NEW HAVEN HARBOR, NEW HAVEN, CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT
FINAL INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

February 2020

Lead Agency

U.S. Army Corps of Engineers - New England District
696 Virginia Road Concord, MA 01742

Cooperating Agencies

Connecticut Department of Energy & Environmental Protection
Connecticut State Historic Preservation Office
National Marine Fisheries Service
Mohegan Tribal Historic Preservation Office
U.S. Coast Guard
U.S. Environmental Protection Agency

Abstract: In accordance with the National Environmental Policy Act (NEPA) and the U.S. Army Corps of Engineers (USACE) regulations for implementing NEPA, the USACE prepared a Final Integrated Feasibility Report and Environmental Impact Statement (Final-IFR/EIS) as part of the New Haven Harbor Navigation Improvement Project Study. The study investigated solutions to facilitate efficient and safe navigation and marine commerce in New Haven Harbor (New Haven, Connecticut) and navigation improvements (i.e., deepening and widening) to the existing Federal navigation project. The proposed project consists of deepening the main ship channel, maneuvering area, and turning basin and widening the main channel and turning basin to allow larger vessels to efficiently access the Port of New Haven's terminals. The proposed improvements would remove about 4.28 million cubic yards of predominately glacially deposited silts from the Federal channel. Additionally, improvements would require the blasting and removal of approximately 43,500 cubic yards of rock from the channel. The USACE identified several feasible alternative dredged material placement sites, including: an area for shellfish habitat creation, two borrow pits in the harbor, an area for salt marsh creation, an area for rock reef creation, and open water disposal at an U.S. Environmental Protection Agency's designated ocean dredged material disposal site. This Final-IFR/EIS describes the existing environment of the project area and assesses the impacts of the proposed project.

Comments concerning the Final-IFR/EIS must be received by March 30, 2020.

Comments on the Final-IFR/EIS should be sent to:
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Final Integrated Feasibility Report and Environmental Impact Statement

New Haven Harbor

Navigation Improvement Project

Connecticut

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ADDENDUM

February 18, 2020

New Haven Harbor Navigation Improvement Project, New Haven Connecticut, Final Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS).

PURPOSE: The purpose of this Addendum is to document the changes to the associated cost and the project economic analysis as presented in the Final IFR/EIS. The Final IFR/EIS presents the economic analysis without including the deferred compliance cost for Cross Sound Cable LLC to relocate their power/ communications cable as required in their Corps Section 10 permit dated March 10, 2002 and amended September 16, 2004. The amended permit was issued because the permittee did not place the cable in "Area 6/7" at the depth required by the original permit. Per the terms of the amended permit, the permittee is required to meet at their own expense an installation depth of at least -48 feet mean lower low water "if and when the Corps deepens the New Haven Harbor Federal Navigation Project". A policy waiver request has been submitted to the Assistance Secretary of the Army Civil Works to exclude the cable relocation costs as associated costs.

UPDATED ASSOCIATED COSTS AND BENEFIT-COST RATIO: The economic analysis with the Cross Sound Cable relocation cost as an associated cost is described below. This change to the associated costs in the economic analysis does not impact the report's recommendation or the Recommended Plan.

Total associated costs for the navigation project with the cable deferred compliance relocation cost included are estimated at $35,058,000 and include approximately $2,410,000 for dredging beneficiary terminal berthing areas and $32,648,000 for relocating the Cross Sound Cable. Based on October 2019 price levels (FY20), a discount rate of 2.75 percent, and a 50-year period of economic analysis, the project annual benefits and annual costs (including associated costs) are estimated at $8,124,000 and $4,162,000, respectively, with resulting net excess benefits of $3,962,000 and a benefit-to-cost ratio (BCR) of 2.0 to 1. See Table 1. Without the Cross Sound Cable associated cost the annual cost is $2,558,000. The net benefits are $5,172,000 and the BCR is 2.8.

TABLE 1 – Benefits and Costs of the Recommended Plan with Cross Sound Cable Associated Cost

New Haven Harbor, Connecticut Recommended Plan (NED/BU Plan) Average Annual Equivalent (AAEQ) Benefits and Costs October 2019 price level, 50-year Period of Analysis, 2.75%	
Project Improvement Investment Cost	
GNF, Project First Cost	$64,868,000
Lands, Easements, ROWs, Relocations (LERR)	$0
New Aids to Navigation	$0
Total Project Improvement Cost	$64,868,000
Interest During Construction	$1,792,000
Associated Costs	
LSF, Berth Deepening Cost	$2,410,000
Cross Sound Cable Deferred Compliance Relocation Cost	$32,648,000
Total Investment Cost	$101,718,000
AAEQ Investment Cost	$3,768,000
Annual Increased Maintenance Dredging	$394,000
AAEQ Cost	$4,162,000
NED AAEQ Cost	$4,162,000
NED AAEQ Benefits	$8,124,000
Net NED AAEQ Benefits	$3,962,000
NED Benefit-Cost Ratio	2.0
Beneficial Use of Dredged Material	
Salt Marsh Increment Project First Cost	$7,443,000
Interest During Construction	$206,000
Total Incremental Investment Cost	$7,649,000
Total Salt Marsh AAEQ Costs (includes annual O&M)	$298,000
Benefit (salt marsh)	58 acres (458 units)
Salt Marsh AAEQ Cost per unit	$650
Salt Marsh AAEQ Cost per acre	$5,100

NEW HAVEN HARBOR
CONNECTICUT

NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

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Executive Summary

The purpose of this Feasibility Study is to determine if improvements to the existing Federal navigation project at New Haven Harbor, Connecticut are warranted and in the Federal interest and if necessary, recommend Federal participation in implementing improvements. Figure ES-1 shows the harbor and the features of the Federal Navigation project. The New Haven Port Authority and Connecticut Port Authority requested the study. Legislative authority for the study of New Haven Harbor, Connecticut, is contained in a resolution by the United States Senate Committee on the Environment and Public Works dated 31 July 2007.

> *"Resolved by the Committee on Environment and Public Works of the United States Senate, that the Secretary of the Army is requested to review the report of the Chief of Engineers on New Haven Harbor, Connecticut, published as House Document 517, 79th Congress, 2nd Session, and other pertinent reports, to determine whether modifications to the recommendations contained therein are advisable in the interest of navigation, sediment control, environmental restoration and preservation, and other related purposes at New Haven Harbor, Connecticut."*

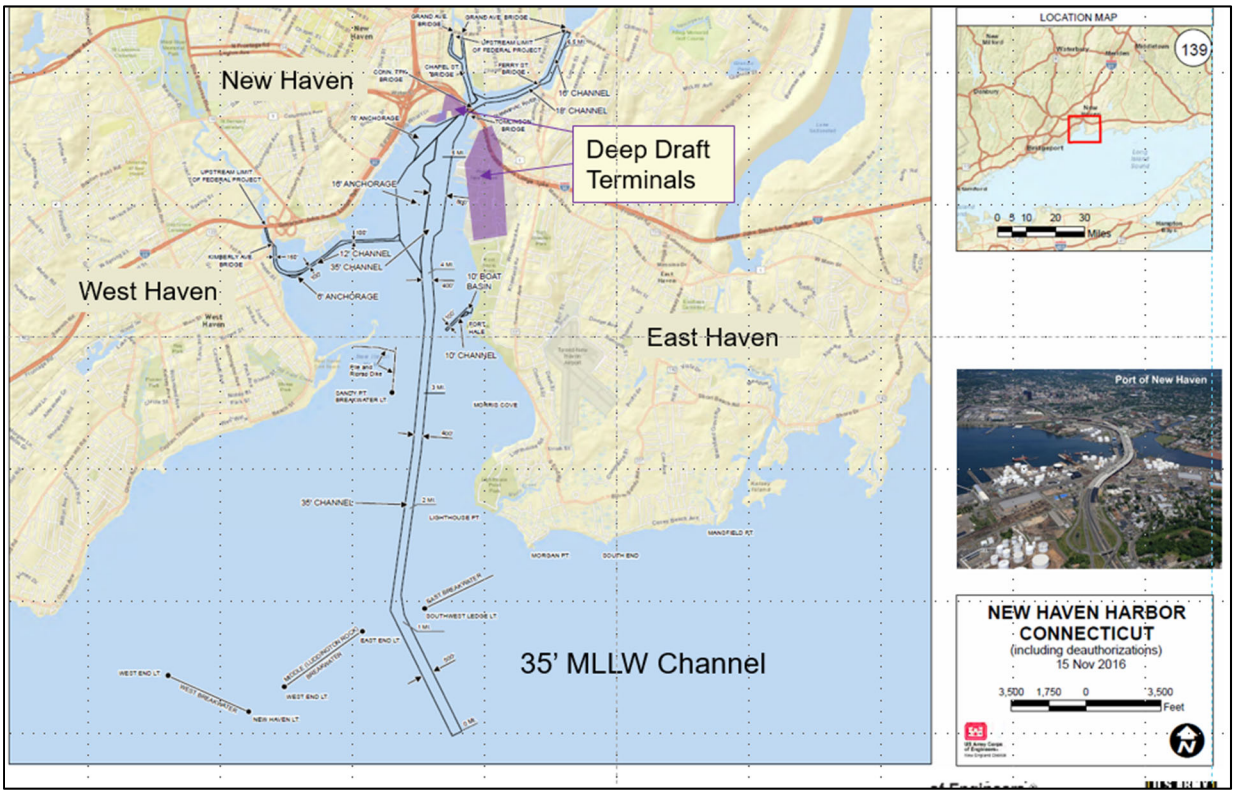

Figure ES-1: New Haven Harbor Federal Navigation Project

DESCRIPTION OF REPORT

This document is an integrated Feasibility Report and Environmental Impact Statement (IFR/EIS). The purpose of the Feasibility Report is to develop alternatives to address navigation problems and opportunities, evaluate those alternatives, and identify the improvement project that reasonably maximizes the national economic development benefits, is technically feasible, and environmentally sustainable. The IFR/EIS complies with NEPA requirements to identify and analyze the environmental effects of the alternatives, incorporate environmental concerns into the decision-making process, and to evaluate any environmental impacts of the recommended plan.

This report provides documentation of the plan formulation process to identify, formulate, evaluate, and screen potential alternatives for channel deepening and other related improvements, along with the environmental, engineering, and cost details of the recommended plan.

The existing authorized Federal Navigation Project for New Haven Harbor includes the deep draft ship channel, turning basin, and maneuvering area authorized at a depth of -35 feet at mean lower low water (MLLW), three shallow draft channels, several anchorages, three breakwaters, and a training dike. While the project area includes multiple navigation features, this assessment focuses on the deep draft ship channel, turning basin, and maneuvering area, as these are the features identified by the Non-Federal Sponsors and harbor users as in need of improvements.

PURPOSE AND NEED

The goal of the proposed Federal action (i.e. the navigation improvement project) is to improve navigation safety and efficiency for existing and prospective commerce. The deep draft ships using the port now and in the future are expected to achieve transportation cost savings (increased economic efficiencies) for the improvements.

Pilots, shippers, and terminal owners have identified navigational challenges in New Haven Harbor, as authorized depths do not meet the draft requirements of today's fleet of dry bulk, break-bulk, and tank ships. Tide restrictions, light loading, and lightering operations necessitated by inadequate channel depth result in economic inefficiencies that translate into costs for the national economy.

In terms of total tonnage shipped and received, the Port of New Haven was the largest port in Connecticut and the second largest port in New England in 2016, ranking only behind the Port of

Boston. In 2016, its total freight traffic of 8.8 million metric tons represented about 24 percent of all waterborne commerce in New England and about 81 percent of all waterborne commerce in Connecticut.

Commodities received at the port include petroleum and petroleum products and various dry bulk and break-bulk commodities. Petroleum products imports have historically constituted the major part of channel tonnage. Salt, sand, and cement imports are the dominant bulk cargoes and virtually all volumes are for immediate local use. Scrap metal is Connecticut's largest single export commodity by weight.

The Port of New Haven serves a hinterland including the greater New Haven region, the state of Connecticut, and much of the American Northeast. The port is a crucial import location for refined petroleum products, which supplies demand within Connecticut and the broader Northeast region. The Northeast maintains a large refinery production/demand deficit and must rely heavily on imported volumes of petroleum products in order to meet demand. The majority of the landside acreage at the Port of New Haven is devoted to energy-related uses. This represents a long-term land use and economic asset for the economy of the State of Connecticut.

RECOMMENDED PLAN

Navigation improvement alternatives evaluated included project depths from -37 to -42 feet MLLW. The placement sites for the dredged material are Federal Base Plan (least cost disposal option). The average annual equivalent cost and benefits for each plan were evaluated and the National Economic Development (NED) plan; i.e. the plan that reasonably maximizes net annual benefits was identified. Net annual benefits of an improvement plan are equal to its annual benefits minus its annual costs. The result of this evaluation identified the 40-foot depth plan as the NED plan. The other navigation improvement alternatives considered also contribute to the national economy but to a lesser extent. The NED plan will deepen the existing Federal main ship channel, turning basin, and maneuvering area from a depth of -35 to -40 feet MLLW with incidental widening of the channel, turning basin, and bend easing.

The NED/Federal Base Plan (NED/Base Plan) i.e. the least costly dredged material placement alternative consistent with sound engineering practices and meeting all Federal environmental requirements. The Base Plan includes local open water beneficial use placement alternatives with the remaining dredged material going to open water placement at the Central Long Island Sound Disposal Site (CLDS). This placement determination was informed by the Long Island Sound Dredged Material Management Plan (USACE 2016).

After determining the NED Plan with the Base Plan for dredged material disposal (NED/Base Plan), the PDT assessed beneficial use opportunities beyond the Base Plan to determine whether there would be appropriate matches of sources and uses of New Haven Harbor material. In this case, it was established that the incremental cost to create a 58 acre salt marsh at Sandy Point in West Haven was reasonable in relation to the environmental benefits to be achieved. The recommended plan includes the additional beneficial use (BU) site (i.e. NED + additional increment of BU) referred to as NED/BU plan.

Following selection of the 40-foot depth plan, a ship simulation study was conducted by the USACE Engineer Research and Development Center, Coastal and Hydraulics Laboratory. This confirmed the proposed incidental channel and turning basin widening for the design vessels and advised additional bend widening to improve maneuverability through the breakwaters at the entrance to the harbor.

The recommended plan includes deepening the channel, maneuvering area, and turning basin from - 35 to -40 feet, MLLW, widening the existing channel by 100 feet (from 500 feet to 600 feet in the entrance outside the breakwaters and from 400 feet to 500 feet inside the harbor), widening the turning basin 200 feet to the north, and widening the channel bend near the East Breakwater from 560 feet to 800 feet. The recommended plan involves dredging about 4.28 million cubic yards (cy) of ordinary improvement material and removing 43,500 cy of rock for a total of 4.32 million cy (see Table ES-1). The material proposed to be dredged from the harbor is composed of mainly silt and clays with some fine sand in the entrance channel. The material has been determined to be suitable for unconfined open water placement (see Suitability Determination Appendix J).

Dredged material removed from the project would be transported by dump scow and placed at several open water sites. Sites included in the Base Plan are:

- Morris Cove Borrow Pit
- Oyster Habitat Creation site at the East Breakwater
- West River Borrow Pit
- Rock placement site north of the West Breakwater (rock reef habitat creation)
- Open Water Placement at Central Long Island Sound Disposal Site[1] (CLDS) with targeted placement to cover historic disposal mounds

[1] CLDS is an open water dredged material disposal site designated by the Environmental Protection Agency under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA)

Table ES-1: Dredged Material Quantity Estimates

New Haven Harbor, Connecticut Recommended Plan, Dredged Material Quantity Estimates			
General Navigation Features (GNF) for the 40-Foot Plan	**Dredging Quantities (CY)**		
	Cut to Design Depth	2-Foot Overdepth	Total CY
Entrance Channel	278,300	240,000	518,300
Bend (Ordinary Material)	475,300	161,300	636,600
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging - Ordinary Material	2,786,600	1,492,100	4,278,700
Bend (Rock) (Required Cut to El -42 Feet)*	24,900	18,600	43,500
All Improvement Material	**2,811,500**	**1,510,700**	**4,322,200**

* An additional two feet of required dredging was estimated in areas of rock (ER 1130-2-520, Nov 1996).

In addition, the recommended plan (NED/BU Plan) includes using some of the dredged material (657,000 cy) that would otherwise go to CLDS in the Base Plan to create a salt marsh at Sandy Point. This involves the added costs of mobilizing a hydraulic dredge plant, creating a containment perimeter at the placement site, and managing placement and development of salt marsh.

For the salt marsh creation site the Non-Federal sponsor will be required to furnish the real estate needed for project construction and long-term access. This includes a temporary work area easement for 2 years (access, staging, mobilization) (0.24+/- acre) and a permanent road easement (2.62+/-acres) and fee ownership of 1.53 +/- acres along the south edge of the salt marsh creation site. This land is owned by the City of West Haven. The Non-Federal sponsor will work with West Haven to obtain the real estate for the salt marsh creation site.

Construction costs for the NED/Base Plan and the NED/BU plan are provided in Table ES-2. Construction costs were developed in the USACE's MCACES/MII cost estimating program and

include all major project components categorized under the appropriate sub-feature level. The construction costs for dredging operations were developed using the Corps of Engineers Dredge Estimating Program (CEDEP) and then transferred into the MCACES/MII estimate. The project cost incorporates contingencies that were determined through performance of a Cost and Schedule Risk Analyses.

Table ES-2: Project First Cost Summary

New Haven Harbor, Connecticut Project First Cost Summary October 2019 price levels		
Cost Account and Feature	NED/Base Plan ($)	Recommended Plan NED/BU Plan ($)
12 Navigation Ports and Harbors	60,969,000	67,728,000
01 Lands and Damages	0	171,000
30 Planning, Engineering and Design	2,773,000	3,277,000
31 Construction Management	1,126,000	1,135,000
Project First Cost	**64,868,000**	**72,311,000**

The estimated project first cost of the NED/Base Plan is $64,868,000. The estimated project first cost of the recommended Plan the NED/BU Plan is $72,311,000. The difference is $7,443,000.

Economics benefits for the project were calculated based on transportation cost savings through increased use of larger vessels, delay reductions, and decreased lightering. Economic benefit calculations were performed at the USACE's Deep Draft Navigation Planning Center of Expertise (DDN-PCX) using the Harbor-Sym model.

The project economic cost includes the project first cost, associated local service facilities cost, and estimated increased annual maintenance dredging cost. Table ES-3 provides the recommended plan (NED/BU plan) average annual equivalent (AAEQ) economic cost and benefit and the incremental cost of the salt marsh and environmental benefits achieved.

AAEQ NED benefits are $8,124,000. The AAEQ cost are $2,558,000. The net benefits are $5,172,000 and the BCR is 2.8.

In addition, the recommended alternative includes beneficial use of dredged material to create salt marsh and provides 58 acres of salt marsh habitat (458 NESMM units) at an AAEQ of $650/unit or an AAEQ of $5,100/acre and significantly decreases the quantity of material going to Central Long Island Sound by 657,000 cy of dredged material. The incremental cost of the beneficial disposal method is reasonable in relation to the environmental benefits achieved.

Table ES-3: Annual Cost and Benefits

New Haven Harbor, Connecticut Recommended Plan (NED/BU Plan) Average Annual Equivalent (AAEQ) Benefits and Costs October 2019 price level, 50-year Period of Analysis, 2.75%	
Project Improvement Investment Cost	
GNF, Project First Cost	$64,868,000
Lands, Easements, ROWs, Relocations (LERR)	$0
New Aids to Navigation	$0
Total Project Improvement Cost	$64,868,000
Interest During Construction	$1,792,000
LSF, Berth Deepening Cost	$2,410,000
Total Investment Cost	$69,070,000
AAEQ Investment Cost	$2,558,000
Annual Increased Maintenance Dredging	$394,000
AAEQ Cost	$2,952,000
NED AAEQ Cost	$2,952,000
NED AAEQ Benefits	$8,124,000
Net NED AAEQ Benefits	$5,172,000
NED Benefit-Cost Ratio	**2.8**
Beneficial Use of Dredged Material	
Salt March Increment Project First Cost	$7,443,000
Interest During Construction	$206,000
Total Incremental Investment Cost	$7,649,000
Salt Marsh AAEQ Cost (includes annual O&M)	$298,000
Benefit (salt marsh)	58 acres (458 units)
Salt Marsh AAEQ Cost per unit	$650
Salt Marsh AAEQ Cost per acre	$5,100

The cost for navigation improvement will be shared at a rate of 75 percent Federal government and 25 percent by the Non-Federal sponsor. Once construction is completed, the Non-Federal sponsor would be required to contribute an additional 10 percent of design and construction costs, over a period not to exceed 30 years. The Federal government would be responsible for 100 percent of future navigation project maintenance, exclusive of any new dredged material disposal facilities which would be cost-shared as new construction. For the beneficial use aquatic ecosystem increment that exceeds the Base Plan, the cost will be shared at a rate of 65 percent Federal government and 35 percent Non-Federal sponsor. The terminal owners would be responsible for the full cost of berth deepening commensurate with the improved project depth.

The recommended plan estimated Federal and Non-Federal project cost share at October 2019 price level is shown in Table ES-4.

The recommended plan is supported by the Non-Federal sponsor for the project, the Connecticut Port Authority. The sponsor is capable and willing to pay the required cost-sharing for both the navigation and beneficial use features within the Base Plan and for the beneficial use features beyond the Base Plan (salt marsh). The sponsor understands and is willing to meet the other non-Federal requirements for project implementation.

The possible environmental consequences of the recommended plan are considered in terms of probable environmental, social, and economic factors. Coordination with Federal and State resource protection agencies including USFWS, NMFS, US EPA, CT DEEP, CT SHPO, THPO, and NYDOS was completed during the study in compliance with all applicable regulations. Avoidance and minimization measures were incorporated in development of the project. There would be no significant impacts anticipated to benthic or fish and wildlife resources, or water quality. All impacts are anticipated to be temporary and minor in nature. No cultural resources impacts are anticipated during project implementation.

The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Connecticut, the Non-Federal sponsor (the Connecticut Port Authority), New Haven Port Authority, interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

Table ES-4: Federal and Non-Federal Costs

New Haven Harbor, Connecticut Recommended Plan (NED/BU Plan) Federal and Non-Federal Sponsor Cost Share October 2019 Price Level			
Item	**Federal Share**	**Non-Federal Sponsor Share**	**Total Cost (rounded)**
General Navigation Feature (GNF)	75%	25%	
Construction	$45,727,000	$15,242,000	$60,969,000
PED	$2,080,000	$693,000	$2,773,000
Construction Management	$845,000	$282,000	$1,126,000
LERR	$0	$0	$0
Project First Costs - GNF	**$48,651,000**	**$16,217,000**	**$64,868,000**
Beneficial Use (BU) Incremental Cost (Salt Marsh Creation)	65%	35%	
Construction	$4,393,000	$2,366,000	$6,759,000
PED	$328,000	$176,000	$504,000
Construction Management	$6,000	$3,000	$9,000
LERR	$111,000	$60,000	$171,000
Beneficial Use, Incremental Cost	**$4,838,000**	**$2,605,000**	**$7,443,000**
Total Project First Costs - GNF & BU	**$53,489,000**	**$18,822,000**	**$72,311,000**
Other Items			
Aids to Navigation 100% Federal: US Coast Guard	$0	$0	$0
NFS, Additional 10% Contrib. for GNF	-6,486,800	$6,486,800	
Total Cost Apportionment	**47,002,200**	**25,308,800**	**$72,311,000**
Local Service Faculties			
Local Service Facilities: Berthing Areas 100% Non-Federal	$0	$2,410,000	$2,410,000

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O Monitoring and Adaptive Management Plan for the Sandy Point Salt Marsh

P Salt Marsh Habitat Model

SUPPLEMENTAL TECHNICAL DOCUMENTS (on CD)

#1 AECOM Sediment Evaluation

#2 Data Report Hydro-acoustic and Underwater Video Survey

#3 AECOM Supplemental Sediment Evaluation

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LIST OF ACRONYMS AND ABBREVIATIONS

DCP	acoustic doppler current profiler
AEP	annual exceedance probability
ASA(CW)	Assistant Secretary of the Army for Civil Works
AVS	acid-volatile sulfide
BCR	benefit to cost ratio
BEST	Bioaccumulation Evaluation Screening Tool
BMP	best management practice
BP	Before Present
BU	beneficial use
CAA	Federal Clean Air Act
CAAA	Federal Clean Air Act Amendments
CAD	confined aquatic disposal
CBG	census block group
CBRA	Coastal Barrier Resources Act
CDF	contained disposal facility
CEDEP	Corps of Engineers Dredge Estimating Program
CEEA	completeness, effectiveness, efficiency, and acceptability criteria
CEICA	cost effective incremental cost analysis
CEQ	Council on Environmental Quality
CGS	Connecticut General Statutes
CHL	Coastal Hydraulic Laboratory
CLDS	Central Long Island Sound Disposal Site
cm	centimeter
CO	carbon monoxide
CPA	Connecticut Port Authority
CSO	combined sewer overflow
CSC LLC	Cross Sound Cable Company, Limited Liability Corporation
CT BOA	Connecticut Bureau of Agriculture
CT DOT	Connecticut Department of Transportation
CT DEEP	Connecticut Department of Energy and Environmental Protection
CT DPH	Connecticut Department of Public Health
CT SHPO	Connecticut State Historic Preservation Office
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act
DAMOS	Disposal Area Monitoring System

dB	decibel
dBA	A-weighted decibel
dCO2	dissolved carbon dioxide
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenylchloroethylene
DDN-PCX	Deep Draft Navigation Planning Center of Expertise
DDT	dichlorodiphenyltrichloroethane
DIN	dissolved inorganic nitrogen
DIP	dissolved inorganic phosphorus
DMMP	Dredged Material Management Plan
DO	dissolved oxygen
DPS	distinct population segment
dw	dry weight
DWT	deadweight tons
EFH	essential fish habitat
EJ	environmental justice
EM	Engineer Manual
EO	Executive Order
EOP	USACE Environmental Operating Principles
EPA	U.S. Environmental Protection Agency
ER	Engineer Regulation
ERDC	Engineer Research and Development Center
ERL	Effects Range-Low
ERM	Effects Range-Median
ESA	Endangered Species Act
EQ	Environmental Quality
FCSA	Feasibility Cost Sharing Agreement
FDA	U.S. Food and Drug Administration
FHWA	Federal Highway Administration
FNP	Federal Navigation Project
FVP	Field Verification Program
FY	fiscal year
g	gram
g/m2/yr	grams per square meter per year
GC	General Conformity
GNF	General Navigation Feature
H2S	hydrogen sulfide
HAB	harmful algal bloom
HAP	hazardous air pollutant

HARS	Historic Area Remediation Site
HEPA	high-efficiency particulate air
Hz	Hertz
IDC	interest during construction
IFR/EIS	Integrated Feasibility Report and Environmental Impact Statement
KHz	Kilohertz
L10	noise level exceeded for 10% of a period of time
LIS	Long Island Sound
LOA	length overall
Leq	equivalent continuous sound level
Ldn	day-night average sound level
lb	pound
LC	lethal concentration
LPC	limiting permissible concentration
LEER	Lands, easement, right of way, and relocations
LSF	local service facility
m	meter
MCDA	Multi-Criteria Decision Analysis
MCACES/MII	Micro Computer Aided Cost Estimating System Version II
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
mi	mile
MLLW	mean lower low water
MLW	mean low water
MMPA	Marine Mammal Protection Act
MPA	marine protected area
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSA	Magnuson-Stevens Act
NAAQS	National Ambient Air Quality Standards
NAD	North Atlantic Division (USACE)
NAE	New England District (USACE)
NBSP	National Benthic Surveillance Program
NCA	National Coastal Assessment
NDC	Navigation Data Center
NED	National Economic Development
NEPA	National Environmental Policy Act
NERDT	New England Regional Dredging Team
NESMM	Assessment of Wildlife Habitat Value of New England Salt Marsh model

ng/g	nanograms/gm
NHPA	New Haven Port Authority
NLDS	New London Disposal Site
NMFS	National Marine Fisheries Service
nmi	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NOx	oxides of nitrogen
NR/SR	National Register/State Register
NWR	national wildlife refuge
OBS	optical backscatter
OD	over depth
ODMDS	offshore dredged material disposal sites
OLISP	Office of Long Island Sound Programs
OPA	otherwise protected area
OSE	Other Social Effects
P&G	Principles and Guidelines
Pa	pascal
PAHs	polycyclic aromatic hydrocarbons
PAL	Public Archaeology Laboratory
PBDEs	polybrominated diphenyl ethers
PCBs	polychlorinated biphenyls
PDT	project delivery team
PED	pre-construction, engineering and design
PEG	polyethylene glycol
PM	particulate matter
PM2.5	particulate matter less than 2.5 microns in diameter
PM10	particulate matter less than 10 microns in diameter
PMP	Project Management Plan
PON	particulate organic nitrogen
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
psi	pounds per square inch
QC	Quality Control
RAT	Regional Air Team
RCRA	Resource Conservation and Recovery Act
RED	Regional Economic Development
REMOTS	Remote Ecological Monitoring of the Seafloor
RPD	redox potential discontinuity

RSLC	relative sea level change
SAP	sampling and analysis plan
SAV	submerged aquatic vegetation
SF	square feet
SHPO	State Historic Preservation Office
SIP	state implementation plan
SMMP	Site Management and Monitoring Plan
SO2	sulfur dioxide
SPI	sediment profile imagery
SQG	sediment quality guideline
SQT	Sediment Quality Triad
SQUID	Sediment Quality Information Database
STFATE	Short-Term Fate numerical model
SVOC	semi-volatile organic compound
THPO	Tribal Historic Preservation Office
TMDL	Total Maximum Daily Load
TN	total nitrogen
TOC	total organic carbon
TP	total phosphorus
TPH	total petroleum hydrocarbon
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
VTR	vessel trip report
WLDS	Western Long Island Sound Disposal Site
WQC	water quality certification
WRDA	Water Resources Development Act
ww	wet weight
WPCF	waste-water pollution control facility
YOY	young of year
yd	yard
yr	year

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1.0 STUDY INFORMATION

1.1 Introduction

This New Haven Harbor, Connecticut, Navigation Improvement Project, Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) documents the United States Army Corps of Engineers (USACE) study planning and decision process for recommended channel improvements at New Haven Harbor and documents compliance with the National Environmental Policy Act (NEPA) in the planning process.

New Haven is Connecticut's largest seaport and is located on the northern shore of Long Island Sound (LIS) on the central Connecticut coast. The existing Federal navigation project (FNP) was adopted by the Act of 1852 and modified by the Acts of 1870, 1871, 1873, 1875, 1878, 1879, 1882, 1890, 1899, 1902, 1905, 1907, 1910, 1912, 1913, 1930, 1935, 1945, 1946, 1949, 1955, and 1986. The existing project, as completed in 1950, consists of (1) a 35-foot main channel, 400 to 500 feet wide, widened to 800 feet along the wharves to form a maneuvering basin, (2) a 16-foot anchorage in the upper harbor west of the main channel, (3) a pile and stone dike extending easterly from Sandy Point, (4) 18 and 16-foot channels in the Quinnipiac River, (5) a 12-foot channel in the Mill River, and (6) a 12-foot channel and 6-foot anchorage in the West River. The Mill and Quinnipiac River project segments were last maintained in 1982 and the West River in 1989. The project also includes three offshore stone breakwaters totaling about 12,100 feet long providing a refuge in the outer harbor. The list of project authorizations and construction history is included in Appendix B.

The focus of this study is the main ship channel, maneuvering area, and turning basin as these are the places requiring improvements to efficiently accommodate today's larger deep-draft ships. These areas were last dredged in 2014 to remove shoals and restore the project to the authorized depth. This type of routine maintenance occurs about every 10 years at 100 percent Federal government expense. Routine maintenance and implementation of required improvements by the Federal government and its partners ensure the harbor waterway network is available and capable of providing important marine transportation services to the nation.

1.2 Congressional Districts

The New Haven Harbor FNP is in the 3rd Congressional District represented by Senators Blumenthal (CT) and Murphy (CT); and Representative DeLauro (CT).

1.3 Study Authority

Legislative authority for the study of the New Haven Harbor, Connecticut, is provided by the United States Senate Committee on the Environment and Public Works Resolution of 31 July 2007.

> *"Resolved by the Committee on Environment and Public Works of the United States Senate, that the Secretary of the Army is requested to review the report of the Chief of Engineers on New Haven Harbor, Connecticut, published as House Document 517, 79th Congress, 2nd Session, and other pertinent reports, to determine whether modifications to the recommendations contained therein are advisable in the interest of navigation, sediment control, environmental restoration and preservation, and other related purposes at New Haven Harbor, Connecticut."*

1.4 Non-Federal Sponsorship

The New Haven Port Authority (NHPA) is the study's Non-Federal sponsor in partnership with the Connecticut Port Authority (CPA) for the Feasibility Study. The NHPA and USACE executed a feasibility cost sharing agreement (FCSA) on December 4, 2015 for the study.

The Connecticut Port Authority is the Non-Federal sponsor for the recommended project.

NHPA is a public authority created by the City of New Haven, Board of Alderman in 2003 in accordance with the General Statutes of the State of Connecticut CGS Sec. 7-329a. The purpose of the NHPA is to stimulate the shipment of freight and commerce through New Haven's port, to develop and promote the facilities within the port district and thereby to create jobs and increase the tax base of the city, to work with the city in maximizing the usefulness of available public funding by consolidating and coordinating efforts to assist the waterfront of the city and to cooperate with the state and federal agencies in connection with the maintenance, development, improvement, and use of the facilities within the port district.

The Connecticut Port Authority is a quasi-public authority created by Connecticut Public Act 14-222 and began operation in October 2015. CPA is responsible to coordinate port development with a focus on private and public investments, pursue federal and state funds for dredging and other infrastructure improvements to increase cargo movement through Connecticut ports, operate and manage state port facilities, market the advantages of such ports to the domestic and international shipping industry, coordinate the planning and funding of capital projects promoting the development of the state's ports, and develop strategic entrepreneurial initiatives that may be available to the state.

1.5 Cooperating Agencies

The lead Federal agency is USACE. Cooperating agencies for this project are the National Marine Fisheries Service (NMFS), Environmental Protection Agency Region 1 (EPA), US Coast Guard (USCG), CT Department of Energy & Environmental Protection (CT DEEP), CT State Historic Preservation Office (SHPO), and the Mohegan Tribal Historic Preservation Office.

1.6 Purpose and Need for Improvement Project

The goal of the proposed Federal action (i.e. the navigation improvement project) is to improve navigation into and out of the port for the deep draft ships using the port now and in the future and to achieve transportation cost savings (increased economic efficiencies).

Navigational challenges have been identified in New Haven Harbor by pilots, shippers and terminal owners, as authorized depths do not meet the draft requirements of today's fleet of bulk and tanker ships. Tide restrictions, light loading, and other operational inefficiencies created by inadequate channel depth result in economic inefficiencies that translate into costs for the national economy.

The main ship channel and turning basin have inadequate channel depths. To reach the terminals, large ships must lighter outside the breakwaters, or be light-loaded at their port of origin, and/or experience delays while waiting for favorable tide conditions, or some combination of all three. The economic analysis is anticipated to demonstrate National Economic Development (NED) benefits; e.g. reduced navigation cost with an improvement project.

Improvements to the Quinnipiac River Channel, Mill River Channel, West River Channel, the refuge breakwaters, and the project's shallower draft anchorage areas are not included in the improvement study. For the Quinnipiac and Mill River Channels current authorized depths are reported by users to be adequate for existing and future barge and recreation marine traffic that utilize the waterways. The West River project features are separately being considered for maintenance dredging in the near term.

1.7 Feasibility Study and EIS Purpose

This integrated document serves as the USACE decision document supporting the recommended navigation improvement project and as the EIS to meet NEPA requirements for the proposed action. The analysis conducted during the Feasibility Study determines if improvements to the constructed Federal navigation project at New Haven Harbor, Connecticut are warranted and necessary and if necessary, recommend improvements.

The NEPA Council on Environmental Quality (CEQ) Regulation, Section 1502.13, provides the fundamental legal guidance on Purpose and Need statements for an EIS. The Purpose and Need statement, "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." This step in the NEPA process mirrors a similar step in the USACE 6-step planning process, development of problems and opportunities statements. Once the problems and opportunities are identified, the next step is to define the study planning objectives and the constraints that will guide efforts to solve these problems and achieve these opportunities. In developing a feasibility report with integrated NEPA components, the problems and opportunities are used synonymously with "need" and objectives and constraints are used synonymously with "purpose".

1.8 Harbor Location and Study Area

New Haven Harbor, Connecticut, is centrally located on the north shore of Long Island Sound, about mid-way between the cities of New York and Providence, Rhode Island. See Figure 1-1.

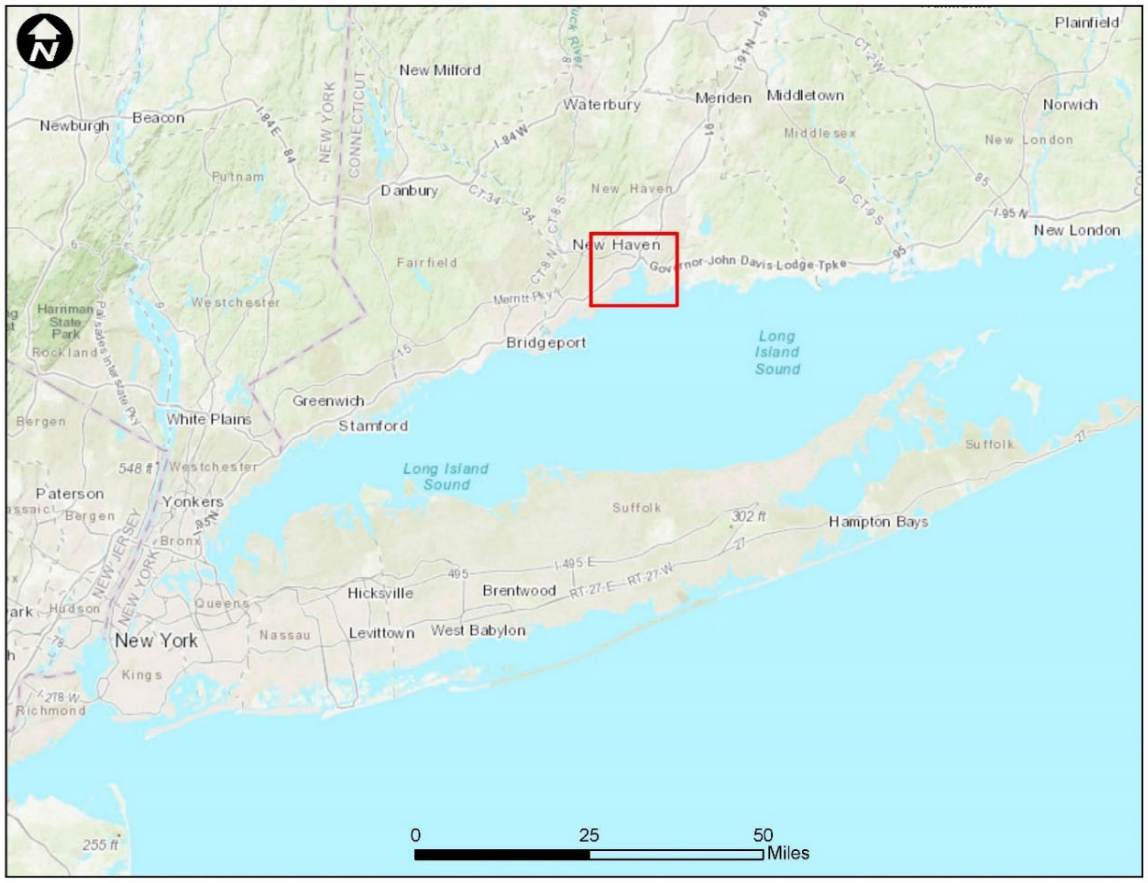


Figure 1-1: Location of New Haven Harbor, CT

The study area includes New Haven Harbor, Long Island Sound, and the Port's service areas. The Port of New Haven serves a hinterland including the greater New Haven region, the state of Connecticut, and much of the American Northeast. The port is a crucial import location for refined petroleum products, which supplies demand within Connecticut and the broader Northeast region. The Northeast maintains a large refinery production/demand deficit and must rely heavily on imported volumes of petroleum products in order to meet demand. The majority of the landside acreage at the Port of New Haven is devoted to energy-related uses. This represents a long-term land use and economic asset for the economy of the State of Connecticut.

In terms of total tonnage shipped and received, the Port of New Haven was the largest port in Connecticut and the second largest port in New England in 2016, ranking only behind the Port of Boston. In 2016, its total freight traffic of 8.8 million tons represented about 24 percent of all waterborne commerce in New England and about 81 percent of all waterborne commerce in Connecticut.

Commodities received at the port include petroleum and petroleum products and various dry bulk and break-bulk commodities. Petroleum products imports have historically constituted approximately 80 percent of the channel tonnage. Salt, sand, and cement imports are the dominant bulk cargoes and virtually all volumes are for immediate local use. Scrap metal is Connecticut's largest single export commodity by weight. Figure 1-2 that provides a view of a portion of the terminals.

Figure 1-2: View of Terminals

1.9 Existing Federal Navigation Project

Figure 1-3 shows the Federal navigation project. The list below describes authorized and constructed dimensions of the project. The main ship channel extends from deep water in Long Island Sound through the harbor breakwaters to the head of New Haven Harbor. Throughout the history of the project, numerous improvements were made to the project to keep pace with changes in the commercial shipping industry. See Appendix B. The last improvement to the deep draft commercial shipping channel, providing the current 35-foot depth, was completed in 1950. After approximately 70 years, improvements are again needed to meet existing use.

The entrance channel width in Long Island Sound is 500 feet and widens to 560 feet at the bend between the breakwaters. The channel width is 400 feet from the bend north past Fort Hale and Sandy Point, where it widens again to 500 feet. In the vicinity of the Port terminal facilities the channel widens to provide an 800-foot wide maneuvering area. The project also includes a 35-foot deep, trapezoidal-shaped turning basin west of the main channel across from New Haven Terminal.

<u>Navigation Features of the Existing Federal Navigation Project</u>

- A main ship channel, -35 feet MLLW, extending about 5 miles from deep water in Long Island Sound to the head of the harbor at the mouth of the Quinnipiac River, varying in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widened to 800 feet along the upper harbor terminals to provide a maneuvering area;
- A turning basin in the upper harbor west of the channel also at -35 feet MLLW;
- Two anchorages west of the main channel, at -15 and -16 feet MLLW;
- The Quinnipiac River Channel, at -18 feet MLLW (lower channel) and -16 feet MLLW (upper channel), and generally 200 feet wide;
- The Mill River Channel, at -12 feet MLLW, 200 feet wide, including two branches (east branch at 100 feet wide, and west branch at 125 feet wide);
- The West River channel authorized at -12-feet MLLW, 100 to 150 feet wide, with a -6 foot MLLW anchorage;
- A pile and stone T-dike at Stony Point west of the main channel, 4,200 feet long; and
- Three offshore stone breakwaters, totaling 12,100 feet in length providing a refuge in the outer harbor.

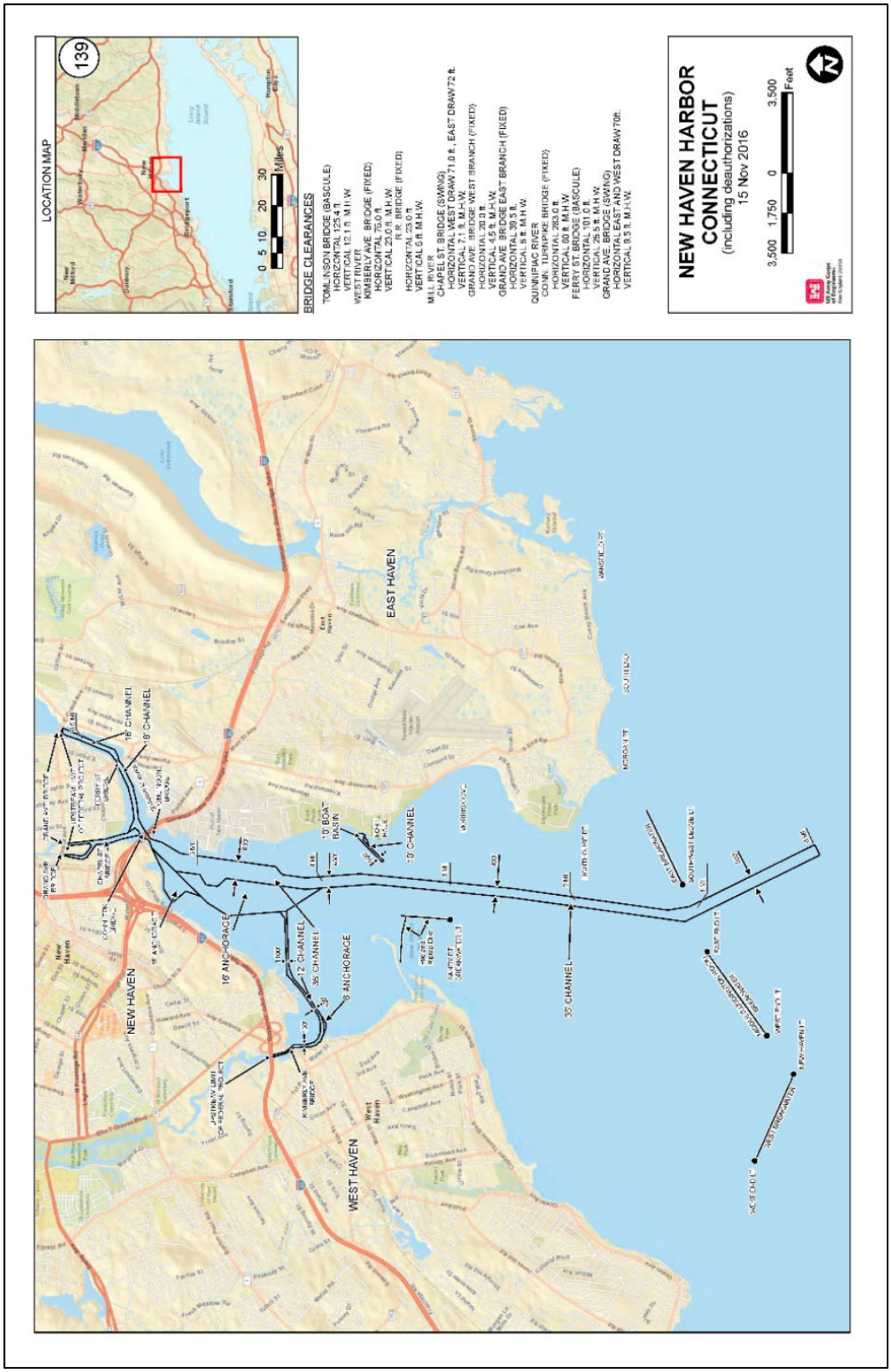


Figure 1-3: Existing Federal Navigation Channel

1.10 Prior Reports and Studies

The following are relevant prior reports completed for the New Haven Harbor.

- Long Island Sound Dredged Material Management Plan (DMMP) and Final Programmatic Environmental Impact Statement, January 2016.
- Navigation Improvement Project New Haven Harbor, Connecticut, Preconstruction Engineering and Design Efforts, U.S. Army Corps of Engineers, New England District, August 1988.
- Technical Report Hl-88-24, New Haven Harbor Numerical Model Study, by David R. Richards, Hydraulics Laboratory, U.S. Army Corps of Engineers, Waterways Experiment Station, Final Report September 1988.
- Navigation Improvement Project, New Haven Harbor, Connecticut, Interim Report, Assessing the Potential Impacts the Navigation Improvement Project on the Oyster Resource in New Haven Harbor, U.S. Army Corps of Engineers, New England District November 1987.
- Supplement Report to April 1981 Feasibility Report Including the Addendum to the Final Environmental Impact Statement, U.S. Army Corps of Engineers, New England District 15 October 1981, with accompanying Chief's report 26 July 1982.
- New Haven Harbor Feasibility Report including Final Environmental Impact Statement, U.S. Army Corps of Engineers, New England District April 1981.

The 1981 Feasibility Report and Environmental Impact Statement recommended a plan that included deepening (to -40 feet MLLW) and widening the main channel and turning basin. The 1981 plan estimated removal and disposal of about 4.4 million cubic yards of soft dredged material and about 27,200 cubic yards of rock. WRDA 1986 authorized the improvements recommended in the 1981 report. However, this improvement was never constructed and the 1986 authorization expired 16 April 2002 (Federal Register Vol. 68, 26 June 2003).

1.11 Federal Policy & Procedures

The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. In support of the Federal objective, it is within both the National and USACE interest to participate in studies to improve commercial navigation.

The "Federal Interest" decision in USACE planning is generally limited to instances where benefits of a potential project are expected to exceed the costs to the nation and the project is

consistent with protecting the nation's environment. Because this is a single purpose navigation project, National Economic Development (NED) benefits are evaluated in terms of reduced navigation costs.

Identification of project-specific planning criteria used in USACE project planning is guided by the Principles and Guidelines (P&G) of 1983, the Planning Guidance Notebook, ER 1105-2-100 (22 April 2000), and NEPA of 1969, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and Procedures for Implementing NEPA, ER 200-2-2 (4 March 1988).

USACE project planning follows the six-step process first described in the P&G and further elaborated in the Planning Guidance Notebook, ER 1105-2-100 (April 2000). Although presented in series, these steps are applied in an iterative process. Steps in the P&G plan formulation process include:

1. Specification of water and related land resources problems and opportunities (relevant to the planning setting) associated with the federal objective and specific state and local concerns;
2. Inventory, forecast, and analysis of water and related land resource conditions within the planning area relevant to the identified problems and opportunities;
3. Formulation of alternative plans;
4. Evaluation of the effects of the alternative plans;
5. Comparison of alternative plans; and
6. Selection of a recommended plan.

The planning practice has continued to evolve since the 1983 P&G, an evolution that now includes its confluence with risk analysis. The challenge in a world of limited time and budget is to efficiently reduce uncertainty by gathering only the instrumental evidence needed to make the next planning decision and to manage the risks that result from doing so without more complete information (USACE, 2017). This study utilizes the model of risk identification, analysis and management throughout the planning decision making process.

1.12 Report Organization

As noted above, this report serves as the USACE decision document supporting the recommended navigation improvements and as the EIS to meet NEPA requirements for the proposed action. The document is formatted to facilitate review and processing by the Assistant Secretary of the Army for Civil Works to provide a report with recommendations to Congress. The remainder of the report is organized as follows.

Section 2: Project Setting: General, Existing Economics (Waterborne Commerce), Physical
Section 3: Existing Conditions/Affected Environment
Section 4: Plan Formulation
Section 5: Alternatives: Navigation Improvement Alternatives, Dredged Material Placement
Section 6: Recommended Plan
Section 7: Environmental Consequences of the Alternatives
Section 8: Environmental Compliance
Section 9: Public Review and Agency Coordination
Section 10: List of Preparers
Section 11: Recommendations
Section 12: References
Attachment: Clean Water Act Section 404(b)(1) Evaluation
Appendices

2.0 PROJECT SETTING

2.1 General Setting

New Haven Harbor is located on the northern side of Long Island Sound, about 68 nautical miles northeast of New York City, and 179 nautical miles southeast of Boston, Massachusetts via the Cape Cod Canal. Three detached breakwaters[1] protect the entrance of New Haven Harbor from Long Island Sound. The deep-water entrance of the main ship channel to the harbor lies between the Luddington Rock (Middle) Breakwater and the East Breakwater, and the ship channel extends from deep water in Long Island Sound to the head of the harbor about 6 miles in length. New Haven Harbor's open water area varies from about 4 miles in width near the breakwaters to 0.5 mile at the north end of the Harbor.

Figure 2-1: View of Lighthouse on East Breakwater

The commercial port area of New Haven includes the inner portion of New Haven Harbor extending from Sandy Point on the west side and Fort Hale on the east to the head of the harbor,

[1] The three detached armor stone breakwaters are at the southern entrance to New Haven Harbor. These structures were authorized by the River and Harbor Acts of 3 March 1879 and 19 September 1890. Construction of the East Breakwater was started in 1880 and was completed to a length of 3,450 feet in 1890. The Middle or Luddington Rock Breakwater was started in 1891 and was completed to a length of 4,500 feet in 1896. Construction of the West Breakwater began in 1896 and was completed to a length of 4,200 feet in 1915. These structures provide a harbor of refuge at the mouth of the harbor and afford protection to the harbor from all but southwestern storms. The breakwaters also afford the northern shore of the City of West Haven protection from southern and southeastern storms, thereby reducing storm damage to this area.

and the navigable portions of the Mill, Quinnipiac and West Rivers. The Mill and Quinnipiac Rivers empty into the head of the harbor through a common mouth, and the West River enters the west side of the harbor about one mile below its head. See Figure 2-2 that provides a view of the harbor from Sandy Point looking to the north.

The primary tributary area served by the harbor is the south central Connecticut region, encompassing 767 square miles and includes 46 cities and towns. The largest city is New Haven. The most significant natural resources in south central Connecticut are the harbor itself, the coastal terrain, the Quinnipiac, West, and Mill Rivers that flow into New Haven Harbor, and Long Island Sound. The irregular coastline provides many fine beaches and sheltered covers for a variety of waterside recreation.

Figure 2-2: View of New Haven Harbor Looking Northerly from Sandy Point

2.2 Economic Conditions (Waterborne Commerce)

The Port of New Haven serves a hinterland including the greater New Haven region, the state of Connecticut, and much of the American Northeast. The port is a crucial import location for refined petroleum products, which supplies demand within Connecticut and the broader

Northeast region. The Northeast maintains a large refinery production/demand deficit and must rely heavily on imported volumes of petroleum products in order to meet demand. The majority of the landside acreage at the Port of New Haven is devoted to energy-related uses. This represents a long-term land use and economic asset for the economy of the State of Connecticut.

2.2.1 Port Facilities and Commodities

New Haven Harbor port facilities include seven privately owned terminals (see Figure 2-3a, 2-3b, and Table 2-1). New Haven terminals have connections to interstate highways 95 and 91, rail and pipelines. Rail service is provided by the Genesee & Wyoming (formerly Providence & Worcester), and the Buckeye Pipeline connects to Bradley International Airport in Connecticut and the Westover Air Reserve Base in Massachusetts.

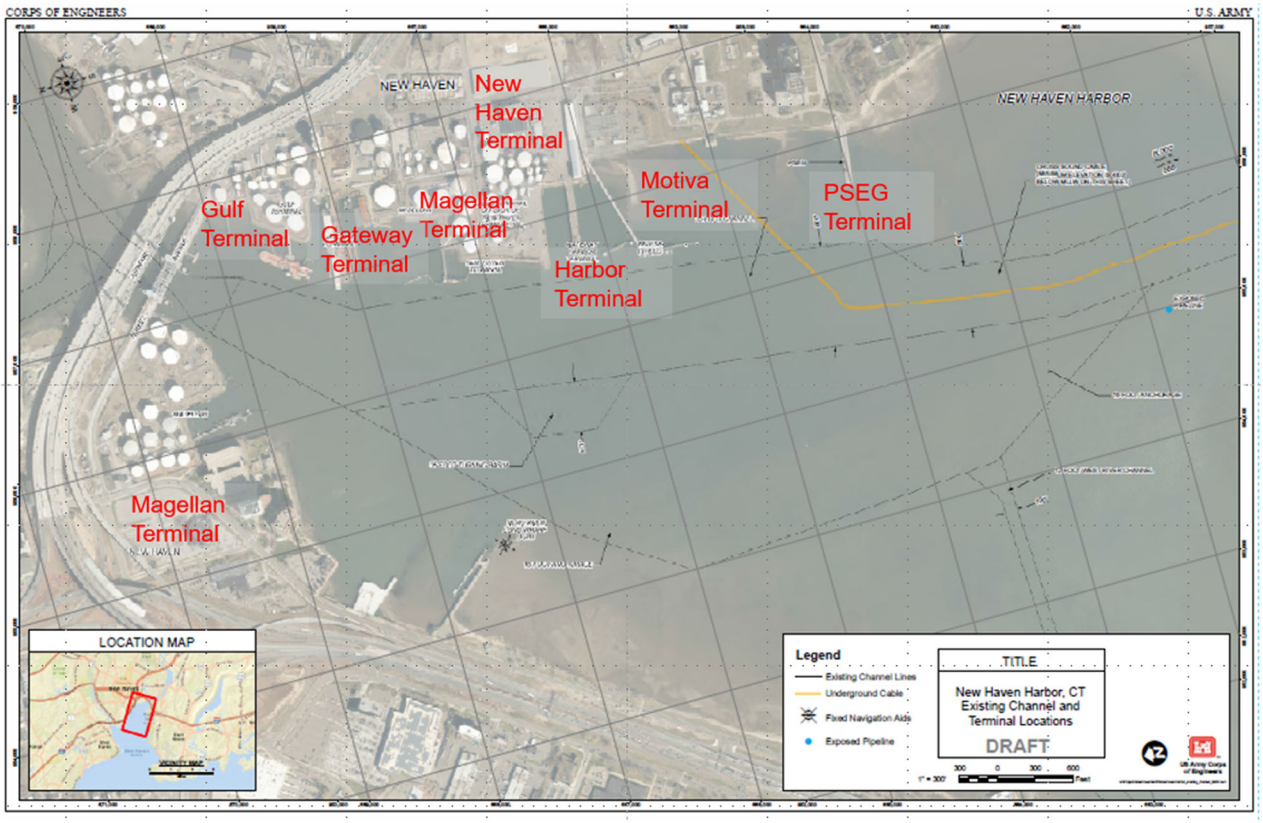


Figure 2-3a: Port Terminals Location

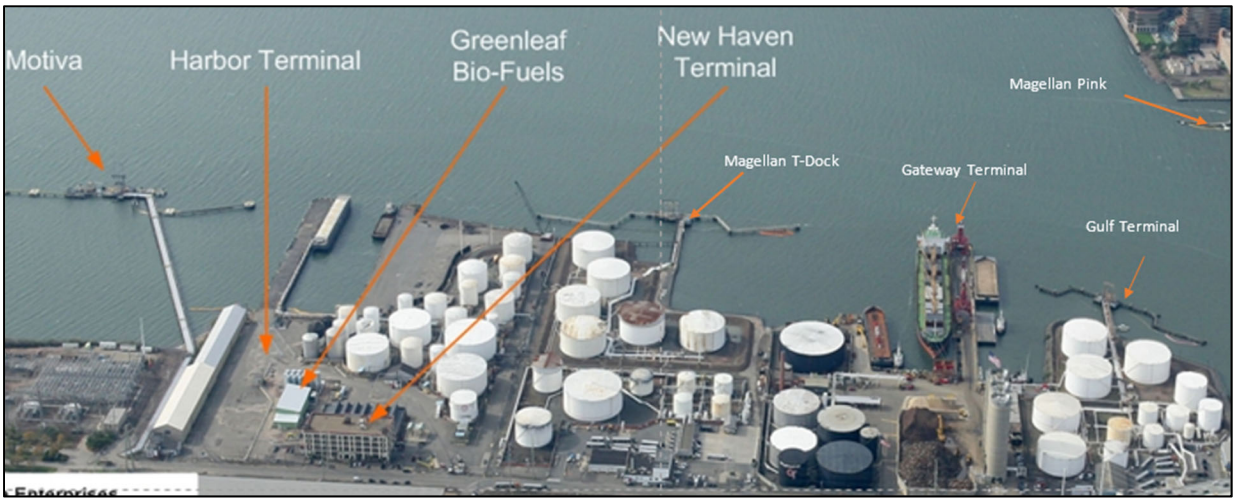


Figure 2-3b: Aerial View of Port Terminals

The Gulf Oil Terminal receives petroleum products by tankers and barges. Gulf Oil supplies gasoline, heating oil, diesel fuel, jet fuel and kerosene through its terminal network. The terminal operates one berth for tankers.

Gateway Terminal, the most active terminal in the port, is located on the eastern shore of New Haven Harbor. The terminal receives bulk products, such as salt and dry cargo including aggregates, coal, steel billets, steel rail, rebar, scrap metal, and pumice. Gateway Terminal then delivers these commodities to customers in the Northeast, Midwest, and Eastern Canada by truck, rail or barge. Two berths, the north and south berths, are located at Gateway Terminal's main concrete finger pier.

Figure 2-3c: Gateway Terminal Cranes

Gateway Terminal has two high-speed FMC link-belt gantry cranes with a duty cycle capability of 50-ton lifts and a reach of 120 feet to load/discharge a variety of dry cargoes.
The Magellan terminal located on Waterfront Street receives and ships petroleum products by barge and tanker. The T-dock has two berths for tankers.

Magellan has two terminals (Waterfront Street and East Street) that receives petroleum products by barge and tanker and ships petroleum products by barge. The tanks are connected to Westover Air Reserve Base, in Massachusetts by pipeline.

The New Haven Terminal (and Harbor Terminal Wharf leased by Gateway) handles general cargoes and liquid petroleum products. There is also a bio-diesel manufacturing facility on site at this terminal. The Harbor Terminal finger pier extends westward into New Haven Harbor with two berths. The facility also has a marginal wharf used for dry cargo. This wharf is directly next to a paved lay down/storage area capable of holding all or part of a ship's cargo.

Motiva (Shell) Terminal, located on the west side of New Haven Harbor, handles commodities such as gasoline, diesel fuel, jet fuel, and ethanol. Products received via marine vessel are distributed by truck, vessel, and pipeline. The terminal has two berths one for liquid tankers and the other for barges.

PSEG Power Connecticut built an electric generating peaking facility at its New Haven Harbor Station. The new peaking units began commercial operation in 2012. The terminal receives fuel deliveries by barges.

Table 2-1: Terminals and Commodities

Terminal	Commodities	Vessels
Gulf Oil	Petroleum Products, Chemicals and Related Products	Barges, Tankers
Gateway Terminal	Petroleum Products, Cement, Steel Products, Salt, Sand, Stone, Scrap Metal, General Cargo	Barges, Bulk Carriers, General Cargo, Tankers
Magellan Terminals - Waterfront Street (T-Dock) And East Street (Pink Tanks)	Petroleum Products, Chemicals and Related Products	Barges, Tankers
New Haven Terminal (and Harbor Terminal)	Petroleum Products, Steel Products, Sand, Scrap Metal, General Cargo, Lumber, Waste Paper	Barges, Bulk Carriers, General Cargo, Tankers
Motiva Enterprises	Petroleum Products, Chemicals and Related Products	Barges, Tankers
PSEG Power	Petroleum Products	Barges

2.2.2 Commodities and Trends

In terms of total tonnage shipped and received, the Port of New Haven was the largest port in Connecticut and was the 2nd largest port in New England in 2016, ranking only behind the Port of Boston. In 2016, its total freight traffic of 8.8 million tons represented about 24 percent of all waterborne commerce in New England and about 81 percent of all waterborne commerce in Connecticut. Figure 2-4 shows the distribution of tonnage by commodity for New Haven in 2016. New Haven's terminals also provide dry bulk and break-bulk services. Salt, sand, and cement imports are the dominant bulk cargoes and virtually all volumes are for immediate local use. Approximately one million tons of scrap metal are produced annually within the State, with approximately half of that amount is exported through the Port of New Haven.

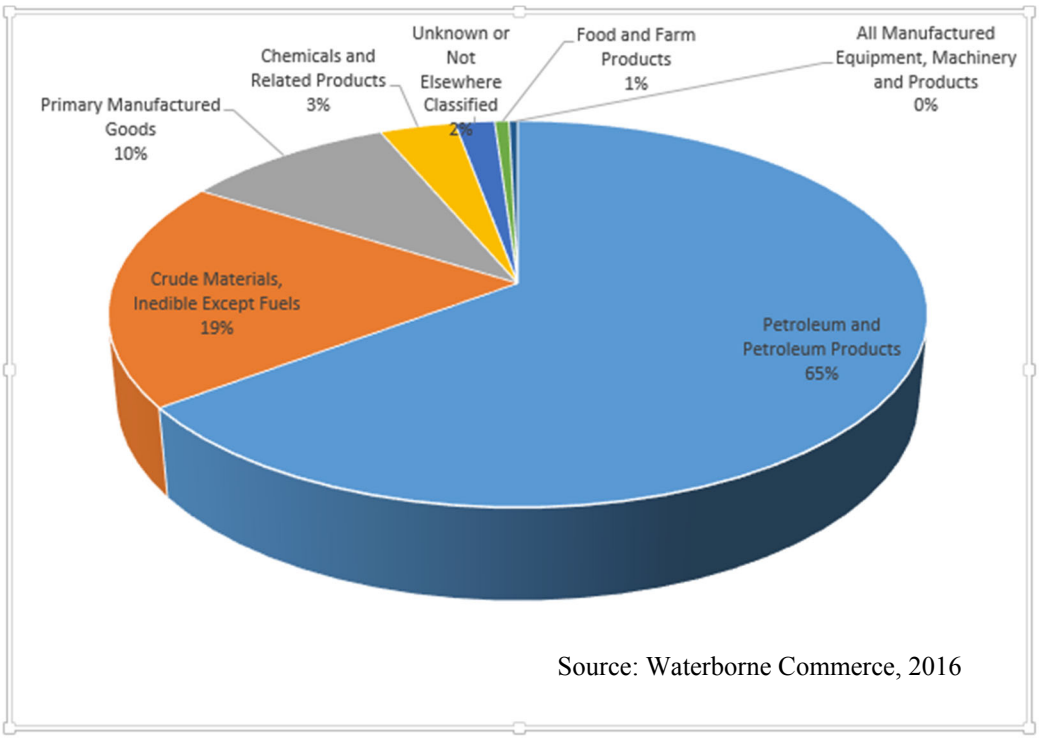


Figure 2-4: Commodity Mix

New Haven Harbor is a receiving port for petroleum products. During the 2012-2016 period, petroleum products accounted for major part of all waterborne commerce (65 percent in 2016). These products were gasoline, jet fuel, kerosene, fuel oils, asphalt, and petroleum coke. The remaining waterborne commerce is comprised of coal, chemicals, crude materials, primary manufactured goods, food and farm products, manufactured equipment and machinery, and goods not elsewhere classified.

Petroleum products are shipped to New Haven by ocean-going, deep-draft tankers from foreign

ports and by shallow-draft coastal tankers and barges from Northeastern U.S. ports and. In 2016, about 21 percent of inbound petroleum products were foreign imports and about 79 percent were domestic receipts. Outbound domestic shipments of petroleum products from New Haven are generally carried in shallow draft coastal tankers and barges to other Long Island Sound ports. Figure 2-5 displays foreign petroleum product tonnage by year.

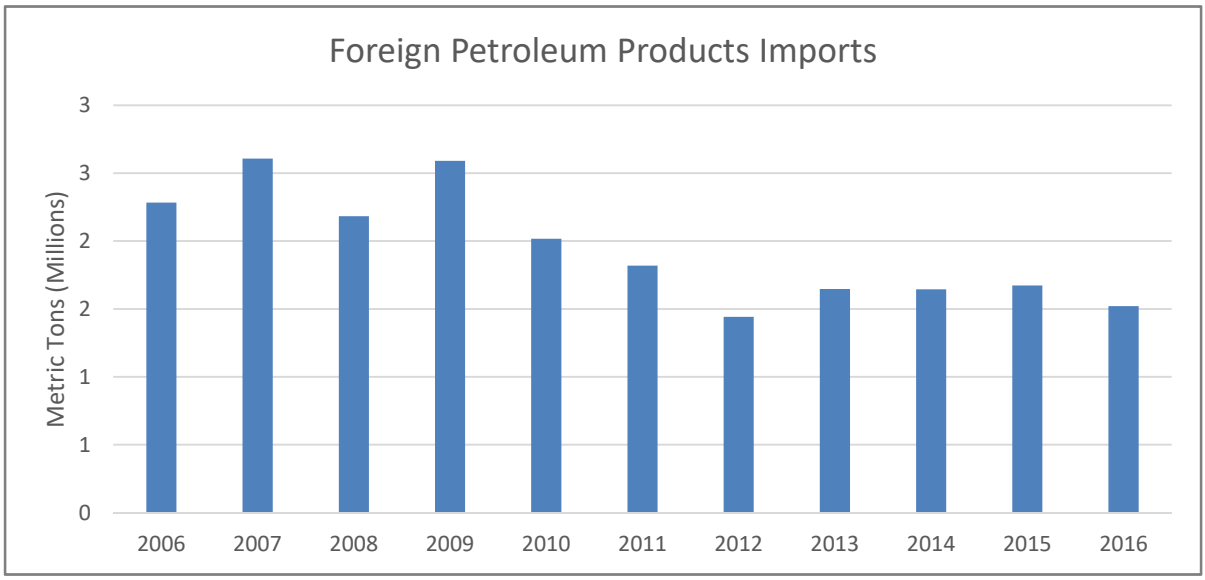


Figure 2-5: New Haven Petroleum Products Tonnage (Foreign Imports)
Source: Waterborne Commerce, 2006-2016

Scrap metal is Connecticut's largest single export commodity by weight. (Scrap metal is transported by bulk carriers.) The market for scrap metal is highly competitive with few large producers (shredders) accounting for the majority of production volume/sales. An estimated one million tons of scrap metal are produced annually within the State, with approximately half of that amount exported through the Port of New Haven to destinations in Turkey, Peru, Egypt, and Saudi Arabia. The balance is exported, largely by truck, through New Jersey, Rhode Island, and Philadelphia. Figure 2-6 displays foreign scrap metal export tonnage by year.

Figure 2-6: New Haven Scrap Metal Foreign Export
Source: Waterborne Commerce, 2006-2016

Salt is a major import at the port of New Haven, much of which is road salt used mostly by municipalities but also by commercial retailers for winter use. (Salt is transported by bulk carriers.) Gateway terminal built a storage facility for salt imports from Chile through Morton Salt. Figure 2-7 displays foreign salt imports.

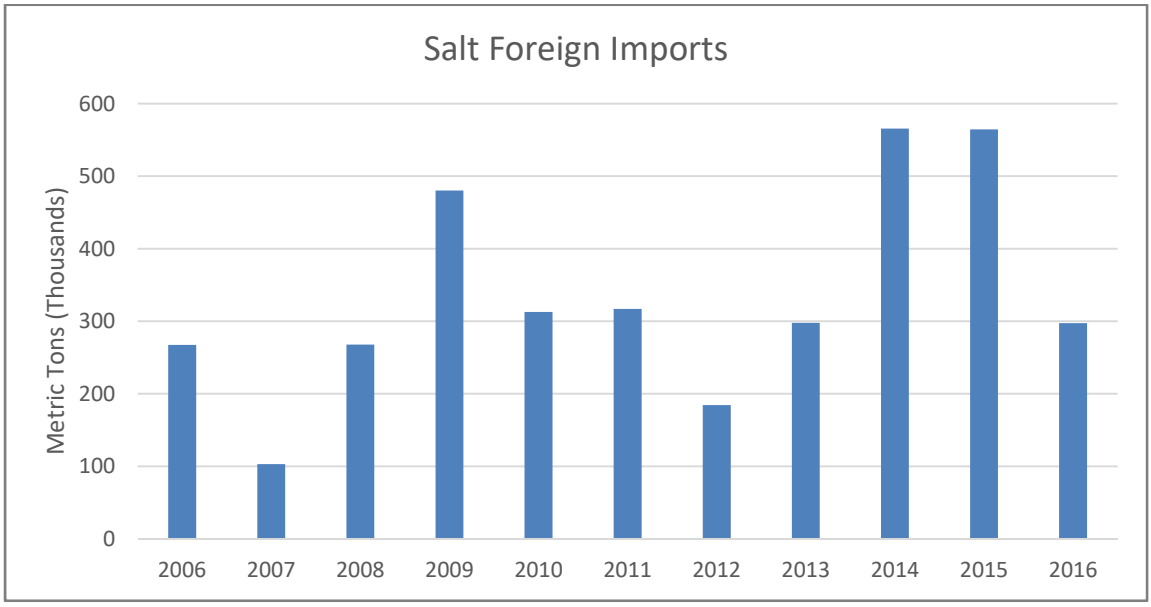


Figure 2-7: New Haven Salt Foreign Imports
Source: Waterborne Commerce, 2006-2016

The Port of New Haven receives foreign imports of primary manufactured goods consisting of iron and steel products (primary forms, sheets, shapes, pipe & tube), aluminum, and fabricated metal products. Figure 2-8 displays foreign primary manufactured goods.

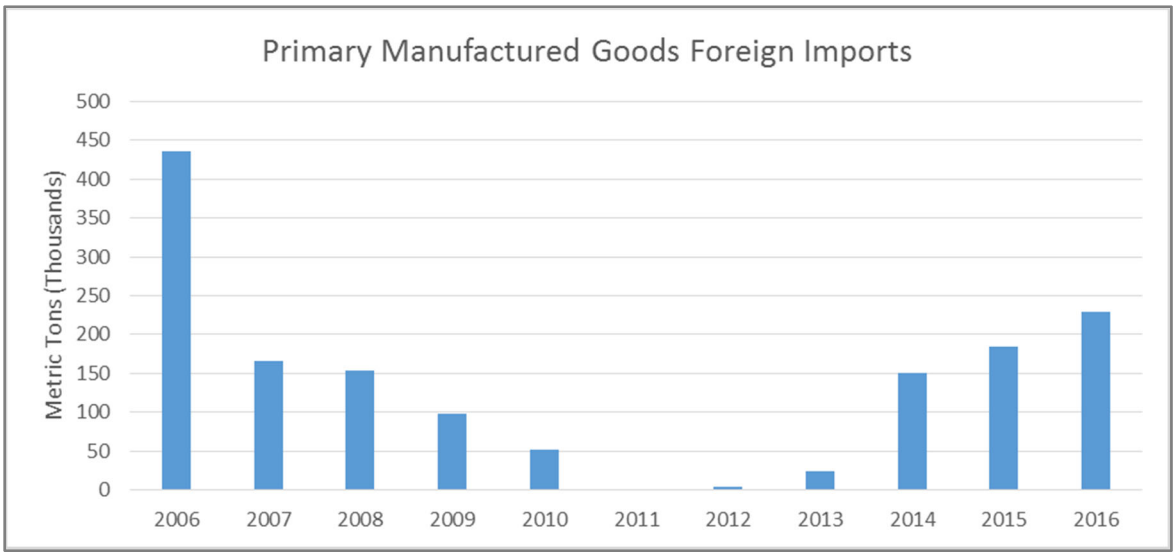


Figure 2-8: Primary Manufactured Goods Foreign Imports
Source: Waterborne Commerce, 2006-2016

The miscellaneous category of commodities includes all remaining tonnage (excluding petroleum products, scrap metal, salt, and primary manufactured goods). Commodities in this category include all manufactured equipment and machinery, forest products, agricultural products, chemicals, and commodities that are unknown or not elsewhere classified. During the 2006-2016 timeframe, miscellaneous foreign imports represented only 2% of foreign import tonnage on average at the Port of New Haven.

2.2.3 Vessel Traffic

Vessel Depth Restriction. The current depth of New Haven Harbor's deep draft project features is -35 feet MLLW, and pilot rules in the channel require that each vessel must have 4 feet of water under the ship (2 feet of underkeel clearance and 2 feet for squat). With this requirement, inbound vessels that draft deeper than 31 feet must either light-load, perform lightering operations in the Long Island Sound or wait and use the tide to transit the channel.

Use of the Tide. The tide range at New Haven is six feet (rounded), meaning that inbound vessels with a maximum draft of 37 feet can wait and use the high tide to transit the channel. Bringing the ship in at high tide while possible incurs operational cost due to the need to wait on the tide, discourages use of deeper draft ships, and requires the Pilots to bring the ship in under

less than desired sailing current conditions.

Lightering. If a vessel cannot wait on the tide or has a draft greater than 37 feet, then the vessel must anchor in the Long Island sound. Ships are lightered in the USCG designated New Haven Anchorage in LIS. This anchorage is in open, unprotected waters approximately 3 to 6 miles offshore. Lightering involves the additional cost of barges, ship operation time, and booming costs. In addition, lightering operations can be delayed as most Tug Captains will not put their barges alongside ships if the wind is greater than 20 knots or seas exceed 3 feet. Also booming requirements may delay lightering as the Connecticut State Statute regarding booming exempts vessels from booming requirements "when weather, wind, sea, or ice conditions prevent the boom or other device from being wholly or partially deployed in a safe manner." When these conditions exist, it's too rough to go alongside or lighter.

Vessel Types. New Haven Harbor receives three vessel types: Tankers, Bulk Carriers, and General Cargo Ships. Table 2-2 below displays average vessel class dimensions, the commodities carried by vessel class, and the number of calls per vessel class in the existing condition. The existing condition was developed using 5-year historical averages for vessel calls 2012-2016. As Table 2-2 shows many of the vessel types have an average design draft greater than 31 feet.

Table 2-2: Vessel Types

Vessel Type	Vessel Class	Avg. LOA	Avg. Beam	Avg. Design Draft	Capacity (metric tons)	Commodities	Number of Calls
Bulk Carrier	BLK-1	463.3	81.3	28.3	15-25k	Primary Manufactured Goods	4
Bulk Carrier	BLK-2	573.6	92.3	35.7	25-32k	Primary Manufactured Goods	8
Bulk Carrier	BLK-3	601.8	94.7	44.8	32-37k	Primary Manufactured Goods, Miscellaneous	6
Bulk Carrier	BLK-4	637.1	103.1	38.9	37-46k	Primary Manufactured Goods, Miscellaneous, Scrap Metal	7
Bulk Carrier	BLK-5	626.9	105.7	43.2	46k-55k	Scrap Metal, Salt, Primary Manufactured Goods, Miscellaneous	25
Bulk Carrier	BLK-6	656.0	105.3	43.3	55-60k	Salt	2
General Cargo Ship	GCC-1	467.0	70.0	26.5	5-15k	Miscellaneous, Primary Manufactured Goods	4
General Cargo Ship	GCC-5	519.0	86.0	33.0	20-27k	Primary Manufactured Goods	1
General Cargo Ship	GCC-6	599.0	94.0	35.6	27-35k	Miscellaneous, Primary Manufactured Goods	2
Tanker	TK-1	438.2	71.8	28.2	5-20k	Petroleum Products	13
Tanker	TK-4	600.3	101.0	40.2	30-45k	Petroleum Products, Miscellaneous	44
Tanker	TK-5	603.4	105.9	42.7	45-50k	Petroleum Products, Miscellaneous	14
Barge	Dry Cargo Barge	240.0	66.0	14.6	1-10k	Salt	3
Barge	Liquid Barge	459.0	72.6	28.6	2-30k	Petroleum Products	2

Figure 2-9 displays the total trips by draft for ships drafting 31 feet or greater. As the data demonstrates there is a significant use of the channel by ship drafting in the 31 to 38 foot range. This use by ships draft greater than 31 feet is expected to continue in the future. (For addional, information see Appendix C, Economic Analysis.)

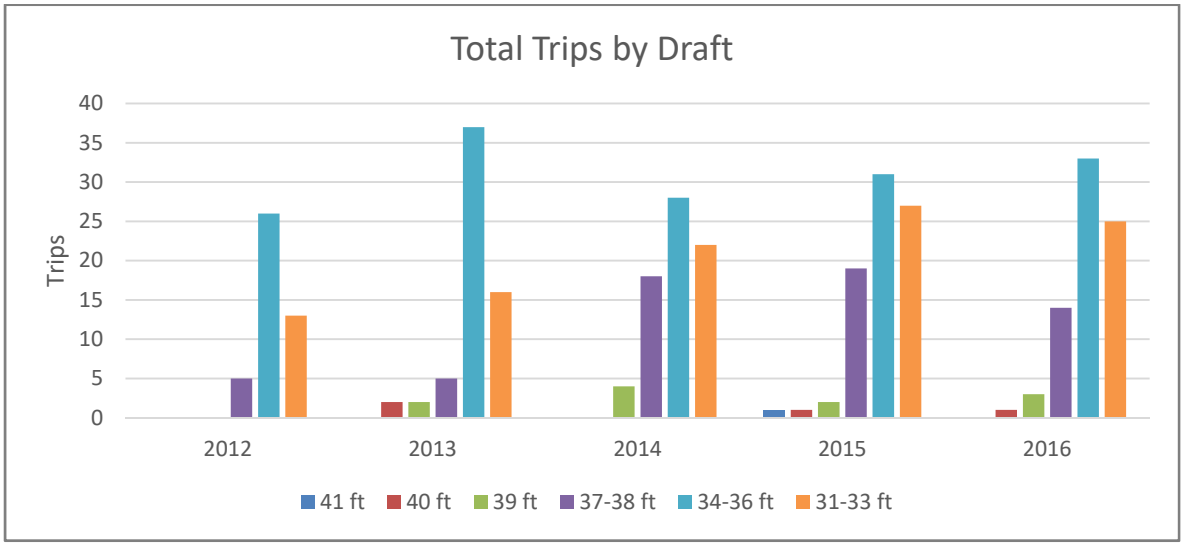


Figure 2-9: Total Vessel Trips by Draft

2.3 Physical Setting

2.3.1 Wind and Wave Climate

Connecticut lies in a transition zone of westerly air currents that encompass the southward movement of dry polar air masses and the northern movement of moist tropical air masses. It is in this transition zone that storm centers form and move. Superimposed on these large-scale effects are those created by New Haven's proximity to Long Island Sound. During warmer months when air temperatures exceed water temperature, a sea breeze is likely to occur which tends to reinforce normal wind flow from the south or southwest. Such sea breezes occur when the pressure gradient is weak along Long Island Sound. This environment moderates the climate of New Haven by producing cooler summers and warmer winters in comparison to inland areas of Connecticut. In addition, the low-level air mass wind speeds are increased by the sea breeze in the spring and summer.

Long Island shelters the New Haven shoreline from long period waves from the Atlantic Ocean. Therefore, waves in Long Island Sound in the New Haven Harbor vicinity are fetch-limited only, driven by winds blowing over a length of the Sound. The inner harbor is fairly well protected from storm and wave action in the sound by virtue of its location away for the sound. The outer harbor is protected by the breakwaters that separate the harbor from Long Island Sound.

2.3.2 Water Depths, Tides and Currents

Water depths in the outer harbor (with the exception of the Federal Navigation project generally range from -15 to -25 feet MLLW, while majority of the inner harbor is characterized by water

depths of less than -6 feet MLLW. Water depths in Long Island Sound near the entrance channel deepen to -45 feet MLLW.

The tide in New Haven Harbor is semi-diurnal. At the entrance to New Haven Harbor, the mean tidal range is 6.1 feet and the mean diurnal range is 6.7 feet (NOAA, 2018). Currents in the harbor are generally less than 0.5 knots. The currents in the main channel as it passes through the breakwaters average about 0.8 knots with peak ebb and flood currents averaging 1.3 and 0.9 knots, respectively. See Coastal Engineering Appendix E for additional information on tides and currents.

2.3.3 Relative Sea-Level Change

Relative sea level is projected to rise in New England. The USACE studies consider three sea level rise scenarios when describing study area conditions. These include a low rate based on the historic rate of rise and intermediate and high rates of rise. See the USACE Sea Level Change Curve Calculator, available at: http://www.corpsclimate.us/ccaceslcurves.cfm. This calculator uses the methodology described in Engineer Regulation (ER) 1100-2-8162, *Incorporating Sea Level Changes in Civil Works Programs* (USACE 2013). Over the next fifty years (2023-2073), sea level at New Haven is projected to rise 0.46 feet, 0.97 feet, and 2.54 feet under the USACE low, intermediate, and high scenarios, respectively. Over a 100-year period (2023-2123), the projected increase is 0.93, 2.37, and 6.94 feet for the low, intermediate, and high rates of rise, respectively. See Figure 2-10 below for the Relative Sea Level Change curves for the gage at Bridgeport, Connecticut (#8467150).

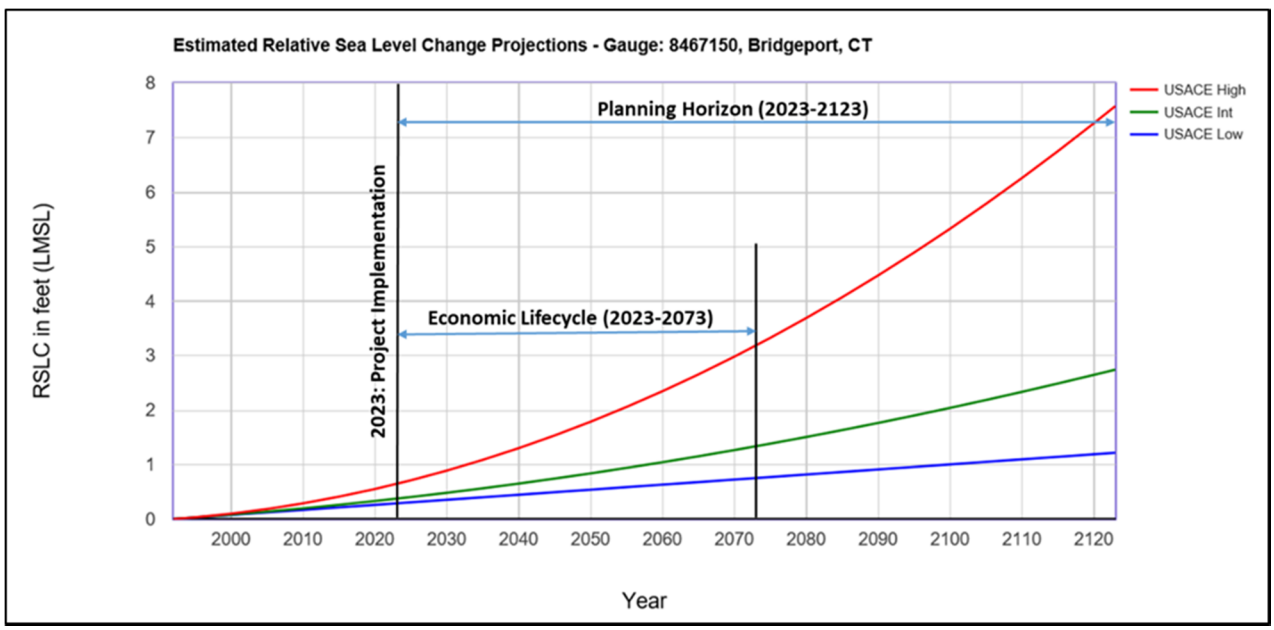


Figure 2-10: Relative Sea Level Change Projections

2.3.4 Geology

Regional Bedrock Geology and Structure

The New Haven Harbor Federal Channel is located both north, and south, of the Eastern Border Fault. The Eastern Border Fault crosses New Haven Harbor at the approximate latitude of Morris Cove and strikes roughly ENE -WSW. The Eastern Border Fault forms the eastern and southern boundary of the Mesozoic Hartford Basin.

Mesozoic sedimentary rock is located to the north and west of the Eastern Border Fault and Precambrian metamorphic rock is located to the south and east of the Eastern Border Fault. As a result, most of New Haven Harbor is surrounded to the northwest through northeast by younger New Haven Arkose consisting of red, poorly sorted sandstone and conglomerate.

South of the fault, New Haven Harbor is underlain by bedrock consisting of undivided schists and gneisses consisting of meta-sedimentary and meta-igneous rocks of Proterozoic to Devonian age. The Buttress Dolerite is located east of New Haven Harbor. It consists of gabbro, traprock, and basalt. The Oronoque Schist is located southwest of New Haven Harbor. It consists of granofels and gray/silver schist. The Light House Gneiss is located south and southeast of New Haven Harbor. It consists of pink granitic gneiss. Bedrock below the Federal Navigation Channel near the bend at the breakwaters is Granodiortic Gneiss and Light House Gneiss. (Environmental Science Services, Inc. 2002)

The bedrock topography beneath New Haven Harbor consists of the large West Haven Bedrock Valley formed by the coalescence of three smaller V-shaped bedrock valleys associated with the West River, Quinnipiac River, and Farm River. The head of the large bedrock valley is at the approximate latitude of Morris Cove. The large valley strikes southwesterly, parallel to the western edge of New Haven Harbor, and parallel to the inferred orientation of the Eastern Border Fault.

Surficial Geology New Haven Harbor

Glacial Lake Connecticut formed over what is now Long Island Sound and costal Connecticut at the fore edge of the ice sheet of the Wisconsin glaciation, as the ice sheet began to retreat 18 to 20,000 years before present. It was dammed by the terminal moraine (glacier deposited material) that now forms the spine of Long Island and Fishers Island, eventually the moraine dam failed. The outlet is now known as The Race and is located between the islands east of the north fork of Long Island and Fishers Island. Glaciofluvial deposits associated with the sediment-dammed lake are located in the New Haven Harbor project area.

Distal deltaic deposits of sand overly lake bottom sediments in the upland surrounding much of New Haven Harbor. Sand is of variable thickness, commonly in inclined foreset beds and overlying thinly bedded fines of variable thickness.

Surficial Geology New Haven Inner Harbor

New Haven Harbor is floored with a layer of gray clayey silt containing marine shells and fine-grained, dark-colored organic matter. This material, characteristic generally of open estuaries along the Connecticut coast, is known from borings to reach thicknesses of at least 40 feet. The mud was deposited during the time when the sea level, rising relatively against the land, has been encroaching through the harbor area, a period inferred, from radiocarbon dates, to have embraced the last 7,000 years or more. The borings show also that in New Haven Harbor the estuarine mud overlies reddish or brown sand of glacial outwash origin. (Flint, 1963)

Surficial Geology of New Haven Outer Harbor

The surficial geology of the outer harbor consists of offshore submerged deposits of Glacial Lake Connecticut, including deltaic deposits consisting of foreset and bottomset beds overlying lake-bottom deposited silt and clay sediments. The deltaic deposits are also due to deposition from the Quinnipiac River, the Mill River, and the West River into Glacial Lake Connecticut.

Surficial Geology of Long Island Sound

Offshore submerged deposits of Glacial Lake Connecticut (Late Wisconsinan) include three types of deposits.

1. Deltaic deposits. These deposits are inferred to be delta-foreset and bottomset facies of emergent deltaic deposits of coastal Connecticut. Deposits are up to 131 feet thick and are a dominant component of lake sediment in much of the northern nearshore area. Deposits locally overlie bedrock, undifferentiated drift, end moraine deposits, or lacustrine-fan deposits. Generally, however, they overlie and intertongue distally with varved clay lake-bottom facies.

2. Coarse-grained, proximal facies and fine-grained, distal facies. Ice-marginal lacustrine fan deposits are present in the lower part of the glaciolacustrine section. These deposits overlie bedrock, Cretaceous strata, and/or, undifferentiated drift and are commonly in the same stratigraphic position as moraine deposits. Fans occur locally throughout the basin, but are numerous and more extensive in wide central Long Island Sound. Each lacustrine-fan sequence consists of two facies. Ice-proximal facies always occur in the northern part of the deposit, and fine-grained distal facies always occur in the southern part.

3. Lake-bottom deposits. These deposits are inferred to be varved silt and clay commonly 260 feet thick and locally greater than ~500 feet thick in deep valleys. These deposits dominate the glacial section in the southern half of the basin and variously overlie bedrock and/or, Cretaceous beds, undifferentiated drift, end-moraine deposits, and lacustrine-fan deposits.

Early postglacial deposits (Early Holocene/Late Wisconsinan) include submerged marine deltaic deposits – deltaic facies and delta-distal facies and early postglacial deposits (Early Holocene) including submerged fluvial-estuarine, and channel-fill deposits. Fluvial sediments are overlain

by estuarine sediments up to 66 feet thick in channel-fill configuration overlying steep-sided, channel-shaped unconformities that truncate glacial-lake deposits. These deposits are interpreted to be terrestrially derived fluvial sediment deposited when streams drained across a subaerially exposed lakebed. Map patterns of these channels show a paleodrainage system related to terrestrial valleys. Tributary channels draining southward from Connecticut and northward from Long Island join an east-draining trunk valley that exits the Long Island Sound basin at The Race. Fluvial facies are commonly overlain in the upper section of channel-fill by fine-grained, estuarine sediment deposited as the rising postglacial sea entered the basin through the notch at The Race and spread to the west via a paleochannel system.

Harbor Geology and Material Type

Based on the above information, native materials that will likely be encountered during dredging include organic silts, silty sands with gravel, glacial till, and bedrock. The sediments represent deltaic and glaciolacustrine sediments deposited into Glacial Lake Connecticut. During investigations in the 1970s and 1980s, soils collected from the inner portions of New Haven Harbor consisted of Holocene, black to gray, organic silt and clay overlying reddish-brown silty medium-fine sand and soils collected from the outer portions of New Haven Harbor consisted of black to gray organic silt and gray organic silt, underlain by gray, medium-fine sand, silty-fine sand, and reddish brown silty fine sand, underlain by till, underlain by bedrock.

2.3.5 Sediment Characteristics in the Project Area

Initial Sediment Sampling & Testing and Sediment Characterization (2017)

Sediment cores throughout New Haven Harbor were collected in August 2017 in order to characterize the physical and chemical nature of the material proposed to be removed from the FNP for improvement. Using a conceptual site model (see Appendix J – Suitability Determination) and a draft improvement project design (which was based on an expanded turning basin, 100 foot widening of the FNP, and improving up to a depth of -42 feet MLLW), NAE prepared a sampling and analysis plan (SAP) for the project on 8 May 2017 which was coordinated with EPA Region 1 and CT DEEP. The SAP called for the collection of 26 individual sediment cores from the project area, which were composited based on geographic location and physical properties (i.e., grain size) of the sediments. Sample locations are identified as Stations A through Z on Figures 2-12 and 2-13. Following plan formulation, evaluation and comparison of alternatives an improvement depth of 40 feet was selected as the tentatively selected plan and the northerly expanded turning basin design was refined.

NAE's environmental services contractor (AECOM) collected sediment vibracores on 8 to 17 August 2017. The cores were collected to -42 feet MLLW plus two feet of allowable overdepth to cover the alternative depths up to -42 feet being evaluated in the study. The cores were described in the field and individual sediment horizons were sub-sampled for grain size and bulk

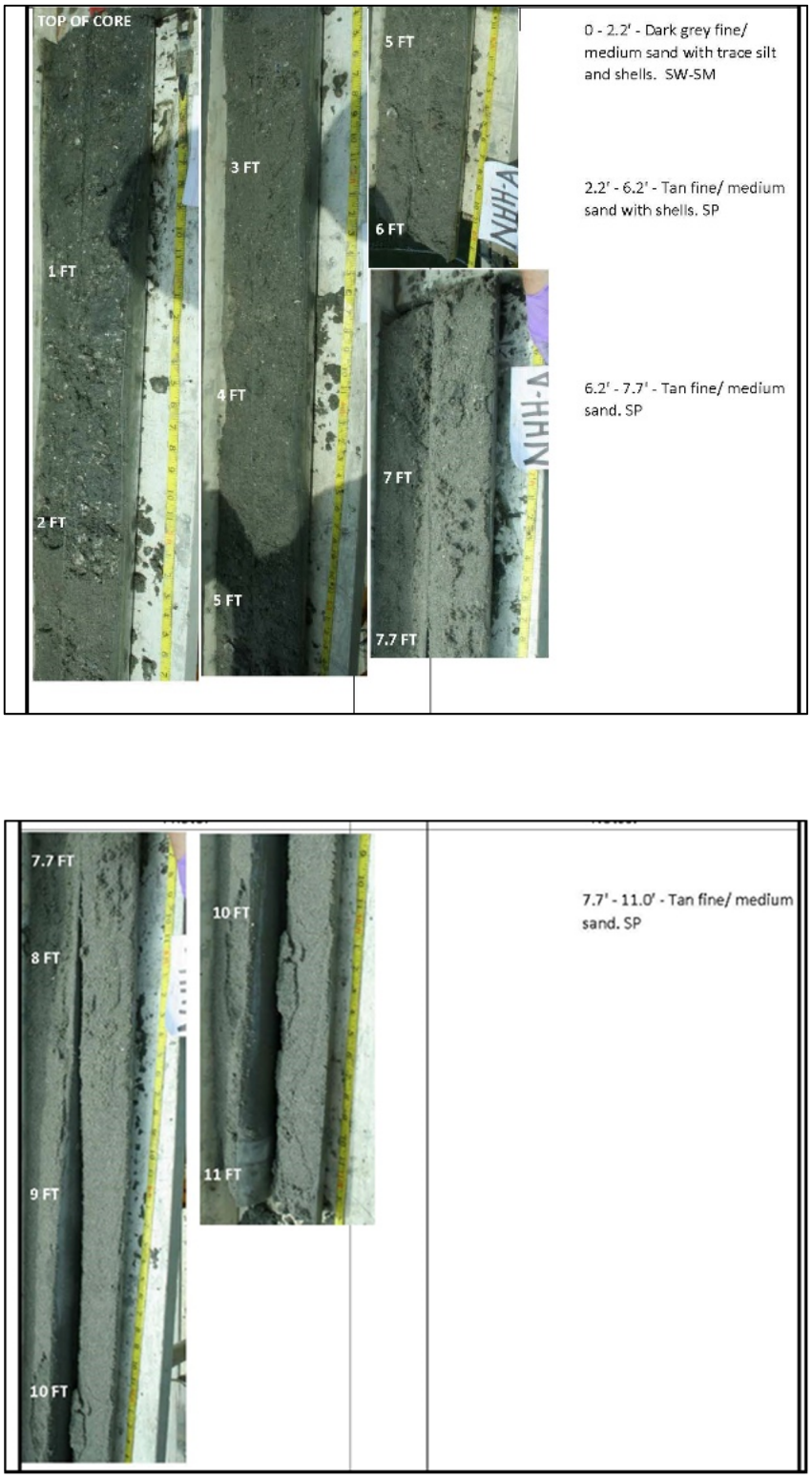
chemistry analysis. The segments subsampled for each individual core are noted in Table 2-3. The remaining material was stored at 4°C until rapid (24-hour turnaround) grain size results could be used to confirm the compositing plan for subsequent biological testing. Due to feasibility study schedule constraints bulk chemistry analysis, whole sediment bioassays, suspended particulate phase toxicity tests, and 28-day bioaccumulation tests were run concurrently on all samples, rather than relying on a more typical sequential sampling and testing program.

Grain size results (Table 2-3) documented coarser grained material throughout the length of all cores collected at the outer harbor stations (A, B, and C) (See Figure 2-11). Surficial sediments at the inner harbor stations were predominantly organic silts and clay. Multiple inner harbor stations (K, N, S, W, and Y) transitioned to a native sand layer at a depth between 5.5 and 8.5 feet below the silty sediment surface. The native sand is likely a deltaic deposit. All other inner harbor stations were predominately fine grained material to project depth with the exception of stations F and T, which exhibited a layer of native clay below the overlying organic silt. The clay is likely a lacustrine deposit. The results from the sampling were consistent with investigations performed in the 1970s and 1980s that found that sediments collected from the inner portions of New Haven Harbor consisted of Holocene, black to gray, organic silt and clay overlying reddish-brown silty medium-fins sand and sediments collected from the outer portions of the harbor consisted of gray organic silt underlain by gray medium-fine sand, silt-fine sand, till, and bedrock. See Section 2.3.4 above for the geologic origin of the New Haven Harbor sediments.

The results of grain size analysis were used to determine the compositing plan for subsequent biological testing. Native sand and clay intervals were excluded from additional testing. Grain size results are presented in Table 2-3. All grain size data, quality control data, core logs, and photographs of cores can be found in Technical Supporting Document #1 (AECOM – Sediment Evaluation).

As no project specific contaminants of concern beyond typical testing requirements (which includes metals, pesticides, PAHs, and PCBs), were identified in the conceptual site model used for the SAP, individual sub-samples from each core were analyzed for the standard suite of contaminants specified in the Regional Implementation Manual (USACE//USEPA, 2004). The sample material was composited into eight samples to undergo whole sediment bioassays, suspended particulate phase toxicity tests, and bioaccumulation tests. The compositing scheme used is shown in Table 2-4.

Figure 2-11: Example Core Log, Station A, Outer Harbor



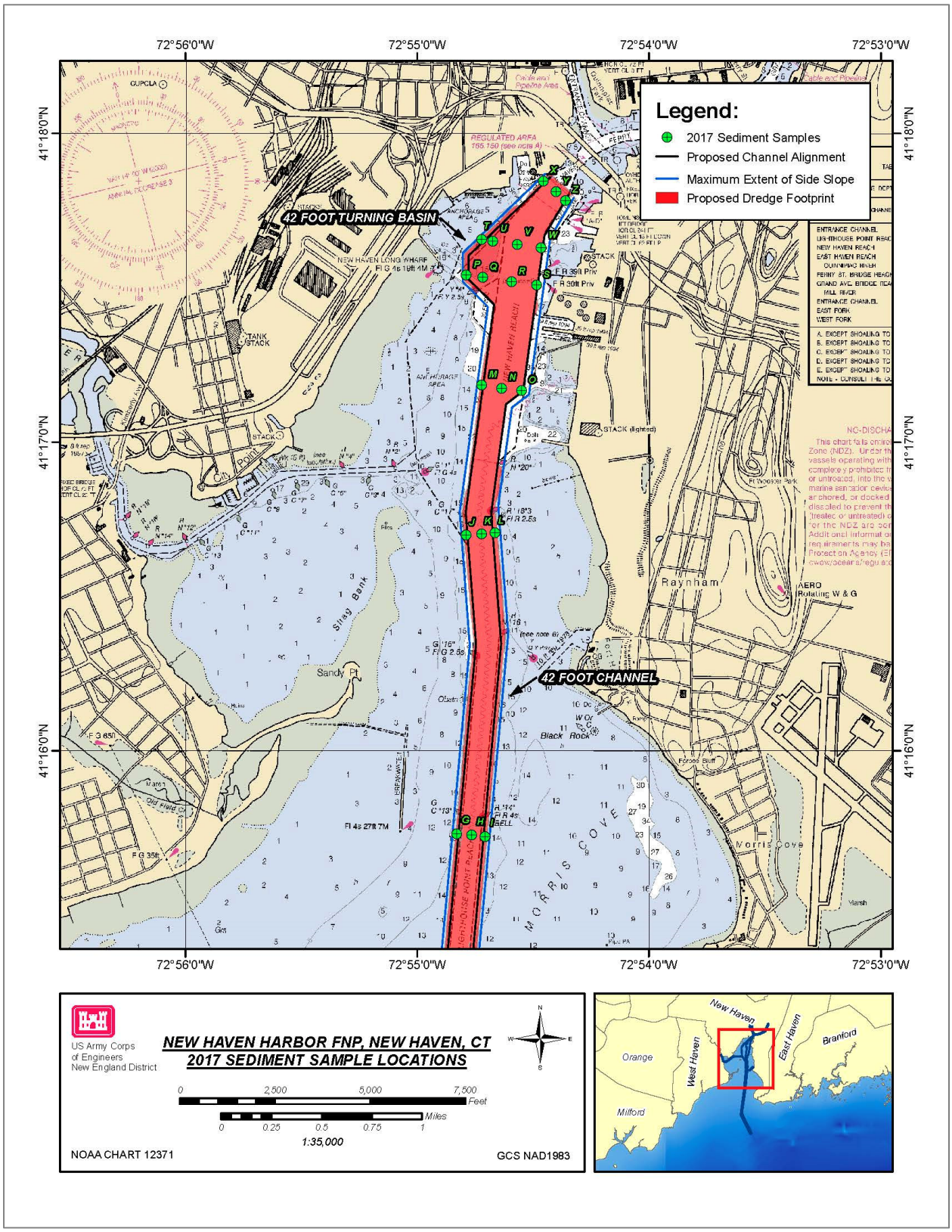


Figure 2-12: Location of Sediment Core Samples (Stations G – Z), New Haven Harbor

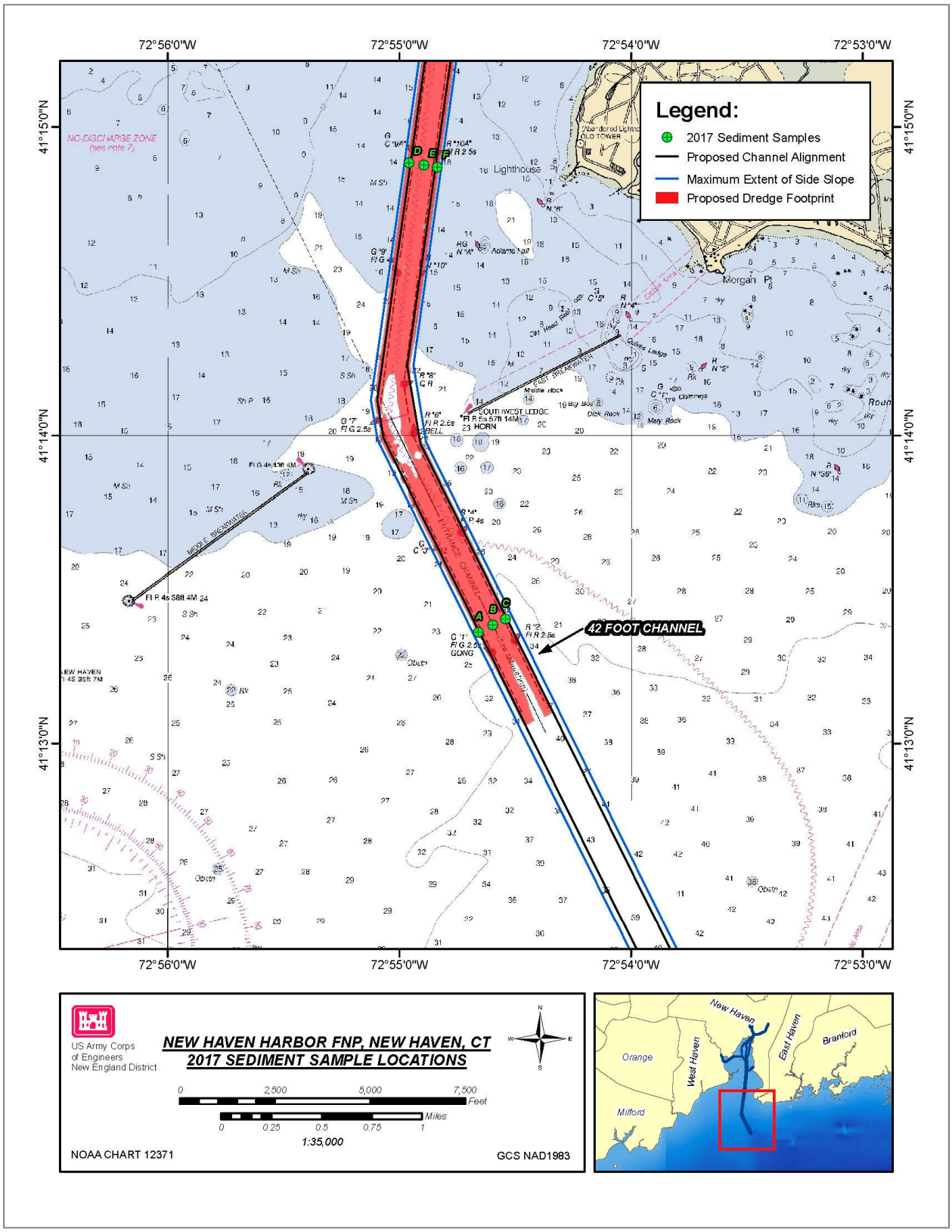


Figure 2-13: Location of Sediment Core Samples (Stations A – F), New Haven Harbor

Table 2-3: Grain Size Percentages and Sediment Descriptions from New Haven Harbor

Sample Name	*Core Length (FT)*	*Sample Top (FT)*	*Sample Bottom (FT)*	*ASTM Group Name*	*% Total Gravel*	*% Total Sand*	*% Total Fines*
NHH-A-TOP	11.0	0.0	2.2	poorly graded sand	1.9	91.1	7
NHH-A-BOTTOM	11.0	2.2	9.9	poorly graded sand	0.1	97.8	2.1
NHH-B	8.8	0.0	4.2	silty sand	2.2	79.7	18.1
NHH-C-TOP	15.0	0.0	2.8	silty sand	3.4	72.5	24.1
NHH-C-BOTTOM	15.0	2.8	8.0	silty sand	0.6	55.3	44.1
NHH-D-TOP	19.5	0.0	4.8	silt with sand	0.2	16.1	83.7
NHH-D-BOTTOM	19.5	4.8	10.3	silt with sand	0.1	16.6	83.4
NHH-E-TOP	9.8	0.0	6.5	silt	0.1	6.9	93.1
NHH-E-BOTTOM	9.8	6.5	8.1	silt with sand	0.2	17.5	82.5
NHH-F-TOP	16.5	0.0	3.2	sandy silt	0.1	32.9	67.1
NHH-F-BOTTOM	16.5	3.2	10.5	silt	0.1	7.1	92.9
NHH-G-TOP	19.6	0.0	4.3	silt with sand	0.3	24.2	75.5
NHH-G-BOTTOM	19.6	4.3	13.7	silt with sand	0.1	18.8	81.2
NHH-H-TOP	9.3	0.0	5.4	silt with sand	0.1	24.8	75.2
NHH-H-BOTTOM	9.3	5.4	7.7	sandy silt	0.1	30.5	69.5
NHH-I-TOP	17.5	0.0	0.7	silt with sand	0.1	25.2	74.8
NHH-I-BOTTOM	17.5	0.7	2.5	silty clay with sand	0.1	15	85
NHH-J	9.7	0.0	5.4	silt with sand	2.5	18.4	79.1
NHH-K-TOP	9.1	0.0	5.5	clayey silt with sand	0.1	18.2	81.8
NHH-K-BOTTOM	8.2	5.5	8.2	poorly graded sand	1.9	96.5	1.6
NHH-L	9.8	0.0	6.7	sandy silt	0.1	32.6	67.4
NHH-M	9.7	0.0	6.8	silt and clay	0.1	2	98
NHH-N-TOP	9.3	0.0	6.0	sand and Silt	3.7	55.7	40.6
NHH-N-BOTTOM	9.3	6.0	7.5	silty sand	0.1	84.7	15.3
NHH-O-TOP	13.4	0.0	8.3	silt	0.1	2.3	97.7
NHH-O-BOTTOM	13.4	8.3	10.9	silty sand	0.1	75.4	24.6
NHH-P-TOP	29.4	0.0	5.8	silt	0.1	1.9	98.1
NHH-P-BOTTOM	29.4	5.8	12.3	silt	0.1	1.5	98.5
NHH-Q-TOP	29.5	0.0	5.3	silt with clay	0.1	1.1	98.9
NHH-Q-BOTTOM	29.5	5.3	29.4	silt with clay	0.1	3.2	96.8
NHH-R-TOP	9.2	0.0	4.2	clayey silt with sand	0.2	18.8	81
NHH-R-BOTTOM	9.2	4.2	7.7	clayey silt with sand	0.1	8.5	91.5
NHH-S-TOP	9.5	0.0	6.0	sandy silt	4.9	33.5	61.6
NHH-S-BOTTOM	9.5	6.0	6.4	silty sand	0.1	71.4	28.6
NHH-T-TOP	19.7	0.0	4.8	silt with clay	0.1	1	99
NHH-T-BOTTOM	19.7	4.8	16.3	clayey silt	0.1	2.1	97.9
NHH-U-TOP	30.0	0.0	5.8	silt with clay	0.1	4.7	95.3
NHH-U-BOTTOM	30.0	5.8	30.0	clayey silt	0.1	1.5	98.5

Sample Name	*Core Length (FT)*	*Sample Top (FT)*	*Sample Bottom (FT)*	*ASTM Group Name*	*% Total Gravel*	*% Total Sand*	*% Total Fines*
NHH-V-TOP	9.9	0.0	4.8	silt with clay and sand	4.8	18.6	76.6
NHH-V-BOTTOM	9.9	4.8	8.6	clayey silt with sand	1.1	10.2	88.7
NHH-W-TOP	9.8	0.0	5.5	silty sand	0.1	53.4	46.6
NHH-W-BOTTOM	9.8	5.5	8.2	silty sand	0.1	69.8	30.2
NHH-X-TOP	9.7	0.0	5.2	silt with sand	0.1	7.7	92.3
NHH-X-BOTTOM	9.7	5.2	8.0	silty sand	0.1	64.5	35.5
NHH-Y-TOP	9.4	0.0	5.9	silt	0.1	4.6	95.4
NHH-Y-BOTTOM	9.4	5.9	8.5	poorly graded sand with silt	9.8	79.7	10.5
NHH-Z-TOP	9.7	0.0	5.0	silt	0.1	4.8	95.2
NHH-Z-BOTTOM	9.7	5.0	8.7	silt with sand	0.1	20	80

Table 2-4: Compositing Scheme for New Haven Harbor Core Samples

Composite	Core Samples Used for Composite
1	A,B,C
2	D,E,F
3	G,H,I
4	J,K,L
5	M,N,O
6	P,Q,R,S
7	T,U,V,W
8	X,Y,Z

The conceptual site model from the sampling and analysis plan identified the uptake of placed dredged material by benthic organisms as a potential exposure pathway for the New Haven Harbor improvement project. As a screening tool to assess the potential for adverse effects to benthic organisms, and bulk sediment chemistry results from each core, were compared against applicable sediment quality guidelines (SQGs). Applicable SQG screening values for marine and estuarine sediments are the National Oceanic and Atmospheric Administration (NOAA) effects-range low (ERL) and effects-range median (ERM). ERL/ERM values are empirically derived guidelines that identify contaminant levels that indicate when the potential for toxic effects are unlikely (ERL) and when an increased probability of toxic effects is evident (ERM). SQG values are noted in the Suitability Determination (Appendix J).

At all outer harbor stations (A, B, and C) and several inner harbor stations (D, H, I, and X below 5.2') all analytes were either not detected or were detected at concentrations below the ERL.

The majority of the remaining inner harbor stations had detectable concentrations of metals, Total PAHs, Total PCBs, and pesticides that were above the ERL but below the ERM. A subset of inner harbor stations had concentrations of certain metals (copper, mercury, and zinc), Total PAHs, or Total PCBs that were above the ERM. Sub-samples with ERM exceedances were more common in the extreme inner harbor stations near the turning basin and terminals. Bulk chemistry results are presented in the Suitability Determination (Appendix J). All bulk chemistry results, quality control documentation, and laboratory methods are documented in Technical Supporting Document #1 (AECOM - Sediment Evaluation).

Sediment toxicity of the eight composite samples was determined through a 10-day whole sediment acute toxicity test as described in the Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual (Green Book, EPA/USACE 1991). Mortality in the control sample of the 10-day whole sediment acute toxicity test was less than 20% for the amphipod test (*Leptocheirus plumulosus*) and less than 10% for the mysid test (*Americamysis bahia*); therefore the test was valid based on criteria established in the Green Book.

Mean survivability for the amphipod *L. plumulosus* ranged from 87% to 96% for the eight composites and was not statistically different from the survivability of the amphipods exposed to reference sediment with the exception of Composite 8. Survivability in Composite 8 was within 20% of the survivability in the reference sediment that is within the acceptance criteria established in the Green Book. Therefore, the material proposed to be dredged is not considered acutely toxic to the amphipods used in this assessment.

Mean survivability for the Mysid *A. bahia* ranged from 74% to 96% for the eight composites and was not statistically different from the survivability of the mysids exposed to reference sediment with the exception of Composites 5 and 6. The survivability in Composite 5 was within 20% of the survivability in the reference sediment, which is within the acceptance criteria established in the Green Book. Survivability in Composite 6 was 24% lower than the reference sediment, which is outside of the acceptance criteria established in the Green Book. Therefore, the material proposed to be dredged is not considered acutely toxic to the mysids used in this assessment with the exception of the material in the vicinity of Composite 6. Survivability data from the 10-day whole sediment toxicity test for both the amphipod and mysid are summarized in the Suitability Determination (Appendix J). All 10-day whole sediment toxicity test results, quality control documentation, and laboratory methods are documented in Technical Supporting Document #1 (AECOM - Sediment Evaluation).

In order to assess the potential risk to human health through the potential exposure pathways identified in the conceptual site model a 28-day bioaccumulation test was performed with the clam *Macoma nasuta* and marine worm *Nereis virens* on all sediment composites. Results showed statistically significant increases of certain contaminants in tissue samples from clams

exposed to project sediments when compared to tissue samples from clams exposed to reference area sediments including cadmium, chromium, copper, lead, several individual PAHs, and the pesticide 4,4'-DDE. Significant increases in worm tissue samples included copper, zinc, several individual PAHs, and two PCB congeners. All bioaccumulation test results, quality control documentation, and laboratory methods are documented in Technical Supporting Document #1 (AECOM - Sediment Evaluation). Based on these bioaccumulation results the tissue burden data were analyzed with the EPA Bioaccumulation Evaluation Screening Tool (BEST) model to determine the toxicological significance of bioaccumulation from exposure to the dredged sediment.

The BEST model includes an evaluation of the non-carcinogenic risk, carcinogenic risk, and any observed exceedance of Food and Drug Administration (FDA) thresholds to determine potential adverse impacts to human health from the consumption of lobster, fish, or shellfish exposed to project sediments. Modeling based on the tissue contaminant loads measured in the New Haven Harbor improvement project found that all contaminants were below the EPA Hazard Quotient for non-carcinogenic risk of 1.0, below the EPA carcinogenic risk threshold (1×10^{-4}), and were also less than established FDA action levels. Based on this analysis the sediments are in compliance with the bioaccumulation assessment criteria in the Green Book. BEST model outputs are provided in the Suitability Determination (Appendix J).

The conceptual site model also identified the uptake of contaminants from the water column during the placement of dredged material as a potential exposure pathway for the New Haven Harbor navigation improvement project. 33 U.S.C. §1416(f) requires that all Federal dredging projects of any size and all Non-Federal projects of more than 25,000 CY conducted under permit, and proposing to place dredged material in the waters of LIS, are subject to the requirements of the Marine Protection Research and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act. Since one of the proposed placement sites for the project, the Central Long Island Sound (CLDS), is in LIS the dredged material has been evaluated based on the requirements of both MPRSA and the Clean Water Act (CWA). The potential for water column toxicity was determined though a suspended particulate phase toxicity test as described in the Green Book (EPA/USACE 1991).

Suspended particulate phase toxicity results were used to determine the median lethal concentration (LC50) for each species exposed to elutriate from the sediment composites. The mysid *Americamysis bahia*, the minnow *Menidia beryllina*, and the urchin *Arbacia punctulata* showed no effect on survival when exposed to the elutriate from Composite 1 with of LC50 values of >100%. Elutriates from the other seven composites had high levels of ammonia at the start of the suspended particulate phase toxicity tests. Elevated ammonia concentrations occur naturally in sediment and cause toxicity in the static environmental conditions of a laboratory suspended particulate phase test (Kennedy et al. 2015). In open water conditions, such as the

proposed placement areas, ammonia is a non-persistent compound that dissipates rapidly and is not considered a contaminant of concern for dredged material evaluations (Kennedy et al. 2015). In cases where ammonia is the driver for an observed response in a suspended particulate phase test an alternate application factor is applied following MPRSA §227.27(a)(3) to determine the limiting permissible concentration (LPC). Unionized ammonia, the more toxic form, was 2 to 8 times higher than the water quality criteria for acute toxicity in the elutriates from Composites 2-8. Elutriate chemistry results for these composites showed that all COCs were either not detected or were below water quality criteria for acute toxicity with the exception of Total PCBs in Composites 6 and 7. Based on this evaluation NAE identified unionized ammonia as the sole driver for the toxicity observed in the suspended particulate phase tests for Composites 2, 3, 4, 5, and 8 and the alternate application factor (0.05) was applied to calculate the LPC. Due to the presence of Total PCBs above the water quality criteria in Composites 6 and 7 the source of toxicity could not be identified and the standard application factor (0.01) was applied to calculate the LPC for those composites. Suspended particulate phase toxicity results and elutriate chemistry concentrations, including unionized ammonia, are presented in Appendix J.

To determine if the discharge of dredged material would meet the limiting permissible concentration NAE utilized the Short-Term Fate (STFATE) numerical model to analyze the disposal cloud as it is descends through the water column after release from a scow. Results of the STFATE evaluation predicted that the water column would attain the LPC within four hours of disposal and therefore meet the criteria in the testing protocol for Composites 1, 2, 3, 4, 5, and 8. Results of the STFATE model for Composites 6 and 7 did not attain the LPC within four hours and therefore do not meet the criteria for open water placement without additional testing to verify the source of the observed toxicity.

Based on the results of biological testing and subsequent risk assessment modeling no significant adverse impacts were found for the New Haven Harbor navigation improvement project with the exception of the material around Composites 6 and 7, adjacent to the marine terminal facilities. Based on the testing and evaluation requirements set forth in Section 103 of the Marine Protection, Research, and Sanctuaries Act and Section 404 of the Clean Water Act, the sediments to be dredged from the New Haven Harbor navigation improvement project are considered suitable for unconfined open water placement as proposed with the exception of the material around Composites 6 and 7. The US EPA and CT DEEP have concurred with this determination.

Supplemental Testing Sediment Sampling & Testing and Sediment Characterization (2018)

Through the evaluation of project alternatives, specifically a reduction in the size and location of the turning basin needed for navigation, NAE refined the alignment and dimensions of the proposed project features in 2018 after the completion of the initial sediment characterization effort. As such, a supplemental round of sampling was performed in October of 2018 to

characterize the material within the reduced proposed project footprint. During the supplemental sampling effort, a potential location for a CAD cell was also investigated in case it would be needed. However, as all material ultimately tested suitable for open water disposal the CAD cell was not required for the project.

NAE prepared a second sampling and analysis plan (SAP) for the project on 1 August 2018 which was coordinated with EPA Region 1 and CT DEEP. The SAP called for 13 sediment cores to be collected from the project areas. Sample stations are identified on Figure 2-14 and were located to characterize the revised turning basin and channel alignment (TB-1, TB-2, R', S', V', W'), define the extent of any possible unsuitable material in the inner harbor (US-1, US-2, DS-1, DS-2), and to evaluate a proposed Confined Aquatic Disposal (CAD) cell for the containment of potential unsuitable material (CAD-1, CAD-2, CAD-3).

NAE collected sediment vibracores between 22 and 25 October 2018. The cores were collected to the project depth of the Tentatively Selected Plan, -40 feet mean lower low water (MLLW), plus two feet of allowable overdepth. The cores were described in the field and individual sediment horizons were sub-sampled for grain size and bulk chemistry analysis. The remaining material was then composited based on geographic location and grain size for subsequent analysis of whole sediment toxicity, suspended particulate phase toxicity, and bioaccumulation.

Grain size results were consistent with the 2017 sampling effort and were dominated by fine-grained material in upper core segments with a sharp transition to coarse-grained material at depth within the FNP (see Appendix J). Stations in the proposed CAD cell area transitioned from organic silt in the upper segments to a clayey silt at depth. Native sand and clay intervals were excluded from biological testing.

All contaminants of concern in the clayey silt intervals from the stations within the CAD cell area were either not detected or detected at concentrations below the ERL. The overlying organic silt layer in the CAD cell area, and in the FNP stations, were also characterized by non-detects for the majority of pesticides and polychlorinated biphenyls (PCBs) but had detectable concentrations of most metals, polycyclic aromatic hydrocarbons (PAHs), and individual PCBs and pesticides. Several of these concentrations exceeded the ERL value but there were only isolated exceedances of the ERM (mercury at CAD-3 and Total PCBs at DS-2 and W'). Bulk chemistry results, SQGs, and mean reference area concentrations for CLDS are presented in the Suitability Determination (Appendix J).

Sediment toxicity of the composite samples was determined through a 10-day whole sediment acute toxicity test as described in the Green Book (EPA/USACE 1991). Mortality in the control sample of the 10-day whole sediment acute toxicity test was less than 20% for the amphipod

(*Leptocheirus plumulosus)* and less than 10% for the mysid (*Americamysis bahia)*; therefore the test was valid based on criteria established in the Green Book. Mean survivability for *L. plumulosus* ranged from 90% to 99% for the five evaluated composites and was not statistically different from the survivability of the amphipods exposed to reference sediment. The material proposed to be dredged is not considered acutely toxic to the amphipods used in this assessment. Mean survivability for *A. bahia* ranged from 91% to 96% for the five evaluated composites and was not statistically different from the survivability of the mysids exposed to reference sediment. The material proposed to be dredged is not considered acutely toxic to the mysids used in this assessment. Results from the whole sediment toxicity test are presented in Appendix J.

In order to assess the potential risk to human health through the exposure pathways identified in the CSM a 28-day bioaccumulation test was performed with the clam *Macoma nasuta* and marine worm *Nereis virens.* Results showed statistically significant increases of certain contaminants in tissue samples from clams exposed to project sediments when compared to tissue samples from clams exposed to reference area sediments including cadmium, lead, 4,4'-DDE, and several individual PAHs. Copper was the only contaminant with a significant increase in worm tissue uptake. These tissue burden data were analyzed with the EPA Bioaccumulation Evaluation Screening Tool (BEST) model to determine the toxicological significance of bioaccumulation from exposure to the dredged sediment.

The BEST model includes an evaluation of the non-carcinogenic risk, carcinogenic risk, and any observed exceedances of Food and Drug Administration (FDA) thresholds to determine potential adverse impacts to human health from the consumption of lobster, fish, or shellfish exposed to project sediments. Modeling based on the tissue contaminant loads measured in the New Haven Harbor improvement project found that all contaminants were below the EPA Hazard Quotient for non-carcinogenic risk of 1.0, below the EPA carcinogenic risk threshold (1×10^{-4}), and were also less than established FDA action levels. Tissue body burden concentrations and BEST model outputs are provided in Appendix J.

The potential for water column toxicity was determined though a suspended particulate phase toxicity test as described in the Green Book (EPA/USACE 1991). Suspended particulate phase toxicity results were used to determine the median lethal concentration (LC_{50}) for each species exposed to elutriates from the sediment composites. The tests were carried out in accordance with the method established in the Green Book using the mysid *Americamysis bahia,* the minnow *Menidia beryllina,* and the urchin *Arbacia punctulata*. Suspended particulate phase test results showed no significant negative effects for all composites and all test species (see Appendix J).

To determine if the discharge of dredged material would meet the limiting permissible concentration NAE utilized the Short-Term Fate (STFATE) numerical model to analyze the disposal cloud as it is descends through the water column after release from a scow. Results of the STFATE evaluation using the lowest LC_{50} value predicted that the water column would attain the LPC within four hours of disposal and therefore meet the criteria in the testing protocol based on the disposal of 4,000 cubic yards of material at the CLDS. A summary of biological testing results, water column evaluation, and risk assessment modeling is presented in the Suitability Determination (Appendix J)

Based on the results of the biological testing and subsequent risk assessment modelling, no significant adverse impacts were found for the New Haven Harbor navigation improvement project. Based upon the testing and evaluation requirements set forth in Section 103 of MPRSA and Section 404 of the CWA, the sediments to be dredged from the New Haven Harbor navigation improvement are considered suitable for unconfined open water placement (see Appendix J).

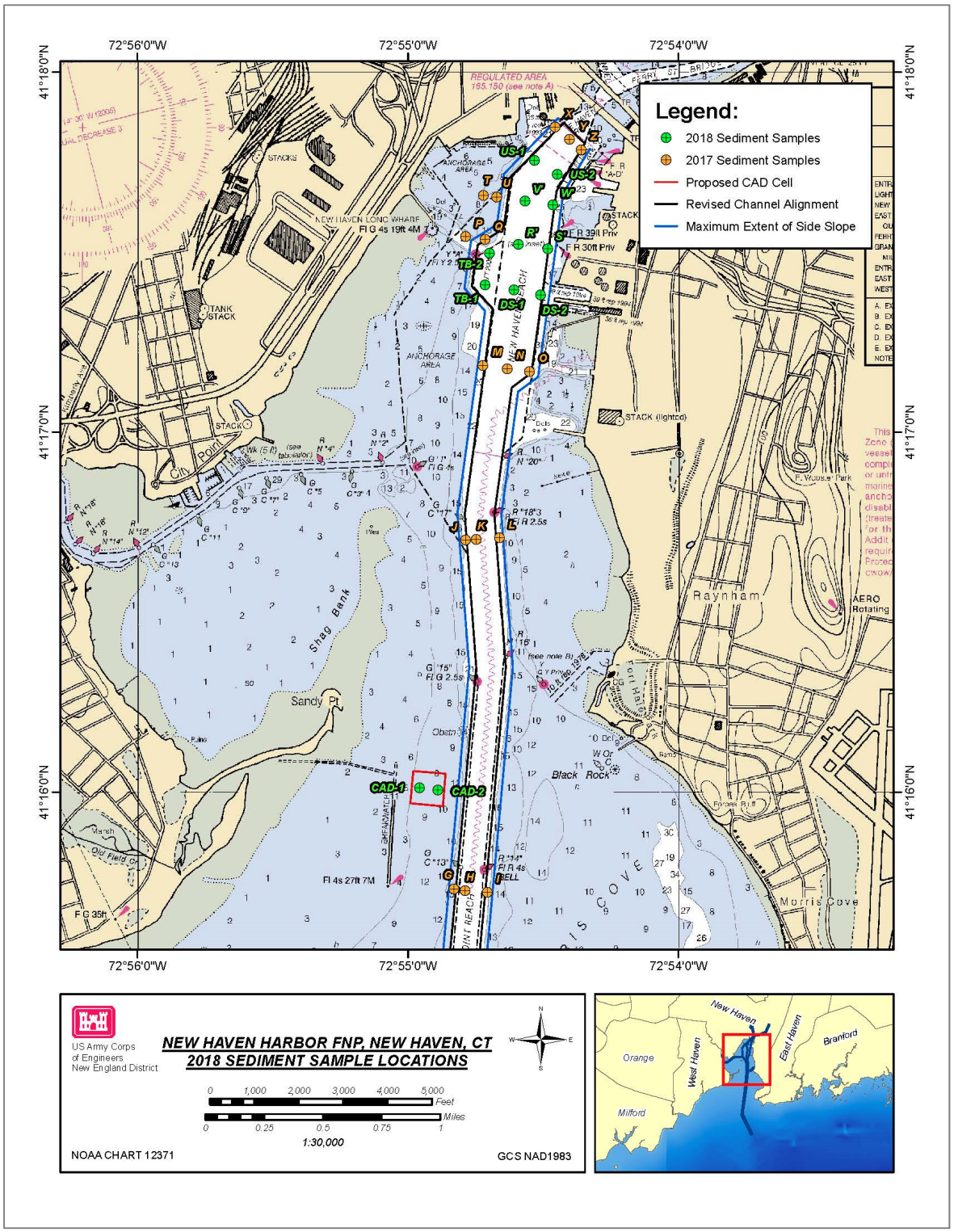


Figure 2-14: Location of Supplemental Sediment Core Samples, New Haven Harbor

3.0 EXISTING CONDITIONS/AFFECTED ENVIRONMENT

3.1 Protected and Managed Lands

Numerous surrounding protected and managed lands that provide buffers from development and other benefits to the estuarine environment of New Haven Harbor exist. These areas are all open to the public.

Lighthouse Point Park

Lighthouse Point Park is a park in the city of New Haven, Connecticut that is operated as a New Haven city park. The 82-acre park is located at the eastern point of New Haven Harbor in the East Shore neighborhood. The park features the deactivated Five Mile Point Lighthouse, which is open for tours on special events, and the Lighthouse Point Carousel, which is operated seasonally. Park amenities include a sand beach area with a bathhouse, restrooms and lifeguard, a boat launch, two pavilions, splash play area, playground, summer concession stand, fishing pier, picnic tables, grills and nature trails. Lighthouse Point Park abuts the Morris Creek Nature Preserve, a 20-acre salt marsh that is partly owned by the New Haven Land Trust. The park is located on the Atlantic flyway, a major migration route for butterflies, hawks, and many other migrant bird species, which makes it a popular site for bird watching.

East Shore Park

East Shore Park is an 85-acre parcel of land that operates as a New Haven city park. It is located on the east shore of New Haven Harbor. The park contains tennis courts, athletic facilities, a handicapped accessible playground, and several lighted ball fields. There is also a meandering trail along the shoreline. The park area was elevated and expanded in the 1950s using dredged material from the 35-foot improvement dredging of the FNP.

Fort Hale Park, Black Rock

Fort Hale Park, Black Rock, is a 20-acre park located on the east shore of New Haven Harbor in New Haven, Connecticut. It includes the site of a 1659 colonial era fort, a Revolutionary War-era fort, and a Civil War-era fort. It is used as a park and maintained as a historical site by the City of New Haven. Educational programs are given throughout the year to students attending local schools. The site was listed on the National Register of Historic Places in 1970. The listing included three contributing buildings, one contributing site, and three contributing structures.

Long Wharf Nature Preserve

The Long Wharf Nature Preserve is located in the northwestern portion of New Haven Harbor in

New Haven just off Interstate Highway 95 (I-95). The upland, created by filling, evolved into a grassland and a small woodland dominated by tall cottonwood trees, almost all the result of natural seed dispersion. The tidal wetland and dune area accreted over the 50 years since I-95 was constructed. At low tide, the preserve encompasses approximately 15 acres, from mud flat to dune to salt marsh to upland. A loop trail connecting the shore and upland and leads to the historic Oyster Point neighborhood.

Morse Park & Morse Beach

Morse Beach is a sandy beach located in West Haven, Connecticut fronting the southwestern portion of New Haven Harbor. The beach is located adjacent to the City of West Haven's wastewater treatment plant and behind Sandy Point and occupies about 7 acres.

Sandy Point

Sandy Point is a barrier beach (sand spit) system with a tidal creek, an area of tidal marsh, and tidal flats in West Haven, Connecticut. It is situated in the southwest portion of New Haven Harbor. The site is approximately 66 acres. The area is extremely popular for fishing and other beach-related uses in the warmer months, as well as being a popular destination for birders. This area provides some of the most important beach habitat in Connecticut for piping plovers, least tern, and common tern. The 3.5 miles of public beach extending west of Sandy Point are popular for bird-watching year-round, although access to parts of some of these beaches are seasonally-restricted to protect nesting birds. A 1.7-mile paved recreational greenway provides pedestrians, cyclists and roller-bladers with a waterfront view of Long Island Sound.

3.2 Water Quality

3.2.1 Water Quality Classification

New Haven Harbor is largely surrounded by urbanized land. Three waste-water pollution control facilities (WPCF) in the cities of New Haven, West Haven, and North Haven release effluent into the Quinnipiac River and New Haven Harbor. Effects of the WPCFs in North Haven and West Haven are minimal as compared to effects on New Haven east shore WPCF (Bell and Romick, 2002). The intensity of this urbanization and associated industrialization has brought with it all the attendant problems of municipal and industrial pollution, ranging from sewage to oil spills.

The waters of New Haven Harbor are classified by the State of Connecticut as SB throughout the harbor. The term SB is for coastal waters of overall good quality. The Connecticut Class SB waters designated uses are for: marine fish, shellfish and wildlife habitat, commercial shellfish harvesting, recreation, industrial water supply, and navigation (CT DEEP, 2017).

3.2.2 Water Column Turbidity

Turbidity refers to the clarity or clearness of the water. The greater the amount of total suspended solids (TSS) in the water, the murkier it appears and the higher the measured turbidity. Although turbidity is not an inherent property of water such as temperature or pH (Davies-Colley and Smith, 2001, in Wilde, F.D., 2005), it is an indicator of water body health. Turbidity is caused by suspended and dissolved matter; such as clay, silt, finely divided organic matter, plankton and other microscopic organisms, organic acids, and dyes (ASTM International, 2003, in Wilde, F.D., 2005).

Natural causes of turbidity include runoff, phytoplankton and zooplankton, minute fragments of dead plants, and storm events. Anthropogenic sources of turbidity include runoff from agricultural fields, stormwater runoff from construction sites and urban areas, shoreline erosion from heavy boat traffic, bottom sediment resuspension from vessel traffic, dissolved nutrients released in treated wastewater, organics released by sewage treatment plants, and periodic dredging events.

High levels of turbidity, outside the normal range of turbidity levels, over sustained periods can be a concern for the health and productivity of the estuarine ecosystem for several reasons. Turbid waters can decrease light penetration into the water, thereby lowering photosynthetic activity and reducing the area available for submerged aquatic plants to grow. Algae can greatly limit light penetration and can limit primary production to the uppermost layers of water. This can cause invertebrate population decline (caused by fewer photosynthetic organisms available for food). This in turn can result in fish population decline (caused by fewer invertebrates available for food). Suspended material in large quantities for sustained periods can foul the filter-feeding systems of certain estuarine animals. Particles may accumulate on the gills of fish and inhibit breathing. High levels of turbidity can hinder aquatic predators from spotting and tracking down prey. Additionally, dissolved oxygen can be depleted if turbidity is largely due to organic particles.

As the proposed project involves dredging sediments that will increase turbidity levels during construction, background levels in the project area are important to understand. Background levels of suspended materials in the waters of New Haven Harbor were documented by USACE (1996) in a study evaluating the effect of dredging on water column suspended sediments. Typical background values averaged 8 mg/l throughout the entire harbor with natural peaks (i.e., peaks not attributed to construction or vessel traffic) on the order of 25 mg/l being observed (USACE 1996).

3.2.3 Dissolved Oxygen

Dissolved oxygen (DO) in marine waters is essential for most healthy aquatic life. If DO levels are too low it can be a sign of human induced impacts such as excessive runoff or nutrients or it can be attributed to natural causes such as seasonal variations. Healthy conditions for aquatic life exist when dissolved oxygen are above 5.0 mg/l. Concentrations between 5.0 mg/l and 3.5 mg/l are generally healthy, except for the some sensitive species. When concentrations fall below 3.5 mg/l, conditions become unhealthy. The most severe effects occur if concentration levels fall below 2.0 mg/l, even for short periods of time (EPA, 1997).

Dissolved oxygen levels exhibit seasonal variations within New Haven Harbor with the highest concentrations occurring during winter months and lowest during the summer months. This temporal pattern of DO concentrations is typical in New England waters and reflects the inverse relationship of temperature and oxygen solubility in water. DO concentrations are usually similar in surface and bottom waters, and between physical locations except during summer, when inner harbor values are usually lower than the outer harbor (DeLeuw Cather, 1991). Recent water quality monitoring in inner New Haven Harbor found DO concentrations ranging from 5.75mg/l to 13.6 mg/l (SCSU 2013).

3.2.4 Nutrients

Nutrients such as nitrogen and phosphorus are necessary in a productive marine ecosystem. However, too much nitrogen, especially in the form of ammonia, can fuel and stimulate the excessive overgrowth of algae and seaweed. The dense algae blooms cloud the water and shade the bottom. Dense algae blooms can prevent enough light from reaching shallow water bottoms to support the growth of submerged aquatic vegetation, an important habitat for shellfish and juvenile fish (EPA, 1997). Also, when the algae die and settle to the bottom, they are decayed by bacteria that use oxygen and this may cause a reduction in DO levels. Oxygen is necessary for aquatic organisms to feed, grow, and live. In extreme low DO conditions, some organisms may suffocate and die, while others flee the hypoxic (low DO level in the water) zones.

Major detrimental water quality impacts have resulted from the large amounts of nutrients discharged into Long Island Sound (and therefore New Haven Harbor) through atmospheric deposition, domestic and industrial waste water flows, fertilizer releases, and urban runoff (Mullaney et al. 2014). Major strides have been made in reducing the inflow of nutrients into Long Island Sound, however cultural eutrophication is still an ongoing problem and nutrient control efforts remains a high priority (Latimer et al. 2014).

3.3 Wetlands

Wetlands, specifically coastal salt marshes, border portions of New Haven Harbor and its tributaries. Figure 3-1 shows the extent of wetland resources in the vicinity of the proposed project. Data for wetland distribution in the area, obtained from the USFWS National Wetlands Inventory (USFWS, 2018), show approximately 450 acres of estuarine and marine wetland areas are currently present in the New Haven Harbor system. Historical data taken from an 1846 Coast Survey map (based upon data collected between 1833-1838 (US Coast Survey, 1846) indicated that there were over 1,200 acres of wetland habitat at the time of the survey. The loss of most wetland habitat in the system appears to be due to the filling of marshes for the development of industrial, commercial, residential, and recreational lands.

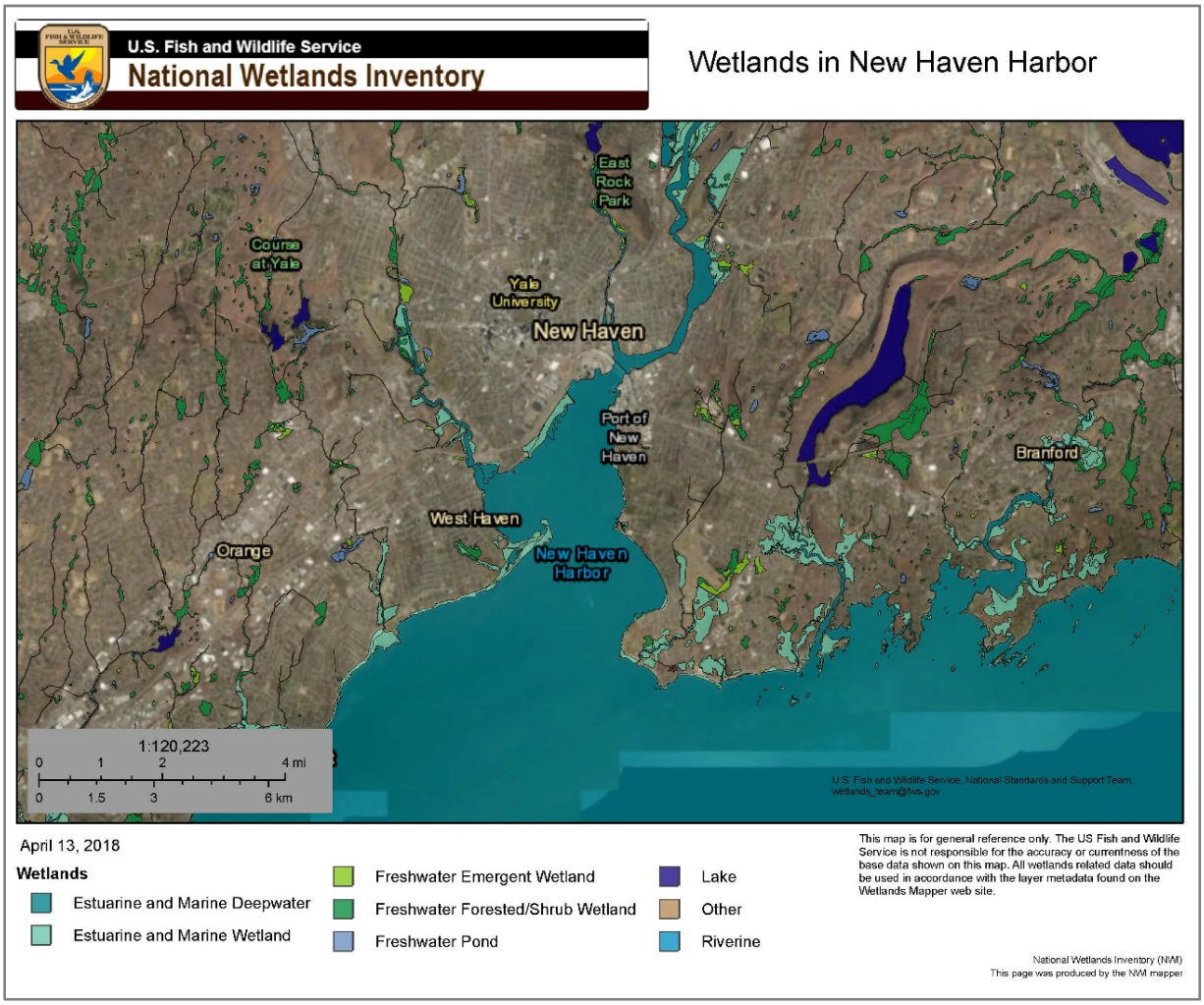


Figure 3-1: Wetlands in New Haven Harbor (USFWS, 2018)

3.4 Benthic Habitat

3.4.1 Navigation Channel

The benthic communities in New Haven Harbor have been documented in numerous studies (NAI 1979, NAI 1985, Pellegrino 1990, DeLeuw Cather 1991, ESS 2001). Data from the sampling stations near and/or in the navigation channel in New Haven Harbor indicate that those areas are generally occupied by a mix of opportunistic early-successional stage benthic communities and mid-successional stage benthic communities (which are a mix of early colonizers and later stage colonizers). Most of the studies noted above described a community of variable species composition, with early successional stage polychaete worms (e.g., *Streblospio benedicti* and *Capitella capitata*) as the dominant species and other species of importance being coot clams (*Mulinia lateralis*), the tube building amphipod (*Ampelisca abdita*), oligochaete worms, mysids (*Neomysis americana*), and the tellinid bivalve (*Tellina agilis*) (NAI, 1985, Pellegrino 1990, ESS 2001).

To validate the findings of the historical studies, the benthic communities in the areas being considered for navigation improvement were sampled in May 2017. Seven grab samples were taken along the length of the navigation channel in proposed dredge areas for the project (see Appendix I for maps of sample locations). The benthic communities of the improvement areas in the New Haven inner harbor area (i.e., areas of the harbor north of sandy point), represented by stations #1 and #2, contained a mix of opportunistic benthic species such as the polychaete *Streblospio benedicti*. The benthic communities in these silty sediment environment were generally low in diversity and dominated by only a few species (Table 3-1). The outer harbor stations (stations #3 - #7), which had silty-clayey sediments, contained a mix of opportunistic species and mid-successional stage organisms such as the tubiculous polychaetes *Clymenella torquata* and *Spiochaetopterus oculatus*. The communities in the outer harbor stations were higher in diversity than the inner harbor stations and individuals tended to be distributed among species more evenly. A complete benthic report is provided as Appendix I.

Table 3-1: Benthic invertebrates collected from the New Haven Harbor Navigation Improvement Areas in May 2017 (Numbers are per 0.04 m^2)

STATION NUMBER	1	2	3	4	5	6	7
ANNELIDA							
POLYCHAETA							
Aricidea sp.	-	-	-	-	-	-	1
Alitta succinea	-	1	2	5	-	-	2
Capitella sp.	-	-	4	-	-	3	4
Clymenella torquata	-	-	-	15	-	-	11
Diopatra cuprea	-	-	-	-	1	-	-
Glycinde solitaria	-	-	1	-	-	1	-
Leitoscoloplos fragilis	-	-	-	2	-	-	7
Nephtys incisa	-	1	-	-	-	-	-
Orbinia sp.	-	-	-	2	-	-	2
Pectinaria gouldii	1	-	-	-	-	-	-
Pherusa sp.	-	-	-	-	-	5	-
Polydora sp.	-	-	-	-	2	-	-
Spiochaetopterus oculatus	-	-	-	3	1	-	
Streblospio benedicti	13	7	9	4	6	-	4
OLIGOCHAETA							
Unidentified Oligochaete sp.	-	10	2	5	-	-	2
ARTHROPODA - CRUSTACEA							
AMPHIPODA							
Unidentified Gammaridae	-	-	-	1	3	2	-
Ampelisca abdita	3	-	-	8	-	6	74
Corophium sp.	-	-	-	1	-	3	-
CUMACEA							
Unidentified Cumacean	-	1	-	-	-	-	-
DECAPODA							
Pagurus longicarpus	-	-	-	-	-	2	-
Neopanope sp.	-	-	-	-	1	-	-
MOLLUSCA							
BIVALVIA							
Anadara ovalis	-	-	-	-	-	1	-
Ensis directus	-	-	-	-	-	-	1
Mulinia lateralis	-	-	-	4	-	-	-
Yoldia limatula	-	1	6	-	4	-	-
GASTROPODA							
Haminoea solitaria	-	6	2	1	-	-	-
Nassarius trivitatus	3	-	5	-	4	-	-
Urosalpinx cinerea	-	-	1	-	-	-	-
INDIVIDUALS / SAMPLE	**20**	**27**	**32**	**51**	**22**	**23**	**108**
SPECIES / SAMPLE	**4**	**7**	**9**	**12**	**8**	**8**	**10**

3.4.2 Shellfish Habitat Creation Area

The benthic communities of the shellfish habitat creation area (described in detail in Section 5.2.5) in New Haven Harbor, represented by stations #8, #9, and #10 contained a mix of opportunistic benthic species such as the polychaete species *Streblospio benedicti* and *Capitella* sp. as well as late-successional stage organisms such as the bivalve *Yoldia limatula*. The benthic communities in this silty sediment environment were generally moderate in diversity and contained an even distribution of individuals among species (Table 3-2).

Table 3-2: Benthic invertebrates collected from the New Haven Harbor Shellfish Creation Area in May 2017 (Numbers are per 0.04 m2)

STATION NUMBER	8	9	10
ANNELIDA			
POLYCHAETA			
Alitta succinea	2	3	2
Capitella sp.	17	6	22
Glycinde solitaria	3	-	-
Leitoscoloplos fragilis	-	-	3
Nephtys incisa	1	4	-
Orbinia sp.	-	-	1
Pectinaria gouldii	1	-	1
Spiochaetopterus oculatus	-	2	6
Streblospio benedicti	21	-	15
OLIGOCHAETA			
Unidentified Oligochaete sp.	-	-	2
ARTHROPODA - CRUSTACEA			
AMPHIPODA			
Ampelisca abdita	-	1	-
CUMACEA			
Oxyurostylus smithii	3	-	-
MOLLUSCA			
BIVALVIA			
Mulinia lateralis	-	-	1
Yoldia limatula	7	6	15
GASTROPODA			
Haminoea solitaria	4	-	-
INDIVIDUALS / SAMPLE	**59**	**22**	**68**
SPECIES / SAMPLE	**9**	**6**	**10**

3.5 Essential Fish Habitat

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act and amended by the Sustainable Fisheries Act of 1996, an Essential Fish Habitat (EFH) consultation is necessary for this project. EFH is broadly defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." New Haven Harbor and the Federal Navigation Project fall into this category and thus have the potential to provide habitat for fish species in the area. Per EFH source documents (NEFMC/NMFS, 2017), Table 3-3 denotes the federally managed species and their associated life stages that have EFH within the project area.

Table 3-3: Federally Managed Species and Their Associated Life Stages that have EFH within the Project Area

Common Name	Scientific Name	Life Stages with EFH in Project Area
Pollock	*Pollachius virens*	juveniles, adults
windowpane flounder	*Scopthalmus aquosus*	eggs, larvae, juveniles, adults
winter flounder	*Pseudopleuronectes americanus*	eggs, larvae, juveniles, adults
silver hake	*Merluccius bilinearis*	eggs, larvae, juveniles, adults
red hake	*Urophysis chuss*	eggs, larvae, juveniles, adults
little skate	*Leucoraja erinacea*	juveniles, adults
winter skate	*Leucoraja ocellata*	juveniles, adults
Atlantic sea herring	*Clupea harengus*	juveniles, adults

3.6 Protected Species

3.6.1 Sea Turtles

Four species of federally threatened or endangered sea turtles may be found seasonally in the coastal waters of Connecticut and New York: the federally threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead turtle (*Caretta caretta*); the federally endangered Kemp's Ridley (*Lepidochelys kempi*); the green turtle (*Chelonia mydas*); and the leatherback (*Dermochelys coriacea*) sea turtle. The leatherback is generally found in deep offshore waters and as such, is unlikely to occur in the action area. In general, listed sea turtles are seasonally distributed in coastal U.S. Atlantic waters, migrating to and from habitats extending from Florida to New England, with overwintering concentrations in southern waters. As water temperatures rise in the spring, these turtles begin to migrate northward. As temperatures decline rapidly in the fall, turtles in northern waters begin their southward migration. Sea turtles can be expected in the waters of Long Island in warmer months, typically when water temperatures are at least 15°C. This typically coincides with the months of May through November, with the highest concentration of sea turtles present from June to October

(Morreale 1999; Morreale and Standora 1998; Shoop and Kenney 1992).

3.6.2 Atlantic Sturgeon and Shortnose Sturgeon

There are five DPSs of Atlantic sturgeon listed as threatened or endangered. Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, South Atlantic and Carolina DPSs are listed as endangered, while the Gulf of Maine DPS are listed as threatened. The marine range of all five DPSs extends along the Atlantic coast from Canada to Cape Canaveral, Florida.

Atlantic sturgeon spawn in their natal rivers, with spawning migrations generally occur during February-March in southern systems, April-May in Mid-Atlantic systems, and May-July in Canadian systems (Murawski and Pacheco 1977; Smith 1985; Bain 1997; Smith and Clugston 1997; Caron et al. 2002). Young remain in the river/estuary until approximately age 2 and at lengths of 30-36 inches before emigrating to open ocean as subadults (Holland and Yelverton 1973; Dovel and Berggen 1983; Dadswell 2006; ASSRT 2007). After emigration from the natal river/estuary, subadults and adult Atlantic sturgeon travel within the marine environment (typically in waters between 16 to 164 feet in depth) using coastal bays, sounds, and ocean waters (Vladykov and Greeley 1963; Murawski and Pacheco 1977; Dovel and Berggren 1983; Smith 1985; Collins and Smith 1997; Savoy and Pacileo 2003; Stein et al. 2004; Laney et al. 2007; Dunton et al. 2010; Erickson et al. 2011).

Adult and subadult Atlantic sturgeon are known to occur in Long Island Sound, as well as within the waters off Connecticut and, as noted above, are likely to be migrating and possibly foraging opportunistically should suitable forage be available. As Atlantic sturgeon spawn in freshwater portions of large rivers and early life stages are not tolerant to salinity, no eggs, larvae or juvenile Atlantic sturgeon are likely to occur in New Haven Harbor.

The state and Federally endangered shortnose sturgeon (*Acipenser brevirostrom*) have a range that extends from St. John River in New Brunswick, Canada to St. Johns River in Florida. Shortnose sturgeon are anadromous, spending a portion of their lives in salt water, but returning to freshwater to spawn. However, in some northern populations (e.g., in the Kennebec River), a portion of the population forages in the saline estuary while others forage in fresh water.

In Connecticut, adult shortnose sturgeon have the possibility of being found in the coastal waters of Long Island Sound. Adult shortnose sturgeon can be found along the coast during migrations approximately from April 1-November 30. These coastal migrations may occur within the 50-meter depth contour (NOAA, 2018).

3.6.3 Birds

Several threatened or endangered bird species are present within the New Haven Harbor project area. The Federally threatened piping plover (*Charadrius melodus*) occurs in the harbor areas,

generally between April and September, where it utilizes intertidal areas for feeding and resting and beach areas for nesting and fledging. The Federally threatened Red knot (*Calidris canutus rufa*) has the potential to occur and use the beaches and intertidal areas of the harbor for feeding and resting. The Federally Endangered Roseate Tern (*Sterna dougallii dougallii*) also occurs within the harbor areas, using the system for feeding and resting.

3.6.4 Mammals

The Federally threatened northern long-eared bat (*Myotis septentrionalis*) is found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. The northern long-eared bat is a wide-ranging species found in a variety of forested habitats in summer and hibernates in caves and mines (or habitat with similar conditions to suitable caves or mines) in winter. While this species is not directly within the project area of the proposed project, the possibility of occurrence in adjacent forested areas is possible.

3.7 Marine Mammals

3.7.1 Harbor Seal

Harbor seals (*Phoca vitulina concolor)* are the only marine mammals common to Connecticut. Harbor seals are found on both the east and west coasts of the United States and they inhabit most of Canada's coastline and all of Alaska's. They live in coastal waters off beaches and rocky shores, estuaries and river mouths. Harbor seals are active year round. The seals found in Connecticut migrate from northern waters to the Long Island Sound from mid-November to December. They spend the winter and leave for northern waters again in mid-March to April. During the times they are in Long Island Sound can be found on the Connecticut coast from Stonington to Greenwich.

3.8 Fish

3.8.1 General

Long Island Sound, which includes New Haven Harbor, supports a diverse assemblage of fish. Many of the fish species in Long Island Sound are commercially and recreationally important. From 2010 to 2014, Connecticut commercial fisheries harvested on average 5 to 6 million pounds of catch from Long Island Sound annually (CT DEEP 2015). Commercial and recreational fisheries in Long Island Sound are valued at over one billion dollars (LIS Task Force 2003).

The most common year-round species of fish found in Long Island Sound include winter flounder, windowpane flounder, Atlantic menhaden, Atlantic silversides, butterfish, and scup. The most common anadromous species of fish (species that migrate from marine waters to

freshwater streams and rivers) found in these waters include striped bass, alewife, blueback herring, white perch, and American shad. Table 3-4, based on data from Stone et al. (1994) and CT DEEP (2017), presents a list of highly abundant, abundant, common, and rare species collected in Long Island Sound and, by extension, in New Haven Harbor. Field work conducted in New Haven Harbor from early February to late May 2001 and 2002 to evaluate the ichthyoplankton community in the harbor (Lawler, Matusky, and Skelly Engineers 2003) revealed that life stages of the majority of the species noted in the "highly abundant" and "abundant" sections of Table 3-4 were recovered during the sampling.

Fish species that are noted to have essential fish habitat (EFH) in New Haven Harbor include: Pollock, windowpane flounder, winter flounder, silver hake, red hake, little skate, winter skate, and Atlantic sea herring. A complete EFH Assessment is provided in Appendix H.

3.8.2 Anadromous Fish

Anadromous fish migrate through New Haven Harbor into the rivers that discharge into the harbor. The West River has historically supported runs of sea run brown trout, white perch, alewife, and blueback herring and the Quinnipiac River has historically supported runs of alewife, blueback herring and American shad (USFWS, undated). Data collected during spring 2018 fish runs by the Connecticut DEEP Inland Fisheries Division's diadromous fish program identified only alewife and gizzard shad in only the Quinnipiac River (CT DEEP, 2018).

3.8.3 Winter Flounder

Winter flounder (*Pseudopleuronectes americanus*) have historically been one of the most abundant fish species in New Haven Harbor. The harbor is an important spawning area for winter flounder and tends to have average or above average catch of young-of-year (YOY) for winter flounder when compared to other harbors along the Connecticut coast (Howell and Molnar 1994; Schultz, et al. 2007). Winter flounder eggs and larvae have been documented in both inner and outer New Haven Harbor (Schultz et al. 2007), with eggs present over sandy sediments as well as fine grained sediments. Schultz et al. (2007) concluded that the prime winter flounder egg habitat occurs in shallow waters in areas of low water velocity (less than 0.8 knots) and is likely a function of current patterns that form as a result of micro-scale variations in seafloor bottom bathymetry.

The inner and outer harbor areas are also important feeding grounds for juvenile and adult winter flounder (Carlson 1991). Carlson et al. (1997) concluded that winter flounder in New Haven Harbor were primarily opportunistic feeders that tended to forage on the predominant benthic prey species available.

Table 3-4: Fish Species Found in Long Island Sound Grouped by Abundance Categories (Data from Stone et al. (1994) and CT DEEP (2017))

Common Name	Scientific Name	Characteristics
Highly Abundant		
Alewife	*Alosa pseudoharengus*	anadromous, schooling, shallow water fish
Atlantic menhaden	*Brevoortia tyrannus*	schooling, pelagic, shallow water fish
Atlantic silversides	*Menidia menidia*	estuarine, schooling
Blueback herring	*Alosa aestivalis*	anadromous, schooling, shallow water fish
Butterfish	*Peprilus triacanthus*	coastal/oceanic, pelagic
Skates	*Raja* species	demersal
Scup	*Stenotomus chrysops*	demersal, prefers bays and shallow waters
White perch	*Morone americana*	anadromous
Windowpane flounder	*Scophthalmus aquosus*	demersal
Winter flounder	*Pseudopleuronectes americanus*	demersal
Abundant		
American eel	*Anguilla rostrata*	catadromous
American sand lance	*Ammodytes americanus*	demersal, burrowing fish
American shad	*Alosa sapidissima*	anadromous, schooling, shallow water fish
Atlantic herring	*Clupea harengus,*	schooling shallow water fish
Atlantic tomcod	*Microgadus tomcod*	demersal
Bay anchovy	*Anchoa mitichilli*	schooling, shallow water fish
Bluefish	*Pomatomus saltatrix*	pelagic, schooling oceanic fish
Killifishes	*Fundulus* species	small schooling fish
Red hake	*Urophycis chuss*	demersal
Striped bass	*Morone saxitilis*	anadromous, schooling
Weakfish	*Cynoscion regalis*	pelagic
Yellow perch	*Perca flavescens*	primarily freshwater; semi-anadromous
Common		
Atlantic mackerel	*Scomber scombrus*	pelagic
Black sea bass	*Centropristes striata*	groundfish
Channel catfish	*Ictalurus punctatus*	freshwater species, demersal
Cunner	*Tautogolabrus adspersus*	demersal
Gobies	*Gobiosoma* species	estuarine, often associated with oyster reefs
Hogchoker	*Trinectes maculatus*	demersal
Northern pipefish	*Syngnathus fuscus*	demersal
Northern searobin	*Prionotus carolinus*	demersal
Oyster toadfish	*Opsanus tau*	demersal
Pollock	*Pollachius virens*	groundfish
Rainbow smelt	*Osmerus mordax*	anadromous
Sheepshead minnow	*Cyprinodon variegatus*	estuarine, prefers open vs. vegetated bottom
Shortnose sturgeon	*Acipenser brevirostrum*	anadromous (amphidromous)
Tautog	*Tautoga onitis*	demersal, shore fish
Rare		
Atlantic stingray	*Dasyatis sabina*	anadromous, demersal
Cownose ray	*Rhinoptera bonasus*	benthopelagic, brackish, marine
Atlantic sturgeon	*Acipenser oxyrhynchus*	anadromous, demersal

Common Name	Scientific Name	Characteristics
Atlantic salmon	*Salmo salar*	anadromous, benthopelagic
Atlantic cod	*Gadus morhua*	schooling, benthopelagic, brackish, marine
Haddock	*Melanogrammus aeglefinus*	demersal, marine
Spot	*Leiostomus xanthurus*	demersal, brackish, marine
Northern kingfish	*Menticirrhus saxatilis*	demersal, brackish, marine, shallow coastal waters
Mullets	*Mugil* species	schooling, anadromous, benthopelagic
Summer flounder	*Paralichthys dentatus*	demersal, marine, shallow coastal waters

3.9 Shellfish and Lobster

3.9.1 Shellfish

The harvesting of shellfish is an intensive aquaculture industry in the shallow subtidal areas of New Haven Harbor. Shellfish species commercially managed and harvested in New Haven Harbor include the eastern oyster (*Crassostrea virginica*) and the hard-shell clam (*Mercenaria mercenaria*).

The Connecticut Department of Agriculture's Bureau of Aquaculture (BOA) manages the shellfish beds seaward of the mean high water (MHW) line, while shellfish beds located landward of the extension of the MHW line across most harbors, bays, and creeks are typically managed by local municipalities. Under agreements with the New Haven Harbor municipalities (New Haven, West Haven, and East Haven), the BOA monitors and governs all parcels of seafloor within New Haven Harbor, as well as those outside of the breakwaters. Figure 3-2 shows the managed shellfish parcels within New Haven Harbor. Table 3-5 and Table 3-6 display the parcel name, bed type, and total area of each parcel that falls within the footprint of the proposed navigation improvement project.

The BOA and the CT DEEP also map shellfish concentration areas within the harbor and manage the state's growing areas (CT DEEP 2018). Inner New Haven Harbor is classified as a "prohibited" shellfish area. A "prohibited" classification is used to identify: 1) a growing area where there has been no current sanitary survey or where a sanitary survey has found that the area is adjacent to a sewage treatment plant or other point source outfall with public health significance; 2) an area where pollution sources may unpredictably contaminate the growing area; 3) an area where the growing area is contaminated with fecal waste so that the shellfish may be vectors for disease microorganisms; and 4) an area where the concentration of biotoxin is sufficient to cause a public health risk. Shellfish may not be harvested from "prohibited" areas except for seed oystering or depletion of the areas.

The majority of the outer harbor is designated as a "restricted relay" shellfish area. A "restricted

relay" is a classification used to identify a growing area where harvested shellfish stock is relayed to "approved" or "conditionally approved" waters for natural cleansing or depuration. An area may be classified as "restricted relay" when a sanitary survey finds a limited degree of pollution and levels of fecal pollution, human pathogens, or poisonous or deleterious substances so that shellfish stock can be made safe for human consumption by either relaying, depuration or low acid-canned food processing. Shellfish can only be harvested from "restricted" areas by special license, and may not be directly harvested for market or consumption.

Harbor areas just outside of the breakwaters are classified as "conditionally approved" shellfish areas. (CT DEEP 2018). "Conditionally approved" areas are a classification used to identify a growing area that is safe for the direct, marketing or consumption of shellfish when the area is in the open status. The area must meet the criteria for "approved" classification when the area is in the open status, and meets the criteria for the restricted classification in the closed status. An area may be classified as "conditionally approved" when a sanitary survey finds that the area can remain in the open status for a reasonable period of time, the factors impacting the area are known and predictable and do not preclude a reasonable management approach, and the water quality correlates with the environmental conditions or other factors affecting the distribution of pollutants into the growing area. Each "conditionally approved" growing area must have a written management plan that is adhered to by all responsible parties.

Table 3-5: Shellfish Parcels within New Haven Harbor in the Footprint of the Proposed Improvement Project

Parcel Name	Bed Type	Fishing Status	Total Area of Parcel (acres)
05-14	Hard Clam/Oyster	inactive	134.7
Lot 66	Oyster	active	4.5
Lot 49	Oyster	active	30.7
Lot 70	Oyster	inactive	14.3
Lot 72	Oyster	active	204.8
Lot 74	Oyster	active	71.3
Lot 90	Oyster	active	61.8
Lot 97	Oyster	active	20.1
Lot 99	Oyster	active	28.9
Lot 100	Oyster	active	10.8
Lot 103	Oyster	active	33.7

Parcel Name	Bed Type	Fishing Status	Total Area of Parcel (acres)
Lot 106	Oyster	active	23.5
Lease 146	Oyster	inactive	31.5
324B	Hard Clam/Oyster	inactive	52.8
324A	Hard Clam/Oyster	active	41.6
Lot 327	Clam	active	55.5
Lot 339	Hard Clam/Oyster	active	198.3
Lot 343	Hard Clam/Oyster	active	107.9
Lease 568	Clam	active	233.6
L-635	Clam	active	89.1
L-636	Clam	inactive	50.4

Table 3-6: Shellfish Parcels within New Haven Harbor in the Footprint of the Proposed Confined Aquatic Disposal Cell

Parcel Name	Bed Type	Fishing Status	Total Area of Parcel (Acres)
Lot 80	Oyster	Unknown	10.0
Lot 86	Oyster	Unknown	1.0
Lot 89B	Oyster	Unknown	3.5
Lot 90A	Oyster	active	61.8

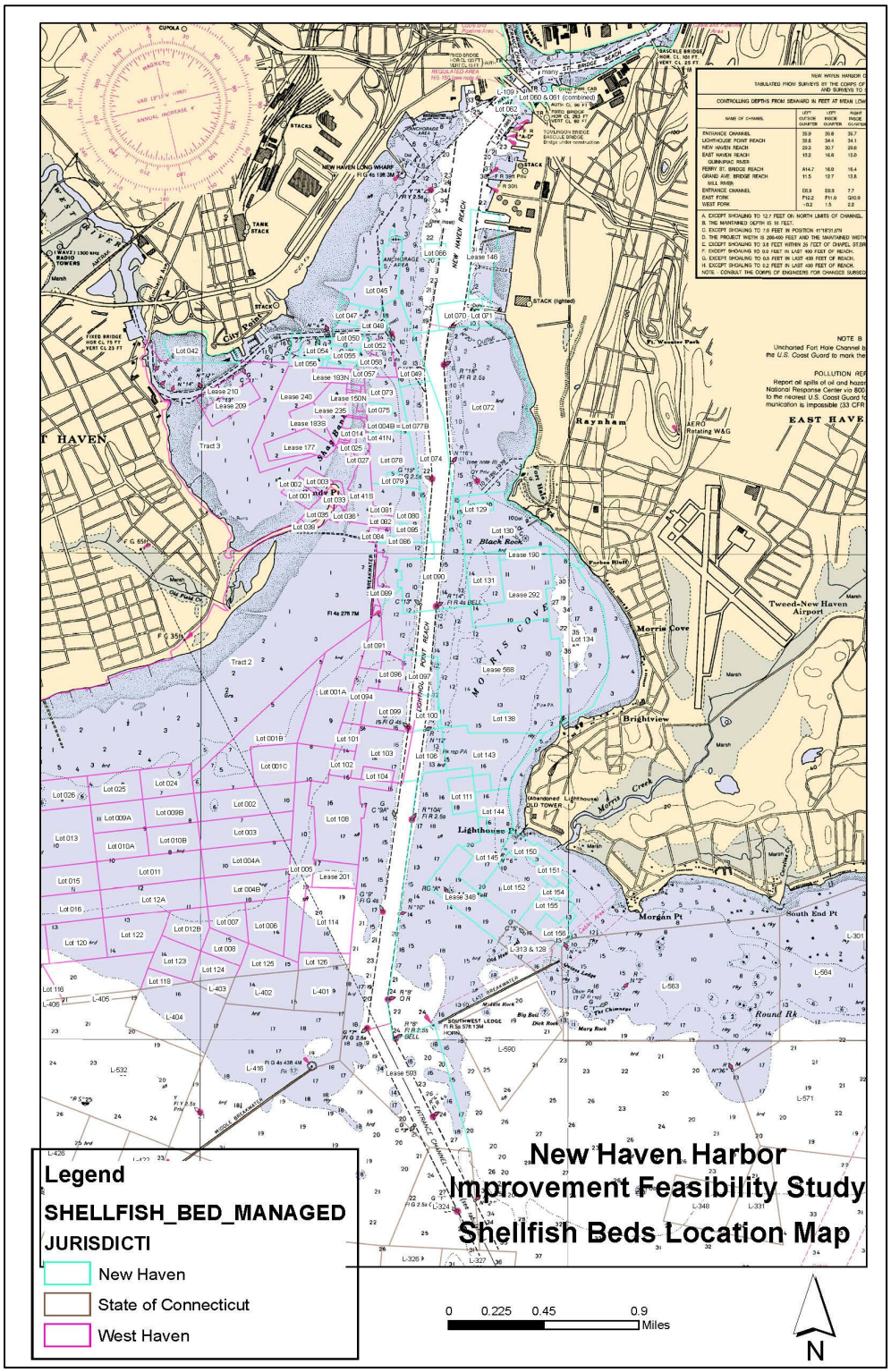


Figure 3-2: Managed Shellfish Parcels in New Haven Harbor, CT

3.9.2 Lobster

The lobster populations in Long Island Sound have been in severe decline over the past two decades (CT DEEP 2015b). Modelling and indicators for lobster stock assessments in the Southern New England (SNE) lobster stock have demonstrated that abundance, spawning stock biomass, and recruitment are at historic low levels for the SNE stock (CT DEEP 2015b). The SNE stock has not shown significant signs of rebuilding since harvest restrictions were put in place following the findings of a 2010 assessment of the stock.

While no site-specific data for lobster resources within New Haven Harbor are available, the harbor does contain a variety of habitat types that are considered preferred lobster habitat, specifically the breakwater structures in the harbor. Observations made during the multiple bathymetric, ecological, and side scan surveys of the improvement areas and placement areas did not reveal the presence of significant amounts of lobster fishing gear (personal communication with Richard Loyd (USACE), June 2018).

3.10 Birds

3.10.1 New Haven Harbor

New Haven Harbor is an important feeding and resting area for many migrating and wintering shorebirds, gulls and waterfowl. The habitat is typical of a large, shallow urbanized estuary.

Historical studies of the New Haven Harbor, from 1971-1977, reported a total of 125 bird species observed in the harbor (Normandeau Assoc., 1979). The western side of the harbor was used extensively by waterfowl, gulls, and shorebirds. The fewest species were observed in spring and the highest numbers observed in summer and fall. Scaup were the most numerous of the diving ducks, and black ducks the most predominant of the dabblers (Normandeau Assoc., 1979). Other waterfowl species that were abundant in the harbor include horned grebe, canvasback, common goldeneye, and bufflehead. Commonly found shorebirds include black-bellied plover, dunlin, sanderling, semipalmated sandpiper, great black-backed gull, herring gull, ring-billed gull, Bonaparte's gull, and common tern.

A review of The Cornell Lab of Ornithology's ebird database (https://ebird.org/map/) revealed observations of 346 species from locations abutting New Haven Harbor between 2008 and 2018. Bird species present were similar to those noted above from the historical studies. Species of note from the ebird data include piping plover, red knot, and roseate tern.

3.10.2 Sandy Point Bird Sanctuary

The Sandy Point bird sanctuary is one of the most significant nesting locations for the federally threatened piping plover in Connecticut. It also contains habitat for least tern and common tern colonies. The area receives significant usage by migrating shorebirds, which roost on the sand

spit and sandbars at high tide and forage on the tidal flats at lower tides. It is one of the primary stopover areas for red knot in Connecticut. There is also a small nesting colony of saltmarsh sharp-tailed sparrows in the small tidal marsh, and the area receives significant usage by saltmarsh and Nelson's sharp-tailed sparrows in migration.

3.11 Invasive Species

Invasive species can adversely impact native plant and animal populations by disrupting natural ecosystem functions. Impacts range from impaired recreational uses, fouled boat hulls, and reduced property value to degraded water quality, declines in finfish and shellfish population, and reduced biodiversity. Invasive species that may occur in the project area or in the area of influence include:

Phragmites australis (Common Reed)
Anoplophora glabripennis (Asian Long Horn Beetle)
Hemigrapsus sanguineus (Asian Shore Crab)

Invasive species are generally introduced into ecosystems via direct stocking, aquarium releases, shipping, and bait releases. Of these pathways, commercial shipping is the only direct mechanism related to this project. The principal way aquatic invasive species can enter state waters through shipping is by the discharge of ballast water while vessels are in port. Ballast water is pumped into the hull of a vessel to stabilize the vessel and keep it upright while carrying cargo. This water can be discharged at the receiving port as the cargo is loaded or unloaded. Each vessel may take on and discharge millions of gallons of water. Ballast water taken on in foreign ports may include an abundance of aquatic plants, animals, and pathogens not native to Connecticut. If discharged into state waters, these foreign species may become problematic.

In addition to ballast water discharge, another important source for the introduction of nonindigenous organisms is the fouling community that grows on the hull, rudder, propellers, anchor, anchor chain, or any other submerged structure of vessels that are not properly cleaned or maintained. Historically, such fouling communities were composed of massive layers of a variety of organisms, both attached and merely entrained in or living on that growth. Although such extensive growth is not as common on seagoing vessels in recent times, it still provides an opportunity for worldwide transport of fouling organisms.

3.12 Air Quality

NEPA requires consideration of whether the Proposed Action will have an adverse effect on air quality in the study area. In order to assess the potential for the proposed action to affect air quality, quantitative emissions analyses have been prepared.

Pursuant to the Federal Clean Air Act (CAA) of 1970, the EPA established National Ambient

Air Quality Standards (NAAQS) for major pollutants known as "criteria pollutants." Currently, the EPA regulates six criteria pollutants: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter, and lead (Pb). Particulate matter (PM) is divided into two particle size categories: particles with a diameter less than 10 micrometers (PM10) and those with a diameter of less than 2.5 micrometers (PM2.5). Connecticut adopted the national standards which includes both the primary and secondary NAAQS for the criteria pollutants (EPA, 2018). The NAAQS are two tiered: the first tier (primary) is intended to protect public health; the second tier (secondary) is intended to protect public welfare and prevent degradation of the environment.

Section 176(c) of the CAA requires Federal agencies to ensure that all of their actions conform to applicable implementation plans for achieving and maintaining the NAAQS. Federal actions must not cause or contribute to any new violation of any standard, increase the frequency or severity of any existing violation, or delay timely attainment of any standard.

Attainment

The NAAQS apply to the concentration of a pollutant in outdoor ambient air. If the air quality in a geographic area is equal to, or is better than the national standard, the Environmental Protection Agency (EPA) will designate the region as an attainment area. Areas where air quality does not meet the national standards are designated as non-attainment areas. Once the air quality in a non-attainment area improves to the point where it meets the standards and the additional redesignation requirements in the CAA [Section 107(d)(3)(E)], EPA may redesignate the area as an attainment/maintenance area, which are typically referred to as "maintenance areas." The CAA requires EPA to designate the status of all areas as being in or out of compliance with the NAAQS. The CAA further defines non-attainment areas for ozone based on the severity of the violation as marginal, moderate, serious, severe, and extreme. The State has developed a State Implementation Plan (SIP) to attain and maintain the standards in the NAAQS. The EPA Green Book, which lists non-attainment, maintenance, and attainment areas, was reviewed to determine the designations for New Haven County in which the proposed project is located. The EPA Green Book shows that New Haven County is designated by the EPA as a moderate non-attainment area for the 2008 8-hour ozone standard. The area is designated as attainment for all other NAAQS (40 CFR §81.307).

3.13 Hazardous, Toxic, and Radioactive Waste

New Haven Harbor is Connecticut's largest commercial port with several possible sources for accidental releases of hazardous waste. The port is a crucial import location for refined petroleum products, which supplies demand within Connecticut and the broader Northeast region, and has several terminals that receive the petroleum products. Several wastewater treatment plants also discharge into New Haven Harbor and its tributaries. Additionally, the

areas surrounding the harbor and its tributaries are home to an electricity generating station, various industrial companies, automobile servicing companies, marinas, and recreational and commercial vessel fuel docks.

A review of the CT DEEP hazardous spill record database for areas surrounding New Haven Harbor between 1999 – 2014 indicated measurable spills (i.e., spills capable of being quantified) of diesel fuel, gasoline, home heating oil (#2 fuel oil), hydraulic oils, raw sewage, waste motor oil, and antifreeze. Locations ranged throughout the harbor and its tributaries.

3.14 Noise

Noise is often defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. Response to noise varies by the type and characteristics of the noise source; distance from the source; receptor sensitivity, and time of day. Noise can be intermittent or continuous, steady or impulsive, and it may be generated by stationary or mobile sources. Noise is described by a weighted sound intensity (or level), which represents sound heard by the human ear and is measured in units called decibels (dB). The potential impacts of underwater sounds associated with dredging operations have come under increasing scrutiny by regulatory agencies.

New Haven has functioned as an international harbor since colonial times. Over the last 300 years, New Haven has evolved to accommodate the growing shipping industry as larger vessels continued to arrive. At the same time, recreational and other commercial boat traffic and industrial noise has continued to increase. Several sources of ambient noise are present in New Haven Harbor. The ambient noise level of an area includes sounds from both natural (wind waves, fish, tidal currents, mammals) and artificial (commercial and recreational vessels, dredging, pile driving, etc) sources. Tidal currents produce hydrodynamic sounds, which are most significant at very low frequencies (< 100 Hz). Vessel traffic, including vessels passing the immediate study area, generate sounds that can travel considerable distances, in frequencies ranging from 10 to 1000Hz. Sea state (surface condition of the water characterized by wave height, period, and power) also produces ambient sounds above 500 Hz. As a commercial and industrial area, New Haven Harbor experiences a wide range of noise from a variety of industrial activities. Biological sounds associated with mammals, fishes, and invertebrates can also generate broadband noise in the frequency of 1 to 10 kHz with intensities as high as 60 to 90 dB.

New Haven Harbor has the typical noise characteristics of a busy harbor. Sources include recreational and commercial vessel traffic, dredging vessels and dockside facilities. Noise sources for vessels include cranes, whistles and various motors for propulsion. Dockside noise sources include cranes, trucks, cars, and loading and unloading equipment. In addition to the noise in the water/marine environment, noise can impact the human environment. Background noise exposures change during the course of the day in a gradual manner, which reflects the

addition and subtraction of distant noise sources.

3.15 Coastal Barrier Resources

The Coastal Barrier Resources Act (CBRA) was enacted by Congress in 1982. The CBRA was implemented to prevent development of coastal barriers that provide quality habitat for migratory birds and other wildlife and spawning, nursery, nesting, and feeding grounds for a variety of commercially and recreationally important species of finfish and shellfish. As a deterrent to development, federal insurance is not available for property within designated high-hazard areas. These high-hazard areas are called CBRA Units.

CBRA Units are areas of fragile, high-risk, and ecologically sensitive coastal barriers. Development conducted in these areas is ineligible for both direct and indirect federal expenditures and financial assistance. Along with CBRA Units are Otherwise Protected Areas (OPAs). OPAs are national, state, or local areas that include coastal barriers that are held for conservation or recreation. The only federal funding prohibition within OPAs is federal flood insurance.

There are two OPAs located within New Haven Harbor, the Morse Park Unit (CT-15P) and the Nathan Hale Park Unit (CT-14P) (Figure 3-3). The Morse Park Unit covers Sandy Point and portions of West Haven Beach to the west of the New Haven Harbor FNP, while the Nathan Hale Park Unit covers Fort Hale Point to the east of the FNP.

Habitats in both units include intertidal sand shoals (estuarine intertidal unconsolidated shore wetlands), shallow open water (estuarine subtidal unconsolidated bottom), marsh (estuarine intertidal emergent wetland), and uplands (dunes and maritime forest). Wetlands of the units provide spawning, nursery, and feeding habitat for commercially and recreationally important species of estuarine-dependent fish and wildlife. The units also provide feeding, nesting, and resting areas for piping plover, terns, shorebirds, and wading birds.

Figure 3-3: Otherwise Protected Areas in New Haven Harbor

3.16 Cultural and Historic Resources

Pre-Contact Period

Archaeologists have typically divided the Northeast, including the southern New England area into three general periods: PaleoIndian, Archaic and Woodland with the latter further subdivided into Early, Middle and Late categories. Each period is defined based on distinctive material culture, land use patterns, and social themes as displayed in the archaeological record (Cherau et al. 2010:15). Current models of sea level rise indicate that the sea level was about 300 feet below its current mean level. Hypothetically, the New Haven Harbor study area was likely located above sea level and was exposed land for occupation by Native peoples throughout the Pre-Contact Period (Cherau et al. 2010:15).

PaleoIndian Period (12,000-10,000 Before Present (BP))

The PaleoIndian period is generally characterized as bands of mobile hunters and gatherers who exploited large game as well as available plant species depending on the availability and distance from glacial lakes, ponds, rivers, streams and wetlands. The only PaleoIndian sites excavated in Connecticut are located on the Housatonic River in Washington, in Seymour, on the Mashantucket Pequot Reservation in Mashantucket, and overlooking the Thames River Valley in Groton (Cherau et al. 2010: 18-19).

Archaic Period (10,000-3,000 BP)

The Archaic Period is characterized as a time of increased exploration and settlement of southern New England along with a more diversified exploitation of animal and plant sources. Hunting and gathering is the primary means of subsistence along with seasonal movements to exploit specific resources in a variety of environments (Cherau et al. 2010:20).

Woodland Period (3,000-450 BP)

In southern New England, the Woodland Period is characterized by an increased use of ceramic vessels for food storage and preparation and the introduction of horticulture in the form of crops such as corn, beans and squash. Regionally, sites are larger in size and complexity and display a pattern of increased sedentism. Coastal shell midden sites increased in frequency during this period and indicate greater exploitation of coastal areas and resources along beaches, bays, estuaries, and salt marshes with increased use of shellfish. This subsistence pattern continued well into the Contact Period (Cherau et al. 2010:28-29).

Southern New England has been home to Native American people going back at least about 12,000 years before the present day. At least 12 Tribes are documented for the region, with the Quinnipiacs being one of the coastal Tribes that inhabited the southern half of the Central Valley region of Connecticut (Cunningham 1995:12).

Historic Context

New Haven was first visited by the Dutch before the arrival of English settlers. In 1614, the Dutch referred to the location of New Haven as “Red Mount.” The area was originally known as Quinnipiac from the name of the local Indian Tribe who also provided the name for the nearby river on the eastern boundary of New Haven. The community of New Haven was originally settled by a group of more than 250 Boston colonists led by John Davenport and Samuel Easton. In 1638, Davenport and Easton claimed the coastal land between Saybrook and Fairfield then known as Quinnipiac. This purchase included all lands within the former limits of the old towns of New Haven, Branford, and Wallingford and the towns of East Haven, Woodbridge, Bethany, Meriden, North Branford, Cheshire, Hamden, North Haven and Orange (Cherau et al. 1997:73).

Commerce and trade flourished during the Colonial Period (1675-1775) with the construction of warehouses and wharves for the West Indies trade. Yale University, originally known as the Collegiate College, was established in Saybrook in 1701 and moved to New Haven in 1716 and renamed Yale University. It was the third college established in the colonies after William and Mary and Harvard. New Haven became one of the leading manufacturing centers of central Connecticut during the Early Industrial Period (1830-1850). Industrial growth helped improve the transportation system with the construction of railroads and bridges across the Connecticut River. The Farmington Canal was constructed in 1835; however, by the mid-1840's, plans were made to convert the canal to a railroad (Cherau et al. 2010:43,46).

Industrial development in the late 19th Century included arms production, hardware and machine tools. New Haven became the center for the production of arms with the Winchester Repeating Arms Company in 1870 and the Marlin Firearms Factory. Following World War II, suburban development altered the rural landscape of New Haven and surrounding towns. Housing developments and industrial parks replaced farmland and the interstate highway system was initiated in 1956 with the construction of Interstates 95 and 91. Today, New Haven and the surrounding New Haven County are densely populated and the economy is characterized by agricultural, commercial, industrial and recreational pursuits (Cherau et al. 2010:47-8).

Previous Studies

USACE 1981 Feasibility Study

USACE completed a Feasibility Report for New Haven Harbor channel improvements in 1981. As part of this study, a cultural resources reconnaissance was conducted by staff archaeologist, John Wilson and others. No historic properties were identified. The shoreline, particularly on the west side of the harbor, has been so disturbed by harbor development that it no longer has historic archaeological significance. Deposition within the harbor, especially at the confluence of the Mill and Quinnipiac Rivers, has likely covered any potential underwater Native American archaeological sites with overburden of an unknown depth. Additionally, commercial oyster harvesting within the harbor has also disturbed sediments to some extent. However, due to sea level rise along the Connecticut, the possibility of submerged Native American sites on what was previously dry land is possible in undisturbed areas. Historic artifacts from nearby Fort Nathan Hale, on the eastern side of the harbor and currently on the National Register of Historic Places, are possible and should be brought to the attention of the dredging team.

Although Native American sites were recorded for the general New Haven Harbor area, none were recorded specifically within the project area. Most of the recorded sites were located on the Quinnipiac, Mill and West Rivers flowing into the harbor as well as on the eastern shore. However, any sites on the eastern shore were likely destroyed by industrialization. An

archaeological sensitivity map completed as part of the 1981 cultural resources reconnaissance indicated high sensitivity at the confluence of the Quinnipiac and Mill Rivers and in the vicinity of Fort Nathan Hale on the eastern shore. Areas of medium sensitivity include the East Shore Park and Lighthouse Park shorelines, also in the eastern shore (Wilson 1981: 5-18 and Figure 2).

PAL Long Island Sound 2010

During preparation for the Long Island Sound (LIS) Dredge Material Management Plan (DMMP), USACE was required to conduct background research and develop a cultural resources inventory for historic, archaeological, and underwater archaeological properties along LIS including the coast of Connecticut, New York and Rhode Island. The DMMP Area of Potential Effect (APE) also included New Haven Harbor. In addition to preparing a Geographic Information System (GIS) database for all historic properties that are included or eligible for inclusion on the National Register of Historic Places (NRHP), this inventory also provided archaeological sensitivity maps for terrestrial and underwater archaeological resources within the project APE.

Within the city of New Haven, one district and eight individual properties are designated as National Historic Landmarks. Twenty-one districts (two of which are located in both New Haven and Hamden) and 29 individual properties are listed or eligible for listing in the NRHP. An additional seven districts (one located in both New Haven and Hamden) and 27 individual properties are listed in the State Register of Historic Places (Cherau et al. 2010:88).

According to Public Archaeology Laboratory's (PAL) 2010 inventory, a total of 23 Pre-Contact and Post-Contact Period sites have been recorded for New Haven, only one of which has been determined eligible for the NRHP. The Pre-Contact sites consist primarily of Archaic and Woodland Period camps in coastal locations around New Haven Harbor and associated river confluences. The Post-Contact Period sites are primarily industrial sites from the 17th to the 20th Centuries, including the Cruttenden Carriage Works which has been determined to be eligible for the NRHP (Cherau et al. 2010:88).

There are eight reported shipwrecks and obstructions in the vicinity of New Haven Harbor, with the waters surrounding New Haven characterized as having moderate archaeological sensitivity (Cherau et al. 2010:89).

3.17 Aesthetics and Recreation

New Haven Harbor supports a recreational fleet based at the marinas along the harbors tributaries (West River and Quinnipiac River). There are also harbor access points (e.g., power-boat ramps, canoe and kayak ramps, parks, and trails) along both the eastern and western shorelines. The number of existing and projected deep-draft vessels transiting the harbor is of minimal concern to recreational traffic as the majority of the recreational traffic occurs outside of

the Main Channel. No recreational facilities are included in the proposed project.

New Haven Harbor and its associated beaches, intertidal flats, marshes, open water areas are valuable resources that are utilized by the public as fishing areas, recreational boating areas (including boat launching), hiking areas, and public swimming areas. The park lands (see Section 3.1) and trails that border New Haven Harbor provide access to scenic views of the harbor and Long Island Sound.

3.18 Socioeconomics

New Haven

In 2015, 130,322 people and 49,771 households resided in the city of New Haven. Of the 49,771 households in New Haven, 28.9% are owner occupied. The median value of owner-occupied housing units was $191,800. The median gross rent is $1,100. The average household size was 2.43. The racial makeup of the town in 2013 was 32.0% White, 33.1% African American, 0.2% Native American, 4.8% Asian, 0.1% Pacific Islander, 26.9% Hispanic or Latino, and 2.9% from two or more races. Of the town population, 48.2% were male and 51.8% were female; 7.1% were under 5 years, 22.8% were 5 years to 19 years, and 9.2% were over 65 years. The median age is 30.3. The median household income for the city of New Haven was $37,192 and the per capita income was $23,527. Approximately 26.6% of the population were below the poverty level (U.S. Census Bureau 2015a; www.city-data.com/city/New-Haven-Connecticut 2014).

The population per square mile in 2010 was 6,947.9 and the land area in square miles is 18.68. The population with a high school diploma in percent of people 25+ years is 83.0%. Those holding a bachelor's degree or higher in percent of people 25+ years is 34.4%. Unemployed population in 2013 was 13.8%. Persons without health insurance under 65 years of age is 14.0%. Those working in the civilian labor force being 16 years or higher is 64.0%, and of these 61.9% were female.

West Haven

In 2016, 54,843 people and 19,961 households resided in the city of West Haven. Of the households in West Haven, 55.5% are owner occupied. The median value of owner-occupied housing units was $193,800. The median gross rent is $1,085. The average household size was 2.6. The racial makeup of the city in 2017 was 64.0% White, 20% African American, 0.3% Native American, 4% Asian, 7% Hispanic or Latino, and 4.5% from two or more races. Of the town population, 50% were male and 50% were female; 5.1% were under 5 years, 19.9% were 5 years to 19 years, and 13.2% were over 65 years. The median household income for the city of West Haven was $50,831 and the per capita income was $26,197. Approximately 15.4% of the population were below the poverty level (U.S. Census Bureau 2017; https://www.census.gov/quickfacts/fact/table/westhavencityconnecticut/PST045217).

The population per square mile in 2010 was 5170.2 and the land area in square miles is 10.75. The population with a high school diploma in percent of people 25+ years is 87.4%. Those holding a bachelor's degree or higher in percent of people 25+ years is 21.9%. Persons without health insurance under 65 years of age is 11.2%. Those working in the civilian labor force being 16 years or higher is 67.1%.

3.19 Sediments

The following section describes the sediments found within the possible dredged material placement locations. A description of the New Haven Harbor sediments to be dredged by the proposed improvement dredging project can be found in section 2.3.5.

Shellfish Creation Area

The sediments in the shellfish creation area are predominately fine grained silts and clays. Table 3-7 provides the grain size distribution of the existing sediments in the area. A small area of hard bottom habitat was identified in the southwestern portion of the site (Figure 3-4).

Table 3-7: Summary of Grain Size Results, New Haven Harbor Shellfish Creation Area

Sample ID	% Cobble	% Gravel		% Sand			% Fines
		Coarse	Fine	Coarse	Medium	Fine	
Station 8	0.0	0.0	0.0	0.2	0.9	2.7	96.2
Station 9	0.0	0.0	0.0	0.1	1.7	5.8	92.3
Station 10	0.0	0.0	0.0	0.0	0.6	8.4	91.0

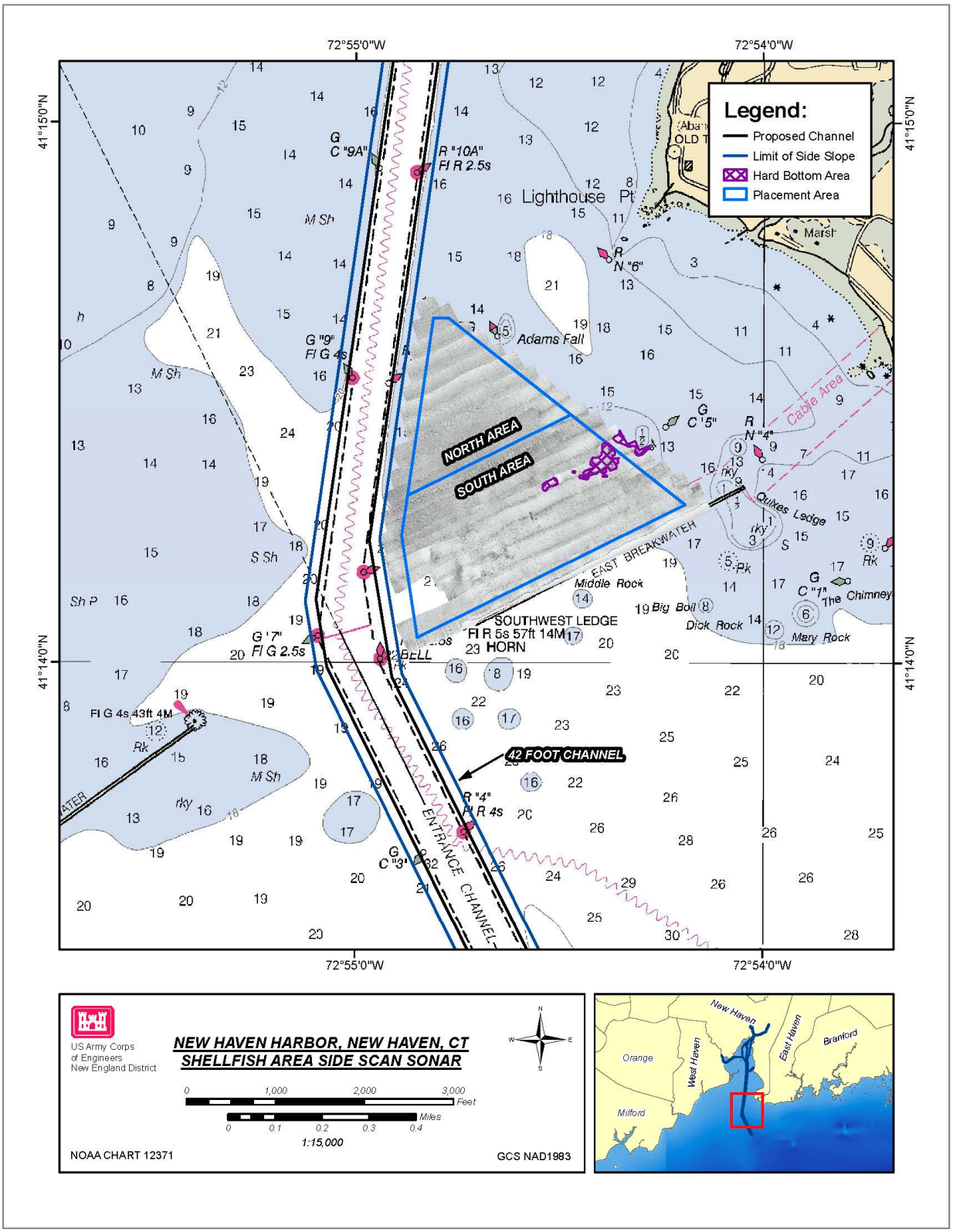


Figure 3-4: Shellfish Creation Area

West River Borrow Pit

The sediments in the West River Borrow Pit (Figure 3-5) are predominately fine grained silts with some fine sands. Sediment type was determined by side scan sonar and visual descriptions of sediment grabs.

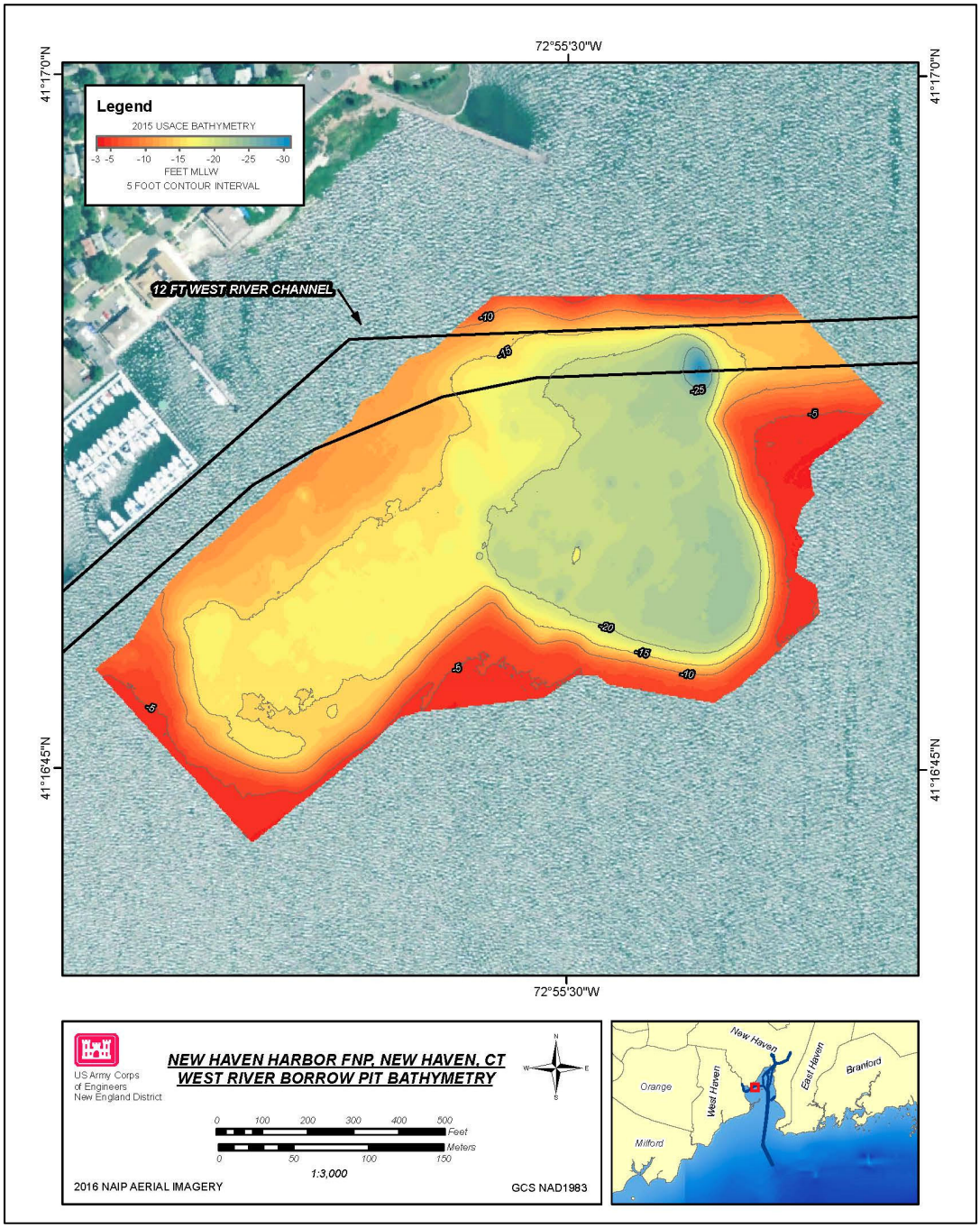


Figure 3-5: West River Borrow Pit

Morris Cove Borrow Pit

The sediments in the Morris Cove Borrow Pit (Figure 3-6) are predominately fine-grained sands and silts. Sediment type was determined by sediment profile imaging performed by the USACE DAMOS program in 2011 (AECOM, 2012).

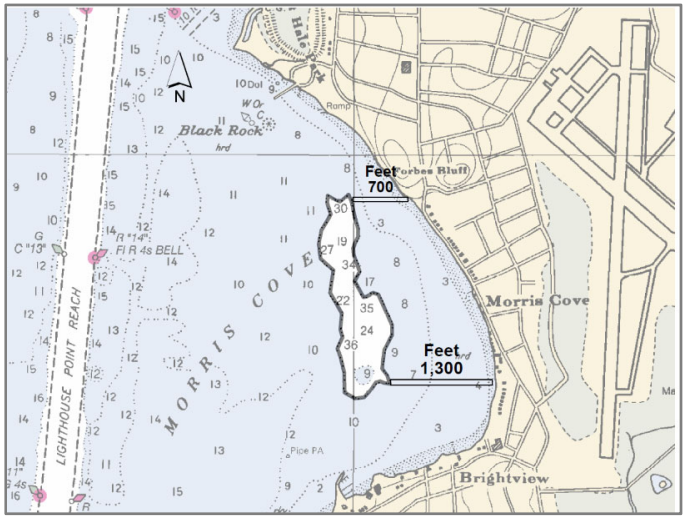


Figure 3-6. Morris Cove Borrow Pit.

Rock Placement Area

The sediments in the rock placement area (Figure 3-7) are predominately fine-grained sands and silts. Sediment type was determined by side scan sonar and visual descriptions of sediment grabs.

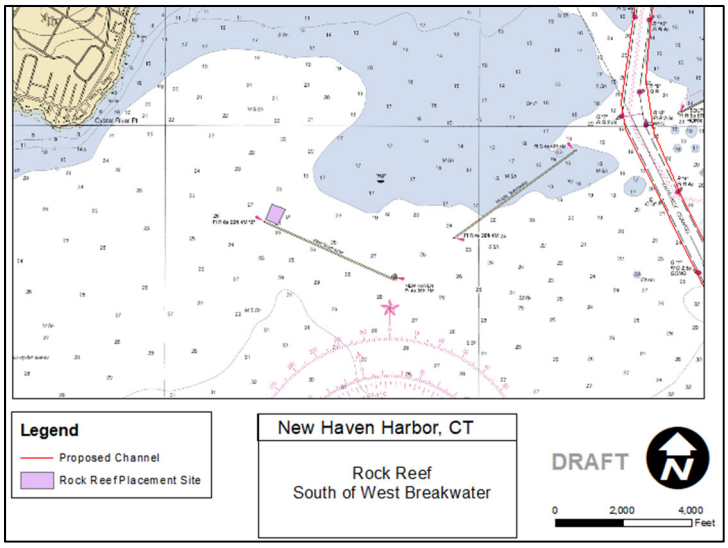


Figure 3-7: Rock Placement Area

Sandy Point Salt Marsh Creation Area

The surficial sediments in the salt marsh creation area are predominately fine-grained sands and silts. Sediment type was determined by visual descriptions of sediment grabs as well as core samples taken for archaeological analysis. See Figure 3-8 for aerial view of site.

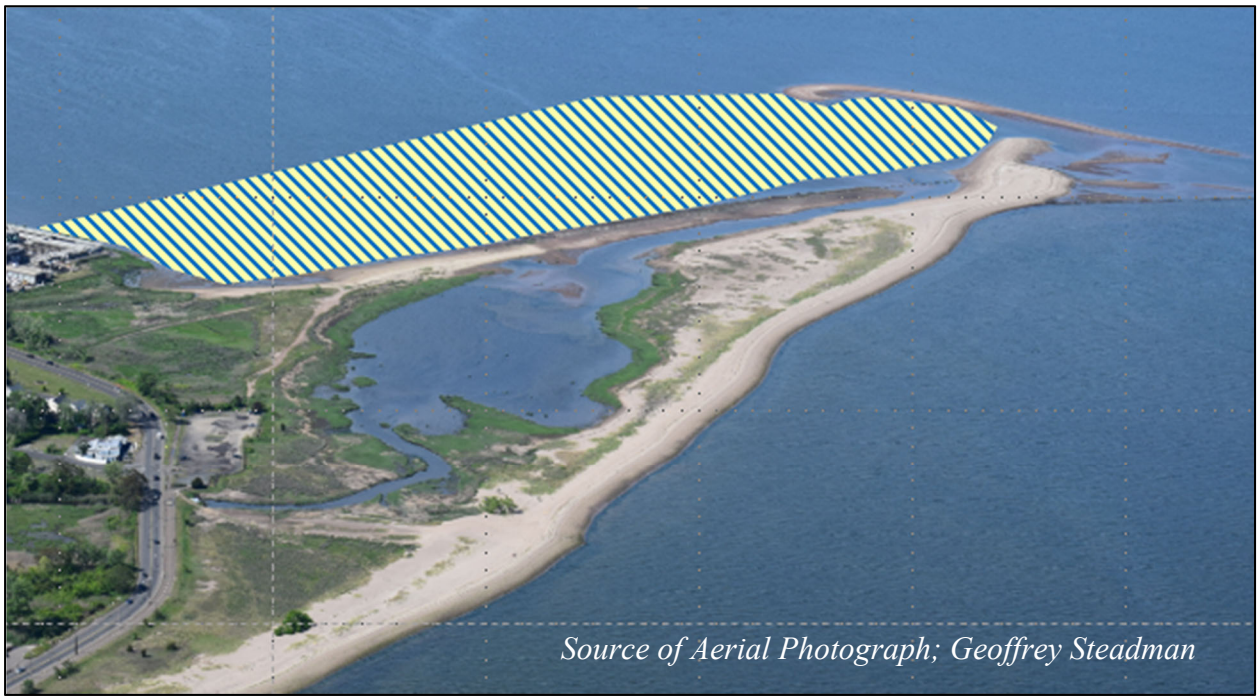


Figure 3-8: Sandy Point Salt Marsh Creation Area

4.0 PLAN FORMULATION

4.1 Navigation Inefficiencies

The goal of USACE deep draft navigation projects is to lower transportation costs. This is done by providing conditions that allow for better utilization of present vessels, or by use of larger, more efficient vessels. Currently, New Haven Harbor has inadequate depth in the Federal channel, which results in significant tidal delays for larger vessels, lightering of vessels, light-loading, and restrictions in the size of vessels that can be used to bring cargo to the port.

4.2 Problems and Opportunities

Problems: Navigation transportation delays & inefficiencies occur due to inadequate Federal project depth (main channel and turning basin). Large ships delay transit to use high tide to transit the channel, light-load at their ports of origin, and/or lighter outside the harbor (anchorage 3 to 6 miles off shore in Long Island Sound). Lightering operations can be adversely affected by the weather and this causes additional delays. Lightering of liquid petroleum products also carries a risk of spills and environmental impacts in Long Island Sound.

Problem #1: Transportation inefficiency

- Large ships experience transit delays or have to lighter due to existing depth of channel
- Existing channel depths limit ship cargo capacity and thus terminals cannot take advantage of economies of scale

Problem #2: Maneuverability concerns

- Existing channel dimensions are not optimal for large ships increasing the risk of an accident

Opportunities: An opportunity provides a chance to create a future desirable condition and potential ways to address the specific problems within the study area.

Opportunity #1: Navigation Efficiency

- Eliminate or reduce navigational restrictions and inefficiencies (i.e., channel depth)

Opportunity #2: Improvements to Main Ship Channel

- Increase maneuverability for large ships (i.e., bend easing)

Opportunity #3: Beneficial Use

- Work with Non-Federal interests for beneficial use of dredged material including habitat creation and coastal resiliency

4.3 Planning Objectives

The primary objective over the 50-year period of analysis[2] is to reduce marine transportation costs and operational inefficiencies for tankers, bulk carriers, and general cargo ships using New Haven Harbor caused by the current federal navigation project channel dimensions. The objectives are to:

- Provide conditions that reduce existing tidal delays and lightering
- Provide conditions that accommodate identified growth in bulk and liquid cargo
- Provide conditions that support a shift to large ships
- Provide conditions that support improved maneuverability for deep-draft ships at New Haven Harbor

A second objective is to consider beneficial use of dredged material and incorporate beneficial use in the project dredged material placement options.

4.4 Planning Constraints

Planning constraints are restrictions that limit the planning process and the available scope of solutions to the identified problems, or that limit consideration of opportunities. Alternative plans are formulated in a manner that meets the planning objectives while avoiding the planning constraints. Planning constraints may be physical (bridges, landmasses, utilities), institutional (legal or legislative), economic, environmental, or cultural resources. The following constraints were identified for the New Haven Harbor study and will be considered during the plan formulation and evaluation process.

- Open water placement of dredged materials in Long Island Sound is limited to EPA designated sites under the Marine Protection, Research and Sanctuaries Act, consistent with the January 2016 LIS DMMP and FPEIS.
- Minimize to the extent practicable any impacts of channel modifications with New Haven Harbor's shellfish Industry
- Avoid or minimize negative impacts to the Environment and Natural Resources including but not limited to protected species, essential fish habitat, water quality, and cultural resources

4.5 Future Without-Project Conditions

The future without project alternative or no-action alternative is the condition expected to occur in the project area in the future should no action be taken by the Federal government to improve the existing Federal navigation project at New Haven Harbor. The future without project conditions are compared to the with-project conditions (study alternatives) to identify project benefits and environmental effects of the alternatives. A 50-year period of analysis is used from

[2] The base year for the 50-year period of analysis of the alternatives is 2023. This is the year when economic benefits of the alternatives are anticipated to begin to occur.

the time the project is operational and begins to accrue benefits.

In the future without project condition it is assumed that the port at New Haven will continue to operate. The future without a navigation improvement project assumes that the existing channel would be maintained at the authorized depth of -35 feet MLLW. The tidal delays and lightering currently experienced would continue to occur. Without an improvement project, shippers would continue to be limited in the size of vessel they can use to call on the Port, leaving them unable to achieve the economies of scale of larger vessels. Many shippers, particularly of bulk commodities, prefer to use larger vessels with lower overall costs per ton, particularly for trips over long distances (from South America or Europe). Without a project, the degree to which commodities brought to the Port can be shipped on the most cost-effective vessels would be limited by the 35-foot authorized channel depth. This will impact commercial navigation at the Port. The quantitative analysis of transportation cost for the without project condition is presented in Section 5.5 of this report and in the Economic Appendix.

There are no specific tide or weather windows in New Haven Harbor. Storm conditions that present safety hazards are taken into consideration by pilots prior to the action to bring a ship into port. The specific safety clearance is 4 feet (2 feet. of UKC and allowance of 2 feet for squat).

4.6 Formulating Alternative Plans for Navigation Improvements

Plan Formulation Rationale - Plans formulation is the process of building alternative plans that meet planning objectives and avoid planning constraints. Management measures are the "building blocks" for all alternative plans. They are specific actions, ideas, programs, regulations that can be taken to address objectives. Management measures for New Haven Harbor were crafted through discussions between the Project Delivery Team (PDT) and stakeholders, review of past New Haven Harbor reports, and review of other USACE navigation reports. Measures identified were then screened qualitatively against criteria of effectiveness (contributes to planning objectives), efficient (cost-effective measure), and environmental concerns.

4.6.1 Non-Structural Navigation Improvement Measures

<u>Utilize Favorable Tides</u>

Ship operators and pilots use higher tides to allow movement of ships that cannot pass through channels at low stages of the tide. Constrained deep-draft ships (ships with drafts in excess of 31 feet) must wait for higher tide to move in the main channel. The specific safety clearance is 4 feet (2 feet. of UKC and allowance of 2 feet for squat). This delay results in additional transportation costs. Pilots prefer to bring the large ships in with good visibility conditions due

to the width of the channel. Although no ship grounding has occurred to date, there is a risk that deeper draft ships relying on the tide for water depth could ground if delayed during transit. This practice is already in place and is expected to continue in the future without project condition.

Lightering

At times ship operators offload, or lighter, a portion of their oil cargo or bulk cargo to barges in Long Island Sound prior to entering the port. This technique is used when arrival ship draft does not allow transit over the 35-foot deep channel even at high stages of the tide. After offloading, both lightened ships and barges deliver their cargos to harbor terminals. Although this practice adds expense to transportation costs, lightering does allow for economies of scale with large ships for ocean transit. Lightering of petroleum products increases the risk of a spill. This practice is already in place and is expected to continue in the future without project condition.

Utilize Other Ports and Intermodal Transport

Alternative delivery sites and methods would divert traffic from the New Haven Port waterways to other locations. New Haven Harbor is the largest and busiest port in of Connecticut. The port has a dense array of receiving, handling, and distribution facilities and serves a significant percent of the petroleum market in southern and western New England. Shifting commerce to another port in an adjacent state and trucking is possible, but economic market forces appear to favor continued use of New Haven Harbor even with current navigation efficiencies. Terminal facilities and other shore infrastructure at other ports would need to be modified to receive additional cargo. It is likely that increased use of truck transport to move cargo would result in added truck traffic to the crowded Interstate 95.

4.6.2 Structural Improvements

The location and alignment of the existing channel, terminals, and breakwaters limited the formulation of practicable structural improvement alternatives that meet the objectives. The current Federal channel passes through the breakwaters then heads directly north to the terminals. The structural improvement measure identified to meet objectives is to deepen the existing Federal channel and turning basin (see Figure 4-1).

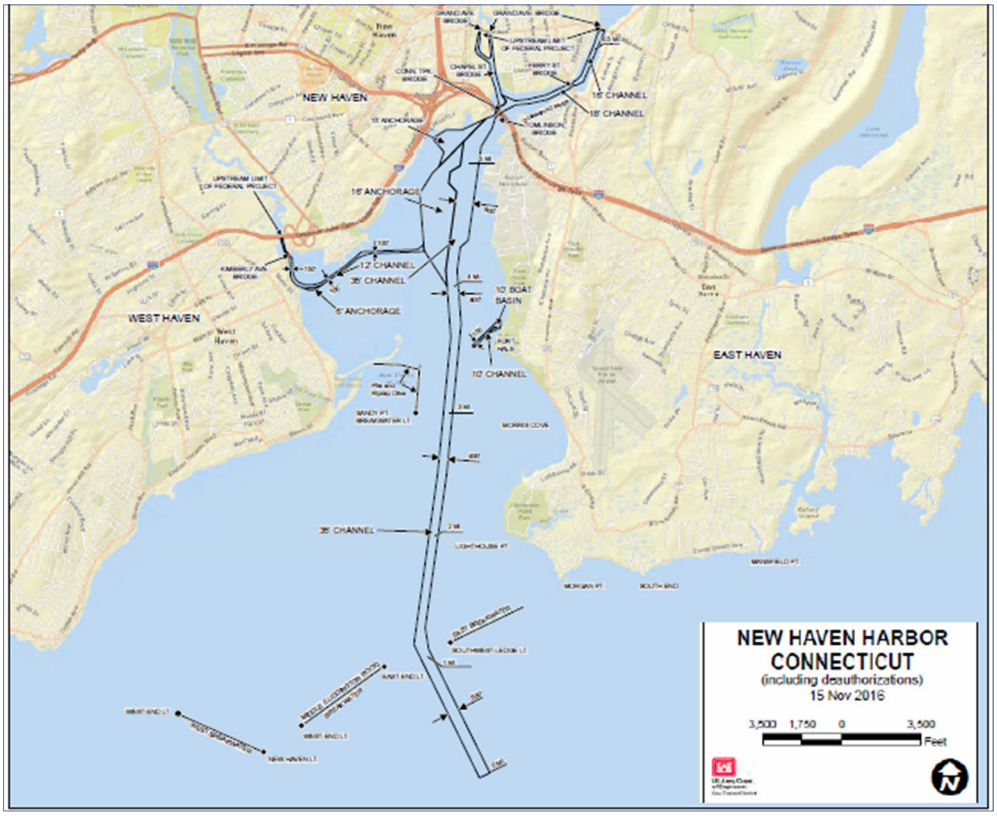


Figure 4-1: Existing Channel Location

4.6.3 Screening of Measures

Screening of measures is presented in Table 4.1 below.

Table 4-1: Screening of Measures

Measure	Effective (Reduce Transportation Cost at Harbor)	Efficient	Environmental Concerns	Carry Forward
Utilize high tide (~6 foot tide range)	Yes, allows for use of deeper draft ships with delays	Yes, but delays reduce benefit	Episodic, grounding may cause impacts	Yes, ✓ part of without project (No Action Alternative)

Lightering	Yes, allows for use of deeper draft ships with transfer of cargo in LIS	Yes, but lightering costs reduce benefit	Episodic, transfer of petroleum products may result in a spill	Yes, ✓ part of without project condition (No Action Alternative)
Measure	Effective (Reduce Transportation Cost at Harbor)	Efficient	Environmental Concerns	Carry Forward
Utilize other Ports with deeper channels and Intermodal Transportation	No, Increased handling of cargo with use of distant ports	No, Investments in infrastructure at New Haven is lost	Long term, increased air pollutant emissions due to increased truck traffic	No X
Deepen channel and turning basin	Yes, provides deeper channel and turning basin for large ships	Yes	Short-term impacts during construction	Yes ✓

4.6.4 Alternatives to Carry Forward

Channel and turning basin deepening of the FNP was carried forward from the screening of measures. The current channel depth is -35 feet MLLW. It was determined based on review of the drafts of the ship using the channel and professional judgment of experienced USACE planners to bracket depths from -37 feet to -42 feet MLLW for the focused alternatives analysis and, if net benefits dictated, revisit this range to incorporate additional depth alternatives. Lightering and use of the tide was also carried forward in the without project (no action) alternative.

The FNP project features to be deepened under each alternative include the entrance channel, main ship channel including northern portion of the maneuvering area, and the turning basin. The channel, bend at the breakwaters, and the turning basin would also be widened to meet channel design requirements.[3] Widening does not provide additional transportation cost

[3] Deepening alternatives include widening the channel, turning basin, and bend to meet USACE design requirements (USACE, Hydraulic Design of Deep-Draft Navigation Projects, EM 1110-2-1613, 31 May 2006).

savings, but is required to meet USACE design requirements for deep draft vessels. Below is the list of alternatives carried forward.

Final Array of Alternatives Carried Forward

- No Action or Continuation of Future Without-Project Condition
- Alternative 1: Deepen project features to -37 feet – widen channel, turning basin, and bend
- Alternative 2: Deepen project features to -38 feet – widen channel, turning basin, and bend
- Alternative 3: Deepen project features to -40 feet – widen channel, turning basin, and bend
- Alternative 4: Deepen project features to -42 feet – widen channel, turning basin, and bend

The above improvement alternatives were evaluated along with the dredged material disposal options identified for the project including identified locally supported beneficial use.
The DMMP for the Long Island Sound region was completed in January 2016 by the USACE and US EPA. The DMMP included evaluation of potential disposal sites for New Haven Harbor Improvement dredged material. This DMMP was used as the starting point to develop the dredged material placement options including beneficial uses for the dredged material. See Section 5.2 below.

5.0 ALTERNATIVES

5.1 Navigation Improvement Alternatives

The navigation improvement alternatives are discussed below. See Figure 5-1 for navigation project features.

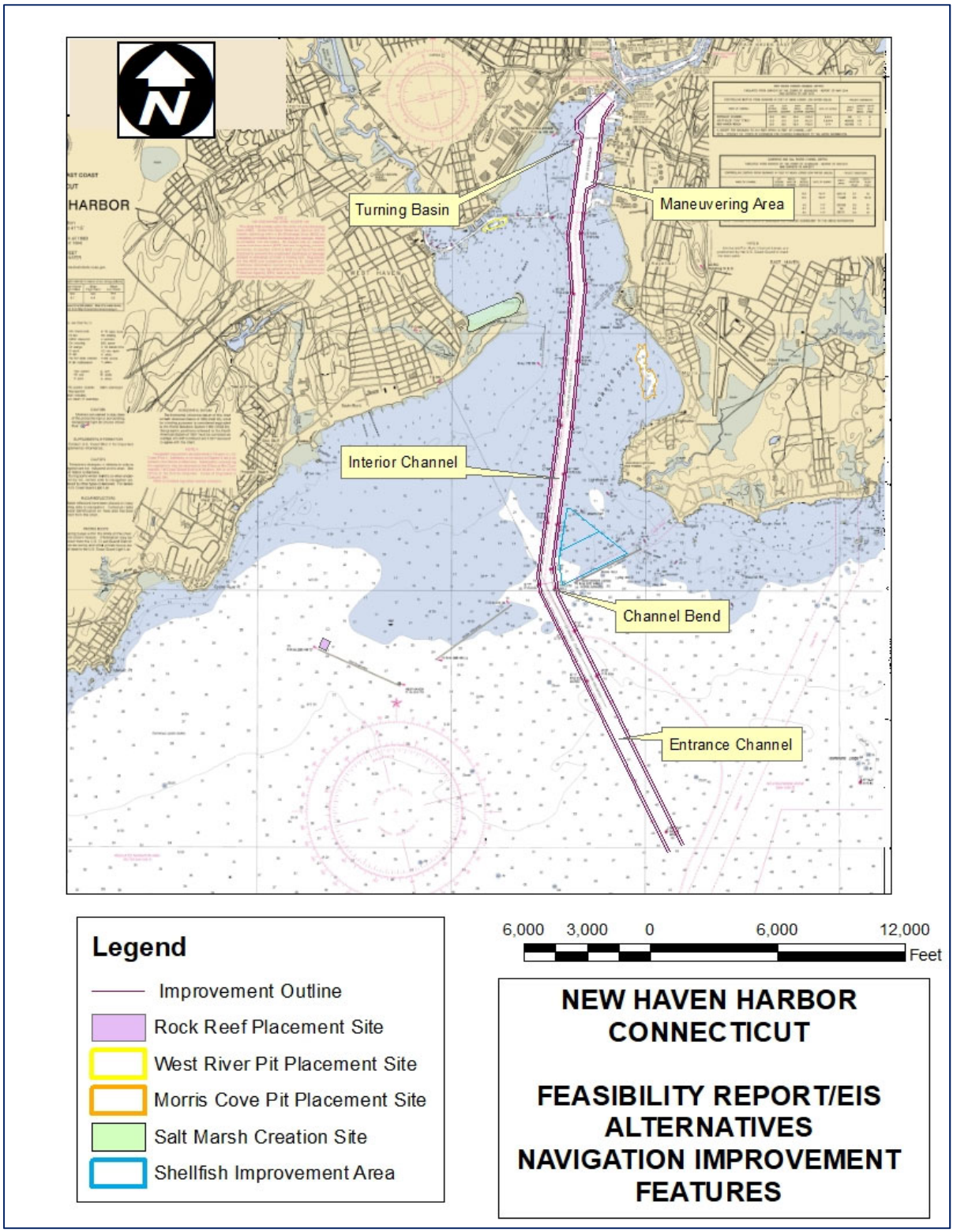


Figure 5-1: Alternatives, Navigation Improvement Features

5.1.1 Channel, Maneuvering Area, and Turning Basin Depth

Four alternative plans at depths of 37, 38, 40, and 42 feet MLLW were evaluated. The depths considered were commensurate with the existing shipping practices and vessel sizes.

5.1.2 New Haven Design Vessel

The design vessel was identified based on input from the terminal operators and harbor pilots regarding the vessels that use the harbor and data on sizes of vessels currently using the harbor, and expected to continue to use the harbor. Liquid tankers and the bulk carriers are the primary movers of commodities in and out of the harbor. The largest tanker vessels calling at the Port of New Haven are Panamax tankers and the second largest vessel class and more common tanker vessel size is the medium range tanker. The largest bulk carrier vessels calling the Port of New Haven are Panamax bulk carriers. The second largest vessel class and more common vessel size is the Handymax bulk carrier. Deep draft vessel sizes that commonly visit the New Haven Port are shown below in Table 5-1.

Table 5-1: Deep Draft Vessel Sizes that Commonly Visit the New Haven Port

	DWT*	LOA** (feet)	Beam (feet)	Draft (feet)	
Tanker	35,000-50,000	551-624	88-106	33.0-44.3	Petroleum Products; General Cargo; Chemicals; Primary Iron & Steel Products
Tanker	50,000-60,000	598-715	105-106	39.4-44.3	Petroleum Products; Chemicals; General Cargo
Bulk	40,000-50,000	590-685	96-106	35.3-40.5	Sulfur (Dry), Clay & Salt; Scrap Metal; Chemicals; General Cargo; Primary Iron & Steel Products
Bulk	50,000-60,000	616-647	105-106	36.5-42.5	Sulfur (Dry), Clay & Salt; Scrap Metal; Primary Iron & Steel Products; General Cargo

*Deadweight tons
** Length overall

For the design of channel improvements, the design vessel size selected length overall (LOA) of 700 feet and beam of 106 feet. The design vessel was chosen to ensure the designed channel with improvements would be able to safely accommodate the larger vessels that are likely use the harbor, although in rare cases an even larger vessel could use the harbor.

5.1.3 Channel Width as Design Element

Deep draft ship traffic into and out of New Haven is currently one-way. Based on pilot and shipper input and future number of vessel calls the probability of two or more vessels wishing to use the channel at the same time is small and one-way traffic for New Haven is adequate. Traffic is not limited by the width of the channel. Channel widening as a stand-alone alternative would not provide for marine transportation cost savings. However, although not an alternative, channel width is a design element that is included in the channel design.

A 500-foot inner channel design width and 600-foot entrance channel design width were incorporated into the channel and turning basin deepening alternatives based on engineering evaluation and consultation with the New Haven Pilots. (See Appendix D for engineering calculations.) The wider entrance channel is proposed as navigation in the entrance channel can be adversely affected by rough seas. In addition, New Haven entrance channel is known to have frequent fog that can cause visibility problems.

5.1.4 Channel Bend at the Breakwaters

Other navigation difficulties include safely maneuvering today's larger ships within the confines of the existing channel, most notably at the channel's bend between the breakwaters. The existing channel bend at New Haven is 35 degrees and about 560 feet wide and passed between the middle and eastern breakwaters. The channel cross section of the bend is asymmetric. This means that the channel cross section has different bank conditions on each side of the channel centerline. The banks are very steep and strong bank force effects are experienced.

Ships entering the harbor drift away from channel centerline toward the steep bank. The bank conditions are even stronger for the larger ships. Larger ships (drafting greater than 31 feet) must navigate through the bend under high current conditions. With the existing approach, inbound vessels favor the east side of the channel, lining up nearest the red buoys, in anticipation that they will be set by the east to west flood current and experience bank suction at the bend, which pulls their stern to the west. In order to make this turn and straighten up to make the next set of navigation buoys, ships have to make full use of their rudder and engine, leaving little room for adjustment or error.

The channel bend widening dimension was determined based on engineering calculations (see Appendix D) and consultation with the New Haven pilots to safely accommodate the larger vessels that enter the channel. For the alternatives analysis the bend was widened from 560 feet to 700 feet[4]. Widening of the bend is a project design feature and does not provide stand-alone

[4] The refined design includes widening the bend to 800 feet based on the ship simulation study conducted following the alternatives analysis. See Section 6.1.2 Recommended Plan Design.

transportation cost savings benefits.

5.1.5 Array of Alternatives

Alternatives analyzed were channel and turning basin depths of -35 feet, -37 feet, -38 feet, -40 feet, and -42 feet (Table 5-2). Marine transportation costs would be reduced with the increased use of larger vessels (efficiencies of scale) with the alternatives. Channel and bend widening are included to meet design requirements and do not provide additional transportation cost savings.

Table 5-2: Array of Navigation Improvement Alternatives

Alternative	Deepen the Channel and Turning Basin (Feet MLLW)	Harbor Channel Width (Feet)	Entrance Channel Width (Feet)	Width in Bend at Breakwaters (Feet)
No Action	-35	400	500	560
Alternative 1	-37	500	600	Increase width to 700
Alternative 2	-38	500	600	Increase width to 700
Alternative 3	-40	500	600	Increase width to 700
Alternative 4	-42	500	600	Increase width to 700

The developed alternatives were verified against the four principles and guidelines (P&G) formulations criteria (see Table 5-3). The completeness, effectiveness, efficiency, and acceptability (CEEA) criteria originated in the Principles and Guidelines, published in 1983 by the U. S. Water Resources Council and is used during the Federal study process for water resources planning.

- Completeness: The extent to which each plan includes all the necessary project components to obtain the desired results (i.e. includes channel deepening for transportation cost savings afforded by deeper draft ships and includes widening to meet channel design criteria).

- Effectiveness: The extent to which the plan meets the primary objective of reducing costs and inefficiencies associated with the current federal navigation project. The plan reduces the need for lightering, and awaiting favorable tide conditions, thereby significantly improving navigation efficiency. The plan also meets the objective of improving navigation safety for larger ships by providing sufficient channel and turning basin width and reduced chance of grounding with deeper channel depths.

- Efficiency: The extent to which the plan is the most cost- effective means of meeting the identified objectives.

- Acceptability: The alternative plan is viable with respect to applicable state and federal laws and regulations.

All plans in the focused array meet the CEEA criteria except for the without project condition or "No Action Alternative". However, this alternative is carried forward through evaluation phase as required by NEPA.

Table 5-3: Alternatives Verified: CEEA Criteria

Alternative	Completeness	Effectiveness	Efficiency	Acceptability
	Includes all actions (including those of others) to achieve outputs	Provide navigation transportation cost savings	Likely Cost Effective means of achieving objectives	Plan is viable with respect to applicable state and federal laws and regulations
No Action	No	No	No	Yes
Alt. 1	Yes	Yes	Yes	Yes
Alt. 2	Yes	Yes	Yes	Yes
Alt. 3	Yes	Yes	Yes	Yes
Alt. 4	Yes	Yes	Yes	Yes

5.2 Dredged Material Placement Sites

Recently a new DMMP (USACE 2016) addressed the placement of dredged material from multiple dredging centers in the Long Island Sound including the New Haven Harbor area. The PDT reviewed the recently completed DMMP and worked with stakeholders to identify sites that would meet the Federal Standard for dredged material placement and/or provide the opportunity for beneficial use of the dredged material.

The Federal Standard for dredged material placement is defined in USACE regulations as the least costly dredged material placement alternative (or alternatives) identified by USACE that is consistent with sound engineering practices and meets all federal environmental requirements, including those established under the Clean Water Act (CWA) and the Marine Protection, Research, and Sanctuaries Act (MPRSA).

If a beneficial use is selected for dredged material placement and that beneficial use happens to be (or be part of) the Federal Standard or base plan option for the project (because it is the least costly alternative that is consistent with sound engineering practices and meets all federal

environmental requirements), the costs of that beneficial use are assigned to the navigational purpose of the project and are shared with the Non-Federal sponsor according to the navigation project depth.

Beneficial use project costs exceeding the cost of the Federal Standard (or "base plan") option become either a shared Federal and Non-Federal responsibility, or entirely a Non-Federal responsibility, depending on the type of beneficial use. In summary, while the Federal Standard establishes the limits of Federal participation for navigation purposes (called the Base Plan). However, the USACE has authorities that may allow the government to share in the incremental costs beyond the Base Plan to achieve beneficial use of dredged material for ecosystem restoration and coastal storm damage risk mitigation (such as beach nourishment).

5.2.1 Previous Federal Channel Maintenance Dredging

Maintenance of deep-draft project features since construction in 1950 has occurred nine times with smaller additional actions over the years to remove unclassified hard materials. All maintenance materials removed from the New Haven Harbor FNP since the 1970s have been placed at the CLDS. Over a 50-year period nearly 4.5 million CY have been dredged and placed at CLDS. Most recently, in 2013-2014, approximately 830,000 CY of shoal material was removed from the -35-foot MLLW main harbor channel.

5.2.2 Dredged Material Management Plan

The USACE completed DMMP for Long Island Sound in January 2016. The DMMP recognized that actual decisions on the recommended plan for a project would be made when a particular Federal navigation project was investigated with more specificity in the future. The Federal Base Plan for disposal of material from the main channels at New Haven Harbor, as identified in the January 2016 LIS DMMP and FPEIS was open water placement at the Central Long Island Sound Disposal Site. While this feasibility study will examine that and other alternatives, there is disagreement between the States of Connecticut and New York on the acceptability of open water placement in LIS. The June 2016 Final Rule by EPA modifying the designation of the Central Long Island Sound and Western Long Island Sound dredged material disposal sites called for creation of a Steering Committee and Regional Dredging Team to review dredged material placement proposals, provide comments to regulatory agencies, and help promote beneficial uses of dredged material to reduce over time reliance on open water placement. Non-government organizations active in CT and NY are both opposed to and in favor of continued open water placement.

The LIS DMMP provides an initial screening of sites for dredged material disposal such as beneficial use (e.g., marsh creation, beach nourishment, historic disposal mound capping), open water placement, and upland placement for the New Haven Harbor Navigation Improvement

project. Placement sites were screened based on cost and environmental criteria, the dredged material placement sites identified in the DMMP for New Haven are:

- Beach Placement of any sand at nearby beaches or near shore
- Use as Fill for Coastal Resiliency Projects in the New Haven Harbor Area
- Morris Cove Borrow Pit Fill
- Marsh Creation at Sandy Point Dike
- Open Water Placement at Central Long Island Sound Disposal Site (CLDS)

In addition to the above, four sites the following were added in the scoping phase of this project:

- Oyster Habitat Creation at the East Breakwater
- West River Borrow Pit Fill
- Rock placement at West Breakwater
- And targeted Open Water at CLDS to cover historic disposal mounds

In the "Evaluation and Analysis" phase of this study, additional information was gathered on the characteristics of the dredged material and the potential dredged material placement sites to determine disposal alternatives for the project. Based on material characterization efforts and the finding that materials to be removed are mostly silts, clay, and fine sand resulted in the elimination of the beach placement sites and the elimination of the use of the material for fill for coastal resiliency projects. Based on cost and compatibility analysis the disposal sites that are included in the Plan are filling the Morris Cove and West River Borrow Pits, oyster habitat creation at the East Breakwater, rock placement at the West Breakwater (rock reef), and covering historic disposal mounds at CLDS. An opportunity is also included to create a salt marsh at the Sandy Point in West Haven.

5.2.3 Beach Nourishment

Beach nourishment is the practice of using dredge material (mainly sand) from dredge areas to nourish adjacent beaches. This alternative generally uses a hydraulic pipeline or hopper dredge vessel to dredge the sediments from the shoaled areas and pump/place the material onto the beach or sandbar just offshore (near-shore placement). Beach disposal was considered for the proposed project, however, the sediments to be dredged consist primarily of silts and clays. These fine grained sediments are not compatible with the sediments on the beaches in the region around New Haven, Connecticut.

5.2.4 Use as Fill for Coastal Resiliency Projects

The majority of the sediment to be dredged for the improvement project consists of fine grained material (silts and clays). This material is not suitable for structural fill.

5.2.5 Morris Cove Borrow Pit

Morris Cove, located in New Haven Harbor, contains an existing borrow pit created decades ago when sand and gravel were removed to be used as fill for the Interstate Highway 95 (I-95) embankment in New Haven. The sediments were excavated along a north-northwest to south-southeast axis, resulting in a submerged depression approximately 650 feet wide and 2,450 feet long. Currently, water depths in the vicinity range from about -10 feet MLLW adjacent to the Morris Cove borrow pit, to about -31 feet MLLW within the deepest portion of the borrow pit. Morris Cove has twice been used by the U.S. Coast Guard for placement of suitable fine-grained materials dredged from its LIS Station. The capacity of the Morris Cove borrow pit for the potential deposition of dredged material in the future remains quite large. Approximately 623,000 cy of silty dredged material is recommended to be strategically placed within the pit to fill it to a depth of -11.5 feet MLLW roughly even with the surrounding ambient bottom.

A number of studies have been performed at the Morris Cove borrow pit dating back more than 30 years to evaluate the potential use of the pit for placement of dredged material. These include bathymetric surveys, a dye study, video transects, a sediment-profile imaging survey, a current meter study, and water quality investigations (USACE 2016). In summary, these investigations have determined the following:

- Ecological functionality is diminished in the deeper areas of the pit due to trapping of organic matter and resulting periodic anoxic conditions. The benthic system surrounding the pit is healthy, suggesting that returning to pre-borrow pit depths (i.e., filling it) would return the area to a healthy benthic habitat.
- The tidal currents and potential wave climate over the borrow pit are low enough such that if filled, scouring of the surface is unlikely.
- Lower salinity in the bottom waters of the pit was noted only in a limited number of measurements. Hence, a large and continuous discharge of groundwater to the pit is not expected.
- The National Marine Fisheries Service (NMFS) has also identified Morris Cove as an important spawning and nursery area for a variety of commercially important fish species, including winter flounder. NMFS has expressed concern regarding the presence of the existing borrow pit within Morris Cove. Their concern aligns with the above bullet concerning the ecological functionality of the pit.

Use of the pit for placement of material from New Haven harbor would involve transporting material from the adjacent New Haven channel by scow to the site. This site is close to the dredging area and avoids the longer haul distance to CLDS. This site is a viable placement alternative for material found suitable for open-water placement. This site was retained as a beneficial use site for placement of dredged material.

5.2.6 West River Borrow Pit

This site is located near the West River just south of the river channel. This site was identified to the USACE by the Harbor Master in West Haven at the public meeting in January 2018. The USACE investigated the site and determined that about 87,000 cy of dredged material could be used to fill the pit. This is closer than transport of the material for placement at CLDS. This site is a viable placement alternative for material found suitable for open-water placement. This site was retained as a beneficial use site for placement of dredged material.

Filling the pit will restore the original depth of the sea floor in this area and create habitat suitable for recolonization by benthic organisms. In the current condition, the pit is likely to slowly fill with the sediments. Decomposition of the organic material in the pit may result in anaerobic conditions and generally poor water quality due to limited circulation in the pit.

5.2.7 Shellfish Habitat Creation Area

New England District Staff and Mr. David Carey of the Connecticut Department of Agriculture, Bureau of Aquaculture identified the area behind the East Breakwater as a potential new oyster bed area. The area behind the breakwater ranges from elevation -13 feet MLLW to -25 feet MLLW. The existing substrate within this area is silty, and for oyster bed establishment, the substrate must be a sandy material. The disposal recommendation for the New Haven Deep Draft improvement project is to place a minimum of 2-foot thickness of sandy dredge material within the proposed placement area to encourage oyster bed development. Utilizing a recommended 2-foot depth of sandy material placed on top of the native silty material, the East Breakwater Oyster Bed has a capacity of beneficially re-using all of the of dredge material from the entrance channel and entrance channel extension.

5.2.8 Sandy Point Salt Marsh Creation Area

CTDEEP proposed Sandy Point Marsh as a potential disposal alternative. The concept of this disposal alternative is to beneficially reuse dredged sediment for the purpose of creating new tidal wetland (salt marsh) at Sandy Point. The Sandy Point project site is located along the western shore of the inner New Haven Harbor, just north and in the lee of a spit of land known as Sandy Point, in the vicinity of the West Haven Water Pollution Control Facility at First Avenue, West Haven. The spit that extends along the southern boundary is currently undeveloped and is identified as a bird sanctuary. A stone dike constructed by the USACE in the 1880s extends east from the end of the spit with an outer leg parallel to the entrance channel. The dike was constructed as a control feature to assist in keeping the channel from shoaling. An outfall pipe from the wastewater treatment plant extends through this area and discharges in deeper water offshore. Maintaining both the bird sanctuary and the outfall pipe will be important considerations during the design phase of this project.

The concept for Sandy Point salt marsh (wetland) creation area is to establish a structural perimeter boundary, fill the area with suitable silty dredged material through either mechanical or hydraulic means, and plant wetland vegetation. The goal of the proposed disposal area would be to place the sediment to an elevation where intertidal wetland plant species would thrive. The constructed perimeter of the entire wetland creation cell would be approximately 7,210 linear feet with the overall area measuring approximately 58 acres. Assuming a target elevation for the surface of the wetland of approximately 3.6 feet NAVD88, the elevation would need to be raised by a range of 2.5 feet to 6.5 feet within the wetland creation area. This would enable the cell to receive a total of approximately 657,000 cy of dredged sediment. This project would restore a portion of the historical area of salt marsh to that section of shoreline. The containment will need to resist wave forces to ensure that the material stays within the marsh, and does not wash away. Options for containment included coconut fiber coir logs and fillable geotubes. Diking with sheetwall, rock, and other structural methods of containment were screened out due to their high cost of construction. Fillable geotubes are considered more resistant to wave forces over time than coir logs and were selected as the containment method for the tentatively selected plan.

The containment geotubes can be filled in place in water and dredged materials can be deposited within the containment footprint. Hydraulic placement techniques were assumed for filling the wetland cell. It should be noted that wetland cell construction requires a highly ordered and controlled sequence of dredge material placement to assure that wetland cells are not overloaded beyond the quantities required to achieve the target wetland surface elevation. Further, the time allotted for wetland cell development (i.e. placement of dredged materials, grading and initial planting) is a function of dredged material thickness. Greater dredged material thickness will increase the time required to reach a stable surface ready for planting and will decrease the probability of achieving any particular target surface elevation as dredge materials consolidate.

The salt marsh will be designed with tidal creeks to allow for adequate drainage of both the site and Old Field Creek. During preconstruction engineering design (PED) phase, the wetland final design and detailed construction methods will be developed in coordination with the resource agencies. Additional work in PED will include further review of literature and drainage design.

5.2.9 Rock Reef Creation Area

The proposed plan recommends that the rock removed from the improvement dredging project be placed north of the West Breakwater as rock reef habitat (see Figure 5-1).

5.2.10 Open Water Disposal

The nearest U.S. Environmental Protection Agency (EPA) designated open-water dredged material disposal site is the Central Long Island Sound Disposal Site (CLDS) located about 6 miles from New Haven Harbor breakwaters. Disposal of material at the CLDS is managed by

the Corps and EPA, in accordance with the requirements of the Marine Protection, Research, and Sanctuaries Act (MPRSA) and the Clean Water Act (CWA). The CLDS is also subject to long-term monitoring under the New England District's Disposal Area Monitoring System program (DAMOS). Through this monitoring, the USACE has determined that no significant impacts occur at this site from disposal of dredged material. This site has been used for disposal of dredged material during past harbor maintenance and will continue to be monitored in the future. There are additional benefits of utilizing the improvement dredging material at CLDS Disposal Site. The dredged improvement material can be used to restore historic mounds within the disposal site by placing the suitable material from New Haven Harbor over mounds that predate testing requirements. The site has a remaining long-term capacity of at least 20 million cy (DMMP, 2016).

5.3 Dredged Material Quantity Estimates

5.3.1 Dredge Quantity Estimates by Alternative

Quantities of improvement material to be removed for each alternative is estimated using the hydrographic surveys made in 2000 and 2014 for the project and the proposed channel alignment. The total quantities are shown in Table 5-4 and include an over depth (OD) allowances for dredging of 2 feet. An additional two feet of required dredging was estimated in areas of rock (ER 1130-2-520, Nov 1996, Chapter 8, Dredging).

Table 5-4: Quantity Estimates for Alternatives Analysis

37-FT PROJECT	**Dredging Quantities (CY)**			**Dredging Areas (SF)**
	Cut	2-Feet OD	Total	
Total Improvement Dredging	930,800	1,181,600	2,112,400	9,760,100
38-FT PROJECT	**Dredging Quantities (CY)**			**Dredging Areas (SF)**
	Cut	2-Feet OD	Total	
Total Improvement Dredging	1,534,700	1,242,300	2,777,000	10,707,600
40-FT PROJECT	**Dredging Quantities (CY)**			**Dredging Areas (SF)**
	Cut	2-Feet OD	Total	
Total Improvement Dredging	2,804,900	1,463,700	4,268,600	15,686,700
42-FT PROJECT	**Dredging Quantities (CY)**			**Dredging Areas (SF)**
	Cut	2-Feet OD	Total	
Total Improvement Dredging	3,727,000	1,560,800	5,287,800	18,784,275

Details on quantity estimates are provided in Appendix D. Concurrent with the improvement dredging some Federal maintenance dredging would be required to remove material from the existing project to its authorized depth of -35 feet MLLW. Improvement quantities provided below do not include the current Federal maintenance quantity of 109,700 cy shoal material.

5.3.2 Placement Site Quantities

Table 5-5 and 5-6 includes the quantity of dredged material for the indicated alternative and the identified placement sites. For New Haven Harbor, the least cost placement option is open water disposal at CLDS (DMMP, 2016). However, the PDT was able to identify beneficial use placement sites inside New Haven Harbor that are least cost as they are close to the dredging site and no additional efforts are required to place the material at these sites. These sites are part of the Federal Base Plan for placement of dredged material from the improvement project. These sites provide for reduction in open water placement in Long Island Sound. The PDT also identified the opportunity to create a salt marsh at Sandy Point Dike. This salt marsh site does require additional work for dredged material placement and is more expensive than taking the material to CLDS (~$5.50/cy-increased cost).

Table 5-5: Federal Base Plan Placement Sites

Site/Alternative	37-FT	38-FT	40-FT	42-FT
	CY	CY	CY	CY
CLDS	1,274,090	1,879,890	3,173,490	4,096,776
Oyster Habitat	120,600	169,900	351,300	434,100
Rock Reef	6,600	16,100	32,700	45,815
Morris Cove Borrow Pit	623,310	623,310	623,310	623,310
West River Borrow Pit	87,800	87,800	7,800	87,800
Total Cubic Yards	2,112,400	2,777,000	4,268,600	5,287,800

Table 5-6: Placement Sites with Salt Marsh Creation Beneficial Use

Site/Alternative	37-FT	38-FT	40-FT	42-FT
	CY	CY	CY	CY
CLDS	433,659	1,039,459	2,333,059	3,256,345
Oyster Habitat	120,600	169,900	351,300	434,100
Rock	6,600	16,100	32,700	45,815
Morris Cove Borrow Pit	623,310	623,310	623,310	623,310
West River Borrow Pit	87,800	87,800	87,800	87,800
Salt Marsh Creation	840,400	840,400	840,400	840,400
Total Cubic Yards	2,112,400	2,777,000	4,268,600	5,287,800

5.4 Evaluation and Comparison of Alternative Plans

The PDT used specific economic decision criteria to evaluate and compare plans against each other to determine which plan to select. The 1983 Principles and Guidelines (P&G) for Water and Related Resources Planning dictates that the national economic development benefit (NED account) be the primary decision criteria for selecting a solution. This criteria is based on an estimate of costs and benefits for each alternative and selection of the plan that reasonably maximizes net benefits. Development of costs and benefits for each alterative is discussed below. The PDT also considered three additional accounts established in the P&G to display and compare project effects. These are the environmental quality/impacts, regional economic development, and other social effects accounts. (U.S. Water Resources Council, 1983)

5.5 Cost of Alternatives

USACE Cost Engineering developed cost estimates for use in the economic analysis for each alternative. Costs for the economic analysis use the Federal Base Plan placement sites (the least cost disposal options). Costs included for the alternatives analysis are described below and shown in Table 5-7 and Table 5-8.

Construction Costs

Construction costs were developed for each alternative in MCACES/MII for use in the economic analysis and include all major project components. The construction cost estimates for dredging operations were developed using the Corps of Engineers Dredge Estimating Program (CEDEP) and transferred into MCASES/LII estimating program. CEDEP estimates include costs for mobilization and demobilization, construction plant (dredge, scows, tugs), cost of fuel, labor, insurance, materials, overhead, bond and profit. CEDEP inputs include consideration of the type of material to be dredged, efficiency of dredging operation, and haul distance. The drilling and blasting program includes costs for mobilization and demobilization, and all other costs associated drilling and blasting the rock.

The construction cost estimates includes a contingency estimated by the USACE cost engineer using a cost and schedule risk analyses. Risk considered in estimating contingencies include construction contract modifications, restricted work windows due to environmental conditions, differing conditions, drill and blast and equipment assumptions.

Planning, Engineering and Design (PED)

PED cost estimates include design phase project management, planning and engineering including collection of additional geotechnical information (borings, probes, marine geophysics, laboratory testing), additional agency coordination, and preparation of plans and specifications, costs for reviews, and pre-construction contracting activities.

Construction Management Costs

Cost estimates include project management, contract administration, construction supervision & inspection, engineering during construction, and before and after-dredge surveys and monitoring.

Lands, Easements, Rights of Way (LER)

The area to be dredged and the open water placement areas are below the ordinary high watermark of the navigable watercourse. Therefore, navigational servitude applies and would be invoked for the project.For the beneficial use salt marsh creation site, a temporary work area,permanent road easement, and fee acquisition of land along the edge of Sandy point is required.

Aids to Navigation

No new aids to navigation are needed for the improvement project. The US Coast Guard will relocate the existing floating aids to navigation during construction and will reset those buoys to their new locations once dredging is completed.

Local Service Facilities (LSF)

For the purpose of estimating the LSF costs of the alternatives it was assumed that the benefiting terminals would dredge the deep draft berths to the project channel depth plus 2 feet of overdepth. Deepening the berths was discussed with the terminal operators at site visits in October 2016. The terminal operators agreed to pursue berth deepening as required to realize the benefits of a deeper channel. Cost estimates for berth deepening are included for the alternatives economic cost analysis.

Table 5-7: Costs for Alternatives Analysis, Federal Base Plan

NEW HAVEN HARBOR, CONNECTICUT Federal Base Plan FY18 price level, 2.75% discount rate	37-FT Improvement	38-FT Improvement	40-FT Improvement	42-FT Improvement
FEDERAL BASE PLAN				
Construction Cost	$25,061,000	$38,634,000	$52,274,000	$67,403,000
PED	$1,302,000	$2,008,000	$2,717,000	$3,503,000
Construction Management	$1,302,000	$2,008,000	$2,717,000	$3,503,000
PROJECT FIRST COST	$27,665,000	$42,649,000	$57,707,000	$74,409,000
LSF COST	$800,000	$1,070,000	$2,000,000	$2,800,000
TOTAL	$28,465,000	$43,719,000	$59,707,000	$77,209,000

Table 5-8: Costs for Alternatives Analysis with Salt Marsh Creation Site

NEW HAVEN HARBOR, CONNECTICUT With Salt Marsh Creation Beneficial Use Plan FY18 price level, 2.75% discount rate	37-FT Improvement	38-FT Improvement	40-FT Improvement	42-FT Improvement
BENEFICIAL USE PLAN				
Construction Cost	$31,239,000	$42,562,000	$58,714,000	$73,920,000
PED	$1,623,000	$2,212,000	$3,051,000	$3,842,000
Construction Management	$1,623,000	$2,212,000	$3,051,000	$3,842,000
LER	$157,000	$157,000	$157,000	$157,000
PROJECT FIRST COST	$34,642,000	$47,143,000	$64,973,000	$81,761,000
LSF COST	$800,000	$1,070,000	$2,000,000	$2,800,000
TOTAL	$35,442,000	$48,213,000	$66,973,000	$84,561,000

5.6 Analysis of Economic Benefit of Alternatives

The economic benefit analysis was performed by the USACE Deep Draft Navigation Planning Center of Expertise (DDN-PCX) for the study. The HarborSym model was used for the New Haven Harbor modifications analysis. The model was developed by the USACE Institute of Water Resources in cooperation with the DDN-PCX. It is a planning level, general-purpose model to analyze the economic impacts of various waterway modifications within a harbor. It is a Monte Carlo simulation model that replicated vessel operations within the channel under various scenarios, including existing and future ”without” project conditions as well as “with” project alternatives. See Appendix C for more information the HarborSym model.

There are three primary effects from channel deepening that lead to changes in the future fleet at the Port of the New Haven. The first is an increase in a vessel’s maximum practicable loading capacity. Channel restrictions limit a vessels capacity by limiting its draft. Deepening the channel reduces this constraint and the vessel’s maximum practicable capacity increases towards its design capacity. This increase in vessel capacity results in fewer required vessel trips to transport the forecasted cargo. The second effect of increased channel depth is the increased reliability of water depth, which encourages the increased deployment of larger vessels to New Haven. The third effect is a consequence of the second. The increase in larger vessels displaces the less economically efficient vessels.

Transportation cost benefits were estimated using the HarborSym Economic Reporter, a tool that summarizes and annualizes HarborSym results from multiple simulations. This tool collects the transportation costs from various model run output files and generates the transportation cost reduction for all project years, and then produces an Average Annual Equivalent (AAEQ) benefit. Transportation costs were estimated for a 50-year period of analysis for the years 2023

through 2072. Transportation costs were estimated using HarborSym for the years 2023, 2033, 2043, and 2053. The present value was estimated by interpolating between the modeled years and discounting at the current FY18 Federal Discount Rate of 2.75 percent. Estimates were determined for each alternative project depth.

Table 5-9 provides the average annual equivalent (AAEQ) transportation costs and the AAEQ transportation cost reduction benefits by alternative. For detailed information, see the economic analysis provided in Appendix C, Transportation Cost Savings Benefits Analysis. (Table 20 from Appendix C is copied below as Table 5-9).

Table 5-9: AAEQ Transportation Cost and Cost Savings

Alternative	AAEQ Transportation Cost	AAEQ Transportation Cost Reduction Benefit
Future Without Project	$67,859,000	
37 Feet	$63,799,000	$4,060,000
38 Feet	$63,345,000	$4,514,000
40 Feet	$59,735,000	$8,124,000
42 Feet	$59,370,000	$8,489,000

5.7 Determination of the NED plan

The national economics development (NED) plan is that plan which reasonably maximizes net annual benefits. The net annual benefits of an improvement plan are equal its annual benefits minus its annual costs. The annual benefits, annual costs, (BCR), and annual net benefits for each alternative were evaluated and compared using outputs calculated at the FY18 discount rate of 2.75 percent and FY18 price level. Annualized costs include interest during construction[5] (IDC).

Table 5-10 shows the benefit and cost economic analysis. The alternative that reasonably maximize the net annual benefits is the 40-FT improvement alternative and is the NED plan. Net benefits equal $5,599,000 and return a benefit cost ratio of 3.2.

[5] IDC is included to account for the lost opportunity cost of construction funds over the period of construction, yielding the total investment cost. IDC is included for economic analysis purposes only and is not included in total project costs for budgeting or cost-sharing purposes.

Table 5-10: Summary of Benefits and Costs for Alternatives

Alternative	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Benefit/Cost Ratio
37-FT	$1,209,000	$4,059,000	$2,850,000	3.4
38-FT	$1,829,000	$4,514,000	$2,685,000	2.5
*39-foot depth **	$2,177,000	$6,319,000	$4,142,000	2.9
40-FT	$2,525,000	$8,124,000	$5,599,000	3.2
*41-foot depth**	$2,902,000	$8,306,500	$5,404,500	2.9
42-FT	$3,279,000	$8,489,000	$5,210,000	2.6

**Interpolated values provided for 39 and 41 foot-depths to provide a display values at 1-foot increments.*

Note: The cost and benefits of the NED plan presented above and developed during the alternatives analysis phase in 2018 are updated in Section 6 for the recommended plan.

Alternatives to deepen the channel beyond -40 feet MLLW would require the full length of the Cross Sound Cable (CSC) in the Federal Channel be buried deeper than the USACE permitted burial depth of -48 feet MLLW. Alternatives deeper than the 40-foot plan (i.e. a 41 and 42-foot alternatives) currently provide lower net benefits than the 40-foot plan and achieving CSC requirements suitable for these alternatives would increase the cost of and further decrease the net benefits of the 41 and 42- foot alternatives. (See Section 6.4 for more information on the cable.)

5.8 Ecological Benefits of the Salt Marsh Creation Beneficial Use

Appendix P describes the salt marsh creation resource significance and quantifies the environmental benefits to demonstrate that the incremental cost of the beneficial use disposal alternative (using dredged material to create a salt marsh at Sandy Point) is reasonable in relation to the environmental benefits to be achieved.

The USACE used the Assessment of Wildlife Habitat Value of New England Salt Marsh model (NESMM) to quantify the ecological benefits gained. The model was used to calculate the number of NESSM units to be provide by the No Action (i.e. not using the dredge material to create the salt marsh) and alternative sizes of marsh. A cost effective incremental cost (CE/ICA) analysis was performed on the ecological outputs and project costs. This is an alternative to benefit-cost analysis used when the primary outputs/benefits of alternative plans are not measured in dollars. Cost effectiveness ensures that the least cost alternative is identified for level of ecological output, or NESMM units in this case. The incremental cost analysis reveals changes in costs as output units increase and allows an assessment of whether the increase in units is worth the additional cost (identifies diminishing returns). This process does not identify a unique optimal solution; rather it informs and supports selecting an alternative.

The incremental cost curve consisted of three points, No Action, Alternative A (30 acres) and Alternative C (58 acres), the three Best Buy Plans. Alterative A would provide an additional 414 NESMM units over the No Action Alternative at an average annual equivalent (AAEQ) cost [6]of $558/unit. Alternative C would provide additional 44 NESMM units over Alternative A at an incremental AAEQ cost of $1,523 per NESMM unit. Although the incremental cost per unit in moving from Plan A to Plan C is higher than going from the No Action to Plan A, it is worth the increase to obtain, the additional environmental benefits provided by the larger 58-acre marsh and take full advantage of the beneficial use of dredged material.

Alternative C is the recommended alternative and provides 58 acres of salt marsh habitat (458 NESMM units) at an AAEQ of $650/unit or a AAEQ of $5,100/acre and significantly decrease the quantity of material going to Central Long Island Sound by 657,000 cy of dredged material. The incremental cost is reasonable in relation to the environmental benefits achieved.

5.9 Additional Accounts

<u>Environmental Quality Account (EQ)</u>

Environmental effects of the implementation of the improvement alternatives are all similar and are not anticipated to have significant environmental impacts. Environmental effects of

[6] The salt marsh cost effective/incremental cost analysis was updated for the final report and uses October 2019 price level costs and the FY20 discount rate of 2.75%.

navigation improvement versus no action are discussed in detail in Section 7 of this report. The no action alternatives would continue the risk of an oil spill due to existing and increased lightering operations. The improvement alternatives would both decrease the likelihood of an oil spill occurring due to lightering and improved maneuverability of the channel. Positive environmental effects of the improvement alternatives are using dredged material beneficially to create habitat within the New Haven Harbor area.

Regional Economic Development Account (RED)

The improved navigation alternatives would also have positive regional economic effects (RED benefits). Note: the full RED analysis is included in the Economics Appendix. The transportation cost savings of the alternatives would be seen in lower costs of bringing products to manufacturers and consumers in New Haven area and the larger service area of the port. The port would remain viable and continue to provide marine commerce benefits to the local economy. All channel deepening alternatives will provide an RED benefit, with the deeper channel alternatives providing a greater benefit as the transportation cost savings increase with depth. The full RED analysis is included in the Economics Appendix.

Other Social Effects Account (OSE)

In the Other Social Effects (OSE) category, the most significant benefit would be the improved maneuverability through the bend at the entrance to the harbor. The risk associated with navigating the bend with the larger ships would be eliminated. This would help ensure reliable and efficient deliveries of petroleum products and raw materials to the region. The benefit is similar for all the deepening alternatives as all include the bend widener.

5.10 Identification of the Selected/Recommended Plan

Based on the above alternatives analysis and decision criteria of maximizing the net economics benefits and consideration of the EQ, RED, and OSE accounts the navigation improvement project selected plan is the 40-foot plan (NED plan). The 40-foot improvement alternative returns net benefits of $5,599,000 and a BCR of 3.2. (Note: these numbers represent the completion of the alternatives analysis in 2018 and are updated in Section 6.0 below to reflect the design refinements for the recommended plan.) The selected plan also includes the beneficial use dredge material placement opportunity for salt marsh creation at Sandy Point. The analysis of the environmental benefits of the proposed salt marsh demonstrated that the outputs of the beneficial use of dredged material for the salt marsh justify its incremental costs above the Base Plan of bringing the dredged material to CLDS. The Non-Federal sponsor is willing to pay their share of the increment above the Federal Base Plan to use the dredged material to create the 58-acre salt marsh.

6.0 RECOMMENDED PLAN

6.1 Components

The recommended plan for the New Haven Harbor Navigation Improvement project is the 40-foot improvement project with the salt marsh creation beneficial use site. The recommended plan consists of the following General Navigation Features (GNF) improvements:

- Deepen the channel, maneuvering area, and turning basin from - 35 to -40 feet, MLLW
- Widen the turning basin to the north 200 feet (refined design)
- Widen the inner channel from 400 to 500 feet
- Widen the entrance channel from 500 to 600 feet
- Widen the channel bend near the East Breakwater from 560 to 800 feet (refined design)

The plan involves dredging about 4.27 million cubic yards (cy) of ordinary improvement material and removing 43,500 cy of rock. Seven open water sites are included for placement of the material. These sites are:

- Morris Cove Borrow Pit
- Oyster Habitat Creation site at the East Breakwater
- West River Borrow Pit
- Rock placement site at West Breakwater (rock reef)
- Salt Marsh creation at Sandy Point Dike
- Open Water Placement at Central Long Island Sound Disposal Site (CLDS) with targeted placement to cover historic disposal mounds

CLDS is an authorized dredged material disposal site designated by the Environmental Protection Agency under Section 103 of the Marine Protection, Research, and Sanctuaries Act (MPRSA). In addition, open water beneficial use sites within New Haven Harbor are proposed for placement of the dredge material within New Haven Harbor. Beneficial use sites include creating oyster habitat, filling old underwater borrow pits, creating rock reef habitat, and creating salt marsh habitat. The material proposed to be dredged from the harbor is composed of mainly silt and clays with fine sand in the entrance channel. All of the material has been determined to be suitable for unconfined open water placement (see Suitability Determination Appendix J). The channel bend widening near breakwaters will require blasting for rock removal.

<u>Salt Marsh Creation Beneficial Use Site</u>: The opportunity to use some of the dredged material that would go to CLDS to create about 58 acres of salt marsh is included in the recommended plan. This salt marsh creation site represents an increase in cost for the project due to the need to construct a perimeter dike and mobilize a hydraulic dredge to pump material to the site. The Non-Federal Sponsors support the salt marsh creation site and is willing to share in the incremental cost above the Federal Base Plan.

6.2 Recommended Plan Design Refinements

6.2.1 Navigation Features

During the final phase of the study, the USACE refined the navigation project design at the channel bend and the turning basin based on ship simulator study results.

The study was performed at the USACE Engineer Research and Development Center (ERDC), Coastal Hydraulics Laboratory (see appendix K, Ship Simulation, Report). Representatives from ERDC, the Connecticut Pilots (Capt. David Charlie Jonas and Capt. DJ Toby), and the New England District staff participated for the duration of the simulations which tested the navigability of the design. Feedback from the pilots during the ship simulator study on the draft design resulted in confirmation of the proposed widths of the entrance and inner channels as well as the configuration of the maneuvering area. Iterative testing of the channel bend and turning basin resulted in the design refinements described below.

Channel Bend: While the widened bend (700 feet versus 560 feet existing) allowed the pilots to make the turn at the breakwater entrance, the turn still required the pilots to use all their rudder, leaving no additional rudder control to respond to unexpected changes in environmental conditions (wind, waves, and current) and little room for error. Based on simulation analysis the proposed bend design was widened to 800 feet to allow the pilots to make the turn without bank effects thus providing the required maneuverability through the bend.

Turning Basin: The new turning basin adjacent to the existing turning basin was tested using the simulator, while the pilots were able to maneuver within the proposed new turning basin, it was determined through ship simulator analysis that the existing turning basin, with a small enlargement (increased length 200 feet), provided better maneuverability given its more central location to the terminals.

6.2.2 Salt March Creation Site:

During the final phase of the study, a more detailed look at the beneficial use placement site (salt marsh creation site) bathymetry resulted in refinement of the quantity of dredged material to be placed at the site from 840,000 cy to 657,000 cy.

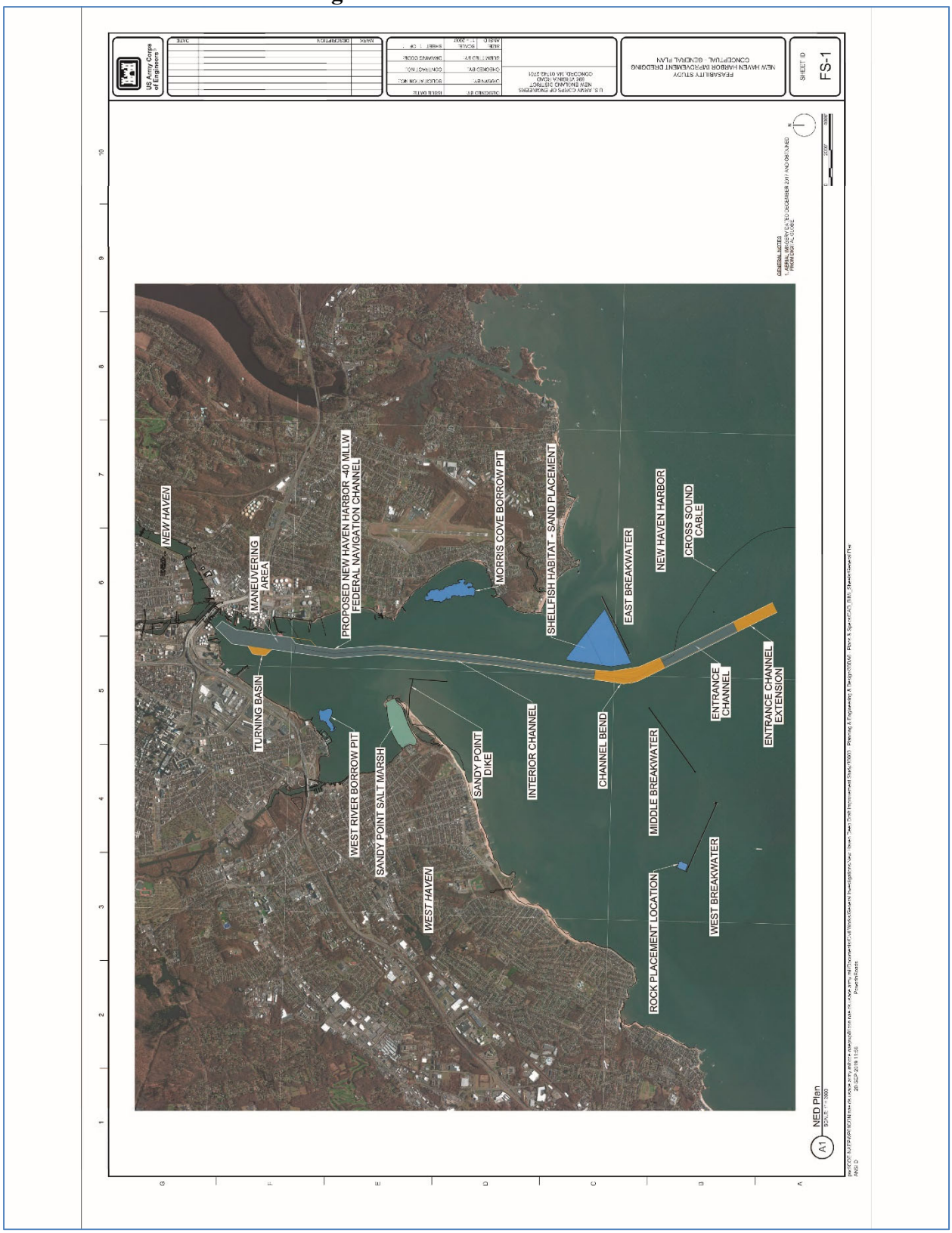
6.2.3 Recommended Plan Dredged Material Quantities

Figure 6-1 shows the recommended plan and Table 6-1 provides the dredged material quantity estimates for the recommended plan.

Table 6-1: Recommended Plan, Dredged Material Quantity Estimates

40-FT Recommended Plan Refined Design	**Dredging Quantities (CY)**		
	Cut to Design Depth	2-Foot Overdepth	Total CY
Entrance Channel	278,300	240,000	518,300
Bend Area (Ordinary Material)	475,300	161,300	636,600
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging - Ordinary Material	2,786,600	1,492,100	4,278,700
Bend Area (Rock) (Required Cut to El -42)	24,900	18,600	43,500
All Improvement Material	2,811,500	1,510,700	4,322,200

Figure 6-1: Recommended Plan



6.3 Construction Methodology and Schedule

Several types of dredges can be used to remove material from deep draft navigation channels, including hydraulic pipeline dredges, hopper dredges, and various types of mechanical bucket dredges and excavators. The New Haven Harbor improvement project would use both mechanical dredges and a hydraulic pipeline dredge.

Mechanical dredging involves the use of a barge-mounted crane with a clamshell bucket, or a excavator (backhoe arm) to dig the material from the harbor bottom. Typical dredging buckets come in various sizes from five cubic yards to thirty, fifty or more cubic yards. The material is placed in a scow for transport to the disposal or transfer site by tug. For open-water or ocean disposal, a split-hull scow is generally used for ease of disposal and to minimize the discharge plume.

Material placement at the disposal site is typically discharged using preset coordinates monitored by the tug with instrumentation also on the scow. This point dumping is generally intended to form a discrete mound of dredged material at the disposal site to minimize possible off-site migration and assist in monitoring the disposal operation and post-disposal activities at the site such as benthic recolonization. Point dumping on a grid can also be used when the goal is to spread the dredged material over a large area as cover atop material already on the bottom.

Removal of hard material, including loose or fractured rock capable of being ripped is typically accomplished with an excavator. This method removes and disposes of the hard material in a manner similar to the unconsolidated ‘ordinary’ material as described above. This method can also be used to minimize the area and volume of rock that requires drilling and blasting, or some other means of pre-treatment, before a dredge can remove it.

Channel closure is not expected for dredging of ordinary material. The last maintenance project was conducted in 2014 and about 800,000 cy of shoaled material was removed without any impact on commercial activity in the channel.

Drilling and blasting of rock is expected to be required for the rock that must be removed from the deepened channel. Blasting will occur from October 1 through March 1 and will require a marine exclusion zone for 30 minutes before and after blasting. It is anticipated that commercial ships transiting the channel can work with the blasting schedule to time the channel transit to avoid the closure periods. The contract specifications will require the Contractor to provide adequate and frequent notice to the USCG, harbormaster, pilots, and the navigation dependent industry of drilling and blasting activities, schedules, and locations.

6.4 Cross Sound Cable

There is a submarine power and fiber optic cable located within much of the length of the New Haven Harbor main ship channel from the inner reaches of the entrance channel through the bend and northerly almost as far as the maneuvering area. The cable is owned by Cross Sound Cable Company, LLC (CSC) and is made up of a bundle of cables that carry a capacity of 330 MW of high voltage direct current and internet and phone data transfer. The cable connects from a terminal in New Haven, Connecticut to terminal in Shoreham, New York a distance of about 25 miles across Long Island Sound.

The USACE Regulatory Program[7] issued a Section 10 permit for construction of the cable in 2002 and approximately 4 miles of the 25-mile long cable is located within the Federal navigation channel. The permit required the cable be buried to a depth of at least -48 feet MLLW in the Federal channel. The cable burial relied on the jet plow method where high-pressure water is used to fluidize the sea floor to create a trench for the cable to fall in to. During construction with the jet plow, a short length (700 feet) of the cable in the Federal channel, was not embedded to the required -48 feet MLLW due to encountering ledge and hard material that obstructed the achievement of the required embedment depth. The USACE granted CSC a permit amendment that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE. The Regulatory program is actively engaged with CSC to achieve compliance with the embedment depth required in the permit. Regulatory is attempting to resolve this issue informally, however, they are prepared to proceed with an enforcement action if necessary. The Cross Sound Cable Company LLC is responsible for the cost of bringing the cable into compliance with the 2002 USACE permit.

6.5 Real Estate Considerations

The ship channel and turning basin dredging areas and the dredged material placement sites required for project construction are below the ordinary high watermark of the navigable watercourse. Therefore, navigational servitude applies and would be invoked for these features of the project. The navigation servitude is the dominant right of the Government under the Commerce Clause of the U.S. Constitution (U.S. CONST. Art. I, §8, cl.3) to use, control and regulate the navigable waters of the United States and the submerged lands hereunder for various commerce-related purposes including navigation and flood control. The Federal Government's rights under the navigation servitude exist irrespective of the ownership of the banks and bed of a

[7] Note: The U.S. Army Corps of Engineers (USACE) has the power to regulate Non-Federal use of navigable waters under Section 10 of the River and Harbor Act of 1899.

stream below the ordinary high water mark.
The proposed plan's navigation improvement features will be constructed by water based equipment and will not require acquisition of real estate interests for access. Any contractor bidding the project will be required to make their own private arrangements for access via any of the many private piers in the Harbor.

For the salt marsh creation site the Non-Federal sponsor must acquire a temporary work area easement for 2 years (access, staging, mobilization) (0.24+/- acre) and permanent road easement (3.77+/-acres). This land is owned by the City of West Haven. The Non-Federal sponsor will be required to furnish the temporary and permanent easements.

The harvesting of shellfish is an intensive aquaculture industry in the subtidal areas of New Haven Harbor. Shellfish species commercially managed and harvested in New Haven Harbor include the eastern oyster (*Crassostrea virginica*) and the hard-shell clam (*Mercenaria mercenaria*). The Connecticut Department of Agriculture's Bureau of Aquaculture (BOA) manages the shellfish beds under agreements with the New Haven Harbor municipalities (New Haven, West Haven, and East Haven). The BOA monitors and governs all parcels of seafloor within New Haven Harbor, as well as those outside of the breakwaters. There are 20 shellfish parcels that are partially within the channel improvement project area. These are highlighted in the Shellfish Parcel Map included in Real Estate Report (Appendix G). Aquaculture leases in the project area are subject to navigation servitude.

6.6 Aids to Navigation

No new aids to navigation are planned for the project There are multiple existing buoys that mark the Federal channel, turning basin, and maneuvering area. The United States Coast Guard (USCG) maintains the navigation aids. Aids would be reset by the USCG to reflect the widened channel and turning basin. Resetting the existing aids is accomplished during each maintenance dredging operation for the project, and would be required for as part of the USCG periodic service of the aids even if no improvement dredging were planned. No new aids will be required for the improvement project which would occur concurrent with maintenance of the existing project.

6.7 Recommended Plan Cost Estimate

The recommended project cost was calculated for both the Federal Base Plan disposal sites and with the Beneficial Use placement site i.e. salt marsh creation at Sandy Point. Table 6-2 provides the project first costs. The project costs contain a 26% contingency. Details of the cost estimates including the Total Project Cost Summary sheets are provided in the Cost Engineering Appendix F. The total project cost for the Federal Base Plan is $64,868,000 and with the Beneficial Use, i.e. salt marsh creation, the cost increases to $72,311,000. The incremental difference in costs is $7,443,000. The construction costs for the salt marsh creation include the mobilization of the hydraulic dredge plant, pumping of dredge material to the creation site, and the cost for a geo-tube perimeter to contain the dredge material at the placement site until the salt marsh grasses are established.

Table 6-2: Project First Cost Summary

Project First Cost Summary Recommended Plan October 2019 Price Level		
Cost Account and Feature	NED/Base Plan ($)	Recommended Plan NED/BU Plan ($)
12 Navigation Ports and Harbors		
Mobilization/Demobilization	3,767,000	6,155,000
Entrance Channel	5,206,000	5,247,000
Entrance Channel Seaward Extension	1,674,000	1,687,000
Bend (Ordinary)	5,799,000	5,845,000
Bend (Rock)	19,300,000	19,455,000
Interior	17,665,000	21,719,000
Maneuvering area	6,205,000	6,255,000
Turning Basin	1,353,000	1,365,000
Total of Above	60,969,000	67,728,000
01 Lands and Damages	0	171,000
30 Planning, Engineering and Design	2,773,000	3,277,000
31 Construction Management	1,126,000	1,135,000
Project First Cost	64,868,000	72,311,000

6.8 Operation and Maintenance

Maintenance of the improvement project will require periodic dredging of shoal material similar to what is currently provided for the existing Federal Navigation project.

Maintenance dredging operations currently occur about once every 10 years and typically remove about 880,000 cy, a current shoaling rate of about 88,000 cy/year. To account for the potential changes in future shoaling rates and dredging needs, the dredging history of New Haven Harbor was reviewed and expected shoaling rates were estimated using ERDC/CHL CHETN-IV-64 "Coastal Inlet Navigation Channel Shoaling with Deepening and Widening" (Rosati, 2005). Dredging typically occurs on the east and west edges of the main channel from north of the ledge/hard bottom area near the entrance breakwaters up to the head of the harbor. Through this stretch, dredging is not required over the entire length nor the full width of the channel. The greatest shoaling occurs at the very head of the harbor just south of Tomlinson's Bridge, north of the majority of terminals, where there is little current and projected change in flow velocity. Little to no dredging is needed in the vicinity of the breakwaters, where the greatest changes in flow velocities are projected, due to the hard bottom in this area. It is anticipated that this shoaling pattern will continue, with no new sediment sources from upstream or alongshore.

Increased shoaling associated with channel implementation was estimated using ERDC/CHL CHETN-IV-64 to be 1% of the improvement volume per year, approximately 43,000 cy/yr. This represents a 50% increase in channel shoaling over the current 88,000 cy/year. This estimate was made using the total dredge improvement volume along the entire channel, and may be conservative given the history of little to no O&M dredging needed in the vicinity of the harbor breakwaters and the entrance channel. Given the project's history and the future shoaling rate estimated, more frequent dredging is not anticipated.

The DMMP 2016 identified the Central Long Island Sound Disposal Site (CLDS) as a least cost placement site for maintenance dredging of fine-grained material from the New Haven Harbor project. However, future maintenance dredging would also consider any identified beneficial use opportunities consistent with disposal requirements at CLDS. The disposal capacity at CLDS of 20,000,000 cy is sufficient to accommodate the maintenance dredging of the harbor.

6.9 Monitoring and Adaptive Management of Salt Marsh Creation Site

A Monitoring and Adaptive Management Plan has been prepared for the Sandy Point salt marsh creation site associated with the New Haven Harbor Navigation Improvement Project (see Appendix O). This beneficial use alternative will create approximately 58 acres of salt marsh in the New Haven Harbor ecosystem. Post-construction monitoring and management will be

performed over a period of up to ten years. An initial monitoring event will immediately follow completion of salt marsh creation.

The purpose of the monitoring plan for salt marsh creation is to:

- Assess baseline conditions for water quality, vegetation, invertebrates, and other bio-assessments;
- Evaluate the success for salt marsh creation; and
- Develop a better understanding of salt marsh restoration/creation opportunities and protection needs in the study area.

Adaptive management measures will be implemented if specific marsh creation standards are not met or if actual conditions diverge sufficiently far from the intended conditions to threaten the achievement of overall project goals. The adaptive management program will consider the following conditions identified by the monitoring reports that may be limiting potential success:

- Review of site hydrology and tidal influence
- Whether appropriate vegetation species are colonizing site or if additional plantings are needed
- Impact of invasive species and herbivore damage to vegetation and identification and evaluation of potential remedies.
- Review of restoration and enhancement designs to identify where design may not be appropriate to address the water resource problems.

O&M for the salt marsh site is expected to be minimal due to the self-sustaining nature of the project and design targets for sustainability. There are no project features requiring operation. Minor maintenance may include some repairs to geotubes as appropriate and possible plant species maintenance (see Appendix O). Annual O&M is estimated to be about $15,000 per year and is 100% non-Federal cost.

6.10 Economic Cost and Benefits

Annual economic cost and NED benefits were calculated for the recommended 40-foot plan to reflect updated costs (see Table 6-3). The AAEQ benefits are $8,124,000. The AAEQ cost are $2,952,000. The net befits are $5,172,000 and the BCR is 2.8. Calculations used October 2019 price level and FY20 Federal discount rate of 2.75%.

In addition, the recommended alternative includes beneficial use of dredged material to create salt marsh and provides 58 acres of salt marsh habitat (458 NESMM units) at an AAEQ of $650/unit or a AAEQ of $5,100/acre and significantly decrease the quantity of material going to Central Long Island Sound by 657,000 cy of dredged material. The incremental cost of the beneficial disposal method is reasonable in relation to the environmental benefits achieved.

Table 6-3: Economic Benefits and Cost, Recommended Plan

New Haven Harbor, Connecticut Recommended Plan (NED/BU Plan) Average Annual Equivalent (AAEQ) Benefits and Costs October 2019 price level, 50-year Period of Analysis, 2.75%	
Project Improvement Investment Cost	
Project First Cost	$64,868,000
New Aids to Navigation	$0
Total Project Improvement Cost	$64,868,000
Interest During Construction	$1,792,000
LSF, Berth Deepening Cost	$2,410,000
Total Investment Cost	$69,070,000
AAEQ Investment Cost	$2,558,000
Annual Increased Maintenance Dredging	$394,000
AAEQ Cost	$2,952,000
NED AAEQ Cost	$2,952,000
NED AAEQ Benefits	$8,124,000
Net NED AAEQ Benefits	$5,172,000
NED Benefit-Cost Ratio	**2.8**
Beneficial Use of Dredged Material	
Salt March Increment Project First Cost	$7,443,000
Interest During Construction	$206,000
Total Incremental Investment Cost	$7,649,000
Salt Marsh AAEQ Cost (includes annual O&M)	$298,000
Benefit (salt marsh)	58 acres (458 units)
Salt Marsh AAEQ Cost per unit	$650
Salt Marsh AAEQ Cost per acre	$5,100

6.11 Federal and Non-Federal Project Costs

Cost sharing for the improvement project will be in accordance with Section 101 of WRDA 1986, as amended. Two sets of costs are presented. Table 6-4 presents costs and cost apportionment at the October 2019 price level. These are the costs used for project authorization and for the Chief of Engineers Report. Table 6-5 presents costs and cost apportionment at at the fully funded level through the estimated mid-point of construction. These are the estimated costs used in budgeting and project partnership agreements. For the General Navigation Features (GNF), the Non-Federal Sponsor is required to provide 25 percent of the total cost of design and construction of the GNFs attributable to dredging to a depth in excess of -20 feet MLLW but not in excess of -50 feet MLLW. Also, the Non-Federal sponsor is required to pay an additional 10 percent of construction costs plus interest, less any credit afforded by the Government for the real property interests and relocations, over a period not to exceed 30 years (Section 101 of WRDA 1986, as amended). The cost share for the incremental cost of the Beneficial Use Plan above the Federal Base Plan (least cost disposal option) is shared 65 percent Federal and 35 percent Non-Federal sponsor (WRDA 1986, as amended, Section 103, subsection a to d). The terminal owners are responsible for the cost of berth deepening.

Table 6-4: Federal and Non-Federal Project Costs, October 2019 Price Level

New Haven Harbor, Connecticut Recommended Plan (NED/BU Plan) Federal and Non-Federal Sponsor Cost Share October 2019 Price Level			
Item	**Federal Share**	**Non-Federal Sponsor Share**	**Total Cost (rounded)**
General Navigation Feature (GNF)	75%	25%	
Construction	$45,727,000	$15,242,000	$60,969,000
PED	$2,080,000	$693,000	$2,773,000
Construction Management	$845,000	$282,000	$1,126,000
LERR	$0	$0	$0
Project First Costs - GNF	**$48,651,000**	**$16,217,000**	**$64,868,000**
Beneficial Use (BU) Incremental Cost (Salt Marsh Creation)	65%	35%	
Construction	$4,393,000	$2,366,000	$6,759,000
PED	$328,000	$176,000	$504,000
Construction Management	$6,000	$3,000	$9,000
LERR	$111,000	$60,000	$171,000
Beneficial Use, Incremental Cost	**$4,838,000**	**$2,605,000**	**$7,443,000**
Total Project First Costs - GNF & BU	**$53,489,000**	**$18,822,000**	**$72,311,000**
Other Items			
Aids to Navigation 100% Federal: US Coast Guard	$0	$0	$0
NFS, Additional 10% Contrib. for GNF	-6,486,800	$6,486,800	
Total Cost Apportionment	**$47,002,200**	**25,308,800**	**72,311,000**
Local Service Faculties			
Local Service Facilities: Berthing Areas 100% Non-Federal	$0	$2,410,000	$2,410,000

Table 6-5: Federal and Non-Federal Project Costs, Fully Funded

New Haven Harbor, Connecticut Recommended Plan (NED/BU Plan) Federal and Non-Federal Sponsor Cost Share Fully Funded Price Level			
Item	**Federal Share**	**Non-Federal Share**	**Total Cost (rounded)**
General Navigation Feature (GNF)	75%	25%	
Construction	$50,825,000	$16,942,000	$67,766,000
PED	$2,214,000	$738,000	$2,952,000
Construction Management	$963,000	$321,000	$1,285,000
LERR	$0	$0	$0
Project First Costs - GNF	**$54,002,000**	**$18,001,000**	**$72,003,000**
Beneficial Use (BU) Incremental Cost (Salt Marsh Creation)	65%	35%	
Construction	$4,883,000	$2,630,000	$7,513,000
PED	$423,000	$228,000	$651,000
Construction Management	$7,000	$4,000	$10,000
LERR	$116,000	$63,000	$179,000
Beneficial Use, Incremental Cost	**$5,429,000**	**$2,925,000**	**$8,353,000**
Total Project Costs - GNF & BU	**$59,430,000**	**$20,926,000**	**$80,356,000**
Other Items			
Aids to Navigation 100% Federal: US Coast Guard	$0	$0	$0
NFS, Additional 10% Contrib. for GNF	-7,200,300	$7,200,300	
Total Cost Apportionment	**$52,229,700**	**$28,126,300**	**$80,356,000**
Local Service Facilities			
Local Service Facilities: Berthing Areas 100% Non-Federal	$0	$2,669,000	$2,669,000

6.12 Relative Sea Level Change

There are no bridge clearance concerns associated with the project as all improvement areas are seaward of the bridges. The biggest potential risk associated with RSLC is inundation to the local service facilities (LSF), including piers, cranes, and utilities serving the berthing areas. Based on readily available data for the terminals, the current facilities are high enough to avoid inundation at mean high water for all RSLC scenarios (low, intermediate, and high) through 2070. In addition, in 2070 terminal deck elevations are also expected to be above the 99% AEP water level (one-year storm elevation) under the low and intermediate RSLC scenarios. However, the LSF at Magellan Pink Tanks, is expected to be below the one-year storm water level under the high RSLC scenario by 2070. Overall, this assessment indicates there is a low risk to the LSF at the project over the 50-year project life.

Sea level change will increase the navigable depth of the channel over time and, given the low sedimentation rate of the waterway, reduce the amount of Operations & Maintenance dredging required to maintain the authorized channel depth. However, the amount of sea level change alone would not significantly improve conditions in the waterway to achieve project objectives. See Coastal Appendix E for additional discussion of RSLC.

6.13 Status of Non-Federal Sponsor

The Connecticut Port Authority (CPA) is the Non-Federal Sponsor for the implementation of this navigation improvement project. The Non-Federal sponsor fully supports the proposed improvement project and views the proposed improvement project to be crucial to the Harbor's existing and future operation.

The Non-Federal Sponsor understands its responsibilities under the future Project Partnership Agreements required to design and implement the project. The Non-Federal Sponsor has provided a letter of support for inclusion in the final report that states their concurrence with and support for the recommended plan, their intent to execute the required design and project partnership agreements for the project (letter from CPA, dated October 3, 2019).

6.14 Financial Analysis of Non-Federal Sponsor's Capabilities

A financial analysis is required for any plan being considered for USACE implementation that involves non-Federal cost sharing. The ultimate purpose of the financial analysis is to ensure that the non-Federal sponsor understands the financial commitment involved and has reasonable plans for meeting that commitment. By memorandum dated April 24, 2007, the Assistant Secretary of the Army (Civil Works), granted approval of the self-certification of non-Federal sponsors for their ability to pay the non-Federal share of projects. The Connecticut Port Authority has provided the Self-Certification of Financial Capability to support the project.

6.15 Risk and Uncertainty

6.15.1 Dredged Material Placement at CLDS

There is disagreement between the States of Connecticut and New York on the acceptability of open water placement in LIS. The June 2016 Final Rule by EPA modifying the designation of the Central Long Island Sound and Western Long Island Sound dredged material disposal sites called for creation of a Steering Committee and Regional Dredging Team to review dredged material placement proposals, provide comments to regulatory agencies, and help promote beneficial uses of dredged material to reduce over time reliance on open water placement. Non-government organizations active in CT and NY are both opposed to and in favor of continued open water placement. A challenge for the New Haven Harbor navigation improvement feasibility study was to consider the various points of view regarding the acceptability of placement of dredged material in Long Island Sound and balance this with the cost of placement in order to select and recommend an implementable plan. Full consideration of practicable beneficial uses of dredge materials was evaluated and the recommended plan includes several beneficial use sites for dredged material inside the harbor.

6.15.2 Removal of Rock at Southwest Ledge Area

The entrance channel as it passes between the East and Middle Breakwaters bends to a more northerly alignment along the natural channel course to reach the upper harbor. The area where the breakwaters converge and the channel bends is at an area known as the Southwest Ledge. Previous channel deepening and widening near the Southwest Ledge has required removal of hard material. Reflection and refraction surveys were completed in August 1987 during the previous pre-construction, engineering and design efforts. Some of the areas were interpreted to contain bedrock above elevation -45 feet MLLW. This area will require blasting of rock to deepen the channel. Blasting design will be conducted during the PED phase.

The current study is relying on existing geotechnical information to estimate rock quantities in the southwest ledge area. The current estimate of rock excavation is 43,500 cy. Rock quantity development is based on the 1987 geophysical survey, borings from 1988, 1977, and 2002 (see Appendix D). As rock removal is always the most expensive aspect of a dredge improvement project, to reduce the uncertainty regarding rock quantities additional field and laboratory investigation will be conducted during the preconstruction engineering and design (PED) phase.

Specifications will include a confined underwater blasting section to be used if the Contractor chooses to blast. The current estimated period for blasting is from October 1 to March 1. This period has been selected to prevent impacts to environmental resources. If quantities of rock were to increase any blasting would still be confined to this time period and no additional environmental risk would be incurred.

6.16 Engineering Resilience of Recommended Plan

Application of Resilience: Engineering & Construction Community of Practice (ECB-2018-2) provides the policy and guidance for applying the USACE principles of resilience – Prepare, Absorb, Recover, and Adapt (PARA). This guidance was considered for the project.

Channel Stability. The design of relatively flat side slopes ensures long-term stability of the channel side slopes and accommodates the potential presence of soft sediments that lack the engineering properties necessary to hold steeper slopes.

Reliable Deep Draft Navigation Channel: Recommended improvements to the navigation channel will provide reliable channel conditions for pilot's bringing deeper draft ships into the harbor.

7.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

The Environmental consequences of the no action alternative and the preferred alternative are discussed below. All action alternatives considered in Section 5 (i.e. different alterative dredging depths from 37 to 42 feet) would have similar environmental consequences to the preferred alternative (40-foot plan) discussed below.

7.1 Protected Managed Lands

No Action Alternative

Under the No Action Alternative, no changes to managed lands surrounding New Haven Harbor would occur.

Preferred Alternative[8]

The proposed project will have no significant effects on Lighthouse Point Park, East Shore Park, Fort Hale Park, or the Long Wharf Nature Preserve. The proposed project may temporarily interfere with the scenic views of the harbor from the parklands during construction. However, upon completion of the project and removal of construction equipment, the scenic views will be restored.

The project will affect the Morse Park, Morse Beach, and the Sandy Point areas. The creation of salt marsh in the vicinity of those areas will convert subtidal and intertidal areas within the parks to marshland. The beach areas of Morse Park and Morse Beach will be converted to salt marsh and will be permanently lost. The beaches of the Sandy Point area will be temporarily impacted by construction activities (i.e., accessing the beach areas during the construction of the salt marsh), however long-term impacts to the Sandy Point beach areas are not expected.

7.2 Water Quality

No Action Alternative

Under the no action alternative, the water quality in New Haven Harbor would remain unchanged. The harbor would continue to have a Class SB water quality designation. Turbidity (suspended sediments), dissolved oxygen levels, and nutrient concentrations in the harbor would continue to be similar to the conditions described in Section 3.2.

[8] For purposes of this study and to conform to NEPA requirements, the recommended plan may also be referred to as the preferred alternative.

Preferred Alternative

7.2.1 Water Quality Classification

The proposed project is not expected to change the long-term water quality classification of New Haven Harbor. Short-term impacts to turbidity, dissolved oxygen, and nutrients (discussed below) are anticipated. However, the water quality classification in New Haven Harbor is expected to remain as Class SB during and upon completion of the proposed project. The designated uses of Class SB waters are marine fish, shellfish and wildlife habitat, commercial shellfish harvesting, recreation, industrial water supply, and navigation (CT DEEP, 2017).

7.2.2 Turbidity

Turbidity – Mechanical Dredging

Portions of the dredging efforts are proposed to be performed with a mechanical clamshell dredge. This action will remove and suspend some of the bottom sediments, causing localized increases in turbidity and sedimentation. Numerous studies (ranging over decades) have been conducted to document levels of suspended sediments and sediment plume distances associated with mechanical dredging and are discussed below.

New London Harbor Monitoring Example

Analysis of the spatial and temporal persistence of the turbidity plume from the dredging of silts was quantified in 1977 from dredging the Thames River/New London Harbor channels (Bohlen et. al., 1979). The conclusions of this study defined the measurable suspended sediment plume as extending 700 meters downstream. Analysis of the composition and concentration of the plume indicated the majority of material suspended occurred within 300 meters of the dredge. Suspended material concentrations closest to the dredge ranged from 200 mg/l to 400 mg/l resulting from suspension of approximately 1.5 to 3.0% of the substrate in each bucket load. Suspended material concentrations were reduced by a factor of ten within the first 200 meters downstream of the dredge. Surface concentrations returned to normal 250 meters downstream of the dredge. Mid-water and near bottom concentrations returned to background levels 700 meters downstream of the dredge.

Previous New Haven Harbor Monitoring

Sediment plumes were monitored during a maintenance dredging effort of the New Haven Harbor FNP between October 1993 and January 1994 (USACE, 1996). Dredging of silty material from New Haven Harbor was conducted with an enclosed mechanical bucket. The two major objectives of the New Haven monitoring were to: 1) establish the background suspended solids concentration before and after dredging, and 2) document the movement of the dredge plume relative to fisheries resource areas. The results of the survey revealed that background

suspended sediments in the harbor average 8 mg/l prior to dredging efforts, and that during dredging, numerous aperiodic short duration spikes of 100 mg/l were observed.

The study also concluded that there were dredge-induced sediment plumes, and that the plumes did travel outside of the navigation channel. However, these excursions onto the shoal areas outside the channel only occurred when the dredge was in the immediate vicinity (i.e., dredging the side of the channel directly adjacent to the shoal areas).

The study also noted that monitoring detected several long duration (1-3 days) - high suspended sediment perturbations (concentrations reaching 700 mg/l) that were not likely related to dredging operations. Evidence from meteorological data and wastewater effluent records indicate that these high suspended sediment events were likely the result of winds and wind-generated waves, alone or in combination with discharges from wastewater treatment plant outfalls.

The study concluded that dredged induced sediment resuspension was found to be a minor perturbation to the much longer duration, larger amplitude events associated with wind, wind-waves, and effluent discharges from outfalls. The effects of dredge related spikes in suspended sediments on the winter flounder spawning grounds (i.e., the shoal areas outside the channel), and the regional water quality in general, appear to have been limited in duration and of relatively low amplitude (USACE, 1996).

Boston Harbor Monitoring Example

Monitoring was conducted in 1996 for dredging of the surface silty material during construction of a confined aquatic disposal (CAD) cell for the Boston Harbor Navigation Improvement Project. This monitoring included: 1) documentation of the spatial and temporal distribution of the sediment plume for the four extremes of tidal currents (high water slack, maximum ebb, low water slack, maximum flood) on two days within the first week of dredging; 2) collection of water samples from the lower half of the water column at two locations – 1,000 feet up current of the dredging and 500 feet down current from the dredging; and 3) analysis of water samples for TSS.

During dredging, turbidity measurements ranged from 3-5 NTU (Nephelometric Turbidity Units) at the reference station 1,000 feet up current from dredging the silty surface material using an environmental bucket. Turbidity was only slightly elevated at the station 500 feet down current of the dredging ranging from 4-11 NTU. TSS ranged from 4-5 mg/l at the reference station and from 5-9 mg/l at the down current station. No plume was visible at the surface outside the immediate area of the dredging operation, and no significant plume was detected in the water column (ENSR, 1997).

Monitoring of turbidity plumes in 1998 associated with the dredging of silty maintenance material from Boston Harbor was also performed (USACE/Normandeau, 1998b). Mapping of the turbidity associated with use of a closed mechanical bucket (i.e., an environmental bucket) to dredge silty material in Boston Harbor was performed during periods of high and low water slack and during maximum flood and ebb tides. The mapping required generation of plan views of turbidity at mid-depth and near bottom extending from 300 feet up current to 1,000 feet down current of continuous dredging operations. Generation of a cross section of turbidity located 300 feet down current of the dredging was also required. Near bottom turbidity values were highest for all measurements with values no higher than 100 NTU approximately 300 feet down current of the dredging operation. Mid-depth turbidity was much less, and all values returned to background levels (10-20 NTU) between 600 and 1,000 feet down current (ENSR, 2002).

The monitoring studies noted above show that turbidity plumes associated with mechanical bucket dredges are produced during dredging, however they are generally limited to the immediate vicinity of the dredge. Therefore, while suspended sediment plumes will be produced during the construction of the proposed project, they are not anticipated to significantly impact water quality.

Turbidity – Hydraulic Dredging

Hydraulic dredging equipment will be used to remove silty material from the channel that will be used for marsh creation at the Sandy Point beneficial use site. Re-suspension of fine–grained material during hydraulic dredging is usually restricted to the vicinity of the dredge head and decreases rapidly with increasing distance from the operation. The cutterhead pipeline dredge is capable of removing sediments with relatively small amounts of resuspension extending beyond the immediate vicinity of the dredge.

A cutterhead could suspend 25-250 mg/l of silty sediments within 100 to 400 feet downcurrent of the dredge (Hayes, 1986). The discharge of material at the end of the hydraulic pipeline at the placement area has the potential to suspend large amount of silt and clay. However, the anticipated methodology involves using the hydraulic dredge to fill geotubes in place with the silty material. The geotubes will be designed to retain all fine-grained material. Once the geotubes are filled, they will create a containment structure which will ring the perimeter of the marsh creation area. Hydraulic dredging will then be used to fill the area within the geotube containment area to elevations appropriate for salt marsh creation. Best management practices will be used to keep suspended sediments within the geotube containment area and minimize impacts to adjacent subtidal softbottom habitats.

Turbidity – Blasting

Blasting of rock from the proposed project will produce short term increases in turbidity as silts

and clays overlaying and in the vicinity of each blast event are suspended during the underwater explosions and the release of gasses from the fractured rock. Teleki and Chamberlin (1978) reported elevated short-term turbidity levels associated with blasting in glacial tills in the shallow waters of Lake Erie, however elevated turbidities lasted only a matter of hours before returning to ambient conditions. Blasting activities are generally limited to one to two blasting events per day as the process of drilling holes, loading explosives, setting charges, and removing divers must be done sequentially and therefore requires significant time to accomplish. Therefore, blasting is not anticipated to contribute to significant levels of turbidity for extended periods of time during construction of the proposed project.

7.2.3 Dissolved Oxygen

The resuspension of sediments by dredging activities has the potential to depress dissolved oxygen concentrations in the water column. Dissolved oxygen concentrations were monitored during dredging of parent materials to construct CAD cells in Boston Harbor in conditions similar to New Haven Harbor (ENSR 1997). Dissolved oxygen concentrations during CAD cell construction varied by a maximum of 0.6 mg/l between the upstream reference and downstream monitoring stations and never dropped below the level specified in the water quality standards of 5.0 mg/l for Class SB waters or 6.0 mg/l for Class SA waters. While small decreases in DO are expected during dredging operations, no long-term impairment to DO is expected from the dredging process.

Deepening and widening of federal navigation channels can result in lower dissolved oxygen (DO) concentrations due to changes in water dynamics. The change in elevation within the New Haven Harbor navigation channel is not expected to cause a significant difference in DO levels as this area is well flushed by the tides and currents passing in and out of New Haven Harbor.

7.2.4 Nutrients

The proposed project would not result in an increase of nutrients into New Haven Harbor waters. However, dredge operations can increase nutrient concentrations in the immediate vicinity of the dredge as sediment bound nutrients are disturbed during material removal. The effect of releasing sediment bound nutrients would be temporary and minor. The proposed project would not affect nutrient concentrations, nutrient loading, or nutrient cycling within New Haven Harbor waters.

7.3 Wetlands

No Action Alternative

Under the no action alternative, wetlands in the vicinity New Haven Harbor would remain unchanged, subject to projected sea level changes.

Preferred Alternative

Dredging Impacts

In general, the majority of New Haven Harbor navigation channel is shallow subtidal estuarine water with surficial sediments dominated by silt. No impacts to salt marsh areas or other wetlands in the New Haven Harbor system adjacent to the dredging operations are anticipated.

Beneficial Use Impacts

Beneficial use of the material to be removed by the proposed project is expected to create approximately 58 acres of salt marsh wetland in the New Haven Harbor system. Figure 7-1 depicts a conceptual location for the salt marsh. As noted in Section 3.3, the New Haven Harbor system has lost significant amounts of wetland due to marsh filling for development. The addition of 58 acres of salt marsh to the system will positively benefit fish and wildlife resources in the area by adding to the diversity of habitat available in the area. The addition of salt marsh to the system would also benefit the communities that neighbor New Haven Harbor by increasing the habitat complexity of the harbor and increasing the system's ability to deal with coastal storms, sedimentation, and water quality issues.

The creation of the 58 acres of salt marsh would displace approximately 52 acres of shallow subtidal (ranging between 0 to 4 feet deep MLLW) soft-bottom habitat and approximately 6 acres of intertidal mud/sand flats that currently exist in the 58 acre footprint. As the majority of New Haven Harbor is shallow subtidal soft-bottom habitat, the conversion of the area to salt marsh would not significantly diminish the availability of subtidal soft-bottom habitat in the system.

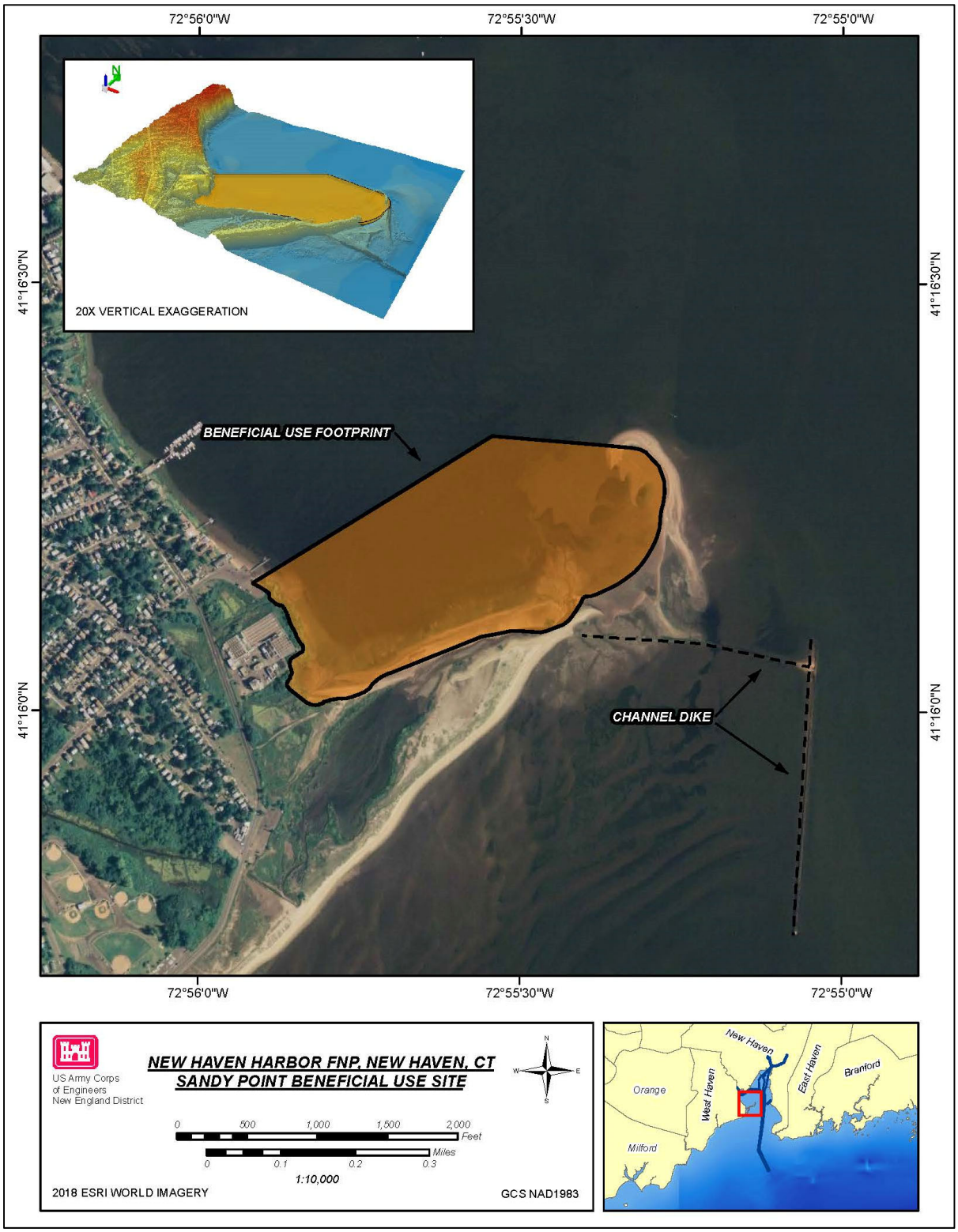


Figure 7-1: Location of Salt Marsh Creation Area in New Haven Harbor, CT

7.4 Benthic Habitat

No Action Alternative

The No Action Alternative will have no effect on the benthic habitats of New Haven Harbor.

Preferred Alternative

Dredging Impacts

Most shallow benthic habitats in estuarine systems are subject to deposition and resuspension events on daily or even tidal time scales (Oviatt and Nixon, 1975). Many organisms have behavioral or physiological responses to sediments that settle on or around them. Many organisms avoid the area of disturbances while others have a tolerance to attenuated light conditions or anaerobic conditions caused by partial or complete burial. Direct effects of sedimentation include smothering, toxicity (exposure to anaerobic sediment layers), reduced light intensity, and physical abrasion, whereas indirect effects include changes in habitat quality (Wilber, et al., 2005).

Studies of burial of estuarine invertebrates found species specific responses. According to Hinchey et al. (in Berry, et al., 2003), the responses varied as a function of motility, living position and inferred physiological tolerance of anoxic conditions while buried. The deposition of dissimilar sediments has a greater impact on organisms than sedimentation of like materials (Maurer, et al., 1978, 1986). In the New Haven Harbor navigation channel, the benthic community already experiences and has adapted to sedimentation stress caused by resuspension of sediments due to natural processes (e.g., storms and tides) as well as anthropogenic influences (e.g., large vessel traffic). Monitoring of previous dredging activities in New Haven Harbor and in Boston Harbor (Boston, Massachusetts) have shown that sediment plumes settle out predominantly in the dredge area (see Section 7.1) limiting the extent of additional stress to the system. The Boston and New Haven monitoring studies did however show that, to a limited extent, sediment plumes can extend outside of the navigation channels and can produce short-term increases in turbidity.

Turbidity impacts are dependent on the concentration and the duration of the suspended sediments (Clarke and Wilber, 2000; Suedel 2015). Motile benthic organisms (e.g., lobster and crab) can generally avoid unsuitable conditions in the field and, under most dredging scenarios, encounter localized suspended sediment plumes for exposure durations of minutes to hours, unless the organism is attracted to the plume and follows its location. Although adult bivalve mollusks are silt-tolerant organisms (Sherk, 1972 in Clarke and Wilber, 2000), they can be affected by high suspended sediment concentrations. Hard clams (Pratt and Campbell, 1956 in Clarke and Wilber, 2000), and oysters (Kirby, 1994 in Clarke and Wilber, 2000), exposed to fine

silty-clay sediments have exhibited reduced growth and survival, respectively. Suspended sediment concentrations required to elicit these responses and mortality, however, are extremely high, i.e., beyond the upper limits of concentrations reported for most estuarine systems under natural conditions, as well as typical concentrations associated with dredging operations (see Section 7.1). Sublethal effects, such as reduced pumping rates and growth, were evident for adult bivalves at concentrations that occur under natural conditions, but may be of a short-term (i.e. hours to days) duration, for example, during a storm (Schubel, 1971; Turner and Miller, 1991 in Clarke and Wilber, 2000). The egg and larval stages of benthos (e.g., shellfish) are more sensitive to suspended sediment impacts than adults. Estimates of suspended sediment impacts to these pelagic, early life history stages must consider the local hydrodynamics of the dredging site, which strongly influence the likelihood of extended exposure to suspended sediment plumes (Clarke and Wilber, 2000, Suedel et al 2015).

The benthic community in the navigation channel will be eliminated by direct removal from deepening efforts. Additionally, the benthic communities in the current side slopes of the channel will be eliminated by widening efforts. Once dredging is completed, the benthic community of the channel and side slope areas is expected to begin recolonization by recruitment from benthic species in other areas of New Haven Harbor. As the benthic community throughout the existing channel and side slopes is a mix of opportunistic early-successional stage benthic communities and mid-successional stage benthic communities, a return to a similar community following dredging is expected within approximately 1-3 years.

The New Haven Harbor navigation channel is shallow subtidal estuarine water with surficial sediments dominated by silt. The proposed deepening and widening of the project will not alter the habitat type (soft bottom) over the majority of the project area. There are sections of the FNP (approximately 5.8 acres) that contain rock below overlaying silt to the proposed project depth, and therefore may initially be converted from silty bottom to hard bottom during construction. However, given the frequency of maintenance dredging in New Haven Harbor (approximately every 10 years) the conversion to hard bottom habitat is not expected to persist as the FNP shoals in frequently with silty material.

Impacts of Material Placement at All Sites

For over 40 years, studies and monitoring efforts have been conducted in New England to understand the consequences of dredged material placement to benthic habitats and local food webs (Wolf, et al. (2012), Fredette & French, (2004), Valente (2007)). The type and extent of impacts depend on the characteristics of both the dredged material and the habitat at the placement site (Bolam, et al., 2006). Although short-term impacts and long-term changes in habitat due to sediment type and elevation of the seafloor have occurred at studied sites, there is no evidence of long-term effects on benthic processes or habitat conditions (Germano, et al.

(2011); Lopez, et al. (2014)).

One of the key biological impacts is the burial of benthic invertebrates where dredged material is deposited. Sediment type, sediment depth, burial duration, temperature, and adaptive features such as an organism's ability to burrow and to survive can affect the ability of organisms to migrate to normal depths of habitation. Benthic disturbance from dredged material placement at designated disposal sites has direct, immediate effects on sessile epifauna and infauna (Germano, et al. (1994), (2011)). Sediment accumulations greater than 6 inches are expected to smother most benthic infauna (Lopez, et al., 2014). Large decapod crustaceans (i.e., cancer crabs, shrimp species, lobster) are able to penetrate deeply into the sediment, which provides them with mechanisms that enable them to survive some burial. Other strong deposit feeders can withstand burial of 4 inches or more (Jackson & James (1979); Bellchambers & Richardson (1995)), while 0.4 inch of sediment can kill attached epifaunal suspension feeders (Kranz, 1974). The greatest impacts from burial occur in the central mound area, where multiple deposits result in the thickest amounts of placed sediment (Germano, et al., 1994). The burial on benthic invertebrate populations is typically a short-term impact, because infauna rapidly recolonize the freshly placed, organic-rich material.

Additional short-term impacts of placement may occur. Small surface-dwelling animals (e.g., some amphipod and polychaete species) may be dislodged and transported to the outer region of the deposit with water and sediment movement. The sediment plume may temporarily interfere with benthic feeding and respiration in the water column.

The physical nature of seafloor sediments defines the type of habitat that is available for benthic organisms to colonize, and thus the types of organisms and benthic community that can live and thrive on the placed dredged material. Potential long-term impacts may include changes in benthic community composition that result from potential alterations in sediment grain size and TOC as well as alterations in seafloor elevation.

Blasting Impacts

The impacts of blasting on the benthic communities of New Haven Harbor, with the exception of the immediate vicinity of the blast, should be minimal. As noted in section 7.1, increases in turbidity are expected to occur in the immediate vicinity of the blasting, however, elevated turbidity levels are expected to be short-term (i.e., a matter of hours). Other impacts from blasting (increased noise and blasting pressure waves) should not affect benthic communities outside of the blasting zone.

Benthic communities in the footprint of the blasting will be eliminated. Soft-bodied invertebrates in the immediate vicinity would be killed, while populations of those in outlying

areas would sustain less damage. Damage to hard-bodied invertebrates near the blast site may occur and could include cracked or broken shells and carapaces. Long term impacts are not expected.

7.5 Essential Fish Habitat and Managed Species

No Action Alternative

The No Action Alternative will have minor effects on the essential fish habitat and managed species of New Haven Harbor. Naturally occurring storms have been documented to produce elevated turbidity levels in the New Haven Harbor system (USACE, 1996). Additionally, large storm events can mobilize sediments that cover benthic resources and affect the forage base for fish species. These impacts would continue to exist without the proposed action. Additionally, the typical noise environment of New Haven Harbor, which includes impacts from large commercial shipping vessels, tug boats, pilot boats, and a large recreational fleet, would continue to provide minor noise impacts to EFH in the harbor.

Preferred Alternative

Dredging and Disposal

The proposed project would impact EFH for managed species. The habitats affected include shallow subtidal soft bottom habitat, intertidal sand flat habitat, and water column habitat. Effects of the proposed project include death and injury of fishes and forage during dredging operations and subsequent maintenance dredging operations. Direct removal of soft bottom habitats will occur in the dredging areas and direct covering of soft bottom habitats will occur in the placement areas. Indirect impacts due to changes in water quality will occur, however, they are anticipated to be short-term and localized to within hundreds of feet of the dredging and disposal efforts. These effects have been documented in Sections 7.2 7.4, and 7.8. The list below summarizes potential effects of the proposed project on EFH and managed species. Details on the effects to specific groups of managed species associated with certain essential fish habitats can be found in Appendix H of the Final IFR/EIS.

1. Directly affecting mortality or injury of individual fishes (adults, subadults, juveniles, larvae, and/or eggs, depending on species, time of year, location, etc.) due to dredge equipment during construction (various areas of the channel between October 1 and March 1 over the course of 2 years) and maintenance dredging (an effect temporary in duration). No one area would experience an extended duration of effects.

2. Indirectly affecting foraging behavior of individuals through production of turbidity at construction/maintenance dredging and disposal sites (an effect temporary in duration).

3. Indirectly affecting movements of individuals around/away from dredging sites due to construction equipment and related disturbed benthic habitats (an effect temporary in duration).

4. Indirectly affecting foraging and refuge habitats by removal of benthic habitat (i.e., soft bottom) (an effect temporary in duration).

Many of the dredging related impacts (i.e., increases in turbidity, changes in fish movement behavior, benthic community changes) are common temporary occurrences in estuarine systems like New Haven Harbor. Therefore, these temporary impacts will occur in the No Action alternative. However, the proposed project involves a longer duration of these temporary impacts. As noted, the effects would only occur in the area of dredging activity and material placement locations, which would not be taking place at all locations at all times. Individually or cumulatively, the above are not anticipated to significantly adversely affect managed species or most species EFHs. Where possible, the above effects have been minimized via project design. An EFH Assessment has been prepared for this project and is presented in Appendix H.

Blasting

Blasting effects to bottom habitats are discussed above in Section 7.4 and effects to fish are discussed below in Section 7.8.

Conclusion

Considering the expected duration and location of the impacts noted above within New Haven Harbor, the Corps has made the determination that the impacts from the proposed action will not significantly impact managed species and their associated EFH.

7.6 Protected Species

No Action Alternative

Under the no action alternative, protected species in the vicinity New Haven Harbor would remain unchanged.

Preferred Alternative

The Corps has made the determination that no threatened or endangered species are likely to be adversely affected by the proposed project. Impacts to each protected species are presented below.

Sea Turtles

The use of New Haven Harbor by sea turtles is possible but not common. The potential for finding any sea turtle species does increase at the CLDS and the areas used to travel through to get to the disposal site. All of the sea turtle species that have any potential of being in New Haven Harbor and Long Island Sound are endangered species and discussed in the Threatened and Endangered Section in the Affected Environment. Sea turtle's mobility should allow all species that may be present in New Haven Harbor and CLDS during all material placement alternatives (i.e., all dredging and disposal activities) to avoid negative effects. Benthic forage species at the dredging and placement sites would be temporarily impacted by removal or burial, but would be expected to return to preconstruction conditions over time. Trained sea turtle observers will be present during any blasting activities and blasting operations will be delayed should any sea turtle species be present. Therefore, the proposed project is not likely to adversely affect any sea turtle species.

Atlantic Sturgeon and Shortnose Sturgeon

As noted in section 3.6, adult and subadult Atlantic sturgeon and adult shortnose sturgeon are known to occur in Long Island Sound, where they are likely to be migrating and possibly foraging opportunistically should suitable forage be available. As Atlantic sturgeon spawn in freshwater portions of large rivers and early life stages are not tolerant to salinity, no eggs, larvae or juvenile Atlantic sturgeon are likely to occur in the action area. While the possibility exists for adults to be present, their mobility should allow them to avoid dredging and disposal activities. Benthic forage species at the dredging and placement sites would be temporarily impacted by removal or burial, but would be expected to return to preconstruction conditions over time. Trained fisheries observers will be present during any blasting activities and blasting operations will be delayed should any Atlantic sturgeon or Shortnose sturgeon (or other large fish and/or large schools of fish) be present. Therefore, the proposed project is not likely to adversely affect Atlantic sturgeon or Shortnose sturgeon.

Birds

Several federally-listed threatened or endangered bird species (piping plover, red knot, and roseate tern) are present within the New Haven Harbor project area. Time of year restrictions will be used to avoid impacts to these species. No dredging, disposal, or blasting activities will occur between April 1 and August 31 of any year to avoid protected bird species. The creation of 58 acres of salt marsh to the New Haven Harbor ecosystem will positively benefit these species by providing resting and feeding areas.

Mammals

The Federally threatened northern long-eared bat (*Myotis septentrionalis*) is found across much of the eastern and north central United States and all Canadian provinces from the Atlantic coast west to the southern Northwest Territories and eastern British Columbia. While this species is not directly within the project area of the proposed project, the possibility of occurrence in adjacent forested areas is possible. All activities associated with the proposed project will not affect any adjacent forested lands, therefore no impacts to long-eared bats are expected.

The Corps has made the determination that no threatened or endangered species are likely to be adversely affected by the proposed project. This finding was coordinated with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Connecticut Department of Energy and Environmental Protection.

7.7 Marine Mammals

No Action Alternative

Under the no action alternative, marine mammal species in the vicinity New Haven Harbor would be unaffected.

Preferred Alternative

Dredging and Placement

Harbor seals have the potential to be found in areas proposed for dredging, the material placement areas, and along the haul route to CLDS, and in CLDS. Harbor seals that wander into the harbor during dredging activities should be able to avoid impact as they are highly mobile and could easily avoid the dredging and placement activities. No significant impacts to harbor seals are expected as a result of the dredging or disposal activities.

Blasting

Although harbor seals are infrequent visitors of New Haven Harbor, they could be potentially be affected by blasting if they should occur too close to the blast site. If present during a detonation, individuals would likely sustain injuries as a result of pressure waves produced by the blast. To avoid this potential impact, a marine mammal observer will be present during all blasting events and will provide guidance to the contractor on when to restrict blasting if a marine mammal is within or in close proximity to the established safety zone (assuming no human safety concerns exist).

7.8 Fish

No Action Alternative

Under the no action alternative, fish resources in the vicinity New Haven Harbor would remain unchanged.

Preferred Alternative

Dredging and Disposal

The proposed project would impact fish species in the project area. Effects of the proposed project include possible death and injury of fish, interference with fish movements, disruption of the forage base, and changes in water quality during dredging operations. As noted in Section 7.4, direct removal of soft bottom habitats will occur in the dredging areas and direct covering of soft bottom habitats will occur in the placement areas. As noted in section 7.2, indirect impacts due to changes in water quality will occur, however they are anticipated to be short-term and localized to within hundreds of feet of the dredging and disposal efforts.

Intermittent, short-term impacts to fish also include disturbance of fish throughout the water column within the localized area during dredging and disposal efforts. Due to their mobility, most fish would be expected to move out of an active dredging area or a dredged material burial area. The sediment plume associated with dredging and the plume following material placement would also have potential short-term water quality impacts that may also have indirect impacts on fish by temporarily altering certain finfish behaviors, such as migration, spawning, foraging, schooling, and predator evasion (O'Connor, 1991). Increased turbidity has also been associated with potential gill abrasion and respiratory damage (Saila, et al. (1971); Wilber & Clark (2001)).

Sediment characteristics and the life stage of species affect how sensitive species are to suspended sediment, with egg and larval stages tending to be the most sensitive (Johnson, et al., (2008); Berry *et al*. (2003), Wilber & Clark (2001)). During material placement, these impacts are limited both in duration and spatially due to the short time needed for dredged material to reach the bottom (Kraus (1991); Dragos & Lewis (1993); Dragos & Peven (1994)). Saila, et al. (1971) also point out that "aquatic animals are able to tolerate high concentrations of suspended sediments for short periods." Since the tolerance level for suspended solids is high in shallow and mid-depth coastal waters, and fish and lobster may experience major changes in turbidity during storms, Saila, et al. (1971) conclude that mortality due to elevated sediment concentrations in the water column resulting from dredged material placement is not likely.

As noted through this document, concentrations of sediments and the duration needed to cause impacts to fish resources are expected to be short-term and localized and as such, effects to fish

sources in the proposed project areas should be minimal.

Blasting

The extent of damage to fish populations by blasting depends primarily on the proximity to the blast and the presence or absence of a swim bladder. Fish with swim bladders (e.g., Atlantic herring) will be unable to adjust to the abrupt change in pressure propagated by the blast. If they are within a zone of influence, fish with swim bladders may be injured or killed. Fish without swim bladders (e.g., winter flounder) are less likely to be injured, and would likely sustain injuries only if they are in the immediate vicinity of the blast. Blasting may displace resident fishes, although this impact is expected to be only temporary. Blasting impacts will be avoided or minimized by the methods discussed in the following paragraphs.

Several precautionary measures, or best management practices (BMPs) will be put in place to avoid or minimize the incidence of injury to fish and marine mammals from blasting. These blasting mitigation measures include:

- Limiting blasting events to a period between October 1 and March 1
- Use of a fish detecting and startle system to avoid blasting when fish are present or transiting through the area;
- Requiring the use of sonar and the presence of a fisheries and marine mammal observer during blasting events;
- Prohibiting blasting during the passage of schools of fish, or in the presence of marine mammals, unless human safety is a concern;
- Using inserted delays of a fraction of a second per blast drill hole, and;
- Placing material on top of the borehole (stemming) to deaden the shock wave reaching the water column.

Given the BMPs noted above to minimize blasting impacts to fish resources, significant impacts from the blasting efforts are not expected to significantly affect fish in the project area.

Winter Flounder

Winter flounder is a Federally managed demersal (bottom dwelling) fish. EFH for winter flounder is contained within the project area. Winter flounder eggs are demersal and larvae are found near the bottom in shallow areas. As noted above, minimal levels of sedimentation can potentially have an adverse impact on early and/or critical life stages of fish as sediments have the potential to bury demersal eggs, while larvae may be trapped or buried by the sediments (Wilbur and Clarke, 2001). To protect these sensitive life stages (i.e., eggs and larvae) of winter flounder, dredging will occur from October 1 to January 1, in areas within winter flounder essential fish habitat (i.e., shallower that 5 meters). Dredging will occur between October 1 and

March 1 in areas outside of winter flounder essential fish habitat (i.e., deeper than 5 meters). Placement of material inside the New Haven Harbor breakwaters will occur from October 1 through January 1. Placement of material at CLDS will occur between October 1 and March 1.

Winter flounder spawn on various substrates and (within the proposed project area) in areas less than 5 meters deep. In order to quantify the proposed project's effects on the areal extent of winter flounder habitat that would be affected, two specific calculations were made. The first, winter flounder habitat lost, was calculated by measuring subtidal areas that were at depths of 5 meters or shallower and were planned to be deepened by the proposed dredging efforts or filled by the creation of salt marsh. The second, winter flounder habitat gained, was calculated by measuring areas that were deeper than 5 meters (i.e., the borrow pits), but were planned to be filled to depths shallower than 5 meters deep. Table 7-1 below notes the values for each calculation. The net loss of winter flounder habitat, which is due in large part to the creation of 58 acres of salt marsh (51.6 acres of which is flounder habitat), is approximately 3.2 acres. While a net loss of 3.2 acres of shallow subtidal habitat is substantial, New Haven Harbor contains approximately 6,000+ acres of similar habitat within harbor system. Therefore, the project should not significantly jeopardize the harbor's ability to sustain winter flounder populations.

Table 7-1: Losses and Gains of Winter Flounder Essential Fish Habitat in New Haven Harbor from the Proposed Project

Project Feature or Placement Site	Winter Flounder EFH Lost (acres)	Winter Flounder EFH Gained (acres)
Main Channel and Turning Basin	8.6	0.0
Morris Cove Borrow Pit	0.0	42.0
West River Borrow Pit	0.0	15.0
Sandy Point Marsh Creation	51.6	0.0
Shellfish Habitat Creation Area	0.0	0.0
Rock Placement Area	0.0	0.0
TOTALS	**60.2**	**57.0**

7.9 Shellfish and Lobster

No Action Alternative

Under the no action alternative, shellfish and lobster resources in the vicinity of New Haven Harbor would remain unaffected.

Preferred Alternative

Dredging

Dredging Effects to Resources

The improvement dredging of New Haven Harbor will remove all shellfish and lobster resources in the direct footprint of the dredge. Additionally, the benthic community, which lobsters utilize as a forage source, will also be removed. Shellfish resources in adjacent areas should not be significantly impacted and will serve as a recruitment source following the cessation of dredging. Impacts from elevated turbidity to shellfish resources in the vicinity of the dredging operation should be minimal as the impact area will be highly localized. Several studies have demonstrated that shellfish are capable of withstanding elevated turbidity levels for short time periods (i.e., days) with no significant metabolic consequences or mortality (Wilbur and Clarke 2001; Archambault et al. 2004; Norkko et al. 2006). Adult lobsters are also tolerant of exposure to elevated suspended sediment concentrations (Stern and Stickle 1978). Since the dredging of the project areas will be a short-term effort and reestablishment of shellfish populations in the dredge footprint will recover, impacts to shellfish resources are anticipated to be minimal. Therefore, the proposed project should not have long-term significant impacts to lobster and shellfish resources in the dredging area.

Effects to Managed Shellfish Parcels

As noted in Section 3.9, the State of Connecticut (Department of Agriculture/Bureau of Aquaculture) manages many parcels of land underwater that are dedicated to shellfish growing and harvesting. Table 7-2 notes each of the parcels that are located within the footprint of the proposed project and the estimated area of the parcel that would be affected by the dredging effort.

The proposed deepening and widening of the New Haven FNP should not pose a significant long-term impact to the shellfishing industry of New Haven Harbor. For those active parcels located within the proposed improvement areas, live shellfish (and/or shellfish shells that are on the seafloor serving as a growing substrate) will be able to be removed prior to dredging and placed elsewhere within the harbor. The practice of relocating shellfish resources is routinely used in New Haven Harbor, as the majority of the harbor is in “conditional relay” harvesting status. Portions of sixteen active lots (noted in Table 7-2), totaling approximately 228 acres will be permanently lost to shellfish growing and harvesting as they will become a part of the New Haven Harbor FNP.

The placement of material at the various beneficial use sites will impact portions of leased lot areas. Table 7-3 shows the affected lots and the expected area of impact to each lot. About 98 acres of lots will be impacted by beneficial use placement alternatives, however, about 42 acres

of shellfish habitat within the Morris Cove borrow pit will be restored as shellfish habitat.

Shellfish Habitat Creation Area

An area (Figure 3-4) behind the East Breakwater in New Haven Harbor has been identified as a potential site to place silty-sand from outer New Haven Harbor to create habitat more suited for oyster beds. The placement of approximately 434,000 CY of sand within this area (with the exception of a small portion of hard bottom in the southeast corner of the site) will create approximately 25 acres of oyster habitat. The placement of material at the site is intended to raise the elevation above the surrounding harbor bottom and provide a harder substrate than currently exists. The entire shellfish creation area is located within a State of Connecticut owned shellfish parcel that is not currently fished. Any existing shellfish resources in the creation area will be removed prior to placing dredged material within the site.

Table 7-2: Managed Shellfish Parcels in New Haven Harbor Improvement Project Area

PARCEL NAME	BED TYPE	FISHING STATUS	TOTAL AREA OF PARCEL (ACRES)	TOTAL AREA OF PARCEL IN THE EXISTING FNP (ACRES)	AREA OF IMPACT FROM PROPOSED PROJECT (ACRES)
05-14	Hard Clam/Oyster	inactive	134.7	15.27	15.08
LOT 66	Oyster	active	4.5	2.37	1.05
LOT 49	Oyster	active	30.7	2.47	1.66
LOT 70	Oyster	inactive	14.3	6.73	0.34
LOT 72	Oyster	active	204.8	27.1	8.69
LOT 74	Oyster	active	71.3	50.36	15.4
LOT 90	Oyster	active	61.8	25.45	11.48
LOT 97	Oyster	active	20.1	16.18	7.3
LOT 99	Oyster	active	28.9	6.82	3.7
LOT 100	Oyster	active	10.8	8.79	3.25
LOT 103	Oyster	active	33.7	6.84	4.96
LOT 106	Oyster	active	23.5	14.3	4.78
LEASE 146	Oyster	inactive	31.5	7.56	4.4
324B	Hard Clam/Oyster	inactive	52.8	28.33	10.45
324A	Hard Clam/Oyster	active	41.6	12.84	4.67
LOT 327	Clam	active	55.5	22.84	19.82
LOT 339	Hard Clam/Oyster	active	198.3	67.96	67.96
LOT 343	Hard Clam/Oyster	active	107.9	21.59	21.59
LEASE 568	Clam	active	233.6	18.87	8.57
L-635	Clam	active	89.1	12.06	5.44
L-636	Clam	inactive	50.4	8.13	8.13

Table 7-3: Managed Shellfish Parcels in New Haven Harbor Affected by the Proposed Placement Areas.

PARCEL NAME	PLACEMENT SITE	FISHING STATUS	TOTAL AREA OF PARCEL (ACRES)	AREA OF IMPACT FROM PROPOSED PROJECT (ACRES)
LOT 134N	Morris Cove Borrow Pit	Unknown	50.0	23.7
LOT 134S	Morris Cove Borrow Pit	Unknown	50	18
LOT 1	Sandy Point Salt Marsh	Unknown	8	4.5
LOT 2	Sandy Point Salt Marsh	Unknown	22	12
LOT 3	Sandy Point Salt Marsh	Unknown	6.2	0.5
LOT 33	Sandy Point Salt Marsh	Unknown	3.8	0.9
LOT 35	Sandy Point Salt Marsh	Unknown	6.5	6.5
TRACT 3	Sandy Point Salt Marsh	Unknown	254	28
LOT 56	West River Borrow Pit	Unknown	7.5	2.1
L 673	Rock Reef	Unknown		1.5

7.10 Birds

No Action Alternative

Under the no action alternative, bird resources in the vicinity of New Haven Harbor would remain unchanged.

Preferred Alternative

Dredging, Disposal, and Blasting

As discussed in Section 2.5.15, a very large and diverse bird community exists in the New Haven Harbor area. The USACE does not anticipate that avian species, including shorebirds, seabirds, and migratory birds, would be adversely (directly or indirectly) affected by the proposed project. The proposed project would cause only temporary impacts to the bird community as individuals avoid active construction areas due to noise and general activity. Since dredging would occur in open and deep water, impacts to the bird community are expected to be temporary and minor. Placement of dredged material within the marsh creation area may displace individuals using the sites for foraging and resting. However, these impacts are expected to be short-term and limited to the periods of active construction.

The salt marsh creation beneficial use alterative will increase available salt marsh habitat in the New Haven Harbor system. Salt marshes are used by a variety of migratory bird species for nesting, foraging, and loafing/roosting habitats.

7.11 Invasive Species

No Action Alternative

Under the no action alternative, invasive species in the proposed project area would remain unchanged.

Preferred Alternative

Dredging

As mentioned in Section 2.5.16, the major known pathways for non-native species to enter the project area include stocking, aquarium releases, shipping, and bait releases. Commercial shipping, via the use of ballast water and from vessel fouling communities, is the only direct mechanism related to this project. Federal regulations require the shipping industry to implement control of the invasive species introduction pathway through the ballasts of vessels (US Coast Guard, 2012). These regulations should decrease the rate at which invasive species are introduced to United States waters. The proposed project would result in fewer vessels than what is anticipated in the No Action Alternative (see Section 7.14), which should reduce the

potential for the introduction of invasive species. Therefore, the proposed project is not anticipated to increase invasive species within the study area.

7.12 Air Quality

General Conformity under the Clean Air Act, Section 176 was evaluated for the New Haven Harbor Navigation Improvement project. As noted in Section 3.12, New Haven County is designated by the EPA as a moderate non-attainment area for the 2008 8-hour ozone standard. Total direct and indirect emission from this project/action are estimated to be at levels that are considered to be de minimus. The calculated volumes are below the conformity threshold value established at 40 CFR 93.153(b) of 100 tons/year of NOx and 50 tons/year for VOCs. Table 7-4 below shows the calculated VOCs and NOx emissions per calendar year for the proposed project. A general conformity record of non-applicability and the associated emissions calculations are located in Appendix L.

Table 7-4: Calculation of Ozone (VOCs and NOx) Emissions per Calendar Year for the New Haven Harbor Navigation Improvement Project

Year	Total NOx (tons)	Total VOC (tons)
2021	79.83	11.28
2022	99.06	14.28
2023	73.71	10.42

7.13 Hazardous, Toxic, and Radioactive Waste

No Action Alternative

Under the no action alternative, the existing conditions noted in section 3.13 would remain unchanged.

Preferred Alternative

Dredging, Disposal, and Blasting

The project is not anticipated to contribute any hazardous, toxic, or radioactive waste material to the New Haven Harbor system.

7.14 Noise

No Action Alternative

Under the no action alternative, the existing noise conditions noted in section 3.14 would remain unchanged.

Preferred Alternative

Impacts of Dredging Noise on Marine Life

Reine et al. (2012) found that the majority of underwater sounds produced by hydraulic cutterhead dredging operations were of relatively low frequency (< 1000 Hz). Their study was conducted during rock fragmentation and therefore represented a worst case scenario. The source level was estimated to be between 170 and 175 dB re 1uPa @1m. These sound levels decreased with increasing distance from the source. The authors determined that the area of influence was limited to less than 100 m from the source. At 100 m received levels were less than 150 dB re 1 uPa rms.

Based on existing studies, the NMFS current thresholds for determining impacts to marine mammals is between 180 and 190 dB re 1 uPa for potential injury to cetaceans and pinnipeds respectively, and 160 dB re 1 uPa for behavioral disturbance/harassment from an impulsive noise source, and 120 dB re 1 uPa from a continuous source. Reine et al. (2012) found that the 120 dB re 1uPa proposed threshold was exceeded by ambient noises in their study area. Based on reviews by Popper et al. (2006) and Southall et al. (2007) it is unlikely that underwater sound from conventional dredging operations can cause physical injury to fish species. Some temporary loss of hearing could occur if fishes remain in the immediate vicinity of the dredge for lengthy durations, although the risk of this outcome is low (CEDA 2011). Fish would likely respond to dredging by using avoidance techniques. Avoidance is defined as an effect that causes fish to not occupy an area that is periodically or infrequently occupied. Dredging is likely to cause avoidance due to noise (and increased suspended sediments and other temporary water quality changes).

NMFS criterion for physical injury to fish is 206 dB peak, regardless of fish size. However, dredging operations would likely cause the temporary displacement of fish species as a behavioral response to the noise. This would not likely have an effect on populations of fish as they would be able to use areas outside of the navigation channel to traverse to and from spawning and feeding grounds.

The sediment within New Haven Harbor is predominantly silt/clay mixture, with the exception of hard rock in portions of the Main channel near the breakwaters. According to the Clarke et al. (2002), the peak amplitude for the bucket hitting the rocky, gravel, cobble bottom at Cook Inlet, Alaska was about 40 - 50 dB. Both Doug Clarke and Charles Dickerson, US Army ERDC, stated that this peak amplitude of the bucket hitting sand/silt/mud substrate would be significantly less than 120 dB. Since the substrate composition of New Haven Harbor is predominantly silt/clay material, it is reasonable to assume that the New Haven Harbor dredging would have a lower sound level.

Impact of Dredging Noise on the Human Environment

Maintenance dredging and periodic new work dredging has occurred in New Haven Harbor for over 100 years. For continued maintenance dredging, the dredging equipment is usually present in the Harbor on an 8 to 9-month frequency and that frequency is not expected to change with the proposed project. While there would be an increase in the ambient noise level during the dredging phase of the project, the source of noise is at a distance far enough away from any sensitive receptors that no impact is anticipated. Since dredging does not occur in one position for any extended period of time, there will be no disproportionate adverse impact on any communities adjacent ot the harbor. Noise generated by this project would not be substantially different from other ambient noise levels of a typical harbor.

Impact of Underwater Noise from Vessel Traffic

Most vessels produce low frequency sound (below 1 kHz) from onboard machinery, hydrodynamic flow around the hull, and from propeller cavitations. This frequency relates to vessel size, speed, load, condition, age, and engine type. Low frequency sound can travel hundreds of miles and can increase ambient noise in large areas of the ocean. Additionally, Okeanos (2008) showed that shipping noise does not exceed 100 dB. The economic assessment from this project has determined that the number of vessels transiting in and out of New Haven Harbor would decrease as a result of the proposed project and that the same number of larger vessels would call on the Harbor regardless of channel depth. The difference being that with a deeper channel, the larger vessels can fully load their cargo and be unrestricted by tide. Without the project, a greater number of vessels would be required to deliver the same amount of commercial goods which would have a greater impact on marine noise. As a result, no adverse impact is anticipated from underwater noise resulting from vessel activity as a result of deepening the Harbor.

Port noise can come from port facilities, cranes, cargo handling equipment, warehousing, vessel repair or maintenance, and engine noise from vessels at berth. The proposed project would not cause an increase in the number of vessels anticipated to arrive in the Port of New Haven. The only change may be in the timing of vessel unloading. In light of these factors, the proposed deepening is not expected to result in adverse noise impacts as a result of port operations.

Blasting Noise

Ambient noise represents the combination of all sound within a given environment at a specified time. Humans hear sound from 0-140 dB. Sound above this level is associated with pain. High intensity sounds can permanently damage fish hearing (Nightingale and Simenstad 2001). Dredging operations generally produce lower levels of sound energy but last for more extended periods of time than more intense construction activities (e.g., pile driving) (Nightengale and

Simenstad 2001). These sounds have been documented to be continuous and low frequencies (< 1000 Hz) and are within the audible range of listed species of both whales (7Hz–22 kHz) and sea turtles (100-1000Hz) (Clarke et al., 2002).

Noise has been documented to influence fish behavior. Fish detect and respond to sound by utilizing cues to hunt for prey, avoid predators, and for social interaction. Fish produce sound when swimming, mating, or fighting and also noise associated with swimming. Fish use a wide range of mechanisms for sound production, including scraping structures against one another, vibrating muscles, and a variety of other methods. Sounds produced by spawning fishes, such as sciaenids, are sufficiently loud and characteristic for them to be used by humans to locate spawning locations.

Relative to exposure to anthropogenic noise, NOAA guidelines define two levels of harassment for marine mammals: Level A based on a temporary threshold shift (190 dB for pinnipeds and 180 dB for cetaceans), and Level B harassment with the potential to disturb a marine mammal in the wild by causing disruption to behavioral patterns such as migration, breeding, feeding, and sheltering (160 dB for impulse noise such as pile driving and 120 dB for continuous noise such as vessel thrusters) (http://www.nwr.noaa.gov/Marine-Mammals/MM-sound-thrshld.cfm). According to Richardson et al. (1995) the following noise levels could be detrimental to marine mammals:

- Prolonged exposure of 140 dB re 1 μPa/m (continuous man-made noise), at 1 km can cause permanent hearing loss.
- Prolonged exposure of 195 to 225 dB re 1 μPa/m (intermittent noise), at a few meters or tens of meters, can cause immediate hearing damage.

While short-term impacts to the noise environment are expected by blasting actions, these impacts will cease upon termination of the blasting activities thus having no long term impacts to the noise environment of New Haven Harbor.

7.15 Coastal Barrier Resources

There are two OPAs located within New Haven Harbor: the Morse Park unit and the Nathan Hale Park unit. The proposed project would have no effect on the Nathan Hale Park Unit. The project will affect the Morse Park Unit by creating saltmarsh habitat within the unit. However, this action will not violate CBRA as it would not induce development in the unit. Additionally, per 16 U.S.C. § 3505(a), the following exemption criteria is met: “the maintenance or construction of improvements of existing federal navigation channels (including the Intracoastal Waterway) and related structures (such as jetties), including the disposal of dredge materials related to such maintenance or construction.” The USFWS has concurred that the proposed project will not violate CBRA requirements.

7.16 Cultural and Historic Resources

No Action Alternative

Under the no action alternative, the existing conditions noted in section 3.16 would remain unchanged.

Preferred Alternative

Navigation Improvements

USACE has conducted side scan sonar surveys and obtained vibracore samples of the navigation improvements areas within the New Haven Harbor study area. A possible wreck/obstruction site was located just outside of the main channel and adjacent to the channel side slope (see side scan image in relation to APE). CT SHPO recommends a 150-foot buffer from all sides of the side scan sonar image of the possible wreck site. The current data is inconclusive to determine whether this site is a shipwreck or other obstruction. Since the location is outside of the current improvements to the channel, it will be avoided with an appropriate buffer. However, if impacts to the area cannot be avoided, then an archaeological examination of the site would be required during a later phase of the study to determine whether the location represents a significant historic property eligible for the NRHP.

No other possible wreck sites were identified in the side scan data. The vibracore samples were examined and consisted primarily of deep fill material overlaying the original sediments. No evidence of habitation surfaces or artifacts of any types were encountered. Many of the cores contained a black tar-like substance indicative of petroleum products that exuded a strong smell. This black tar overlaid recent fill material in many of the cores and correlates with the presence of a large, urban harbor where shipping of oil and petroleum products is a prime commodity.

Impacts to historic properties are not expected from the navigational improvements to New Haven Harbor adjacent to the current channel dimensions and a buffer will be established around the possible wreck/obstruction indicated above.

Disposal Sites

The Central Long Island Sound Disposal Site or CLIS is a previously utilized disposal site for dredged material. Disposal of dredged material from the New Haven Harbor navigation improvement project at CLIS is unlikely to impact any significant historic properties.

Beneficial Use Site

Sandy Point Wetland Creation Site

Research conducted as part of the LIS DMMP by PAL (Cherau et al. 2010) identified one potential shipwreck, the Laura S. Hatch, located to the northwest of the Sandy Point Dike. As per SHPO recommendation, a 150-foot buffer will also be required around this site. As the beneficial use site is well to the south (roughly 2,000 feet) and located along the edge of Sandy Point, its use will not impact this possible wreck site. If the dimensions of the beneficial use site change and the buffer cannot be maintained around the shipwreck, further evaluation would be required including archaeological investigation and coordination with SHPO.

Vibracores of the Sandy Point site (a total of 8 cores) were taken to ascertain the stratigraphy of the area and determine if the sediments exhibit stratified deposits and/or artifacts indicative of possible Native American habitation. The 2010 PAL study of Long Island Sound identified most of the southern New Haven Harbor and surrounding coastal areas as having moderate underwater archaeological sensitivity. A review of the vibracores indicated primarily organic silt and fine sand over dark gray clay silt to the bottom with assorted oyster, clam, and whelk shells throughout the column. This is indicative of coastal wetland deposits in the area. No evidence of soil horizons, habitation levels, or artifacts of any type were identified.

An archaeological survey of the West Haven Water Pollution Control Facility adjacent to Sandy Point was conducted in 2009. Originally built in 1969, the facility was proposing an expansion to the east along the former wetland areas that bordered Sandy Point. Shovel test pits along three transects uncovered primarily fill deposits overlaying the original wetland soils, with thicker fill deposits closer to the existing water treatment plant. The original plant was built with imported fill over wetland soils and this is documented in thick fill deposits containing modern debris in highly disturbed contexts closest to the plant with lesser amounts of debris away from the facility. No further archaeological work was recommended (Archaeological Consulting Services (ACS) 2009:1-2).

West River Borrow Pit

No known or recorded shipwrecks or submerged archaeological sites are located in the vicinity of the proposed West River borrow pit site. As this site has previously been utilized for borrow material and will simply be filled with dredged material, impacts to historic properties are not expected.

A side scan sonar survey of the West River borrow pit conducted during spring 2018 identified 26 vessel moorings, 2 navigation aid moorings, and one submerged vessel. According to the local harbormaster, this is a modern sailboat that sank recently (within the last 20 years).

USACE will confirm this information and attempt to identify the actual vessel lost during project design.

Morris Cove Borrow Pit

No known or recorded shipwrecks or submerged archaeological sites are located in the vicinity of the proposed Morris Cove site. This site is also a previously utilized disposal site for dredged material and impacts to historic properties are not expected.

East Breakwater Oyster Habitat Creation Site

No known or recorded shipwrecks or submerged archaeological sites are located in the vicinity of the proposed East Breakwater improvement area. Side scan sonar survey of this area did not identify any possible submerged historic properties or obstructions, with the exception of a linear feature inshore of the breakwater determined to be a cable running from Morgan Point to the Southwest Ledge Lighthouse.

West Breakwater, General Rock Placement Area

No known or recorded shipwrecks or submerged archaeological sites are located in the vicinity of the proposed West Breakwater rock placement area. Side scan sonar survey of the area did not identify any potential historic properties. Impacts to cultural resources are not expected.

The CT SHPO has concurred with these determinations by letter dated May 13, 2019. Additionally, USACE consulted with the Mashantucket Pequot Tribal Nation and the Mohegan Tribe; both Tribes received this original correspondence dated April 3, 2019. The Mashantucket Pequot Tribal Nation provided a letter dated May 6, 2019 with questions from the Deputy Tribal Historic Preservation Officer that were addressed in a subsequent response letter dated June 7, 2019. We have received no further response from the Mohegan Tribe.

In all cases, if unanticipated discoveries are found during implementation of the project, USACE will follow the post review discoveries guidance of the Advisory Council's regulations (36 CFR 800.13). No further work will be allowed in the area and coordination with project stakeholders will commence to determine the appropriate course of action for identification and evaluation of the possible historic property.

7.17 Aesthetics and Recreation

The proposed project would not change the aesthetic resources of New Haven Harbor, nor the numerous recreational opportunities. Although the definition of aesthetics is fluid, for the purposes of the present evaluation, the principal aesthetic "targets" include the visual perception of New Haven Harbor's land- and seascapes and historic features. Commercial and recreational

vessel traffic patterns, shoreline land uses, and natural resources that define the aesthetic characteristics of the area would not be adversely affected by the proposed project.

The economic analysis for this project determined that the same size vessels would call on New Haven Harbor with or without a project; however the larger vessels would be able to access the harbor more fully with a project than without. This would reduce the number of vessels visible within and outside of the harbor as vessels would not need to wait in deep waters for appropriate tidal conditions.

One notable change to the harbor area would be an increase in salt marsh in the vicinity of Morse Beach and Sandy Point. The creation of this valuable habitat will add an additional natural habitat feature to the harbor's landscape.

As a public safety measure, boating would be prohibited near the operating construction equipment and sediment placement locations. Recreational access to these areas would return to preconstruction conditions following completion of the project. Although short-term impacts could occur, no long-term adverse effects are anticipated. Commercial shipping would continue in the federal navigation channel. Information would be provided to the USCG so they could issue a "Notice to Mariners" prior to initiation of construction and for each major change in the construction activities. This would alert public boaters of areas to avoid and the possibility of limited and restricted access. No significant adverse impacts to public safety are expected from the proposed project.

7.18 Socioeconomics

7.18.1 General

Long-term forecasts for the New Haven County region of Connecticut indicate continued growth of both population and employment, but at slower rates than has been experienced in the past decades (UCONN, 2018). As the port operators associated with New Haven Harbor provide many jobs (directly and indirectly) throughout Connecticut, the proposed project should sustain or increase the economic importance of the port of New Haven. Therefore, no negative effects on the socioeconomic environment are anticipated as a result of this project.

7.18.2 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations was signed on February 11, 1994. This EO is designed to focus the attention of Federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potentially disproportionately high and adverse impacts from the proposed actions in minority communities and low-income communities and to identify alternatives that might mitigate these impacts.

No significant adverse environmental impacts to minority or low income populations are anticipated as a result of this project. Although the populations surrounding the project area have a larger percentage of minorities and low-income population compared to the rest of the State of Connecticut, this dredging and disposal project is not expected to have a significant human health or environmental effect on any portion of the human population.

7.18.3 Protection of Children

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks was signed on April 21, 1997. A growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health risk and safety risks. Based on this risk, each Federal agency has been directed by this EO to identify and assess environmental health risks and safety risks that may disproportionately affect children. Each Federal agency is directed to ensure that its policies, program activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

The project activities are located in the waters of New Haven Harbor and Long Island Sound, not an area that would be used disproportionately by children. The environmental impacts are generally temporary and contained within the aquatic environment. As discussed in the previous sections, any potential air quality impacts will conform to State and Federal emission standards during construction. Completion of the proposed project will reduce future regional air emissions by reducing vessel numbers transiting New Haven Harbor and thereby slightly decreasing potential health risks from poor air quality.

7.19 Sediments

The following section describes the impacts to the sediments within the improvement project as well as the sediments within the possible dredged material placement locations.

<u>New Haven Harbor Federal Navigation Project</u>

As described in Sections 2.3.4 and 2.3.5, the sediments to be dredged as part of the improvement dredging effort within New Haven Harbor are predominately silt. The outer harbor has sediments composed of fines sands and the area of the main channel that runs between the breakwaters has a fine layer of silt and fine sands upon underlying rock. Upon completion of the improvement dredging project, the various areas of the harbor are anticipated to have sediments similar to pre-dredge conditions. The silty areas in the harbor are expected to remain silt and the portions of the channel with sediments of fine sand are expected to remain fine sand. The areas in which blasting occurs (i.e., in rock) may lose the veneer of overlying silt for a short period of time following blasting and rock removal efforts. Natural deposition and shoaling processes in New Haven Harbor should cover the exposed rock within months of project completion.

Shellfish Creation Area

The sediments in the shellfish creation area will be changed from predominately fine grained silts and clays to sediments consisting of fine grained sands. The fine sands from outer New Haven Harbor will be placed within the shellfish creation area to provide a preferred substrate for oyster growth. A small area of hard bottom habitat identified in the southwestern portion of the site (Figure 3-4) will be avoided.

West River Borrow Pit

The sediments in the West River Borrow Pit (Figure 3-5) are predominately fine grained silts with some fine sands. The silty material from inner New Haven Harbor will be placed in the West River Borrow Pit. Thus, the sediments in the area will be similar to the existing sediments following construction.

Morris Cove Borrow Pit

The sediments in the Morris Cove Borrow Pit are predominately fine-grained sands and silts. The silty material from mid New Haven Harbor will be placed in the Morris Cove Borrow Pit. Thus, the sediments in the area will be similar to the existing sediments following construction.

Rock Placement Area

The sediments in the rock placement area are predominately fine-grained sands and silts. As this area is planned to receive any rock generated by the proposed project, the sediments in this area will be permanently changed from fine-grained silts and sand to rocky hard bottom interspersed with fine-grained silts and sands.

Sandy Point Salt Marsh Creation Area

The surficial sediments in the salt marsh creation area are predominately fine-grained sands and silts. A containment wall built with dredged material filled geotubes will ring the marsh creation site and material from inner New Haven Harbor will be placed within the containment area. The area will be filled to an elevation conducive to the growth of salt marsh plant species. Therefore, the existing sediments will be permanently converted from subtidal sands and silts to salt marsh sands and silts.

7.20 Cumulative and Secondary Impacts

7.20.1 Cumulative Impacts

The National Environmental Policy Act (NEPA) defines cumulative effects as: “the impact on the environment which results from the incremental impact of the action when added to other

past, present, and reasonably foreseeable future actions regardless of what agency (Federal or Non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

Past actions in New Haven Harbor include the construction of bulkheads, rock revetments, seawalls, and groins along the harbor, the filling of salt marsh and deforestation of forested uplands for residential and commercial development, and the dredging of borrow pits in the harbor for sand and gravel reclamation. Wastewater treatment plants and a power generation station that discharge into the harbor have also been constructed adjacent to New Haven Harbor. The development of a commercial shipping port in inner New Haven Harbor, commercial and recreational navigation in the harbor, and commercial and recreational fishing within the harbor have also occurred. Additionally, New Haven Harbor is an exit point for the Cross Sound Cable, which is an electrical cable that crosses Long Island Sound between New Haven, CT and Shoreham, NY. The parklands that border the harbor have historically been used for various recreational activities such as swimming, hiking, and bird-watching.

Past actions specifically associated with the New Haven Harbor FNP include the construction of the navigation channels and anchorages in New Haven Harbor (dredging and wetland filling) and the construction of the harbor's breakwaters. Additionally, maintenance dredging efforts associated with the New Haven Harbor FNP have occurred approximately every 10 years.

Some past actions (e.g., bulkheading, building seawalls, the filling of salt marshes, and the destruction of maritime forest) have significantly impacted the New Haven Harbor ecosystem by removing valuable habitat and replacing it with commercially and residentially developed properties. Other past actions (construction of waste-water treatment plants and electric generating stations, port development, navigation through the harbor) have impacts to water quality in the harbor which range from short-term impacts (e.g., increased storm water discharge) to long-term impacts (e.g., entrainment of larval fish).

As noted in Section 2.2, the Port of New Haven is presently an active import and export port whose commodities include items such as petroleum products, crude materials, and manufactured goods, so present actions include the operation of the port facilities as well as navigation to and from the port. Other present actions in New Haven Harbor include the discharge of water from waste-water treatment facilities and the electricity generating plant, commercial and recreational fishing, as well as public recreating. Impacts from these actions are generally related to short-term impacts to water quality.

Future activities in New Haven Harbor are anticipated to remain similar to those present actions noted above: port operation, operation of waste-water treatment facilities, commercial and recreational navigation, commercial and recreational fishing, and public recreating. Additionally many terminal operators perform maintenance dredging of their berth facilities, and this is

anticipated to continue into the future. The improvement of the FNP in New Haven Harbor will be a major future action and its effects are documented throughout this report.

The construction of the improvement project will necessitate the moving of the Cross Sound Cable to meet the USACE permit requirements. This action will likely disturb small portions of the harbor bottom. Environment impacts from cable placement activities are generally minor if proper planning minimizes impacts to important resources. Minimization would be accomplished through compliance with conditions in the existing USACE permit and through required coordination with resources agencies during the State of Connecticut permitting process.

Future maintenance dredging of the New Haven Harbor FNP is also expected and will likely occur at 10-year intervals. The maintenance dredging effects are anticipated to be similar to the effects noted throughout this report.

Generally, most of the cumulative impacts related to the range of present and future harbor actions will occur in the water column (e.g., impacts from discharges) and in the subtidal bottom areas (e.g., disturbed seafloor areas where benthic resources reside). However, the majority of impacts to these areas are short-term in nature and should not significantly contribute to a decline in the ecological or socioeconomic importance of New Haven Harbor.

7.20.2 Secondary Impacts

The proposed Deep Draft Project alternatives would dredge the Main Ship Channel to a depth greater than the currently authorized depth of -35 feet at mean lower low water (MLLW). This would put New Haven Harbor more in line with other similar U.S. coast ports of its size. The Deep Draft Project would allow larger vessels to access the port facilities in an environmentally safer and economically efficient manner, thereby increasing the efficiency of the cargo loaded and unloaded at New Haven Harbor while maintaining existing sailing schedules and port rotations.

This section discusses the secondary, or indirect, impacts likely associated with the Deep Draft Project and the related increases in the sizes of ships calling on the Port of New Haven. Direct effects are caused by the proposed dredging and occur contemporaneously at or near the location of the action. As defined in NEPA, indirect effects:

> *"… are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."* (40 CFR 1508.8)

The Port of New Haven is well established and has experienced a large volume of ship traffic for many years. Within this context, the Deep Draft Project represents a continuation of navigation channel alterations following numerous historical maintenance and improvement projects. Major maintenance dredging generally occurs at a frequency of approximately every 10 years depending on funding. The Deep Draft Project would allow larger, deeper-draft vessels to access New Haven Harbor port facilities in an environmentally safer and economically-efficient manner and for those vessels to carry more cargo. By allowing larger vessels to access the port facilities in an economically-efficient and environmentally safer manner, the Deep Draft Project should not affect bulk carrier or petroleum vessel traffic and maximize existing sailing schedules and port rotations. The array of shipping scenarios is discussed in the economic analysis of project benefits (Appendix C).

As vessel traffic to the Port is expected to decrease due to the shift to larger vessels with the project, no secondary impact from increased vessel traffic, or secondary impacts to air quality are expected. Total cargo is expected to increase at a growth rate of 1.5 percent per year over the existing volume. This may lead an increase in truck transportation traffic associated with port activities, which may increase local area traffic impacts and add to air quality impacts.

8.0 ENVIRONMENTAL COMPLIANCE

8.1 Cooperating Agency Request

The National Environmental Policy Act (NEPA) encourages early agency cooperation. A Federal agency which has jurisdiction by law shall be a cooperating agency upon request of the lead agency (the USACE in this instance). In addition, any other Federal agency which has special expertise on environmental issues, which should be addressed in the EIS, may also be a cooperating agency upon request of the lead agency. Where appropriate, the lead agency should also seek the cooperation of the State or local agencies of similar qualifications. Cooperating agencies shall participate in the NEPA process at the earliest possible time, participate in scoping meetings, help prepare information or environmental analyses which the cooperating agency has expertise, and provide staff support as requested by the lead agency (USACE) to enhance interdisciplinary capability. Cooperating Federal agencies that have jurisdiction by law or special expertise include the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, NOAA-Fisheries, and the U.S. Coast Guard. The Connecticut Department of Energy and Environmental Protection and the environmental agencies it oversees, the New York Department of State (which contains New York's Coastal Zone Management Program) and the Mohegan Tribe also have jurisdiction by law or special expertise that is relevant to the proposed project. A letter requesting cooperating agency participation was sent by the USACE to the four Federal agencies, the State agencies, and Indian Tribes (Pequot and Mohegan) on Dec. 14, 2016.

Three Federal agencies (USEPA, NOAA-Fisheries, and USCG) agreed to participate as cooperating agencies on this EIS. One Federal agency (USFWS) chose not to be a cooperating agency, but retained their responsibilities to review the proposed project under pertinent laws and regulations. The Connecticut Department of Energy and Environmental Protection agreed to represent the State environmental agencies in the development of the EIS. CT SHPO and the Mohegan Tribe also agreed to participate as cooperating agencies. The New York Department of State declined to be a cooperating agency. See Appendix A for a copy of the correspondence.

8.2 Threatened and Endangered Species Consultation

The USACE coordinated the development of this EIS with NOAA-Fisheries, USFWS, and the Connecticut Department of Energy and Environmental Protection in regard to threatened and endangered species. Information on threatened and endangered species was requested during the NEPA scoping meeting to aid in the formulation of project alternatives. During the development of alternatives for the project, the three agencies were briefed individually on project progress through meetings, webinars, and site visits. Received letter from NMFS July 8, 2019 indicating that the project was not likely to adversely affect any ESA listed sp. or critical habitat. Received letter from USFWS August 14, 2019 indicating that the project was not likely to adversely affect any ESA listed species or critical habitat.

8.3 Essential Fish Habitat Consultation

The 1996 amendments to the Magnuson-Stevens Fishery Conservation Management Act strengthen the ability of the National Marine Fisheries Service and the New England Fishery Management Council to protect and conserve the habitat of marine, estuarine, and anadromous finfish, mollusks, and crustaceans. This habitat is termed "essential fish habitat (EFH)" and is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

The USACE has been coordinating the development of this EIS with NOAA-National Marine Fisheries Service (NMFS) in regard to Essential Fish Habitat (EFH). Information on EFH and managed species was requested during the NEPA scoping meeting to aid in the formulation of project alternatives. During the development of alternatives for the project, the NOAA fisheries was briefed individually on project progress. An EFH assessment has been prepared in conjunction with this EIS and is located in Appendix H. NMFS provided their conservation recommendation letter on February 21, 2019. USACE response to recommendations provided to NMFS on September 4, 2019 (see Appendix A).

8.4 Coastal Zone Management Consistency Determination

The Coastal Zone Management (CZM) Act of 1972 established a national program to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations" and to "encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone..." (16 U.S.C. 1452, Sec. 303 (1) and (2)). Section 307 (c)(3)(A) of the CZMA provides that "... any applicant for a required Federal license or permit to conduct an activity, in or outside the coastal zone, affecting any land or water use or natural resource of the coastal zone of that state shall provide ... a certification that the proposed activity complies with the enforceable policies of the state's approved program and that such activity will be conducted in a manner consistent with the program." Similar requirements are included for activities conducted by or funded by a Federal agency.

Federal Consistency Determinations were prepared for the proposed projects for both the state of Connecticut's and the state of New York's coastal zone management programs. These determinations address the proposed project's consistency with all the relevant CZM policies from each state. The determinations are located in Appendix M and N. New York Department of State concurrence received February 11, 2019. Connecticut Department of Environmental Energy concurrences received on August 14, 2019 (see Appendix A).

8.5 Compliance with Federal Laws, Regulations and Programs

This section describes the Federal laws, regulations, and programs that are relevant to the dredging and placement of dredged material from the New Haven Harbor Federal navigation improvement project.

Federal Statutes

1. Coastal Barrier Resources Act, 16 USC 3501 et seq.

Compliance: The project is not located within any Coastal Barrier Resources Act unit and no development is planned as a result of this project, therefore this project is compliant.

2. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: The "general conformity" requirements of Section 17(c)(1) of the Clean Air Act, 42 U.S.C. 7506(x)(1), will be adhered to by limiting construction and using "clean" equipment to avoid exceeding air quality standards or by purchasing emission credits.

3. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 U.S.C. 1251 et seq.

Compliance: Under Section 401 of the Clean Water Act, any Federal activity that will result in a discharge to waters or wetlands subject to Federal jurisdiction is required to obtain a State Water Quality Certification (WQC) to ensure compliance with State water quality standards. An application was filed with the State of Connecticut for a WQC pursuant to Section 401 of the Clean Water Act for the placement of dredged material into the Morris Cove and West Haven borrow pits, shellfish habitat creation area, rock placement area, or marsh creation area within New Haven Harbor and/or the placement of material at the Central Long Island Sound Disposal Site. Section 404 of the Clean Water Act governs the disposal of fill, including dredged material into waters of the United States within the three-mile territorial sea. This applies to discharges landward of the baseline of the territorial sea and in instances seaward of the baseline when the intent is to fill or nourish beaches. A Section 404(b)(1) Evaluation and Compliance Review has been prepared for all the possible placement sites and is included with this EIS. The Connecticut Department of Energy and Environmental Protection issued a WQC for the proposed project on August 14, 2019.

4. Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 et seq.

Compliance: The U.S. Army Corps of Engineers completed a Federal consistency determination pursuant to Section 307 of the Coastal Zone Management Act that determined the proposed project is consistent to the maximum extent possible with the CT and NY Coastal Zone Management program offices. The determinations are provided in Appendix M and N. Concurrence of the CZM consistency determinations satisfies the requirements of this statute. A

New York Department of State coastal zone management consistency concurrence was received 11 February 2019. A Connecticut Department of Energy and Environmental Protection concurrence was received on August 14 2019 (see Appendix A).

5. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Project scoping and coordination with the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries yielded no formal consultation requirements pursuant to Section 7 of the Endangered Species Act. Informal consultation with USFWS under Section 7 of the Endangered Species Act for listed piping plovers, red knots, and terns was initiated with the release of the Draft EIS. Informal consultation with NOAA Fisheries under Section 7 of the Endangered Species Act for listed sea turtles, shortnose sturgeon, and Atlantic sturgeon was initiated with the release of the Draft EIS. NMFS, by way of letter dated 8 July 2019, concurred with USACE's assessment that the proposed project was not likely to adversely affect any ESA listed species or critical habitat. USFWS, by way of letter dated August 14, 2019, also concurred that the proposed project is not likely to adversely affect any ESA listed species or critical habitat.

6. Estuarine Areas Act, 16 U.S.C. 1221 et seq.

Compliance: The Chief of Engineers Report will be submitted to Congress.

7. Federal Water Project Recreation Act, as amended, 16 U.S.C. 4601-12 et seq.

Compliance: Public notice of availability of this report relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

8. Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.

Compliance: Coordination with the U.S. FWS, NOAA Fisheries, Connecticut Department of Energy and Environmental Protection, and the Connecticut Department of Marine Fisheries signifies compliance with the Fish and Wildlife Coordination Act.

9. Land and Water Conservation Fund Act of 1965, as amended, 16 U.S.C. 4601-4 et seq.

Compliance: Public notice of availability of this report relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

10. Marine Protection, Research, and Sanctuaries Act of 1971, as amended, 33 U.S.C. 1401 et seq.

Compliance: Applicable; project involves the transportation or disposal of dredged material in

ocean waters pursuant to Sections 102 and 103 of the Act, respectively. No disposal of materials at the CLDS will occur unless it meets the requirements of MPRSA. All testing has found the proposed dredged material to be suitable for disposal at CLDS and meets the requirements of the MPRSA.

11. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

Compliance: Project coordinated with the State Historic Preservation Office (SHPO) and the Mashantucket Pequot and Mohegan Tribal Nations. Letter 13 May 2019 from SHPO concurs with USACE that no historic properties will be affected by the proposed undertaking.

12. National Environmental Policy Act of 1969, as amended, 42 U.S.C 4321 et seq.

Compliance: Preparation of this Environmental Impact Statement signifies partial compliance with NEPA. Full compliance will be achieved at the time the Record of Decision is issued.

13. Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.

Compliance: This report will be sent to Congress for approval.

14. Watershed Protection and Flood Prevention Act as amended, 16 U.S.C 1001 et seq.

Compliance: Not applicable, project area is not a watershed protection or flood prevention act area.

15. Wild and Scenic Rivers Act, as amended, 16 U.S.C 1271 et seq.

Compliance: Not applicable, project area is not a Wild or Scenic River.

16. Magnuson-Stevens Act, as amended, 16 U.S.C. 1801 et seq.

Compliance: Coordination with the NOAA Fisheries and preparation of an Essential Fish Habitat (EFH) Assessment signifies partial compliance with the EFH provisions of the Magnuson-Stevens Act (MSA). Final coordination efforts are complete and signifies compliance with the MSA. NMFS provided their conservation recommendation letter on February 21, 2019 and USACE provided a response on September 4, 2019 (see Appendix A.)

17. Marine Mammal Protection Act of 1972, 16 U.S.C. 1361-1407.

Compliance: Project scoping and coordination with the NOAA Fisheries yielded no formal consultation requirements pursuant to Marine Mammal Protection Act. Informal consultation

with NOAA Fisheries under the Marine Mammal Protection Act for whales, dolphins, and seals was completed.

18. Archaeological Resources Protection Act of 1979, 16 USC 470 et seq .

Compliance: Not applicable as Federal or Tribal lands are not involved in this project.

19. American Indian Religious Freedom Act of 1978, 42 USC 1996.

Compliance: Not applicable as Federal lands are not part of this project. USACE consulted with the CT Tribes as required under Section 106 of the National Historic Preservation Act.

20. Native American Graves Protection & Repatriation Act, 25 USC 3000-3013, 18 USC 1170

Compliance: Not applicable as Federal or Tribal lands are not involved. If Native American remains and associated funerary objects are disturbed, USACE would follow the procedures for unanticipated discoveries

Executive Orders

1. Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971.

Compliance: Coordination with the State Historic Preservation Officer signifies compliance.

2. Executive Order 11988, Floodplain Management, 24 May 1977 amended by Executive Order 12148, 20 July 1979.

Compliance: Not applicable; project is not located within a floodplain.

3. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: Applicable. Project will not significantly impact Federal wetlands and therefore complies with the EO.

4. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979.

Compliance: Not applicable; project is located within the United States.

5. Executive Order 12898, Environmental Justice, 11 February 1994.

Compliance: Not applicable; project is not expected to have a significant impact on minority or low income population, or any other population in the United States.

6. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, 21 April 1997.

Compliance: Not applicable; the project would not create a disproportionate environmental health or safety risk for children.

7. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000.

Compliance: Consultation with Indian Tribal Governments, where applicable, and consistent with executive memoranda, DoD Indian policy, and USACE Tribal Policy Principals signifies compliance.

8. Executive Order 13112, Invasive Species Control, 3 February 1999.

Compliance: The project will not introduce invasive species to the project area and is therefore compliant with the EO.

9. Executive Order 13186, Protection of Migratory Birds, 10 January 2001.

Compliance: Consultation with USFWS, which was completed in August 2019, signifies compliance.

10. *Executive Order* 13007, Accommodation of Sacred Sites, 24 May 1996

Compliance: Not applicable as Federal lands are not involved.

11. *Executive Order* 13807, Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects.

Compliance: Full Compliance will be met upon issuance of a Record of Decision.

Executive Memorandum

1. Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, 11 August 1980.

Compliance: Not applicable; project does not involve or impact agricultural lands.

2. White House Memorandum, Government-to-Government Relations with Indian Tribes, 29 April 1994.

Compliance: Consultation with Federally Recognized Indian Tribes, where appropriate, signifies compliance.

Coordination with the Federal Aviation Administration

Coordination was conducted with the Federal Aviation Administration (FAA) to ensure there were no concerns regarding potential wildlife aircraft strikes associated with the proposed wetland creation site at Sandy Point, West Haven. Tweed Airport is 2 miles to the east, on the opposite side of New Haven Harbor. Coordination was concluded with FAA on 07 February 2019 and they had no comments on the proposed project. The Memorandum for the Record is included in Appendix A.

8.6 Environmental Commitments

The following list of actions will be taken to minimize adverse impacts to natural and economic resources:

1) Dredging will occur from October 1 to January 1, in areas within winter flounder essential fish habitat (i.e., shallower that 5 meters). Dredging will occur between October 1 and March 1 in areas outside of winter flounder essential fish habitat (i.e., deeper than 5 meters). Placement of material inside the New Haven Harbor breakwaters will occur from October 1 through January 1. Placement of material at CLDS will occur between October 1 and March 1.

2) Dredging will not occur from June 1 to September 30 to avoid spawning shellfish in New Haven Harbor.

3) Barge overflow, the process of filling the receiving barges with dredged material and allowing them to overflow to reduce the water content of the barge load, will not be allowed.

4) USACE will abide by the conservation recommendations outlined in the US Fish and Wildlife Coordination Act Report and the Essential Fish Habitat conservation recommendations provided by NMFS, where practicable and justified. All practicable and justified reasonable and prudent measures (RPMs), habitat conservation recommendations (HCRs), and/or terms and conditions that were generated during the Endangered Species Act and the Magnuson-Stevens Act consultations with USFWS and NMFS have been incorporated into the proposed project.

5) USACE has committed to coordinating adaptive management and corrective actions related to salt marsh creation placement site.

6) USACE will abide by the 401 Water Quality Certification conditions provided by the state of Connecticut.

9.0 PUBLIC REVIEW AND AGENCY COORDINATION

9.1 Authority for Public Review

Public involvement during this study was conducted in compliance with the following Federal laws and regulations:

- National Environmental Policy Act (NEPA) of 1969**,** as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982);
- U.S. Clean Water Act, Section 404(a);
- Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA, Sec. 1501.7 Scoping and Sec. 1506.6 Public Involvement;
- 30 CFR Part 230 and Engineering Regulation (ER) 200-2-2;
- ER 1105-2-100, Planning Guidance, as amended.

Federal agencies are required under NEPA to undertake an assessment of the environmental effects of their proposed actions prior to making decisions. Two major purposes of the environmental review process are better informed decisions and citizen involvement in weighing the effects of those decisions. There are three Federal agencies that have particular responsibilities for NEPA. Primary responsibility is vested in the CEQ, established by Congress as outlined in NEPA. The USEPA-Office of Federal Activities reviews environmental impact statements (EISs) and some EAs issued by Federal agencies. Another government entity that may become involved in NEPA is the U.S. Institute for Environmental Conflict Resolution, which was established by the Environmental Policy and Conflict Resolution Act of 1998 to assist in resolving conflict over environmental issues that involve Federal agencies.

In 1978, CEQ issued binding regulations directing agencies on the fundamental requirements necessary to fulfill their NEPA obligations. The CEQ regulations set forth minimum requirements for agencies. The CEQ regulations also called for agencies to create their own implementing procedures that supplement the minimum requirements based on each agency's specific mandates, obligations, and missions. In accordance with these regulations, the USACE put in place ER 2002-2 (30 CFR Part 230) specific to NEPA compliance, as well as ER 1105-2-100 to provide, among other things, specific internal guidance on a number of environmental compliance issues including NEPA.

9.2 Scoping and Public Meetings

Two formal public meetings have been held for the project. One was the NEPA scoping meeting held in January 24, 2017 and the second was the public information meeting on navigation improvement alternatives and dredged material disposal sites held in January 19, 2018. Information from these public meetings are included in Appendix A. Two Public Hearings were held during the review of the Draft IFR/EIS on October 23 and 24, 2018. Information from these public hearings are included in Appendix A.

9.3 Agency Coordination

Federal, state, and local agencies and the Connecticut Tribes (Pequot and Mohegan) were invited to attend an initial agency scoping meeting in January 25, 2017 and to provide comments throughout the study. Several Agencies agreed to participate as a cooperating agency in the development of the EIS. See Section 8.1. Federal, State and local agencies and Tribes were invited to attend the public information meeting on January 10, 2018 and several site visits and conference calls were conducted during the study. Federal, State and local agencies and Tribes were invited to attend the public hearings on the Draft IFR/EIS on October 23 and 24, 2018. Coordination letters requesting comments on the Draft IFR/EIS were also provided to Federal, State and local agencies and the Tribes. Also see Section 8.5 for environmental compliance coordination.

9.4 Environmental Operating Principles

The USACE Environmental Operating Principles (EOPs) are considered throughout the study process, and will continue to be part of construction and operation of the proposed project.

Below are the USACE EOPs:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups

interested in USACE activities.

In coordination with the agencies and other stakeholders, the USACE proactively considered the environmental consequences of the proposed deepening project. In accordance with the mandate of this designation and the EOPs, the USACE has proposed a project that supports economic and environmentally sustainable solutions.

9.5 USACE Campaign Plan

USACE Vision: A great engineering force of highly disciplined people working with our partners through disciplined thought and action to deliver innovative and sustainable solutions to the Nation's engineering challenges.

USACE Mission: Provide public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters.

Commander's Intent: The USACE will be one disciplined team, in thought, word, and action. We will meet our commitments, with and through our partners, by saying what we will do and doing what we will say. Through execution of the Campaign Plan, the USACE will become a GREAT organization as evidenced by the following in all mission areas: delivering superior performance; setting the standard for the profession; making a positive impact on the Nation and other nations; and being built to last by having a strong "bench" of educated, trained, competent, experienced, and certified professionals.

The IFR/EIS for this project is consistent with these themes. The vertical USACE project team jointly applied the latest policy and planning guidance and worked closely with Federal, State and local stakeholders and professionals familiar with the problems, opportunities and resources to fully and fairly evaluate the feasibility of improving the Port in an expeditious fashion to achieve the common goals of providing safe, effective, and efficient navigation while protecting the environment.

10.0 LIST OF PREPARERS

Barbara Blumeris, Project Manager, Planning Lead, Planning Division, New England District, U.S. Army Corps of Engineers
Experience: Ms. Blumeris is a Regional Technical Specialist (RTS) in plan formulation responsible for management of project delivery teams and development and evaluation of project alternatives for planning studies including coastal storm risk management, navigation improvement, ecosystem restoration, and watershed studies. Ms. Blumeris has lead Agency Technical Reviews for the Coastal Storm Risk Management, Deep Draft Navigation, and Flood Risk Management USACE Planning Centers of Expertise.
Role in Preparing this EIS: Ms. Blumeris is the project manager/planning lead for the New Haven Harbor Navigation Improvement Study. She is primary author of the Feasibility Report.

Caitlin Bryant, Economist, Deep Draft Navigation Planning Center of Expertise, U.S. Army Corps of Engineers
Experience: Ms. Bryant is an economist in the Deep Draft Navigation Planning Center of Expertise (DDN-PCX) located in the Mobile District. As a member of the DDN-PCX, Ms. Bryant provides technical services such as economic analyses, Agency Technical Reviews, and research and development.
Role in Preparing this EIS: Ms. Bryant is the lead economist for the New Haven Harbor Navigation Improvement study. She is responsible for economics analysis of study alternatives and providing economic documentation.

Jeffrey A. Gaeta, Senior Cost Engineer, New England District, U.S. Army Corps of Engineers
Experience: Mr. Gaeta is a registered professional engineer with cost engineering experience in navigation, flood risk management, and environmental restoration projects.
Role in Preparing this EIS: Mr. Gaeta is the lead cost engineer for the New Haven Harbor Deep Draft Navigation Improvement Study. He is responsible for all cost products to include construction costs, risk-based contingency, construction schedule, and total project cost summaries.

Mark L. Habel, Chief, Navigation and Environmental Studies Section, Planning Division, New England District, U.S. Army Corps of Engineers
Experience: Mr. Habel has extensive experience with the Corps of Engineers in leading studies and project management for design and construction of navigation and coastal protection projects. Mr. Habel has been the Chief of the New England District's Navigation Planning Section.
Role in Preparing this EIS: Mr. Habel is a technical reviewer of all sections of the EIS.

Aaron D. Hopkins, Environmental Resource Specialist, New England District, U.S. Army Corps of Engineers
Experience: Mr. Hopkins has experience in marine sediment sampling and analysis, water quality evaluations, coastal monitoring, and oceanographic surveys. He is the Deputy Program Manager for the New England District's Disposal Area Monitoring System (DAMOS) and is responsible for evaluating the impacts of dredged material placement at open-water, nearshore, and confined aquatic disposal sites. He is also responsible for determining the suitability of material from Federal dredging projects for potential placement alternatives.
Role in Preparing this EIS: Mr. Hopkins performed hydroacoustic surveys, underwater video investigations, and collected sediment samples in support of the New Haven Harbor EIS. He also reviewed and analyzed physical, chemical, and biological data to develop the suitability determination for the New Haven Harbor Improvement Project. Mr. Hopkins performed technical review for multiple sections of the EIS and participated in public outreach events in support of the project.

Lauren Jacobs, Civil Engineer, Design Branch, New England District, U.S. Army Corps of Engineers
Experience: Ms. Jacobs is a civil engineer with experience working on navigation and civil works projects.
Role in Preparing this EIS: Ms. Jacobs developed the updated the channel alignment and dredge quantities following the ship simulation study at the U.S. Army Research and Development Center in Vicksburg, Mississippi. Ms. Jacobs also assisted in developing the beneficial use designs.

Richard B. Loyd, Marine Operations Program Manager, Planning Division, New England District, U.S. Army Corps of Engineers
Experience: Mr. Loyd is an environmental scientist working on dredging and environmental restoration projects. As the Marine Operations Program Manager for the Environmental Resources Section, he is responsible for: sediment sampling and testing; collection, processing, and interpretation of hydroacoustic survey data; and GIS analysis.
Role in Preparing this EIS: Mr. Loyd developed the sediment sampling and testing plan for this EIS, managed the sampling and testing contract, and performed quality control on the sampling and testing data. He was the lead for the side scan sonar, subbottom profiling, and bathymetric survey efforts for the study. Mr. Loyd also provided technical support to project design.

Marcos (Marc) Paiva, Archaeologist/Tribal Liaison, Planning Division, New England District, U.S. Army Corps of Engineers
Experience: Mr. Paiva is the North Atlantic Division Regional Technical Specialist

(Archaeology/Tribal Affairs) and experienced in cultural resource management, historic preservation, and regulatory compliance as it pertains to all military and civil works activities conducted by the U.S. Army Corps of Engineers. He was the cultural resources team member for the Boston Harbor Deep Draft Project, Searsport Harbor Navigation Improvement Project and other similar navigation projects and studies.
Role in Preparing this EIS: Mr. Paiva is the cultural resources team member for the New Haven Harbor Navigation Improvement Project Feasibility Study. He is responsible for all cultural resource activities to include: development of historic context, affected environment and environmental impact sections of the Decision Document; scoping, management and evaluation of any required archaeological studies/surveys and associated report deliverables; and coordination of project activities with project stakeholders and regulators including the CT State Historic Preservation Officer, CT State Archaeologist, and the Mashantucket Pequot and Mohegan Tribal Nations for compliance with Section 106 of the National Historic Preservation Act.

Stephen S. Potts, Senior Geologist, Geo-Environmental Branch, Engineering Division, New England District, U.S. Army Corps of Engineers.
Experience: Dr. Potts is a Professional Geologist (TN, LA, NY licenses) with experience/knowledge in the areas of environmental engineering, geology and geophysics, and underwater blasting. Dr. Potts provides input to project technical issues related to Civil Works, Dam Safety, DERP-FUDS, BRAC, Superfund, and IIS. Projects cover a diverse range of technical issues related to environmental and engineering geology, hydrogeology, contaminant fate and transport, risk and remediation. Dr. Potts served as Project Geologist for marine geologic and geophysical site characterization and blasting specifications development for dredging of the Boston Harbor Deep Draft Improvement Project; Project Geologist for marine geotechnical site characterization and specifications development for widening of Portsmouth Harbor Turning Basin; and ATR Team Leader and Geologist for a number of studies including: Delaware River Main Channel Deepening Dredging and Rock Removal, Jacksonville Harbor, Construction Dredging, Beach Erosion Control and Hurricane Protection Project, Miami-Dade County, Florida, Beach Renourishment 2016, Miami Beach Hotspots; Assunpink Creek Stream Daylighting & Ecosystem Restoration plans and specs; St. Mary's River Sea Lamprey Traps, Draft Integrated Detailed Project Report & Environmental Assessment, Section 506 GLFER; Delaware River Rock Removal blasting plans & specs and Construction Submittals including Operational Blast Plan, Test Blast Plan, & Blasting Safety Plan.
Role in Preparing this EIS: Project Geologist.

Todd Randall, Senior Marine Ecologist, Environmental Resources Section, Planning Division, New England District, U.S. Army Corps of Engineers
Experience: Mr. Randall has extensive experience in the field of ecology and environmental

resource management. Mr. Randall is a marine ecologist in New England District's Environmental Resources Section and his responsibilities include project design and formulation for many of the District's environmental restoration projects, the drafting of environmental compliance documents (Environmental Assessments and Environmental Impact Statements), and ecological sampling and monitoring.
Role in Preparing this EIS: Mr. Randall is the project ecologist for the New Haven Harbor Deep Draft Navigation Improvement Study. He is the environmental compliance lead and primary author of the EIS.

Lisa R. Winter, Senior Coastal Engineer, Engineering Division, New England District, U.S. Army Corps of Engineers
Experience: Ms. Winter is a registered professional engineer and a certified floodplain manager with coastal engineering experience evaluating coastal hazards and designing projects for navigation, flood risk management, and environmental restoration.
Role in Preparing this EIS: Ms. Winter is currently the coastal engineer for the New Haven Harbor Deep Draft Improvement Project Feasibility Study. She is responsible for providing technical input such as water levels, wave heights, and wind and current speeds on the design of the navigation channel improvements. Ms. Winter is also responsible for ensuring plan resilience to climate change and sea level rise impacts.

11.0 RECOMMENDATIONS

I have given consideration to all significant aspects in the overall public interest including engineering feasibility, economic, social, cost and risk analysis, and environmental effects. The recommended plan described in this report provides the optimum solution for National Economic Development (NED) benefits within the study area that can be developed with the framework of the formulation concepts and provides for beneficial use of dredged material for environmental benefits.

I recommend that navigation improvements for New Haven Harbor, Connecticut be authorized in accordance with the reporting officers' recommended plan with such modifications as in the discretion of the Chief of Engineers may be advisable. Based on a October 2019 price level, a 2.75-percent discount rate, and a 50-year period of analysis, the estimated project cost of the NED Plan (Federal Base Plan) is $64,868,000. The estimated project cost of the recommended NED/Beneficial Use Plan is $72,311,000. The incremental difference between the NED/Federal Base Plan and the NED/Beneficial Use Plan is $7,443,000 and the incremental cost is reasonable in relation to the environmental benefits achieved.

The estimated Federal and Non-Federal shares of the project are $53,489,000 and $18,822,000, respectively. In addition to the Non-Federal Sponsor’s estimated share of the project first cost, the Non-Federal sponsor must pay an additional 10 percent of the cost of the general navigation features of the project in cash over a period note to exceed 30 years with interest. The additional 10 percent payment is estimated to be $6,486,800 before interest is applied.

11.1 Items of Local Cooperation

The recommended plan conforms to the essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies and complies with other Administration and legislative policies and guidelines on project development. If the project were to receive funds for Federal implementation, it would be implemented subject to the cost sharing, financing, and other applicable requirements of Federal law and policy for navigation projects including WRDA 1986, as amended; and would be implemented with such modifications, as the Chief of Engineers deems advisable within his discretionary authority. Federal implementation is contingent upon the non-Federal sponsor agreeing to comply with applicable Federal laws and policies. Prior to implementation, the non-Federal sponsor shall agree to:

a. Provide 25 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of -20 MLLW but not in excess of -50 MLLW; plus 50 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of -50 MLLW as further specified below:

(1) Provide 25 percent of design costs allocated by the Federal government to commercial navigation in accordance with the terms of a design agreement entered into prior to commencement of design work for the project;
(2) Provide, during the first year of construction, any additional funds necessary to pay the full Non-Federal share of design costs allocated by the Federal government to commercial navigation;
(3) Provide, during construction, any additional funds necessary to make its total contribution for commercial navigation equal to 25 percent of the total cost of construction of the GNFs attributable to dredging to a depth in excess of -20 MLLW but not in excess of -50 MLLW; plus 50% of the total cost of construction of the GNFs attributable to dredging to a depth in excess of -50 MLLW;

b. Provide all lands, easement, and rights-of-way (LER), including those necessary for the borrowing of material and disposal of dredged or excavated material, and perform or assure the performance of all relocations, including utility relocations, all as determined by the Federal government to be necessary for the construction or operation and maintenance of the GNFs;

c. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the GNFs, an additional amount equal to 10 percent of the total cost of construction of GNFs less the amount of credit afforded by the Federal government for the value of the LER and relocations, including utility relocations, provided by the Non-Federal sponsor for the GNFs. If the amount of credit afforded by the Federal government for the value of LER and relocations, including utility relocations, provided by the Non-Federal sponsor equals or exceeds 10 percent of the total cost of construction of the GNFs, the Non-Federal sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of LER and relocations, including utility relocations, in excess of 10 percent of the total costs of construction of the GNFs;

d. Provide, operate, and maintain, at no cost to the Federal government, the local service facilities in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Government;

e. Provide 50 percent of the excess cost of operation and maintenance of the project over that cost which the Federal government determines would be incurred for operation and maintenance if the project had a depth of -50 MLLW;

f. Give the Federal government a right to enter, at reasonable times and in a reasonable manner, upon property that the Non-Federal sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating and maintaining the GNFs;

g. Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

h. Keep and maintain books, records, documents, or other evidence pertaining to costs and expenses for a minimum of three years after the final accounting and assure that such materials are reasonably available for examination, audit, or reproduction by the Government;

i. Perform, or ensure performance of, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601–9675, that may exist in, on, or under LER that the Federal government determines to be necessary for the construction or operation and maintenance of the GNFs. However, for lands, easements, or rights-of-way that the Federal government determines to be subject to the navigation servitude, only the Federal government shall perform such investigation unless the Government provides the Non-Federal sponsor with prior specific written direction, in which case the Non-Federal sponsor shall perform such investigations in accordance with such written direction;

j. Assume complete financial responsibility, as between the Federal government and the Non-Federal sponsor, for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under LER that the Government determines to be necessary for the construction or operation and maintenance of the project;

k. Agree, as between the Federal government and the Non-Federal sponsor, that the Non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA;

l. Comply with Section 221 of PL 91-611, Flood Control Act of 1970, as amended, (42 U.S.C. 1962d-5b) and Section 101(e) of the WRDA 86, Public Law99-662, as amended, (33 U.S.C. 2211(e)) which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until the Non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element;

m. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, PL 91-646, as amended, (42 U.S.C. 4601-4655) and the Uniform Regulations contained in 49 CFR 24, in acquiring lands, easements, and rights-of-way, necessary for construction, operation and maintenance of the project including those necessary for relocations, the borrowing of material, or the disposal of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

n. Comply with all requirements of applicable Federal laws and implementing regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto; the Age Discrimination Act of 1975 (42 U.S.C. 6102); the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Army

Regulation 600-7 issued pursuant thereto; and 40 U.S.C. 3141-3148 and 40 U.S.C. 3701-3708 (labor standards originally enacted as the Davis-Bacon Act, the Contract Work Hours and Safety Standards Act, and the Copeland Anti-Kickback Act);

o. Not use funds from other Federal programs, including any Non-Federal contribution required as a matching share therefore, to meet any of the Non-Federal sponsor's obligations for the project costs unless the Federal agency providing the Federal portion of such funds verifies in writing that such funds are authorized to be used to carry out the project;

p. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the outputs produced by the project, hinder operation and maintenance of the project, or interfere with the project's proper function; and

q. Accomplish all removals determined necessary by the federal government other than those removals specifically assigned to the federal government.

The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the State of Connecticut, the Non-Federal sponsor (the Connecticut Port Authority), interested Federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.

7 FEB 2020
Date

William M. Conde
Colonel, U.S. Army
District Commander

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12.0 REFERENCES

AECOM. 2012. Monitoring Survey of the Morris Cove Borrow Pit, September-October 2011. DAMOS Contribution No. 190. U.S. Army Corps of Engineers, New England District, Concord, MA, 103 pp.

Archaeological Consulting Services (ACS). 2009. Phase I Archaeological Reconnaissance Survey of the Water Pollution Control Facility, West Haven, Connecticut. Prepared by ACS, 118 Whitfield Street, Guilford, CT.

Archambault, M., V. M. Bricelj, J. Grant, and D. M. Anderson. 2004. Effects of suspended and sedimented clays on juvenile hard clams, *Mercenaria mercenaria*, within the context of harmful algal bloom mitigation. Marine Biology. Vol 144(3): 553-565.

ASSRT (Atlantic Sturgeon Status Review Team). 2007. Status Review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 175 pp.

Bain, M. B. 1997. Atlantic and shortnose sturgeons of the Hudson River: Common and Divergent Life History Attributes. Environmental Biology of Fishes 48: 347-358.

Bellchambers, L. M. & Richardson, A. M., 1995. The effect of substrate disturbance and burial depth on the venerid clam, *Katelysis scalarina* (Lamark, 1818). J Shellfish Res, Volume 14, p. 41–44.

Berry, W., N. Rubenstein, B. Melzian, and B. Hill. 2003. The Biological Effects of Suspended and Bedded Sediments (SABS) in Aquatic Systems: A Review. Internal report to US EPA, Office of Research and Development, National Health and Environmental Effects Laboratory, Narragansett, RI.

Bohlen, W.F., D.F. Cundy and J.M. Tramontano. 1979. Suspended Material Distributions in the Wake of Estuarine Channel Dredging Operations. Estuarine and Coastal Marine Science. 9: 699-711.

Bolam, S. G. et al., 2006. Ecological consequences of dredged material disposal in the marine environment: a holistic assessment of activities around the England and Wales coastline. Mar Poll Bull, 52(6), pp. 415-426.

Carlson, J.K. 1991. Trophic relationships among demersal fishes off New Haven Harbor (New Haven, CT) with special emphasis on the winter flounder (*Pseudopleuronectes americanus*). M.S. Thesis. Southern Connecticut State University. 71 p.

Carlson, J.K., T.A. Randall, and M.E. Mroczka. 1997. Feeding habits of winter flounder (*Pleuronectes americanus*) in a habitat exposed to anthropogenic disturbance. J. NorthW. Atl. Fish. Sci. 21:65-73.

Caron, F., D. Hatin, and R. Fortin. 2002. Biological characteristics of adult Atlantic sturgeon (Acipenser oxyrinchus) in the Saint Lawrence River estuary and the effectiveness of management rules. Journal of Applied Ichthyology, 18: 580-585.

Cherau, Suzanne, Stephen Olausen, David Robinson, Jennifer Banister, Kimberly Allegretto, and Quinn Stuart. 2010. Technical Report – Cultural Resources Inventory, Long Island Sound – Dredged Material Management Plan, Long Island Sound, Connecticut, New York, and Rhode Island. 2 vols. Contract #W921WJ-08-R-002, WHG # PAL0002. Prepared by: USACE, New England District, Concord, MA and PAL, Inc., Pawtucket, RI (PAL Report No. 2394). Submitted to: USACE, New England District and Woods Hole Group, East Falmouth, MA.

Clarke, D., Dickerson, C., and K. Reine 2002. "Characterization of underwater sounds produced by dredges. Dredging 2002, ASCE, Orlando, Florida, USA, p 64-81.

Clarke, D.G. and D.H. Wilber. 2000. Assessment of Potential Impacts of Dredging Operations Due to Sediment Resuspension. DOER Technical Notes Collection ERDC TN-DOER-E9. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

CT DEEP. 2015a. Interstate Marine Fisheries Management. Connecticut DEEP, 79 Elm Street, Hartford, CT 06106-5127. 328 pp. http://www.ct.gov/deep/lib/deep/fishing/performance_reports/interstate_marine_fisheries_management.pdf

CT DEEP. 2015b. American Lobster Monitoring Program. Connecticut DEEP, 79 Elm Street, Hartford, CT 06106-5127. 57 pp. http://www.ct.gov/deep/lib/deep/fishing/commercial/ctdeep_marine_fisheries_2014_lobster_monitoring_report.pdf

CT DEEP 2015c. State of Connecticut Water Quality Classifications of Surface Water. Department of Energy and Environmental Protection. Available at: http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707#NaturalResourcesManagement

CT DEEP. 2017a. Connecticut Department of Energy and Environmental Protection: Water Quality Maps. http://cteco.uconn.edu/maps/town/wtrqualcl/WtrQualCl_NewHaven.pdf

CT DEEP. 2017b. A study of marine recreational fisheries in Connecticut. Connecticut DEEP, 79 Elm Street, Hartford, CT 06106-5127. 328 pp. http://www.ct.gov/deep/lib/deep/fishing/publications/2016_marine_fisheries_study_of_marine_recreational_fisheries_in_connecticut.pdf

CT DEEP. 2018. Connecticut Shellfish Area Classification Maps. http://www.ct.gov/doag/cwp/view.asp?a=3768&q=478054

CT DEEP. 2018. Connecticut Weekly Diadromous Fish Report. http://www.ctriversalmon.org/wp-content/uploads/2018/05/Fish-Report-5-15-2018.pdf

Cunningham, Janice P. 1995. Historic Preservation in Connecticut, Volume III: Central Valley: Historical and Architectural Overview and Management Guide. Connecticut Historical Commission, Hartford, CT.

Clarke, D., C. Dickerson, and K. Reine. 2002. Characterization of underwater sounds produced by dredges. Dredging 2002, ASCE, Orlando, Florida, USA, p 64-81.

Clarke, D.G. and D.H. Wilber. 2000. Assessment of Potential Impacts of Dredging Operations Due to Sediment Resuspension. DOER Technical Notes Collection ERDC TN-DOER-E9. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Collins, M. R. and T. I. J. Smith. 1997. Distribution of shortnose and Atlantic sturgeons in South Carolina. North American Journal of Fisheries Management. 17: 995-1000.

Dadswell, M.J. 1984. Status of the Shortnose Sturgeon, *Acipenser brevirostrum* in Canada. The Canadian Field-Naturalist 98 (1): 75-79.

Dadswell, M. 2006. A review of the status of Atlantic sturgeon in Canada, with comparisons to populations in the United States and Europe. Fisheries 31: 218-229.

DeLeuw, Cather, and Co. 1991. Technical Memorandum #8. An inventory of selected aquatic biological resources in the vicinity of the Quinnipiac River Bridge. Prepared for the Connecticut DOT and Federal Highway Administration. 186 pp.

Dovel, W. L. and T. J. Berggren. 1983. Atlantic sturgeon of the Hudson River estuary, New York. New York Fish and Game Journal 30: 140-172.

Dragos, P. and D. Lewis. 1993. Plume Tracking/Model Verification Project. Prepared under EPA Contract No. 68-C8-0105. 49 pp plus appendix.

Dragos, P. and C. Peven. 1994. Plume Tracking of Dredged Material Containing Dioxin, Final Report. Prepared under EPA Contract No. 68-C2-0134. 49 pp plus appendix

Dunton et al. 2010. Abundance and distribution of Atlantic sturgeon (*Acipenser oxyrinchus*) within the Northwest Atlantic Ocean, determined from five fishery-independent surveys. Fish. Bull. 108(4):450-465.

Environmental Protection Agency, U.S. (EPA). 1997. Long Island Sound Study Proposal for Phase III Actions for Hypoxia Management. EPA 840-R-97-001.

ENSR. 1997. Summary Report of Independent Observations Phase 1 – Boston Harbor Navigation Improvement Project. Prepared for Massachusetts Coastal Zone Management.

ENSR International. 2002. Boston Harbor Navigation Improvement Project: Phase 2 Summary Report. Prepared for U.S. Army Corps of Engineers, New England District and Massachusetts Port Authority. Document No. 9000-178-000. Contract No. DACW33-96-D- 004, Task Order 51. May 2002.

Erickson et al. 2011. Use of pop-up satellite archival tags to identify oceanic-migratory patterns for adult Atlantic Sturgeon, *Acipenser oxyrinchus oxyrinchus*. Journal Appl. Ichthyology. 27: 356-365.

Environmental Science Services, Inc. October 22, 2002, Cross Sound Cable Project: Area 6/7 Geotechnical Investigation, New Have Harbor, New Haven, Connecticut: Environmental Science Services, Inc. and Ocean Surveys, Inc. for Cross-Sound Cable Company, LLC.

R.F. Flint, 1963, New Haven/Woodmont Quadrangles, CT. CT Geological Survey, Quadrangle Report 18, 1:24,000.

Fredette, T. J. & French, G. T., 2004. Understanding the physical and environmental consequences of dredged material disposal: history in New England and current perspectives. Mar Poll Bull, 49(1-2), pp. 93-102.

Germano, J. D., Rhoads, D. C. & Lunz, J. D., 1994. An integrated, tiered approach to monitoring and management of dredged material disposal sites in the New England region, Waltham, Massachusetts: DAMOS Contribution No. 87, U.S. Army Corps of Engineers, New England District.

Germano, J. D. et al., 2011. The use of sediment profile imaging (SPI) for environmental impact assessments and monitoring studies: lessons learned from the past four decades. Oceanogr Mar Biol Ann Rev, Volume 49, p. 247–310.

Hayes, D.F. 1986. Guide to Selecting a Dredge for Minimizing Resuspension of Sediment. Environmental Effects of Dredging Technical Notes: EEDP-09-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Holland, B.F., Jr. and G.F. Yelverton. 1973. Distribution and biological studies of anadromous fishes offshore North Carolina. North Carolina Department of Natural and Economic Resources, Division of Commercial and Sports Fisheries, Morehead City. Special Scientific Report 24:1-132.

Howell, P. and D. Molnar. 1994. "Inshore Survey of Juvenile Winter Flounder" in A Study of Marine Recreational Fisheries in Connecticut by the State of Connecticut, Department of Environmental Protection, Bureau of Natural Resources, Fisheries Division, Federal Aid to Sport Fish Restoration F54R Annual Progress Report March 1, 1993 – February 28, 1994.

Jackson, M. J. & James, R., 1979. The influence of bait digging on cockle, Cerastoderma edule, population in North Norfolk. J Appl Ecol, Volume 16, p. 671–679.

Johnson M, Boelke C, Chiarella L, et al. (2008) Impacts to marine fisheries habitat from nonfishing activities in the Northeastern United States. pp 322. http://www.fpir.noaa.gov/Library/HCD/NOAA%20Technical%20Memo%20NMFS-NE-209.pdf.

Kennedy, A.J., Lotufo, G.R., and Steevens, J.A. 2015. Review of Dredging Elutriate Application Factors: Relevance to Acute-to-Chronic Protection, Contaminant, and Endpoint Specificity. Dredging Operations Technical Support Program. U.S. Army Corps of Engineers, Engineering Research and Support Center. ERDC/EL TR-15-10. July 2015.

Kranz, P. M., 1974. The anastrophic burial of bivalves and its paleoecological significance. J Geol, Volume 82, p. 237–265.

Kraus, N.C. 1991. Mobile, Alabama, Field Data Collection Project, 18 August – 2 September 1989. Report 1: Dredged Material Plume Survey Data Report. U.S. Army Corps of Engineers, Dredging Research Program. USACE Tech. Report No. DRP-91-3, Washington, D.C.

Laney, R.W., J.E. Hightower, B.R. Versak, M.F. Mangold, W.W. Cole Jr., and S.E. Winslow. 2007. Distribution, Habitat Use, and Size of Atlantic Sturgeon Captured during Cooperative Winter Tagging Cruises, 1988-2006. American Fisheries Society Symposium 56: 000-000.

Latimer, J.S., M. A. Tedesco, R. L. Swanson, C. Yarish, P. E. Stacey, and C. Garza. 2014. Long Island Sound: Prospects for the Urban Sea. Springer Science 558 pp.

Lawler, Matusky, and Skelly Engineering. 2003. New Haven Harbor Station. Entrainment and New Haven Harbor ichthyoplankton monitoring program, February – May – 2001-2002. Submitted to PSEG Power Connecticut, New Haven, CT.

Lopez, G. et al., 2014. Biology and Ecology of Long Island Sound: Disturbed Habitats. In: J. S. Latimer, et al. eds. Long Island Sound: Prospects for the Urban Sea. New York, New York: Springer Series on Environmental Management.

Maurer, D.L., R.T. Keck, J.C. Tinsman, W.A. Leathem, C.A. Wethe, M. Huntzinger, C. Lord, and T.M. Church. 1978. Vertical migration of benthos in simulated dredged material overburdens Vol. 1 Marine benthos. Dredged Material Research Program Technical Report D-78-35: 1-97. For the Waterways Experimental Station, Vicksburg, Mississippi by University of Delaware, College of Marine Studies.

Maurer, D.L., R.T. Keck, J.C. Tinsman, W.A. Leatham, C. Wethe, C. Lord, and T.M. Church. 1986. Vertical Migration and Mortality of Marine Benthos in Dredged Material: A Synthesis. International Revue ges Hydrobiology 71: 50-63.

Morreale, S.J. 1999. Oceanic migrations of sea turtles. PhD thesis, Cornell University, Ithaca, New York.

Morreale, S.J., and A. E. Standora. 1998. Early life stage ecology of sea turtles in northeastern US waters. NOAA Technical Memorandum NMFS-SEFSC-413

Mullaney, J.R., J. C. Varekamp, A.E. McElroy, and V.T. Breslin. 2014. Metals, organic compounds, and nutrients in Long Island Sound; sources, magnitudes, trends, and impacts. *In*: Long Island Sound: Prospects for an Urban Sea. Springer Science 558 pp.

Murawski, S. A. and A. L. Pacheco. 1977. Biological and fisheries data on Atlantic Sturgeon, *Acipenser oxyrhynchus* (Mitchill). National Marine Fisheries Service Technical Series Report 10: 1-69.

NOAA. 2018. NOAA tide station for New Haven Harbor, New Haven, CT. https://tidesandcurrents.noaa.gov/stationhome.html?id=8465705

NAI (Normandeau Associates, Inc.) 1979. New Haven Harbor Ecological Studies Summary Report 1970-1977. Prepared for The United Illuminating Company, New Haven, Connecticut.

NAI (Normandeau Associates, Inc.) 1985. New Haven Harbor Ecological Studies Summary Report Supplement 2. 1981- 1984. Prepared for the United Illuminating Company, New Haven, Connecticut, by Normandeau Associates, Inc., Bedford, New Hampshire R-344

NEFMC/NMFS. 2017. Final Omnibus Essential Fish Habitat Amendment 2. Volume 2: EFH and HPAC Designation Alternatives and Environmental Impacts.

Nightingale, B., and C. A. Simenstad. 2001. White Paper. Dredging Activities: Marine Issues. x+119pp.+app. A-C. Sch. Aquat. Fish. Sc., Univ Wash., [Seattle, WA]. July 13.

Norkko, A. R. Rosenberg, S. F. Thrush, and R. B. Whitlatch. 2006 Scale- and intensity-dependent disturbance determines the magnitude of opportunistic response. Jour. Exper. Mar. Biol. And Ecol. Vol 330:195-207.

Okeanos. 2008. International Workshop on shipping noise and marine mammals. Okeanos – Foundation for the Sea. Hamburg, Germany, April 2008. http://sea-inc.net/assets/pdf/sn_HamburgReport_RevFinal.pdf

Oviatt, C.A. and S.W. Nixon. 1975. Sediment Resuspension and Deposition in Narragansett Bay. Estuarine and Coastal Marine Science 3: 201-217.

Pellegrino, P. E. 1990. Macrobenthic Monitoring Program of New Haven Harbor: structure and functional analyses. Final report to United Illuminating, New Haven, CT, 112 p.

Pellegrino, P. E. 1992. Macrobenthic Monitoring Program of New Haven Harbor: structure and functional analyses. Final report to United Illuminating, New Haven, CT, 95 p.

Popper, A., Carlson, T., Hawkins, A., and B. Southall. 2006. Interim criteria for injury of fish exposed to pile driving operations: a white paper, available at http://www.wsdot.wa.gov/NR/rdonlyres/84A6313A-9297-42C9-BFA6-750A691E1DB3/0/BAPileDrivingCriteria.pdf.

Reine, Kevin J., Douglas Clarke and Charles Dickerson. 2012. Characterization of underwater sounds produced by a hydraulic cutterhead dredge fracturing limestone rock. ERDC-TN-DOER-E36. January 2012.

Saila, S.B., S. D. Pratt, and T.T. Polar. 1972. Dredge spoil disposal in Rhode Island Sound. Marine Technical Report #2. University of Rhode Island Sea Grant. 54 pp.

Savoy, T. and D. Pacileo. 2003. Movements and important habitats of subadult Atlantic sturgeon in Connecticut waters. Transactions of the American Fisheries Society 132: 1-8.

Schubel, J.R. 1971. Tidal Variation of the Size Distribution of Suspended Sediment at a Station in the Chesapeake Bay Turbidity Maximum. Netherlands Journal of Sea Research 5: 252-266.

Schultz, E. T.; J.J. Pereira, and P.J. Auster. 2007. Determining Winter flounder Spawning Sites in Two Connecticut Estuaries. (2007). EEB Articles. 19. https://opencommons.uconn.edu/eeb_articles/19

SCSU 2013. Water Quality Monitoring in New Haven Harbor, 2013-2014. http://www.southernct.edu/research/research-centers/ccms/studentprojects.html

Smith, T. I. J. 1985. The fishery, biology, and management of Atlantic sturgeon, *Acipenser oxyrhynchus*, in North America. Environmental Biology of Fishes 14(1): 61-72.

Smith, T. I. J. and J. P. Clungston. 1997. Status and management of Atlantic sturgeon, *Acipenser oxyrinchus*, in North America. Environmental Biology of Fishes 48: 335-346.

Southall, B.I. Bowles, A.E., Elison, W.T., Finneran, J.J., Gentry, R.L., Greene, C.R.J., Kastak, D., Ketten, D.R., Miller, J.H., Hachtigall, P.E., Richardson, W.J., Thomas, J.A., and P. Tyack. 2007. Marine mammal noise exposure criteria: initial scientific recommendations. Aquatic Mammals 33:411-521.

Stein, A. B., K. D. Friedland, and M. Sutherland. 2004. Atlantic sturgeon marine distribution and habitat use along the northeastern coast of the United States. Transactions of the American Fisheries Society 133: 527-537.

Shoop, C. R. and R. D. Kenney. 1992. Seasonal distribution and abundances of loggerhead and leatherback sea turtles in northeastern United States waters. Herpetol Monograms 6:43–67.

Suedel, B.C., J.U. Clarke, J. Wilkens, C.H. Lutz, and D. G. Clarke. 2015. The effects of a simulated suspended sediment plume on eastern oyster (*Crassostrea virginica*) survival, growth, and condition. Estuaries and Coasts 38:578-589.

Stern, E. M. and Stickle, W. B. 1978 Effects of turbidity and suspended material in aquatic environments: Literature Review, WES Technical Report D-78-21.

Stone, S.L., T.A. Lowery, J.D. Field, C.D. Williams, D.M. Nelson, S.H. Jury, M.E. Monaco, and L. Anderson. 1994. Distribution and abundance of fishes and invertebrates in Mid-Atlantic estuaries, ELMR Rep. No. 12. NOAA/NOS Strategic Environmental Assessments Division, Silver Spring, MD.

Teleki, G.C. and A.J. Chamberlin. 1978. Acute effects of underwater construction blasting on fishes in Long Point Bay, Lake Erie. Jour. of the Fisheries Research Board of Canada. 35(9): 1191-1198.

UCONN. 2018. University of Connecticut – Connecticut State Data Center. https://ctsdc.uconn.edu/2015-to-2040-population-projections-town-level/#visualizations

USACE, New England Division. 1979. Environmental Impact Statement and 404 Evaluation on Coastal Development for Navigation at New Haven Harbor, Connecticut.

USACE, New England Division. 1981. Feasibility Report including Final Environmental Impact Statement for New Haven Harbor, Connecticut, Coastal Development for Navigation.

USACE, New England Division. 1985. Long Island Sound Studies Dredged Material Containment Facilities Feasibility Report, Public Review Draft.

USACE. 1996. An Investigation of the Dispersion of the Sediments Resuspended by Dredging Operations in New Haven Harbor. Disposal Area Monitoring System (DAMOS) Contribution 112. New England Division, U.S. Army Corps of Engineers, Waltham, MA. Prepared by: W. Frank Bohlen, MM. Howard-Strobel, David. R. Cohen, Eric T. Morton, Science Applications International Corp., Newport, RI.

USACE, 2006. Hydraulic Design of Deep-Draft Navigation Projects. US Army Corps of Engineers, Washington, DC. EM 1110-2-1613, 31 May 2006.

USACE. 2010. Upland, Beneficial Use, and Sediment Dewatering Site Investigations, Phase 2, Long Island Sound Regional Dredged Material Management Plan (DMMP). US army Corps of engineers, New England District, Concord, MA 01742.

USACE. 2011. Monitoring Survey at the Morris Cove Borrow Pit: September-October 2011. Prepared by AECOM, Submitted to the DAMOS Program, USACE, Concord, MA 01742.

USACE. 2013. ER 1100-2-8162. Incorporating Sea Level Change in Civil Works Programs. US Army Corps of Engineers. Washington, DC.

USACE. 2014. Dredged Material Evaluation and Disposal Procedures, User Manual. Dredged Material Management Program, U.S. Army Corps of Engineers, Seattle District.

USACE. 2016. Long Island Sound Dredged Material Management Plan (DMMP) and Final Programmatic Environmental Impact Statement (FPEIS). US Army Corps of Engineers, New England District.

USACE, 2017 Planning Manual Part II: Risk Informed Planning, US Army Corps sof Engineers, Institute of Water Resources

USACE/Normandeau Associates Inc. 1998. Boston Harbor Dredging. Water Quality Monitoring. Environmental Bucket Qualification Study. Prepared for: Great Lakes Dredge and Dock Company, September 1998.

USEPA/USACE 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters. U.S. EPA Region 1, Boston, MA/U.S.

Army Corps of Engineers, New England District, Concord, MA.

USEPA/USACE 1991. Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual. Environmental Protection Agency, Office of Water and Department of the Army, United States Army Corps of Engineers. Washington, D.C. U.S. Coast Guard. 2012. Standards for living organisms in ship's ballast water discharged in U.S. waters. Federal Register, Vol 77, No. 57, pp 17253-17320, March 23, 2012.

US Coast Survey. 1846. New Haven Harbor Survey founded upon a Trigonometric Survey under the direction of F.R. Hassler Superintendent of the Survey of the Coast of the United States. Map

US Water Resources Council. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, 1983.

USFWS, undated. Northeast Coastal Areas Study – Site 22 - New Haven Harbor Complex. https://nctc.fws.gov/pubs5/necas/web_link/22_new%20haven.htm

USFWS. 2018. National Wetlands Inventory Website. https://www.fws.gov/wetlands/index.html

Valente, R. M., Carey, D., Read, L. & Wright, C., 2007. Postdisposal Monitoring of Lobster Abundance at the Rhode Island Sound Disposal Site in 2005 Compared to the 1999 Predisposal Survey, Concord, MA: U.S. Army Corps of Engineers, New Division.

Vladykov, V.D. and J.R. Greeley. 1963. Order Acipenseroidea. Pages 24-60 in Fishes of the Western North Atlantic. Memoir Sears Foundation for Marine Research 1 (Part III). xxi + 630 pp.

Wilber, D.H., W. Brostoff, D.G. Clarke, and G.L. Ray. 2005. Sedimentation: potential biological effects from dredging operations in estuarine and marine environments. DOER Technical Notes Collection (ERDC TN-DOER-E20), U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Wilber, D.H. and D.G. Clarke. 2001. Biological Effects of Suspended Sediments: A Review of Suspended Sediment Impacts on Fish and Shellfish with Relation to Dredging Activities in Estuaries. North American Journal of Fisheries Management 21: 429-449.

Wilde, F.D., ed., variously dated, Field Measurements: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chap. A6, accessed from http://pubs.water.usgs.gov/twri9A/ on March 15, 2018.

Wilson, John. 1981. Cultural Resources Reconnaissance, New Haven Harbor Channel Improvement, New Haven, CT, Appendix 5 – Other Social Effects and Cultural Resource Reconnaissance. USACE, New England District, Waltham, MA.

Wolf, S., Fredette, T. J. & Loyd, R. B., 2012. Thirty-five Years of Dredged Material Disposal Area Monitoring – Current Work and Perspectives of the DAMOS Program. [Online] Available at: https://www.westerndredging.org/phocadownload/WEDA-Volume-12-Issue-2-2012.pdf

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX A
PUBLIC INVOLVEMENT AND PERTINENT CORRESPONDENCE

Appendix A Public Involvement and Pertinent Correspondence

Summary and Contents

Public Information on the study, news releases, and presentations are at:
http://www.nae.usace.army.mil/Missions/Projects-Topics/New-Haven-Harbor/

A1-Public Scoping Meeting January 24, 2017
Notice of Intent - Federal Register
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A2-Agency Scoping Meeting, January 25, 2017
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A3-Scoping Letters Received 2017

A4-Public Informational Meeting January 10, 2018
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A5-Public Review of DIFR/EIS Comments and Response

A6- Letters Receive on DIFR/EIS, Review September 23, 2018 to November 15, 2018

A7-Public Meetings October 23 and 23, 2018
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A1- Public Scoping Meeting January 24, 2017

Notice of Intent - Federal Register
Transcript of Meeting

Office of the Assistant Secretary of Defense for Health Affairs announces a proposed public information collection and seeks public comment on the provisions thereof. Comments are invited on: Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; the accuracy of the agency's estimate of the burden of the proposed information collection; ways to enhance the quality, utility, and clarity of the information to be collected; and ways to minimize the burden of the information collection on respondents, including through the use of automated collection techniques or other forms of information technology.

DATES: Consideration will be given to all comments received by February 27, 2017.

ADDRESSES: You may submit comments, identified by docket number and title, by any of the following methods:

• *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the instructions for submitting comments.

• *Mail:* Department of Defense, Office of the Deputy Chief Management Officer, Directorate for Oversight and Compliance, Regulatory and Advisory Committee Division, 4800 Mark Center Drive, Mailbox #24, Alexandria, VA 22350–1700.

Instructions: All submissions received must include the agency name, docket number and title for this **Federal Register** document. The general policy for comments and other submissions from members of the public is to make these submissions available for public viewing on the Internet at *http://www.regulations.gov* as they are received without change, including any personal identifiers or contact information.

Any associated form(s) for this collection may be located within this same electronic docket and downloaded for review/testing. Follow the instructions at *http://www.regulations.gov* for submitting comments. Please submit comments on any given form identified by docket number, form number, and title.

FOR FURTHER INFORMATION CONTACT: To request more information on this proposed information collection or to obtain a copy of the proposal and associated collection instruments, please write to ATTN: Ms. Shane Pham, 7700 Arlington Boulevard, Suite 5101, Falls Church, VA 22042–5101, or call at (703) 681–8666.

SUPPLEMENTARY INFORMATION:

Title; Associated Form; and OMB Number: TRICARE Plus Enrollment Application and TRICARE Plus Disenrollment Request; DD Form 2853 and DD Form 2854; OMB Control Number 0720–0028.

Needs and Uses: The information collection requirement is necessary for enrollment and disenrollment in the Department of Defense's TRICARE Plus Health Plan established in accordance with Title 10 U.S.C. 1099 (which calls for a healthcare enrollment system) and 1086 (which authorizes TRICARE eligibility of Medicare Eligible Persons and has resulted in the development of a new enrollment option called TRICARE Plus) and the Assistant Secretary of Defense for Health Affairs Policy Memorandum to Establish the TRICARE Plus Program, June 22, 2001. The information collected hereby provides the TRICARE contractors with necessary data to determine beneficiary eligibility and to identify the selection of a health care option.

Affected Public: Individuals or households.

Annual Burden Hours: 386.

Number of Respondents: 3305.

Responses per Respondent: 1.

Annual Responses: 3305.

Average Burden per Response: 7 minutes.

Frequency: On occasion.

The Department of Defense established TRICARE Plus as an enrollment option for persons who are eligible for care in Military Treatment Facilities (MTF) and not enrolled in TRICARE Prime. TRICARE Plus provides an opportunity to enroll with a primary care provider at a specific MTF, to the extent capacity exists. This is a way to facilitate primary care appointments at an MTF when needed. TRICARE Plus enrollment will help MTFs maintain an adequate clinical case mix for Graduate Medical Education programs and support readiness-related medical skills sustainment activities. In order to carry out this program, it is necessary that certain beneficiaries electing to enroll/disenroll in TRICARE Plus complete an enrollment application/disenrollment request. Completion of the enrollment forms is an essential element of the TRICARE program. There is no lock-in and no enrollment fee for TRICARE Plus.

Dated: December 20, 2016.

Aaron Siegel,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2016–31078 Filed 12–23–16; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare an Environmental Impact Statement for the New Haven Harbor (New Haven, Connecticut) Navigation Improvement Project

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The U.S. Army Corps of Engineers (USACE), New England District is conducting a feasibility study and Environmental Impact Statement (EIS) to examine navigation-improvements to the existing New Haven Harbor Federal Navigation project. The non-Federal sponsor for the study is the New Haven Port Authority in partnership with the Connecticut State Port Authority. Inadequate channel depths result in navigation inefficiencies in transporting goods into and out of the harbor. To reach the terminals, larger ships must lighter outside the breakwaters and/or experience delays while waiting for favorable tide conditions, or both. Deeper and wider navigation features (main channel, maneuvering area, and turning basin) are needed to increase the navigation efficiency and safety of New Haven Harbor.

FOR FURTHER INFORMATION CONTACT: Questions about the proposed action and EIS can be answered by: Mr. Todd Randall, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742–2751, (978) 318–8518, email: *todd.a.randall@usace.army.mil.*

DATES: A public scoping meeting will be held on January 24, 2017 from 6:30 p.m. to 8:30 p.m. (registration starts at 6:00 p.m.) at the Hall of Records, Hearing Room, 200 Orange Street, New Haven, Connecticut.

SUPPLEMENTARY INFORMATION: The Corps participation in this study is authorized by a resolution of the Senate Committee on the Environment and Public Works dated July 31, 2007. This study was initiated at the request of the New Haven Port Authority and the Connecticut State Port Authority. The study is being cost-shared 50-percent Federal and 50-percent non-Federal with the New Haven Port Authority.

Proposed Action: The study will consider navigation improvements including deepening and widening the federal navigation project. The New Haven Harbor navigation project's main ship channel, maneuvering area, and

turning basin are authorized to a depth of −35 feet mean lower low water (MLLW). The main ship channel is about 5 miles long extending from deep water in Long Island Sound to the terminals at the head of the harbor. The channel varies in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widens to 800 feet along the terminals. Deeper and wider channels, maneuvering area, and turning basin are needed to increase the navigation efficiency and safety of New Haven Harbor.

Alternatives: The feasibility study will identify, evaluate, and recommend to decision makers an appropriate, coordinated and workable solution to the navigation inefficiencies at New Haven Harbor. Alternatives will include analyzing various incremental channel depths and widths based upon need, as well as alternative dredging methodologies. In addition, the study will evaluate various dredged material disposal alternatives such as beneficial use (*e.g.,* marsh creation, beach nourishment, historic disposal mound capping), nearshore placement, open water placement, and upland placement.

Public Involvement and Scoping: Full public participation of affected Federal, state and local agencies, affected Indian tribes, and other interested private organizations and parties is invited. All interested parties are encouraged to submit their names and email addresses to the address noted above, to be placed on the project mailing list to receive fact sheets, newsletters and related public notices. The Corps and the New Haven Port Authority will host a public meeting on the study on January 24, 2017 (*see* **DATES** section). The public is invited to attend and further identify issues that should be addressed in the EIS. In addition to this notice, the date, place, and time of the public meeting will be announced in the local newspaper and on the USACE New England District Web page. Following the scoping process, a public informational meeting will be held in 2017 to present and discuss potential project alternatives. The Draft Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) is scheduled to be complete in April of 2018 and will be available for public review and comment.

Significant Issues: Significant issues to be discussed in the DEIS include the effects of dredging and disposal on the physical, biological, cultural, and socioeconomic environment of the project area.

Environmental Review and Consultation Requirements: The proposed project is subject to review pursuant (but not limited to) to the Coastal Zone Management Act, Clean Water Act, Clean Air Act, Endangered Species Act, Fish and Wildlife Coordination Act, Magnuson-Stevens Fishery Conservation and Management Act, Marine Protection, Research, and Sanctuaries Act, and the National Environmental Policy Act.

Estimated Date: It is estimated that the Draft IFR/EIS will be made available to the public in April of 2018.

Dated: December 20, 2016.

Colonel Christopher J. Barron,

District Commander, U.S. Army Corps of Engineers, New England.

[FR Doc. 2016–31210 Filed 12–23–16; 8:45 am]

BILLING CODE 3720–58–P

DEPARTMENT OF EDUCATION

[Docket No.: ED–2016–ICCD–0145]

Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; Comment Request; Application for Grants Under the Credit Enhancement for Charter School Facilities Program (1894–0001)

AGENCY: Office of Innovation and Improvement (OII), Department of Education (ED).

ACTION: Notice.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. chapter 3501 *et seq.*), ED is proposing an extension of an existing information collection.

DATES: Interested persons are invited to submit comments on or before January 26, 2017.

ADDRESSES: To access and review all the documents related to the information collection listed in this notice, please use *http://www.regulations.gov* by searching the Docket ID number ED–2016–ICCD–0145. Comments submitted in response to this notice should be submitted electronically through the Federal eRulemaking Portal at *http://www.regulations.gov* by selecting the Docket ID number or via postal mail, commercial delivery, or hand delivery. *Please note that comments submitted by fax or email and those submitted after the comment period will not be accepted.* Written requests for information or comments submitted by postal mail or delivery should be addressed to the Director of the Information Collection Clearance Division, U.S. Department of Education, 400 Maryland Avenue SW., LBJ, Room 226–62, Washington, DC 20202–4537.

FOR FURTHER INFORMATION CONTACT: For specific questions related to collection activities, please contact Clifton Jones, 202–205–2204.

SUPPLEMENTARY INFORMATION: The Department of Education (ED), in accordance with the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3506(c)(2)(A)), provides the general public and Federal agencies with an opportunity to comment on proposed, revised, and continuing collections of information. This helps the Department assess the impact of its information collection requirements and minimize the public's reporting burden. It also helps the public understand the Department's information collection requirements and provide the requested data in the desired format. ED is soliciting comments on the proposed information collection request (ICR) that is described below. The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology. Please note that written comments received in response to this notice will be considered public records.

Title of Collection: Application for Grants under the Credit Enhancement for Charter School Facilities Program (1894–0001).

OMB Control Number: 1855–0007.

Type of Review: An extension of an existing information collection.

Respondents/Affected Public: Private Sector.

Total Estimated Number of Annual Responses: 15.

Total Estimated Number of Annual Burden Hours: 1,200.

Abstract: An application is required by statute to award the Credit Enhancement for Charter School Facilities Program (formerly known as the Charter School Facilities Financing Demonstration Program) grants. These grants are made to private, non-profits; public entities; and consortia of these organizations. The funds are to be deposited into a reserve account that will be used to leverage private funds on behalf of charter schools to acquire, construct, and renovate school facilities. The U.S. Department of Education is seeking an OMB extension approval for

PUBLIC SCOPING MEETING

NEW HAVEN HARBOR DEEP DRAFT NAVIGATION AND IMPROVEMENT FEASIBILITY STUDY AND ENVIRONMENTAL IMPACT STATEMENT

JANUARY 24, 2017

PRESENT:
MARK HABEL, CHIEF, NAVIGATION SECTION, ENGINEERING-PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
JUDY SHEIFFELE, EXECUTIVE DIRECTOR, NEW HAVEN PORT AUTHORITY
EVAN MATTHEWS, EXECUTIVE DIRECTOR, NEW HAVEN PORT AUTHORITY
BARBARA BLUMERIS, PROJECT MANAGER, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
TODD RANDALL, ENVIRONMENTAL COMPLIANCE LEAD, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

REPORTED BY:

TREVOR DRUMMOND
SHORTHAND REPORTER

. . . Public scoping meeting regarding the New Haven Harbor Improvement Deep Draft Navigation and Improvement Feasibility Study and Environmental Impact Statement for Long Island Sound before Trevor Drummond, a duly qualified Court Reporter within and for the State of Connecticut, held at 200 Orange Street, New Haven, Connecticut on January 24, 2017 at 6:30 p.m.

MR. HABEL: Okay. Good evening, and welcome to this public scoping meeting for the New Haven Harbor deep draft navigation and improvement feasibility study and environmental impact statement. Can everybody hear me? Good. I'm Mark Habel, chief of navigation and environmental studies section for the U.S. Army Corps of Engineers, New England District.

The New Haven Harbor deepening study is being undertaken by the Army Corps of Engineers in partnership with the project sponsor, the New Haven Port Authority and with the Connecticut Port Authority. The purpose of this meeting is to inform the public of the proposed project, to provide the public with an opportunity to ask questions about the project, to solicit public input to the scoping and feasibility study and draft EIS, and to inform the public of opportunities to provide comment on the project to the Corps.

At this time if anybody has cell phones please shut them off so we don't get interrupted.

I'd like to call on a representative from our non-federal sponsor, the New Haven Port Authority, Executive Director, Judy Sheiffele.

MS. SHEIFFELE: Thank you, Mark.

My name is Judy Sheiffele, executive director of the New Haven Port Authority, local sponsor for this project. On behalf of the commissioners I'd like to welcome you all and thank you for attending this meeting. There has been considerable discussion about our nation's infrastructure, and the need to increase investment in our transportation network to both improve safety and increase efficiencies. However, most often referenced in the context are highways, bridges, and passenger rail. The subject of tonight's meeting addresses the need of another mode of the transportation network; ship channels. In the maritime world it is the depth of those ship channels along with access to good highway and great rail connections that are the essential hallmarks of a competitive harbor. It is worth noting the depth of the federal channel of New Haven Harbor has long been a concern of the terminal operators. They continue to upgrade their facilities to maintain their competitiveness. And each and every one of them has committed to making the improvements required to handle deeper draft vessels should our channel be deepened. I'd like to thank the Army Corps of Engineers for undertaking this study, to the Connecticut Port Authority for providing the match

required of the local sponsor. And I need to acknowledge the vital role that our congressional delegation played in securing the authorization and subsequent appropriations so this study can move forward. Thank you.

Mark?

MR. HABEL: Thank you, Judy.

I'd now like to introduce Mr. Evan Matthews, executive director for the Connecticut Port Authority.

MR. MATTHEWS: Thanks, Mark. I don't have any prepared remarks, but I wanted to reemphasize what Judy said about the importance of the port complex here in New Haven. The Connecticut Port Authority represents all the maritime interests and promotes all the maritime interests in the entire state. And when we run any kind of analysis, obviously the port in New Haven and its channel represents the largest amount of commercial shipping in and out of Connecticut. So it's a very important harbor. And we're very interested in the analysis and feasibility study. We look forward to working with the Corps and New Haven Port Authority on this project.

MR. HABEL: Thank you, Evan.

With me tonight from the Corps of Engineers, New England District, we have Barbara Blumeris, our

project manager; Todd Randall, biologist, and preparer of the EIS, and staff from our field office who you met when you entered the facility.

The agenda tonight: Following this introduction Barbara Blumeris will provide an overview of the Corps' role in navigation and improvement projects and specifics of the New Haven Harbor navigation project.

Following Barbara, I will provide a brief overview of potential dredged material placement options for New Haven Harbor as were identified in the 2016 Long Island Sound Dredged Material Management Plan and Final Programmatic EIS.

Following that, Todd Randall will provide a brief overview of the NEPA EIS process as it relates to this New Haven Harbor study.

I will then open the meeting to your comments and questions. Should you need copies of the public notice or other pertinent information, it is available at the registration table at the back.

Ladies and gentlemen, Barbara Blumeris.

MS. BLUMERIS: Thank you, Mark, and the public for the opportunity to be here tonight to talk about the Corps of Engineers and New Haven harbor.

The first thing we have is what I'm going to talk about a little is about the purpose, explain what's out there today, and then talk about the Corps' study process for our federal project.

So the purpose, as Mark noted, and as the port authority has mentioned, is to look at ways to improve navigation into the harbor. Currently the main channel is at minus 35 feet, authorized by Congress, and maintained by the Corps of Engineers. We know this is no longer a good depth for the types of ships that are coming into this harbor. So we're looking at improvements to both the depth and width of that channel. But to do that we will need to go to the feasibility study process that I will explain to you. And then that report will go up to Congress for a recommendation and decision. So this is a decision document that will go to Congress eventually to authorize a different document.

So here we are with the existing channel. As I mentioned, it's currently authorized at minus 35 feet in the middle of the water. The width of the channel is about 400 feet on the inside, 500 feet outside those breakwaters. People familiar with the channel will realize there's three breakwaters in the outer harbor that provide refugee for ships. And then

the channel extends out to deepwater in Long Island Sound. At the head of the harbor you have a maneuvering area, you see where it widens a little to the north in front of the terminals for the ships to turn. There's a few anchors associated as well with the federal navigation project as well as channels and a few of the tributaries; West River, Quinnipiac and Mill River. Those aren't necessarily part of the improvement project, but part of the federal navigation project. So the improvement project is focusing on the five-mile ship channel.

I just want to say just before we go on to the next slide, in 1986 there was an improvement authorized to the existing channel. It was actually authorized to go to 40 feet. A feasibility study similar to what we're doing now was done in the '80s, and the project went to Congress and was authorized by Congress to be constructed. But it was never constructed. And that authorization sunsetted in 2002. So in 2007 Congress asked us to look at it again and come up with the best improvement, environmental and economic. So a little history on the channel.

Next slide: So this slide shows you some of the facts that have been mentioned, the largest

10

1 deepwater port in Connecticut. It does 8.7 million
2 tons of cargo in 2014. That increased over 4 percent
3 from 2013. It's ranked 59th of the top 150 U.S. ports
4 by cargo volume. It has intermodal connections to
5 water, rail, pipeline for the transport of goods. It
6 is also the home of the Long Island Sound U.S. Coast
7 Guard.
8 This is an aerial view of I-95, but the
9 terminals, you'll see those white tanks, some of the
10 terminals. There's seven terminals that use the
11 channel. This is the head of the harbor. So that
12 channel ships come in and they come up to the berths
13 of the terminals. And that is where the goods are
14 off-loaded. So there's at least seven terminals right
15 in this area.
16 So this -- again, this is another photo
17 looking in at the terminals. You can see 95 in the
18 background. There again are the terminals. You can
19 see here some of the berthing area. You can see a
20 ship coming in. This shows another view of the port.
21 Very important connections here; pipelines that serve
22 Connecticut and Massachusetts, about a hundred-mile
23 pipeline carrying petroleum products through New
24 Haven, central Connecticut into Massachusetts. So
25 there's many uses of this port; by rail, by truck, and

11

1 by pipeline.
2 So for our feasibility studies the Corps
3 works in partnership with a nonfederal sponsor, in
4 this particular case the New Haven Port Authority,
5 Judy Sheiffiele, executive director, mentioned they're
6 the signatory on the cost sharing agreement with us.
7 So we have to sign a cost sharing agreement. We work
8 in partnership with the local port authority to do the
9 harbor study. The Connecticut State Port Authority is
10 a funding source. So they actually help put up
11 through the state legislature the funding for this
12 study. So the study itself is estimated to cost $3
13 million. The cost sharing is 50-50. So it's 1.5
14 million federal, 1.5 million state funds.
15 So as we know when we visited with the
16 terminal operators, talked to the pilots about the
17 problems in the port -- many people in the public are
18 already familiar with this -- the dimensions limit the
19 use of the harbor. Larger vessels have to lighter
20 outside the breakwaters that I pointed out and take
21 material in on barges until they get light enough to
22 bring the vessel in. They also can bring a ship in
23 without a full load. This increases transportation
24 costs and decreases efficiencies of shipping. The
25 lightering outside the breakwaters also carries a risk

12

1 of spills. So it's a poor operation of the harbor and
2 vessels that are using the harbor.
3 So now I'm going to talk a little bit about
4 the process of the feasibility study. So what we do
5 in the Corps of Engineers is very similar to the NEPA
6 process or any process to come up with a plan of
7 improvement. We first figure out what the problem is.
8 We look at what's existing, collect information.
9 Before we pass that out into the future, look at
10 alternatives to be able to handle that ship traffic in
11 an efficient manner, evaluate each of those
12 alternatives against each other to come up with a
13 cost-effective environmentally acceptable plan.
14 That's sort of the Corps' planning process. And
15 that's very similar to the EIS planning process.
16 These two processes will be done in tandem. So we'll
17 be doing an integrated feasibility report/EIS. When
18 you see the report it will be both processes melded
19 together into one.
20 Next slide. Here is our Corps of Engineers'
21 study schedule. This is our process that we follow.
22 First, we have the scoping phase. That's the phase
23 we're in now. This is where we gather information.
24 We find out about the issues, scope out the problems,
25 get ideas on alternatives people would like to see.

13

1 We also start to line up the alternatives for disposal
2 for the dredged material. Gather information on
3 future conditions, economics. We also collect
4 geotechnical information on the material that will be
5 dredged. We have to collect in the harbor, take
6 borings to see what's out there. We'll look at all
7 the different resources associated with the harbor.
8 Do all this. Identify everything. Try to figure out
9 what the most significant issues and problems are
10 from an environmental point of view. That's the
11 phase we're in right now; the scoping phase.
12 The next phase is once we collect the
13 information we do an alternatives evaluation as I
14 described. After that we go out to public review with
15 the draft EIS. After that, after both the public
16 review and comments we do more detailed engineering,
17 economic analysis. And then finally we come to the
18 chief's report. And that's the document that goes up
19 to Congress eventually to authorize the project. And
20 at that point too we circulate the final EIS that will
21 eventually become signed into law. That's the whole
22 process. It takes about three years to do this
23 process.
24 Next slide. I put a little detail. This
25 will be up on our website. So we have a project

website that we're going to be posting our PowerPoints as well as fact sheets and updates reports will be posted. This is just a little description of what comes under each smart planning module or milestone, what kind of things we will have accomplished by that milestone.

So as I mentioned we're going to be looking at an array of improvements; deepening and widening the existing channel from Long Island Sound to the head of the deep draft terminals near I-95. So we will be looking at a range of depths from minus 37 to minus 42 feet. Based on the types of information we have gathered on ships to date, that will be the range we look at. And we will be checking that with the port and the future forecast of the types of vessels that will use the harbor.

Next slide. The way we'll look at -- One of the tools we'll use in our process is a program called HarborSym. So the Corps has a protocol that we use to calculate benefits of harbor deepening and harbor widening. So this will look at the estimated project savings of transporting cargo in on the improved waterway. So there will be no more lightering, no waiting for the tide. There will be improved safety at areas that are now less than optimal. So once we

have a better waterway, shippers will be encouraged to move to deeper draft ships. So there may be a cost savings with that. So it will be a positive from an economic point of view. There will be savings in transportation costs. Benefits will be looked at over a 50-year period of analysis. So we're not just looking at benefits today or 10 years from now, but over 50 years. These are projects we don't do often, as you know. The last was in the 1950s it was constructed. When we do them we look at a long period of analysis so we get the right channel that will last for a while. Here we'll be using HarborSym. That will be conducted by our Deep Draft Navigation Section down in Mobile.

And this slide; as we go through the process we start out with a lot of uncertainly, but we make decisions, screen out alternatives, scope issues. As we hone in towards the end of the study, we decrease the uncertainty and get a little bit more detailed information on a few plans. So not as much detail, but as we get into the fewer plans we'll have more detail, and then the final plan.

Next slide. And then this is a schedule. I mentioned it's a three-year effort. This shows the core milestones. But you can see right now we're in

the alternatives milestone up till March 2017. That's where we get our vertical team, New England district division which is in New York, the headquarters, go over the alternatives we're going to look at in the next phase, alternatives evaluation phase. We'll say these are the types of issues, these are the types of alternatives. And then we'll get their endorsement of that to move forward into the next phase, the evaluation phase, and eventually come up with a TSP by February of 2018. But the release of the draft feasibility report and EIS is April 2018. And you can see the other milestones which will be on the website. If you'd like to get that slide. Basically the report will be complete in September 2019.

As I mentioned, the cost share for the study itself is 50-50. Once we go into the implementation phase this would be the cost share federal-nonfederal for the actual project. This is just a little information for the future when people talk about how much is this going to cost. Then they can understand how much the state's share will be about. Basically it's 65-35. It's 75-25 with an extra 10 percent. So it comes out to be 65-35, 65 federal, 35 nonfederal. So that's an overview of the study process.

And now Mark Habel will come up and talk a

little about the disposal alternatives.

MR. HABEL: Thank you, Barbara. The Corps in partnership with the states of Connecticut and New York and other agencies recently completed a dredged material management plan for Long Island Sound. Now, not everybody agreed with the results of that study and its recommendations, but it made a lot of them which are fairly similar to what we're going to look at in New Haven.

When we dredge materials off the bottom of a harbor it's either improvement dredging or it's maintenance dredging. Maintenance dredging dredges shoal material that has accumulated since the time the harbor was last dredged before. Improvement dredging is dredging down into materials that have never been dredged before, they are natural parent materials whether rock or clay or till or sand. And we classify material to determine appropriate disposal options based on whether it's sand; maintenance silt; improvement silt; or unsuitable material, material that by the nature of chemical or biological test results cannot be placed unconfined in open water.

Here in New Haven the last several maintenance cycles, as most of you know, we maintain the 35-foot channel. The last several maintenance

1 cycles in New Haven going back to the 1980s have all
2 been taken out to the central Long Island Sound site.
3 It's tested all the time, and determined to be
4 suitable for placement out there. There are
5 unsuitable materials in New Haven, but they come from
6 inner reaches of the Quinnipiac and Mill rivers.
7 Those are materials that would never go out into Long
8 Island Sound. The last couple times they've been
9 tested they were found to be unsuitable. You used to
10 be able to cap material in Long Island Sound, in other
11 words put unsuitable material down and then bring in a
12 much bigger project with suitable material and cap it.
13 You have not been able to do that under EPA's rules
14 since about the mid-'90s. So again, things like the
15 Mill and Quinnipiac, other options would need to be
16 found. But we're not talking about that right now.
17 We're talking about deepening the main channels by
18 removal of parent material. And here in New Haven
19 that is largely glacial clay. There is a good amount
20 of glacial till when you get out near the breakwaters.
21 And when you get between the breakwaters there is some
22 rock that would need to be blasted if we determined it
23 couldn't be ripped and removed that way.
24 Next slide. In the dredged material
25 management plan we threw out a lot of different ideas

1 just to see where people's heads were. When you have
2 a project like the improvement of New Haven which is
3 going to generate somewhere in the neighborhood of
4 four to five million yards of parent material, we
5 view that as dredged material looking for a disposal
6 site. We view that as a resource that needs to be
7 used beneficially if it can be. When we last dredged
8 New Haven in 1956, when we deepened it from 30 feet to
9 35 feet we took out, again, five or six million cubic
10 yards at that time of various classifications of
11 material. We found some sand deposits in the outer
12 entrance channel that ended up on beaches in West
13 Haven and Milford. We found a lot of glacial till and
14 clay that went into fill and development of the park
15 on the east side of the harbor. Also the expansion of
16 the airport was going on, and some of that material
17 was taken over there. So there were a lot of
18 different things done with material, but still most of
19 it went out to central Long Island Sound.
20 Our challenge here because of the agreement
21 between New York, Connecticut, and the EPA over how
22 the final rule for using the open water sites in
23 western and central Long Island Sound was written
24 requires us to take a much harder look at alternatives
25 and see if there are beaches that can take sand, if we

1 do have discrete deposits of the sand; to see if there
2 are uses for the rock or gravel and cobble to create
3 additional shellfish habitat somewhere in the bay or
4 in the harbor. We will have to take a look at if
5 there are any upland projects going on in the vicinity
6 such as additional highway projects that might need
7 fill, and can we take some of our material out there.
8 Still we're going to end up with a lot of material,
9 millions of cubic yards that we need to find a home
10 for, beneficially if we can. That leaves marsh
11 creation. Certainly in the 200 or so years that the
12 port of New Haven has been developed you've lost a lot
13 of marshland to terminal development and other onshore
14 projects. Is there the opportunity to offset some of
15 that loss by building a new marsh somewhere in the
16 harbor? From the Corps' point of view you could do
17 that behind the Sandy Point strip. You could
18 construct a marsh there. You could put more than a
19 million cubic yards in such an area. Build that up
20 and plant marsh grass and use it as wildlife habitat.
21 Like I said, if we find sand we're going to
22 look to put it on beaches. We want to hear from New
23 Haven and West Haven and East Haven and Milford. Are
24 there beaches you want sand on? At some point in this
25 study we're actually going to have some grain-sized

1 data for people to take a lot at and see if that's
2 something they want to see us do with that material.
3 Next slide. One of the big things we've
4 been doing with parent material recently is
5 remediation. We've only been testing dredged material
6 essentially since about 1970, and not in a really
7 comprehensive way since 1980. So there's a lot of
8 dredged material out there in the central Long Island
9 Sound site and other sites that was placed there
10 before the advent of really in-depth testing
11 requirements. The central Long Island Sound site has
12 been used since the middle of the latter half of the
13 1800s for open water placement of dredged material.
14 So at Boston Harbor where next year we're
15 about to start a major port deepening to take that
16 harbor from 40 feet down to 47, that's going to
17 generate 11,000,000 cubic yards of unconsolidated
18 dredged material and clay, and another half a million
19 yards or so of rock. The Corps together with the
20 Commonwealth of Massachusetts and EPA came up with a
21 plan to use virtually all of that 11,000,000 cubic
22 yards of material to cap the former industrial waste
23 site in Massachusetts Bay. We're going to be able to
24 place about a 5-foot cap on roughly half a square mile
25 of that old site that was used for chemical waste and

1 radiological waste from the '30s to 1980. That kind of
2 volume of parent material to do those types of things
3 comes along once in a generation. And I think
4 everybody in Massachusetts recognized that, and said
5 if we're going to ever do something about the old
6 industrial waste site, now is the time to do it.
7 You may have a similar opportunity here if
8 the Corps in Connecticut and New York can identity
9 where some of those old pre-1970 disposal mounds are
10 on the bottom at central Long Island Sound and maybe
11 at the Norwalk and Milford sites; and use this
12 material to cap those old mounds, thereby improving
13 the chemical quality of the material at the bottom of
14 the sound. These are the things this study is going
15 to examine as we go forward. And of course we're
16 looking to hear other people's ideas as well.
17 When we were doing the DMMP we looked at is
18 there one thing we could do in Long Island Sound that
19 would accommodate all 30 years of all the harbors in
20 Long Island Sound in one site. And the thing that
21 came to the surface was something that's been raised
22 before over the decades, and that's a containment
23 island in outer New Haven Harbor. This could be a
24 diked area. It doesn't have to be the thousand acres
25 you see there. It could be something smaller filled

1 and redeveloped as park land or wildlife habitat or
2 whatever the city or state wanted to do. The Corps
3 has built similar islands in partnership with the
4 state of Texas and elsewhere. There are some large
5 ones in Chesapeake Bay, Poplar Island; big ones all
6 over Galveston Bay also. It's not new technology.
7 It's something we could do. It's just is there a call
8 for this to be done? Do people see this as a benefit
9 or not?
10 Next slide. Other solutions: I mentioned
11 some of these already; use in highway projects;
12 processing to use at brownfields, still a few of
13 those in Connecticut; use it for other efforts at
14 elevating other lands along the coast, elevating
15 marshes to keep up with sea level rise. The weakness
16 here is all of these would require scheduling and
17 funding to be on the same time line as the port
18 deepening project to make that work. Sometimes we can
19 make that happen. Sometimes we can't. But we would
20 need nonsponsoring communities to be champions of
21 these ideas and to partner with the Corps to make that
22 happen.
23 Todd Randall is next. Please be kind to
24 Todd. He's getting over a cold like I am. His voice
25 is gone, but he's going to do his best.

1 MR. RANDALL: Hello, my name is Todd
2 Randall, and I am an ecologist and environmental
3 compliance specialist with the New England District of
4 the U.S. Army Corps of Engineers. So tonight I'm
5 going to talk really quickly about the NEPA process
6 for the New Haven Harbor navigation improvement study,
7 give an overview of the NEPA process for this project.
8 I will define what NEPA is, talk about what the Corps
9 does to implement its process, and give you details on
10 the products that will come from the process. And
11 most importantly I will detail how you can participate
12 in the NEPA process and assist the study.
13 The National Environmental Policy Act, or
14 NEPA, is a federal law that was enacted on January 1,
15 1970. This law requires federal agencies proposing
16 any action to identity and analyze potential
17 environmental and socioeconomic impacts that may occur
18 as a result of the proposed action.
19 The requirement to apply the NEPA process is
20 triggered by federal actions that could significantly
21 affect the quality of the human environment. The NEPA
22 process ensures that the public has the opportunity to
23 participate in the federal decision making process by
24 providing input during project development, which we
25 are doing tonight; and that the public has access to

1 the information used to assess the baseline conditions
2 and the potential impacts of any proposed project.
3 The product of the NEPA process is generally
4 a report in the form of an environmental assessment or
5 environmental impact statement. Basically it looks at
6 the impact of the proposed alternatives, as well as
7 other alternatives, on existing conditions or
8 socioeconomic impact. If the impacts of any proposed
9 project are determined not to be significant, if a
10 project is not overly complex, or if there are no
11 controversies associated with a proposed project an EA
12 is generally prepared. An EIS is generally prepared
13 if the impacts associated with a project are deemed
14 significant, a project is complex, or if there are
15 controversies associated with a project.
16 Due to the complexity of New Haven Harbor
17 improvement study, the Corps has decided to prepare
18 an EIS for the project.
19 I will now go over the purpose of an EIS.
20 An EIS is intended to identity and evaluate all
21 alternatives for a proposed project in a defined study
22 and demonstrate compliance of the proposed action
23 with all applicable laws and regulations.
24 Identifying alternatives involves gathering
25 the practicable universe of possible alternatives and

1 solutions to the problem you are trying to solve.
2 Evaluating alternatives means gathering the
3 baseline conditions of the human environment, so the
4 environmental and socioeconomic conditions that exist
5 in the proposed study area; and then predicting the
6 impact to those conditions from the various
7 alternatives.
8 The alternatives considered, the evaluation
9 of the impacts to the conditions, and the
10 demonstration of compliance with all applicable laws
11 are then documented and are all presented in the EIS.
12 Public participation in the EIS creation is
13 done through a scoping meeting, getting concerns or
14 relevant data during the alternatives formulation
15 process, public informational meetings as the EIS is
16 prepared, review of the draft EIS once it's available,
17 reviewing the alternatives considered and their
18 associated impacts, and then comments on the draft EIS
19 once it's public, and finally a review of the final
20 EIS and record of decision.
21 The major steps in the EIS process: Once an
22 agency undertakes a project, they issue a notice of
23 intent to prepare an EIS. Then we start the scoping
24 project. This is the process seeking input from the
25 public, knowledgeable persons, and other resource

1 agencies regarding the scope of the EIS; what factors
2 should be considered in detail, and what factors are
3 less important or do not have to be included in the
4 analysis.
5 Baseline data gathering, it's pretty
6 self-explanatory.
7 Impact analysis is the process of examining
8 how any proposed action may affect the baseline
9 conditions.
10 The draft EIS is the document that presents
11 the alternatives considered, the baseline conditions
12 and conditions that would be expected without the
13 project, analysis of the effects of the project, and
14 usually includes the agency's preferred alternative.
15 As I said before, the draft EIS wraps all those items
16 into a document.
17 Once the draft EIS is made public a review
18 period not shorter than 30 days is established and
19 public hearings/meetings to present the results of the
20 EIS and hear comments are scheduled. Following the
21 review period, the lead agency addresses comments
22 received and produces a final EIS and a record of
23 decision identifying the alternative to be
24 implemented.
25 This is an outline of a typical EIS so that

1 you can see the general framework for the information
2 that would be contained within the EIS: A summary of
3 the EIS; the purpose and scope of the EIS; the propsed
4 action; the alternatives considered; the affected
5 environment or baseline conditions of the study area;
6 environmental and socioeconomic consequences of the
7 project or impact analysis; a compliance section that
8 details the project's compliance with all appropriate
9 laws; a section detailing the public participation
10 efforts, so a description of the scoping meeting,
11 informational meetings, hearings, public notices,
12 comments received on the project, and how those
13 comments were addressed in the EIS; and finally a list
14 of the EIS preparers.
15 Next slide: This is our general schedule.
16 We're in scoping right now. Sometime after summer we
17 will get back together. We will have a list of
18 alternatives to present to the public in September.
19 As I said before, all this wraps up, draft EIS, in
20 April 2018 it hits the streets. 30 days after which
21 you have the public meetings. We will address those
22 comments and finally come out with the final EIS in
23 July of 2019.
24 So the public participates throughout the
25 process. The first effort is this scoping meeting,

1 that's what we're doing tonight, in which we will be
2 accepting comments and questions in just a few
3 minutes.
4 We will also be holding an informational
5 meeting on the alternatives once we have a chance to
6 review comments on the project, develop the range of
7 practicable alternatives, and organize those into
8 presentable form.
9 Following our analysis of impacts to the
10 alternatives considered and all the other EIS efforts
11 that I spoke about previously, we will release a draft
12 EIS that will be available for review and comment.
13 Following the release of the draft EIS, a
14 public meeting/hearing to present the results of the
15 draft EIS will be held during which time comments can
16 be provided. Written comments are also accepted
17 during this period.
18 During the study the Corps, as Barbara
19 noted, we host a website dedicated to the New Haven
20 project, and will keep the website updated with
21 information on the study as it becomes ready.
22 And then finally the purpose of tonight's
23 meeting is to get feedback, comments, concerns on the
24 proposed feasibility study. I know it's a lot to soak
25 in. When we have comments tonight I just put up a

1 tentative list of what people like to talk about in
2 these meetings. It's definitely not limited to these
3 issues.
4 Just for example, how do I provide comments?
5 Public affairs in the back has a comment card. You
6 can provide verbal questions or comment to the panel.
7 We have a stenographer. Or you can provide comments
8 in writing or by E-mail. We would like to have all
9 the comments on this part of the study in within 30
10 days so we can understand them, by the 20th of
11 February that would be great.
12 Thankfully that's all I have. I will turn
13 it back over to Mark.
14 MR. HABEL: Okay. Thank you, Todd.
15 Ladies and gentlemen, in accordance with the
16 goals of the National Environmental Protection Act to
17 encourage public participation, this public scoping
18 meeting is your opportunity to ask questions. We
19 believe it's crucial to this public participation
20 process that your voice is heard. And we thank you
21 for your contribution. Since we only have two people
22 signed up to speak, I'm going to dispense with all the
23 warnings rules and time limit, except to say please
24 respect everybody's opinion, even if it's different
25 from yours.

1 And we have Mr. Michael Piscitelli from the
2 City of New Haven.
3 MR. PISCITELLI: First of all, let
4 me say thank you to Mr. Habel and members of the Army
5 Corps, our partners from the Connecticut Port
6 Authority and New Haven Port Authority.
7 My name is Michael Piscitelli. I'm the
8 deputy economic development administrator for the City
9 of New Haven. I appear before you on behalf of Mayor
10 Tony Harp and our economic development administrator,
11 Matthew Emerson.
12 With some excitement and appreciation for
13 the effort and the journey to date that you're coming
14 to us with the next step in a very important project
15 for the City of New Haven which is the deepening of
16 this channel. We have recognized for some time along
17 with our port community how important it is that the
18 existing users have a better, safer, and more
19 efficient channel in which to conduct business. And I
20 think we've also recognized that the economic value of
21 our port district in some ways is left unrealized
22 because we don't have the full endeavor of modal
23 connections that we need to make an economic impact,
24 if you will.
25 I would suggest as well in the intervening

1 years since Congresswoman DeLauro and others were able
2 to identify some funding for this project we've been
3 able to make the right steps to position ourselves.
4 91 and 95 are now complete thanks to our friends in
5 the State of Connecticut, as well as bringing
6 intermodal access to the port with the freight
7 railroad; as well as establishing governance, and also
8 for lack of a better word, a district. So that the
9 land side access is there for lay down and storage,
10 and not just the ability to bring ships in, but
11 actually do something with a more diverse setup.
12 We'll of course submit more complete written
13 testimony before your deadline. We did want to speak
14 today to four areas of consideration that relate in
15 part to the environment document or scoping or general
16 feasibility.
17 The first of those is we have other maritime
18 users and people who use New Haven Harbor. So we
19 would ask that you be very considerate and respectful
20 for the aquaculture community. We have active
21 shellfish beds in New Haven Harbor and other users.
22 And to the extent we could do this project with the
23 least amount of impact to those users would go a long
24 way forward.
25 Second, I would suggest to you your

1 proposals and thoughts regarding the dredged spoils
2 are not only interesting, but innovative and creative
3 and well worth the next step of dialogue to figure out
4 what we can do here. I would offer to you, those of
5 you from Boston, that the City of New Haven was
6 heavily impacted by the two coastal storms, both Sandy
7 and Irene. So to the extent living shorelines or
8 other mechanisms to protect resiliency may be very
9 well-received in this community, may be ways to work
10 creatively with the spoils to protect other businesses
11 along the coastline and other areas at risk for the
12 next coastal storm.
13 The third area and very sensitive is the
14 cross sound cable. This is the Trans Energy line
15 which has been laid directly north-south in the
16 navigation channel. And many of you who have been
17 here for a number of years will recall the city was
18 quite vocal along with many our partners expressing a
19 significant amount of concern that the cross sound
20 cable would have no material impact on the ability to
21 deliver the channel deepening project. And I trust
22 that you will keep that front and center in your mind
23 as you go through the cost benefit analysis or
24 economic considerations or feasibility associated with
25 the cross sound cable, that there are a series of

commitments along the way that make it clear that the deepening project prevails. And figure out a way to make it work for all the parties that use the channel, but at the same time not foreclose our opportunity to deepen the channel.

Lastly, very importantly for the city and our community, New Haven port is in a confined area. It's in a neighborhood. So to the extent we had a public hearing tonight that many people attended, we do need to take another step in public input with the New Haven Board of Aldermen, the residents of our neighboring communities. So to make a fulfilling project for everyone, do it responsibly, we'll do this before February 23, make sure the neighbors are heard as well. They have been great partners in allowing the port to grow, but there are impacts. And we'd like to make sure their voices are part of this process.

With that, let me close by saying you'll hear from me and others. We believe this project will be found in the national interests, both in terms of transportation and future economic development. And I thank you for your time.

MR. HABEL: Thank you. Next we have John Acampora.

MR. ACAMPORA: The cost of the project, has there been estimates?

MR. HABEL: Estimates done in the late '70s and '80s; 5,000,000 cubic yards, somewhere in the 40 to 50 million dollar range.

MR. ACAMPORA: There's a change now in the participation between the federal and state based on the depth of the channel?

MR. HABEL: There has but it doesn't affect New Haven. Because that was a change in cost sharing prior to the latest act in December was a break at the 45-foot depth, the cost sharing changed. And this is roughly 40, 42. So the 2016 act moved that 45 break to 50 feet. So it really doesn't impact New Haven.

MR. ACAMPORA: How about the availability of funds? This is like three or four years out.

MR. HABEL: Who knows what Congress will or won't do?

MR. JONAS: I'm Shelby Jonas. I'm one of the pilots bringing ships in and out of New Haven. I've been a pilot bringing ships in and out of New Haven and other Long Island Sound ports for over

30 years. Right now the maximum draft we can bring in and out of New Haven without any tide restriction is 31 feet. It's a 35-foot channel. We have port requirements at 2-foot under keel clearance. When the ship is underway we have squat where the stern of the ship is sucked down to the bottom. At high tide we can bring in 37-foot, and we've brought out 37-foot. At Gateway Terminal a lot of times they'll get ships in that load scrap metal. And as it approaches the tide if the tide is higher than normal maybe we'll load it a little bit deeper. But when you consider the size ships Gateway loads its scrap on, if they could load to one foot deeper on the draft that puts about 2,000 more tons of cargo on that ship. That's a considerable amount.

The tankers that we bring in, the maximum draft two of the terminals take tankers at 37-foot. We're bringing them in an hour before high water. We have our required under keel clearance and the squat. But also the ships get alongside these tankers and they want to get what they call pumping through the tide. They want to get the ship light enough so that they're not near the bottom at low water. The port requirement for the ships at the berth is that they're safely afloat. So we need to do some dredging there.

We're at the maximum. 37-foot is the maximum safe draft that we can bring in. And safety is the main concern here.

These Panamax ships that come, they're about 106-foot beam and 600 feet long. With a full load on them their draft is 40-foot. For them to come to New Haven they're going to go outside and lighten. They're going to have to take about 3 feet off that draft. That could be one or two barges. It could be a 12- to 24-hour operation. It's very expensive, lightering. It's weather dependent also. We have a wide open area where the barge comes along the ship. If there are 2- or 3-foot seas, 15, 20-knot winds, the ship is just going to sit there. Some of these ships, their chartering would be up to $1,000 an hour. So one-day delay is a $25,000 bill. And maybe the ship was chartered for another voyage, but maybe they'll miss that voyage because of the delay due to lightering. If we have a 42, 44-foot draft channel we wouldn't have to do any lightering, we could bring the ships right into the dock. It would save a lot of money and a lot of time.

So the pilots, we're in favor of the dredging, and also the widening of the channel. Because the draft that we're bringing in now is also

limited by the width of the channel, not only the depth. Okay, thank you.

MR. HABEL: Thank you very much. Is there anyone else who would like to speak? We're not just here to listen to us but to listen to you. Anyone else have a question or statement about the process for or against?

Okay. Thank you very much for your questions and comments this evening. Written questions and feedback, letter can be sent to the Corps, either in writing or by E-mail at any time.

We at the U.S. Army Corps of Engineers, New Haven Port Authority, and Connecticut Port Authority extend our appreciation to all who took the time to involve themselves in this public scoping process. Thank you again for providing us with your questions, your thoughts, and your feedback. And that concludes tonight's public scoping meeting. Good night.

(The meeting concluded at 7:25 p.m.)

STATE OF CONNECTICUT)
) ss:
COUNTY OF HARTFORD)

I, Trevor Drummond, do hereby certify that the foregoing matter was recorded stenographically by me and reduced to typewriting by me.

I FURTHER CERTIFY that the foregoing transcript of the said hearing is a true and correct transcript of the testimony given at the time and place specified hereinbefore.

I FURTHER CERTIFY that I am not a relative or employee or attorney or counsel of any of the parties, nor a relative or employee of such attorney or counsel, or financially interested directly or indirectly in this action.

IN WITNESS WHEREOF, I have hereunto set my hand and seal of office at East Hartford, Connecticut, this 31st day of January, 2017.

_____
Trevor Drummond,
Court Reporter

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A2-Agency Scoping Meeting, January 25, 2017

Meeting Notes
Cooperating Agency Letters

MEETING MINUTES

US Army Corps of Engineers
New England District

Date: January 25, 2017
Time: 0930 - 1230
Participants:

Todd Randall	USACE	Barbara Blumeris	USACE
Marc Paiva	USACE	Mark Habel	USACE
Michael Narcisi	USACE		

Joe Salvatore	CT Port Authority
Judi Sheiffele	New Haven Port Authority
Jeannie Brochi	USEPA (via webinar)
Alison Verkade	NMFS (via webinar)

Peter Francis	CTDEEP	Kristal Kallenberg	CTDEEP
Fred Riese	CTDEEP		

Davis Carey	CTBOA
Shannon Andrews	USCG
Brain Jones	CT Office of State Archaeology

Subject: Agency Scoping Meeting for the New Haven Harbor Improvement Project Environmental Impact Statement

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The group of attendees listed above met at the Connecticut DOT offices in Newington (CT) and via webinar to discuss the scoping of the Environmental Impact Statement for the New Haven Harbor Improvement Project. Ms. Barbara Blumeris, Mr. Mark Habel, and Mr. Todd Randall of the USACE presented the attached PowerPoint presentations. The main discussion points in the presentations were: the purpose and needs of the improvement dredging in New Haven Harbor, potential navigation improvement features being considered in the study, purpose of the NEPA process, potential alternative locations know to the USACE for material placement, study schedule, and available data and data gaps for the study.

Dredging Purpose and Needs & Navigation Features Being Considered

Ms. Blumeris presented slides that detailed the New Haven Harbor project history, project need, and probable navigation features that would be studied for the New Haven Harbor Improvement Project. Presentation is attached.

Alternatives

Mr. Habel presented slides that detailed potential dredged material placement sites that would be studied for the New Haven Harbor Improvement Project. Presentation is attached.

NEPA Process & Available Data and Data Gaps for the Study

Mr. Randall discussed the National Environmental Protection Act (NEPA) process that the study (and Environmental Impact Statement (EIS) would follow. The major steps in the process include: the Notice of Intent to conduct the study, the invitation for agencies to be cooperating agencies, scoping, baseline data gathering, impact analysis, Draft EIS publication, public review and comment, Final EIS publication, and publishing a Record of Decision. Mr. Randall also presented a project schedule for the process. Mr. Randall also presented existing data available for New Haven Harbor and discussed possible data gaps that would be obtained during the study. Presentation is attached.

General Discussion

Brian Jones (SHPO)

Mr. Jones noted that new side scan data of the improvement features would be helpful in identifying any archaeological resources in the areas of new dredging. He noted that he would be interested in knowing if any buried terrestrial sediments would be found in the new dredge area and if it would be possible to get a sense of where the historical channel was and how it changed over time. Mr. Jones noted that historic ship wrecks could serve as obstructions if any were present in the side slope areas being considered for improvement and asked if the USACE know of any. Mr. Paiva (USACE) responded that there were no known wrecks and that the Cross Sound cable installation within the channel in the 2000's did not find any in their investigations. Mr. Jones requested that the sampling and analysis plan for sediment sampling be coordinated with the State Historic Preservation Office and that a set of cores be processed for archaeological studies.

Jeannie Brochi (EPA)

Ms. Brochi noted that, when considering placement alternatives, there are historical disposal sites throughout Long Island Sound (some that were used for medical waste disposal) as well as current EPA designated sites. EPA strongly suggests looking at beneficial uses (e.g., marsh creation or beach nourishment) of the material.

Peter Francis and Krystal Kallenberg (CTDEEP)

CT DEEP noted that the proposed study will need a joint Water Quality Certification and Coastal Zone Management Consistency Determination. CT DEEP committed to working with USACE on the permitting process by keeping the USACE informed of requirements they will need for review.

CT DEEP noted that there is a proposal to create a living shoreline project in the Long Wharf section of New Haven Harbor. CT DEEP suggested reaching out to City of New Haven for details.

Ms. Kallenberg asked about the percentage of blasting that will be required for the improvement project. Mr. Habel noted that while there was no calculated percentage as of this meeting, the blasting would be likely be limited to the area in the bend of the existing FNP (between the breakwaters) where the ledge is closer to the surface than other areas of the harbor. Mr. Habel noted that a previous navigation improvement study took some rock borings within the FNP.

CT DEEP inquired as to the status of the Cross Sound cable that is currently in the limits of the FNP. USACE noted that the permitting of the cable placement included a requirement for the cable's operator to move the cable should deepening of the FNP be undertaken.

Judi Sheiffele (New Haven Port Authority)

Ms. Sheiffele asked if the improvement project could be completed within one dredge season. USACE noted that the length of project construction would be determined by the selected alternative, the type of equipment needed to complete the project, and any time of year constraints that may be needed to protect ecological resources.

Ms. Sheiffele asked if the creation of a dredged material placement island would be a possibility. Mr. Habel noted that, while all alternatives are being evaluated for this study, the creation if islands requires substantially more dredged material than would be generated from the New Haven project and that such an alternative would likely need to be a regional facility instead of a project specific alternative.

Ms. Sheiffele noted that the floodplain elevations in New Haven have been raised and asked if any dredged material could be stockpiled in an upland area for future resilience use. USACE responded that if the material to be removed from New Haven Harbor was found to be suitable for use as structural fill, then that could be a viable option.

Alison Verkade (National Marine Fisheries Service)

Ms. Verkade noted that all the placement options would need to be reviewed by NMFS and noted that their main concerns (for both dredging and placement) would be habitat alteration as well as direct and indirect impacts to all NMFS trust resources. USACE noted the concern and insured NMFS that they would be consulted during the study process for their input on placement locations and other project details.

Ms. Verkade also noted that if blasting was going to occur, there would likely be time of year restrictions as well as other blasting requirements to minimize impacts to NMFS trust resources.

Joe Salvatore (Connecticut Port Authority)

Mr. Salvatore noted that New Haven Harbor contains a large portion of undersea bottom that is leased for shellfishing and asked if that would affect the potential to improve the FNP. Mr. Habel replied that USACE does not recognized subtidal leases and that the presence of any leases would not affect the ability to improve the New Haven FNP.

David Carey (Connecticut Bureau of Aquaculture)

Mr. Carey noted that there are shellfish beds present in New Haven Harbor and exhibited a map of the current leases and plots in the harbor. Mr. Carey said that some lease holder agreements date to the 1800s. Mr. Carey also noted that the New Haven Harbor water quality is currently appropriate for shellfish cultivation and that surficial sediment quality is generally good as historic contamination tends to be below recently settled sediments.

Mr. Carey stated that the deepening of the FNP is not a major concern for shellfish resources as the FNP is routinely dredged every 10 years or so. The main impact to shellfish habitat would come from the potential widening of the FNP and the associated side slopes.

Mr. Carey voiced opposition to the idea of a dredged material island creation alternative as it would remove potential oystering and clamming grounds in the harbor.

Mr. Carey mentioned that any rock to be generated from blasting activities could be used to stabilize Charles Island in Milford, CT. USACE noted that it could be considered as an alternative but would likely need a sponsor to support the added costs of transporting the material out of New Haven Harbor.

Summation

Following the presentations and general discussion, Mr. Randall requested that written comments on the project be provided to the USACE within 30 days. Mr. Randall also noted that any additional questions or concerns could be brought to the attention of Ms. Blumeris or Mr. Randall via letter, email, or call.

Meeting Adjourned.

Todd Randall

Marine Ecologist

The following agencies were invited to the scoping meeting via letter 30 days prior to the meeting:

National Marine Fisheries Service – Habitat Conservation Division
National Marine Fisheries Service – Protected Resources Division
US Environmental Protection Agency
US Fish and Wildlife Service
US Coast Guard
Connecticut Department of Energy and Environmental Protection – Marine Fisheries Division
Connecticut Department of Energy and Environmental Protection – Land & Water Resources Division
Connecticut Department of Agriculture – Bureau of Aquaculture
Connecticut Office of Historic Preservation
New York Department of State - Coastal Management Program
New York Department of Environmental Conservation
Mashantucket (Western) Pequot Tribe
Mohegan Tribe

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
5 POST OFFICE SQUARE SUITE 100
BOSTON, MASSACHUSETTS 02109-3912

April 6, 2017

Lawrence Oliver
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Dear Mr. Oliver:

We are writing to accept your invitation to serve as a cooperating agency under the National Environmental Policy Act (NEPA) in conjunction with the U.S. Army Corps of Engineers preparation of an Environmental Impact Statement (EIS) for New Haven Harbor, Connecticut Federal Navigation Project. As a cooperating agency we will review draft documents and attend coordination and public meetings as appropriate and as resources permit.

Should you have any questions, please feel free to contact Jean Brochi of my staff at (617) 918-1536 or brochi.jean@epa.gov.

Sincerely,

Regina Lyons, Manager
Coastal and Ocean Protection Unit

From:	Randall, Todd A CIV USARMY CENAE (US)
To:	Blumeris, Barbara R CIV USARMY CENAE (US); Habel, Mark L CIV USARMY CENAE (US); Oliver, Lawrence R CIV USARMY CENAE (US); Mackay, Joseph B CIV USARMY CENAE (US)
Subject:	FW: New Haven Harbor Improvement Project EIS scoping meeting
Date:	Thursday, January 26, 2017 11:01:29 AM

FYI from NYDOS on New Haven Improvement

-----Original Message-----
From: Maraglio, Matthew (DOS) [mailto:Matthew.Maraglio@dos.ny.gov]
Sent: Thursday, January 26, 2017 10:58 AM
To: Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil>
Cc: Zappieri, Jeffrey D (DOS) <Jeffrey.Zappieri@dos.ny.gov>
Subject: [EXTERNAL] RE: New Haven Harbor Improvement Project EIS scoping meeting

Todd

Thank you for reaching out to Denise regarding your invitation to participate as a cooperating agency for the New Haven Harbor Connecticut Federal Navigation Project feasibility study and environmental impact statement. The Department will not be participating as a cooperating agency pursuant to the National Environmental Policy Act. The Department is granted comparable authority to participate in such actions pursuant to the Coastal Zone Management Act and is happy to contribute to the discussion in this capacity. Please coordinate with myself and Jeffrey Zappieri (cc'd).

Matthew P. Maraglio
Coastal Resources Specialist, NYS Coastal Management Program
Consistency Review Unit, Office of Planning & Development

New York Department of State
99 Washington Avenue, One Commerce Plaza, Suite 1010, Albany, NY 12231
O: 518.473.3371 | Matthew.Maraglio@dos.ny.gov
Blockedwww.dos.ny.gov

-----Original Message-----
From: Randall, Todd A CIV USARMY CENAE (US) [mailto:Todd.A.Randall@usace.army.mil]
Sent: Thursday, January 19, 2017 11:16 AM
To: Caldwell, Denise (DOS) <Denise.Caldwell@dos.ny.gov>
Subject: RE: New Haven Harbor Improvement Project EIS scoping meeting

ATTENTION: This email came from an external source. Do not open attachments or click on links from unknown senders or unexpected emails.

Hello Denise, I was wondering if NYDOS would be responding to the Cooperating Agency request letter for the New Haven Improvement Project? Also, will a NYDOS representative be available to attend the Agency scoping meeting described below?

Thanks,
TODD

TODD RANDALL
Marine Ecologist

US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978-318-8518
todd.a.randall@usace.army.mil

-----Original Message-----
From: Randall, Todd A CIV USARMY CENAE (US)
Sent: Tuesday, January 03, 2017 7:19 AM
To: 'denise.caldwell@dos.ny.gov' <denise.caldwell@dos.ny.gov>
Subject: New Haven Harbor Improvement Project EIS scoping meeting

Hi Denise,

My name is Todd Randall and I am an Ecologist with the New England District of the Corps of Engineers. The Corps is beginning the study of navigation improvements (i.e., deepening and widening) in the New Haven Harbor Federal Navigation Project in New Haven, CT. For the study the Corps will be drafting an Environmental Impact Statement (EIS). As such, our project managers have drafted letters with some specifics of the project and inviting stakeholder agencies to be cooperating agencies in the EIS process. The attached letter was sent out a week or 2 ago. I apologize for not dropping you an email sooner to give you a heads up. I believe your name came up as the point of contact for the NY DOS because of your previous involvement with Corps projects. If this is incorrect, could you please let me know who to use as a NY DOS POC (and forward this information to them).

In accordance with NEPA policies in the development of an EIS, the Corps will be holding a public scoping meeting as well as an agency scoping meeting to present the rationale for the improvement study and explain the study process. The Corps would like to invite the NY DOS to the agency scoping meeting (and public scoping meeting if you so desire), so this email provides the details of the meeting date and time.

The date for the Agency Scoping Meeting for the New Haven Harbor Navigation Improvement EIS will be Jan 25, 2017. Details are below:

Agency Scoping Meeting
Jan 25, 2017
0930-1230
Conference Room B

Connecticut DOT Office
2800 Berlin Turnpike
Newington, CT 06131

The Corps has also planned a public scoping meeting to present the study to the public. The details for that meeting are:

Public Scoping Meeting
January 24, 2017
6:30 pm to 8:30 pm

New Haven Hall of Records
200 Orange Street
New Haven, CT 06515

Please RSVP to this email to let me know if NY DOS would like to attend the agency scoping meeting. If you cannot attend but would still like to provide comments, please let me know and we'll arrange an alternative time to get together and go over the project and get NY DOS's input.

The Corps will provide an agenda for the agency scoping meeting as we move closer to the meeting date.

Thanks in advance for your assistance with this project. Feel free to call or email should you have any questions.

V/R,
TODD

TODD RANDALL
Marine Ecologist
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978-318-8518
todd.a.randall@usace.army.mil

From:	Randall, Todd A CIV USARMY CENAE (US)
To:	Blumeris, Barbara R CIV USARMY CENAE (US); Habel, Mark L CIV USARMY CENAE (US); Paiva, Marcos A CIV USARMY CENAE (US); Oliver, Lawrence R CIV USARMY CENAE (US); Mackay, Joseph B CIV USARMY CENAE (US)
Subject:	FW: New Haven Harbor
Date:	Thursday, January 26, 2017 2:37:50 PM

FYI - CT State Arch.- Accepts being Coop Agency

-----Original Message-----
From: Jones, Brian [mailto:brian.jones@uconn.edu]
Sent: Tuesday, January 24, 2017 3:43 PM
To: Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil>
Subject: [EXTERNAL] New Haven Harbor

Mr. Todd Randall,

I am writing to accept your invitation to act as an agency contact regarding EIS coordination for the New Haven Harbor dredging project. A letter of invitation to participate recently arrived in my campus mailbox from Mr. Lawrence Oliver. Unfortunately, my office was moved last Fall, so mail has been delayed in the forwarding process (for future notifications, please see the updated address below).

I will be at tomorrow's scheduled scoping meeting in Newington.

Sincerely,

Brian Jones

Brian Jones, Ph.D.
State Archaeologist
Office of State Archaeology
brian.jones@uconn.edu <mailto:brian.jones@uconn.edu>
860-299-5769

For scheduled office visits: Monteith 408, UConn, Storrs
Mailing address: Department of Anthropology, UConn, 354 Mansfield Road, Storrs, Connecticut 06269-1176

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

January 24, 2017

Mr. Lawrence Oliver
Chief, Planning Division
U. S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Mr. Oliver:

Thank you for your letter of December 14, 2016 inviting the Department to become a Cooperating Agency for the preparation of an Environmental Impact Statement (EIS) as part of the feasibility study to examine navigation improvements to the existing New Haven Harbor, Connecticut Federal Navigation Project. We will assist and participate in the NEPA process.

You should understand that because of the level of detail available during NEPA/CEPA review, all regulatory issues may not be fully identified in the environmental review process. By becoming a Cooperating Agency, the Department does not relinquish any authority, including requiring more detailed information for applications, under our Water Quality Certification and Coastal Zone Management programs.

Frederick Riese of the Office of Environmental Review is the appropriate NEPA/CEPA contact person for the New Haven Harbor IFR/EIS project. He will attend the January 25 meeting and coordinate the Department's participation in the review process with the appropriate resource and regulatory offices. He may be reached at (860) 424-4110 or frederick.riese@ct.gov.

Again, thank you for the invitation to participate in the environmental review process in connection with feasibility study and EIS for improvements to the New Haven Harbor Federal Navigation Project. I trust you will find the participation of Frederick Riese helpful.

Yours truly,

Betsey Wingfield
Bureau Chief
Water Protection and Land Reuse

BW/gw

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

REF: New Haven Harbor Navigation Project draft EIS January 20, 2017

Mr. Lawrence Oliver
Department of the Army
U.S. Army Corps of Engineers
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Mr. Oliver:

This responds to your letter requesting that the U.S. Fish and Wildlife Service (Service) participate as a cooperating agency, pursuant to 40 CFR 1501.6, in preparation of an environmental impact statement for the subject project. Your letter was dated December 14, 2016, and was received in our office on December 22, 2016. Under 40 CFR 1501.6, a jurisdictional nexus and special expertise may qualify an agency to act as a cooperating agency under the National Environmental Policy Act. However, although the federally threatened piping plover (*Charadrius melodus*) and red knot (*Calidris canutus rufa*) are known to occur in coastal Connecticut, at this time, it is not clear that these or other species listed under the Endangered Species Act (ESA), or other resources under the jurisdiction of the Service, would be affected by the subject project. In addition, the Service lacks special expertise in navigation improvement projects. Therefore, in the absence of a clear jurisdictional nexus or special expertise, we are declining to participate as a cooperating agency. If you are aware that listed species or other resource(s) under Service jurisdiction may be affected, please notify us so we may re-evaluate our participation. We are available to provide technical assistance as needed when the U.S. Army Corps of Engineers (Corps) considers the potential effects of the project under section 7 of the ESA.

Thank you for considering the Service in this process, and we look forward to working with you and the Corps in the future. If you have any questions regarding this letter, please contact David Simmons at 603-227-6425 or at david_simmons@fws.gov.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

From:	Linnick, Katherine E MST1
To:	Blumeris, Barbara R CIV USARMY CENAE (US); Randall, Todd A CIV USARMY CENAE (US)
Cc:	Andrew, Shannon L LTJG; Gunning, Jason CDR; Terveen, Jay C MST2
Subject:	[EXTERNAL] New Haven Harbor - Environment Impact Statement (EIS)
Date:	Wednesday, January 18, 2017 8:43:44 AM

Good morning,

I am responding to your letter requesting participation in the EIS for New Haven harbor. Our Waterway Management Office here locally is willing to participate and assist in any way during this process. Please let me know when the first meeting will be setup and if there is any sort of scheduled agenda.

Thank you.

Regards,

MST1 Katherine Linnick
USCG Sector Long Island Sound
Waterways Management Division
Tel: (203)468-4565

todd.a.randall@usace.army.mil

-----Original Message-----
From: James Quinn [mailto:jquinn@moheganmail.com]
Sent: Tuesday, January 03, 2017 2:30 PM
To: Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil>
Cc: Autumn Cholewa <ACholewa@moheganmail.com>
Subject: [EXTERNAL] New Haven Harbor, Connecticut Federal Navigation Project EIS

Dear Mr. Randall,

My office recently received an invitation to assist with the NEPA process for the above referenced project. Please accept this email as confirmation that the Mohegan Tribal Historic Preservation Office accepts the invitation to participate in the formulation of the EIS. Please provide any additional relevant information as it becomes available.

We look forward to working with all interested parties, stakeholders and agencies assisting with the process.

Best regards,
James

James Quinn

The Mohegan Tribe

Mohegan Tribal Historic Preservation Officer & Archaeology Department Manager

13 Crow Hill Rd.

Uncasville, CT

Office: 860-862-6893

Cell: 860-367-1573

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

DEC 2 2 2016

Lawrence Oliver
Chief, Planning Division
Department of the Army, Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Re: New Haven Harbor: Navigation Improvement Project EIS, Request for Participation as a Cooperating Agency

Dear Mr. Oliver,

This letter is in response to your request, dated December 14, 2016, that we participate as a cooperating agency in the preparation of an Environmental Impact Statement (EIS) associated with the New Haven Harbor Navigation Improvement Project. We agree to participate as a cooperating agency to help advance effective interagency coordination on this project.

Our role and degree of involvement as a cooperating agency is dependent on existing staff and fiscal resources. Our contributions will be limited to providing written comments in response to your documents prepared as part of the NEPA process, i.e. draft EA, EIS and scoping documents. You can expect our comments in response to provide technical information identifying species and habitats of concern, identification of issues and topics that need consideration and evaluation in your NEPA process, and guidance on evaluating, minimizing and avoiding effects to our trust resources. We are not in a position to undertake data collection, conduct EIS analyses, or prepare sections of the draft or final EIS as staff and resources are fully tasked in other obligatory NOAA Fisheries programs.

Thank you for the opportunity to participate as a cooperating agency on this project. We look forward to working with you. If you have any questions regarding this matter, please contact Alison Verkade at (978) 281-9266 or by email at Alison.Verkade@noaa.gov for information regarding EFH (HCD Contact) or Zach Jylkka at (978) 282-8467 or by email at Zachary.Jylkka@noaa.gov for information regarding ESA (PRD Contact).

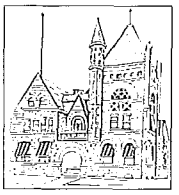
Sincerely,

for John K. Bullard
Regional Administrator

EC: Verkade, NMFS/HCD; Jylkka, NMFS/PRD;
Blumeris, USACE; Randall, USACE

A3-Scoping Letters Received

CITY OF WEST HAVEN, CONNECTICUT
HARBOR MANAGEMENT COMMISSION
City Hall | 355 Main Street West Haven, Connecticut 06516



March 17, 2017

Mr. Todd Randall
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

RE: Proposed Dredging of New Haven Harbor

Dear Mr. Randall:

The Harbor Management Commission is aware that there is an effort to begin planning for the dredging of New Haven Harbor. The Commission is in the process of completing a Harbor Management Plan for West Haven and is supportive of efforts to dredge New Haven Harbor. This is important since West Haven shares a border with the Harbor but also because the only accessible deep water for West Haven is located along the Harbor and its confluence with the West River.

Since the federal channel extends westerly to the West Haven border and continues up into the West River, the Commission asks that plans to dredge New Haven Harbor also consider the feasibility of dredging the channel up the West River to its intersection with Interstate-95. Extension of this dredging to include this segment of the federal channel will help to better serve the commercial and recreational boating needs of West Haven, will help to implement our draft Harbor Management Plan and will provide an important access for emergency services (an existing police boat and a pending fire boat). It will also result in a comprehensive treatment of the Harbor that will not require a separate, future dredging project.

The Commission supports the efforts of the Corps of Engineers to identify appropriate beneficial uses for the dredged material, including upland uses to support water-dependent uses and increase coastal resilience. Please contact us if you have any questions on this request or would like to discuss it with us in further detail.

Thank you for your consideration,

Eugene Pacapelli

Eugene Pacapelli,
Chairman
West Haven Harbor Management Commission

Cc: Mayor Edward O'Brien
Edward O'Donnel, U.S. Army Corps of Engineers
Joseph Salvatore, CT Port Authority

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employ

February 27, 2017

Todd Randall
U.S. Army Corps of Engineers
New England Division
696 Virginia Road
Concord, Massachusetts 01742

RE: New Haven Harbor Dredging
Feasibility Study and Environmental Impact Statement
Scoping Comments

Dear Mr. Randall:

The Department of Energy and Environmental Protection (DEEP) thanks you for the opportunity to submit these scoping comments as you begin your Deep Draft Navigational Impact Study for New Haven Harbor. We understand that a range of alternative configurations will be considered including deepening the existing 35' main channel to a depth in the range of 37' to 45' MLLW and widening the channel by up to 100'. Options for methodology and equipment will be considered in the study as well as various sediment disposal options including beneficial reuse. DEEP looks forward to following the progress of this study and has previously committed its intent to be a Cooperating Agency in the study effort (January 24, 2017 letter to Mr. Lawrence Oliver).

First of all, DEEP would like to express its support for maintaining and enhancing the Federal Navigation Project at New Haven Harbor. The State of Connecticut, through policies adopted as part of its federally-approved Coastal Zone Management Program, supports development of ports and harbors and encourages enhancement of existing federal navigation channels. Connecticut General Statutes speaking to this support include:

- Section 22a-92(b)(1)(c): to promote, through existing state and local planning, development, promotional and regulatory authorities, the development, reuse or redevelopment of existing urban and commercial fishing ports giving highest priority and preference to water dependent uses, including but not limited to commercial and recreational fishing and boating uses; and

- Section 22a-92(c)(1)(C): to initiate in cooperation with the federal government and the continuing legislative committee on state planning and development a long-range planning program for the continued maintenance and enhancement of federally maintained navigation facilities in order to effectively and efficiently plan and provide

for environmentally sound dredging and disposal of dredged materials; to encourage, through the state permitting program for dredging activities, the maintenance and enhancement of existing federally maintained navigation channels.

DEEP sees the Feasibility Study and Environmental Impact Statement as valuable planning tools in the process of developing the optimal project for the New Haven Harbor navigation channel enhancement. The EIS should include a detailed justification for the expansion option ultimately selected for implementation. DEEP will also look for the EIS to propose a project which minimizes shellfish impacts to the extent practical and which incorporates appropriate mitigation for all unavoidable shellfish impacts.

Regulatory Programs

The proposed channel enhancement dredging will require a Federal Coastal Consistency Determination from DEEP. In addition, a Section 401 Water Quality Certification will be necessary for the sediment disposal activities of this project. Both of these approvals would be obtained through the DEEP Land and Water Resources Division. DEEP looks forward to working with the Corps to assess the suitability of various disposal options, based on sediment characteristics and quality, whether employing upland disposal, beach nourishment, island or marsh creation, or open water disposal.

Fisheries Issues

A major concern from a fisheries perspective is the effect that the project will have on the quality of fish habitat. It is likely that deepening the existing Federal Navigation Project from -35 feet to -42 feet MLLW would have only a minimal effect. On the other hand, it is possible that widening the channel may have a very significant negative effect because shallow water habitat (roughly -10 to -15 feet MLLW) would be converted to deep water habitat. In addition, the bottom habitat in the channel is subjected to chronic disturbance by ship traffic. The additional magnitude of this effect would depend largely on how much new bottom area is created as the channel is widened.

To better understand what the effects of channel widening might be, the benthic habitat in the existing channel and the area proposed to be dredged should be characterized in terms of physical characteristics and the nature of the macrobenthic invertebrate community. The existing channel bottom habitat and associated macroinvertebrate communities would represent what could be expected to develop after the dredging is completed, and that can be compared to what currently exists in the shallower waters outside of the channel. The differences should be quantified for each widening scenario being considered in the feasibility study.

Fish habitat quality is also dependent on water quality. In this case, seasonal dissolved oxygen (DO) levels may be most important parameter. It is possible that in the summer months DO in the federal channel decreases to concentrations lower than what occurs in the shallower waters adjacent to the channel. Furthermore, DO may decrease to concentrations that could exclude fish from the channel's bottom water layer. Existing water quality data, if available, could be used to evaluate this issue; otherwise water quality data should be acquired.

Fish use of the bottom habitat in the channel compared to that of adjacent bottom habitat should be evaluated. Existing information may be used for this purpose if it is sufficient, otherwise the feasibility and effectiveness of conducting a fish survey should be discussed with DEEP and NOAA Fisheries.

The DEEP Fisheries Division routinely evaluates dredging projects in New Haven Harbor for the need to recommend time-of-year restrictions (TOYs) to protect specific fisheries resources. TOYs have been recommended for past Federal Navigation Project maintenance dredging projects, most recently a project in 2013. For that project, TOYs were developed to protect anadromous fish migration and winter flounder reproduction (see Special Conditions in the State Water Quality Certificate #201300217-KR). For the purposes of the EIS, these TOYs may serve as a guide for what the Fisheries Division may recommend for this improvement project. However, the need for TOYs is always determined on a case-by-case basis using the most current information. Implementation of this project is some number of years in the future so it is not possible at this time to provide specific TOYs.

Beneficial Reuse of Dredged Materials

DEEP supports the beneficial reuse of the sediments dredged to deepen and widen the Federal Navigation Project. Reuse opportunities will depend on the texture of the dredged materials, their cleanliness, ecological resources at the potential reuse sites and cost. DEEP looks forward to working with the Corps to develop the sediment sampling protocols for this project.

A check with the DEEP Waste Engineering and Enforcement Division revealed no anticipated opportunities for reuse of the dredged materials as potential cover material for any upcoming landfill closures. Likewise, the DEEP Remediation Division is not aware of any upcoming remediation projects which could make use of the dredged materials five to ten years from now. However, the DEEP State Parks Division is very interested in suitable New Haven Harbor dredged materials for beach nourishment at either Silver Sands State Park in Milford or Hammonasset Beach State Park in Madison, given suitable grain size and sediment quality. The interest in these sediments is not time sensitive so the timing of the channel deepening and widening is less of an issue for this purpose. Potentially significant volumes of dredged materials could be accommodated at these parks, particularly at Hammonasset.

Potential sediment reuse options such as marsh creation or artificial islands may be problematic in that such contained disposal facilities may likely require lengthy study periods to assess the current ecology and uses in the affected areas. Any such potential confined disposal areas would need to be assessed for the current fishing, lobstering, clamming, oystering, etc., uses they support and suitable compensation would need to be developed for impacts to these uses. Notwithstanding these issues, DEEP supports the further evaluation of a marsh creation project at Sandy Point in West Haven, as identified in the Long Island Sound Dredged Material Disposal Plan.

DEEP is aware of at least two local projects which may provide opportunities for beneficial reuse of dredged materials. The Town of East Haven has a potential use for a large volume of fill on approximately ten acres for an economic development project in connection with an expansion of an existing Town Fair Tire facility. The ten acre site is the upland portion of a larger property which the Town may transfer to Town Fair Tire. Mr. Sal Brancati, Economic Development Director for East Haven, may be contacted at (203) 468-3205 for more information on this project.

In addition, the City of New Haven is proposing a living shoreline, green infrastructure project at Long Wharf which will include a dune/berm system and wetland creation, both requiring fill material. This project may be able to take advantage of materials from the channel dredging and expansion. Donna Hall, Senior Project Planner with the City of New Haven, can be contacted at (203) 946-7842 or at dhall@newhavenct.gov.

Cross Sound Cable

Pursuant to approvals granted by the Connecticut Siting Council in Docket No. 208 (2001) and by Connecticut DEEP in Permit 200102720-MG and Certificate of Permission COP-2004-086-MG issued in 2002 and 2004, respectively, Cross Sound Cable Company LLC installed a 330MW direct current cable from United Illuminating's East Shore Substation on Waterfront Street in New Haven to Shoreham, Long Island.

The route of the Cross Sound Cable in New Haven Harbor runs within the Federal Navigation Project channel for 3.8 miles, buried to a minimum depth of 6' below channel bottom except in areas where the presence of ledge prevented that depth from being achieved. The planning and permitting for the Cross Sound Cable envisioned that the cable would need to be temporarily relocated should the navigation channel be dredged, and condition #21 of the 2002 DEEP permit requires Cross Sound Cable Company to remove and relocate the cable as necessary to accommodate future operations by the Corps in the channel, while condition #24 of that permit required Cross Sound Cable Company to post a $1,000,000 performance bond for emergency repairs, removal or relocation of the cable.

A new Certificate of Permission from the DEEP Land and Water Resources Division will be required for the temporary relocation and then reburial of the Cross Sound Cable. Micheal Gryzwinski will be the contact in this regard and he can be reached at (860) 424-3674 or at micheal.gryzwinski@ct.gov. Recognizing the need for the temporary relocation and then post-dredging reburial of the cable, DEEP asks that the sequencing and methodology of the pre-dredging and post-dredging cable work be covered in detail in the upcoming EIS. This will promote the efficiency with which we can process the necessary regulatory approvals. This cable relocation and reburial will also be subject to time-of-year restrictions which, like those for the other elements of this project, will be specified by the DEEP Fisheries Division after the project parameters are defined. Cross Sound Cable Company is also encouraged to contact the Connecticut Siting Council to ascertain what, if any, modifications may be necessary to the approval given for the cable in the Docket 208 decision.

Shorebird Considerations

The upcoming EIS will need to consider and evaluate impacts to piping plovers and least terns from the dredging work and the disposal of the dredged materials. If dredged materials are used to nourish nearby beaches, this may create or enhance suitable nesting habitat for piping plovers. It may also require review and post-construction monitoring by the U.S. Fish and Wildlife Service. The Quinnipiac River marsh and its confluence with the harbor provide outstanding habitat for many wildlife species, including a number that are state-listed, and the harbor is both an important wintering area and a stopover site for many wildlife species. DEEP would like to see an assessment of potential impacts, both positive and negative, to these resources.

Thank you again for the chance to offer these scoping comments. DEEP wishes the Corps well with this study. Should you have any questions concerning these comments, please feel free to contact me at (860) 424-4110 or at frederick.riese@ct.gov.

Respectfully yours,

Frederick L. Riese

Frederick L. Riese
Senior Environmental Analyst

cc: Brian Thompson, DEEP Land and Water Resources
Micheal Gryzwinski, DEEP Land and Water Resources
Peter Francis, DEEP Land and Water Resources
Kristal Kallenberg, DEEP Land and Water Resources
George Wisker, DEEP Land and Water Resources
Tom Tyler, DEEP State Parks
Peter Aarrestad, DEEP Fisheries

Connecticut PORT AUTHORITY

February 22, 2017

Mr. Todd Randall
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742

Subject: New Haven Harbor Navigation Improvement Feasibility Study – Comments

Dear Mr. Randall:

The newly established Connecticut Port Authority (herein know as CPA) would like to offer comments on the New Haven Harbor Feasibility Study and Environmental Impact Statement (EIS). CPA board members and staff attended both the public informational meeting and the agency scoping meeting held in January. In addition to attendance at the meetings, the December 2016 Federal Register Notice of Intent and the final Long Island Sound Dredge Material Management Plan (DMMP) have been reviewed specific to the National Environmental Policy Act (NEPA) and project disposal alternatives for Long Island Sound.

The New Haven Federal Navigation Channel serves Connecticut's busiest port complex and critical driver for the State's economy. The CPA request that the Corps investigate all proposed navigation improvements to the existing New Haven Harbor Federal navigation project. The navigation inefficiencies continue to exist within the main channel and turning basin. The main channels were last maintenance dredged in 2014, generating approximately one million cubic yards of sediment utilizing open water disposal. As we embark into a feasibility study to improve the navigation condition of the harbor it is very important to the CPA that project alternatives are investigated v. open water disposal.

CPA offers the following potential options for consideration into the plan;

Marsh Creation and Restoration:
Sandy Point Marsh Creation Site, West Haven, 70 acre site, 1.10 million cubic yard capacity. A CAD Cell developed would meet the needs of New Haven's unsuitable upper tributary channels materials, prior to nourishing the marsh area atop it (West, Mill and Quinnipiac Rivers). This will also serve as a coastal protection feature. The Cell could be design to accommodate the size needed.
To include; Habitat Restoration at Leetes Island Marsh, Guilford, 35 acre site.

Beach Nourishment Sites:
If sand deposits are located within the project limits as were found during the 1956 improvement to the -35-foot channel could be used on local beaches at Prospect Beach, West Haven and Lighthouse Point Park Beach, New Haven. CPA suggest that these two location be investigated as well as others in the project area.
To include; Hammonassett State Park Beach, Westbrook Beach sites, Rocky Neck State Park Beach, and others identified in the LIS DMMP (PEIS, 2015, table 6-22)

Morris Cove Borrow Pit Filling:
The Morris Cove borrow pit was created in 1956 to generate fill for the construction of Interstate 95. The pit remains and now has the opportunity to get filled with New Haven Harbor parent material sediments. The current area is identified as low productivity due to low concentrations of dissolved oxygen. The restored pit (600,000 cubic yards received) would turn this area into a productive shellfish resource which it currently is not. The beach front may also be considered for nourishment.

Confined Disposal Facilities (CDF's)
The existing two New Haven (west) breakwater structures be considered as the primary intended location for a CDF. The existing structures can be expanded and diked to create an island, development of wetlands, wildlife habitat, or park or a combination of all. The CDF size is open for discussion.
To include; Faulkner Island, Duck Island Roads, Twotree Island, and Groton Black Ledge as possible CDF locations as discussed in the LIS DMMP.

Upland Placement and Innovative Treatment:
Processing and Upland transport for use in Brownfield sites.
Use as construction fill.
Use as fill in land elevation efforts for coastal resiliency (City of New Haven, west side of harbor, west side of Bridgeport Harbor Dike plan, and Stratford Point restoration project).

Shellfish Habitat Creation:
New Haven Harbor east breakwater area. Place sediments to -8-foot depth to establish shellfish beds. Current depths are too deep to cultivate shellfish. This "fill" area would create new and productive habitat in a low stress area.

New Haven Port Terminal Infrastructure Improvements:
Terminal expansion by constructing CDF's to increase their facility foot print. Terminal owners and operators have indicated to CPA interest in expansion.

Resilience and Climate Adaption:
The CPA suggest that the Corps engages the Connecticut Institute for Resilience and Climate Adaption (CIRCA) to discuss potential project(s) along our coastline. CIRCA's mission is to increase the resilience and sustainability of vulnerable communities along CT coast and inland waterways. http://circa.uconn.edu/
The opportunity to utilize New Haven Harbor's dredge sediment to construct nearshore berms, restore wetlands and marsh's, raise land elevations, construct CDF islands is a one-time offering to the State to plan and execute these types of projects.

In addition, the CPA supports the Corps efforts to enforce the Cross Sound Cable owner(s) into compliance of their approved permit to relocate if the channel is deepened. It is also supported that the cost to relocate the cable not be included into the cost benefit analysis for the project. Your authority through the Rivers and Harbors Act of 1899, to handle physical encroachments within a channel is encouraged in this matter.

The CPA supports the Corps efforts to investigate and recommend beneficial use alternatives for the New Haven Harbor Navigation project. Please review our recommendations and let us know if we can be of any further assistance in your decision making process. The New Haven Navigation Deepening project is a vital part to Connecticut's long term growth of our maritime sector.

If you have any questions please contact,

Joseph Salvatore, Program Manager - 860-270-8199 - Joseph.salvatore@ct.gov

Sincerely,

Scott Bates

Chairman, Connecticut Port Authority

Cc: Evan Matthews, Executive Director

CITY OF NEW HAVEN
TONI N. HARP, MAYOR

PREPARED COMMENT OF THE CITY OF NEW HAVEN

RE: NEW HAVEN HARBOR NAVIGATION IMPROVEMENT
PROJECT FEASIBILITY STUDY

February 20, 2017

I. Summary

The City of New Haven ("City") respectfully offers this written comment concerning the above-referenced project, the environmental impact study and public scoping meeting. The City of New Haven, together with the New Haven Port Authority, supports the feasibility study and the efforts of the Army Corps of Engineers, New England Division ("ACOE"), to improve the navigability of New Haven Harbor and, in turn, to support the economic development of the Port of New Haven ("the Port"). There is significant unrealized economic potential due to the current depth of the federal navigation channel. The current depth restricts the type of ships that call on New Haven and all but forecloses opportunities for container services to call on New Haven. While the City is a regional leader in petroleum and other commodities; direct and indirect economic value will be enhanced substantially through improved navigation for larger ships and more diverse trade. The deepening of the federal navigation channel is likewise consistent with the City's forward thinking vision for sustainable economic growth and, more importantly, is consistent with the interests of the United States by supporting economic development through intermodal and waterborne transportation.

II. Context

The City is the socio-economic center of south central Connecticut and among the fastest growing cities in New England in terms of both population and economic significance. For the first time since 1991, there are over 80,000 jobs in the City, making up approximately a quarter of the jobs in the New Haven MSA. Economic drivers in higher education, the life sciences, advanced manufacturing, information technologies and supporting service industries are catalyzing new job growth. New Haven also is a major transportation hub. In addition to the Port, New Haven is home to two Interstate Highways (91 & 95); the Northeast Corridor rail line; and freight rail. The Port is the largest deep-water commercial port in Connecticut and a leading port of

call on the Atlantic Seaboard. The Port is ranked #51 in the nation for domestic trade (5.9 million short tons) and #53 in the nation for foreign trade (2.7 million short tons) based on 2013 volume. The Port of New Haven moves 55% of the annual tonnage entering through Connecticut ports, including 71% of all petroleum and 98% of all manufactured products.[1] The City established a 366-acre Port district and the Port Authority itself to facilitate job growth through waterborne transportation. With assistance for the new Connecticut Port Authority, New Haven is even more well-positioned to attract new business.

III. Key Considerations

Due to the nature of this project, incorporating project feasibility and environmental considerations, the City respectfully requests that the ACOE take into account the following:

a. Protection and mitigation of potential impacts to New Haven's well-established aquaculture industry, including shellfish beds and other facilities;
b. Development of a cost-effective approach to the disposal of dredge material in containerized cells and/or through use of the Central LIS facility, adaptive reuse of material and/or living shoreline applications within New Haven Harbor and in support of New Haven's coastal resiliency program; and
c. Relocation of the Transenergie "Cross Sound Cable" on a temporary or permanent basis at no cost or inconvenience to the deepening project, nor adverse effect to the cost-benefit analysis of the project; and
d. Inclusion of meaningful community input by engaging the New Haven Board of Alders, community residents and the environmental justice community as well as commercial interests.

IV. Closing

The City appreciates the efforts of the ACOE, working with partners at the Connecticut Port Authority and New Haven Port Authority, to undertake this important and timely project. In light of the economic development potential of the Port of New Haven, the demonstrated needs of the shipping community and the readiness of the Port to accommodate responsible growth, the City supports the project and looks forward to a constructive partnership from planning through to implementation.

Respectfully submitted,

CITY OF NEW HAVEN

Michael Piscitelli, AICP
Deputy Economic Development Administrator
City of New Haven
165 Church Street
New Haven, CT 06510

[1] New Haven Official Statement, 2016.

POST OFFICE BOX 9663
NEW HAVEN, CONNECTICUT 06536
(203) 467-1997
FAX (203) 469-5956

GATEWAY TERMINAL

To: U.S Army Corps of Engineers & New Haven Port Authority
From: Gateway Terminal
Date: January 24, 2017
Re: New Haven Harbor Navigation Improvement Feasibility Study and Environmental Impact Statement

Gateway Terminal (GT) appreciates the opportunity to offer the following comments relative to the New Haven Harbor Navigation Improvement Feasibility Study and Environmental Impact Statement at the public hearing jointly convened by the U.S. Army Corps of Engineers – New England District, and the New Haven Port Authority on January 24, 2017.

GT strongly supports the proposed feasibility study regarding the potential to dredge New Haven harbor to benefit the Port of New Haven and the region as a whole. We would direct your attention to the Connecticut Port Authority's (CPA) first Annual Report, wherein the CPA states the following:

> New Haven is Connecticut's largest seaport and is located on the northern shore of Long Island Sound on the central Connecticut coast. The main channels were last maintenance dredged in 2014, the Mill River and Quinnipiac Rivers in 1982 and 1989. This project will serve multiple users that require a deeper depth at their berths to accommodate the calling of deeper draft vessels. The deeper depth channel will produce a greater annual net benefit to the terminal operators and the NHPA.

GT, which was founded 30 years ago, is the largest shipping operator in the port of New Haven. We currently handle hundreds of thousands of tons of cargo each year at our facility on Waterfront Street. The materials we handle include salt, petroleum products, iron and steel products, scrap metals, cement, aggregates, fertilizers and other dry and break bulk cargo. Gateway directly employs in excess of 150 people at our New Haven facilities, and we support numerous other transportation related businesses through our activities in the Port of New Haven. In addition, we recently acquired adjacent properties to allow for us to continue to grow our business and compete in the marketplace to handle an expanding list of commodities and materials.

We have done all of this while being severely limited by the depth of the channel into our facilities in New Haven; which forces us to turn away business opportunities as well as prosecute our existing business in an inefficient manner.

Improving the conditions in the port of New Haven by dredging the harbor to a depth in excess of the current 35 feet is essential if we are to compete with the larger and much deeper ports in Boston, Providence, New York/New Jersey and Philadelphia. With the expansion of the width and depths of the Panama Canal as well as the dredging of competing harbors along the East Coast of the United States to handle super cargo ships (far in excess of 45 ft) puts increased pressure on us to compete in the marketplace. While competitors move efficiently in and out of these ports, we often have to lighter ships in the harbor at anchorage in order to allow them to pass through the shallow channel to our docks. This adds time and cost related to handling the cargo several times before offloading it to our facilities and ultimately makes us less attractive in an increasingly competitive market.

Ensuring the viability of the Port of New Haven into the future should be both the goal and the responsibility of the local, state and federal government if we are to act as responsible stewards of this economic resource. Working together, we can ensure that this dredging and improvement project is planned and executed in a responsible way, taking into account the concerns all interested parties. Proceeding with this feasibility study is a prudent and necessary first step.

A4-Public Informational Meeting January 10, 2018

USACE News Release
Transcript of Meeting

NEWS RELEASE

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

For Immediate Release:
Dec. 19, 2017
Release No. CT 2017-135

Contact:
Tim Dugan, 978-318-8264
cenae-pa@usace.army.mil

Corps of Engineers, New Haven Port Authority to hold public meeting Jan. 10 on New Haven Harbor Navigation Improvement Study

CONCORD, Mass. – The U.S. Army Corps of Engineers, New England District, the Connecticut Port Authority, and the New Haven Port Authority will hold a public information meeting on the status of the New Haven Harbor Navigation Improvement Feasibility Study and Environmental Impact Statement (EIS) on Jan. 10, 2018 in New Haven, Conn. The meeting will provide an opportunity for the Corps and the Connecticut and New Haven port authorities to provide a status update on the study and allow the public an opportunity to ask questions and provide comments.

In response to a resolution of the Senate Committee on the Environment and Public Works dated July 31, 2007, the U.S. Army Corps of Engineers, New England District is conducting a feasibility study and Environmental Impact Statement to examine navigation improvements to the existing New Haven Harbor Federal Navigation Project. The non-Federal sponsor for the study is the New Haven Port Authority in partnership with the Connecticut State Port Authority.

The public information meeting will be held on Wednesday, Jan. 10, 2018 in the Nathan Hale School auditorium at 480 Townsend Avenue in New Haven, Conn. Registration will start at 6 p.m. and the meeting will start at 6:30 p.m.

The study is considering navigation improvements, including deepening and widening the federal navigation project. Inadequate channel depths result in navigation inefficiencies in transporting goods into and out of the harbor. To reach the terminals, larger ships must lighter outside the breakwaters and/or experience delays while waiting for favorable tide conditions, or both. Deeper and wider navigation features (main channel, maneuvering area, and turning basin) are needed to increase the navigation efficiency and safety of New Haven Harbor.

The feasibility study will identify, evaluate, and recommend to decision-makers an appropriate, coordinated and workable solution to the navigation inefficiencies at New Haven Harbor. Alternatives will include analyzing various incremental channel depths and widths based upon net economic benefits and design requirements for deeper draft vessels. In addition, the study will evaluate various dredged material disposal alternatives such as beneficial use (e.g., oyster habitat and marsh creation, beach nourishment, historic disposal mound capping, nearshore placement), open water placement, and upland placement.

More information on the New Haven Harbor Improvement Study is available on the Corps website at: http://www.nae.usace.army.mil/Missions/Projects-Topics/New-Haven-Harbor/.

– more –

Public information meeting Jan. 10 on New Haven Harbor Improvement Study/2-2-2-2

The Draft Integrated Feasibility Report/Environmental Impact Statement (IFR/EIS) is scheduled to be completed in April 2018 and will be available for public review and comment.

Significant issues to be discussed in the Draft EIS include the effects of dredging, disposal, and beneficial use of dredged material on the physical, biological, cultural, and socioeconomic environment of the project area.

Comments or questions about the EIS can be directed to Mr. Todd Randall, U.S. Army Corps of Engineers, New England District, 696 Virginia Road, Concord, MA 01742-2751, or by email to todd.a.randall@usace.army.mil.

# # #

PUBLIC INFORMATION MEETING FOR THE NEW HAVEN HARBOR IMPROVEMENT STUDY

JANUARY 10, 2018

6:30 P.M.

NATHAN HALE SCHOOL

480 TOWNSEND STREET

NEW HAVEN, CONNECTICUT

APPEARANCES:

MARK HABEL, CHIEF, NAVIGATION AND ENVIRONMENTAL STUDIES SECTION, PLANNING DIVISION
U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

JOSEPH SALVATORE, CONNECTICUT PORT AUTHORITY

JUDI SHEIFFELE, EXECUTIVE DIRECTOR
NEW HAVEN PORT AUTHORITY

TODD RANDALL, ENVIRONMENTAL COMPLIANCE LEAD
U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

BARBARA BLUMERIS, Project Manager
U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

(The hearing commenced at 6:30 p.m.)

MR. HABEL: Okay, good evening. Can everyone please take their seats, and we'll get underway here. Good evening and welcome to this public information meeting for the New Haven Harbor Deep Draft Navigation Improvement Feasibility Study and Draft Environmental Impact Statement.

My name is Mark Habel. I'm the Chief of the Navigation and Environmental Studies section for the U.S. Army Corps of Engineers, New England District. The New Haven Harbor Deepening Study is being undertaken by the Corps of Engineers in response to direction from Congress and in partnership with the project sponsors, the New Haven Port Authority and the Connecticut Port Authority.

This is my first time in this building, so I'm sure all of you know more about this place than I do, but for anyone who needs them, restrooms are down the hall on the left on either side of the cafeteria, and if you find yourself overcome by thirst, there's a water bubbler across from the men's room.

With that said, the purpose of this meeting is to inform the public of our progress on the

feasibility study, to provide the public an

opportunity to ask questions about the project, to solicit public input to the feasibility study and draft EIS, and to inform the public of opportunities to provide comment on the project to the Corps and its sponsors.

I'd now like to call on the representative from our non-federal study sponsor, the New Haven Port Authority, Judi Sheiffele. Judi, thank you.

MS. SCHEIFFELE: Good evening, my name is Judi Sheiffele, and I must apologize. I've been losing my voice for the past week, so I'll try to yell, but I'm the executive director of the New Haven Port Authority, and it's almost been a year now since we had the kickoff meeting where there was a discussion on what would be involved in a navigation improvement feasibility study.

During this past year I worked very closely with our partners, the Army Corps of Engineers and the Connecticut Port Authority, to assess the existing conditions in our port and to define the long-term navigational needs of New Haven Harbor.

Tonight, as Mark explained, the

Corps will share some of the tasks that have been completed and provide a timeline for those yet to be

achieved.

The primary objectives of this study are to identify transportation inefficiencies and safety concerns and evaluate the net benefits a deeper channel would provide in increasing the economic competitiveness of the Port of New Haven.

On behalf of the commissioners of the New Haven Port Authority I would like to extend our thanks to the Army Corps of Engineers for undertaking this study, to the Connecticut Port Authority for providing the matching funds that were required of the local sponsor, and also to the maritime community who served the Port of New Haven for their cooperation in supplying us with the very necessary data that was needed for this study. With that, thank you.

MR. HABEL: Thank you, Judi. And now I'd like to call Joe Salvatore from the Connecticut Port Authority for a few words.

MR. SALVATORE: Good evening and welcome to this public meeting on the New Haven Harbor Deep Draft Navigation Improvement Study. My name is Joe Salvatore, and I'm here on behalf of the Chairman

of the Board, Scott Bates, and our executive director, Evan Matthews.

The Port of New Haven is our state's largest port and significant contributor to our state's economy, not to mention the importance as a source of import for much of our state's commerce including the heating oil keeping us warm this evening.

The Connecticut Port Authority, in partnership with the New Haven Port Authority and the Army Corps of Engineers, supports the study in a deepening of the Port's navigation channels to ensure that commerce remains in Connecticut.

The Connecticut Port Authority also supports the beneficial use of dredge material from the project including the proposals for ecosystem enhancement and restoration. Along with our partners here this evening, we welcome your remarks and hope to answer your questions on the study and the project.

If you want to learn more about the Connecticut Port Authority, go to www.ctportauthority.com. Thank you.

MR. HABEL: Also with me tonight from the Corps of Engineers, New England District is

Barbara Blumeris, our project manager, Todd Randall, biologist, and the preparer of the draft EIS, Lisa Winter, our coastal engineer, and Aaron Hopkins, who

is also from our environmental resources section, is providing our slideshow today, and the staff of the Public Affairs office, Sally and Tim, who you met as you entered the facility.

The agenda tonight is; following this introduction, Barbara Blumeris will provide an overview of the Corps' study effort and the specifics of the New Haven Harbor Navigation Project. Following Barbara, Todd Randall will provide a briefing on the status of our field investigations for the New Haven Harbor Study and dredge material placement options under consideration.

I will then open this meeting to your comments and questions. Should you need copies of the public notice or other pertinent information, those are available out in the lobby at the table you registered at, so ladies and gentlemen, Barbara Blumeris.

MS. BLUMERIS: Good evening to everyone. I would like to start this presentation off with -- the first slide is j the agenda of what we're going to cover this evening. Today's

presentation will focus on these ten items listed on the slide. The items are presented to inform you of the various aspects of the feasibility

study.

Next slide. The feasibility study purpose is to look at improvements to the existing federal navigation project that we have here at New Haven Harbor.

AUDIENCE MEMBER: Could you speak up, please?

MS. BLUMERIS: Oh, sure. So the purpose of the study today is to look at the improvements to the existing project that we have in New Haven Harbor, the main channel specifically. The study will examine increasing the depth and other improvements to that existing channel.

The outcome of the study will be a recommendation in a report to Congress for potential Congressional authorization for those improvements. The recommendation would require determination that such improvements are engineeringly feasible, environmentally acceptable, and economically justified.

Next slide. We have the

non-federal sponsors with us tonight, and they are, as we know, the New Haven Port Authority, and the state Port Authority. They provide the 50 percent cost share match for the study. The total cost of the

study is $3 million, and it takes -- it will last for a period of three years.

Next slide. This slide shows you the main channel coming into New Haven Harbor. I'm not sure how many people here are familiar with the channel, but it starts out in the deep water of Long Island Sound and goes through the breakwaters, heading in past Morris Cove, up past Sandy Point Dike, and then to where all the terminals are located at the head of the harbor.

The existing channel that you see up there that is currently in use today was completed in 1950, so quite awhile ago. At that time there was about 5.1 million cubic yards of material removed to create this 35-foot channel. That's 400 feet wide on the inside, and 500 feet wide on the outside. This channel provides one-way traffic for the deep draft vessels that enter into those terminals at the head of the harbor.

The Corps of Engineers maintains the project at 100 percent federal cost. We dredge it

approximately on a 10-year cycle, and people in the room, you know, may be familiar with the fact that we dredged it in 2014, because you might have seen the dredges out there at that time.

At that time we removed 650,000 cubic yards of material. That material was tested prior to dredging. It was determined suitable to go to the Central Long Island Sound disposal site. So there's the existing channel, and the Corps currently maintains that, so now what we're trying to do in this study is look at ways to improve that channel. Obviously it was built in the '50s. There's been changes in ships since 1950.

Next slide, please. Currently the port is ranked number 53 out of 150 U.S. ports in the United States based on cargo volume. It's the largest deep water port in Connecticut and important to the State of Connecticut as we heard from both Judi and Joe.

Basically -- this diagram shows the terminals. We have various terminals, Magellan up in the upper left-hand corner. Then coming out we have the Gulf terminal, the Gateway terminal, the Magellan T-dock,

you can see the T, the New Haven Harbor terminal with the finger pier, and finally the Motiva Shell terminal at the very lower piece of the slide.

So that shows you the facilities that are here that are dependent on this

channel. PSEG is a little further seaward is not shown on this slide. They have a dock where they bring in barges occasionally, but they have converted over to natural gas, so they don't actually use that pier as much for deep draft any longer. So these are the main terminals that we're looking at from the deep draft point of view, the ones you see on the slide.

The port is serviced by the railroads. We have access to areas in New England as well as Canada. The pipeline transports jet fuel that runs from here to the Bradley International Airport and out to Westover.

Next slide. So now the problems why -- so I mentioned it was constructed in 1950, and we have larger ships now coming in. The insufficient channel depth and turning basin for the larger ships causes transportation inefficiencies. Ships drafting greater than 31 feet must enter in a rising tide, that's a high tide, and offload some of their product outside of the

21 breakwaters and the anchorages onto barges, have those
22 barges bring that material in, and then having been
23 lighter, then move themselves into the terminals.
24 So that is an issue, that the ships
25 cannot enter in the area because of the depth of 35

1 feet. The existing bend, which we see on this slide
2 to your right, is also a little bit of an issue. That
3 is -- it's a 35-degree bend, and it passes between the
4 existing breakwaters. The banks of this bend are very
5 steep, and strong bank forces are experienced when the
6 larger deep draft ships navigate through that
7 channel.
8 This problem is worse for the deeper
9 draft ships that must enter on the rising tide to take
10 advantage of that extra water. At that time the
11 currents are higher, so they experience those forces
12 to a greater extent.
13 Next slide. This is the study
14 schedule, so right now we're in the evaluation phase.
15 We anticipate being ready to release the draft report
16 this spring with the EIS. That will be for public and
17 agency review. Following
18 the public review, sort of in the
19 middle of the diagram, then after that we would do an

optimization analysis of the selected plan and then prepare a Chief's Report in 2019.

That Chief's report would be April 2019, about a year and a half from today, and -- that is a report I had mentioned that would go to Congress for authorization for construction. If

construction is authorized, it wouldn't be anticipated until 2023.

Next slide. . This is a slide just to demonstrate the types of commodities that enter into those terminals, into the port that I showed you. It's primarily petroleum product. That's that orange portion of the pie, but there are other goods that come in as well. Other goods include coal, sand, gravel, salt, copper, steel, cement, fabricated metal products, and scrap metal, so there's -- primarily the bulk of the product is petroleum that comes in.

Next slide. This slide is to give you a sense of the change in volume of cargo coming into the port over time. So it shows the commerce for both the domestic and foreign ships coming in. So the top is the total commerce, the domestic is the second line, and then the foreign commerce is the bottom line.

Domestic traffic primarily comes from New York Harbor and other Northeastern ports, and that primarily consists of petroleum products. Domestic tonnage, a lot of that is barge traffic. Foreign traffic primarily comes from Canada, from the Netherlands, from Chile, United Kingdom and Turkey as

well as a few other countries. So that comes in to these terminals, and that is petroleum product as well as some of the other products I mentioned such as steel and some of the exports that go out.

So this is the -- what the future would look like without a project. So without a project, without doing something -- we're now in 2023 before we actually construct. That would be almost 75 years from the original 35-foot deepening. Without a project, transportation inefficiencies, safety and maneuverability concerns to inadequate channel depths and widths will continue to persist.

The imports and exports into the port, the cargo volume is expected to continue to grow. As Joe mentioned, many of the households in Connecticut rely on fuel oil or some form of oil for heating, and the population is expected to continue to grow. Over the past 20 years, 25 years it has

actually increased 6.7 percent. Salt is one of the products that come in, is used by Connecticut DOT, and that's used for all of the different roadways in the area.

Next slide. So this is to give you a sense of the size of some of the ships that are coming in. So this figure shows the fleet

distribution for the petroleum tankers coming into New Haven Harbor. So you can see here the yellow is MR2. MR2 is the midrange tanker, and that's the primary tanker that's currently coming into New Haven.

So the MR2 drafts from 35 to 45 feet, the length overall, which is the length of the ship can be up to 660 feet, and the width is 106 feet. That gives you a sense of the size of the tankers coming in. We also have a couple of visits of some larger tankers.

Next slide. This slide shows you the distribution of the bulk ships coming in such as the salt and some of the other products I mentioned. This shows you on this slide that the Handymax is the most common size coming into the port. So you can see the Handymax, the draft is 33 to 45 feet, length overall up to 708 feet, and a mean of 106. So these are the size ships that are coming in right now, so

the channel is inadequate for these size ships to come in officially into this port.

Next slide. This shows just a summary of the design vessels for the particular studies. This is part of what the Corps looks at and analyzes in terms of designing the new channel for the port. This is just to give you a sense of what kinds

of information we use.

next slide. So -- this is a summary of how we calculate our economic benefits. They're based on decreasing transportation costs. So for the feasibility study the project benefits are assessed based on bringing the product in on larger vessels, thereby achieving efficiencies of scale of the larger vessels so we can bring in volume at a lower unit cost into the harbor.

Savings also results in reduction in tidal delays, so the larger ships do not need to wait outside of the breakwater to enter on the rising tide. It also reduces the safety concerns that resulted with trying to navigate that bend.

There's also a reduction in lighting costs of offloading material out in Long Island Sound and then bringing it into the harbor, and that also

reduces environmental risk of spills in the harbor in the Long Island Sound by reducing lighting. So these are the alternatives we are looking at, like I mentioned, without the project, , continued problems, safety concerns, inefficiencies.

Some of the alternatives that we're looking at are deepening the main ship channel as well as widening it slightly and then changing and widening

the bend. We're considering depths from minus 37 to minus 42 feet, and these dredging or widening improvement alternatives would be combined with different placement options.

So when we look at the alternatives from the design point of view, there's components of the design. So we have the inner channel, which is the main channel. That's currently 35 feet, 400 foot wide, and then we have the width. Along with that we have a small turning basin. This is when the ships back their ships out, and then they have to turn the ship to head out. That's that turning basin.

So we have -- on the slide on your right upper left is the proposed turning basin area, and that's centrally located in front of the terminal so they can take advantage of it, so that's two key components.

We've also -- to minimize the improvement dredging quantity, the alignment of the improved channel will generally follow the course of the existing authorized channel, so we are not moving away from the existing channel. We're staying in it. We're going to use the same maneuvering area in front of the terminals, so that will help us to minimize impacts. As I mentioned, the turning basin is going

to be slightly north to align with the location of the terminals in New Haven Harbor.

Next slide. So this shows the concept for widening the bends. The bend between the two breakwaters is challenging for the ships to navigate. As I mentioned, the proposed bend alignment will replicate the existing bend. However, improvements will be made in widening to the east and also in deepening it as well.

The entrance channel, which is the other component of the -- fourth component of this --, I talked about four components -- is from the breakwater out to deep water. So this is aligned with the existing channel today, and what will happen is it will be extended out to deep water of the selected depth. So we're looking at 37 to 42 feet, so

it will extend out to either 37 or 42, whatever the selected plan is.

Next slide. So this is the amount of material that would need to be dredged for these improvement projects. So we have a range. We have dredge quantities ranging from 2 million cubic yards for the 37-foot project to up to 5.7 million cubic yards for the 42-foot project. That would be sort of in the range of the original construction back in the

1950s.

As you can see, there's quite a range depending on what turns out is the net that optimizes, which one has the highest net benefits when we look at both the cost and transportation cost savings as well as environmental issues. Of that material most of it is fine silt and clay. There is some material that is not fine silt and clay.

There is a portion that's fine sand, and that is primarily in the entrance channel. That's the area outside of the breakwater. There is a portion at the breakwaters that will be ledge. That area would require blasting to deepen, and those are your numbers for that rock removal.

Next slide. So when we dredge the material, then we'll have placement options, different

alternatives of where we could put it. So one option is the Central Long Island Sound disposal site, and that is listed on the sign as CLDS. So Central Long Island Disposal Site, although that's CLDS. That is what that is and that's -- people are probably familiar with that. It's in Long Island Sound.

There we would use some of the material to cover some of the historic disposal mounds where material was disposed at that site pre 1970s

before we did sediment testing. So we would use that, this material from our dredging project to cover some of the preexisting historic disposal mounds within CLDS. That's one use of it.

Other uses are inside of the harbor that we're going to look at, the Morris Cove, oyster habitat creation, salt marsh restoration, rock placement. Now, before I move on to those, which you have on the next slide, I'll tell you which ones have been eliminated.

MS. PINSKY: Morris Cove should be eliminated.

MR. HABEL: Can we please limit comments and questions until after the presentations and then we can talk about Morris Cove.

MS. BLUMERIS: Yes, I'm going to give more information on it. So the options that are eliminated due to the fine grain nature of the material, and Todd will get into a little bit of the work ongoing on the sediment testing and the studies we're doing, but we found already, we've looked at some of the information, although we're still in the process of looking at it, is that the sand is not suitable for beach placement.

So we have found sand, but it's not

suitable. It has fines greater than the percentage allowed to be placed on beaches. However, it's still good, fine sand, and that will be used for the oyster placement areas. Also, the fill, because again of the fine nature of this material, it wouldn't be suitable for coastal resiliency projects. It would wash away, so it would not be suitable to place along the shoreline as fill.

It would also not be suitable for structural fill, so those three options are now off the table based on the nature of the material.

MS. PINSKY: Question. The material --

COURT REPORTER: I'm sorry, I can't hear her, and if anyone's going to talk, they need to

come up here.

MR. HABEL: Yeah, we're going to hold any questions and comments until after the presentations.

MS. PINSKY: I wasn't aware of that. Okay.

MS. BLUMERIS: So we're basically taking into full consideration the practical benefits of the dredge material in cooperation with willing and capable sponsors and parties. All this will be key to

a successful project. So next slide.

This shows, as I mentioned, some of the -- a little bit more detail on the placement sites within New Haven Harbor. So Morris Cove Borrow Pit, filling the pit with clean material. The capacity of the Morris Cove is about 600,000 cubic yards of material, and the material strategically placed within the pit to fill it to roughly even with the surrounding bottom.

The other area that we're talking about is the oyster habitat creation area near the east breakwater. So that would be putting sandy material in that area to about a 2-foot depth on top of the native silty material. This area has a

capacity of about 440,000 cubic yards to place sandy material. Although we don't maybe have that much, we would put what we have there. So right now we're still looking at these sites, but that's a potential option for the sandy material, is oyster habitat creation at the east breakwater.

Another area we're looking at is Sandy Point Dike Salt Marsh Restoration. So that's over to the west side, and there we would use the material, the fine grain, silty material to create a salt marsh. That area has a capacity of about 450,000

to maybe a million cubic yards. However, we're still looking at that as well.

The rock placement. So I mentioned there would be rock. So that rock would be placed at the west breakwater, at the toe of the breakwater seaward to help stabilize the toe. So those are the sites within the harbor, and then we have the CLDS disposal mound covering. We're definitely trying to look for beneficial uses of this material

, based on the nature of the material.

We also are minimizing, to whatever extent practical, interference with the New Haven shellfish harbor industry, and we're working with the Department of Agriculture to avoid impacts to

shellfish.

We also have the Cross-Sound power cable under the channel. It runs down the centerline of the channel. This is a 25-mile 330-megawatt fiberoptic cable that carries electric power, phone, and Internet to Long Island. So most of the cable is buried at 48 feet.

However, a portion of the cable, about 700 feet, was not embedded to the required depth and rests on the rock at the south ledge area near the

east breakwater. This area, this portion of the cable would need to be moved. In 2004 the Corps issued a permit that allowed the owner to meet the 48-foot depth when we deepen the channel.

Next slide. This is some of the environmental compliance acts that we will be complying with as part of this project. These acts address a wide range of topics including air quality, water quality, fish habitat, and cultural resources.

Next slide. This slide shows the non-federal cost sharing requirement for the navigation project improvement. As I mentioned, the studies cost share 50/50 of the project itself, because it would be greater than 20 feet would be cost

shared 35 percent non-federal. For example, I put a range of project cost estimates, which are still under development, but this is just to give you a feel for the magnitude of the project, could range from 40 to 80 million. 35 percent of the $40 million project is $14 million.

Other items in the table are cost shared as shown. For instance, improvements that the terminals would need to make to their facilities to accommodate if they needed to deepen their brooks would be 100 percent their cost.

-- the federal government cost shares in the actual construction in the new navigation channel and turning basin maintenance area, and then we would maintain it at 100 percent federal cost into the future.

Next. Next we will have Todd Randall come up and give us an overview of the field studies.

MR. RANDALL: Thanks, Barb. It's good to be back in New Haven. I spent a lot of time here as an undergraduate, so it's kind of neat to be back studying an area that I did a lot of fieldwork with a long time ago. I see some old friends. I was going to talk to you today about --

MR. HABEL: Speak up more.

MR. RANDALL: Yep, sorry, sorry. I was just making small talk before my presentation loaded. My name is Todd Randall. I'm a marine ecologist with the Corps of Engineers. I just wanted to share with you some of the studies we did in support of the project. I'm essentially going to run through some of the sediment sampling that we did in support of the project, our biological sampling that we did in support of the project, and then some hydroacoustic surveys we did.

Again, this was to take a look at the bottom in the areas that we're going to improve in our navigation channel to look for, –or to give us some more detailed bathymetry of the bottom, to calculate out qualities, and to look for anomalies. We do have one mystery at the end of this presentation.

We did find one, I'll call it a “structure” in the water, and we don't know what it is. Luckily, it's outside of the footprint of the improvement project, but if anybody happens to know what it is, I'm going to put my money on Mike Pimer, it would be great to know exactly what it is.

Next slide. So sediment sampling.

We contracted out this work to one of our environmental contractors, AECOM, and they worked with Ocean Surveys, Incorporated out of Old Saybrook to take some sediment samples within our improvement area. So as Barbara said, we're widening, we're looking at widening the channel, and deepening the channel.

So you'll see in the next slide -- not yet. What we did is set up a series of transects within the navigation channel to try to pick up those side slopes that we would be expanding as well as the depth that we'd be looking

at. So for our target depth, we just went with the maximum.

As Barbara said, we're looking at a depth range of between 37 and 42 feet. So we actually sampled down to minus 44 feet, which gives us a maximum depth of 42, plus two feet that we're allowed to go over. If anybody that doesn't know what vibracoring is, essentially there's a boat with a moon pool and a big crane, and they lower that little apparatus down into the bottom. It's got a core liner in the middle of that tube, and it's got a pneumatic piston that just drives it down, so that would allow us to achieve those depths of 44 feet that we wanted to get to.

I was just going to show you some examples. We don’t have enough time to go through every single core, but you can see what a representative of the majority of the material looks like. These are our stations in the inner harbor. We have six transects. You can see they are formed by those green dots that run across, and within those six transects we had 17 stations.

Next slide. In the outer harbor we had two transects with six stations, so essentially three stations per transect, and I'll show you what we found from some of those so you can get a feel for

what the material looks like.

Next slide. So hopefully you can see this. This is a series of pictures from one of the cores from the outer harbor. This is -- so right out here, this is sample A. It was on one of the side slopes, so in one of the areas where we're talking about widening the channel.

Essentially what’s shown is a series of pictures that show from the top of the core, that's at the sediment water interface, down to the bottom, which is about 11 feet, and so you can see here the material out there was that fine sand that Barbara was talking about.

It does have a component of silt in it, so we can't put it on beaches, but it is useful material.

Basically all that material from the breakwater out is similar and has the characteristic of being sand, so that's where that majority of sand that Barbara was talking about -- I'll flash up those quantities again so you can see them, but essentially that's the area that the sand is coming from.

Next slide. This is what the majority of the material from the breakwaters into the harbor looks like. This sample is from Station I, which is right here on the side slope across from Morris Cove. Again, the series of pictures show the depths of the

core.

On the left it starts at the top and goes down to about 12 feet, and the material inside the breakwater all the way into here is very similar to this. It's a mix of silt and clay. It looks like glacially deposited material. This again is one from the side slope. The ones in the channel were obviously a little shallower, but, they all look very similar. The inner harbor is a little bit different.

Next slide, please. This is core from station X, which is all the way up here just before the bridges. This station is right in the middle, the

center of the channel, and what we see again, pictures of the course from top to bottom, but -- so from zero to about 5, 5.2 feet up in the top over there. You have a black organic silt, and then below that it varies.

Sometimes we would see that gray silt and clay again. Other times, as in the case that's right in the channel, we would come upon a little bit more of a sand layer, and that, you know, is essentially characteristic of these transects in here that are within the channel.

The stations that we found here in the little proposed turning basin area were

essentially silt all the way down, that gray -- well, a combination of the black and then the gray silt. I think in May we took cores down to about 30 feet, but it was all very, very silty material.

Next slide. So this is just Barbara's slide again on the quantities. You have the channel design depth across the top. As Barbara said, there's going to be some rock that would come out of the bend. Those are her numbers again on the top. The sand ranges from about 121,000 cubic yards up to 475,000 cubic yards depending on the depth that we go to, but again, it does have a signature of silt

in it, so it's really not beach compatible, but it's useable material, and then the fines we have 1.9 to 5.2 million cubic yards.

Next slide. So sediment chemistry. We did take individual chemical profiles of each individual core for the contaminants of concern, and we also ran biological testing on a composite from each transect. So for each transect we would composite the material and run these tests with the end result being its suitability -- I mean, what we're trying to get at is the material’s suitability for open water placement.

So there are a series of tests that we run: whole sediment testing where we put some

critters in an aquarium with the sediment and check on their survivability -- suspended sediment testing: where we suspend the sediment in elutriate form, put critters in, see their survivability.

And there's the bioaccumulation testing where we put critters with the sediment, let them live in the sediment for about a month, and then we analyze their tissues for contaminants. Unfortunately, we didn't get our testing results back until just before Christmas.

So our chemistry folks are still

reviewing all the Q/A and QC on that, so we don't have the results available right now, but we expect them within the next month or so, and then that all leads into the suitability modeling that gets done.

Next slide. Some of the other things that we did, as Barbara mentioned, we worked with the Bureau of Aquaculture to identify some beneficial uses for the dredge material. One of the suggestions that they put forth was to take a look at the area behind the eastern breakwater and possibly see if we can enhance the bottom sediments for shellfish.

At the moment the bottom is fine, silty material, which basically is not good for oyster habitat. So since we couldn't put that sand up on the

beach, one of the ideas put forth by the Bureau of Aquaculture is to possibly place the sand in that area to create more viable oyster habitat.

So while we were sampling out there we took some samples just to see if that was indeed the case, and sure enough, all that area behind there is silt and clay.

Next slide. We also did some benthic community analysis. Essentially this is just critter counts. You know, you want to see what is living in those sediments that we are talking about

disturbing. So on the slide slopes that we're going to widen and within the channel we took some of these benthic community samples.

Essentially benthic sampling entails using a rig like you see here on the left, which takes a sample of sediment. You bring it up, run it through a screen, and then back in the lab you identify what's in it, and it gives you a kind of picture of the health of the bottom.

Next slide. So in New Haven we have a fairly long, historic record, again, a lot of benthic sampling back in the day for -- was it UI? Yeah. And so we also have a pretty good historic record, because as Barbara said, we maintain this

channel every ten years.

So what we tried to do, since we kind of know what's going on there, we targeted those side slopes, you know, the widening areas to see what we can find. So we had three samples on the inside and about seven on the outside. We put some in that shellfish triangle I showed you, the area behind the eastern breakwater, to try and identify the benthic community. Next slide. Real quick benthic ecology 101 on this slide. When you take a look at the benthos that live on the bottom, there's kind of a continuum. If

you would imagine a forest, if you were to kind of clear cut it, and you start off with dirt, and you have grasses, and then shrubs come back and trees, same kind of concept in benthic ecology.

Sediments that are stressed or disturbed. Once the disturbance stops, you tend to start with this group 1 situation, which are really small organisms that reproduce in high numbers, and then there's a kind of continuum up to group 3 where you find bigger bodied creatures. They're a little more stable. They live longer.

Bottom line is the New Haven Harbor channel and that shellfish area that we're looking at are basically kind of in the middle. You know,

there's a lot of representatives of these Groupd I species, and there's some group three in there, too, so it's nothing out of the ordinary: what we expect. This is kind of chealthy community what we expect to see in an estuary like New Haven Harbor.

Next slide. Some of the other surveys that we did, we did with our survey vessel. We can go through this later in detail if anyone wants. Aaron's one of the guys that helps us out with this, so any technical questions we can work with him on it, but essentially we did some surveys out in the harbor.

Next slide. That helped us better define the bathymetry. Like I said before in the beginning, we're looking at anomalies on the bottom to see what we did. If we came across any that we didn't know what they were, we used this little ROV. It's an underwater camera on a tether that gives us some pictures, so I got some pictures for you to look at in just a few seconds.

Next slide. Really quick. This is just the survey plan. We surveyed about 70 miles in total back and forth in New Haven Harbor.

Next slide. As Barbara said, we're also looking at extending the channel as it comes out into Long Island Sound. Our target is 44

feet, so the existing channel stops somewhere around that green, so we extended the extent of the survey out to see if there would be any required dredging out there.

Next slide. This is just the bathymetry we got, and we'll use this to finalize and kind of fine tune our material quantities that I showed you before.

Next slide. This is just the outer harbor. Again, the bathymetry. Next slide. So,

again, this is just more of the bathymetry from outside. So if anybody wants to discuss this after or in questions, we can certainly do that, but what that data gave us was also a side scan sonar survey of the bottom. So that's kind of like almost a digital picture of the bottom.

We basically go through with our survey data and identify targets on the bottom that would be affected by any kind of dredging, and obviously we're trying to concentrate on those areas that we're widening. The main channel has been maintained once every ten years, so there's not a lot in the main channel. But we're just trying to make sure there's nothing of biological or historical significance on the side slopes where we're going to

widen the channels.

So in all we came away with about 242 targets, and we have numbers of different examples. Some of them we know right away, because we encounter them so often.

Next slide. So those are all the targets that we found. Next slide. So we have known targets. These are things that we can go over and compare to a coast chart, and it's pretty obvious what it is.

Next slide. So here within that blue circle you can see, it's just a square block. We compare it with the coast chart. It's right next to the red nun #2 buoy, so basically that's a mooring block. So we can eliminate a lot of things like that by making an educated guess by the navigational features that are supposed to be there, mooring blocks, sewer outfalls, things of that nature.

Next slide. This is a cool slide. You can see all those drag marks on the bottom: they are essentially shellfish draggers marks. Those are the scars from dragging their equipment around, and in that dark shade is a kind of mounding of sediment maybe after they pull their equipment. As I mentioned before, some of the sewer outfalls can be seen.

Here is a sediment pattern that kind of develops over the top of the sewer outfall. Again, we compare it to a nav chart, and that's what we see.

Next. So we eliminate a lot of those known objects, and we get down to a handful of stuff that we actually have to go out and investigate what that is. That's where that little camera on the sled comes in.

Next slide. Here is one target next to the channel just north of Sandy Point, again, just a block

on the bottom. There weren't any obvious mooring fields or navigation marks there. So we went down with the ROV, and it turns out it's some derelict fishing gear. It's a lobster pot and string.

Next slide. Again, we're looking for any things of historical or biological significance. We came across an anomaly here to see what it was and -- next slide. It turns out it's a crepidula reef. Crepidula is a small -- well, not -- it's a relatively big Gastropod, snail, that forms little reefs, so we've identified that. Again, this is outside of the footprint of the project. We did pick it up, so we decided to look at it.

Next slide. Let's see. Here's one on the inside of West River, it’s a long structure. We figured it was a piling, but we dove on it on it anyways. It

was a piling. So that's kind of what we've seen. We'll have that information in the EIS, and you'll be able to look at all the targets that we got.

So now the moment everyone's been waiting for. What is this? It's just north of Sandy Point. It looks like -- well, it kind of looks like a half-buried wreck. So we went down with the camera, and… we still don't know what it is. Fortunately, it's outside of the project area, so we are going to put a

buffer around it just to make sure nothing happens to it, but it may end up being investigated.

We have a staff of archaeological folks that may take a look at it, if need be, but again, it's not inside the project. It's just outside, so we can keep a buffer around it. So those are some of the things that we did for studies, and that's all I have. Thank you.

MR. HABEL: Okay, ladies and gentlemen, now it's time for you to speak to us. In accordance with the goals of the National Environmental Policy Act to encourage public participation in the preparation of feasibility studies and environmental impact studies, this public information meeting continues your opportunity to ask questions and provide feedback to the Corps and other

agencies undertaking and cooperating in the study.

We believe it's crucial to this public participation process that your voice be heard. That's why we're here, and we thank you for your contribution. This public information meeting will be conducted in a manner that, should time allow, provides those who desire to ask a question or require information regarding the project an opportunity to do so.

If we do run out of time this evening, you're welcome to forward your questions to the Corps or to fill out a feedback card that can either be mailed to the Corps or provided to any one of our team here tonight. Agency e-mail addresses and other resources are listed on one of our handouts that you would have picked up out in the lobby.

I must emphasize that this is not a public hearing. We're here to listen to your comments and answer your questions where we can at this point. Though we have a stenographer present to record your concerns and views, we're not taking actual testimony here tonight. There will be a time for public hearings when the Corps and its partners have completed their draft analysis and have a document ready for public review.

We will be back to New Haven and have public hearings on that. To help ensure that the most people possible get to ask questions and provide comments, please state your name and question succinctly so that we may provide specific responses.

Please understand that not all questions may be able to be answered tonight. These studies are still ongoing, and no decisions have been

reached on the project. We are not here to reach any conclusions. We are here to provide information and answer your questions.

Please respect the right of all to express their views. Please do not interrupt the questions and responses. We will begin with those who filled out a card at the registration table indicating they had a question to ask. When you have had your opportunity to speak, we had hoped to provide a microphone, but we couldn't find one. I hope everybody can hear me, and please speak up so that everybody can hear you also.

In order to keep things flowing, I will identify the next speaker when I call the speaker who will come up currently. Please limit your question time to a couple of minutes so we can accommodate as many of you as possible.

When beginning your question or statement, please state your name and identify if you are speaking for or representing a position of an organization. If you speak as an individual, please say so, and let us know what community or area you are from. If all those who have filled out a card have had an opportunity to ask questions and there's still time remaining, we can open the floor to additional

questions.

If at that time you wish to ask a question, please raise your hand, and one of our floor facilitators will take your information. I want to emphasize again that we would like all who wish to ask a question to have an opportunity to do so. Should we run out of time this evening, you're encouraged to send your questions or feedback directly to the Corps.

Before we get going, I'd like to go off script just a bit and explain two things about the project. We're looking at an improvement dredging project. Maintenance of the existing project, the existing 35-foot channel, takes place about once a decade when we remove anywhere from half a million to a million cubic yards of accumulated silty shoal material. That's material that through natural processes has deposited itself in the channel since it

was last dredged. That process will continue probably as long as there's a port in New Haven.

Improvement dredging is when we deepen a port or make a port's channels and anchorages and turning basins bigger, and when we do improvement dredging, we're digging into areas or elevations that have not been dug before. So we're removing material

that was deposited long before the harbor was developed and industry came and even long before people inhabited the area. As Todd mentioned, this is mostly glacial silts and clays that are inside the breakwaters, so that's just the distinction between maintenance and improvement dredging.

Now, I'd like to start calling people in the order that they filled out cards. I'll try to get your names pronounced right to the extent you were able to write clearly. So first up is Michael Pimer. Could you please come up. We're going to ask everybody to stand over here so that the stenographer can record your remarks. Next will be Renate Dicks.

MR. MICHAEL PIMER: Right here?

MR. HABEL: Right there, that's good.

MR. MICHAEL PIMER: Everybody hear

me all right?

MR. HABEL: All okay.

MR. MICHAEL PIMER: A lot of you don't know who I am. I'm Michael Pimer. I've lived in New Haven, West Haven my entire life. I'm 79, shortly to be 80. I've been a harbormaster for New Haven for sixteen years. I rode the Spider, which

laid down the cable and kept track of the cable going across the Long Island Sound while it was in the harbor.

I have been doing marine stuff for Yale, for Southern Connecticut, for just about all the universities. These cores he took up, we took them, a little different, but they were still called vibracore, and we took vibracore samples back 50 years ago. Had to have a diver on the bottom to guide the thing, because we didn't have the good system they got today, but here is what I want to say.

Approve the project. I don't know how you're going to do anything unless you do move the cable, but that's your problem. The spoils that you're going to take out of the harbor, Sandy Point has pretty much disappeared, the jetty. That jetty protected City Point in West Haven and New Haven, South Water Street, the restaurants.

I've been around long enough to have seen many storms and one storm 25 years ago or so pick the oyster boats up and put them in the parking lot. That's catastrophic today. It was bad enough back then, but the guys were working around getting the boats back in the water. Don't happen like that

today. Big expense plus the housing plus the restaurant livelihoods. That's the West River.

Sandy Point protects the West River from bad weather, and it's been going downhill since before I was born. It's actually shifted and moved. Sand from West Haven's beaches that they replenish every year, because of the westerly breeze, comes across Sandy Point into New Haven Harbor and ends up in the anchorage in New Haven. It used to stop. It doesn't happen anymore.

I set moorings for City of New Haven as the harbormaster for years, and within the last five years I'm pulling them up, and it's got red and light colored sand in it, which means it's washing off the beach, coming across, and ending up there.

We also have a sewer line in West Haven that ends up a hundred foot from the main channel, and it's in the books to have a new sewer line put in place. I believe the Corps -- in fact, I know the Corps

has got to approve that, but you want to keep this in mind that maybe West Haven ought to get on the ball and do that prior to your filling in, if you're going to fill in, and like I said, I approve of that.

There's also -- we have all kinds of moans and groans, because I know the people very well

over here in Morris Cove that don't want anything going on in the borrow pit, but that borrow pit's so full of mud that it's unbelievable. I've dove down there. UConn almost lost a diver in it, because it's so sludgy, absolutely horrible stuff, but you can cap it as long as you don't ...

Years ago we were convinced, when they built the highway, that you could dredge out there, and it wouldn't affect the beaches. Well, all of Morris Cove lost a beach. Off of the Sound School there is also a borrows pit, and I was going to ask is that where that light line was by buoy 5 in the West River outside the main channel?

MR. RANDALL: Might be.

MR. MICHAEL PIMER: There's a 36-foot sailboat sitting in the bottom of it. It's been there for five years, and people sail right over the top of it, because they don't know it's there. The mast was taken down and then sunk in a storm, but

that is another borrows pit 26-foot in depth in some places, not too many, probably an eighth to a quarter mile long you can use for dredge material.

The West River. This is my favorite project, why I'm here tonight, guys. I belong to City

Point Yacht Club. We got 350 plus members. We have no water. Number of years ago, a lot of years ago, Kimberly Avenue Bridge, they decided it needed to be replaced. The Corps did this with the agreement of New Haven and West Haven, which contributed to it, and they built a temporary bridge.

The temporary bridge was built to temporary specs, which means the uphill grade don't mean a thing except it's not permitted in a permanent bridge. Well, eight, ten years ago they made it permanent. Now the traffic coming across crashes into the traffic getting off the highway, because they cannot see over the top. Not part of the dredging problem, but it also stopped us from dredging upriver.

The City of New Haven has 12 foot of water to the end of Pequonnock Yacht Club, and then it becomes six. It wasn't that way. Now I believe Congress zipped it up to six foot so they wouldn't have to dredge it anymore. We have boats bigger and

deeper than six foot.

We were told to keep it dredged. We had to have commercial vessels, fishermen, dredgers, bigger boats inside of the bridge to get it dredged outside of the bridge up to it, which is a navigable

channel, navigable to six foot. Commercial boats aren't six foot. They're a little deeper.

We plow our way through the mud till we get to City Point where now we got 12 feet. We would like to see that resumed back 12 foot right up to the bridge. We're not asking you to go under the bridge. City Point Yacht Club has picked up the price of dredging the main channel last time we dredged our marina. We at least would like to see the Army Corps of Engineers keep the channel.

We might have to go back to Congress, I think I'm right about that, put it back to 12 foot and leave it there, but look into the future. We're building a waterfront project there. They're going to plan on putting -- they're going to have their own marina. They want to invite people in with boats that draw more than six foot to visit, spend money in the City of West Haven and New Haven. You got to have the water.

So I'm here tonight to ask you to

consider putting that channel back to 12 foot. We had an oil disposal unit 50 foot this side of the Kimberly Avenue Bridge called Farnham Environmental Protection. They offloaded tugboat sludge out of the bilge, and

they made -- that's beside the point.

Not too good a job, but they had water enough for tugboats, and they had it all along. This is what I'm trying to tell you. I'm not making this story up. They come in, they pump the bilges, and then they got rid of it. I don't know where they put it. That's not the subject tonight.

But the river itself needs to be put back to what it was initially, and Sandy Point needs to be built up again with dredge material from the main channel, and that would save Water Street and the restaurants and the people at City Point and the school, and I think I've talked enough, folks.

MR. RANDALL: Thank you.

MR. HABEL: Okay, thank you, Mr. Pimer. Ms. Dicks, and next up would be Robert Pimer.

MS. DICKS: I'm Renata Dicks, and I'm a Morris Cove resident, and I'm one of many people here who have been to numerous Army Corps of Engineer meetings that have dealt with our harbor, our Morris

Cove borrow pit, and the dredging of both New Haven as well as Bridgeport, and I have to say I'm delighted to see for the first time that the plans are to fill the borrow pit with clean fill.

We would be anxious to see what the clean fill is and be reassured that that will indeed not affect the houses that get this water into their basements, but I'm just so happy not to see the idea of having bridge sludge tucked into that borrow pit and capped and us ongoing having to fight that idea.

So thank you for putting that at the top of options, and hopefully that clean fill will be very clean, and we will have a very healthy Morris Cove with new life able to grow on top of it. Thank you.

MR. HABEL: Okay, thank you. I'll have a few comments on Morris Cove, and then we'll get on with your questions. At the last meeting that we had on this project downtown almost a year ago we talked with some of you that were there about Morris Cove, and there had been prior meetings, as Renate said, about what should happen with Morris Cove with respect to dredge material.

What I said last year was as long as that borrow pit exists on the bottom of New Haven

Harbor, somebody's going to want to fill it with something, and the Corps and the state had proposed putting material from Bridgeport there. Sometimes it

takes the government a while to listen, but we heard you, and we're not going to do that.

But the borrower pit does present an opportunity for the Corps and the State and the City to save a little bit of money by putting 400,000, 600,000 cubic yards of material in the borrower pit rather than haul it out to Central Long Island Sound and to cap that material over maybe with some portion of the sand that we have.

We're not going to put material into the Morris Cove borrow pit that Connecticut DEEP and EPA do not approve of. The material is going to have to meet their requirements for unconfined open water placement, which is our definition of a marine world of what is clean versus not clean.

Right now the plan is, pending the outcome of the current round of sampling and testing and maybe even some additional sampling and testing later in the year, to take the material that is in the channel that is immediately adjacent to Morris Cove and put it into the Morris Cove borrow pit, bring that pit back up to the elevation of the surrounding area

so that it's then available to the shellfish industry or whoever else wants to use it.

You will be given the opportunity to

view all of those test results and the opinions of those agencies and comment on it. Robert Pimer, and next up after Robert will be it looks like Joseph Gilbert.

MR. ROBERT PIMER: Yeah, my name is Bob Pimer. I promise not to talk as long as my father did. I'd just like to give a little brief history, because my main concern is the West River. I'm the senior trustee for City Point Yacht Club. I've been an officer there on and off for the last 20 something years, and I won't go into relating most of the things my dad said.

The river does need to get back to 12 feet. We do allow the New Have -- I mean West Haven's fireboat, which will be coming this spring, to use our facility for zero dollars, the West Haven Police Department. It's also right now that New Haven was good enough to build another fireboat. Our channel's the only access to protect the Amtrak railroad bridge north of 95.

So I would love for you guys to include the West River somehow. Maybe it won't get

done in 2023 here, but if it could be at that time period, I think it's very important like for the

Amtrak bridge and the safety of those folks. God forbid you get a fire there. It's the only access. There's no road access to get there.

So I am here for City Point Yacht Club, and I'm not sure if there's anybody here from Pequonnock or West Haven, but everything my dad said about Sandy Point is very true. We need that jetty point. I commend you guys. I think the borrow pit, I think the rock on the outside of the west wall, all the areas you mentioned tonight are great avenues for putting your material and not just sending it offshore at a big expense to the government or ourselves.

I would like to give just a little brief history just so people don't think I'm just some officer from a yacht club. I'm a 30-year tugboat captain, and I come from the days of my family running pilot boats, wooden pilot boats, and I've actually worked with the New Haven/Bridgeport pilots when they would back ships into New Haven terminal un-tug assisted.

We've come a long way, and the widening of that channel out by the main wall, that's a godsend. If you got to move the cable, you got to

move the cable. I've worked with Northeast pilots, Sandy Hook pilots. I've dove and done research with

Yale, Southern Connecticut, the Army Corps of Engineers. I put four years in the U.S. Coast Guard. I'm not shooting off the hip. I think you did a fantastic presentation. Thank you.

MR. HABEL: Okay, thank you. And before we have the next speaker come up, which is Anstress Farwell --

MS. FARWELL: I'm going to pass.

MR. HABEL: You're going to pass, okay. Ned Taylor. Okay, you'll be next, but I do want to talk about West River a little bit. West River is an authorized federal navigation project. It has a 12-foot entrance channel that goes partly up the river and then a 6-foot channel that used to go even farther up the river before Congress de-authorized the upper end.

I understand that West Haven is working with our navigation maintenance group, Eddie O'Donnell and his people, to try to get the West River studied and funded for maintenance dredging. If the City wants to look beyond the depths that are currently provided in the Congressional authorization, that's a whole different process, and I'd be happy to

talk to you after the meeting about how to go about

doing that. Okay, Mr. Taylor.

MR. TAYLOR: My name is Ned Taylor, and I've lived here in Morris Cove for about the same length of time as you've been the harbormaster, okay, and the reason I'm here is I'm worried about the material.

Number 1, I'm all for doing this work on the channel. We need business in New Haven. Boy, we need something to set off the taxes. I hope we do something. The reason I'm here about it is because the material. I was here for the '55 dredging. That's the one with all the gray clay that's in back of the airport, which is East Shore Park, and I'm also the president of the Fort Nathan Hale Restoration Group, and every time we dig a hole for a bench post, we run right into it.

Second was the one where they took the sand and everything, put it over and built IKEA, so forth and so forth, and then somebody from the Engineering Department had a bright idea of putting the excess sand all along the rock underneath the cliffs and everything else.

Today I defy you to find one grain. It got all sucked up, and then it goes around the

corner and comes into our fort. I'm losing my moat. So

if you have an extra little bit, dig out my moat, if you will.

But the biggest thing I'm worried about is pollution. The entire Morris Cove/West Haven area is surrounded by signs that say don't take the shellfish. It's polluted. Don't take it. When I was growing up, we used to clam the hell out of it. You name it, blue shell crabs, everything else, and we don't have it today. Now the next thing the fishermen are telling me at the fort is the sandworms are gone. They've died or they're just plain gone.

So the pollution part is wherever you're going to put this material, I'm not too happy about putting it in Morris Cove, because I don't know what's in it. So when you do your core samples or whatever, I'd like to see the material.

And the last thing is when you're looking around on the bottom, I have three cannons that are missing from the fort. If you find three, they're ours. 1759 they went in, so -- also the biggest thing is we stick out the closest to the channel, so anything goes by, people love to come to the fort and say they're almost onboard ship. That ship is almost within reach, so I'd like to see the

channel done and so forth.

Yes, the big thing is pollution. I don't want to see that happen, okay, and I can't tell you the fish and what have you that are missing, but whatever. I hate to say the last flat fish I caught tasted like Mobil 1, but I know that's not you. Thank you.

MR. HABEL: Thank you. The next speaker is Laura Chan. She left, okay. Martin Torres Quintero, and after Martin will be Laura Moore.

MR. TORRES QUINTERO: Yeah, greetings to everybody. I'm Martin Torres Quintero, and I'm the outdoor event coordinator for the City of New Haven, so I work for the City, and I have a list of comments and questions, but I'm just going to be brief, and I'll just ask some questions.

We run, in the City of New Haven, one of the largest recreational boating programs, so I would like to know if you have taken into consideration or will take into consideration the impact that this probably will have on the canoeing, paddleboard and sailing programs that we run at some parks that will be affected by this. Those parks are Lighthouse Point Park, East Shore Park, and Criscuolo Park.

I would also like you to take into consideration the fact that we're about to finish the boathouse on Long Wharf, so that is supposed to be now -- once it's finished it's going to be one of the largest human powerboating facilities in the state. So I noticed that on the widening of the channel, that's basically going to some of the areas we are currently expanding our boating programs, so that's one I would like to take into consideration.

(2) I would also like to know what the timeline is for the project, because obviously this is going to impact some of the wildlife that had moved to New Haven Harbor, particularly sensitive migratory birds. As you may know, we have now bald eagles that are nesting nearby, and we have some other species such as snowy owls that -- and it's just a matter of like -- I just want to take into consideration when the sensitive times for these guys are.

And also obviously if I could have a request to have better delineation of the channel, to also let the recreational boaters know what to do, because obviously, as you may know, paddle board and kayaking have become the No. 1 activity in the Greater New Haven waterways. So we have a lot of people that

go there and recreate, and obviously a paddleboard and a kayak are not going to mix well with a tugboat and a barge or an oil tanker.

So that's -- those are the ones that I have, and I'll just be more than happy to pass this to somebody. I have this, thank you.

MR. HABEL: Thank you, Martin. We'd be happy to take into consideration whatever information you provide, and if you give your contact information to Barbara.

MR. TORRES QUINTERO: Yeah, it's there with my e-mail.

MR. HABEL: She would be happy to talk to you.

MR. TORRES QUINTERO: All right, thank you.

MR. HABEL: Okay. Laura Moore, and next would be Julia Merk.

MS. MOORE: So I'm Laura Moore. I'm just a neighbor here, not representing anybody but myself. However, I do go out and swim in the harbor. My family does, we kayak, so the biggest concern is pollution. What I wanted to do was actually synopsize a little bit and see if I understand what you presented. So at this time you do not have the

results of chemical or biological testing; is that correct?

MR. RANDALL: We just received them prior to Christmas break. We don't have them here today, yes.

MS. MOORE: So what's the plan for presenting that? I know this is going to go on for another year and a half, so there's going to be an additional meeting in six months? Three months? It'll be on your Web site? How will we get that information?

MR. HABEL: That information will be made available this spring with the publication of the draft report.

MS. MOORE: Okay. And that's posted on your Web site?

MR. HABEL: That'll also be posted on our Web site, yes, and it'll be -- that will be done before the public hearings.

MS. MOORE: So now you talked a lot about the sand and the rock and what your plans were for those, and then there was this huge volume of silt and clay, and I didn't hear any talk about what the plan for that was. I mean, what -- I assume that's sort of unsuitable for any kind of like --

MR. RANDALL: No, no, no, no, definitely not. The silt and clays are, especially the glacial material, would be suitable for the marsh creation at Sandy Point. We would basically construct a containment structure on the outside and backfill it so it could be used for marsh sediments.

Central Long Island Sound Disposal Site and the remediation of those PRE-NEPA disposal that are out there and then the use of the Morris Cove borrow pit.

MS. MOORE: So when you dump stuff in the borrow pit, is it just the heaviness of the material that takes it into that pit? Like how does it get there?

MR. RANDALL: Yeah, so silt and clay -- the best explanation I've ever heard of it is: the diameter of a silt and clay particle is kind of similar to like cooking flour, right, that you use in the kitchen. So you would think if you just throw it in the water, it would go everywhere.

But if you took that same flour and add some water to it, right, you get a ball of dough. So when we dredge it up, it's basically been compressed over time, and it has water within it, so it kind of acts like a giant solid, just kind of drops

down to the bottom.

I mean, there is some resuspension that happens, but the Corps spent years and decades modeling the effects of when it goes down and what happens to that material. So the results of the chemistry and all those tests that I talked about basically get put into models, and that tells us whether it's suitable to be done like that, to be disposed of like that, or whether it's not.

So that whole process is ongoing right now, and that will all be presented and laid out in a draft report.

MS. MOORE: Okay. So once we know what's in it --

MR. RANDALL: Absolutely, yeah, yeah.

MS. MOORE: That'll be much easier to understand like, oh, it's going to end up on the beach, and it's okay, it's not okay, that kind of thing.

MR. RANDALL: Okay, exactly.

MS. MOORE: That's all of my questions. Thank you.

MS MERK: Hi. I'm Julia Merk. I've lived in the cove for about four years now. I think

most of the questions and comments that I had have been addressed, but I guess I don't expect an answer to this question, but hypothetically would you support this project if it was happening in your backyard, in the water that you swim in, and your family plays in and so just --

MR. RANDALL: Yeah, absolutely.

MS. MERK: You guys -- we know how we all feel about it, but --

MS. SHEIFFELE: I live in Worchester Square. I wish I lived on the water, but --

MS. MERK: So you would feel comfortable taking your kids in the water and --

MR. RANDALL: As a matter of fact, my parents still live in --

MS. MERK: I'm not asking about you.

MR. RANDALL: So we come down here quite often, and we go out fishing in New Haven and swim down there.

MS. MERK: Do you eat the fish?

MR. RANDALL: What's that?

MS. MERK: Do you eat the fish?

MR. RANDALL: Absolutely.

MS. MERK: All right. And others,

do you all live around here or --

MR. HABEL: No, we don't.

MS. MERK: Would you feel comfortable going into this water while this is going on?

MR. HABEL: I've been doing this work for 39 years now. If I wasn't comfortable with it, I wouldn't be doing it.

MS. MERK: All right. That was -- thanks.

MR. HABEL: Okay. Next is Chris Olier or --

MR. OZYCK: Ozyck.

MR. HABEL: Ozyck. Sorry about that, Chris.

MR. OZYCK: Chris Ozyck. I live at 603 Quinnipiac Avenue. So I was struck on this presentation, I was sitting up front, I was happy, because when the presentation showed the core samplings for the zero to five foot, it was described as silty clay, nonplasticky, and I don't know if you caught it, it also said faint odor of petroleum, and so that is I think a concern that a lot of people will have here as to where that material is going.

I also noticed on the slides that

there was a structural upland deposition. It was the

last item on how you would dispose of this material.

MS. BLUMERIS: Right.

MR. OZYCK: And so my question was those two things I think are things that I've heard from a number of people, that they're very concerned about where those type of materials would be placed, in what communities, and how they would be handled.

You know, it was interesting. The long-time fisherman/tugboat operator, you know, he's eaten a lot of fish in his day, and he said recently they've tasted like petroleum. So it's not hard to connect the dots as to where that petroleum product is coming from.

And one of my concerns has been it's great to have economic vitality, widen the channel so we can get more ships in here. I'm not sure how much that benefits the City of New Haven. It may benefit the State of Connecticut. It may benefit the communities north of us such as New York, Massachusetts and even Vermont.

They're looking at making a rail connection to get more cargo to go up there, but yet the Port Authority has not lived up to its

environmental mandates that were part of its creation, and so there's supposed to be a greenway connection

between this community and downtown, and that has not happened and now they're actually looking at selling a parcel of that land.

So you sort of say, hey, you know, this sounds like a great idea, but maybe we should really look at who benefits and who pays the -- bears the burden. So I don't know if you guys have any comments on that.

MS. SHEIFFELE: I'd certainly like to have that conversation with you, Chris. We're not selling land. The state's trying to take it.

MS. OZYCK: Okay. That's not what your minutes show, but that's fine.

MR. HABEL: Chris, in terms of looking at upland placement for some of the material, originally when we started this study, we had a whole list of things. We knew what we had done back in the '50s.

As somebody mentioned, the airport and the park and the City had a proposal to do some shorefront resilience fill along the downtown waterfront. But after we got a look at the nature of the dredge material and that it wasn't really

structural material, those came off the table.

MR. OZYCK: Okay. So are you

committing that none of the dredgings will end up being mixed with concrete and used in an upland cap?

MR. HABEL: The Corps has no plans for that, no.

MR. OZYCK: Okay. And so what will happen to the petroleum-smelling material from one to five feet in the channel?

MR. HABEL: If the material passes all of the tests to EPA's satisfaction and DEEP's satisfaction, then our plan is that any material we don't use in marsh creation would go out to the Central Long Island Sound site where it would be used as cover material for some of the older disposal mounds from back in the '50s, '60s, and even before material that was put out there, before there was any sampling and testing of that.

MR. OZYCK: And should the samples not (?) meet those criteria, where will that material go?

MR. HABEL: We don't know. We would have to come up with a plan to contain those materials.

MR. OZYCK: Is there a practice of

one solution to pollution is dilution, of diluting the polluted material enough so that it does meet that criteria, or will you keep it as one element and not

mix it with other materials?

MR. HABEL: Well, that's one way of putting material upland and satisfying the state's requirements. I don't believe EPA would allow you to undertake that practice to make it suitable for open water placement.

MR. OZYCK: Okay. Thank you.

MR. HABEL: Okay. Next is Frank Cochran, and after him Steven Ortiz.

MR. COCHRAN: Hi. My name is Frank Cochran. I live at 433 Edgewood Avenue in New Haven. I'm here this evening primarily to just make contact on behalf of the West River Watershed Coalition, which is a group of a very large number of organizations including five cites, two of which are New Haven, West Haven, and we are undertaking all kinds of studies and projects around the West River, so I'm very interested in the maintenance dredging prospect that was mentioned earlier, but I also want to be in contact here.

There are other resources. There are also oyster beds in the -- where the West River

empties into the harbor, and I wanted to make one other point. I don't guess there's anybody from the City of West Haven here tonight.

You may want to have a similar meeting in West Haven, because its Harbor Commission has recently adopted a new plan, and there are some facilities in West Haven near the mouth of the West River but in the harbor, which, you know, might be affected by this or might be added to the project even.

So I'd like to just leave a brochure for the Watershed Commission and my card for future communications purposes.

MR. RANDALL: Thank you.

MR. COCHRAN: And I think most of the other thoughts that I have had really have been -- would be echoing things people have already said. I would be very interested in looking at those sampling results when they do become available, obviously.

MR. HABEL: Okay. Thank you, Frank.

MR. MICHAEL PIMER: I'm here representing the Harbor Management Commission from the City of West Haven. That's what I wrote down. West Haven is well aware of it.

MR. HABEL: Steven.

MR. ORTIZ: Hi, Steven Ortiz, a life-long resident of the City of New Haven. Just a couple questions. Was this meeting a mandatory

scheduled meeting?

MR. HABEL: No, it's not.

MR. ORTIZ: So I feel like the only unanswered question is the results of the core testing. I felt like maybe you could have postponed the meeting till you had that, because not everybody's going to have the same amount of time to come to all the meetings.

Having said that, is there going to be a set date where you release all those actual meetings, because I think primarily the biggest concern is the ecological effect with the shellfish and the fishing and the birds and every other animal that revolves around the shore.

So I don't know if you can answer that question now, but will we have a date where we can sit here and listen to those results and the action plan to deal with those results?

MR. HABEL: Yes, there will be. We don't have a date yet. We have one checkpoint to get by with D.C., and then we've got to begin preparing

the draft document that will go to the public, and as Barbara and I said earlier, sometime this spring that will be published. It will be made available through our Web site.

We'll give notice to the various neighborhood groups in the City to try to spread the word on that, and once that's gone out, there is a public comment period that's 30 to 45 days. In the middle of that period we would have one or more public hearings.

MR. ORTIZ: Okay, all right, thank you.

MR. HABEL: John Cox? Linda Pinsky.

MS. PINSKY: I've been around for the first block with the bridge dredging issue, and I'm suspicious that you might be trying to use this as an issue to still put the bridge dredgings in there, in our pit.

I'm also suspicious that our neighborhood has a high cancer cluster, and I don't want to see anything that goes into our neighborhood to be contaminated.

I also don't like that we are being called to a meeting with only a short notice, and that

more people could not have been coming because of opportunity. I also don't trust the DEP results, and I would want independent results as well, because I'm suspicious of the DEP results, because they have shown very lack of concern over what goes into the water

here.

I think you guys should just leave our pit alone. Just leave it alone. Move on. The odor from the harbor as you drive by is usually pretty horrendous. I don't want that permeating our little cove.

Connecticut has become the fourth state in the country of people leaving. In Connecticut more people are leaving than coming. We're a little beach area in New Haven. The only little jewel of Connecticut, as the independent paper once said, and I don't want to see it contaminated. I don't want to see it messed with. I want to see it protected. It deserves to be protected.

It's got a long history. It's got a long history, and it's got a long membership of New Haven and it's parallel to very exotic places. It's a lovely cove. It's a lovely place to live, and we don't need anybody contaminating it.

We went through studies of stuff

that can break through the CAD. Is that what you're talking about forming, a CAD?

MR. HABEL: Well, we don't have to form a CAD. There's a pit there already.

MS. PINSKY: Right, but you were

going to top it off, right?

MR. HABEL: If we were to put dredge material in the cove pit, we would cover it with probably a layer of sand so that it could be used for oysters.

MS. PINSKY: Right. We've already proven that stuff can be permeated into the neighborhood with the tides always coming over the wall and going into the underground. That would permeate in people's yards and lawns and grass, and people would be eating stuff that they've grown, the vegetables that are touching the stuff and putting it in their face and getting contaminated.

I'm a nurse. I know this, and I know a lot of people are sickened. Stop polluting it. Stop putting these ideas in it. Move on. Find somewhere else. We don't need it, and as for the traffic, we don't need that either. You have other harbors that are larger that these boats can go to.

It makes me suspicious as to why you're picking on New Haven again.

New Haven's not -- it isn't a beautiful place. We don't need more boats coming in here either. We need it to be a quiet, sleepy, beautiful town that can make money by tourists or by

ingenuity, by tech. There are a lot of things that we have smart people to do things. We don't need more boats coming in here polluting, throwing bottles into the water, throwing garage. It always washes up on my beach.

MR. HABEL: That's the end of the people who had signed up to speak. Is there anyone else who wishes to say something? Yes, sir, could you come up, please? Please state your name for the stenographer.

MR. SCHWARTZ: My name is Ed Schwartz, and I live on Quinnipiac Avenue, and you touched very briefly on what the dredging is going to be in the Quinnipiac River. It's a very marine intensive area, as you well know, including oysters, barge building, etcetera, kayaking, recreational use, and I would appreciate a little better explanation of what you're going to be doing north of the Tomlinson Bridge in the Quinnipiac River and what kind of

disruption that's going to have on the recreation and the economy of the Quinnipiac River. Thank you.

MR. HABEL: Okay. In answer to your question, the lower Quinnipiac River and Mill River are both parts of the Federal Navigation Project for New Haven. The Mill River has an authorized depth of

12 feet. I believe the Quinnipiac has a split depth of 16 in the lower end and 12 in the upper end.

Right now we have no plans to conduct any maintenance dredging or improvement dredging of either of those two waterway segments. We had talked with the Port Authority and the City when we started this study, and they both expressed to us that there was no need for dredging in those areas.

MR. SCHWARTZ: Okay, thank you.

MR. HABEL: Yes.

MS. VISSER: Hello. My name is Rika Visser, and I live in Morris Cove. I think I heard, and I'm not sure if I heard correctly, that the buildings around the harbor, the guarding structures, would have to be updated, but it's not part of this project.

So my question is how would that play out if the channel is wider and the ships are

bigger, but the logistics around that is not in place? How would that work? Whose responsibility will it be to make sure that that actually connects?

MR. HABEL: The project is being built so that the users of the harbor that bring in the bigger ships will either be able to bring in larger ships or will be able to act more efficiently

by getting rid of the practice of offloading cargo out in the Sound.

MS. VISSER: Okay.

MR. HABEL: All of the terminals have represented to the Corps that with the exception of deepening some of their berth areas, their facilities already have the existing capacity to support those increases in use. So they've told us they don't need any more facilities. They just need to dredge a little bit of their berths, and even if they did need to conduct some improvements, that would be on them to study and permit implement.

MS. VISSER: Okay. Just for my education, are those terminals privately owned or owned by the City?

MR. HABEL: All of them are privately owned in New Haven.

COURT REPORTER: Could you spell

your first and last name for me, please?

MS. VISSER: My name is Rika, R-I-K-A, and my last name is Visser, V-I-S-S-E-R.

MR. HABEL: Thank you. Anyone else? Okay. We've heard your many thoughtful remarks tonight and questions. Thank you very much. Additional written questions and feedback may be

submitted to the Corps either in writing or by e-mail. Certainly any comments you submit to the state or City Port Authority can also get referred to us.

We at the Corps and our partners, the New Haven Port Authority and the Connecticut Port Authority, extend our appreciation to all who took the time to involve themselves in this public meeting.

I'd like to thank all of you, once again, for taking the time to provide us with your questions, thoughts, and feedback. This concludes this public information hearing. Thank you again.

(Whereupon, this public information hearing was concluded at 8:18 p.m.)

CERTIFICATE OF REPORTER

I, Jacqueline V. McCauley, a Notary Public duly commissioned and qualified in and for the State of Connecticut, do hereby certify that the NEPA Scoping Session for the New Haven Harbor Improvement Study was taken on January 10, 2018 at 6:30 p.m., and reduced to writing under my supervision; that this hearing is a true record of the testimony given during the hearing.

I further certify that I am neither attorney nor counsel for, nor related to, nor employed by any of the parties to the action in which this hearing is taken, and further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, or financially interested in the action.

IN WITNESS HEREOF, I have hereunto set my hand

and affixed my seal this 18th day of January, 2018.

Jacqueline V. McCauley

Notary Public

My Commission expires: 12/31/2019

A5-Public Review of DIFR/EIS Comments and Response

#	Received		Organization	Name			Comment	Response
1	Draft DEIS comment period	10/24/2018	Private Citizen	Cort	Sperry	NA	I am 100% in favor.	Thank you for your support of the project.
2	Draft DEIS comment period	10/24/2018	Private Citizen	Cort	Sperry	NA	You should also dredge West Haven harbors, beaches.	New England District's Maintenance Dredging Program is currently testing the material in the West River channel (West Haven, CT) and developing placement alternatives for a maintenance dredging effort.
3	Draft DEIS comment period	10/24/2018	Gateway Terminal	N/A	N/A	Gateway Terminal Management and Staff	Supports project	Thank you for your support of the project.
4	Draft DEIS comment period	10/24/2018	Gateway Terminal	N/A	N/A	Gateway Terminal Management and Staff	Gateway is also strongly in support of straightening out the dog leg turn at the entrance, along with widening the main channel and turning basin which will allow larger Panamax and post Panamax vessels access to the Port of New Haven's terminals. Allowing the channel to be expanded both in width and depth will greatly facilitate the safe maneuvering of inbound and outbound ship traffic.	Thank you for your support of the project.
6	Draft DEIS comment period	10/24/2018	Gateway Terminal	N/A	N/A	Gateway Terminal Management and Staff	Review original permit for Cross Sound Cable and hold owner responsible for its relocation costs to keep navigation project cost down	The USACE granted CSC a permit amendment in 2004 that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE.
7	Draft DEIS comment period	11/2/2018	City Point Yacht Club	Penna	Art	NA	Concern about depositing fill near Sandy Point to create salt marsh	Material placed in the salt marsh creation area in the vicinity of Sandy Point will be contained with geotubes. No impacts from the proposed project will occur to the West River Channel or the City Point Yacht Club.
8	Draft DEIS comment period	11/2/2018	City Point Yacht Club	Penna	Art	NA	USACE should add additional rock to jetty (at city point yacht club) to make it more visible to boaters	The rock to be removed from New Haven Harbor by blasting will consist of a mix of various sized rocks. The variability in size of rock eliminates the

#	Received		Organization	Name			Comment	Response
								material from being used in an engineered structure such as a jetty or breakwater.
9	Draft DEIS comment period	11/2/2018	Private Citizen	Maddern	Phil	NA	Don't relocate dredge materials to area near existing sandbar - please re-think b/c of water quality and fish health concerns	The placement of dredged material in the area near Sandy Point will create approximately 58 acres of salt marsh. Salt marshes provide critical functions and values to estuarine ecosystems like New Haven Harbor. Best management practices will be used during the salt marsh creation effort to minimize impacts to water quality and fish and wildlife in the harbor. Upon completion of the salt marsh it will provide habitat to many species.
10	Draft DEIS comment period	11/7/2018	Briarpatch Enterprises	Follini	Nancy	President	Our New Haven Lot 568 spans both sides of the Federal Channel and we are concerned that we will permanently lose many acres from shellfish production when they become part of the expanded FNP. We recommend that any shellfish bed owner impacted by the project be compensated for acreage lost due to the Project with acreage in kind from the proposed Shellfish Creation Area, or have their lease fees adjusted accordingly by the CT Bureau of Aquaculture. In addition, the Draft should have maps and tables that accurately list all impacted shellfish beds. While Lot 568 is listed in Table 7-2 of the Draft, it does not appear in the Shellfish Parcel Map in Attachment 2 of Appendix G.	Aquaculture leases in the project area are subject to navigation servitude and no compensation is required by the project. However, Connecticut Bureau of Agriculture will work with lease holders to facilitate use alternative bed use.

#	Received		Organization	Name			Comment	Response
11	Draft DEIS comment period	11/7/2018	Briarpatch Enterprises	Follini	Nancy	President	We have concerns about the filling in of the Morris Cove Borrow Pit that abuts the eastern portion of Lot 568. We have recently cultivated the substrate on the eastern portion of the lease in order to enhance the setting of shellfish on the bed. We are concerned that the filling activities in the Borrow Pit will cover this cultivated area with fine sediment, spoil our cultivation efforts and smother any young shellfish there. In addition, prop wash, scouring and damage from spuds, barges and tugs on Lot 568 are a concern to us because the fill will be transported from the Project area over Lot 568 to the Borrow Pit. We recommend that all transportation of fill to and filling activities in the Borrow Pit be done in a manner that minimizes impacts to the surrounding shellfish beds.	In order to minimize impacts shellfish in the Harbor no work will be done between June 1 to September 30. Best management practices will be used during placement events to minimize suspended sediments being transported away from the disposal location. Also the filling of the Morris Cove borrow pit will create approximately 42 acres of viable shellfish habitat
13	Draft DEIS comment period	11/7/2018	Briarpatch Enterprises	Follini	Nancy	President	Third, the Shellfish Creation Area was not adequately sampled and the sampling equipment used was insufficient to detect all natural resources in the benthic community. The entire Shellfish Creation Area was sampled in only three locations using a small 0.04 square meter grab sampler. This small grab sampler is insufficient in size and does not sample deep enough to detect all organisms in the benthos. Of note, no hard shell clams (Mercenaria mercenaria) were identified in any of the samples despite the area's long history as a productive hard shell clam bed (formerly known as Lot 634). We recommend that the Shellfish Creation Area be sampled again over a larger area and using better equipment in order to determine the total environmental impact of the Shellfish Creation Area on the benthic community, especially the hard shell clam population. Without adequate sampling data the Draft fails to account for impacts to a vast natural resource that would, be buried in 2 feet of sand. We recommend that the clams in the Shellfish Creation Area be removed prior to filling in the area with 434,000 CY of sand to create new oyster habitat in order to mitigate damage to the clam resource there	The benthic sampling that was performed was done to verify existing benthic data form New Haven Harbor. The USACE is aware that hard clam resources may be present in the footprint of the shellfish creation area. Prior to construction hard clam resources will be removed and relocated to adjacent hard clam habitat.

#	Received		Organization	Name			Comment	Response
15	Draft DEIS comment period	11/7/2018	Briarpatch Enterprises	Follini	Nancy	President	DEIS does not note the presence of the lease on Lot 674 in proposed Rock Reef Recreation Area	The Rock Reef creation area has been moved to the northern portion of the West Jetty and out of Lease 674.
16	Draft DEIS comment period	11/7/2018	Briarpatch Enterprises	Follini	Nancy	President	Finally, the Draft does not account for the presence of Lot 674 in the proposed plan for the Rock Reef Creation Area. In March of 2018, Briarpatch signed a lease with the CT Bureau of Aquaculture for the West Haven Shellfish Lot 674. Coincidently, the proposed Rock Reef Creation area is in the same location as Lot 674, south of the western portion of the West Breakwall. Section 5.2.9 of the Draft is incorrect in noting that there are "no existing shellfish leases in that area". In addition, the Draft should have maps that accurately list all impacted shellfish beds and Lot 674 does not appear in the Shellfish Parcel Map in Attachment 2 of Appendix G.	In consultation, with CT Bureau of Agriculture, the rock reef has been relocated to avoid Lot 674. No impacts form the proposed project will occur to Lot 674.
18	Draft DEIS comment period	11/8/2018	NA	Peszke	Michael	Captain	Supports project	Thank you for your support of the project.
19	Draft DEIS comment period	11/10/2018	Interports Pilots Agency Inc. Connecticut State Pilots	Jonas	Charlie	Captain	Supports project	Thank you for your support of the project.
20	Draft DEIS comment period	11/10/2018	NA	Toby	Donald	State Pilot	Supports project	Thank you for your support of the project.
21	Draft DEIS comment period	11/11/2018	Connecticut Maritime Coalition	Gash	William	Executive Director	Supports project	Thank you for your support of the project.
22	Draft DEIS comment period	11/11/2018	NA	Mulligan	William	Captain	Supports project	Thank you for your support of the project.
23	Draft DEIS comment period	11/13/2018	New England Shipping Company	Pohorylo	David	President	Supports project	Thank you for your support of the project.
24	Draft DEIS comment period	11/13/2018	US Coast Guard	Andrew	Shannon	Lieutenant	As a cooperating agency, we appreciate your thorough community outreach and encourage this outreach to continue as the project progresses. Please keep my office informed as the projects advances; there will be additional interest from my office regarding the possible relocation of Aids to Navigation, construction time frame, and dredge disposal locations.	USACE will continue to update the USCG on the project's progress and will include USCG in all future construction coordination efforts.
25	Draft DEIS comment period	11/14/2018	Interport Pilots Agency	Occhipinti	Don	Captain	Supports project	Thank you for your support of the project.
26	Draft DEIS comment period	11/14/2018	Blakeslee Arpaia Chapman	Chapman	David	President	Supports project	Thank you for your support of the project.

#	Received		Organization	Name			Comment	Response
27	Draft DEIS comment period	11/14/2018	Gulf Oil Limited Partnership	Baron	Michael	Terminal Manager	Supports project	Thank you for your support of the project.
28	Draft DEIS comment period	11/14/2018	New Haven Cooperative	Bacon	James	President	Supports project	Thank you for your support of the project.
29	Draft DEIS comment period	11/14/2018	New Haven Terminal Inc.	Vasaturo	Michael	Vice President/COO	Supports project	Thank you for your support of the project.
30	Draft DEIS comment period	11/14/2018	Port Security Services, Inc.	Gogliettino	Ralph	President	Supports project	Thank you for your support of the project.
31	Draft DEIS comment period	11/14/2018	Sea Support, Inc.	Gogliettino	Ralph	Principal	Supports project	Thank you for your support of the project.
32	Draft DEIS comment period	11/15/2018	New Haven Port Authority	Goodbody	Katharine	Chairwoman	Supports project	Thank you for your support of the project.
33	Draft DEIS comment period	11/15/2018	The American Waterways Operators	Vahey	Brian	Senior Manager - Atlantic Region	Supports project	Thank you for your support of the project. USACE will continue to engage and inform the stakeholders in New Haven Harbor about project progress. The New Haven Port Authority and the Connecticut Port Authority are feasibility study/project sponsors and are kept in constant contact in regard to project progress.
34	Draft DEIS comment period	11/15/2018	City of New Haven	Piscitelli	Michael	Deputy Economic Development Administrator	Supports project	Thank you for your support of the project.
35	Draft DEIS comment period	11/15/2018	City of New Haven	Piscitelli	Michael	Deputy Economic Development Administrator	The City is pleased to see that the ACOE has conducted a thorough assessment of environmental impacts and identified a cost-effective approach to the deepening of the federal navigation channel and the disposal of dredge material. However, we understand that the Army Corps is still carrying the cost of relocation of the Cross Sound Cable as part of the Total Investment Cost on Table ES-3, as well as on Table ES-4, Table 5-4a, and Table 5-4b. The City respectfully disagrees with the inclusion of the cable as a project cost and recommends that this cost should not be borne against the cost-benefit analysis. Given that the permit for the construction of the cable in 2002 required the cable to be buried to a depth of at least -48 feet MLLW in the Federal channel, the cost of corrective action	The USACE granted CSC a permit amendment 2004 that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE.

#	Received		Organization	Name			Comment	Response
							should not present an inconvenience or adverse effect to this very important port deepening project.	
36	Draft DEIS comment period	11/15/2018	CT Port Authority	Bates	Scott	Chairman	Supports project	Thank you for your support of the project.
37	Draft DEIS comment period	11/15/2018	CT Port Authority	Bates	Scott	Chairman	The CPA would also like to express our strong support for the removal of the Cross Sound Cable cost from the Benefit Cost Ration analysis (BCR). We believe that revision is essential to the success of the project. The CPA would like this issue resolved at the Agency Decision Milestone meeting being held January 2019. The owner of the cable should be held in compliance of the permit issued to relocate if a deepening is to occur.	The USACE granted CSC a permit amendment 2004 that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE.
38	Draft DEIS comment period	11/15/2018	Interport/CT State pilots	Meade	Sean	Captain	Supports projectJH35:I35	Thank you for your support of the project.
39	Draft DEIS comment period	11/15/2018	CT Dept of Ag	Carey	DAvid	Director, Bureau Aquaculture and Laboratory	Increasing the depth of the channel from 35 feet to 40 feet: The New Haven Harbor navigational channel intersected a number of shellfish beds when originally designated in 1850. Although these historical franchise and lease beds are still in existence, increasing the depth of the channel is likely to have minimal practical impact to shellfish production, as the channel has been dredged repeatedly in recent years and in likely no longer as suitable for shellfish habitat as it was under pre-dredge conditions.	The USACE agrees with this statement.

#	Received		Organization	Name			Comment	Response
40	Draft DEIS comment period	11/15/2018	CT Dept. of Ag	Carey	David	Director, Bureau Aquaculture and Laboratory	Expansion of the width of the channel by 50 feet on each side: The project seeks to expand the width of the channel by 50 feet on each side, encompassing an additional 75 acres of commercial shellfish beds. Increasing the width and then reestablishing a 2 to 1 slope may negatively impact acreage at the upper surface of the channel bank, an area that has not been previously disturbed. The Department will continue to work with ACOE and the designated contractor to help ensure minimal impacts to these beds. The Department has several administrative options available in terms of the existing shellfish leases in the project area, parcels 593 and 673. Leases typically have a three-year term with a right of preference to renew unless the Commissioner with cause, ceases to lease such ground for shellfish culture. A commercial shellfish operation had expressed an interest in leasing inactive parcel 593. In consideration of the navigational channel project, the Department has declined this lease request in order to allow the channel widening to proceed without impact. The Department has sought to assist that operation and has issued a new lease in another location at their request. The area described as lease 593 is not currently productive shellfish grounds, and enhancement of more suitable area elsewhere in the project vicinity would have an overall greater benefit to oyster habitat than that currently provided by this area.	Thank you for your assistance in project coordination.
41	Draft DEIS comment period	11/15/2018	CT Dept. of Ag	Carey	David	Director, Bureau Aquaculture and Laboratory	Breakwater oyster habitat development: The construction of a new oyster habitat area inside the eastern breakwater along the navigational channel turn will utilize native material dredged during the deepening and widening of the channel. By way of correction to the information in the project Environmental Impact Statement (EIS),	USACE agrees with this recommendation and have adjusted the rock reef location.

#	Received		Organization	Name			Comment	Response
							rock removed from former lease 593 should be placed on the north side of the western breakwater in the vicinity of shellfish lease 673, rather than on the south side as described in the EIS.	
42	Draft DEIS comment period	11/15/2018	CT Dept of Ag	Carey	DAvid	Director, Bureau Aquaculture and Laboratory	The construction of the salt marsh on the north side of Sandy Point, West Haven will impact an acreage of ten, comprised of several small shellfish parcels. The Department will work with impacted industry towards a resolution to address these losses as the project moves forward. Sandy Point salt marsh development:	A detailed operational plan will be developed during the design phase of the project and will incorporate plans to minimize impacts to shellfish resources in the vicinity.
43	Draft DEIS comment period	11/15/2018	CT Dept of Ag	Carey	DAvid	Director, Bureau Aquaculture and Laboratory	By way of correction to the information in the project Environmental Impact Statement (EIS), rock removed from former lease 593 should be placed on the north side of the western breakwater in the vicinity of shellfish lease 673, rather than on the south side as described in the EIS.	The Rock Reef creation area has been moved to the northern portion of the West Jetty and out of Lease 674.
	Draft DEIS comment period	11/15/2018	CT Dept of Ag	Carey	David	Director, Bureau Aquaculture and Laboratory	Sandy Point salt marsh development: The construction of the salt marsh on the north side of Sandy Point, West Haven will impact an acreage of ten, comprised of several small shellfish parcels. The Department will work with impacted industry towards a resolution to address these losses as the project moves forward.	Thank you for your assistance in project coordination.
44	Draft DEIS comment period	11/15/2018	EPA	Timmermann	Timothy	Director, Office of Environmental Review	EPA requests the opportunity to consult and coordinate with the USACE and the State of Connecticut Department of Energy and Environmental Protection regarding the relationship between the timing of USACE's General Conformity applicability analysis and the future reclassification of New Haven County. Please contact Mr. John Rogan of EPA 's Air Unit at 617 /918-1645 or rogan.john@epa.gov to discuss project General Conformity issues in greater detail.	Coordination with EPA Region 1 staff (Mr. John Rogan) in January 2019 determined that the 2008 8-hour ozone standard that was is place as of the date of the filing of the Draft EIS (September 28, 2018) was applicable.

#	Received		Organization	Name			Comment	Response
45	Draft DEIS comment period	11/15/2018	EPA	Timmermann	Timothy	Director, Office of Environmental Review	Alternatively, we encourage the USACE to require diesel retrofits whenever practicable. require the use of cleaner fuels, and institute idle reduction measures to minimize emissions from diesel construction equipment. Retrofit technologies may include EPA verified emission control technologies and fuels and CARB-verified emission control technologies.	USACE will consider diesel retrofits when practicable.
46	Draft DEIS comment period	11/15/2018	EPA	Timmermann	Timothy	Director, Office of Environmental Review	EPA requests the opportunity to continue to coordinate with the USACE on the design and implementation of the CAD cell for the unsuitable dredge material. If available, updated information should be provided in the FEIS regarding the CAD cell design, location, and development resulting from this coordination.	USACE has coordinated with EPA Region 1 on the final suitability determination and it has been concluded that all material from the New Haven Harbor Improvement project is suitable for open water placement. A CAD cell will not be required and has been removed from the project recommendation.
49	Draft DEIS comment period	11/15/2018	EPA	Timmermann	Timothy	Director, Office of Environmental Review	EPA appreciates the USA CE commitment to coordinate on the salt marsh creation portion of the project. We recommend that the USA CE coordinate closely with all cooperating agencies and we intend to continue to work with the USA CE on the design of each of the beneficial use projects. Mr. Ed Reiner (617/918-1692 or reiner.ed@epa.gov) will serve as the point of contact for the salt marsh creation work and Ms. Jeannie Brochi (6 l 7 /918-1536 or brochi.jean(@.epa.gov) will serve as the EPA point of contact for all of the other beneficial use projects.	Thank you for your support of the project.
50	Draft DEIS comment period	11/15/2018	EPA	Timmermann	Timothy	Director, Office of Environmental Review	Recommendation: EPA recommends that the habitat restoration work prioritize· the use of sediments from the outer harbor over more contaminated inner harbor sediments.	USACE has coordinated with EPA Region 1 on the final suitability determination and it has been concluded that all material from the New Haven Harbor Improvement project is suitable for open water placement.
52	Draft DEIS comment period	11/15/2018	Morgan Shipping Agencies, Inc.	Gura	James	Vessal Manager	Supports project	Thank you for your support of the project.

#	Received		Organization	Name			Comment	Response
53	Draft DEIS comment period	11/15/2018	City of West Haven, CT, Harbor Management Commission	Pacapelli	Eugene	Chairman	Supports project	Thank you for your support of the project.
54	Draft DEIS comment period	11/15/2018	City of West Haven, CT, Harbor Management Commission	Pacapelli	Eugene	Chairman	The Harbor Management Commission supports the improvement and creation of wetlands in the outer Sandy Point area with the utilization of clean dredge material. We do have concerns about the specific siting of these materials, given its location in close proximity to our current boat launch and limited mooring areas. We seek to both improve the City's boat launching area as well as expand mooring options in the future in this area. Given the City's extensive coastline, it may not be immediately evident of our limited opportunities to do so. While there are multiple acres of open space and miles of sandy beach, much of the area from Sandy Point moving west is unsuitable for both uses. Our primary target area is the north side of Sandy Point to the West River basin. With careful planning and consideration, both the wetlands proposal and the future marine use plans are tenable and harmoniously achievable.	The USACE has been and will continue to coordinate with the City of West Haven in regard to the proposed project.
55	Draft DEIS comment period	11/15/2018	City of West Haven, CT, Harbor Management Commission	Pacapelli	Eugene	Chairman	A second serious consideration is the replacement of our WPCA outfall pipe. Our current pipe is past its life expectancy. It's now undersized for our needs moving forward, has suffered damage during large storms due to its design, and has been the subject of a replacement feasibility study. The current pipe, as well as the planned new one, lie directly inside the boundaries of the dredging project with the outfall terminus being on the west side of the channel bank. We are concerned that the draft Environmental Impact Statement shows no assessment of the potential impact of your proposed dredging project on that outfall pipe. We think this is an oversight. We would like to see both projects demonstrate consideration	The USACE has reviewed the outfall plans and the refined feasibility design provides for a 10 foot off-set form the outfall. We will continue to coordinate with West Haven during the pre-construction and engineering design phase of the project to ensure the project does not impact the outfall and keep West Haven informed of the proposed project schedule.

#	Received		Organization	Name			Comment	Response
							for the other. Ideally, with two very large excavation events, it makes both economic and environmental sense to complete the work either simultaneously or as close as possible to each other.	
56	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	Winter flounder is the most important fishery species in New Haven Harbor and is dependent on the harbor's habitat for all life stages. To protect this species, the EIS specifies on page 118 that no dredging or materials placement will occur between February 1 and June 30. It is unclear if this commitment supersedes the timeframes given in Appendix H, Draft Essential Fish Habitat Assessment, which contains in Section 4.2 a tiered seasonal restriction of no project activities occuning between February 1 and June 30 for portions of the harbor north of Sandy Point, and no project activities occurring between April 1 and June 30 for areas south of Sandy Point. DEEP Fisheries Division prefers the single February 1 through June 30 seasonal restriction for all of New Haven Harbor.	USACE coordinated with CTDEEP through its Water Quality Certification process to establish the appropriate time of year restrictions to minimize impacts to marine resources in the project area.

#	Received		Organization	Name			Comment	Response
61	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	Page 88 of the EIS discusses the need to increase the depth of burial of the Cross Sound Cable to -48' MLL W for those areas where it does not currently meet this requirement, which corresponds to the area of ledge just north of the channel bend. For this approximately 700' segment, the cable is installed at depths as shallow as -41. 5' MLL W. As discussed in the DEEP scoping comments of February 27, 2017, relocation or deeper burial of the cable will require a new Certificate of Permission from the DEEP Land and Water Resources Division. Micheal Grzywinski can be contacted in this regard and can be reached at (860) 424-3674 or at Micheal.grzywinski@ct.gov. Cross Sound Cable is also advised to contact the Connecticut Siting Council to determine what, if any, modifications 'may be necessary to the approval given by the Council for the cable in its Docket 208 decision.	Noted.
62	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	The shellfish habitat creation area north of the East Breakwater is proposed to be created using the fairly limited volume of suitably sandy material to be dredged as part of the TSP. This volume is estimated to be 351,300 cubic yards for a 40' channel depth, with the area of created shellfish habitat to be twenty-five acres according to page 120 of the EIS. If the volume of suitable sandy substrate should increase in subsequent sediment surveys, expansion of the area of enhanced shellfish habitat should be considered as both a beneficial use for this material and an avenue to compensate for potential losses of shellfish habitat from ·other elements of the project. Discussions with the Bureau of Aquaculture have indicated that the proposed shellfish habitat creation area could be expanded without encroaching upon any active shellfish lease areas and that the Bureau would support such an expansion.	The shellfish habitat enhancement area may be expanded if, during the project's design phase, there are substantial changes in the volume of material that would appropriate for placement as shellfish habitat.
63	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	Coordination needed with DEEP Natural Diversity Data Base.	Coordination with DEEP Natural Diversity Data Base was performed.

#	Received		Organization	Name			Comment	Response
64	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	Fort Hale Park is described on page 34 as being a 20-acre State-owned, City-run park. The vast majority of the once State-owned acreage was turned over to the Coast Guard when the adjacent Coast Guard station was developed. DEEP's residual ownership, which consisted of 0.4 acres of property and the park pier, was transferred to the City of New Haven in 2016. The State has no remaining ownership interest in Fort Hale Parle	EIS has been amended.
65	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	The goal of eliminating lightering operations for larger or more heavily-laden ships entering the harbor is cited on pages 68, 71, 72 and 92 in the EIS and would certainly be a benefit of the project both in terms of improving efficiency and reducing the risk of any spills·. The EIS treats this subject in a purely generic fashion. Is any information available? as to what percentage of inbound ships require lightering and what is the frequency of any spills or other mishaps that occur during such operations?	While USACE Is not aware of any specific spills relating to the lightering operations the navigation improvement project will reduce the risk of spills in the future. USACE does not have a tracking of historic lightering operations in the harbor. Ships that draft greater than 31 feet would be required to lighter or wait for the tide. Information on ship drafts is in the Economics Appendix C of the IFR/EIS.
66	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	The size of the saltmarsh proposed to be created at Sandy Point may not be precisely determined until permitting and final design. It is noted here that the area is described in several locations in the EIS including pages 93 and 94 as being 70 acres and in other areas, including pages 81, 108 and 119, as being 73 acres	EIS has been amended to reflect correct salt marsh acreage of proposed plan.
67	Draft DEIS comment period	11/16/2018	CT Dept of Energy and Environmental Protection	Riese	Frederick	Senior Environmental Analyst	Discussion on page 59 of the EIS under Historic Context says Yale University was established in Saybrook in 1717 and subsequently moved to New Haven. Yale actually was founded in Saybrook in 1701, American's third oldest institution of higher learning, and moved to New Haven in 1716.	EIS has been amended.

#	Received		Organization	Name			Comment	Response
68	Draft DEIS comment period	11/16/2018	NMFS	Jylkka	Zach	Fisheries Biologist	My one main comment is that you did not consider the presence of migrating and foraging adult shortnose sturgeon, which could be present in the action area from April through November. I can provide some more detail on shortnose if you'd like. We are not prepared to concur with your preliminary NLAA determination, as the EIS does not include a full analysis of the potential effects of the project on listed species.	The presence of migrating and foraging adult shortnose sturgeon have been incorporated into the Final Environmental Impact Statement.
32	Transcript from Public Hearing	10/23/2018	Private Citizen	Pimer	Mike	Mr	Use material from blasting "between the breakwater" to put on the breakwater at Sandy Point to make it more visible to boaters [raise elevation of breakwater]	The material form the blasting is not suitable for placement on the training dike structure.
33	Transcript from Public Hearing	10/23/2018	Private Citizen	Pimer	Mike	Mr	Concern about Sandy Point Marsh creation affecting the West Haven Yacht Club Channel - let public know the extent of the proposed marsh creation	Material placed in the salt marsh creation area in the vicinity of Sandy Point will be contained with geotubes. No impacts from the proposed project will occur to the West River Channel or the West Haven Yacht Club.
34	Transcript from Public Hearing	10/23/2018	Private Citizen	Pimer	Mike	Mr	Dredge West River up to I-95 while doing the outer channel work.	New England District's Maintenance Dredging Program is currently testing the material in the West River channel (West Haven, CT) and developing placement alternatives for a maintenance dredging effort.
35	Transcript from Public Hearing	10/23/2018	Private Citizen	Marazzi	Bill	Mr	Deepen West River channel.	New England District's Maintenance Dredging Program is currently testing the material in the West River channel (West Haven, CT) and developing placement alternatives for a maintenance dredging effort.
36	Transcript from Public Hearing	10/23/2018	Empire Fisheries (Briarpatch Enterprises)	Gilbert	Joe	Mr	Impacts outside of navigation channel are of concern to Empire Fisheries/Briarpatch Enterprises	Noted.

#	Received		Organization	Name			Comment	Response
37	Transcript from Public Hearing	10/23/2018	West River Watershed Coalition and West Haven Restoration Committee	Hebert	Kathy	Ms	There is an old oyster bed on the New Haven side of the West River.	USACE has coordinated with CT Dept. of Agriculture to minimize impacts to all shell fish resources in New Haven Harbor.
38	Transcript from Public Hearing	10/23/2018	West River Watershed Coalition and West Haven Restoration Committee	Hebert	Kathy	Ms	Concern expressed for project impacts on the Sandy Point Bird Sanctuary	USACE has coordinated with the State and Federal resources agencies to ensure that the creation of salt marsh at Sandy Point will not impact ecological resources at Sandy Point.
40	Transcript from Public Hearing	10/23/2018	West Haven Harbor Management Commission	Flynn	Dennis	Mr	The whole federal navigation channel should be dredged in this project because it would be more "cost effective while you've got everything [dredging equipment] there"	New England District's Maintenance Dredging Program is currently testing the material in the West River channel (West Haven, CT) and developing placement alternatives for a maintenance dredging effort.
41	Transcript from Public Hearing	10/23/2018	West Haven Harbor Management Commission	Flynn	Dennis	Mr	Question: how far away are you going to be from an outflow pipe.	The USACE has reviewed the outfall plans and the refined feasibility design provides for a 10 foot off-set form the outfall. We will continue to coordinated with West Haven during the pre-construction and engineering design phase of the project to ensure the project does not impact the outfall.
42	Transcript from Public Hearing	10/24/2018	Office of Congresswoman Rosa DeLauro	Dodge	Allison	Outreach Coordinator	Supports project	Thank you for your support of the project.
43	Transcript from Public Hearing	10/24/2018	Office of Congresswoman Rosa DeLauro	Dodge	Allison	Outreach Coordinator	Comcerend with the inclusion of the repositioning of the Cross-Sound Cable and the total project cost.	The USACE granted CSC a permit amendment 2004 that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE.
44	Transcript from Public Hearing	10/24/2018	Private Citizen	Cox	John	Mr	Supports plan for Morris Cover Borrow Pit	Thank you for your support of the project.

#	Received		Organization	Name			Comment	Response
45	Transcript from Public Hearing	10/24/2018	NA	Jonas	Charlie	Mr	Supports project	Thank you for your support of the project.
47	Transcript from Public Hearing	10/24/2018	Private Citizen	Blau	Renate	Ms	Supports plan for Morris Cover Borrow Pit	Thank you for your support of the project.
48	Transcript from Public Hearing	10/24/2018	Private Citizen	Hilts	John	Mr	The study needs more alternatives.	A range of dredging and placement alternatives were evaluated. The proposed project will use 45% of the material beneficially in the harbor to create habitat for ecological resources.
49	Transcript from Public Hearing	10/24/2018	Private Citizen	Hilts	John	Mr	Project benefits handful of private companies in harbor and wants a commitment from those companies to stay in New Haven so that the befits in trasit are realized as opposed to not being realized.	The Connecticut Port Authority and the New Haven Port Authority are sponsors to the project and are working to maintain the economic viability of the Harbor.
50	Transcript from Public Hearing	10/24/2018	Private Citizen	Gilbertson	Terry	Mr	Cross Sound Cable Owner should bear the cost of relocating it through enforcement of the 2002 permit	The USACE granted CSC a permit amendment 2004 that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE.

A6- Letters Receive on DIFR/EIS, Review September 23, 2018 to November 15, 2018

Blumeris, Barbara R CIV USARMY CENAE (USA)

From: Cort Sperry <cms0313@yahoo.com>
Sent: Wednesday, October 24, 2018 5:40 PM
To: CENAE-PD, NAE
Subject: [Non-DoD Source] New haven dredging

I am 100% in favor. You should also dredge West Haven harbors,beaches. Go Army Corp of engineers.

Sent from Yahoo Mail for iPad <Blockedhttps://overview.mail.yahoo.com/?.src=iOS>

POST OFFICE BOX 9731
NEW HAVEN, CONNECTICUT 06536
(203) 467-1997
FAX (203) 469-5956

GATEWAY TERMINAL

October 24, 2018

U.S. Army Corps of Engineers, New England District
Attention Mr. Todd Randall
696 Virginia Road
Concord, Ma 01742-2751
NAE-PD-PN@usace.army.mil

RE: New Haven Harbor Navigation Improvement Project.

Gateway Terminal is writing this letter in support of the New Haven Harbor Navigational Improvement Project consisting of deepening the main ship channel, maneuvering area, and tuning basin to 40 ft. MLLW or deeper. Gateway is also strongly in support of straightening out the dog leg turn at the entrance, along with widening the main channel and turning basin which will allow larger Panamax and post Panamax vessels access to the Port of New Haven's terminals. Allowing the channel to be expanded both in width and depth will greatly facilitate the safe maneuvering of inbound and outbound ship traffic.

Gateway Terminal is an established, fully licensed and bonded deep-water marine terminal operating in the Port of New Haven since 1985. Gateway Terminal handles import and export dry bulk, liquid bulk and break-bulk cargoes arriving and departing by vessels. Gateway also operates a fleet of tugs and barges that operate out of the Port of New Haven.

The implementation of this project is vital to the growth and success of our facility, the Port of New Haven and the State of Connecticut. As ship owners and charterers continue to push for larger bulkers and tankers capable of handling more cargo on a single voyage, the port of New Haven will risk obsolescence if the Navigation Improvement Project is not undertaken, putting at risk the jobs of numerous people whose livelihood is directly dependent on the shipping industry in New Haven. Without the needed improvements to the federal channel, the State stands to lose millions in revenue to neighboring states and risks higher taxes with increased costs of simple commodities such as deicing salts.

Allowing larger vessels to berth on arrival, without the need to lighter or wait for tide, would help attract or win back ship owners that otherwise would not and have not called the Port of New Haven because of delays. In our industry a twelve hour delay could very easily equate to tens of thousands of dollars in lost revenue to the ship owners. The ability to attract larger vessels to the Port of New Haven would create more jobs due to increased vessel traffic and result in

lower freight rates for vessel owners, which would reduce the overall cost of the cargoes.

The port of New Haven is uniquely situated between New York City and Boston, making us extremely attractive to customers that send cargo both east and west. Gateway Terminal has easy access to major highways and rail systems, which provides us the ability to ship cargo throughout the continental US and into Canada with relative ease and efficiency. Should New Haven Harbor fall behind the curve due to our inability to continue to bring in larger ship traffic, we will lose our ability to keep up with modern shipping, forcing us to rely solely on less economic older ships that are constantly being phased out. Larger ships equal lower cost for ship owners, operators, importers and exporters. With lower cargo costs, more cargo will come, bolstering the entire economy of New Haven, Connecticut, New England and beyond.

Gateway Terminal does also respectfully request that the Army Corps of Engineers review the original permit for the Cross Sound Cable that will need to be relocated for the improvement of the channel. It is our understanding that in accordance with the original permit for the cable, the owner of the cable is solely responsible for all costs associated with bringing the cable down to a depth of 48'. Holding the owner responsible for this cost will effectively cut the cost of this project in half, greatly improving the cost to benefit ratio.

Please accept this letter as a show of support for very important project.

Sincerely,

Gateway Management and staff.

From: Art
To: Blumeris, Barbara R CIV USARMY CENAE (USA)
Subject: [Non-DoD Source] New Haven Harbor project
Date: Friday, November 2, 2018 6:27:21 PM

Hi Barbara, I am concerned of what I learned coming of the West Haven meeting at Bailey Junior Hight. The mention of dropping aces of fill off the sandbar can serious impact West River and our City Point Yacht club with the in coming tide pushing the silt up river.
Second, why isn't the Army Corp, looking to add additional rock to our Jetty. At hight tide you cannot see the top of the rocks. Even a high low tide they are barely seen. A dangerous situation for boaters unaware of the area. They may not own up but a Coast Guard vessel hit it recently and they are based in the harbor

Art Penna Jr
City Point Yacht Club

Sent from my iPhone
Art

From:	phil maddern
To:	Blumeris, Barbara R CIV USARMY CENAE (USA)
Subject:	[Non-DoD Source] Dumping of dredge material
Date:	Friday, November 2, 2018 6:06:50 PM

From what Ive read to make a decision to relocate the dredge materials to an area near the existing sandbar is one crazy idea. Not sure who came up with this idea but I believe it needs to rethought please I beg you the water around the sound is getting cleaner every year and more fish are showing up please do not upset the area thank you the Madderns .

Sent from my iPad

Briarpatch Enterprises, Inc.

322 New Haven Avenue
Milford, CT 06460

Phone: (203) 876-8923 Fax: (203) 877-8263

November 7, 2018
TO: Mr. Todd Randall, U.S. Army Corps of Engineers, New England District
FROM: Nancy Follini, President, Briarpatch Enterprises, Inc.
RE: Comments on the New Haven Harbor Navigation Improvement Project Draft Integrated Feasibility Report and Environmental Impact Statement

Dear Mr. Todd Randall,

Briarpatch Enterprises, Inc. (Briarpatch) is a shellfish company that holds shellfish leases in the area impacted by the New Haven Harbor Navigation Improvement Project (Project) and the proposed Rock Reef Creation Area. As such, we have some comments regarding the Project's Draft Integrated Feasibility Report and Environmental Impact Statement (Draft).

For one, our New Haven Lot 568 spans both sides of the Federal Channel and we are concerned that we will permanently lose many acres from shellfish production when they become part of the expanded FNP. We recommend that any shellfish bed owner impacted by the project be compensated for acreage lost due to the Project with acreage in kind from the proposed Shellfish Creation Area, or have their lease fees adjusted accordingly by the CT Bureau of Aquaculture. In addition, the Draft should have maps and tables that accurately list all impacted shellfish beds. While Lot 568 is listed in Table 7-2 of the Draft, it does not appear in the Shellfish Parcel Map in Attachment 2 of Appendix G.

Second, we have concerns about the filling in of the Morris Cove Borrow Pit that abuts the eastern portion of Lot 568. We have recently cultivated the substrate on the eastern portion of the lease in order to enhance the setting of shellfish on the bed. We are concerned that the filling activities in the Borrow Pit will cover this cultivated area with fine sediment, spoil our cultivation efforts and smother any young shellfish there. In addition, prop wash, scouring and damage from spuds, barges and tugs on Lot 568 are a concern to us because the fill will be transported from the Project area over Lot 568 to the Borrow Pit. We recommend that all transportation of fill to and filling activities in the Borrow Pit be done in a manner that minimizes impacts to the surrounding shellfish beds.

Third, the Shellfish Creation Area was not adequately sampled and the sampling equipment used was insufficient to detect all natural resources in the benthic community. The entire Shellfish Creation Area was sampled in only three locations using a small 0.04 square meter grab sampler. This small grab sampler is insufficient in size and does not sample deep enough to detect all organisms in the benthos. Of note, no hard shell clams (*Mercenaria mercenaria*) were identified in any of the samples despite the area's long history as a productive hard shell clam bed (formerly known as Lot 634). We recommend that the Shellfish Creation Area be sampled again over a larger area and using better equipment in order to determine the total environmental impact of the Shellfish Creation

Area on the benthic community, especially the hard shell clam population. Without adequate sampling data the Draft fails to account for impacts to a vast natural resource that woud, be buried in 2 feet of sand. We recommend that the clams in the Shellfish Creation Area be removed prior to filling in the area with 434,000 CY of sand to create new oyster habitat in order to mitigate damage to the clam resource there.

Finally, the Draft does not account for the presence of Lot 674 in the proposed plan for the Rock Reef Creation Area. In March of 2018, Briarpatch signed a lease with the CT Bureau of Aquaculture for the West Haven Shellfish Lot 674. Coincidently, the proposed Rock Reef Creation area is in the same location as Lot 674, south of the western portion of the West Breakwall. Section 5.2.9 of the Draft is incorrect in noting that there are "no existing shellfish leases in that area". In addition, the Draft should have maps that accurately list all impacted shellfish beds and Lot 674 does not appear in the Shellfish Parcel Map in Attachment 2 of Appendix G.

The disposal of 32,700 cubic yards of rock on Lot 674 would displace many acres of shellfish ground leased by Briarpatch. Once covered in disposed rock, the Rock Reef Creation Area will be inaccessible to shellfish harvest vessels without substantial damage to harvest equipment. We recommend that the Rock Reef Creation Area be relocated to an area where there are no existing shellfish leases.

Sincerely,

_____

Nancy Follini
President
Briarpatch Enterprises, Inc.

CC: David Carey, Director, Connecticut Bureau of Aquaculture
Judi Sheiffele, Executive Director, New Haven Port Authority

To: U.S. Army Corps of Engineers

November 8, 2018

From: Captain Michael A. Peszke

Re: New Haven Harbor Dredge Project

Dear Sir/Mam

My name is Michael A. Peszke and I am a licensed State of Connecticut Marine Pilot. I am writing this letter to urge the U.S.A.C.E. to approve funding and expedite all aspects of New Haven Harbor dredge project. New Haven Harbor is a most vital transportation and economic hub for the State of Connecticut which benefits a much larger area throughout Southern New England by allowing ships to move large volumes of refined petroleum cargo as well as bulk general cargo which eases congestion on our already over used highways. Deepening to 40 feet will assist in keeping the port relevant and competitive with the port of New York and New Jersey as well as Providence and Boston. Further neglecting to maintain the deep water port of New Haven will have long term far reaching effects. The Connecticut River was once a busy inland waterway alternative to Interstate 91 for moving petroleum cargo and it has been neglected to the point of unusable. This has an effect on availability and price of fuel delivered to Central Connecticut. It is imperative that the population of Connecticut as well as Southern New England can rely on New Haven harbor to continue to be a viable deep water port in regards to home heating oil delivery and gasoline as well as salt for our roads in winter time and many other cargoes too numerous to list.

Any and all consideration that you can give this project which allows it to move forward in a timely fashion is greatly appreciated.

Sincerely

Michael A. Peszke

INTERPORT PILOTS AGENCY, INC.
CONNECTICUT STATE PILOTS

906 Port Monmouth Road, Port Monmouth, New Jersey 07758-0236
business@interportpilots.net · (732)787-5554

10 November 2018

US Army Corps of Engineers, New England District
Attention: Mr. Todd Randall
696 Virginia Road
Concord, Massachusetts 01742-2751

Re: New Haven Harbor Deepening Project

Dear Mr. Randall:

New Haven Harbor channel depth is 35 ft at MLLW; for harbor transit, the port requirement is 2 ft UKC plus an additional 2 ft for squat thereby reducing the maximum low water transit draft to 31 ft. Maximum high water transit draft is 36 ft and is made on a rising tide about 1 hour before high water; at this time, a strong westerly set from the flood tide runs across the entrance channel; at the jetties, when making the 35 degree course change to starboard, the strong westerly set pushes the ship's stern to port which is compounded by severe bank suction on the ship's port quarter caused by the channel's steep bank in the vicinity of the #7 buoy. Depths inside the edge of the channel in this area are up to 40 ft, depths just outside the channel are about 23 ft------this steep gradient amplifies bank suction effect.

Ships bound for New Haven with drafts over 36 ft must lighter before entering port. Lightering is done at New Haven Anchorage which is in open, unprotected waters of Long Island Sound approximately 3 to 6 miles offshore. The lightering operations are frequently delayed due to adverse weather conditions. The additional transfer of bulk liquid oil cargoes during lightering reduces the safety factor and drives up the cost of doing business in our port.

The proposed project to deepen and widen the channel resolves the draft, ship handling and LOA restrictions we are currently facing. The proposed 40 ft channel depth will increase the maximum low water draft transit to 36 ft and the maximum high water transits to 42 ft; widening the inner and outer channels, turning basin

and the turn at the jetties will enhance the safety of piloting larger, deeper ships into the port.

The deepening and widening project will make the Port of New Haven, which is the largest port in Connecticut and the second largest port in New England, a safer and more economical destination for the larger, deeper ships.

This project is fully supported by the pilots.

Yours truly,

Captain Charlie Jonas
President
Interport/Connecticut State Pilots
cpjonas@optonline.net

From: Donald Toby
To: CENAE-PD, NAE
Subject: [Non-DoD Source] Attention Mr. Todd Randall
Date: Saturday, November 10, 2018 9:37:57 AM

Dear U.S. Army Corps of Engineers,

I am one of the State Licensed Pilots that bring Ships in/out of New Haven. The Channel being dredged to 40ft and widened up to 800ft would make New Haven a much more intriguing port to the shipping industry for importing/exporting cargo. The current depth of the channel of 35ft prevents many of the ships from docking on arrival which makes the customers divert the cargo to another port. An additional benefit to having the channel deepened and widened will make the transit safer for the pilots by reducing the effects of squat and bank suction that we currently deal with now.
I am eager to see what comes next with the study and working with the Army Corps and New Haven Port Authority.

Sincerely,

DJ Toby
Connecticut State Pilot

516-382-4318

Connecticut Maritime Coalition

11 November 2018

US Army Corps of Engineers, New England District
Attention: Mr. Todd Randall
696 Virginia Road
Concord, Massachusetts 01742-2751

Re: New Haven Harbor Deepening Project

Dear Mr. Randall:

This letter is in support of the New Haven Deepening Project currently under consideration by your District.

The New Haven Harbor channel depth is 35 feet at MLW; for harbor transit, the port requirement is 2 feet Under Keel Clearance plus an additional 2 feet for vessel squat thereby reducing the maximum low water transit draft to 31 feet. Maximum high water transit draft is 36 feet and is made on a rising tide about 1 hour before high water; a strong westerly set from the flood tide runs across the entrance channel; at the jetties, when making the 35 degree course change to starboard, the strong westerly set pushes the vessel's stern to port which is compounded by severe bank suction on the vessel's port quarter caused by the channel's steep bank in the vicinity of the #7 buoy. Depths inside the edge of the channel in this area are up to 40 feet, depths just outside the channel are about 23 feet------this steep gradient amplifies bank suction effect.

Vessels bound for New Haven with drafts over 36 feet must lighter before entering port. Lightering is done at New Haven Anchorage which is in open, unprotected waters of Long Island Sound approximately 3 to 6 miles offshore. The lightering operations are frequently delayed due to adverse weather conditions. The additional transfer of bulk liquid oil cargoes during lightering reduces the safety factor and drives up the cost of doing business in the Port of New Haven.

P.O. Box 188, Stonington, Connecticut 06378 *Fax:* (888) 436-5413 *E-mail:* ctmaritime@msn.com
Visit us on the web at: www.ctmaritime.com

The proposed project to deepen and widen the channel resolves the draft, ship handling and LOA restrictions. The proposed 40-foot channel depth will increase the maximum low water draft transit to 36 feet and the maximum high-water transits to 42 feet; widening the inner and outer channels, turning basin and the turn at the jetties will enhance the safety of piloting larger, deeper vessels into the port.

The deepening and widening project will make the Port of New Haven, which is the largest port in Connecticut and the second largest port in New England, a safer and more economical destination for the larger, deeper commercial vessels.

This project is fully supported by the Connecticut Maritime Coalition.

Respectfully,

William Gash
Executive Director

Capt. William R. Mulligan, Jr.

33 Farview Ave.

Old Saybrook, CT 06475

Wmulligan01@snet.net

November 11, 2018

New England District

696 Virginia Road

Concord, Massachusetts 01742

U. S. Army Corps of Engineers

Attention: Todd Randall

Dear Sir:

I am writing in support of the deepening of the Federal Channel in New Haven harbor to 40 feet.

I am a Connecticut State Pilot and believe that the future of the marine industry in Connecticut depends on the continued upgrading of our waterways.

Please consider authorization of the deepening project of New Haven harbor.

Regards,

Capt. William R. Mulligan, Jr.

New England Shipping Company, Inc.

CORPORATE HEADQUARTERS
359 New Haven Ave. • Milford, CT 06460
Tel: (203) 301-3333 • Fax: (203) 301-3332
email: ops@newenglandshipping.com
www.newenglandshipping.com

US Army Corps of Engineers, New England District
Attention: Mr. Todd Randall
696 Virginia Road
Concord, Massachusetts 01742-2751

November 13, 2018

Re: New Haven Connecticut Harbor Deepening Project

Dear Mr. Randall:

This letter is in support of the New Haven Connecticut Harbor Deepening Project currently under consideration by your District.

The New Haven Harbor channel depth is 35 feet at MLW; for harbor transit, the port requirement is 2 feet Under Keel Clearance plus an additional 2 feet for vessel squat thereby reducing the maximum low water transit draft to 31 feet. Maximum high water transit draft is 36 feet and is made on a rising tide about 1 hour before high water; a strong westerly set from the flood tide runs across the entrance channel; at the jetties, when making the 35 degree course change to starboard, the strong westerly set pushes the vessel's stern to port which is compounded by severe bank suction on the vessel's port quarter caused by the channel's steep bank in the vicinity of the #7 buoy. Depths inside the edge of the channel in this area are up to 40 feet, depths just outside the channel are about 23 feet------this steep gradient amplifies bank suction effect. Vessels bound for New Haven with drafts over 36 feet must lighter before entering port. Lightering is done at New Haven Anchorage which is in open, unprotected waters of Long Island Sound approximately 3 to 6 miles offshore. The lightering operations are frequently delayed due to adverse weather conditions. The additional transfer of bulk liquid oil cargoes during lightering reduces the safety factor and drives up the cost of doing business in the Port of New Haven.

The proposed project to deepen and widen the channel resolves the draft, ship handling and LOA restrictions. The proposed 40-foot channel depth will increase the maximum low water draft transit to 36 feet and the maximum high-water transits to 42 feet; widening the inner and outer channels, turning basin and the turn at the jetties will enhance the safety of piloting larger, deeper vessels into the port. The deepening and widening project will make the Port of New Haven, which is the largest port in Connecticut and the second largest port in New England, a safer and more economical destination for the larger, deeper commercial vessels.

Sincerely,

David E. Pohorylo
President

NEW YORK • 182 Calhoun Street [illegible] New Jersey 07114 Tel: (973) 274-9026 Fax: (973) 274-9028
NEW LONDON • [illegible] New London, Connecticut 06320 Tel: (860) 443-8042 Fax (860) 443-8243
ALBANY • 240 [illegible] Street [illegible] New [illegible] 2202 Tel (518) 436-1320 Fax (518) 203-1986

U.S. Department of Homeland Security

United States Coast Guard

Commander
United States Coast Guard
Sector Long Island Sound

120 Woodward Avenue
New Haven, CT 06512
Phone: (203) 468-4437
Fax: (203) 468-4443

5740
November 13, 2018

Colonel William M. Conde
District Engineer
United States Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Colonel Conde:

I would like to thank you for reaching out to Sector Long Island Sound regarding the New Haven Harbor, Connecticut, Navigation Improvement Project. Continued coordination and discussions between the Army Corps of Engineers and the Coast Guard are vital to maintain safe waterways throughout the United States.

Currently, Sector Long Island Sound has no comments pertaining to the Draft Integrated Feasibility Report and Environmental Impact Statement (D-IFR/EIS), including all enclosed documents mailed to my office and dated on October 10, 2018.

As a cooperating agency, we appreciate your thorough community outreach and encourage this outreach to continue as the project progresses. Please keep my office informed as the projects advances; there will be additional interest from my office regarding the possible relocation of Aids to Navigation, construction time frame, and dredge disposal locations.

We look forward to continued coordination with your office on this and other projects. Please feel free to reach out to myself if you need any additional information or comments from Sector Long Island Sound at Shannon.L.Andrew@uscg.mil or (203) 468-4432.

Sincerely,

LT

S. L. ANDREW
Lieutenant, U.S. Coast Guard
Waterways Mgmt Division Chief
Sector Long Island Sound

From:	Randall, Todd A CIV USARMY CENAE (US)
To:	Blumeris, Barbara R CIV USARMY CENAE (USA)
Cc:	Habel, Mark L CIV USARMY CENAE (US)
Subject:	FW: [Non-DoD Source] Letter of Support - NH Dredging Project
Date:	Wednesday, November 14, 2018 5:44:40 PM

FYI

-----Original Message-----
From: Donald Occhipinti [mailto:donald.occhipinti@gmail.com]
Sent: Wednesday, November 14, 2018 4:34 PM
To: Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil>
Subject: [Non-DoD Source] Letter of Support - NH Dredging Project

Mr. Randall,

My name is Capt. Don Occhipinti and I am a pilot with the Interport Pilots Agency, Inc.

I am writing in support of the dredging project at New Haven Harbor, Connecticut.

Thank you,

Capt. Don Occhipinti
631.235.5200

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200 NORTH BRANFORD ROAD, ROUTE 139 - P.O. BOX 835
BRANFORD, CONNECTICUT 06405-0835
TELEPHONE (203) 488-2500
FAX (203) 488-4538
FAX (203) 488-3997
www.bac-inc.com

November 14, 2018

US Army Corps of Engineers, New England District
Attention: Mr. Todd Randall
696 Virginia Road
Concord, Massachusetts 01742-2751

Re: New Haven Harbor Deepening Project

Dear Mr. Randall:

This letter is in support of the New Haven Deepening Project currently under consideration by your District.

The New Haven Harbor channel depth is 35 feet at MLW; for harbor transit, the port requirement is 2 feet Under Keel Clearance plus an additional 2 feet for vessel squat thereby reducing the maximum low water transit draft to 31 feet. Maximum high water transit draft is 36 feet and is made on a rising tide about 1 hour before high water; a strong westerly set from the flood tide runs across the entrance channel; at the jetties, when making the 35 degree course change to starboard, the strong westerly set pushes the vessel's stern to port which is compounded by severe bank suction on the vessel's port quarter caused by the channel's steep bank in the vicinity of the #7 buoy. Depths inside the edge of the channel in this area are up to 40 feet, depths just outside the channel are about 23 feet------this steep gradient amplifies bank suction effect.

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The proposed project to deepen and widen the channel resolves the draft, ship handling and LOA restrictions. The proposed 40-foot channel depth will increase the maximum low water draft transit to 36 feet and the maximum high-water transits to 42 feet; widening the inner and outer channels, turning basin and the turn at the jetties will enhance the safety of piloting larger, deeper vessels into the port.

The deepening and widening project will make the Port of New Haven, which is the largest port in Connecticut and the second largest port in New England, a safer and more economical destination for the larger, deeper commercial vessels.

This project is fully supported by the Connecticut Maritime Coalition.

Respectfully,

BLAKESLEE ARAPIA, CHAPMAN, INC.

David Chapman
Senior Vice President

Gulf Oil Limited Partnership
500 Waterfront St.
New Haven, Ct. 06512

November 14, 2018

U.S. Army Corps. Of Engineers
New England District
696 Virginia Road
Concord, MA. 01742
Attention: Todd Randall

Mr. Randall:

As a long time and current stakeholder here in the New Haven Harbor this letter is to inform you of Gulf's desire to see the Federal Navigation Channel through New Haven harbor deepened to 40-42 feet.

We currently operate a Bulk Oil Storage Terminal at the northern end of the harbor. We are presently in the design phase of a terminal upgrade to add additional storage tank(s) to our facility. The main purpose of this upgrade is to allow our terminal to accept larger vessels with larger cargos for simple economic reasons. The dock at our New Haven Terminal can currently accommodate ships with an arrival draft of up 39 feet. Should the channel deepening project take place we would certainly dredge our berth to be in line with or, more probably, be deeper than the channel restrictions.

Your consideration in this matter is greatly appreciated.

Best Regards,

Michael Baron
Terminal Manager

New Haven Harbor Cooperative

November 14, 2018

U.S. Army Corps of Engineers
New England District ATTN: Todd Randall
696 Virginia Road
Concord, Massachusetts 01742

VIA EMAIL to Barbara.r.blumeris@usace.army.mil / Signed Copy sent via U.S. Mail

Dear Mr. Randall:

On behalf of the New Haven Harbor Cooperative, we stand in full support of the U.S. Army Corps of Engineers Navigation Improvements Study for New Haven Harbor.

The New Haven Harbor Cooperative (Co-op) is non-profit, voluntary cooperative serving members throughout Connecticut who are in, or closely affiliated, with the petroleum or energy supplier industry in the New Haven Harbor. The New Haven Harbor Cooperative, which was constituted in 1962, is the first group of companies in the United States to form an Oil Spill Cooperative. The mission of the Co-op is to provide the maritime facility industry a platform to facilitate collaboration, sharing of information, and partnering on certain regulatory exercises and training with both members and governmental agencies.

Our organization has been closely monitoring and our members have attended the Army Corps' various public hearings on the deepening of the federal channel in New Haven harbor from 35 to 40 feet. Our belief is that this project would result in greater frequency of deliveries into the harbor and a positive economic impact on our representative companies and the region.

We also fully support the widening of the main channel and turning basin. We believe this would allow for larger vessels into the New Haven harbor area. Additionally, the improvements will provide safer transit of vessels and more efficient vessel ingress and egress. With a widened main channel and turning basin our vessels will no longer have to lighten at anchorage outside of New Haven Harbor – a risky undertaking under certain seafaring conditions.

The New Haven Cooperative supports the deepening and widening efforts of the New Haven Harbor as proposed by the Army Corps of Engineers.

Sincerely,

James Bacon
President

NEW HAVEN TERMINAL, INC.

CHEMICAL AND PETROLEUM STORAGE SERVICES
P.O. BOX 9423 NEW HAVEN, CT 06534-0423
TEL (203) 468-0805 FAX (203) 469-6374

November 14, 2018

U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts, 01742
Attention: Mr. Todd Randall

Dear Mr. Randall

I write this letter on behalf of New Haven Terminal, in support of the New Haven Harbor Navigation Improvement Project We are a privately-owned Marine Terminal located in the Port of New Haven. We have been in business for over 75 years.

The deepening of the channel from 35 feet to 40 feet, is critical to the Port of New Haven, without this deepening the Port as well as our Terminal will find it difficult to maintain our current level of business and will make it impossible to take advantage of new business opportunities.

New Haven Terminal maintains three berths, with drafts of 40ft, 36ft and 36ft.

If the channel is deepened, New Haven Terminal is committed to increase the draft of all three of our berths to 40ft+.

Ports, as I'm sure you are aware can only be competitive based upon their infrastructure, such as rail, warehouse space, land and equally if not more importantly Draft, to keep up with new vessel sizes and requirements.

We strongly support this project and are requesting it be approved.

Sincerely

Michael Vasaturo
Vice President / COO

Port Security Services, Inc.

Corporate Headquarters:
100 Waterfront Street
New Haven, CT 06512
Mail to: P.O. Box 9166
New Haven, CT 06532

Toll Free: (800) 762-9147
Local:(203) 468-5489
Fax: (203) 468-2670
Email: ralph@portsecurity.us

November 14, 2018

U.S. Army Corps of Engineers
New England District
ATTN: Todd Randall
696 Virginia Road
Concord, Massachusetts 01742

VIA EMAIL to Barbara.r.blumeris@usace.army.mil / Hard Copy via U.S. Mail

Dear Mr. Randall:

On behalf of my company, specifically, and the Greater New Haven Harbor area, generally, I write to you in support of the U.S. Army Corps of Engineers Navigation Improvements Study for New Haven Harbor.

My company provides MTSA security at many of the terminals which currently bring in vessels of cargo to the New Haven Harbor. We believe this deepening of the federal channel in New Haven harbor from 35 to 40 feet would result in greater frequency of deliveries into the harbor and a positive economic impact on our company and the region.

We also support a widening of the main channel and turning basin. We believe this would hopefully allow for larger vessels into our harbor area. Additionally, the improvements will provide safer transit of vessels and more efficient ingress and egress.

This project is vital for New Haven harbor's survival. As the largest port of call in Connecticut (tonnage wise) our desire is to continue to expand port deliveries and operations. This would not be possible without the deepening and widening efforts as proposed by the Army Corps of Engineers.

Best regards,

Ralph Gogliettino
President

SEA SUPPORT INC.

100 Waterfront St.,
New Haven, CT 06512

Ph: 203-467-1590
Fax: 203-468-2670
EMail: ralph@portsecurity.us

November 14, 2018

U.S. Army Corps of Engineers
New England District
ATTN: Todd Randall
696 Virginia Road
Concord, Massachusetts 01742

VIA EMAIL to Barbara.r.blumeris@usace.army.mil / Copy Sent via U.S. Mail

Dear Mr. Randall:

I write to you in support of the U.S. Army Corps of Engineers Navigation Improvements Study for New Haven Harbor. My company, Sea Support, Inc., is an environmental booming company that secures floating boom retention containment systems around vessels in New Haven's Harbor. This boom must be secured before any vessel unloads oil or petroleum liquids onto Connecticut's dock areas.

We are in full support of the deepening of the federal channel in New Haven harbor from 35 to 40 feet. We believe this would result in greater frequency of vessel deliveries into the harbor and, as a result, the need for more booming by my company. This would obviously have a positive economic impact for my company.

Aside from the positive economics for the company, we also firmly believe in the safety and free transit of vessels in the harbor. As such, we support a widening of the main channel and turning basin as these improvements will provide safer transit of vessels and more efficient vessel traffic flow.

Being in the Northeast and in Connecticut in particular, the economic situation has not been as plentiful as in the past. As a result, any effort which could serve as a impudence toward expanded port traffic and operations would be plus.

The bottom line is we fully support the Army Corps of Engineers deepening and widening efforts for New Haven Harbor.

Best regards,

Ralph Gogliettino
Principal

NEW HAVEN PORT AUTHORITY
P.O. BOX 8716
NEW HAVEN, CONNECTICUT 06531

November 15, 2018

U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742
Attention: Todd Randall

RE: Draft Integrated Feasibility Report ("IFR") & Environmental Impact Statement ("EIS")

Dear Mr. Randall:

As the local sponsor for the Navigation Improvement Project in New Haven Harbor, the New Haven Port Authority ("the Port") concurs with the findings presented in the draft report and applauds the alternatives that have been identified in the EIS for disposal of the dredge material. The Port's only concern rests in the inclusion of the cost to relocate the Cross Sound Cable in the project budget

The Port of New Haven is strategically located at the junction of I-95 and I-91, with freight rail service that has seen significant growth since being reestablished after more than a decade off-line to accommodate the construction of the Pearl Harbor Memorial Bridge. The Port also hosts the Buckeye Pipeline. An increase in the controlling depth of the federal channel from 35 to 40 feet has been a long awaited infrastructure improvement for terminal operators here. Having previously been authorized at 40 feet, but never constructed, the deepening of the federal channel has been consistently raised by the terminal operators as a much needed infrastructure improvement. In fact, many of the terminals, in anticipation of a deeper draft channel, have undertaken dockside and landside improvements to accommodate a deeper controlling draft.

The IFR accurately examined and describes the cargo handled in New Haven. In addition to being the busiest port on Long Island Sound, the Port is second only to Boston in New England in volume of cargo handled. The Port of New Haven is a multi-modal port representing an asset and economic generator both locally, to the region and beyond. It is worth noting that jet fuel is

transported via the Buckeye Pipeline from the port of New Haven to Bradley International Airport and the Air National Guard base in Massachusetts.

The New Haven Port Authority fully supports both the IFR and the EIS and is committed to seeing this project move to construction. However, as previously stated, it is concerned with the inclusion of the cost to relocate the Cross Sound Cable in the project budget. It is its fear that the inclusion of those costs will impact the Benefit Cost Ratio and may limit its ability to secure an appropriation for the construction of this project.

The emphasis of the New Haven Port Authority continues to be increasing the volume of waterborne commerce at our port and to facilitate more efficient and safer transport of cargo both on its waters and over land.

Sincerely,

Katharine Goodbody
Chairwoman

Telephone: 203 946-6778 e-mail: portauthority@newhavenct.gov

The American Waterways Operators

801 North Quincy Street
Suite 200
Arlington, VA 22203

PHONE: 703.841.9300, ext. 251
EMAIL: bvahey@americanwaterways.com

Brian Vahey
Senior Manager – Atlantic Region

November 15, 2018

Mr. Todd Randall
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Re: Draft Feasibility Report and EIS for the New Haven Harbor Navigational Improvement Project Study (COE-2016-31210)

Dear Mr. Randall:

The American Waterways Operators is the national trade association for the U.S. tugboat, towboat and barge industry. Our industry is the largest segment of the nation's 40,000-vessel Jones Act fleet and moves more than 760 million tons of cargo each year safely and efficiently. This includes more than 80 percent of New England's home heating oil, 60 percent of U.S. export grain and significant bulk commodities imported to and exported from New England states. On behalf of our over 300 AWO member companies, thank you for the opportunity to comment on the Draft Feasibility Report and EIS for the New Haven Harbor Navigational Improvement Project Study.

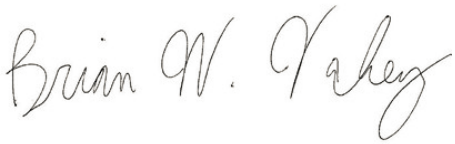
AWO members play a pivotal role in the safe and efficient movement of commerce throughout the Northeast Region. In Connecticut alone, the maritime industry moves more than two million tons of petroleum products, including home heating oil, and contributes millions of dollars to the state economy. The efficiency of maritime commerce helps to keep traffic off the roads, benefiting the environment, decreasing fatalities and improving the quality of life in Connecticut and throughout the Northeast region. A single dry cargo barge can haul 1,750 tons of cargo, the same amount of cargo as 16 bulk rail cars or 70 tractor trailers. Similarly, in order to move 27,500 barrels of liquid cargo, it would take 144 tanker trucks or 46 rail cars, compared to a single barge.

AWO supports the U.S. Army Corps of Engineers' preferred approach to improve the operational efficiency of New Haven Harbor. The plan to deepen the channel and turning basin to 40 feet and to widen the navigation channel to a minimum of 500 feet will make navigation

in the harbor safer and create new opportunities for AWO members. Several AWO member companies are active in New Haven Harbor, moving petroleum and aggregate to the terminals along the waterfront, conducting crew changes, mooring barges, and managing other types of projects that require adequate space to navigate. In addition to tug and barge traffic, large ocean-going ships call on the port in New Haven and require towing vessel ship assists to maneuver into berth. This proposed project will help harbor stakeholders manage all of these jobs safely and efficiently.

Given the importance of this project to tug and barge operators, AWO encourages the Corps to continue to work closely with the New Haven and Connecticut Port Authorities and with local maritime industry stakeholders to help make this project a reality. Thank you again for the opportunity to comment. We would be pleased to answer any questions you have.

Sincerely,



Brian W. Vahey
Senior Manager – Atlantic Region

CITY OF NEW HAVEN
TONI N. HARP, MAYOR

PREPARED COMMENT OF THE CITY OF NEW HAVEN

RE: NEW HAVEN HARBOR CONNECTICUT NAVIGATION IMPROVEMENT PROJECT
DRAFT INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

November 15, 2018

I. Summary

The City of New Haven ("City") respectfully offers this written comment concerning the New Haven Harbor Connecticut Navigation Improvement Project Draft Integrated Feasibility Report and Environmental Impact Statement. The City, together with the New Haven Port Authority, supports the efforts of the Army Corps of Engineers, New England Division ("ACOE"), to improve the navigability of New Haven Harbor and, in turn, to support the economic development of the Port of New Haven ("the Port"). There is significant unrealized economic potential due to the current depth of the federal navigation channel. The current depth restricts the type of ships that call on New Haven and all but forecloses opportunities for container services to call on New Haven. While the City is a regional leader in petroleum and other commodities; direct and indirect economic value will be enhanced substantially through improved navigation for larger ships and more diverse trade. The deepening of the federal navigation channel is likewise consistent with the City's forward thinking vision for sustainable economic growth and, more importantly, is consistent with the interests of the United States by supporting economic development through intermodal and waterborne transportation.

II. Context

The City is the socio-economic center of south central Connecticut and among the fastest growing cities in New England in terms of both population and economic significance. There are over 80,000 jobs in the City, making up approximately a quarter of the jobs in the New Haven MSA. Economic

drivers in higher education, the life sciences, advanced manufacturing, information technologies and supporting service industries are catalyzing new job growth. New Haven also is a major transportation hub. In addition to the Port, New Haven is home to two Interstate Highways (91 & 95); the Northeast Corridor rail line; and freight rail. The Port is a leading port of call on the Atlantic Seaboard and Connecticut's commercial port for the import of home heating oil, gasoline, and road salt. Given the significance of our Port to the economy of the Northeast, the City established a 366-acre Port district and the Port Authority itself to facilitate job growth through waterborne transportation. With assistance for the new Connecticut Port Authority, New Haven is even more well-positioned to attract new business.

III. Comments

The City is pleased to see that the ACOE has conducted a thorough assessment of environmental impacts and identified a cost-effective approach to the deepening of the federal navigation channel and the disposal of dredge material. However, we understand that the Army Corps is still carrying the cost of relocation of the Cross Sound Cable as part of the Total Investment Cost on Table ES-3, as well as on Table ES-4, Table 5-4a, and Table 5-4b. The City respectfully disagrees with the inclusion of the cable as a project cost and recommends that this cost should not be borne against the cost-benefit analysis. Given that the permit for the construction of the cable in 2002 required the cable to be buried to a depth of at least -48 feet MLLW in the Federal channel, the cost of corrective action should not present an inconvenience or adverse effect to this very important port deepening project.

IV. Closing

The City appreciates the efforts of the ACOE, working with partners at the Connecticut Port Authority and New Haven Port Authority, to undertake this important and timely project. In light of the economic development potential of the Port of New Haven, the demonstrated needs of the shipping community and the readiness of the Port to accommodate responsible growth, the City supports the project and looks forward to a constructive partnership from planning through to implementation.

Respectfully submitted,

CITY OF NEW HAVEN

Michael Piscitelli, AICP
Deputy Economic Development Administrator
City of New Haven
165 Church Street
New Haven, CT 06510

Connecticut PORT AUTHORITY

U.S. Army Corps of Engineers
ATTN: Mr. Todd Randall
New England District
696 Virginia Road
Concord, MA 01742

November 15, 2018

Subject: New Haven Harbor Draft Integrated Feasibility Report and Environmental Impact Statement (D-IFR/EIS) – Comments

Mr. Randall,

The Connecticut Port Authority (CPA) would like to express our strong support for the New Haven Harbor Draft Integrated Feasibility Report and Environmental Impact Study.

The CPA recently released a five-year maritime strategy for Connecticut. A key component of that strategy is working with our partners and the U.S. Army Corps of Engineers to invest in and support dredging projects throughout Connecticut that will sustain and increase the use of our ports, waterways and marinas well into the future. In support of that strategy, CPA supports the Tentatively Selected Plan (TSP) to deepen the channel depth and the turning basin to -40-feet.

The TSP reduces transportation cost, improves navigation through the bend at breakwaters and promotes environmental benefits. The navigation inefficiencies that currently exist were investigated and summarized in the TSP to provide a safe, reliable, efficient, and environmentally sustainable waterborne transportation system. The TSP determined that the navigation improvements to the existing Federal navigation project at the New Haven Harbor are warranted and are in the State and Federal interest.

The TSP outlines several base plan placement sites, to beneficially use the 4.27-million cubic yards of sediment and 43,500 cubic yards of rock. The plan utilized two placement sites in the West River and the Morris Cove borrow pits to place only clean dredge sediment. The rock will be used to create an artificial reef near the West Breakwater. The base plan also includes oyster habitat creation will be developed behind the east breakwater and the balance of the material will go to the Central Long

CONNECTICUT PORT AUTHORITY
455 Boston Post Road Suite 204 | Old Saybrook, CT 06475 | P: 860-577-5174 | CTPortAuthority.com

Island Sound Disposal Site to cover historic disposal mounds. The CPA supports all of these options. Additionally, the CPA supports the opportunity to create approximately a 70-acre salt marsh at Sandy Point, West Haven. The Beneficial Use Plan utilizes 840,000 cubic yards of dredge material to create the marsh. Project elements that support the reduction of open water disposal is encouraging, and creates ecosystem habitat benefits that do not currently exist in this particular location.

The CPA would also like to express our strong support for the removal of the Cross Sound Cable cost from the Benefit Cost Ration analysis (BCR). We believe that revision is essential to the success of the project. The CPA would like this issue resolved at the Agency Decision Milestone meeting being held January 2019. The owner of the cable should be held in compliance of the permit issued to relocate if a deepening is to occur. The TSP project depth of -40-feet has a BCR of 1.90 with the inclusion of the cable relocation cost. It is the CPA's opinion that a BCR below 2.0 is not a likely priority project for funding. Reduction in the project cost will raise the BCR to over 2.0, thus making it more attractive to receive funding authorization. Your authority through the Rivers and Harbors Act of 1899 – to handle physical encroachments within a channel – is encouraged in this matter.

The Connecticut Port Authority strongly supports the Navigational Deepening Improvement of the New Haven Harbor Channel and Turning Basin. The Port of New Haven is the largest port in Connecticut and is the second largest port in New England. Therefore, it is a top priority of the Connecticut Port Authority to improve the channel depth and width to ensure safe navigation and maintain existing commercial activities. The improvement dredging of the channel and turning basin must progress as scheduled in order to maintain the economic viability of the port and Connecticut's maritime economy.

Sincerely,

Scott Bates
Chairman

US Army Corp of Engineers, New England District
Attention: Mr. Todd Randall
696 Virginia Road
Concord, Massachusetts 01742-2751

Re: New Haven Harbor Deepening Project

Dear Mr. Randall,

This letter is written in support of the proposed deepening project for New Haven Harbor. The project would bring a great deal of increased safety for commercial vessels. As the newest licensed pilot in Connecticut, safe and economical business is the most important factor that will insure that I have a long and successful career.

As of now, ships with a draft of 36 feet or more must lighter offshore prior to entering the port. The cost of ship lightering is very expensive and poses its own risks for environmental damage. Because of these hurdles, ships have often been diverted to New York and Boston. Deepening would promote more ship traffic at a cheaper cost to shippers. More ship traffic would bring much needed work to the local longshoremen and terminal operators that depend on the ports maritime business to survive.

As far as the safe piloting of the harbor, the current channel depth and width poses zero room for error. The project would increase safety tremendously as we would require less rudder and power to steer through the turn at the entrance. In addition, there would be less affect from the bank suction, which reduces the risk of the ship sheering and losing control.

In conclusion, the proposed project has my full support along with my colleagues from Interport/Connecticut State Pilots. Please feel free to reach out to us with any question or concerns.

Very Respectfully,

Captain Sean Meade
Interport/Connecticut State Pilots

CONNECTICUT DEPARTMENT OF AGRICULTURE
PO Box 97, 190 Rogers Avenue, Milford, CT 06460
Bureau of Aquaculture

The Connecticut Department of Agriculture Bureau of Aquaculture and Laboratory is the lead state agency for the regulation of shellfish harvest in the state. The Department administers shellfish franchises and shellfish leases for the State of Connecticut, for the purpose of planting and cultivating shellfish.

The Department of Agriculture recognizes the critical importance of the Army Corps of Engineers (ACOE) New Haven Harbor Improvement Project, increasing the depth of the navigational channel and expanding opportunities for commerce within the state and region, and appreciates the opportunity to participate in the permitting process via discussions with the Corps and the Connecticut Department of Energy and Environmental Protection (DEEP). The Department seeks to assist the Corps in the development of a project which ultimately achieves much needed commerce modernization improvements, while minimizing impacts to existing shellfish operations and active shellfish production areas. The Department would like to provide comment on several key components of the project as follows:

Increasing the depth of the channel from 35 feet to 40 feet:

The New Haven Harbor navigational channel intersected a number of shellfish beds when originally designated in 1850. Although these historical franchise and lease beds are still in existence, increasing the depth of the channel is likely to have minimal practical impact to shellfish production, as the channel has been dredged repeatedly in recent years and in likely no longer as suitable for shellfish habitat as it was under pre-dredge conditions.

Expansion of the width of the channel by 50 feet on each side:

The project seeks to expand the width of the channel by 50 feet on each side, encompassing an additional 75 acres of commercial shellfish beds. Increasing the width and then reestablishing a 2 to 1 slope may negatively impact acreage at the upper surface of the channel bank, an area that has not been previously disturbed. The Department will continue to work with ACOE and the designated contractor to help ensure minimal impacts to these beds.

The Department has several administrative options available in terms of the existing shellfish leases in the project area, parcels 593 and 673. Leases typically have a three-year term with a right of preference to renew unless the Commissioner with cause, ceases to lease such ground for shellfish culture.

A commercial shellfish operation had expressed an interest in leasing inactive parcel 593. In consideration of the navigational channel project, the Department has declined this lease request in order to allow the channel widening to proceed without impact. The Department has sought to assist that operation and has issued a new lease in another location at their request. The area described as lease 593 is not currently productive shellfish grounds, and enhancement of more suitable area

elsewhere in the project vicinity would have an overall greater benefit to oyster habitat than that currently provided by this area.

Filling of the Morris Cove borrow pit:

The filling of the Morris Cove borrow pit to within 20 feet of the surface will require a detailed operational plan with the designated contractor. The Department will work cooperatively with the DEEP to ensure that the operational plan: 1) specifies appropriate dredging windows, and 2) includes a plan to ensure that disposal is conducted in a manner that minimizes impacts to critical shellfish resource in the vicinity.

Breakwater oyster habitat development:

The construction of a new oyster habitat area inside the eastern breakwater along the navigational channel turn will utilize native material dredged during the deepening and widening of the channel.

By way of correction to the information in the project Environmental Impact Statement (EIS), rock removed from former lease 593 should be placed on the north side of the western breakwater in the vicinity of shellfish lease 673, rather than on the south side as described in the EIS.

Sandy Point salt marsh development:

The construction of the salt marsh on the north side of Sandy Point, West Haven will impact an acreage of ten, comprised of several small shellfish parcels. The Department will work with impacted industry towards a resolution to address these losses as the project moves forward.

The Department appreciates the extent to which the mitigation of shellfish resource habitat losses and the enhancement of additional oyster habitat are being considered in the overall project development. We will continue to work with the Corps to ensure that the New Haven Harbor Improvement Project proceeds with minimal impact to shellfish resources and associated commercial shellfish activities, in order to achieve an overall beneficial outcome for navigation and commerce in New Haven Harbor.

David H. Carey
Director Bureau Aquaculture & Laboratory

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

November 15, 2018

Todd Randall
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord Massachusetts 01742

Subject: Draft Environmental Impact Statement (DEIS) and Draft Integrated Feasibility Report for the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut (EIS No. 20180224)

Dear Mr. Randall:

The U.S. Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers (USACE) DEIS pursuant to our responsibilities under the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act.

The DEIS evaluates the potential impacts of proposed deepening and widening of the existing USACE New Haven Harbor Federal Navigation Project (FNP). The USACE FNP in New Haven was completed in 1950 and last maintained in 2014 when approximately 830,000 cubic yards of shoal material was dredged. The new improvement dredging includes deepening the main ship channel, maneuvering area and turning basin, and widening the primary channel and turning basin to allow deep draft vessels to efficiently access the port terminals. The proposed project proposal includes dredging approximately 4.28 million cubic yards of silty material and blasting and removal of 43,500 cubic yards of rock from the channel. Most of the dredged material will be disposed at the Central Long Island Sound Disposal Site (CLDS) and some of the sediment will be beneficially used to create shellfish (oyster) habitat, a saltmarsh, and to fill two existing borrow pits in the harbor. The blasted rock will be used to create a reef. Overall increased water depths in the FNP created by the project will result in transportation cost savings for port users and will make operations at the Port of New Haven more efficient.

While EPA supports this dredging effort, our attached comments identify General Conformity issues that should be considered during project development and offer suggestions regarding project design measures that could be implemented to help avoid impacts during the dredging, disposal and use of dredged material generated by the project. We intend to continue to work closely with the USACE to help address these important issues.

Effective October 22, 2018, EPA will no longer include ratings in our comment letters. Information about this change and EPA's continued roles and responsibilities in the review of

federal actions can be found on our website at: https://www.epa.gov/nepa/epa-review-process-under-section-309-clean-air-act.

EPA appreciates the opportunity to review this DEIS. If you have any questions regarding our comments, please contact me at 617/918-1025 or timmermann.timothy@epa.gov.

Sincerely,

Timothy Timmermann, Director
Office of Environmental Review

General Conformity

The New Haven Harbor Navigation Improvement Project is situated in New Haven County, Connecticut. New Haven County (as part of the New York-N. New Jersey-Long Island, NY-NJ-CT air quality control region) is designated by the EPA as a moderate non-attainment area under both the 2008 and the 2015 8-hour ozone standards. The area is designated as attainment for all other NAAQS (see 40 CFR §81.307).

Projects located within a non-attainment area must be evaluated for applicability to the Federal General Conformity regulations found at 40 CFR 93.150-165. Specifically, if the total of direct and indirect emissions of a criteria pollutant or precursor in a non-attainment or maintenance area caused by a Federal action would equal or exceed the applicability thresholds established in 40 CFR 93.153, the requirements of general conformity must be satisfied. The *de minimis* General Conformity applicability thresholds are listed in 40 CFR 93.153.

The estimated project emissions included in Appendix L of the DEIS for the New Haven Harbor FNP indicate that emissions will not exceed either the 100 tons per year (tpy) *de minimis* General Conformity applicability threshold for NOx or the 50 tpy threshold for VOCs. According to the DEIS, the proposed project estimated annual NOx and VOC emissions for the three construction years of the project are 79.83 tpy of NOx and 11.28 tpy of VOC for year one, 99.06 tpy of NOx and 114.28 tpy of VOC for year 2, and 73.71 tpy of NOx and 10.42 tpy of VOC for year three. Under the current non-attainment classification for New Haven County the estimated project emissions would not trigger General Conformity.

However, the USACE should be aware that under the 2008 8-hour ozone standard, New Haven County is subject to reclassification to serious non-attainment due to failure to attain the 2008 8-hour ozone NAAQS by the July 20, 2018 attainment date (see 40 CFR 51.1103). As was explained during a recent conversation with USACE Resources Section program staff, EPA has published a notice of proposed rulemaking in the Federal Register that includes reclassification of New Haven County to serious non-attainment (83 FR 56781). The *de minimis* threshold in a serious non-attainment area is 50 tpy for both NOx and VOCs. Reclassification could affect the USACE's General Conformity applicability analysis for the project.

Recommendation: EPA requests the opportunity to consult and coordinate with the USACE and the State of Connecticut Department of Energy and Environmental Protection regarding the relationship between the timing of USACE's General Conformity applicability analysis and the future reclassification of New Haven County. Please contact Mr. John Rogan of EPA's Air Unit at 617/918-1645 or rogan.john@epa.gov to discuss project General Conformity issues in greater detail.

Reducing Diesel Emissions

The DEIS includes a general commitment to limit construction and use "clean" equipment. Given the public health concerns about diesel exhaust from heavy duty diesel trucks and other heavy-duty construction equipment, EPA encourages the USACE to commit to the use of newer vintage diesel engines whenever possible. Alternatively, we encourage the USACE to require diesel retrofits whenever practicable, require the use of cleaner fuels, and institute idle reduction measures to minimize emissions from diesel construction equipment. Retrofit technologies may include EPA verified emission control technologies and fuels and CARB-verified emission control technologies. A list of these diesel exhaust control technologies can be accessed at https://www.epa.gov/verified-diesel-tech/manufacturer-contact-list-clean-diesel. A list of approved idle reduction technologies can be found on the Agency's SwartWay site here: https://www.epa.gov/verified-diesel-tech/smartway-verified-list-idling-reduction-technologies-irts-trucks-and-school. We also encourage operator training to reduce unnecessary idling of equipment to supplement the adoption of these technologies.

The Northeast Diesel Collaborative has prepared model construction specifications to assist in developing contract specifications that would require construction equipment to be retrofitted with control devices and use clean fuels to reduce diesel emissions. The model construction specifications can be found on the Northeast Diesel Collaborative web site http://northeastdiesel.org/pdf/NEDC-Construction-Contract-Spec.pdf.

Recommendation: We recommend that the USACE identify specific exhaust emission mitigation measures to help reduce and minimize the air quality impacts from construction of the proposed project in the FEIS and more fully describe how commitments to these measures will be secured from the contractors selected to perform project related construction.

Outstanding Technical and Design Issues for Unsuitable Material Disposal

EPA previously concurred with the USACE suitability determination that project sediments are acceptable for ocean disposal except for dredged material in the general vicinity of the port terminals represented by Composites 6 and 7. This material is to be disposed in a Confined Aquatic Disposal (CAD) cell. EPA supports this approach and notes that additional analysis and design work will be necessary to implement this approach.

Recommendation: EPA requests the opportunity to continue to coordinate with the USACE on the design and implementation of the CAD cell for the unsuitable dredge material. If available, updated information should be provided in the FEIS regarding the CAD cell design, location, and development resulting from this coordination.

Beneficial Use of Dredged Material

Consistent with the goal of EPA's 2016 rule to modify the designation of the Central Long Island Sound Disposal Site, which is to "reduce or eliminate open-water disposal of dredged material," EPA agrees with the overall strategy to use dredged material to establish habitat for oysters, fill in existing borrow pits to create winter flounder habitat, and create a salt marsh and a rock reef.

Development of each of these disposal/use options will require thoughtful design, planning and coordination. The DEIS commits to developing and coordinating "adaptive management and corrective actions related to [the] salt marsh creation placement site."

Recommendation: EPA appreciates the USACE commitment to coordinate on the salt marsh creation portion of the project. We recommend that the USACE coordinate closely with all cooperating agencies and we intend to continue to work with the USACE on the design of each of the beneficial use projects. Mr. Ed Reiner (617/918-1692 or reiner.ed@epa.gov) will serve as the point of contact for the salt marsh creation work and Ms. Jeannie Brochi (617/918-1536 or brochi.jean@epa.gov) will serve as the EPA point of contact for all of the other beneficial use projects.

Measures to Avoid and Minimize Impacts

EPA generally agrees with the list of actions proposed to "minimize adverse impacts to natural and economic resources." We support the implementation of the identified time-of-year restrictions to protect sensitive life stages of fish and shellfish in the project areas during dredging and disposal activities. We concur that prohibition on barge overflow during the dredging associated with the project will help minimize impacts.

While suitable for ocean disposal, the dredged material contains elevated levels of metals, Total PAHs and Total PCBs that should be fully considered in the context of habitat restoration. Not all the dredged material is necessarily desirable for habitat restoration due to the potential for adverse effects to benthic organisms. As identified in Appendix J, the majority of inner harbor stations (except D,H, I, and X) had detectable concentrations of metals, Total PAHs, Total PCBs, and pesticides that were above the effects-range low (ERL) but below the effects-range medium (ERM) values which describe how contaminant levels equate to the probability for toxic effects. A subset of inner harbor stations had concentrations of certain metals (copper, mercury, and zinc), Total PAHs, or Total PCBs that were above the ERM. Sub-samples with ERM exceedances were more common in the extreme inner harbor stations near the turning basin and terminals. Use of this material for habitat creation would introduce a stressor to the environment increasing the risk for reduced species diversity and survival.

Recommendation: EPA recommends that the habitat restoration work prioritize the use of sediments from the outer harbor over more contaminated inner harbor sediments.

MORAN
Shipping Agencies, Inc.

Moran Companies
Moran Transportation Ind., Inc.
Moran Shipping Agencies, Inc.
Moran Shipping Agency of Texas, Inc.
Moran-Gulf Shipping Agencies, Inc.
Moran-Pacific Shipping Agencies, Inc.

Going Beyond the Call...*Since 1937*

To: U.S. Army Corps of Engineers New England District
Attn: Todd Randall
Ref: New Haven, CT Dredging
From: Moran Shipping Agencies

Good Day Mr. Randall

Dredging in New Haven Harbor is a needed endeavor. Moran Shipping Agencies fully supports this project. Moran Shipping represents approximately 100 foreign and US flagged vessels that call on the ports of Connecticut annually. The proposed dredging of New Haven Harbor Channel will only increase the potential for more vessels to call into New Haven. Many petroleum tankers are forced to employ costly "lightering" operations at New Haven Anchorage in order to meet a safe transit draft into the harbor. This increases costs and causes delays to the operations. These charges are passed onto the charterers and owners of the vessels' which cause them to look else where to make their bulk deliveries.

As sizes of vessels' increase due to the expansion of the Panama Canal, New Haven will be put at a disadvantage in the future with new ship builds coming online. These vessels will be longer, wider and deeper. This allows them to carry more cargo which reduces costs for their principals. Facilities within the harbor already have the capabilities to accept these vessels. The dredging will allow them to enter port without having to lighter or call another deeper port in advance of the New Haven port call.

The State of Connecticut faces several hurdles economically. However, the location of the state in relation to the Northeast corridor and intermodal access to the port are a bright spot on the state's horizon. A deeper channel will mean more vessel traffic, which will mean more jobs, taxes and revenue. By going forward with the dredging project, the potential of Connecticut can be realized.

Many thanks for your time and consideration

With Regards

James Gura Jr
Moran Shipping Agencies
Vessel Manager

Central Administration and Accounting
106 Francis Street Providence, RI 02903 Tel: (401) 941-7200 Fax: (401) 461-3360
Email: ri@moranshipping.com www.moranshipping.com

CITY OF WEST HAVEN, CONNECTICUT
HARBOR MANAGEMENT COMMISSION

City Hall | 355 Main Street West Haven, Connecticut 06516

CITY HALL 1898-1967

November 15, 2018

Mr. Todd Randall
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Dear Mr. Randall:

The West Haven Harbor Management Commission has reviewed the draft Environmental Impact Statement for this project and offers the following comments: The Harbor Management Commission supports the dredging of NH Harbor as a vital Connecticut port and driver of the New Haven County economy. Since the City now has an adopted Harbor Management Plan, these dredging plans must also be reviewed by the Commission to assure the dredging plans are consistent with the Plan and will not have a negative impact on the Harbor Management Area.

The Harbor Management Commission supports the improvement and creation of wetlands in the outer Sandy Point area with the utilization of clean dredge material. We do have concerns about the specific siting of these materials, given its location in close proximity to our current boat launch and limited mooring areas.

We seek to both improve the City's boat launching area as well as expand mooring options in the future in this area. Given the City's extensive coastline, it may not be immediately evident of our limited opportunities to do so. While there are multiple acres of open space and miles of sandy beach, much of the area from Sandy Point moving west is unsuitable for both uses. Our primary target area is the north side of Sandy Point to the West River basin. With careful planning and consideration, both the wetlands proposal and the future marine use plans are tenable and harmoniously achievable.

A second serious consideration is the replacement of our WPCA outfall pipe. Our current pipe is past its life expectancy. It's now undersized for our needs moving forward, has suffered damage during large storms due to its design, and has been the subject of a replacement feasibility study. The current pipe, as well as the planned new one, lie directly inside the boundaries of the dredging project with the outfall terminus being on the west side of the channel bank. We are concerned that the draft Environmental Impact Statement shows no assessment of the potential impact of your proposed dredging project on that outfall pipe. We think this is an oversight.

We would like to see both projects demonstrate consideration for the other. Ideally, with two very large excavation events, it makes both economic and environmental sense to complete the work either simultaneously or as close as possible to each other.

We look forward to your response and ask that you contact the City's Assistant City Planner, David Killeen to schedule a meeting with the Harbor Management Commission to review these topics.

Thank you for your consideration,

Eugene Pacapelli
DAK

Eugene Pacapelli, Chairman
Harbor Management Commission

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

November 16, 2018

U.S. Army Corps of Engineers
New England Division
696 Virginia Road
Concord, Massachusetts 01742-2751
Attention: Todd Randall

RE: Integrated Feasibility Report and Environmental Impact Statement
New Haven Harbor Navigation Improvement Project
September 2018

Dear Mr. Randall:

The Department of Energy and Environmental Protections (DEEP) appreciates the opportunity to review the above-referenced document and to submit these comments. DEEP fully supports the proposed widening and deepening of the Federal navigation project at New Haven Harbor. The improvements to the Federal navigation channel will not only improve the efficiency and competitiveness of the Port of New Haven but will also achieve environmental and safety benefits through the elimination of the need to lighter many ships outside the harbor, which will reduce the risk of petroleum product spills or accidents, and the substantial widening of the channel at the bend between the Middle and East Breakwaters which will make navigation to enter New Haven Harbor simpler and safer.

The proposed action, referred to in the Integrated Feasibility Report/ EIS as the tentatively selected plan (TSP), would deepen the navigation channel from -35' MLLW to -40' MLLW, widen the channel by 100' to 500' wide in the inner harbor and 600' wide in the outer harbor, widen the channel at the breakwater bend from 560' to 800', and widen the turning basin adjacent to the commercial terminals by 200' to the north. To accomplish this, 4.27 million cubic yards of sediments and 43,500 cubic yards of rock would be removed. We understand that these volumes, as contained in the report, have been somewhat refined since the time of its preparation and may yet undergo further refinement.

DEEP is also supportive of the proposed beneficial use of up to 1.93 million cubic yards of the removed sediments and rock at five placement sites to create oyster habitat, fill in two existing borrow pits, and create approximately 70 acres of salt marsh. The use of the dredged sediments to fill in the Morris Cove and West River borrow pits will restore 57 acres of benthic habitat in the harbor which would be of particular benefit to winter flounder, but to other species as well. The shellfish habitat creation area leeward of the East Breakwater will not only create 25 acres of favorable shellfish habitat but will mitigate other potential habitat losses due to the salt marsh creation at Sandy Point and the widening of the Federal navigation channel. Lastly, the creation of approximately 70 acres of saltmarsh habitat at Sandy Point will replace a small portion of the large areal extent of such habitat which has been lost in the harbor, estimated in the EIS to be 750 acres over the last two centuries. In addition, these beneficial uses of the dredged materials operate to preserve capacity at the Central Long Island Sound Disposal Area.

Previous Coordination between DEEP and the Corps of Engineers

DEEP, particularly through the Land and Water Resources Division, has been coordinating with the Army Corps of Engineers on this project since the scoping process began in January 2017. DEEP's scoping comments of February 27, 2017 highlighted support for this project based on its expected consistency with the policies of Connecticut's Coastal Zone Management Program, cited the need for regulatory approvals from DEEP including a Federal Coastal Consistency Determination and a Section 401 Water Quality Certificate, noted potential fisheries habitat and dissolved oxygen concerns, discussed issues arising from the relocation of the Cross Sound Cable, and expressed support for the beneficial reuse of the dredged sediments.

In particular, DEEP has coordinated with the Corps on the various options for the reuse and disposal of the dredged sediments and we are supportive of the Corps' proposed options. However, the various approaches may each create their own set of impacts which will need to be addressed. For example, the need for a structural barrier to enclose and contain the sediments at the saltwater marsh creation project at Sandy Point will need to be assessed. Also, to ensure the success of the wetland development at this location, a planting and monitoring plan may be required. DEEP will also need to ensure that any materials to be disposed of at the Central Long Island Sound Disposal Site will have been tested and are appropriate for open-water disposal. This is typically done during the Water Quality Certification process. That said, DEEP is supportive of this New Haven Harbor navigation improvement project including the various disposal options.

Winter Flounder Seasonal Restrictions

Winter flounder is the most important fishery species in New Haven Harbor and is dependent on the harbor's habitat for all life stages. To protect this species, the EIS specifies on page 118 that no dredging or materials placement will occur between February 1 and June 30. It is unclear if this commitment supersedes the timeframes given in Appendix H, *Draft Essential Fish Habitat Assessment,* which contains in Section 4.2 a tiered seasonal restriction of no project activities occurring between February 1 and June 30 for portions of the harbor north of Sandy Point, and no project activities occurring

between April 1 and June 30 for areas south of Sandy Point. DEEP Fisheries Division prefers the single February 1 through June 30 seasonal restriction for all of New Haven Harbor.

Cross Sound Cable

Page 88 of the EIS discusses the need to increase the depth of burial of the Cross Sound Cable to -48' MLLW for those areas where it does not currently meet this requirement, which corresponds to the area of ledge just north of the channel bend. For this approximately 700' segment, the cable is installed at depths as shallow as -41.5' MLLW. As discussed in the DEEP scoping comments of February 27, 2017, relocation or deeper burial of the cable will require a new Certificate of Permission from the DEEP Land and Water Resources Division. Micheal Grzywinski can be contacted in this regard and can be reached at (860) 424-3674 or at Micheal.grzywinski@ct.gov. Cross Sound Cable is also advised to contact the Connecticut Siting Council to determine what, if any, modifications may be necessary to the approval given by the Council for the cable in its Docket 208 decision.

Shellfish Habitat Creation Area

The shellfish habitat creation area north of the East Breakwater is proposed to be created using the fairly limited volume of suitably sandy material to be dredged as part of the TSP. This volume is estimated to be 351,300 cubic yards for a 40' channel depth, with the area of created shellfish habitat to be twenty-five acres according to page 120 of the EIS. If the volume of suitable sandy substrate should increase in subsequent sediment surveys, expansion of the area of enhanced shellfish habitat should be considered as both a beneficial use for this material and an avenue to compensate for potential losses of shellfish habitat from other elements of the project. Discussions with the Bureau of Aquaculture have indicated that the proposed shellfish habitat creation area could be expanded without encroaching upon any active shellfish lease areas and that the Bureau would support such an expansion.

DEEP Natural Diversity Data Base

There is no indication in the EIS that any coordination has taken place with the DEEP Natural Diversity Data Base regarding this project. The most recent record of any contact between the Corps and the Natural Diversity Data Base for New Haven Harbor dates from 2013 and concerns the last maintenance dredging project at New Haven. The specific area of interest to NDDB biologists is Sandy Point and the adjacent wetlands creation area. In addition to the three Federally-listed bird species discussed in the EIS (piping plover, red knot and roseate tern) which occur at Sandy Point, there are a number of State-listed bird and plant species occurring there. The Corps should contact the NDDB at DEEP.nddbrequest@ct.gov concerning a survey request for Sandy Point and the surrounding area. Alternatively, Dawn McKay, a wildlife biologist with the NDDB program, can be contacted at (860) 424-3592. Avoidance and protection strategies for any listed species present at the site will be specified in the NDDB survey response.

Miscellaneous Commentary

Fort Hale Park is described on page 34 as being a 20-acre State-owned, City-run park. The vast majority of the once State-owned acreage was turned over to the Coast Guard when the adjacent Coast Guard station was developed. DEEP's residual ownership, which consisted of 0.4 acres of property and the park pier, was transferred to the City of New Haven in 2016. The State has no remaining ownership interest in Fort Hale Park.

The goal of eliminating lightering operations for larger or more heavily-laden ships entering the harbor is cited on pages 68, 71, 72 and 92 in the EIS and would certainly be a benefit of the project both in terms of improving efficiency and reducing the risk of any spills. The EIS treats this subject in a purely generic fashion. Is any information available as to what percentage of inbound ships require lightering and what is the frequency of any spills or other mishaps that occur during such operations?

The size of the saltmarsh proposed to be created at Sandy Point may not be precisely determined until permitting and final design. It is noted here that the area is described in several locations in the EIS including pages 93 and 94 as being 70 acres and in other areas, including pages 81, 108 and 119, as being 73 acres.

Discussion on page 59 of the EIS under *Historic Context* says Yale University was established in Saybrook in 1717 and subsequently moved to New Haven. Yale actually was founded in Saybrook in 1701, American's third oldest institution of higher learning, and moved to New Haven in 1716.

Thank you for the opportunity to submit these comments. Feel free to contact me at (860) 424-4110 or at Frederick.riese@ct.gov should you have any questions concerning them. Best wishes to you and the Corps as you proceed with the planning for this project.

Respectfully yours,

Frederick L. Riese

Frederick L. Riese
Senior Environmental Analyst

cc: Commissioner Rob Klee
Brian Thompson, Land and Water Resources Division
Peter Francis, Land and Water Resources Division
Justin Davis, Fisheries Division
David Carey, Bureau of Aquaculture
Micheal Grzywinski, Land and Water Resources Division

Blumeris, Barbara R CIV USARMY CENAE (USA)

From: Randall, Todd A CIV USARMY CENAE (US)
Sent: Friday, November 16, 2018 4:24 PM
To: Blumeris, Barbara R CIV USARMY CENAE (USA)
Cc: Mackay, Joseph B CIV USARMY CENAE (US)
Subject: FW: [Non-DoD Source] Re: FW: New Haven Harbor DIFR/DEIS released

NMFS-PRD comments on New Haven EIS

-----Original Message-----
From: Zachary Jylkka - NOAA Federal [mailto:zachary.jylkka@noaa.gov]
Sent: Friday, November 16, 2018 4:15 PM
To: Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil>
Subject: [Non-DoD Source] Re: FW: New Haven Harbor DIFR/DEIS released

Hi Todd,

Sorry to be late giving you feedback on this. Per our discussion on the phone this afternoon. My one main comment is that you did not consider the presence of migrating and foraging adult shortnose sturgeon, which could be present in the action area from April through November. I can provide some more detail on shortnose if you'd like. We are not prepared to concur with your preliminary NLAA determination, as the EIS does not include a full analysis of the potential effects of the project on listed species.

Let me know if you have any questions.

Best,
Zach

On Tue, Oct 2, 2018 at 3:40 PM Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil <mailto:Todd.A.Randall@usace.army.mil> > wrote:

Z/M,

Forgot to include you in the email below - apologies!

TODD

-----Original Message-----
From: Randall, Todd A CIV USARMY CENAE (US)
Sent: Tuesday, October 2, 2018 1:36 PM
To: Jeanie Brochi (brochi.jean@epa.gov <mailto:brochi.jean@epa.gov>) <brochi.jean@epa.gov <mailto:brochi.jean@epa.gov> >; 'Lyons, Regina' <Lyons.Regina@epa.gov <mailto:Lyons.Regina@epa.gov> >; 'Alison Verkade - NOAA Federal' <alison.verkade@noaa.gov <mailto:alison.verkade@noaa.gov> >; christopher.boelke@noaa.gov <mailto:christopher.boelke@noaa.gov> ; 'Corsair, Cynthia' <cynthia_corsair@fws.gov <mailto:cynthia_corsair@fws.gov> >; 'David Simmons' <David_Simmons@fws.gov <mailto:David_Simmons@fws.gov> >; Andrew, Shannon L LTJG <Shannon.L.Andrew@uscg.mil <mailto:Shannon.L.Andrew@uscg.mil> >

Cc: Mackay, Joseph B CIV USARMY CENAE (US) <Joseph.B.Mackay@usace.army.mil <mailto:Joseph.B.Mackay@usace.army.mil> >; Blumeris, Barbara R CIV USARMY CENAE (US) <Barbara.R.Blumeris@usace.army.mil <mailto:Barbara.R.Blumeris@usace.army.mil> >
Subject: New Haven Harbor DIFR/DEIS released

Greetings Federal Folk,

Just wanted to give you an informal heads up that the Corps has released the Draft Integrated Feasibility Report/Environmental Impact Statement for the New Haven Harbor Navigation Improvement project. The report and all its appendices can be found through the USACE link below. I've also included the Federal Register Notice of Availability link. Official coordination letters requesting your review and DVD copies of the report will be out to you shortly, but since I know you are all eagerly awaiting these documents ;-) I thought I'd drop you this email now. What better way to spend a rainy Tuesday afternoon???

USACE website - Direct Link to DEIS and Appendices

Blockedhttp://www.nae.usace.army.mil/Missions/Projects-Topics/New-Haven-Harbor/New-Haven-Harbor-EIS/

Federal Register NOA
Blockedhttps://www.federalregister.gov/documents/2018/09/28/2018-21111/environmental-impact-statements-notice-of-availability

Thanks for your assistance with the New Haven Harbor project. We look forward to moving this forward with you all. Enjoy!

V/R,
TODD

TODD RANDALL
Marine Ecologist
US Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
978-318-8518
todd.a.randall@usace.army.mil <mailto:todd.a.randall@usace.army.mil>

--

Zach Jylkka
Fisheries Biologist
Protected Resources Division

Greater Atlantic Regional Fisheries Office NOAA Fisheries Gloucester, MA 01930 zachary.jylkka@noaa.gov
<mailto:zachary.jylkka@noaa.gov>

office: (978) 282-8467

For additional ESA Section 7 information and Critical Habitat guidance, please see:
Blockedwww.greateratlantic.fisheries.noaa.gov/protected/section7
<Blockedhttp://www.greateratlantic.fisheries.noaa.gov/protected/section7>

Blumeris, Barbara R CIV USARMY CENAE (USA)

From: Randall, Todd A CIV USARMY CENAE (US)
Sent: Friday, November 16, 2018 4:24 PM
To: Blumeris, Barbara R CIV USARMY CENAE (USA)
Cc: Mackay, Joseph B CIV USARMY CENAE (US)
Subject: FW: [Non-DoD Source] Re: FW: New Haven Harbor DIFR/DEIS released

NMFS-PRD comments on New Haven EIS

-----Original Message-----
From: Zachary Jylkka - NOAA Federal [mailto:zachary.jylkka@noaa.gov]
Sent: Friday, November 16, 2018 4:15 PM
To: Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil>
Subject: [Non-DoD Source] Re: FW: New Haven Harbor DIFR/DEIS released

Hi Todd,

Sorry to be late giving you feedback on this. Per our discussion on the phone this afternoon. My one main comment is that you did not consider the presence of migrating and foraging adult shortnose sturgeon, which could be present in the action area from April through November. I can provide some more detail on shortnose if you'd like. We are not prepared to concur with your preliminary NLAA determination, as the EIS does not include a full analysis of the potential effects of the project on listed species.

Let me know if you have any questions.

Best,
Zach

On Tue, Oct 2, 2018 at 3:40 PM Randall, Todd A CIV USARMY CENAE (US) <Todd.A.Randall@usace.army.mil <mailto:Todd.A.Randall@usace.army.mil> > wrote:

Z/M,

Forgot to include you in the email below - apologies!

TODD

-----Original Message-----
From: Randall, Todd A CIV USARMY CENAE (US)
Sent: Tuesday, October 2, 2018 1:36 PM
To: Jeanie Brochi (brochi.jean@epa.gov <mailto:brochi.jean@epa.gov>) <brochi.jean@epa.gov <mailto:brochi.jean@epa.gov> >; 'Lyons, Regina' <Lyons.Regina@epa.gov <mailto:Lyons.Regina@epa.gov> >; 'Alison Verkade - NOAA Federal' <alison.verkade@noaa.gov <mailto:alison.verkade@noaa.gov> >; christopher.boelke@noaa.gov <mailto:christopher.boelke@noaa.gov> ; 'Corsair, Cynthia' <cynthia_corsair@fws.gov <mailto:cynthia_corsair@fws.gov> >; 'David Simmons' <David_Simmons@fws.gov <mailto:David_Simmons@fws.gov> >; Andrew, Shannon L LTJG <Shannon.L.Andrew@uscg.mil <mailto:Shannon.L.Andrew@uscg.mil> >

Cc: Mackay, Joseph B CIV USARMY CENAE (US) <Joseph.B.Mackay@usace.army.mil <mailto:Joseph.B.Mackay@usace.army.mil> >; Blumeris, Barbara R CIV USARMY CENAE (US) <Barbara.R.Blumeris@usace.army.mil <mailto:Barbara.R.Blumeris@usace.army.mil> >
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A7-Public Meetings October 23 and 23, 2018

Public Notice

Transcripts of Meetings

Connecticut Public Notices
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NOTICE OF PUBLIC HEARINGS FOR NEW HAVEN HARBOR (NEW HAVEN

NOTICE OF PUBLIC HEARINGS FOR New Haven Harbor (New Haven, Connecticut) Navigation Improvement Project, Draft Integrated Feasibility Study and Environmental Impact Statement. Tuesday, October 23, 2018 Harry M. Bailey Middle School 106 Morgan Ln, West Haven, CT Doors and Registration open at 5:30 p.m., Hearing begins at 6:30 p.m. Wednesday, October 24, 2018 Hall of Records, Hearing Room 200 Orange Street, New Haven, CT Doors and Registration open at 5:30 p.m., Hearing begins at 6:30 p.m. A Draft Integrated Feasibility Report and Environmental Impact Statement (D-IFR/EIS) has been prepared as part of the New Haven Harbor Navigation Improvement Project Study (NHHNIP). To facilitate efficient and safe navigation and marine commerce in New Haven Harbor (New Haven, Connecticut), navigation improvements (i.e., deepening and widening) to the existing Federal navigation project were studied. The proposed project consists of deepening the main ship channel, maneuvering area, and turning basin to -40 feet MLLW and widening the main channel and turning basin to allow larger vessels to efficiently access the Port of New Haven's terminals. The proposed improvements would remove about 4.28 million cubic yards of predominately glacially deposited silts from the Federal channel. Additionally, approximately 43,500 cubic yards of rock would be blasted and removed from the channel. Several feasible alternative dredged material placement sites were identified and include: an area for shellfish habitat creation, two borrow pits in the harbor, an area for salt marsh creation, an area for rock reef creation, and open water disposal at an EPA designated ocean dredged material disposal site in Long Island Sound. This D-IFR/EIS describes the existing environment of the project area and assesses the impacts of the proposed project. The D-IFR/EIS is available on the USACE web site at: http://www.nae.usace.army.mil/Missions/Projects-Topics/New-Haven-Harbor/ Comments concerning the D-IFR/EIS are requested to be submitted by November 15, 2018. Comments on the D-IFR/EIS should be sent to: U.S. Army Corps of Engineers New England District 696 Virginia Road Concord, Massachusetts 01742 Attention: Mr. Todd Randall Mr. Randall can be reached via phone at (978) 318-8518 or email at NAE-PD-PN@usace.army.mil

Appeared in: ***New Haven Register*** on Wednesday, 10/17/2018

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Corps of Engineers, New Haven Port Authority release New Haven Harbor Connecticut Navigation Improvement Project Draft Integrated Feasibility Report and Environmental Impact Statement for review

Email Print

Posted 9/28/2018

Release no. 18-088

Contact
Tim Dugan
978-318-8264
cenae-pa@usace.army.mil

CONCORD, Mass. – A Draft Integrated Feasibility Report and Environmental Impact Statement (D-IFR/EIS) has been prepared as part of the New Haven Harbor Navigation Improvement Project Study (NHHNIP). To facilitate efficient and safe navigation and marine commerce in New Haven Harbor in New Haven, Conn., navigation improvements (i.e., deepening and widening) to the existing Federal navigation project were studied.

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Comments on the D-IFR/EIS should be sent to:

U.S. Army Corps of Engineers

New England District

696 Virginia Road

Concord, Massachusetts 01742-2751

Attention: Mr. Todd Randall

Mr. Randall can be reached via phone at (978) 318-8518 or by email at

NAE-PD-PN@usace.army.mil

Public Hearings are scheduled for:

Tuesday, October 23, 2018

Harry M Bailey Middle School

106 Morgan Ln, West Haven, CT

Doors and registration open at 5:30 p.m., hearing begins at 6:30 p.m.

Wednesday, October 24, 2018

Hall of Records, Hearing Room

200 Orange Street

New Haven, CT

Doors and registration open at 5:30 p.m., hearing begins at 6:30 p.m.

PUBLIC HEARING ON THE

DRAFT INTEGRATED FEASIBILITY REPORT AND EIS

NEW HAVEN HARBOR NAVIGATION IMPROVEMENT PROJECT

OCTOBER 23, 2018

6:32 P.M.

BAILEY MIDDLE SCHOOL

106 MORGAN LANE

WEST HAVEN, CONNECTICUT

APPEARANCES:

MARK HABEL: CHIEF, NAVIGATION AND ENVIRONMENTAL STUDIES SECTION, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
JUDI SHEIFFELE: EXECUTIVE DIRECTOR, NEW HAVEN PORT AUTHORITY

EVAN MATTHEWS: EXECUTIVE DIRECTOR, CONNECTICUT PORT AUTHORITY
JOHN KENNELLY: CHIEF, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

BARBARA BLUMERIS: PROJECT MANAGER, WATER RESOURCES PLANNING SECTION, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

TODD RANDALL: MARINE ECOLOGIST, ENVIRONMENTAL RESOURCES SECTION, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

(The hearing commenced at 6:32 p.m.)

MR. HABEL: Good evening, and welcome to the public hearing for the New Haven Harbor Navigation Improvement Project.

My name is Mark Habel. I'm Chief of the Navigation and Environmental Studies Section for the United States Army Corps of Engineers, New England District. I will be your moderator and facilitator tonight.

Before we begin, I would like to thank you for getting involved in this review process for the New Haven Harbor Navigation Improvement Project Study.

The New Haven Harbor deepening study is being undertaken by the Corps of Engineers in partnership with the project sponsor, the New Haven Port Authority, and with the Connecticut Port Authority.

The hearing officer tonight is John Kennelly, on the far left, your far right, Chief of the Planning Division for the Corps in New England.

Also from the Corps New England Program and Project Management Division is Erika Mark, and from New England's Engineering and Planning Divisions are Barbara Blumeris, the Project

Manager, Todd Randall, Lisa Winter, and Caitlyn Bryant, from the Corps' Jacksonville District, who prepared the economic evaluation for this study.

Should you need copies of the public notice, hearing procedures, or other information, it is available at the registration table.

Following this introduction, the project sponsors will give brief remarks. Judy Sheiffele is the Executive Director of the New Haven Port Authority. Following Judy will be Evan Matthews, the Executive Director of the Connecticut Port Authority.

Our hearing officer, John Kennelly, will then address the hearing. John will be followed by Barbara Blumeris, who will provide information on the Draft Integrated Feasibility Report for the New Haven Harbor Navigation Improvement Project Study. Barbara will be followed by Todd Randall, who will provide an overview of the environmental investigations conducted during this study.

At the conclusion of the briefings, I will then review the Corps of Engineers' responsibilities in this process and explain the hearing procedures.

Following that, I will open the floor to

public comment, utilizing the Corps of Engineers' hearing protocol.

One additional reminder: We are here tonight to receive your comments, not to enter into any discussion of those comments or to reach any conclusions. Any questions should be directed to the record and not to the individuals on the panel.

And now, ladies and gentlemen, I would like to call on the representative from our non-federal study sponsor, Judi Sheiffele, Executive Director of the New Haven Port Authority. Judy?

MS. SHEIFFELE: Thanks, Mark. Good evening. Some of you I remember from past hearings. This is the third hearing I think being held on this project. And although it's been long talked about in the Port community in New Haven, the Corps, along with the Connecticut and New Haven Port Authorities, have been acting on this feasibility study for the past three years and assessing the current conditions and determining the feasibility as to whether the channel should be deepened. And tonight we'll see the results of this study.

We look forward to the end of this phase

and looking on to what will probably be a more challenging phase, trying to get a reauthorization and funding. But thank you.

MR. HABEL: Thank you, Judi.

Ladies and gentlemen, I would like to introduce Evan Matthews, Executive Director for the Connecticut Port Authority.

MR. MATTHEWS: Thank you, Mark. My name is Evan Matthews, and I'm the Executive Director of the Connecticut Port Authority. We are headquartered in Old Saybrook, Connecticut. I'm joined by Joe Salvatore, who many of you may recognize. He heads up all of our dredging programs.

We're both here tonight and excited to work with the Corps for conducting this hearing and moving this project forward. We've used the resources of the CPA in recent weeks to try to encourage involvement in the process, and it's good to see the public here tonight. We believe the public input leads to better results.

From the Port Authority's perspective, this project is entirely consistent with our overall goals outlined in the Port Authority's Connecticut Maritime Strategy, which we released in

August.

The strategy puts an emphasis on maximizing the potential of Connecticut's three deepwater ports. New Haven absolutely is one of those important ports. New Haven is particularly important to this strategy and is long overdue for a Navigation Improvement Plan.

I'm sure there are many ideas on how to improve the draft plan you have published. We look forward to hearing the public input in person at these two hearings and online, and I'm confident you will take those public comments into account as your plans finalize. Thank you.

MR. HABEL: Thank you, Evan.

Ladies and gentlemen, John Kennelly.

MR. KENNELLY: Good evening. I would like to welcome you tonight to this public hearing regarding the New Haven Harbor Navigation Improvement Project Study.

I would also like to thank you for your involvement, for involving yourself in this study and for providing us with your views and comments.

By conducting this public hearing, we, the Corps of Engineers, continue to fulfill our requirement to seek public comment and input

relative to the New Haven Harbor Navigation Improvement Study.

While no decision will be made tonight, we welcome your comments on the New Haven Harbor Navigation Improvement Project Study. Your comments will be considered in our development of the Final Integrated Feasibility Report and Environmental Impact Statement.

Please feel free to provide comments that you would like to enter into the record.

Additionally, we will receive written comments tonight and through November 15th, 2018. I assure you that all of your comments, written or oral, will be addressed during this process, will be treated equally on the record, and will be considered in the development of the final report.

It is crucial to the public process that your voice be heard, and we're here to listen to your comments, to understand your concerns, and to provide you an opportunity to put your thoughts on the record should you care to do so.

The primary purpose of this hearing is to solicit the public's comments and input. However, the hearing will begin with the project team providing background information on the Integrated

Feasibility Report and Environmental Impact Statement, including details on the existing deep-draft navigation problems, alternatives evaluated, information on the Tentatively Selected Plan, and information on the dredge material and placement sites.

These presentations, at the beginning of each public hearing, will assist the public and agency reviewers in understanding the documents and the evaluation process which was followed; thus, aiding the public as they review the draft report.

In addition to providing comments at the public hearing, the public may provide written comments at any time during the public review period. I would like to emphasize this is your hearing, and we need you to assist us in this public review process.

We want your comments on the draft report so that we can consider all of the comments that we receive, those made here tonight, as well as those submitted during the public review process in the preparation of the Final Integrated Feasibility Report and the EIS. Thank you.

MR. HABEL: Thank you, John.

Ladies and gentlemen, Barbara Blumeris.

10

1 MS. BLUMERIS: Good evening. Tonight
2 Todd and I will present summary information on the
3 planning process to reach the Tentatively Selected
4 Plan for the improvements at New Haven Harbor. The
5 slides that we share tonight will be posted on our
6 project website on Thursday. The project website
7 is located -- you can find the location link on
8 that Fact Sheet that's at the front.
9 This slide illustrates the Corps' civil
10 works planning process. New Haven Harbor study has
11 now reached, as I mentioned, the Tentatively
12 Selected Plan milestone. The hour shows we are
13 here. So we are about -- a little over halfway
14 through the process. A Draft Integrated
15 Feasibility Report and Environmental Impact
16 Statement was issued in September, and we'll be
17 taking comments, as mentioned, through November
18 15th from the public.
19 Concurrent with public review, we are
20 also conducting Corps Agency Technical Review and
21 Independent External Peer Review.
22 Following these concurrent reviews, there
23 will be an internal Agency Decision Milestone, near
24 the number 3 on the slide. And that's when we have
25 a buy-in from headquarters office on the plan, and

11

1 we move into the completion of efforts and to
2 optimize the selected plan.
3 Next slide, please. The New Haven Port
4 Authority is the non-federal sponsor for the study.
5 The Connecticut Port Authority is working in
6 partnership with New Haven and provided the
7 non-federal funding for the study. The study is
8 cost shared 50 percent federal and 50 percent
9 non-federal.
10 Legislative authority for the study came
11 from a congressional resolution passed in July
12 2007. The cost share agreement for the study was
13 signed with the Port Authority in December 2015,
14 and work began in earnest in 2016 on site.
15 The purpose of the study is to
16 investigate improvements needed to provide a safe,
17 reliable, efficient, and environmentally
18 sustainable waterborne transportation system at the
19 New Haven Port, and also determine whether the
20 improvements we identify are warranted and in the
21 federal interest.
22 New Haven Harbor is centrally located on
23 the north shore of Long Island Sound, as shown in
24 the small insert map on the right. And the Harbor
25 is an extremely important maritime commercial

12

1 resource for the state of Connecticut.
2 There is an existing federal channel
3 authorized within New Haven Harbor. And this
4 federal navigation project is shown in the middle
5 of this diagram. This consists of several
6 features, a deep-draft channel, turning basin and
7 maneuver area, authorizing a depth of minus 35 feet
8 mean lower low water.
9 That main channel, which the commercial
10 ships deep-draft, are shown in the center of the
11 drawing.
12 In addition, there are three
13 shallow-draft channels, several anchorages, and
14 three breakwaters. The breakwaters are at the
15 entrance of the Harbor. There is also a training
16 dike at Sandy Point.
17 This study focuses on the deep-draft main
18 channel, turning basin, and maneuvering area, as
19 these are the areas requiring improvements.
20 The deep-draft channel was authorized in
21 1946 and constructed in 1950. In 2018, the channel
22 is now 68 years old and due for an improvement as
23 ship sizes have increased over the last 60 years.
24 Next slide. In terms of total tonnage
25 shipped and received, the Port of New Haven is the

13

1 largest port in Connecticut, and the second largest
2 port in New England in 2016, ranking only behind
3 the Port of Boston.
4 The total freight into the port is
5 8.8 million metric tons, and represented about
6 24 percent of all waterborne commerce in New
7 England, and about 81 percent of all commerce in
8 Connecticut.
9 The Northeast maintains a large refinery
10 production/demand deficit, and must rely heavily on
11 imported volumes of petroleum products in order to
12 meet demand.
13 The port is a crucial import location for
14 refined petroleum products, which supplies demand
15 within Connecticut and the broader Northeast
16 region.
17 The majority of the landside acreage in
18 the Port of New Haven is devoted to energy-related
19 uses. And this represents a long-term land use and
20 economic asset for the state.
21 Next slide. Petroleum products imports
22 have historically constituted about 70 percent of
23 the channel tonnage. Data from 2016 is shown in
24 the pie chart with the petroleum products in blue.
25 You can see that. As I mentioned, that is a

1 significant commodity coming into the Port.
2 New Haven also provides dry bulk and
3 break bulk services, including commodities such as
4 salt, sand, cement imports. Virtually all of these
5 volumes are used locally.
6 Steel is also imported, and includes
7 steel rail, rebar, and steel billets.
8 There's approximately 1 million tons of
9 scrap metal produced annually within the state, and
10 about half of that amount is exported through the
11 Port of New Haven. Driving to the hearing tonight,
12 we saw a very large pile of scrap metal right along
13 the harborfront.
14 Export volumes of scrap metal in
15 New Haven have demonstrated sustained growth with
16 volumes destined primarily to Turkey, Peru, Egypt,
17 and Saudi Arabia.
18 Next slide. There are several terminals
19 in New Haven Harbor, and all of these except for
20 the PSEG Terminal provide berths to accommodate
21 deep-draft commercial ships.
22 This slide shows the location of the
23 various terminals: Magellan, Gulf, Gateway,
24 Motiva, and New Haven Harbor Terminal.
25 Gulf Oil, Magellan, and Motiva handle

1 primary petroleum products, chemicals, and related
2 products.
3 Gateway handles petroleum products, dry
4 bulk, such as salt, asphalt, cement, stone, sand,
5 scrap metal, and steel. So Gateway has a terminal
6 shown close to the bridge. They also lease the
7 facilities at Harbor Terminal.
8 Next slide. Navigation transportation
9 delays and inefficiencies occur today due to
10 inadequate federal project depth for the main
11 channel and the turning basin.
12 So, as I mentioned, it's at minus 35 feet
13 mean lower low water. A lot of ships that draft
14 greater than 31 feet are delayed and need to
15 transit the channel only at high tide. They also
16 may have to light-load or offload cargo onto barges
17 before they can come into the port.
18 Lightering operations can be adversely
19 affected by weather, and this can cause additional
20 delays. Lightering of liquid petroleum products
21 also carries the risk of spills and environmental
22 impacts in Long Island Sound.
23 The large ships coming in on the high
24 tide are also an issue. As the ships come in from
25 Long Island Sound in through the breakwaters, the

1 larger ships coming in on the flood are set further
2 to the west, because the current runs east to west.
3 This pushes them toward the steep outer bank of the
4 curve.
5 To compensate for this, the pilots
6 approach the bend on the far right side of the
7 channel. As they come out of the bend, they go
8 hard full ahead to make the turn and not have the
9 stern hit the west bank.
10 This makes straightening the ship toward
11 the next set of buoys ahead difficult since moving
12 forward and turning at a high speed at the same
13 time. This leaves little to no room to respond to
14 changes in conditions that they may experience in
15 bringing in these larger ships.
16 Next slide. So that was explaining the
17 different problems at the existing channel.
18 Now, this is a slide of the ships that
19 are constrained due to the 35-foot channel.
20 The authorized depth is 35 feet at low
21 tide. And this provides insufficient depth for
22 larger ships. So basically, the ships require 4
23 foot of underkeel. That is 4 foot of water under
24 the ship when it comes in. So a 31-foot ship can
25 come in unconstrained with 4 foot of underkeel

1 clearance, but anything that drafts greater than 31
2 feet cannot come in.
3 This shows a diagram of ships that are
4 increasingly coming in at larger drafts.
5 Without an improvement project, ships
6 would continue to be limited in the size of vessel
7 they could use to call on the port, leaving them
8 unable to achieve the economies of scale of larger
9 vessels.
10 Many shippers prefer to use larger
11 vessels, which has a lower overall cost per ton,
12 particularly for the trips that come over long
13 distances, such as from South America or Europe.
14 Without a project, the degree to which
15 commodities brought to the port can be shipped on
16 the most cost-effective vessels would be limited by
17 the 35-foot authorized channel.
18 Next slide. This slide illustrates the
19 alternative depths and widths considered for the
20 improvement project. Alternatives were developed
21 to address vessel delays and inefficient vessel
22 loading. We looked at depths ranging from 37 to
23 42.
24 Next slide. This slide shows the
25 quantity estimates developed for each of the

18

1 alternatives. Along with the increase in depth,
2 there would also be incidental widening to
3 accommodate the larger ships, which was shown on
4 the previous slide.
5 These quantities and widths were
6 estimated for each of the depths, and were used to
7 derive cost estimates for the project. The cost
8 estimates were accurate for the conditions expected
9 in each of the alternatives. And they include a
10 contingency of about 20 percent. So these
11 quantities were used to drive the cost estimates
12 for dredging the improvement.
13 In addition to the federal base plan for
14 our placement sites, we also looked at a beneficial
15 use plan for the placement of dredge material. And
16 Todd will talk later on in this presentation about
17 the alternatives developed for placement of the
18 dredge material.
19 Basically, for the 40-foot, we have about
20 4.2 million cubic yards in the alternatives
21 analysis, with a good portion of that in rock.
22 Next slide. This is the slide that talks
23 about the economic analysis done by our Mobile
24 Deep-Draft Navigation Center. So they're the
25 primary production center for navigation, economic

19

1 analysis for the Corps of Engineers.
2 There are three primary effects from
3 channel deepening that lead to changes in the
4 future fleet at the Port of New Haven. The first
5 is an increase in a vessel's maximum practical
6 loading capacity.
7 Deepening the channel reduces the
8 constraint of the size ship that can come in, as
9 well as the loading of that ship. This increase in
10 vessel has the result of fewer required vessel
11 trips to transport forecasted cargo, improving the
12 transportation into the Harbor.
13 The second effect with increased channel
14 depth is the reliability of the water depth, which
15 encourages the shippers to move -- as you can see
16 in that trends slide of trips per draft, they'll
17 continue to bring in ships that have deeper draft
18 'cause of the economies of scale of the larger
19 ship. So that trend will continue and, with the
20 improvement, be efficient.
21 So transportation costs were estimated
22 for a lookout project condition, that is, as it is
23 today, what does it cost to bring the cargo into
24 the port. And then we looked at that through a
25 50-year period of analysis, so through 2072, from

20

1 2023, assuming the project would be constructed in
2 2023, through 2072 for the width project condition,
3 and basically compared the cost to bring that
4 amount of cargo in without the new project and with
5 the new project.
6 We use a model called a HarborSym model
7 that's done at the Mobile center. It includes a
8 range of variables in running the model. HarborSym
9 is a Monte Carlo simulation model of vessel
10 movement at the port, and it generates costs for
11 that operation.
12 The model calculated costs for all the
13 project years, so that is for all the 50 years
14 going forward, and then produces an average annual
15 equivalent cost. So this can then be compared
16 against the construction costs that I talked about,
17 analyzing both and comparing them.
18 Next slide. So the project team used
19 specific economic decision criteria to evaluate and
20 compare plans against each other.
21 The 1983 Principles and Guidelines for
22 Water Resources Planning within the Corps dictates
23 that the NED plan be the plan that maximizes net
24 economic benefits.
25 So in this case, you see the annual

21

1 equivalent cost -- you have the alternatives, your
2 annual equivalent cost, and then your annual
3 equivalent benefit. And then the net is the
4 difference between those numbers.
5 And then you can see here that the
6 maximum total net benefits occurs at the 40-foot
7 plan. And this carries a BCR of 1.9. So the
8 40-foot plan is the NED plan. That would be the
9 plan that we've selected, along with consideration
10 of other factors, environmental, social, and
11 regional economics. But that 40-foot plan is the
12 selected plan.
13 Following the selection of the TSP, we
14 refined the TSP design. So basically once we
15 selected the 40-foot alternative, we did a ship
16 simulation study at our center down in Vicksburg,
17 Mississippi, where we have a computer simulation of
18 the ships coming in and a computer simulation of
19 the Harbor.
20 So the two pilots familiar with the ships
21 came down to drive the ships in in the computer
22 model. So here we have two of the pilots from
23 Connecticut in Vicksburg running the ship
24 simulation model.
25 So based on the ship simulation study of

1 the 40-foot plan, we had a few design refinements
2 of that plan. So we found that we needed to widen
3 the bend of the breakwaters slightly greater than
4 we had, and also that we would relocate -- we had
5 planned to move the turning basin more to the
6 north, but when we did the ship simulation study,
7 we found that actually its current location is
8 best, and if we just widened it slightly to the
9 north by 200 feet, we would be able to turn the
10 ships sufficiently. So that basically had our
11 refined design.
12 And the ship simulation also verified the
13 widths of the channels that we had chosen of
14 extending 50 feet on either side.
15 Next slide. Here are the features of our
16 Tentatively Selected Plan. Now, as we talked
17 about, had a refined design, so the cost went up
18 slightly due to increased rock at the ledge. At
19 the breakwaters is ledge.
20 And so when we refined the design, we
21 were actually widening that bend a little bit more,
22 so the cost of the project went up a little bit.
23 So that's the TSP. We have 4.27 million cubic
24 yards of ordinary material, a little bit more rock,
25 43 versus 35.

1 Next slide. This is the summary of the
2 TSP. So you could see now the BCR went down
3 slightly. It's 1.6 instead of 1.9. And we'll
4 continue to refine the design as we move forward,
5 as I mentioned, during the optimization phase. So
6 we'll be looking at ways to be more efficient on
7 the costs and also looking at benefits. So these
8 numbers could change again before you see the
9 final.
10 And then also this talks here a little
11 bit about the salt marsh creation, which is a
12 beneficial use site. So that would be an
13 additional cost above the base plan. And we would
14 be able to use some material from the project to
15 create a salt marsh at the Sandy Point Dike.
16 Next slide. So this is a summary of the
17 costs and proportionment of those costs between the
18 federal and non-federal share.
19 So for the first cost for the project,
20 including the beneficial use, the federal cost
21 would be 52 million, and the non-federal cost would
22 be about 18 million.
23 So that summarizes the project that we
24 propose at this time, the Tentatively Selected
25 Plan.

1 And now I'd like to invite Todd to come
2 up and talk about the placement.
3 MR. RANDALL: Thank you, Barbara.
4 I will now talk about the placement
5 alternatives for the New Haven project. In our
6 last meeting back in January, we presented portions
7 of this list as possible placement alternatives.
8 The first six alternatives listed here,
9 which we presented in January, have been identified
10 as feasible alternatives. The West River borrow
11 pit was one that was identified in January. And
12 we've taken a look at it, and it is a feasible
13 placement alternative.
14 The bottom three, beach placement,
15 bidding some kind of resiliency project, or using
16 material and structure fill have been deemed
17 unfeasible because of the nature of the material
18 from New Haven. It's all silt, very difficult to
19 do anything with.
20 And then the fourth from the bottom, a
21 confined aquatic disposal cell may be required.
22 I'm going to talk a lot about that in just a couple
23 minutes. So we'll come back to that.
24 Next slide, please. Before we go into
25 detail on the individual placement sites, I will go

1 through a brief discussion of how the sediments to
2 be dredged can be characterized.
3 Using the study's initial design, a
4 sampling and analysis plan was developed in
5 coordination with the US EPA and the Connecticut
6 Department of Energy and Environmental Protection.
7 The sampling plan was intended to
8 characterize the sediments to be dredged, using at
9 the time the largest footprint that we were looking
10 at for our alternatives. So this included samples
11 at depths of the deepest dredged depth, which was
12 42 feet, and also looking at the width increases of
13 100 and 200 feet.
14 And we also, as Barbara noted, had in our
15 initial design a large turning basin feature in our
16 initial design, different from what's there now and
17 what we're ultimately going to be proposing.
18 But when we had to do our sampling, we
19 used that biggest footprint 'cause we didn't want
20 to miss anything.
21 Next slide, please. Sediment
22 classification and determining suitability for
23 alternative placement options is determined by a
24 tiered process. That's sampling, testing,
25 evaluating, and modeling. These processes are all

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1 aimed at determining the risk of contaminants to
2 human health and ecological health. This process
3 is detailed in testing manuals that are jointly
4 authored by the US EPA and Army Corps of Engineers.
5 Next slide, please. The sediment
6 classification is basically a tiered process. The
7 first tier, the top of the pyramid, is examining
8 the history of the Harbor testing, spills and
9 industry in the area. So basically you're
10 evaluating existing data, existing conditions.
11 The second tier is sampling and testing
12 to determine the physical and chemical
13 characteristics of the material. This tier is a
14 screening tool that's based on chemical
15 concentrations of contaminants in the dredge
16 materials. And it should be noted that chemical
17 concentrations alone are not reliable tools for
18 determining a sediment's actual toxicity. For
19 this, we move into tier 3.
20 Tier 3 involves performing water column
21 testing of the sediments, the water column
22 chemistry, performing toxicity tests on benthic
23 organisms, and performing bioaccumulation tests on
24 organisms that are exposed to the sediment.
25 These are the real drivers to determine

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1 sediment toxicity.
2 And finally, tier 4, performing
3 sub-lethal bioaccumulation tests. And that's
4 basically exposing a critter to the sediment,
5 letting it live for 30 days, and then taking a look
6 at the amount of contaminants it could uptake in
7 the tissue.
8 And then those tests basically culminate
9 in a risk assessment model that determines the
10 potential for risk to human health and ecological
11 health.
12 This tiered method allows us to assess
13 the actual effects of the sediment's chemistry to
14 biological organisms and, through modeling, to
15 human health and ecological health.
16 For the New Haven Harbor project, all of
17 the testing results that I will discuss can be
18 found in Technical Supporting Document 1, which is
19 on our website. And at the end of the
20 presentation, we'll have a link to that. That has
21 all the chemistry and biotesting that you may ever
22 want to see.
23 But if you are looking for a simpler
24 version, a simple table of just the chemistry data,
25 a summary of the biological tests and toxicity

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1 tests can be found in the suitability
2 determination, which is in Appendix J of the Draft
3 Environmental Impact Statement.
4 Links to all these documents are on the
5 website that we will leave up at the very end of
6 the presentation.
7 Next slide, please. Dredge material
8 which is found to be toxic or pose significant risk
9 to the environment or the human health is deemed
10 unsuitable. That's the term that we use.
11 Such materials must be managed to isolate
12 them from the environment, or they must undergo
13 some kind of treatment to reduce their level of
14 contamination to the point that other uses or
15 placement options become available.
16 Only materials determined to be nontoxic
17 and low risk, or suitable, as opposed to
18 unsuitable, may be placed in unconfined open water
19 sites.
20 This slide basically shows the
21 decision-making process in a flowchart form.
22 Sediment proposed for dredging is tested. If it
23 fails testing, the toxicity testing -- not that
24 tier 3 testing I was talking about in the earlier
25 slide -- it's deemed unsuitable.

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1 If the material passes the toxicity
2 testing, you move into water column testing. If it
3 passes that -- I mean if it fails that, it's
4 considered unsuitable.
5 And then finally, the bioaccumulation
6 tests can be done and risk models prepared. And
7 that also is the final test that would determine
8 suitable versus unsuitable.
9 Next slide. So here's the New Haven
10 Harbor and the samples that we tested in our
11 initial project footprint in 2017.
12 In the inner harbor, there were 17
13 stations sampled. As you can see here, we kind of
14 set them up in transect form. So in the inner
15 harbor, there were six transects.
16 These transects, or groups of samples,
17 covered the areas that included channel deepening
18 as well as the widening alternatives.
19 In addition, they covered that shifted
20 and expanded turning basin that's up at the head of
21 the project. In just a second I'm going to show
22 you a slide so you can see where it is now versus
23 what it looks like.
24 The proposed expanded alignment again
25 placed the turning basin further to the north and

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1 to the west of where it's currently located.
2 Next slide. In the outer harbor, we had
3 six samples, we had two different transects.
4 Again, we were looking at maximum depth, 42 feet,
5 and then the width of a hundred feet.
6 Next slide, please. Just a little
7 cartoon. This is a graphic that illustrates how
8 samples were obtained. Basically, a coring device
9 is vibrated down through the sediment to the
10 proposed depth that we want to get to. The core is
11 then sampled for chemical and physical parameters.
12 And then additionally gallons of the
13 sediment are collected to prepare those water
14 column tests, toxicity tests, bioaccumulation
15 tests.
16 For this project, the cores sampled
17 through a layer of maintenance material on top.
18 That's stuff that's been kind of laid down since
19 the Harbor was last dredged. And since we're going
20 deeper, you can see it's into that glacial marine
21 sediment or, you know, sediments that were
22 deposited, we'll leave it at a long time ago.
23 Next slide. So the chemistry data for
24 each sample can be found in Technical Supporting
25 Document 1 and Appendix J.

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1 I also noted that the chemical analysis
2 is a screening that kind of dictates whether you
3 move to biological testing or not. So the
4 chemistry of New Haven Harbor dictated that we move
5 into the bioaccumulation and biotoxicity testing.
6 So these are the results of the
7 biological testing for New Haven. Using the tiered
8 testing approach, the first decision point is the
9 toxicity test.
10 The toxicity test uses two different
11 species of critters that are representative of
12 native fauna. That's the first -- so the
13 composites, those are the transects that I was
14 talking about earlier, the eight transects
15 throughout the inner harbor and outer harbor.
16 The second and third column are the
17 toxicity tests using two critters that are native
18 to this area. And as you can see, all of the
19 transects passed the amphipod Leptocheirus
20 plumulosus. That's the first one.
21 However, the second one, Americamysis
22 bahia, it's a mysid, it's a little shrimp,
23 composite 6 failed. So if we go back to our
24 flowchart, at the moment composite 6 would fail and
25 be deemed unsuitable.

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1 The elutriate test, which is a water
2 column test, which is the 7th column there, water
3 column modeling, that passed for everything with
4 the exception of composite 6 and composite 7. And
5 again, back to our flowchart, that kicks it into
6 unsuitable.
7 So as it stands today, transects 1 and 2,
8 which are in the outer harbor, are suitable.
9 Transects 3, 4, 5, and 8, which are in the inner
10 harbor, are all considered suitable. And then 6
11 and 7, based on this testing, are unsuitable. So
12 there's a little diagram of where they are at the
13 moment. In the next slide I'll talk to you a
14 little more about the unsuitable stuff.
15 So this next slide, if we zoom in and
16 look at the two transects that are currently
17 unsuitable, we see they encompass both the channel
18 area to the east and that relocated or expanded
19 turning basin in our footprint design that was
20 expanded to the west and to the north.
21 The map on the right shows the existing
22 location of the current turning basin. Essentially
23 it's right here. That's the existing turning
24 basin. The map on the left shows that expanded
25 turning basin.

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1 The reason I'm bringing this to your
2 attention is that as the project progressed, we had
3 discussions with the Harbor pilots. We went
4 through the ship simulation model that Barbara
5 talked about just a few minutes ago, and we
6 basically determined that a significantly larger
7 and wider turning basin wasn't needed for the ships
8 that call into New Haven.
9 So as a result, the footprint of the
10 turning basin is being reduced. And in light of
11 the design change, we are currently resampling and
12 retesting the sediment in the areas around these
13 two transects to basically better define the
14 material.
15 Next slide. I'll show you what I mean.
16 With the additional sampling, here's an
17 overlay of the reduced turning basin footprint and
18 the additional sampling that we're currently
19 performing.
20 The green sample locations are the ones
21 that are being evaluated. These sediments will be
22 re-evaluated the same way with the tiered testing
23 process to determine their suitability. It should
24 be noted that -- can you go back one slide,
25 Barbara? I apologize. I forgot. That expanded

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1 turning basin actually kind of encroached into this
2 area here, which is an existing 16-foot anchorage
3 basin that hasn't really been dredged since 1950.
4 So with our -- next slide, please -- with
5 our reduced design of just the existing turning
6 basin, with a slight 200-foot increase to the
7 north, we're trying to pull out of that area that
8 hasn't been dredged in a long time.
9 So today our conclusions indicate that we
10 have some unsuitable material. So with such, we've
11 included a CAD cell in the placement alternatives
12 that I'll discuss in just a second.
13 But it should be noted that data from the
14 sampling of the reduced footprint may show the
15 material is suitable due to removing the material
16 out of that whole existing 16-foot anchorage. But
17 that process is basically still ongoing.
18 Next slide. What is a CAD cell? A CAD
19 cell is basically a confined aquatic disposal site,
20 a hole in the ocean, if you will. The CAD cell is
21 required.
22 This schematic shows you the general
23 process behind the creation of one. Suitable
24 material is removed. And that's what's happening
25 in the first graphic.

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1 And then the second one, the cell is
2 filled with unsuitable material. That's what's
3 happening in the second.
4 And then in the third picture, the
5 unsuitable material is capped with suitable
6 material.
7 So with that in mind, we'll go ahead and
8 go into the alternative placement slides now. So
9 here are the placement alternatives that are
10 carried forward in the study and documented in the
11 Draft IFR/EIS.
12 The baseline plan consists of the two
13 borrow pits, the Morris Cove borrow pit and the
14 West River borrow pit.
15 These pits will be filled to elevations
16 that are within 1 and 2 feet of their surrounding
17 areas. These pits were dredged for material to
18 create the 95 embankment.
19 The material from the outer harbor, which
20 is -- it's a silty sand. It's not sandy enough to
21 put it on the beach or use as a structural fill.
22 But we do plan to take that material and place it
23 behind the east breakwater to raise the bottom
24 elevation and change the bottom sediments a little
25 bit, so it's a little bit sandier sediment for

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1 shellfish habitat. So that's where our plan for
2 the outer harbor material is.
3 All the blasted rock that comes out of
4 that bend that Barbara talked about expanding would
5 be placed south of the west breakwater to create a
6 rock reef, some habitat for Long Island Sound
7 organisms.
8 And then the remaining suitable material,
9 mostly silts, would be placed at the central Long
10 Island Sound disposal site. It's not shown in this
11 map, but it's a few miles south of the entrance to
12 New Haven Harbor.
13 There's an additional beneficial use
14 alternative with the plan that's beyond the federal
15 base plan. This alternative involves using the
16 silty material to create approximately 70 acres of
17 salt marsh and tidal creeks in the vicinity of
18 Sandy Point in West Haven.
19 As noted in the draft EIS, since the late
20 1800s, the New Haven Harbor ecosystem has lost over
21 60 percent of its historical wetlands through
22 filling for residential and commercial property
23 development. So the creation of 70 acres of salt
24 marsh would restore some of the functions and
25 values that marsh systems provide to the New Haven

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1 Harbor ecosystem.
2 Also, as I just noted, during the
3 sediment characterization CAD cell discussion, a
4 potential CAD cell has been planned in the event
5 that we need to manage any kind of unsuitable
6 material. And the proposed CAD cell location is
7 just to the west of the channel in the vicinity of
8 Sandy Point. So it's that purple box just
9 southeast of Sandy Point.
10 Next slide, please. This slide shows the
11 base plan placement sites, about a million cubic
12 yards. So basically, the inner harbor sites total
13 about a million cubic yards for the placement. The
14 rock will be placed, like I said, to the west of --
15 south of the west breakwater. And then the rest of
16 the material would go to central Long Island Sound.
17 Should a CAD cell be required, the
18 material, the suitable material that would come out
19 of a CAD cell would kind of take the place of one
20 of those other options. And unsuitable material
21 would be placed in the CAD cell.
22 Next slide. Here's just a quick look at
23 the beneficial use placement site above the base
24 plan. It involves creating salt marsh in the
25 vicinity of Sandy Point. This option would place

1 approximately 840,000 cubic yards of suitable silt
2 just to the north of Sandy Point, in the area
3 that's shown in the green box in the little inset.
4 This area would be designed as salt marsh, tidal
5 creek, and it would retain the sandy beach habitat.
6 Next slide: This slide is just a summary
7 of the projected measures that, following project
8 review, authorization, and design, would be used to
9 protect resources in New Haven Harbor.
10 Construction windows for dredging and
11 blasting would be used to minimize impacts to
12 potential fish habitat, shellfish, anadromous fish,
13 endangered species.
14 The Corps also performed a series of
15 culture resource studies in the area and did not
16 identify the need to -- we didn't find anything
17 that was in need of protection.
18 Next slide, please. This slide documents
19 the coordination efforts that are ongoing for the
20 project. These are all detailed in the EIS.
21 In terms of our public involvement with
22 the project, we had scoping meetings in January of
23 2017. We had the alternatives briefing in January
24 2018. And now we're into the public review and
25 public hearing process for the Draft Feasibility

1 Report and EIS.
2 The website with all the information we
3 presented is over there in green. But the next
4 slide -- well, the last slide will have that --
5 we'll leave it up in case you'd like to -- next
6 slide, please.
7 And then finally here's the project
8 schedule. As I just noted, we are currently in the
9 45-day review period for the IFR and the EIS.
10 Comments on the draft are due by November 15th,
11 again, written, email, here tonight. We listen to
12 them all.
13 Once we get to that date, we will take a
14 look at all the comments, hopefully get to them by
15 January of this year -- of next year, and with
16 responses make an agency decision on which plan to
17 move forward with. And then we will move towards
18 finalizing the IFR and the EIS, which will, again,
19 come out for public review and public comment. Our
20 time frame for that right now is September of 2019.
21 So on behalf of Barbara and all of the
22 New Haven Harbor team members, thanks for your
23 interest, and thanks in advance for looking at the
24 documents and providing the comments.
25 I'll now hand the microphone back over to

1 Mr. Habel. He can walk you through the commenting
2 process. Thank you.
3 MR. HABEL: Thank you, Todd.
4 The hearing tonight will be conducted in
5 a manner so that all who desire to express their
6 views will be given an opportunity to speak.
7 To preserve the right of all to express
8 their views, I ask that there be no interruptions.
9 When you came in, copies of the Fact Sheet and
10 procedures to be followed at this hearing were
11 available. If you did not receive these, both are
12 still available at the registration table. I will
13 not read either of them, but they will be entered
14 into the record.
15 The record of this hearing will remain
16 open, and written comments may be submitted
17 tonight, sent by mail or by email through
18 November 15th.
19 All written comments will receive equal
20 consideration with oral comments made this evening,
21 and both oral and written comments will be
22 considered in the development of the Final
23 Integrated Feasibility Report and Environmental
24 Impact Statement.
25 We need your participation throughout the

1 entire process, and I thank you for contributing
2 your comments and thoughts tonight.
3 A transcript of this hearing is being
4 made to assure a detailed review of all comments.
5 A copy of the transcript will be available at the
6 Corps' Concord, Massachusetts headquarters for
7 review, posted on the Corps' website for your use,
8 or you may make arrangements with the stenographer
9 for a copy at your own expense.
10 Anyone who does not comment tonight but
11 wishes to send written comments may do so. Please
12 forward those comments to the Corps' project
13 manager, Barbara Blumeris, at the Corps' New
14 England District office located in Concord,
15 Massachusetts.
16 When making a statement tonight, please
17 come forward to the microphone and state your name.
18 If you are speaking for or representing a position
19 of an organization, please say so.
20 There are only about four people who have
21 filled out speaker cards tonight, so we won't use
22 the typical three-minute clock, but I ask you to
23 please summarize your comments. If you have more
24 detailed comments, please make those in writing by
25 email or by letter to the Corps.

Again, oral and written statements will receive equal consideration in making decisions. Also, any written comments you may have brought with you tonight may be submitted to the stenographer.

The first individual to provide comment for the record tonight is Michael Pimer.

MR. PIMER: Good evening. My name is Mike Pimer, ex-harbormaster, ex-business owner. I'm 80-plus years old. That's what makes me ex. Nobody wants me, but I've got a big mouth. And I've been around a long time. And I've got a few questions for you.

I represent the West Haven's harbor management. That I am still part of. Also, I'm like a deputy harbormaster still, 'cause my son is now the West Haven harbormaster. Okay. Here we go.

Initially, when I went to the hearings, you had the straightening of the approach to the breakwater. That's been scrapped?

The straightening of the channel, it's now been widened on the bend, and not so much as moving the channel to the west, the outer channel, making it straighter. Is this correct?

MR. HABEL: Sir, this is a hearing tonight. It's not a dialogue.

MR. PIMER: Well, I'm just asking. Because according to what I'm seeing up there tonight is the channel is the same place it was before. It just got a little wider.

MR. HABEL: It's been widened, yes.

MR. PIMER: Is that basically wider and deeper?

MR. HABEL: Yes.

MR. PIMER: Okay. You're going to blast between the breakwater, correct?

MR. HABEL: Where the rock is.

MR. PIMER: That's where the rock is. It's granite.

I had suggested at the last hearing that we take the material from that blast, instead of putting it on the outside of the west wall, that we might consider putting it on the breakwater at Sandy Point, the little jetty opposite the Coast Guard station.

We've had so many boats run over that because of the rising tide and the fact that it's not -- you can't see it anymore. Government boats have run over it, come right out of the Coast Guard

station and run over it. Not a good thing.

But that was my reasoning for building that up with material which you had to move. I'd just like you to consider that in the future.

Now, you're going to make a marsh to the north of Sandy Point? Is that going to shut off the West Haven Yacht Club channel, basically out to the main channel? They're located inboard on the shore. Are you going to -- I didn't see how far this was going to go. Is it going to hug the Sandy Point break -- beach there, or is it going to move away from the beach? And how far?

So you might consider putting that out on the next hearing you're going to have, showing us exactly how far out you're going to move it. Because West Haven Yacht Club is located inboard of that. And they normally run alongside that sand bar to get out.

West River. You're going to fill in the borrow pit there now. Not a bad idea. It was used for sailboat anchorage. It was part of the harbormaster's domain to put sailboats. They'll find another spot.

But we would like to -- I say we -- the 350 members of the City Point Yacht Club and I

think The Havens, which is a multimillion-dollar investment going into West Haven in the West River, needs to have some water.

While you're doing the outer channel, I would like you to consider doing the West River up to I-95. 12 feet would be desirable. You have 12 feet halfway in that channel and then it suddenly jumps up to 6. And that's a killer.

Half the boats are dragging their tails coming out of that river. And you can't expect people with yachts to come in and go shopping in a big mall when they don't have water. So I just want to throw that out at you.

I think everybody's in agreement here that we ought to deepen the West River. It was deep at one time. We had tugboats and barges that went all the way up to the river tracks past where I-95 is now. We had a brick company up there. We had coal barges going in there.

We had tugboats going into -- just the side of the old Kimberly Avenue Bridge was nonexistent, which used to open up. And we have asked before to have this done. And we've heard that we have to have commercial vessels up there. Well, unless we've got water, we can't have

commercial vessels because they throw more than what we have in depth. You can't tell a commercial boat, oh, I can't go out now. It's low tide.

So we had maybe half a dozen commercial vessels up beyond the bridge. But they're small. We did have bigger boats. Nonexistent.

The Army Corps decided to build a bridge, get rid of an open-and-closing bridge, and turn around and make a permanent bridge. And that was the end of that.

So since that time, it's been getting shallower and shallower and shallower. And when you go to take your samples, you'll notice it's 6 foot, and minus 6 foot is what you're going to find in the West River from Pequonnock Yacht Club up the river.

We would like to see -- we've got a fire training center, New Haven fire boat. We'd like to see that be able to go there. West Haven is getting a very large fire boat. We'd like to see that be able to operate.

We've got to tell them, well, you've got to put it over at City Point because we don't have enough water. We had enough water. I would like to see us get it back. Thank you.

MR. HABEL: Thank you, sir.

Next up is Bill Marazzi.

MR. MARAZZI: Thank you for giving me this opportunity to speak tonight. I don't want to reiterate what Mike Pimer had just given you. But our club is 350 people, City Point Yacht Club. We're one of the oldest clubs around, 1896.

I joined 30, 40 years ago, right after I got out of the Army. If we didn't have water and boating, I probably wouldn't be here today. I fell onto the City Point Yacht Club, and I use it as my falling stone. Instead of going to the VA to get help, I got help from the members of the City Point Yacht Club, which in turn I have used my boat there for therapy, camaraderie. And the depth of the water was much greater, as Michael said.

By giving us a little help up that end of the river, the West River, would be much welcomed. And I think it is much needed for the both yacht clubs that use that channel. Thank you.

MR. HABEL: Thank you. Next is Joe Gilbert.

MR. GILBERT: Hi. My name is Joe Gilbert. I represent Empire Fisheries. I'm here speaking on behalf of Briarpatch Enterprises.

This is an important project for New Haven. Keeping the channel deep and keeping businesses up there competitive is important to all of us.

There are some impacts, though, outside of the actual navigation channel that concern us. I just want to go on record that I will be submitting some written comments to that effect. Thank you.

MR. HABEL: Thank you, sir.

Kathy Hebert.

MS. HEBERT: Hi. I'm Kathy Hebert, and I represent two different watersheds: West River Watershed Coalition and West Haven Watershed Restoration Committee.

In reference to the West River watershed, we have been concerned about the dredging and the sand dumping at the mouth of West River. And you pretty much covered it, where the CAD, if there's any contaminated removal from somewhere else, you're going to fill the West River borrow pit and then cover it up -- no? Okay. That's what I'm not understanding. And I guess we don't get answers tonight.

MR. HABEL: Well, I'll just provide a

quick clarification.

The Morris Cove borrow pit and the West River borrow pit, the holes that are already there, we would be filling those in with suitable dredge material.

MS. HEBERT: Okay.

MR. HABEL: And the unsuitable material from wherever in the Harbor, we would dig a separate confined aquatic disposal cell in the outer harbor to place that in and then cover that.

MS. HEBERT: That's good. That answers that question.

And it was brought to the West River Coalition that there's an old oyster bed on the New Haven side of the West River. And we didn't know about it, and we didn't know if you knew about it.

And in your plans, 'cause you did say you were going to protect the sea life, is there any plan to protect that? Is the dredging going to damage that? Or do you not even know? Did you not know about it? So that's a comment.

And for the West Haven watershed, we're concerned about any changes to Sandy Point bird sanctuary. And I saw the pictures up there.

So, again, a question. Because the outlay pipe from the West Haven Treatment Center pretty much goes alongside or through Sandy Point, and I've heard they're going to be replacing that. Who, I don't know. I don't know if it's you or West Haven. But we just want to make sure that there's no damage to that when you're doing that. Because we don't want any of the sewage in the Sandy Point bird sanctuary and the salt marshes. And I think that was it. Thank you.

MR. HABEL: Okay. Thank you, ma'am.

That was the last of the individuals who filled out speaker cards. Is there anyone else in the audience who did not fill out a card but wishes to speak?

Sir, please come up and state your name.

MR. FLYNN: My name is Dennis Flynn. I'm also a member West Haven Harbor Management Commission.

My two comments are as big as this dredging project is, I can't understand why you're not doing the rest of the federal navigation channel, which I think should be done. It's cost-effective while you've got everything there to do the rest of the dredging.

And the other thing is your slides showing -- and the woman before me commented -- where you're talking about marsh restoration, it doesn't show far enough and exactly how far away you're going to be from an outflow pipe, which is very important to us. We need to know that.

So if we could get, you know, an estimate, is it going to be a hundred feet away, a thousand feet away, that's very important. Thank you.

MR. HABEL: Okay. Is there anyone else?

All right. John, the floor is yours.

MR. KENNELLY: Thank you, Mark. We have heard many thoughtful statements this evening. All of the comments received tonight, as well as written comments we receive during the review period, will be considered in the development of the Integrated Feasibility Report and EIS.

Written statements may be submitted to the Corps of Engineers until November 15, 2018. They will receive equal consideration with those presented tonight.

We, the Army Corps of Engineers, extend our appreciation to all who took the time to involve themselves in this public review process

and the Bailey Middle School for the use of their fine facility tonight.

I'd like to thank all for taking the time to provide us with your thoughts, your comments, and your concerns. Goodnight.

(Whereupon, this public hearing was concluded at 7:42 p.m.)

CERTIFICATE

I hereby certify that I am a Notary Public, in and for the State of Connecticut, duly commissioned and qualified to administer oaths.

I further certify that the record of the proceedings held in the matter was taken by me stenographically in the presence of counsel and reduced to typewriting under my direction, and the foregoing is a true and accurate transcript of said proceedings.

I further certify that I am neither of counsel nor attorney to either of the parties to said matter, nor am I an employee of either party to said matter, nor of either counsel in said matter, nor am I interested in the outcome of said cause.

Witness my hand and seal as Notary Public this 4th day of November 2018.

Janet C. Phillips
Notary Public

My Commission expires:
October 31, 2021

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PUBLIC HEARING ON THE

DRAFT INTEGRATED FEASIBILITY REPORT AND EIS

NEW HAVEN HARBOR NAVIGATION IMPROVEMENT PROJECT

OCTOBER 24, 2018

6:31 P.M.

CITY OF NEW HAVEN HALL OF RECORDS

200 ORANGE STREET

NEW HAVEN, CONNECTICUT

APPEARANCES:

MARK HABEL: CHIEF, NAVIGATION AND ENVIRONMENTAL STUDIES SECTION, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
JUDI SHEIFFELE: EXECUTIVE DIRECTOR, NEW HAVEN PORT AUTHORITY

EVAN MATTHEWS: EXECUTIVE DIRECTOR, CONNECTICUT PORT AUTHORITY
JOHN KENNELLY: CHIEF, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

BARBARA BLUMERIS: PROJECT MANAGER, WATER RESOURCES PLANNING SECTION, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

TODD RANDALL: MARINE ECOLOGIST, ENVIRONMENTAL RESOURCES SECTION, PLANNING DIVISION, U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT

(The hearing commenced at 6:31 p.m.)

MR. HABEL: Good evening, and welcome to the public hearing for the New Haven Harbor Navigation Improvement Project.

My name is Mark Habel. I'm Chief of the Navigation and Environmental Studies Section for the United States Army Corps of Engineers, New England District. I will be your moderator and facilitator tonight.

Before we begin, I would like to thank you for getting involved in this review process for the New Haven Harbor Navigation Improvement Project Study.

The New Haven Harbor deepening study is being undertaken by the Corps of Engineers in partnership with the project sponsor, the New Haven Port Authority, and with the Connecticut Port Authority.

Our hearing officer tonight is John Kennelly, Chief of the Planning Division for the Corps in New England.

Also here from the Corps New England District are Barbara Blumeris, our Project Manager, and Todd Randall, who helped write the Environmental Impact Statement; Lisa Winter, from

our Coastal Engineering Unit.

Should you need copies of the public notice, hearing procedures, or other pertinent information, it is available at the registration table in the back of the room.

Following this introduction, the project sponsors will give brief remarks. Judi Sheiffele is the Executive Director of the New Haven Port Authority. And following Judi will be Evan Matthews, the Executive Director of the Connecticut Port Authority.

Our hearing officer, John Kennelly, will then address the hearing. John will be followed by Barbara Blumeris, who will provide information on the Draft Integrated Feasibility Report and Environmental Impact Statement for the New Haven Harbor Study. And Barbara will be followed by Todd Randall, who will provide an overview of the environmental investigations conducted during this study.

At the conclusion of these briefings, I will then review the Corps of Engineers responsibilities in this process and explain the hearing procedures.

Following that, I will open the floor to

public comment, utilizing the Corps of Engineers hearing protocol.

One additional reminder: We are here tonight to receive your comments, not to enter into any discussion of those comments or to reach any conclusions. Any questions should be directed to the record and not to the individuals on the panel.

And now, ladies and gentlemen, I would like to call on the representative from our non-federal study sponsor, Judi Sheiffele, Executive Director of the New Haven Port Authority. Judi?

MS. SHEIFFELE: Thanks, Mark.

My name is Judi Sheiffele, and, as Mark has told you, I am the Executive Director of the New Haven Port Authority.

The subject of tonight's hearing is to hear the Draft Feasibility Report and Environmental Impact Statement on the Navigational Improvement Project which would involve the deepening and widening of the federal channel in New Haven.

Deepening the channel from its current authorized depth of 35 to 40 feet is a major infrastructure improvement that when constructed will improve the safety and increase the efficiency

of the movement of vessels through the Port of New Haven.

Over the past three years, the Connecticut and New Haven Port Authorities have worked with the Army Corps of Engineers to assess the conditions in New Haven Harbor and make a determination as to whether a deepening is warranted. Tonight the Corps will be presenting the draft findings.

And in closing, I would like to thank you you all for coming, your interest in this project, and we look forward to hearing your comments.

MR. HABEL: Thank you, Judi.

Ladies and gentlemen, I would like to introduce Evan Matthews, Executive Director for the Connecticut Port Authority.

MR. MATTHEWS: Thank you, Mark. My name is Evan Matthews. And I'm the Executive Director of the Connecticut Port Authority, headquartered in Old Saybrook, Connecticut.

We have enjoyed partnering with the New Haven Port Authority to fund this study. I want to thank the Army Corps for conducting this hearing and moving the project forward. We have used the resources of the CPA in recent weeks to

try to encourage involvement in this process because we believe public input leads to better results.

From the Port Authority's perspective, this project is entirely consistent with our overall goals outlined in the Port Authority's Connecticut maritime strategy, which is available on our website, which was released in August.

And that strategy puts an emphasis on maximizing the potential of Connecticut's three deep-water ports. Obviously, New Haven is one of those ports. As you'll hear in some of the analysis later on, it's one of the larger ports complexes in the state.

New Haven is particularly important in that strategy and long overdue for navigational improvements.

I'm sure that there are many ideas on how to improve the draft plan you have published. We look forward to hearing the public's input in person at these two hearings -- we were in West Haven last night -- and online, and I'm confident that you will take those public comments into account as the plan is finalized. Thank you very much.

MR. HABEL: Thank you, Evan.

Ladies and gentlemen, John Kennelly.

MR. KENNELLY: Good evening. I would like to welcome you tonight to this public hearing regarding the New Haven Harbor Navigation Improvement Project Study.

I would also like to thank you for your involvement, for involving yourself in this study, and for providing us with your views and comments.

By conducting this public hearing, we, the Corps of Engineers, continue to fulfill our requirement to seek public comment and input relative to the New Haven Harbor Navigation Improvement Study.

While no decision will be made tonight, we welcome your comments on the New Haven Harbor Navigation Improvement Project Study. Your comments will be considered in our development of the Final Integrated Feasibility Report and Environmental Impact Statement.

Please feel free to provide comments that you would like to enter into the record.

Additionally, we will receive written comments tonight and through November 15th, 2018. I assure you that all of your comments, written or

oral, will be addressed during this process, will be treated equally on the record, and will be considered in the development of the final report.

It is crucial to the public process that your voice be heard, and we're here to listen to your comments, to understand your concerns, and to provide you an opportunity to put your thoughts on the record should you care to do so.

The primary purpose of this hearing is to solicit the public's comments and input. However, the hearing will begin with the project team providing background information on the Integrated Feasibility Report and Environmental Impact Statement, including details on the existing deep-draft navigation problems, alternatives evaluated, information on the Tentatively Selected Plan, and information on the dredge material and placement sites.

These presentations, at the beginning of each public hearing, will assist the public and agency reviewers in understanding the documents and the evaluation process which was followed; thus, aiding the public as they review the draft report.

In addition to providing comments at the public hearing, the public may provide written

1 comments at any time during the public review
2 period. I would like to emphasize this is your
3 hearing, and we need you to assist us in this
4 public review process.
5 We want your comments on the draft report
6 so that we can consider all of the comments that we
7 receive, those made here tonight, as well as those
8 submitted during the public review period, in
9 preparing the Final Integrated Feasibility Report
10 and the EIS. Thank you.
11 MR. HABEL: Thank you, John.
12 Ladies and gentlemen, Barbara Blumeris.
13 MS. BLUMERIS: Good evening. Tonight
14 Todd and I will present summary information on the
15 planning process to reach the Tentatively Selected
16 Plan.
17 The slides that we share tonight will be
18 posted on our project website on Thursday. The
19 project website is included in the Fact Sheet, on
20 the back of the Fact Sheet. So you can see here's
21 the link to the project website. And they'll be
22 posted on that site
23 This first slide illustrates the Corps
24 planning process. We're about in the middle of the
25 process right now, starting on the reviews. So we

1 have public review right now to November 15th. We
2 also at the same time are conducting concurrent
3 reviews with the agency technical review. That's
4 an internal team of four reviewers, and then an
5 independent external review by our panel of
6 reviewers.
7 Next slide. The non-federal sponsors are
8 here with us tonight. And they are cost-sharing
9 this particular effort, 50 percent federal,
10 50 percent non-federal.
11 To conduct the study, we needed
12 congressional authorization. And this slide
13 provides the authorization that was provided by
14 Congress in 2007 to conduct this feasibility study.
15 In 2015, we entered into that
16 cost-sharing agreement with the Port Authority, and
17 we started in earnest in 2016 on the effort.
18 The purpose of the study is to
19 investigate improvements needed to provide a safe,
20 reliable, efficient, and environmentally
21 sustainable waterborne transportation system into
22 New Haven. We're going to be determining whether
23 the navigation improvements to the existing federal
24 project at New Haven Harbor are warranted and in
25 the federal interest.

1 This is the slide that shows the existing
2 federal project.
3 New Haven is centrally located on the
4 north shore of Long Island Sound, as you can see in
5 the small insert map to the right. The Harbor is a
6 very important maritime commercial resource for the
7 state of Connecticut.
8 The current federally-authorized
9 New Haven Harbor Navigation Project includes a
10 deep-draft channel, turning basin, maneuver area.
11 So this is the existing project. So we
12 currently have a deep-draft channel that comes in
13 from Long Island Sound into terminals at the head
14 of the harbor. Those are shown in purple. And
15 that deep-draft channel is authorized at minus
16 35 feet mean lower low water. So that means at low
17 tide, there's 35 feet of water available for ships
18 to sail into the Harbor.
19 This project was authorized in 1946 by
20 Congress, and constructed in 1950. So in 2018,
21 that deep-draft channel will be 68 years old, and
22 due for an improvement, as ship sizes have
23 increased over the last 60 years.
24 Now, the next slide talks about the type
25 of commodities coming in, as well as the total

1 tonnage.
2 In terms of total tonnage, this is the
3 second largest port in New England, and the largest
4 port in Connecticut. In 2016, the total freight
5 traffic was 8.8 million metric tons, representing
6 about 24 percent of all waterborne commerce in
7 New England, and about 81 percent of all waterborne
8 commerce in Connecticut.
9 The Northeast maintains a large refinery
10 production/demand deficit, and must rely heavily on
11 imported volumes of petroleum products in order to
12 meet demand.
13 The port is a crucial import location for
14 refined petroleum products, which supplies demand
15 within Connecticut as well as the broader Northeast
16 region.
17 The majority of the landside acreage in
18 the Port of New Haven is devoted to energy-related
19 uses. This represents a long-term land use and
20 economic asset for the economy in the state of
21 Connecticut.
22 Next slide. Petroleum products have
23 historically constituted about 70 percent of
24 channel tonnage. Data from 2016 is shown on this
25 pie chart, with the petroleum products in blue.

14

1 You can see that, based on this one year, that,
2 yes, petroleum constitutes the most.
3 But we also have other important things
4 coming into the port, including dry bulk and break
5 bulk, including salt, sand, cement. And also we
6 have steel, rebar, and steel billets, steel rail.
7 But then we also have an export, which is
8 the scrap metal, which you probably may have
9 noticed as you drive on the highway, there's a huge
10 pile of scrap metal. And this is an export.
11 There's approximately 1 million tons of scrap metal
12 produced annually within the state, and
13 approximately half of that amount is exported
14 through the Port of New Haven.
15 Next slide. This, shows our port
16 terminals. Magellan, Motiva, and Gateway, one of
17 the larger terminals. So this is just a slide
18 showing the location of the facilities in the
19 harbor.
20 Next slide.
21 There are several problems with the
22 existing channel. One is the insufficient depth of
23 the main channel and the turning basin. And then
24 also there's a problem at the bend. So there's a
25 bend between the two breakwaters that protect the

15

1 inner harbor, and the ships have to transect this
2 bend.
3 The existing channel bend from the
4 entrance channel to the interior is about 35
5 degrees, with the outer portion with a bend to the
6 west. Large ships coming in on the flood are set
7 further west because the current runs east to west.
8 This pushes them towards the steep outer bank of
9 the curve.
10 To compensate for this, pilots approach
11 the bend on the far right side of the channel. As
12 they come out of the bend, they go hard over full
13 ahead to make the turn to not have the stern hit
14 the west bank. This makes straightening the ship
15 toward the next set of buoys very difficult since
16 moving forward and turning at a high speed.
17 So the two problems here that we're
18 trying to address are the channel depth as well as
19 the bend in the channel.
20 Next slide. As I mentioned, the channel
21 is authorized to minus 35 feet mean lower low
22 water. So this provides unrestricted draft of
23 31 feet, which requires 4 foot of underkeel
24 clearance. That means 4 feet of water below the
25 bottom of the ship. Ships greater than 31 feet are

16

1 restricted. So they either have to come in on high
2 tide or they have to lighter outside of the
3 anchorage. This creates transportation
4 inefficiency and results in additional
5 transportation costs of bringing the cargo into the
6 port.
7 Without an improvement project, shippers
8 will continue to be limited to the size of the
9 vessels they can call to port, leaving them unable
10 to achieve the economies of scale of larger
11 vessels, and ships would begin to bypass the port
12 as they cannot bring their larger ships in and
13 unload the cargo at the current dimensions of the
14 channel.
15 Next slide. Once we identified the
16 problem, we wanted to identify alternatives to
17 correct the problem.
18 So one of the issues is the depth. So we
19 looked at a range of depths from 37 to 42 feet to
20 increase the efficiency of ships coming in. We
21 also looked at widening the channel. As the ships
22 get larger, they're a little bit more width. So we
23 increased the width of the inner harbor by a
24 hundred foot and the width of the outer harbor by a
25 hundred foot, 50 feet on either side.

17

1 We also looked at increasing the bend
2 width, as I mentioned, to go from 560 to 700 feet.
3 This slide shows the quantities associated with
4 each of those alternatives. And quantities are
5 important because they drive the cost of the
6 alternative.
7 So this is the amount of material that
8 would have to removed from the sea floor dredge in
9 order to create that deeper channel, create those
10 water channel widths, and to create that bend.
11 Costs were estimated for the federal base plan
12 placement as well as for beneficial use plan
13 placement, which Todd Randall will talk about in a
14 few minutes.
15 Next slide, please. So we have the cost
16 side of the equation, how much is it going to cost
17 to build this. So we have to estimate the benefits
18 side of the equation. And that's the
19 transportation cost savings that will be realized
20 over the 50-year period of the analysis. So that
21 is the amount of cost reduction for ships to bring
22 in the cargo into the port.
23 So without the project, it costs -- on an
24 average annual equivalent basis, it costs 64
25 million, approximately, to bring in the cargo to

18

1 the Harbor. So with each of these alternatives, it
2 will cost less to bring that same amount of cargo
3 in. And that is the result of the fact that they
4 no longer have to lighter, no long have to wait for
5 the tide, but they can also move some of the cargo
6 to a slightly larger ship, and receive the
7 economies of scale of that larger ship.
8 So the next step is we take those two
9 things, the cost of the project and average annual
10 equivalent, and then we compare it against the
11 benefits of the project, the average annual
12 equivalent, and we get the total net benefits for
13 the project. So you can see in the fourth column
14 the total net benefits.
15 And we looked for the project that
16 maximizes the net benefits. So in this case, the
17 project that maximizes the net benefits is the
18 40-foot project. And that has a BCR of 1.9. So
19 that's a benefit-to-cost ratio, and it's a positive
20 project which shows federal interest in this
21 alternative.
22 After we selected the Tentatively
23 Selected Plan, which is the 40-foot project, we did
24 a refinement on that using the ship simulation down
25 at our facility in Vicksburg, Mississippi. So we

19

1 created a computer model of the channel and the
2 coastal hydraulics, and we were able to then
3 simulate the ships coming into the port.
4 And we had two pilots come down and drive
5 those ships so they could test the different
6 scenarios. So they could test the width of the
7 channel, test the bend, test the turning basin
8 under various conditions.
9 As a result of that, we came up with some
10 design refinements on the plan. We verified the
11 inner and outer harbor channel widths. But we did
12 determine that the bend needed to be greater than
13 700 feet, up to 800 foot wide. So we added an
14 additional hundred feet on the bend widening.
15 And we also determined that the turning
16 basin we had turned to the north in the original
17 plan, but because when we tested it in the model,
18 we found that the existing location was optimum,
19 and that all we needed to actually do was widen it
20 200 feet to the north. So this results in a
21 refinement of the quantities, which, as you know,
22 is important 'cause it drives the cost.
23 So the quantity of ordering materials is
24 similar, but the quantity of rock went up from
25 about 30-something thousand cubic yards to 43,000

20

1 cubic yards. So you can see that's going to be a
2 little bit of an additional cost.
3 Next slide. So this is a summary of the
4 Tentatively Selected Plan, the 40-foot plan, with
5 those refinements. So the cost went up slightly,
6 so that means our benefits go down a little bit.
7 Our BCR went down slightly to 1.6.
8 But we will be looking at these numbers,
9 both the costs and benefits over the next few
10 months, and we will be refining this design as we
11 go forward. So those numbers might change again as
12 we check some of the different parameters. And so
13 you might see slightly different numbers in the
14 final report. But the good news is this is still a
15 positive project.
16 So the TSP will result in more efficient
17 transportation of the commodities into the port.
18 It will increase the safety and maneuverability for
19 the larger ships.
20 Next slide. This slide shows the cost
21 share for the non-federal and federal share. Total
22 project cost, including the beneficial use site, is
23 $71 million. And cost shared, you can see the
24 numbers broken down. Federal cost share will be
25 75 percent, and the non-federal will be 25 percent.

21

1 So that's highlighted in yellow.
2 Once construction is completed, the
3 non-federal sponsor will be required to pay an
4 additional 10 percent of the cost of the general
5 navigation features.
6 The federal government would be
7 responsible for a hundred percent of the navigation
8 project maintenance, as it is today. So we
9 currently maintain the channel about every 10
10 years.
11 In the construction of the salt marsh
12 site, beneficial use site is included in that cost,
13 and it would be cost shared at 65/35 with the
14 non-federal sponsor.
15 So that's the Tentatively Selected Plan.
16 And now we'll welcome Todd up to talk about the
17 placement alternatives.
18 MR. RANDALL: Thanks, Barbara. Thanks,
19 everybody, for coming tonight. I'm just going to
20 talk about the placement alternatives that we have
21 for this 4.2 million cubic yards of material that
22 we have coming out of New Haven.
23 We had a meeting back in January of this
24 year, where we essentially ran through these
25 alternatives. Two alternatives have been added to

22

1 this list: The West River borrow pit, which was
2 identified in our January meeting, and then a
3 potential confined aquatic disposal cell. And
4 we'll talk about this in a couple minutes.
5 Next slide, please. Before we go into
6 detail on all the placement sites, I'll go through
7 a brief discussion of how the sediment that are
8 going to be dredged are characterized.
9 Using the study's initial design that
10 Barbara had talked about previously, a sample and
11 analysis plan was developed that was intended to
12 characterize the sediment using that largest
13 project footprint. So an expanded turning basin
14 and 42-foot depth is what we sampled for. Because
15 you'll see chemistry takes a long time to sample,
16 to analyze, and then to make sense of the results.
17 Next slide, please. Sediment
18 classification and determining sediment suitability
19 for alternative placement options is determined by
20 a tiered process of sampling, testing, evaluating,
21 and modeling. These processes are all aimed at
22 determining the risk of contaminants to human
23 health and ecological health.
24 Next slide. Sediment classification is
25 basically done with a tiered process. As you can

23

1 see here in the pyramid, tier 1 is basically
2 examining the history of harbor testing, looking at
3 the industry that's in the Harbor. So basically
4 evaluating existing data. Tier 2 is the actual
5 physical sampling and testing to determine the
6 physical nature of the sediment, is it sand, is it
7 silt, and what the chemistry is. It should be
8 noted that chemical concentrations alone are not a
9 driver of -- a reliable tool for determining a
10 sediment's toxicity. That really comes in tier 3
11 and tier 4.
12 Tier 3 involves performing water column
13 testing of the sediments, water column chemistry,
14 performing toxicity on testing on benthic
15 organisms, the critters that actually live in the
16 sediments, and then bioaccumulation testing on
17 organisms that are exposed to the sediments for a
18 period of time. These are the real drivers that
19 determine the toxicity. And then also performing
20 sub-lethal bioaccumulation tests and risk models
21 that basically evaluates ecological -- potential
22 for ecological risk and human health risk.
23 This tiered methodology allows us to
24 assess the actual effects of the sediment's
25 chemistry to biological organisms and through

24

1 modeling to human and ecological health.
2 For the New Haven Harbor project, all the
3 testing results that I discussed can be found in
4 Technical Supporting Document 1 on our website,
5 which we'll leave up at the end and, as Barbara
6 pointed out, is on your Fact Sheet.
7 And if you just want a simple breakdown
8 of the chemistry results and toxicity tests, I'll
9 refer you to Appendix J, which is the suitability
10 determination for the material. Both of those
11 documents are on the Corps website.
12 Next slide. Dredge material which is
13 found to be toxic or poses significant risk to the
14 environment or human health is deemed unsuitable.
15 Such materials must be managed to isolate them from
16 the environment or undergo some kind of treatment
17 to reduce their level of contaminants to the point
18 that other uses or placement options may become
19 acceptable.
20 Only materials that are deemed to be
21 nontoxic and low risk are suitable and may be
22 placed unconfined in open water. So we have
23 suitable and unsuitable material.
24 This slide just shows the decision-making
25 process in flowchart form. Sediment proposed for

25

1 dredging is tested. If it fails the toxicity test,
2 the tier 3 testing that I talked about before, it's
3 deemed unsuitable. Bioaccumulation tests, if it
4 passes the toxicity, are performed. And then the
5 models are prepared. And if there is significant
6 risk found, it's deemed unsuitable.
7 Next slide. So here's the initial
8 New Haven Harbor footprint that we have and the
9 samples that we took. As you can see, we had in
10 the inner harbor, there were six transects that
11 were represented by 17 stations.
12 These transects cover the areas that we
13 were looking to improve, the widening and the
14 deepening alternatives, as well as that expanded
15 turning basin to the north. I'll show you another
16 picture in just a second and we'll discuss that
17 turning basin.
18 Next slide. And then in the outer harbor
19 we had six stations that were represented by those
20 two transects that you can see there with the green
21 dots.
22 Next slide. Here's just a quick graphic
23 that illustrates how the samples are obtained. A
24 coring device is vibrated down through the sediment
25 to the proposed depth you want to get to. The core

26

is then sampled for the chemistry and physical parameters. And then gallons of all of this sediment are collected to prepare those water column tests and toxicity tests.

Next slide. So if we go back to that tiered evaluation concept, the chemistry data for each sample -- I'm sorry -- the chemistry data for New Haven, which, again, I said can be found in Technical Supporting Document 1, or Appendix J, basically dictated that we move into biological testing.

And so here are the results of the biological testing for New Haven. Using the tiered testing approach, the first decision point is the whole sediment toxicity test. That's what you'll see in the second and third columns there.

This test uses two different species that are representative of native fauna. And as you can see, all the transects passed for the amphipod Leptocheirus. That's the second column. However, in the third column, there was composite 6, failure for the Americamysis. That's a kind of shrimp. So that, according to our hierarchy, would kick it into unsuitable material.

The water column testing, which is in

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column 7, basically met the required standards for all but transects 6 and 7. So again, back to the hierarchy testing, transects 6 and 7 failed that. They are deemed unsuitable.

So today, as it stands right now, transect 1 and 2, which were in the outer harbor, and then transects 3, 4, and 5, which are in the kind of mid-harbor region, and then transect 8, which is all the way up in the top at the head of navigation, are considered to have suitable material, and transects 6 and 7 are considered to have unsuitable material.

So if we zoom in and examine the two transects that are currently unsuitable, we see they encompass both the channel area to the east and that expanded turning basin that was expanded to the west and to the north in our initial design.

So if you see, the map on the right shows that the existing location of this widened -- so that's the existing location of the turning basin, right? But the expanded footprint actually overlaps into what is currently a 16-foot anchorage area right there.

So the reason I'm bringing this to your attention is as the project progressed, we had

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in-depth discussion with the pilots, as well as running the ship simulation model, it was determined that that expanded turning basin wasn't needed.

So as a result, the footprint of the turning basin is being reduced. And essentially it's being pulled out of that 16-foot anchorage area. And the reason that's relevant is because that 16-foot anchorage area hasn't been dredged since the 1950s. So we think that may be a driver of the failures.

Next slide, please. So we have made the Corps go back out and resample in those areas with a reduced footprint. Here is an overlay of the reduced turning basin design and the additional sampling that we're doing in green. These sediments will be evaluated with that tiered testing.

So as of today, our conclusions indicate that we may have unsuitable material to manage. And as such, we've included a CAD cell in the placement alternatives I'll discuss in just a second.

But it should be noted that should the data from the sampling of this reduced footprint

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show the material to be suitable because it's been pulled out of that old 16-foot anchorage, a CAD cell may not be needed.

So what is a CAD cell? Basically, a CAD cell is short for a confined aquatic disposal cell. And it's a way to sequester unsuitable material.

If a CAD cell is required, this schematic shows the general process behind the creation of one. You find an area where you have suitable material and dig that out, and then fill the cell with the unsuitable material. And then following the filling, you cap it with a layer of suitable material.

So with that one in mind, I'll go through all the placement alternatives that were carried forward in the study.

The base plan consists of two borrow pits, one at the entrance of the West River, and one borrow pit in Morris Cove. Now, these two alternatives will be used to place only suitable, silty material. The plan would be to fill these pits to the elevation that are within 1 to 2 feet of their surrounding elevations.

Some of the silty sand that we have from the outer harbor can be placed in an area behind

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1 the east breakwater, represented by that blue
2 triangle. That's just a conceptual area. The
3 material wouldn't take up that whole area.
4 But the idea there would be to raise the
5 bottom elevation slightly and create a slightly
6 sandier bottom than currently exists to create a
7 better substrate for oyster habitat.
8 As Barbara noted, there's going to be
9 some blasted rock coming out from between the east
10 and middle breakwater. That material would be
11 placed just to the south of the west breakwater,
12 where Lisa is circling, basically to create a rock
13 reef for habitat.
14 And then the remainder of the suitable
15 material, which, again, is mostly silt, would be
16 placed at the central Long Island Sound disposal
17 site. It's not shown on this map, I'll give it on
18 the next one, but just a little bit south of
19 New Haven Harbor.
20 There is also an additional beneficial
21 use alternative within the plan that's beyond the
22 federal base plan. This involves using the silty
23 material to create approximately 70 acres of salt
24 marsh and tidal creeks in the vicinity of Sandy
25 Point in West Haven. There were a lot of questions

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1 last night as to where that line is. It's
2 basically from -- if you know the West Haven boat
3 ramp out to Sandy Point, the area essentially in
4 front of the sewage treatment plant.
5 And then also as I noted during the
6 sediment characterization and CAD cell discussion,
7 a potential CAD cell has been planned in the event
8 that we need to manage unsuitable material. And
9 the proposed cell is located just to the west of
10 the channel in the vicinity of Sandy Point, where
11 Lisa just pointed to.
12 Next slide, please. This is just a
13 closer look at the base plan placement sites.
14 About a million cubic yards will be placed
15 throughout these sites in the Harbor, and the
16 remainder will be placed out at central Long Island
17 Sound to cover up historic disposal mounds that
18 were placed out there before sediment testing
19 requirements came into being.
20 And should a CAD cell be required, the
21 material that would be excavated from that, the
22 suitable material, would be placed at one of these
23 alternatives, and the unsuitable material would be
24 placed in the CAD cell.
25 Next slide. The beneficial use placement

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1 site above the base plan, it's the salt marsh that
2 I was talking about. About 840,000 cubic yards of
3 silt could fit in there.
4 From this perspective, it's basically --
5 well, like I said, from the boat ramp out to Sandy
6 Point. And we would keep that sandy beach feature
7 and the little marsh and lagoon feature. And it
8 would be meant to basically complement that
9 sanctuary.
10 Next slide. This slide is a summary of
11 projected measures that, once we get through the
12 process, we could use the protect resources in
13 New Haven Harbor. Construction windows for
14 dredging and blasting would be used to minimize
15 impacts to essential fish habitat, shellfish,
16 anadromous fish resources, and marine mammals.
17 The Corps also performed a series of
18 cultural resource studies in the project area, and
19 didn't uncover anything within the project's
20 footprint that would need to be protected from a
21 historical perspective.
22 Next slide. This is the details of the
23 coordination efforts that are ongoing for the
24 project. And so these are all documented in the
25 EIS.

33

1 In terms of the public involvement with
2 the project, we had the scoping meetings in January
3 2017, public information meetings in 2018, and are
4 now into the public review process of the EIS.
5 The website is there in green, but in the
6 very last slide it will be in big letters.
7 Next slide. Finally, here is the
8 projected schedule. As I noted, we're currently in
9 the 45-day review period for the draft EIS and
10 Feasibility Report. The comments are due,
11 requested by November 15th.
12 Following the review of the comments, the
13 agency and the sponsors will come to a decision
14 point and move towards a final report. And then
15 this final report will be circulated again for
16 comment.
17 So on behalf of Barbara and the whole
18 New Haven team, thanks for your interest in the
19 project, and thanks in advance for your review of
20 the documents. I'll turn it back over to Mark.
21 MR. HABEL: Okay. Thank you, Barbara,
22 and thank you, Todd.
23 The hearing tonight will be conducted in
24 a manner so that all who desire to express their
25 views will be given an opportunity to speak. To

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1 preserve the right of all to express their views, I
2 ask that there be no interruptions.
3 When you came in, copies of the Fact
4 Sheet and procedures to be followed at this hearing
5 were available. If you did not receive these, both
6 are available at the registration table. I will
7 not read either of them, but they will be entered
8 into the record.
9 The record of this hearing will remain
10 open, and written comments may be submitted
11 tonight, sent by email or by email through
12 November 15th, 2018.
13 All written comments will receive equal
14 consideration with oral statements made this
15 evening. And both oral and written comments will
16 be considered in the development of a Final
17 Integrated Feasibility Report and Environmental
18 Impact Statement.
19 We need your participation throughout the
20 entire process. And I thank you for contributing
21 your comments and thoughts tonight. A transcript
22 of this hearing is being made to ensure a detailed
23 review of all comments. A copy of that transcript
24 will be available at the Corps Concord,
25 Massachusetts headquarters for review, posted on

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1 the Corps website for your use, or you may make
2 arrangements with the stenographer for a copy at
3 your own expense.
4 Anyone who does not comment today but
5 wishes to send written comments may do so. Please
6 forward those comments to the Corps project
7 manager, Barbara Blumeris, at the Corps New England
8 district office located in Concord, Massachusetts.
9 When making a statement tonight, please
10 come forward to the microphone and state your name.
11 If you are speaking for or representing a position
12 of an organization, please say so.
13 Since there are only five people who
14 signed up to speak tonight, we will dispense with
15 the three-minute clock, but, again, I do ask you to
16 be brief and address any more lengthy comments in
17 writing to the Corps.
18 The first individual to provide comment
19 for the record tonight is Allison Dodge,
20 representing Congresswoman Rosa DeLauro. Allison?
21 One more thing, please. The microphone
22 we have over here is held up with some tape.
23 Please don't try to move it around. And despite
24 our turning all of the volumes down to zero, it's
25 still pretty loud. So if you'd step back a foot or

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1 two, we'll see if that works. So Allison?
2 MS. DODGE: Good evening. My name is
3 Allison Dodge. I am the Outreach Coordinator for
4 Congresswoman Rosa DeLauro. She asked me to
5 deliver a statement on her behalf this evening.
6 Many thanks to the Army Corps of
7 Engineers for their work to complete the Draft
8 Integrated Feasibility Report and Environmental
9 Impact Statement for the New Haven Harbor
10 Navigation Improvement Project.
11 As I am sure you are aware, the deepening
12 of the federal navigation channel in the New Haven
13 Harbor is a priority of the New Haven Port
14 Authority, the City of New Haven, as well as the
15 various businesses that populate the port district.
16 As the highest volume commercial shipping
17 port on Long Island Sound, and the largest
18 deep-water port in the state of Connecticut,
19 New Haven Harbor is an integral component to the
20 regional economy and represents a key connection in
21 the transportation network that includes water,
22 rail, road, and pipelines.
23 Already today, many vessels destined for
24 the port must lighter their cargo before they can
25 enter because the navigation channel is simply too

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1 shallow for some more modem ships. With
2 ever-advancing technologies and shipmaking design,
3 deepening the navigation channel is critical.
4 Having had the opportunity to review the
5 Integrated Feasibility Report and Environmental
6 Impact Study, I wanted to express my overall
7 support for the project's Tentatively Selected
8 Plan.
9 I was pleased to see that the Corps was
10 thoughtful in their approach to the disposal of
11 dredge materials, including the beneficial use plan
12 in addition to open water disposal.
13 However, I do have some concerns with the
14 inclusion of the repositioning of the Cross-Sound
15 Cable and the total project cost. I will be
16 submitting separate comments to the Corps on that
17 issue.
18 I have long advocated for this
19 infrastructure upgrade, and look forward to working
20 with the Corps, New Haven Port Authority, and the
21 Connecticut Port Authority to move this project
22 forward. Thank you.
23 MR. HABEL: Thank you, Allison.
24 Next up will be John Cox.
25 MR. COX: Good evening. My name is John

Cox. I live at 235 Townsend Avenue, across from the seawall overlooking the borrow pit. I've been involved in Army Corps of Engineers hearings and meetings on this since the ill-fated Bridgeport dredging proposal in 2010.

And I think most of us remember that, where they were proposing to move the toxic waste from Bridgeport into the Morris Cove borrow pit.

At the January public meeting held this year, the Army Corps of Engineers acknowledged the public's comments, and agreed that going forward they would not make any similar proposals and would only recommend that clean DEEP and EPA-approved fill would go in there. And that was absolutely what the community was looking for.

The current plan makes good on that promise. And by eliminating the borrow pit, which was basically an environmental mistake, created a huge dead zone right in the middle of the cove, what they're going to be doing is restoring life to that area, which is now dead -- and that is a very good thing -- by using the 600,000 cubic yards of fill, with sediment from the dredging project.

I applaud this move on the part of the Corps, and support your initiative. I think this

project is good for New Haven's economy, and it's also good for the environment in Morris Cove. So thank you very much.

MR. HABEL: Thank you, Mr. Cox.

Next up will be Charlie Jonas.

MR. JONAS: Good evening. I'm one of the pilots that was at the Army Corps of Engineers research and development facility down in Vicksburg, Mississippi.

And I can't speak more highly of that system that they have and the simulator. It's really, really excellent. We tested the limits of different drafts and different widths of the channel. And of course, we came up with a draft deeper than the Army Corps came up with, but that was on our wish list.

New Haven Harbor has a channel depth right now of 35 feet. To bring a ship in at low tide, we have 2-foot underkeel clearance and we have 2-foot squat for the ships. And that went down to 31 feet at low water.

So the pilots, because of the width of the channel, we do one-way transits. Also, when we have the deeper draft ships come in, we add a foot for every hour of tide to that 31 foot. The

maximum draft we bring in is 37 feet. Only two of the facilities are authorized for 37 feet.

With the inbound deep draft ships, we bring them in on a rising tide. And that's when we have a strong westerly set. And the biggest problem we have, as you heard, is making a turn at the jetties, a 35-degree turn. We're getting set to the left from the flood tide, and then the stern of the ship gets close to the bank, which is a very steep bank. It's 48 foot in some spots right inside the channel, but right outside the channel it's 22 feet. So we get a lot of suction in there that keeps trying to turn the ship to starboard.

We can do it safely, but we're at the limits with this draft and at this stage of the tide that we're bringing ships in. But we're at the limit. We can't do any deeper or any bigger ships. The maximum length overall ship we can bring is in now is 750 feet. And that's the limit.

So the pilots requested that -- this is our wish list again -- 45-foot draft channel, which we're not going to get. We'll get 40 feet, but we can live with that. And to make the channel 300 feet wider. But we're looking at a hundred feet wider.

And the big thing is the turn, making the turn. We have to make two gradual turns instead of one sharp turn. And then we also need the sloping banks where they make the channel deeper to eliminate the effects of bank cushioning.

So we're in favor of this. And now that we know the limits that we're going to go to 40 feet, we can look at the width of the channel and the bend there. So thank you.

MR. HABEL: Thank you, Mr. Jonas.

Next up is Renate Blau.

MS. BLAU: Renate Blau. I also live just off of the seawall. I look down the road and there it is. And I also overlook the borrow pit. And I'm one of many neighbors who have been following this process with a lot of anxiety about what goes into that borrow pit, and hoping that the Corps would come around to see our perspective of wanting that water to stay clean and pristine and useful to both the animals as well as for our recreational purposes. And you've done that.

So I'm here to thank you. Thank you for keeping an open mind, and traversing this long, long period of time to the point where you can see doing something that's both good for us and good

for New Haven Harbor as well. So thank you.

MR. HABEL: Thank you, ma'am.

And next is John Hilts.

MR. HILTS: Good evening. My name is John Hilts. I'm a self-employed consultant who has 30 years of experience in marine construction permitting for regulatory matters such as dredging.

Having read your study, one thing I noticed was a lack of alternatives that were, you know, presented for cost-effectiveness and also lessen the environmental impact. I hope that during the comment period, some of these might be included for further review.

And in addition, I wish to note that by my estimation, the project seems to benefit greatly several private corporations who have terminals in the New Haven Harbor, and I'd like to know further the commitment on their part to remain in the Harbor after this project is completed so that the benefits in transit that we've seen on your slides are realized as opposed to not being realized. Thank.you.

MR. HABEL: Thank you.

That was it for the people who signed a card wishing to speak. Is there anyone else in the

audience who did not fill out a card, but wishes to speak? Could you please come down to the podium – or down to the microphone, state your name and town of residence for the record.

MR. GILBERTSON: Good evening. Terry Gilbertson, New Haven, Connecticut, 61 East Grand Avenue in New Haven.

And I've had a chance to review your rather remarkable and comprehensive report, and I thank you all and the Corps for its very good work.

I can't help but notice and wish to bring to your attention the Cross-Island Cable issue. On page ES-6 of your report, you have a final – first cost construction cost of 65, $66 million. However, the cable enforcement action cost is $32 million.

And there may be those of us in this room, I believe in 2000 might have even been in this room, where we talked about the Cross-Island Cable and how it was not supposed to have this effect on this particular project.

Further, in your report, on other pages in your report, you do identify the Cross-Island Cable is responsible for the cost of relocation down to 48 feet. It did not achieve – for several

reasons, it did not achieve that. And I encourage you to continue your efforts to enforce that earlier 2002 permit.

I am concerned that we've added to the construction cost of this project rather remarkably, presuming that Cross-Island will not perform in its duty. Cross-Island does not provide any benefit whatsoever to the state of Connecticut. And I encourage you to persist in our enforcement efforts. Thank you.

MR. HABEL: Thank you. Is there anyone else who wishes to speak tonight?

Okay. John, the floor is yours.

MR. KENNELLY: Thanks, Mark. We have heard many thoughtful statements this evening.

All of the comments received tonight as well as the written comments we receive during the review period will be considered in the development of the final integrated feasibility report and EIS.

Written statements may be submitted to the Corps of Engineers until November 15th, 2018. They will receive equal consideration with those presented today.

We at the Corps of Engineers extend our appreciation to all who took the time to involve

themselves in this public review process and the City of New Haven for the use of this fine facility tonight.

I'd like to thank you all for taking time to provide us with your thoughts, your comments, and your concerns. Goodnight.

(Whereupon, this public hearing was concluded at 7:29 p.m.)

1 CERTIFICATE
2
3 I hereby certify that I am a Notary Public, in
4 and for the State of Connecticut, duly commissioned and
5 qualified to administer oaths.
6 I further certify that the record of the
7 proceedings held in the matter was taken by me
8 stenographically in the presence of counsel and reduced
9 to typewriting under my direction, and the foregoing is
10 a true and accurate transcript of said proceedings.
11 I further certify that I am neither of counsel
12 nor attorney to either of the parties to said matter,
13 nor am I an employee of either party to said matter, nor
14 of either counsel in said matter, nor am I interested in
15 the outcome of said cause.
16 Witness my hand and seal as Notary Public
17 this 4th day of November 2018.
18
19
20
21
22 Janet C. Phillips
Notary Public
23
My Commission expires:
24 October 31, 2021
25

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A8-Agency Coordination Letters 2019

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

September 4, 2019

Planning Division
Navigation Section

Mr. Louis A. Chiarella
Assistant Regional Administrator
Habitat Conservation
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930-2276

Dear Mr. Chiarella:

I am writing in response to National Marine Fisheries Service (NMFS) letter of February 21, 2019 regarding the US Army Corps of Engineers (Corps) proposal to conduct improvement and maintenance dredging in the New Haven Harbor Federal Navigation Project (FNP) in New Haven, Connecticut. Since the date of your letter, Mr. Todd Randall of the Corps and Ms. Alison Verkade of your office have had several meetings concerning the project. The Corps has provided your office with additional project related information and Mr. Randall and Ms. Verkade have been working on refining project details to minimize environmental impacts to New Haven Harbor resources.

The intent of this letter is to address NMFS comments, EFH conservation recommendations, and Fish and Wildlife Coordination Act recommendations contained in your February 21, 2019 letter and summarize the informal discussions and their outcomes between the Corps and NMFS concerning the comments and recommendations.

In your letter, NMFS commented on several aspects of the project and provided the Corps with three essential fish habitat (EFH) conservation recommendations. Each conservation recommendation is discussed below.

EFH Conservation Recommendation #1. Time of year restriction of January 1 to May 31 be employed for all dredging and blasting activities to protect sensitive life stages of winter flounder.

The Corps agrees with the need to minimize impacts to winter flounder sensitive life stages and winter flounder EFH, however, we cannot accommodate EFH conservation recommendation #1 for the project in its entirety. During discussions between the Corps and NMFS, Ms. Verkade noted that the critical concerns for winter flounder resources in New Haven Harbor are the placement of material inside the harbor (i.e., any placement activity inside the breakwaters) and the dredging of areas that fall within winter flounder EFH (i.e., dredging in areas shallower than 5 meters (16.4 feet)). As such, we have constructed a project time of year schedule (Table 1 attached) that will allow for the January 1 to May 31 restriction to be applied to placement of material in the harbor and the dredging of areas in winter flounder EFH. Table 1 also details the quantities of material to be removed from each

project segment and the location of the placement. The proposed schedule will allow the project to be completed in a timely, cost-effective, and environmentally sensitive manner. Updating of project quantities, dredge sequencing, and matching of dredged material and placement sites will occur in the final design phase of the project.

The justifications for allowing dredging to occur in the months of January and February for the New Haven Harbor Improvement project are that all dredging during that period will be in project segments that are currently greater than 5 meters in depth (authorized depths of 35 feet), mechanical dredging plumes are generally highly localized and short term in their duration, and all placement activities associated with the dredging efforts in January and February will be in open water at the Central Long Island Sound Disposal Site (CLDS). The basis for these justifications are detailed below.

As winter flounder EFH in the project area is defined as waters shallower than 5 meters (16.4 feet), the majority of the New Haven Harbor deepening effort will occur in areas that are not designated as winter flounder EFH. The existing channel is currently authorized and maintained to a depth of 35 feet, as is the proposed seaward entrance channel extension area to the south. A portion of the proposed channel widening areas and proposed side slopes (approximately 8.6 acres) are shallower than 5 meters and therefore contain winter flounder EFH. However, these areas will be sequenced so that they are dredged prior to January 1 to minimize impacts to winter flounder.

Major maintenance dredging of New Haven Harbor occurs about once every ten years with between 500,000 and 1 million cubic yards removed in each cycle. The last maintenance was accomplished in 2014. Based on dredge monitoring information from previous New Haven Harbor dredging efforts (DAMOS, 1996), it was determined that the majority of the suspended sediments associated with the dredging operations tended to stay within the deeper portions of the main channel while limited amounts of suspended sediments were observed within the adjacent shallow subtidal areas. DAMOS (1996) also concluded that dredge-induced sediment suspension was very limited in duration and a minor perturbation relative to other resuspension factors such as wind, wind waves, and effluent discharge. Monitoring of mechanical dredging in Boston Harbor deep draft channels found that the majority of suspended sediments remained near bottom following their suspension and that the suspended plumes dissipated rapidly (USACE/Normandeau 1998, ENSR 2002, Battelle 2009). As all dredging in the months of January and February will be in project segments that are 35 feet deep or greater, we do not anticipate significant impacts to winter flounder resources from suspended sediments as we do not expect the resource to be present in the impacted areas. Additionally, the Corps has agreed to eliminate barge overflow in January and February to aid in reducing suspended sediments during the dredge process.

The areas of the improvement project that require blasting are located exclusively in the vicinity of the channel bend between the east and middle breakwaters. All existing water depths within the expected footprint of the blasting effort are below the 5 meter winter flounder EFH designation. As such, the Corps will allow drilling and blasting efforts to occur between October 1 and March 1. Following additional geotechnical studies during the design phase, should the footprint of the drilling and blasting effort expand into winter flounder EFH, the Corps will prioritize work the areas within winter flounder EFH so that they are completed prior to January 1.

EFH Conservation Recommendation #2. A detailed blasting plan with the areal extent of the blasting clearly delineated should be submitted for NMFS review and comment.

USACE accepts this conservation recommendation. During the Corps' pre-construction engineering and design phase of the project (PED) a probing and boring effort will be implemented to define the areal extent of the rock to be blasted. Following those efforts, the extent of blasting and removal will be delineated and best management practices identified that will be implemented to minimize blasting impacts. The Corps will provide NMFS the results of the geotechnical analyses, the delineation of the blasting area and the BMPs during the PED phase and prior to the start of the project's construction phase for review.

EFH Conservation Recommendation #3. Details plans of the beneficial use sites (Morris Cove Borrow Pit, West River Borrow Pit, Oyster Creation Area, Salt Marsh Creation Area, and Rock Reef) should be provided to NMFS for review.

USACE accepts this conservation recommendation. During the PED phase of the project, detailed plans for placement of material in the beneficial use sites will be developed. Plans will include: plan views and cross sections of the sites, fill elevations, and material source (i.e., which dredging segment the dredged material for a particular site will be coming from). The Corps will provide NMFS the detailed plans during the PED phase and prior to the start of the project's construction phase.

In addition, NMFS provided one Fish and Wildlife Coordination Act conservation recommendation.

Fish and Wildlife Coordination Act conservation recommendation #1. A time of year restriction of April 1 to June 30 be implemented for blasting and dredging activities to protect diadromous fish spawning migrations.

USACE accepts this conservation recommendation as it relates to blasting activities and will incorporate this restriction in the project design. Please note that the USACE does not concur with this restriction for application to dredging operations. However, as this time of year restriction overlaps with restrictions in place for winter flounder and shellfish resources, it is being incorporated in project design.

The Corps thanks NMFS for its conservation recommendations and continued support in providing protection for the nation's marine resources. If you have any questions or require additional information on this project, please contact the project ecologist, Mr. Todd Randall at 978-318-8513, or todd.a.randall@usace.army.mil, or the planning project manager, Ms. Barbara Blumeris at 978-318-8737, or barbara.r.blumeris@usace.army.mil.

Sincerely,

John R. Kennelly
Chief, Planning Division

Attachment

Cc: Ms. Alison Verkade, NMFS

References:

Battelle. 2009. Final Summary Report: Plume Monitoring, Boston Harbor Inner Harbor Maintenance Dredging Project. Prepared for U.S. Army Corps of Engineers, New England District 696 Virginia Road, Concord, MA 01742. Contract No. DACW33-03-D-0004. Delivery Order No. 44.

DAMOS. 1996. An Investigation of the Dispersion of Sediments Resuspended by Dredging Operations in New Haven Harbor. US Army Corps of Engineers, 696 Virginia Road, Concord, MA 01742.

ENSR International. 2002. Boston Harbor Navigation Improvement Project: Phase 2 Summary Report. Prepared for U.S. Army Corps of Engineers, New England District and Massachusetts Port Authority. Document No. 9000-178-000. Contract No. DACW33-96-D-004, Task Order 51. May 2002.

USACE/Normandeau Associates Inc. 1998. Boston Harbor Dredging. Water Quality Monitoring. Environmental Bucket Qualification Study. Prepared for: Great Lakes Dredge and Dock Company, September 1998.

ATTACHMENT

Table 1
Time of Year Schedule for the New Haven Harbor, CT, Navigation Improvement Project

DISPOSAL (See Note 1)		
Disposal Location	**Target Quantity (cy)**	**Time of Year for Disposal**
Morris Cove Borrow Pit	623,310	October 1 – January 1
West River Borrow Pit	87,800	October 1 – January 1
Shellfish Creation Area	518,300	October 1 – January 1
Sandy Point Marsh Creation Area	657,000	October 1 – January 1 (See Note 2)
Rock Reef	43,500	October 1 – March 1
Central Long Island Sound Disposal Site (CLDS)	2,392,290	October 1 – March 1
DREDGING & BLASTING (See Note 1)		
Construction Effort	**Quantity (cy) / Target Disposal Site**	**Time of Year for Construction**
Drill and Blast	-	October 1 – March 1
Rock Removal	43,500 / Rock Reef	October 1 – March 1
Dredge Entrance Channel	464,500 / Shellfish Creation Area	October 1 – January 1
Dredge Entrance Channel Extension	53,800 / Shellfish Creation Area	October 1 – January 1
Dredge Main Channel	657,000 / Sandy Point Marsh Creation Area	October 1 – January 1 (See Note 2)
Dredge Main Channel	623,310 / Morris Cove Borrow Pit	October 1 – January 1
Dredge Main Channel	87,800 / West River Borrow Pit	October 1 – January 1
Dredge Maneuvering Area	652,300 / CLDS	October 1 – March 1
Dredge Turning Basin	158,100 / CLDS	October 1 – March 1 in areas $\geq$ 5m October 1 – Jan 1 in areas $<$ 5m
Dredge Main Channel	1,581,890 / CLDS	October 1 – March 1 in areas $\geq$ 5m October 1 – Jan 1 in areas $<$ 5m

Note 1: All quantities, dredging sequence, and matching specific dredge and disposal areas are subject to change due to shoaling and future surveys.
Note 2: A window of October 1 to March 1 may be used for placement of material in the Sandy Point Marsh creation area if control techniques are developed in design that that effectively limit total suspended solids during construction.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

August 14, 2019

Colonel William M. Conde
District Engineer
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Re: New Haven Harbor, Connecticut, Navigation Improvement Project, Draft Integrated Feasibility Report and Environmental Impact Statement (D-IFR/EIS)
TAILS: 2019-CPA-0005 & 19-I-0134

Dear Colonel Conde:

This responds to your October 9, 2018, letter, received in our office on October 18, 2018, requesting comments and a final coordination act report on the above-referenced project pursuant to section 2(b) of the Fish and Wildlife Coordination Act (FWCA) and comments under the Endangered Species Act. In an email dated March 5, 2019, the U.S. Army Corps of Engineers (Corps) also requested concurrence from the U.S. Fish and Wildlife Service (Service) with the determination that the proposed project may affect, but is not likely to adversely affect the federally threatened piping plover (*Charadrius melodus*) and red knot (*Calidris canutus*), and the federally endangered roseate tern (*Sterna dougallii dougallii*). Lastly, during an August 9, 2019, phone call, the Corps further clarified the scope of the concurrence request—at this time, limiting the request to dredging, open water disposal, several conceptual beneficial use design aspects of project activities, and working with the Service in the Corps' pre-construction and engineering design phase of the project (PED). Your request and our response are made pursuant to section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C 1531, *et seq.*) (ESA).

The Corps proposes (1) dredging and open water disposal of approximately 4.3 million cubic yards of clays, silts, sands, and tills from the harbor bottom; and (2) under the preferred alternative, to continue developing the details and design of a saltmarsh at Sandy Point in West Haven, Connecticut. Dredged material removed from New Haven Harbor would be placed at several open water sites. The preferred alternative also calls for a variety of beneficial use placement sites within the Harbor, including the creation of as much as 73 acres of saltmarsh habitat in and around Sandy

Point. The project would take about 2 years to construct, and dredge and disposal activities will occur between September 1 and March 31.

In the D-IFR/EIS, the Corps made the preliminary determination that the proposed activities associated with the New Haven Harbor Navigation Improvement Project may affect, but are not likely to adversely affect, the federally threatened piping plover and red knot, and the federally endangered roseate tern (section 7.6; pp. 114-116). In a follow-up email dated March 5, 2019, the Corps confirmed that no significant changes to the project as described in the D-IFR/EIS are anticipated, and therefore, this determination will not change. In this subsequent email, the Corps requested our concurrence with this determination.

As documented in section 3.6.3 of the D-IFR/EIS, piping plovers, roseate terns, and red knots and their breeding (piping plovers only), roosting, or foraging habitat may occur in or within the vicinity of the project action area.

Piping plover
Piping plover nesting habitat will not be affected by dredge or disposal activities due to the distance of breeding beaches from the project action area. Piping plovers may forage on the intertidal mud/sand flats in the vicinity of the Sandy Point disposal site, although they would not be present during construction.

Roseate tern
Roseate terns may forage within the project action area if suitable prey (primarily sand lance) are available. Roseate terns are generally present in Connecticut beginning late April through September, and are known to occur in the vicinity of the Sandy Point beneficial use disposal site.

Red knot
Red knots may forage in intertidal sand flats within New Haven Harbor and have been noted to occur in low numbers along the Connecticut coast from May through November. Red knots have been documented in recent years at the Sandy Point beneficial use disposal site from May through September.

Endangered Species Act
The creation and restoration of saltmarsh habitat, particularly high marsh habitat to support species like the at-risk saltmarsh sparrow (*Ammodramus caudacutus*), is a high priority for the Service region-wide, and we support the Corps' intention to use dredge material for this beneficial purpose when possible. The intertidal habitat at Sandy Point supports foraging piping plovers and red knots. The potential loss of this habitat as part of the proposed beneficial use placement and saltmarsh restoration at Sandy Point may affect these species. The Corps will continue to refine its proposal for this portion of the larger project during future design discussions in PED. As discussed on a conference call on June 19, 2019, between the Corps and the Service, the Corps (1) committed to developing a design that will minimize and/or avoid adverse impacts as much as possible; (2) will continue to coordinate with the Service on the potential beneficial use placement at Sandy Point; and (3) will continue to coordinate with the Service under section 7 of the ESA during the design and construction phases of the project. Based on the conceptual nature of the beneficial use

proposal as described in the D-IFR/EIS, we concur that this aspect of the proposed action (i.e., the development of a saltmarsh restoration design at Sandy Point in West Haven, Connecticut) is not likely to adversely affect the federally threatened piping plover and red knot, and the federally endangered roseate tern. The Service will work with the Corps during the subsequent design phase on site-specific aspects of the project to ensure compliance with the ESA on the final project design and implementation.

With regard to the remaining components of the project (i.e., the dredging of the channel and disposal of material at open water sites described in the D-IFR/EIS), we concur with your determination that the proposed project may affect, but is not likely to adversely affect, piping plovers, roseate terns, or red knots based on the following:

- dredge and disposal activities associated with the project will occur during the time of year when these species are not anticipated to be present in the project area;
- piping plover and red knot habitat is not present in the dredge channel or open water disposal sites; and
- the project would have insignificant effects on roseate tern foraging habitat because effects are anticipated to be short term (limited to during and immediately after the dredging activities) and will occur when the species are not present.

Fish and Wildlife Coordination Act
The FWCA established an authority for the Service to provide assistance to, and cooperate with, Federal agencies in minimizing impacts of projects on wildlife resources; however, the workload generated by the collective number of FWCA requests, and other correspondence we receive, exceeds our ability to address all requests. Although we are unable to provide a FWCA report at this time, we are unaware of any substantial impacts the project would have on wildlife resources in the project area during dredging and open water disposal. This does not preclude future evaluation and recommendations by the Service, should the project description change, including during the design phase of the project.

Further consultation with us under section 7 of the ESA is not required at this time. If the proposed action changes in any way such that it may affect a listed species in a manner not previously analyzed or if new information reveals the presence of additional listed species that may be affected by the project, the Corps should contact us immediately and suspend activities that may affect those species until the appropriate level of consultation is completed with our office.

Colonel William M. Conde
August 14, 2019

Thank you for your cooperation, and please contact Ms. Cindy Corsair at (401) 213-4416 if you have questions or need further assistance.

Sincerely yours,

Thomas R Chapman
Supervisor
New England Field Office

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

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Date: October 11, 2019

U.S. Army Corps of Engineers
Barbara Blumeris
696 Virginia Road
Concord, MA 01742

SUBJECT: #201905657-WQC and #201906504-FCC
New Haven Harbor Federal Navigation Project

Dear Ms. Blumeris:

This letter is in response to John Kennelly's September 4, 2019 letter to Susan Jacobson of my staff regarding dredging within a seasonal prohibition period. Terms and Conditions, paragraph 2., of #201905657-WQC and Appendix, paragraph 1., of #201906504-FCC prohibit dredging between February 1st and June 30th in order to protect winter flounder. The U.S. Army Corps of Engineers has requested to begin dredging within the existing navigation channel during February.

Staff has consulted with Bruce Williams of the Department of Energy and Environmental Protection's Fisheries Division regarding work within the winter flounder closure period. Based on this consultation, the following condition has been modified:

> **Seasonal Work Prohibition North of Breakwater.** Unconfined in-water excavation, dredging*, filling, blasting or removal of debris or other material is prohibited between February 1st and September 30th, inclusive, of any year unless otherwise authorized in writing by the Commissioner. The specific closure dates are as follows: February 1st through June 30th in order to protect winter flounder; April 1st through June 30th to protect diadromous fish; March 1st through September 30th to protect nesting birds on Sandy Point; and, June 1st through September 30th in order to protect spawning shellfish.

*Dredging may occur between February 1st and March 1st within existing channels with depths greater than -20' MLLW.

Additionally, the following condition has been added:

> **January and February Dredging Restrictions.** Dredging during January and February shall be conducted by mechanical means only.

The September 4, 2019 letter mentions that "the Corps has agreed to eliminate barge overflow in January and February to aid in reducing suspended sediments during the

dredge process." Please note that for dredge and disposal activities, the following general condition always applies:

> **Barge Control.** Spoil scows or barges shall be loaded and navigated in a manner which prevents uncontrollable motion or spillage and washout of dredged or excavated materials.

Please be advised that all other terms and conditions of the water quality certification and conditions of the consistency concurrence shall remain in full force and effect. If you have any questions, please contact Ms. Jacobson at 860-424-3693 or susan.jacobson@ct.gov.

Sincerely,

Brian P. Thompson, Director
Land and Water Resources Division
Bureau of Water Protection & Land Reuse

cc: Files #201905657-WQC and #201906504-FCC
E-mail to:
Mayor Toni Harp, MayorHarp@newhavenct.gov
Mayor Nancy Rossi, nrossi@westhaven-ct.gov
Joe Salvatore, CT Port Authority, Joseph.Salvatore@ct.gov
Judi Sheiffele, New Haven Port Authority
Bruce Williams, DEEP Fisheries
David Carey, DOA/BOA
Harbormasters, NH and WH
West Haven Harbor Management Commission

Connecticut Department of
ENERGY &
ENVIRONMENTAL
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Date: August 14, 2019

Barbara Blumeris
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742

RE: Federal Coastal Consistency #201906504-FCC
New Haven Harbor Federal Navigation Project

Dear Ms. Blumeris:

The Department of Energy and Environmental Protection (DEEP) has reviewed your request for Federal Consistency Concurrence (FCC) to improve the New Haven Harbor Federal Navigation Project pursuant to section 307(c)(1) of the Coastal Zone Management Act of 1972, as amended, and Subpart C of 15 Code of Federal Regulations (CFR), Part 930. Based on a review of the proposed activities as indicated on the plans and described in the application received by DEEP on June 3, 2019, we conditionally concur with your determination, subject to the requirements in the attached Appendix, that the activity as proposed is consistent with Connecticut's federally approved Coastal Management Program (CMP) and will be conducted in a manner consistent with that program.

Specific activities include:

1. deepening the channel, maneuvering area and turning basin from -35' to -40' MLLW;
2. widening the turning basin to the north by 200';
3. widening the inner channel from 400' to 500' and the entrance channel from 500' to 600';
4. widening the channel bend at the East Breakwater from 560' to 800'; and
5. disposing of the dredge sediment at:
   - Morris Cove (623,000 CY) and West River (88,000 CY) borrow pits;
   - North of the East Breakwater to create oyster habitat (434,000 CY);
   - West Breakwater for the placement of rock (44,000 CY);
   - Sandy Point Salt Marsh Creation Area (845,000 CY) and,
   - Central Long Island Disposal Site (approximately 2,300,000 CY).

By following the conditions in the attached Appendix, such work will be conducted in a manner consistent with the Connecticut CMP. Please be advised that any subsequent modifications to the proposed activity, regardless of their magnitude or impact, constitute a new application for the purposes of FCC. Accordingly, all such modifications must be submitted to DEEP for a coastal consistency concurrence pursuant to 15 CFR 930.50.

Thank you for providing a consistency determination and supporting information for our review. Should you have any questions regarding this consistency determination please contact Susan Jacobson of my office at 860-424-3693 or susan.jacobson@ct.gov.

Sincerely,

Brian P. Thompson, Director
Land and Water Resources Division
Bureau of Water Protection & Land Reuse

Attachment: Appendix

cc: Mayor Toni Harp, MayorHarp@newhavenct.gov
Mayor Nancy Rossi, nrossi@westhaven-ct.gov
Joe Salvatore, CT Port Authority, Joseph.Salvatore@ct.gov
Judi Sheiffele, New Haven Port Authority
Bruce Williams, DEEP Fisheries
David Carey, DOA/BOA
Harbormasters, NH and WH
File copy

APPENDIX

1. **Seasonal Work Prohibition North of Breakwater.** Unconfined in-water excavation, dredging, filling, blasting or removal of debris or other material is prohibited between February 1st and September 30th, inclusive, of any year unless otherwise authorized in writing by the Commissioner. The specific closure dates are as follows: February 1st through June 30th in order to protect winter flounder; April 1st through June 30th to protect diadromous fish; March 1st through September 30th to protect nesting birds on Sandy Point; and, June 1st through September 30th in order to protect spawning shellfish.

2. **Seasonal Work Prohibition South of Breakwater.** Unconfined in-water excavation, dredging, filling, blasting or removal of debris or other material is prohibited between June 1st and September 30th, inclusive, of any year in order to protect spawning shellfish in the area unless otherwise authorized in writing by the Commissioner.

3. **Sediment Suitability for New Haven Harbor Placement Sites.** The Certificate Holder shall submit, no later than 90 days prior to dredging and for the Commissioner's review and final sediment suitability determination, a site-specific sediment placement plan.

4. **Sandy Point Salt Marsh Creation Area.** The Certificate Holder shall submit, for the Commissioner's review and written approval, a final plan for the Sandy Point Salt Marsh Creation Area. Such plan shall be submitted no later than 90 days prior to marsh creation and shall include:
    a. relevant easements with West Haven;
    b. Final comments from the West Haven Harbor Management Commission;
    c. Final NDDB Determination, including, if applicable, Wildlife Division approved best management practices and mitigation plans
    d. location of Old Field Creek channel, including a maintenance plan;
    e. identification of intertidal flat habitat to be impacted by Marsh Creation Area; and
    f. short-term and long-term maintenance plans for the Marsh Creation Area.

5. **Blasting Plan.** The Certificate Holder shall submit, not later than 30 prior to the commencement of blasting, a plan for the blasting of rock within the channel.

6. **Aquaculture Coordination.** Not later than 60 days prior to the commencement of dredging, the Certificate Holder shall notify the Connecticut Department of Agriculture, Bureau of Aquaculture so that shellfish resources may be removed prior to sediment placement activities.

7. **Final Plans.** The Certificate Holder shall submit, not later than 60 days prior to the commencement of dredging, a set of signed and sealed plans to the Commissioner. Such plans shall include proposed dredge conditions within the Federal Navigation Project and sediment disposal sites within New Haven Harbor.

8. **Sequential Disposal at the Central Long Island Sound Disposal Site**. The Certificate Holder shall first dispose of dredge sediment from the north terminus of the project. This sediment shall be sequentially covered by channel sediment from north to south, resulting in inner harbor sediments being covered by outer harbor/entrance channel sediments.

Connecticut Department of
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Date: August 14, 2019

U.S. Army Corps of Engineers
Barbara Blumeris
696 Virginia Road
Concord, MA 01742

SUBJECT: Water Quality Certificate #201905657-WQC
New Haven Harbor Federal Navigation Project

Dear Ms. Blumeris:

Enclosed is the signed certificate which constitutes the approval of your application to conduct regulated activities. Your attention is directed to the conditions of the enclosed permit. Construction or work must conform to that which is authorized.

If you have any questions concerning your certificate, please contact me at 860-424-3693 or susan.jacobson@ct.gov.

Sincerely,

Susan Jacobson, Environmental Analyst
Land and Water Resources Division
Bureau of Water Protection and Land Reuse

Enc. – #201905657-WQC

cc: File #201905657-WQC
E-mail to:
Mayor Toni Harp, MayorHarp@newhavenct.gov
Mayor Nancy Rossi, nrossi@westhaven-ct.gov
Joe Salvatore, CT Port Authority, Joseph.Salvatore@ct.gov
Judi Sheiffele, New Haven Port Authority
Bruce Williams, DEEP Fisheries
David Carey, DOA/BOA
Harbormasters, NH and WH
West Haven Harbor Management Commission

Connecticut Department of
ENERGY &
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Bureau of Water Protection and Land Reuse
Land & Water Resources Division

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Connecticut Department of Energy and Environmental Protection License*

Section 401 Water Quality Certification

Licensee(s):	U.S. Army Corps of Engineers
Licensee Address(s):	696 Virginia Road Concord, MA 01742
License Number(s):	201905657-WQC
Municipality:	New Haven and West Haven
Project Description:	Disposal of approximately 4,334,000 cubic yards of dredge sediment from the New Haven Harbor Federal Navigation Project.
Project Address/Location:	Central Long Island Disposal Site; West River Borrow Pit; Morris Cove Borrow Pit; Sandy Point; East and West Breakwaters
Waters:	New Haven Harbor and Long Island Sound
Authorizing CT Statute(s) and/or Federal Law:	Section 401 CWA (33 USC 1341)
Applicable Regulations of CT State Agencies:	22a-426-1 to 9
Agency Contact:	Land & Water Resources Division, Bureau of Water Protection & Land Reuse, 860-424-3019
License Expiration:	Five (5) years from the date of issuance of this license.
Project Site Plan Set:	Plans to be submitted in accordance with Terms and Conditions, paragraph 7, below.
License Enclosures:	LWRD Dredging and General Conditions, LWRD Dredging Report Form, Work Commencement Form, Compliance Certification Form, Land Record Filing

*Connecticut's Uniform Administrative Procedure Act defines License to include, "*the whole or part of any agency permit, certificate, approval, registration, charter or similar form of permission required by law . . .*"

Authorized Activities:

The Licensee is hereby authorized to conduct the following work as described in application # 201905657-WQC and as depicted on any site plan sheets / sets cited herein:

Dispose of approximately 4,334,000 cubic yards of dredge sediment from the New Haven Harbor Federal Navigation Project, through hydraulic and mechanical means, at the following locations:

a. Morris Cove Borrow Pit with approximately 623,000 CY;
b. West River Borrow Pit with approximately 88,000 CY;
c. North of the East Breakwater to create oyster habitat with approximately 434,000 CY;
d. North of the West Breakwater with approximately 44,000 CY of rock;
e. North of Sandy Point with approximately 845,000 CY in accordance with Terms and Conditions paragraph 5., below; and,
f. Central Long Island Disposal Site with approximately 2,300,000 CY in accordance with Terms and Conditions paragraph 8., below.

Failure to comply with the terms and conditions of this license shall subject the Licensee and / or the Licensee's contractor(s) to enforcement actions and penalties as provided by law.

This license is subject to the following Terms and Conditions:

1. **License Enclosure(s) and Conditions.** The Licensee shall comply with all applicable terms and conditions as may be stipulated within the License Enclosure(s) listed above.

2. **Seasonal Work Prohibition North of Breakwater.** Unconfined in-water excavation, dredging, filling, blasting or removal of debris or other material is prohibited between February 1st and September 30th, inclusive, of any year unless otherwise authorized in writing by the Commissioner. The specific closure dates are as follows: February 1st through June 30th in order to protect winter flounder; April 1st through June 30th to protect diadromous fish; March 1st through September 30th to protect nesting birds on Sandy Point; and, June 1st through September 30th in order to protect spawning shellfish.

3. **Seasonal Work Prohibition South of Breakwater.** Unconfined in-water excavation, dredging, filling, blasting or removal of debris or other material is prohibited between June 1st and September 30th, inclusive, of any year in order to protect spawning shellfish in the area unless otherwise authorized in writing by the Commissioner.

4. **Sediment Suitability for New Haven Harbor Placement Sites.** The Licensee shall submit, no later than 90 days prior to dredging and for the Commissioner's review and final sediment suitability determination, a site-specific sediment placement plan.

5. **Sandy Point Salt Marsh Creation Area.** The Licensee shall submit, for the Commissioner's review and written approval, a final plan for the Sandy Point Salt Marsh Creation Area. Such plan shall be submitted no later than 90 days prior to marsh creation and shall include:

    a. relevant easements with West Haven;

b. Final comments from the West Haven Harbor Management Commission;

c. Final NDDB Determination, including, if applicable, Wildlife Division approved best management practices and mitigation plans

d. location of Old Field Creek channel, including a maintenance plan;

e. identification of intertidal flat habitat to be impacted by Marsh Creation Area; and

f. short-term and long-term maintenance plans for the Marsh Creation Area.

6. **Aquaculture Coordination.** Not later than 60 days prior to the commencement of dredging, the Licensee shall notify the Connecticut Department of Agriculture, Bureau of Aquaculture so that shellfish resources may be removed prior to sediment placement activities.

7. **Final Plans.** The Licensee shall submit, not later than 60 days prior to the commencement of dredging, a set of signed and sealed plans to the Commissioner. Such plans shall include proposed dredge conditions within the Federal Navigation Project and sediment disposal sites within New Haven Harbor.

8. **Sequential Disposal at the Central Long Island Sound Disposal Site**. The Licensee shall first dispose of dredge sediment from the north terminus of the project. This sediment shall be sequentially covered by channel sediment from north to south, resulting in inner harbor sediments being covered by outer harbor/entrance channel sediments.

Issued under the authority of the Commissioner of Energy and Environmental Protection on:

8/14/19
Date

Betsey Wingfield
Deputy Commissioner
Department of Energy & Environmental Protection

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Bureau of Water Protection & Land Reuse
Land & Water Resources Division

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Dredging and General Conditions for Land & Water Resource Division Licenses

1. **Time-of-Year Restriction.** Unless otherwise noted in the License, unconfined in-water excavation, dredging, filling or removal of debris or other material is prohibited, inclusive, in any year from June 1 through September 30 in order to protect spawning shellfish in the area unless otherwise authorized in writing by the Commissioner.

2. **Dredging Report.** Not later than two (2) weeks subsequent to the completion of any dredging activity authorized herein, the Licensee shall submit to the Commissioner a completed Dredging Report. A separate form shall be submitted by the Licensee for each distinct dredging activity conducted pursuant to this license.

3. **Bottom Disturbance.** Dragging the bottom with a spoil barge, scow, vessel, beam or similar equipment outside of any authorized area is prohibited.

4. **Material Handling.** Sidecasting or in-water rehandling of dredged or excavated material is prohibited.

5. **Barge Control.** Spoil scows or barges shall be loaded and navigated in a manner which prevents uncontrollable motion or spillage and washout of dredged or excavated materials.

6. **Sale of Sediment.** Sediment dredged pursuant to the license shall not be sold nor shall any fee for its use be charged without the express prior written authorization of the Commissioner and payment of a $4.00 per yard royalty to the state of Connecticut Department of Energy & Environmental Protection, pursuant to CGS section 22a-361(e).

7. **Sediment Disposal.** The Licensee shall dispose of aquatic sediments in accordance with the terms and conditions of the license.

8. **Submission of As-Dredged Plans.** On or before ninety (90) days after completion of the work authorized herein, the Licensee shall submit to the Commissioner an "as-dredged" survey of the work area showing contours, bathymetries, tidal datums and structures, as applicable. Such survey shall be the original one and be signed and sealed by an engineer, surveyor or architect, as applicable, who is licensed in the State of Connecticut.

Open Water Disposal, if authorized in Project Description

1. **Material Disposal.** The Licensee shall dispose of dredged or excavated material in accordance with the requirements of the United States Army Corps of Engineers-New England District, except that if the authorized disposal site is modified, the Licensee shall submit a request for modification of the location to the Commissioner and shall not dispose of the material until such location modification has been approved in writing by the Commissioner.

2. **Disposal Site / Use Modification.** The Commissioner may modify the authorized disposal site and direct dredged sediment to an alternate site for use as cap material, provided that no modification will take effect if such modification imposes uncompensated additional costs solely attributable to such modification on the Licensee.

3. **Disposal Monitoring.** The Licensee shall not dispose of dredged or excavated material unless said disposal is supervised and witnessed by an on-board inspector or documented by an automated disposal monitoring program approved by the United States Army Corps of Engineers-New England District.

4. **Barge Navigation.** Spoil scows or barges used by the Licensee for disposal of dredged or excavated material shall travel to and from the authorized disposal site utilizing sea lanes defined by the United States Army Corps of Engineers-New England District.

5. **Point Dumping.** The Licensee shall point-dump dredged or excavated materials at a specified buoy or set of coordinates identified by United States Army Corps of Engineers-New England District within the authorized disposal site.

LWRD General Conditions

1. **Land Record Filing.** The Licensee shall file the Land Record Filing on the land records of the municipality in which the subject property is located not later than thirty (30) days after license issuance pursuant to Connecticut General Statutes (CGS) Section 22a-363g. A copy of the Notice with a stamp or other such proof of filing with the municipality shall be submitted to the Commissioner no later than sixty (60) days after license issuance. If a Land Record Filing form is not enclosed and the work site is not associated with an upland property, no filing is required.

2. **Contractor Notification.** The Licensee shall give a copy of the license and its attachments to the contractor(s) who will be carrying out the authorized activities prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Licensee's contractor(s) shall conduct all operations at the site in full compliance with the license and, to the extent provided by law, may be held liable for any violation of the terms and conditions of the license. At the work site, the contractor(s) shall, whenever work is being performed, have on site and make available for inspection a copy of the license and the authorized plans.

3. **Work Commencement.** Not later than two (2) weeks prior to the commencement of any work authorized herein, the Licensee shall submit to the Commissioner, on the Work Commencement Form attached hereto, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.

    - For water diversion activities authorized pursuant to 22a-377(c)-1 of the Regulations of Connecticut State Agencies, the Licensee shall also notify the Commissioner in writing two weeks prior to initiating the authorized diversion.
    - For emergency activities authorized pursuant Connecticut General Statutes Section

22a-6k, the Licensee shall notify the Commissioner, in writing, of activity commencement at least one (1) day prior to construction and of activity completion no later than five (5) days after conclusion.

4. **License Notice.** The Licensee shall post the first page of the License in a conspicuous place at the work area while the work authorized therein is undertaken.

5. **Unauthorized Activities.** Except as specifically authorized, no equipment or material, including but not limited to, fill, construction materials, excavated material or debris, shall be deposited, placed or stored in any wetland or watercourse on or off-site. The Licensee may not conduct work within wetlands or watercourses other than as specifically authorized, unless otherwise authorized in writing by the Commissioner. Tidal wetlands means "wetland" as defined by section 22a-29 and "freshwater wetlands and watercourses" means "wetlands" and "watercourses" as defined by section 22a-38.

6. **Excavated Materials.** Unless otherwise authorized, all excavated material shall be staged and managed in a manner which prevents additional impacts to wetlands and watercourses.

7. **Best Management Practices.** The Licensee shall not cause or allow pollution of any wetlands or watercourses, including pollution resulting from sedimentation and erosion. In constructing or maintaining any authorized structure or facility or conducting any authorized activity, or in removing any such structure or facility, the Licensee shall employ best management practices to control storm water discharges, to prevent erosion and sedimentation, and to otherwise prevent pollution of wetlands and other waters of the State. For purposes of the license, "pollution" means "pollution" as that term is defined by CGS section 22a-423. Best Management Practices include, but are not limited, to practices identified in the *Connecticut Guidelines for Soil Erosion and Sediment Control* as revised, *2004 Connecticut Stormwater Quality Manual*, Department of Transportation's *ConnDOT Drainage Manual* as revised, and the Department of Transportation Standard Specifications as revised.

8. **Work Site Restoration.** Upon completion of any authorized work, the Licensee shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.

9. **Inspection.** The Licensee shall allow any representative of the Commissioner to inspect the project location at reasonable times to ensure that work is being or has been conducted in accordance with the terms and conditions of this license.

10. **Change of Use. (Applies only if a use is specified within the License "*Project Description*")**

    a. The work specified in the license is authorized solely for the purpose set forth in the license. No change in purpose or use of the authorized work or facilities as set forth in the license may occur without the prior written approval of the Commissioner. The Licensee shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this license, request permission from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.

b. A change in the form of ownership of any structure authorized herein from a rental/lease commercial marina to a wholly-owned common interest community or dockominium may constitute a change in purpose as specified in paragraph (a) above.

11. **De Minimis Alteration.** The Licensee shall not deviate from the authorized activity without prior written approval from the Commissioner. The Licensee may request a de minimis change to any authorized structure, facility, or activity. A de minimis alteration means a change in the authorized design, construction or operation that individually and cumulatively has minimal additional environmental impact and does not substantively alter the project as authorized.

    - For diversion activities authorized pursuant to 22a-377(c)-2 of the Regulations of Connecticut State Agencies, a de minimis alteration means an alteration which does not significantly increase the quantity of water diverted or significantly change the capacity to divert water.

12. **Extension Request.** The Licensee may request an extension of the license expiration date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to the license expiration. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall be the Commissioner's sole discretion to grant or deny such request.

13. **No Work After License Expiration.** Work conducted after the license expiration date is a violation of the license and may subject the licensee to enforcement action, including penalties, as provided by law.

14. **License Transfer.** The license is not transferable without prior written authorization of the Commissioner. A request to transfer a license shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Licensee's obligations under the license shall not be affected by the passage of title to the license site to any other person or municipality until such time as a transfer is approved by the Commissioner.

15. **Document Submission.** Any document required to be submitted to the Commissioner under the license or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:

    Regulatory Section
    Land & Water Resources Division
    Department of Energy and Environmental Protection
    79 Elm Street
    Hartford, Connecticut 06106-5127
    860-424-3019

16. **Date of Document Submission.** The date of submission to the Commissioner of any document required by the license shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under the license, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the

Commissioner, whichever is earlier. Except as otherwise specified in the license, the word "day" as used in the license means calendar day. Any document or action which is required by the license to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.

17. **Certification of Documents.** Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under the license shall be signed by the Licensee and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."

18. **Accuracy of Documentation.** In evaluating the application for the license, the Commissioner has relied on information and data provided by the Licensee and on the Licensee's representations concerning site conditions, design specifications and the proposed work, including but not limited to representations concerning the commercial, public or private nature of the work or structures, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, the license may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.

19. **Limits of Liability.** In granting the license, the Commissioner has relied on all representations of the Licensee, including information and data provided in support of the Licensee's application. Neither the Licensee's representations nor the issuance of the license shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.

20. **Reporting of Violations.** In the event that the Licensee becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this license or of any document incorporated into the license, the Licensee shall immediately notify the agency contact specified within the license and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the agency contact, the Licensee shall provide, for the agency's review and written approval, a report including the following information:

    a. the provision(s) of the license that has been violated;

    b. the date and time the violation(s) was first observed and by whom;

    c. the cause of the violation(s), if known;

    d. if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;

e. if the violation(s) has not ceased, the anticipated date when it will be corrected;

f. steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented; and

g. the signatures of the Licensee and of the individual(s) responsible for actually preparing such report.

If the violation occurs outside of normal business hours, the Licensee shall contact the Department of Energy and Environmental Protection Emergency Dispatch at 860-424-3333. The Licensee shall comply with any dates which may be approved in writing by the Commissioner.

21. **Revocation/Suspension/Modification.** The license may be revoked, suspended, or modified in accordance with applicable law.

22. **Other Required Approvals.** License issuance does not relieve the Licensee of their obligations to obtain any other approvals required by applicable federal, state and local law.

23. **Rights.** The license is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.

24. **Condition Conflicts.** In the case where a project specific special condition listed on the license differs from, or conflicts with, one of the general conditions listed herein, the project specific special condition language shall prevail. It is the licensee's responsibility to contact the agency contact person listed on the license for clarification if needed prior to conducting any further regulated activities.

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Bureau of Water Protection & Land Reuse
Land & Water Resources Division

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Land Record Filing*

To: City of West Haven Clerk

Signature and Date: Susan Jacobs 8/14/19

Subject: North of Sandy Point
License # 201905657-WQC

Pursuant to Section 22a-363g of the Connecticut General Statutes, the Commissioner of Energy and Environmental Protection gives notice that a license has been issued to U.S. Army Corps of Engineers, 696 Virginia Road Concord, MA, 01742 to:

create a 60 – 70 acres salt marsh north of Sandy Point by placing sediment filled geotubes and approximately 845,000 cubic yards of dredge sediment.

If you have any questions pertaining to this matter, please contact the Land & Water Resources Division at 860-424-3019.

Return to:

Land & Water Resources Division
State of Connecticut
Department of Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

*The Licensee shall file the Land Record Filing on the land records of the municipality in which the subject property is located not later than thirty (30) days after license issuance pursuant to Connecticut General Statutes (CGS) Section 22a-363g. A copy of the Notice with a stamp or other such proof of filing with the municipality shall be submitted to the Commissioner no later than sixty (60) days after license issuance.

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

Bureau of Water Protection & Land Reuse
Land & Water Resources Division

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Work Commencement Form

To: Regulatory Section
Department of Energy and Environmental Protection
Land & Water Resources Division
79 Elm Street
Hartford, CT 06106-5127

Licensee Name: _____
Licensee Address: _____
_____

License No(s): _____

CONTRACTOR(s):

1 Name: _____
Address: _____
Telephone: _____
E-mail: _____

2 Name: _____
Address: _____
Telephone: _____
E-mail: _____

3 Name: _____
Address: _____
Telephone: _____
E-mail: _____

Date Contractor(s) received a copy
of the license and approved plans: _____

EXPECTED DATE OF COMMENCEMENT OF WORK: _____

EXPECTED DATE OF COMPLETION OF WORK: _____

LICENSEE: _____ _____
(Signature) (Date)

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

DREDGING REPORT

(To be completed by Licensee)

License No(s).: _____
Licensee Name: _____
Address of Dredging Activity: _____
_____

Dredging Contractor Information:
Name: _____
Mailing Address: _____
Business Phone: _____
Contact Person: _____
E-mail: _____

Dates Dredged: _____
Total Volume Dredged during this period: _____
Disposal Volume(s) and Location(s): _____
_____

**If any portion of the dredged materials was used in a beneficial manner, please identify the beneficial use type (i.e. beach nourishment, habitat restoration, landfill cap, construction materials…), volume of dredged material utilized and the location of beneficial usage.

_____
_____
_____
_____

Document Certification:
"I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."

_____ _____
Signature of Licensee Date

If you have any questions pertaining to this form, please contact the Land & Water Resources Division at 860-424-3034.

Return to:
Land & Water Resources Division
State of Connecticut Department of Energy & Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Compliance Certification Form

The following certification must be signed by the licensee working in consultation with a Connecticut-licensed design professional and must be submitted to the address indicated at the end of this form within ninety (90) days of completion of the authorized work.

1. Licensee Name: _____

   License Number(s): _____

   Site Address: _____

2. **Check one:**

   (a) ☐ "I certify that the final site conditions and / or structures are in general conformance with the approved site plans". Identify and describe any deviations and attach to this form.

   (b) ☐ "The final site conditions and / or structures are not in general conformance with the approved site plans. The enclosed "as-built" plans note the modifications".

3. "I understand that any false statement in this certification is punishable as a criminal offence under section 53a-157b of the General Statutes and under any other applicable law."

_____ _____

Signature of Licensee Date

_____

Name of Licensee (print or type)

_____ _____

Signature of CT-Licensed Design Professional Date

_____

Name of CT-Licensed Design Professional (print or type)

_____

Professional License Number (if applicable) Affix Stamp Here

- As-built plans shall include: elevations or tidal datums, as applicable, and structures, including any proposed elevation views and cross sections included in the approved license plans. Such as-built plans shall be the original ones and be signed and sealed by an engineer, surveyor or architect, as applicable, who is licensed in the State of Connecticut.
- The Licensee will be notified by staff of the Land and Water Resources Division (LWRD) if further compliance review is necessary. Lack of response by LWRD staff does not imply compliance.

Submit this completed form to :
Regulatory Section
Department of Energy and Environmental Protection
Land & Water Resources Division
79 Elm Street
Hartford, CT 06106-5127

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

JUL 8 - 2019

John R. Kennelly
Chief, Planning Division
Department of the Army
U.S. Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742-2751

Re: New Haven Harbor Deepening (New Haven, Connecticut)

Dear Mr. Kennelly:

We have completed our consultation under section 7 of the Endangered Species Act (ESA) in response to your letter received on June 24, 2019, regarding the above-referenced proposed project. We reviewed your consultation request document and related materials. Based on our knowledge, expertise, and your materials, we concur with your conclusion that the proposed action is not likely to adversely affect any National Marine Fisheries Service ESA-listed species or designated critical habitat. Therefore, no further consultation pursuant to section 7 of the ESA is required.

Reinitiation of consultation is required and shall be requested by the lead federal agency or by us, where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; or, (c) If a new species is listed or critical habitat designated that may be affected by the identified action. No take is anticipated or exempted. If there is any incidental take of a listed species, reinitiation would be required. Should you have any questions about this correspondence please contact Zachary Jylkka at (978) 282-8467 or by email (Zachary.Jylkka@noaa.gov). For questions related to Essential Fish Habitat, please contact Alison Verkade with our Habitat Conservation Division at (978)-281-9266 or at Alison.Verkade@noaa.gov.

Sincerely,

Michael J. Asaro, PhD
Acting Assistant Regional Administrator
for Protected Resources

EC: Verkade, NMFS/HCD; Randall, USACE
ECO: GARFO-2019-01601
File Code: H:\Section 7 Team\Section 7\Non-Fisheries\ACOE\Informal\2019\New England\USACE New Haven Harbor Deepening

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

June 19, 2019

Planning Division
Evaluation Branch

Michael Pentony
Northeast Regional Administrator
NOAA Fisheries
Northeast Regional Office
55 Great Republic Drive
Gloucester, MA 01930-2276

Dear Mr. Pentony:

This letter serves to initiate informal consultation under Section 7 of the Endangered Species Act (ESA) concerning the potential effects to listed species that could occur from the proposed New Haven Harbor Navigation Improvement Project, in New Haven Connecticut. Pre-consultation technical assistance was provided by your office in 2018 during the alternatives analysis for the effort. We have made the determination that the proposed activity may affect, but is not likely to adversely affect, species listed as threatened or endangered by NMFS under the ESA of 1973, as amended. We have prepared a Draft Integrated Feasibility Report and Environmental Impact Statement (D-IFR/EIS) describing potential effects to threatened and/or endangered species which are likely to result from construction or operation of the proposed project. The findings of that assessment are summarized in this letter.

Proposed Project and Construction Considerations:

The existing New Haven Harbor Federal Navigation Project (FNP) is shown in Figure 1. Navigation features of the existing Federal Navigation Project include:

- A main ship channel, -35 feet Mean Lower Low Water (MLLW), extending about 5 miles from deep water in Long Island Sound to the head of the harbor at the mouth of the Quinnipiac River, varying in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widened to 800 feet along the upper harbor terminals to provide a maneuvering area;
- A turning basin in the upper harbor west of the channel also at -35 feet MLLW;
- Two anchorages west of the main channel, at -15 and -16 feet MLLW;
- The Quinnipiac River Channel, at -18 feet MLLW (lower channel) and -16 feet MLLW (upper channel), and generally 200 feet wide;

- The Mill River Channel, at -12 feet MLLW, 200 feet wide, including two branches (east branch at 100 ft. wide, and west branch at 125 feet wide);
- The West River channel authorized at -12-feet MLLW, 100 to 150 feet wide, with a -6 foot MLLW anchorage;
- A pile and stone T-dike at Stony Point west of the main channel, 4,200 feet long; and
- Three offshore stone breakwaters, totaling 12,100 feet in length providing a refuge in the outer harbor.

Due to inefficiencies in large vessels transiting the harbor, USACE is considering navigation improvement to the New Haven Harbor FNP. The tentatively selected plan (TSP) for the New Haven Harbor Navigation Improvement project is the -40 feet MLLW Plan. The TSP consists of the following General Navigation Feature Improvements:

TSP - General Navigation Feature Improvements

- Deepen the channel, maneuvering area, and turning basin from - 35 to -40 feet, MLLW
- Widen the turning basin to the north 200 feet
- Widen the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet.
- Widen the channel bend at the East Breakwater from 560 to 800 feet

These improvements will involve dredging about 4.3 million cubic yards (MCY) of clays, silts, sands, and tills, the majority of which are parent materials largely of glacial origin, from the harbor bottom. In addition, about 43,500 CY of rock would be blasted and dredged from the harbor. The project would take about two years to construct. The improvement features are shown in Figure 2. The dredged material quantity estimate for the improvement dredging is shown in Table 1.

Table 1. TSP Dredged Material Quantity Estimates.

TSP (-40 feet MLLW Plan)	Dredging Quantities (CY)		
	Cut	2-ft. Over depth	Total
Entrance Channel	278,300	240,000	518,300
Bend (Ordinary Material)	475,300	161,300	636,600
Bend (Rock) (Required Cut to El 42)	24,900	18,600	43,500
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging	**2,811,500**	**1,510,700**	**4,322,200**

Dredged Material Placement Sites Base Plan

The following sites will be used for the placement of dredged material from the improvement project. These sites are considered the Federal base plan and also represent beneficial use of the dredged material. The sites are:

- Morris Cove and West River Borrow Pits
- Create Oyster Habitat north of East Breakwater
- Rock placement at West Breakwater (rock reef)
- Cover historic disposal mounds at the Central Long Island Sound Disposal Site (CLDS)

Salt Marsh Creation Additional Opportunity for Beneficial Use Site

In addition to the above placement sites the opportunity to use some of the dredged material that would go to CLDS to create about 70 acres of salt march was identified. This salt marsh creation site represents an increase in cost over the less expensive option of bringing the material to CLDS. The Non-Federal Sponsors support the salt marsh creation site and are willing to share in the incremental cost above the base plan. The area identified as the salt marsh creation site will be developed into a mosaic of high marsh, low marsh, tidal creek and mudflat habitat during the design phase of the project. The tidal creek areas will be designed to allow for the hydrologic connection between New Haven Harbor and Old Field Creek to the south to remain.

All potential in harbor disposal sites are shown in Figure 2. The CLDS is shown in Figure 3.

Figure 1. New Haven Harbor Federal Navigation Project

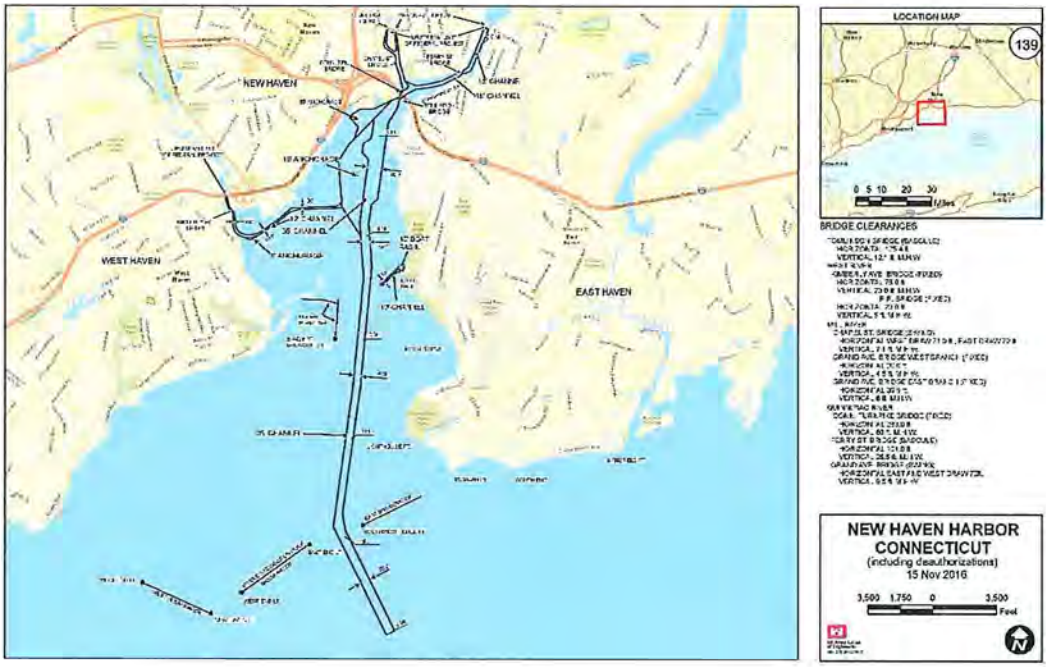
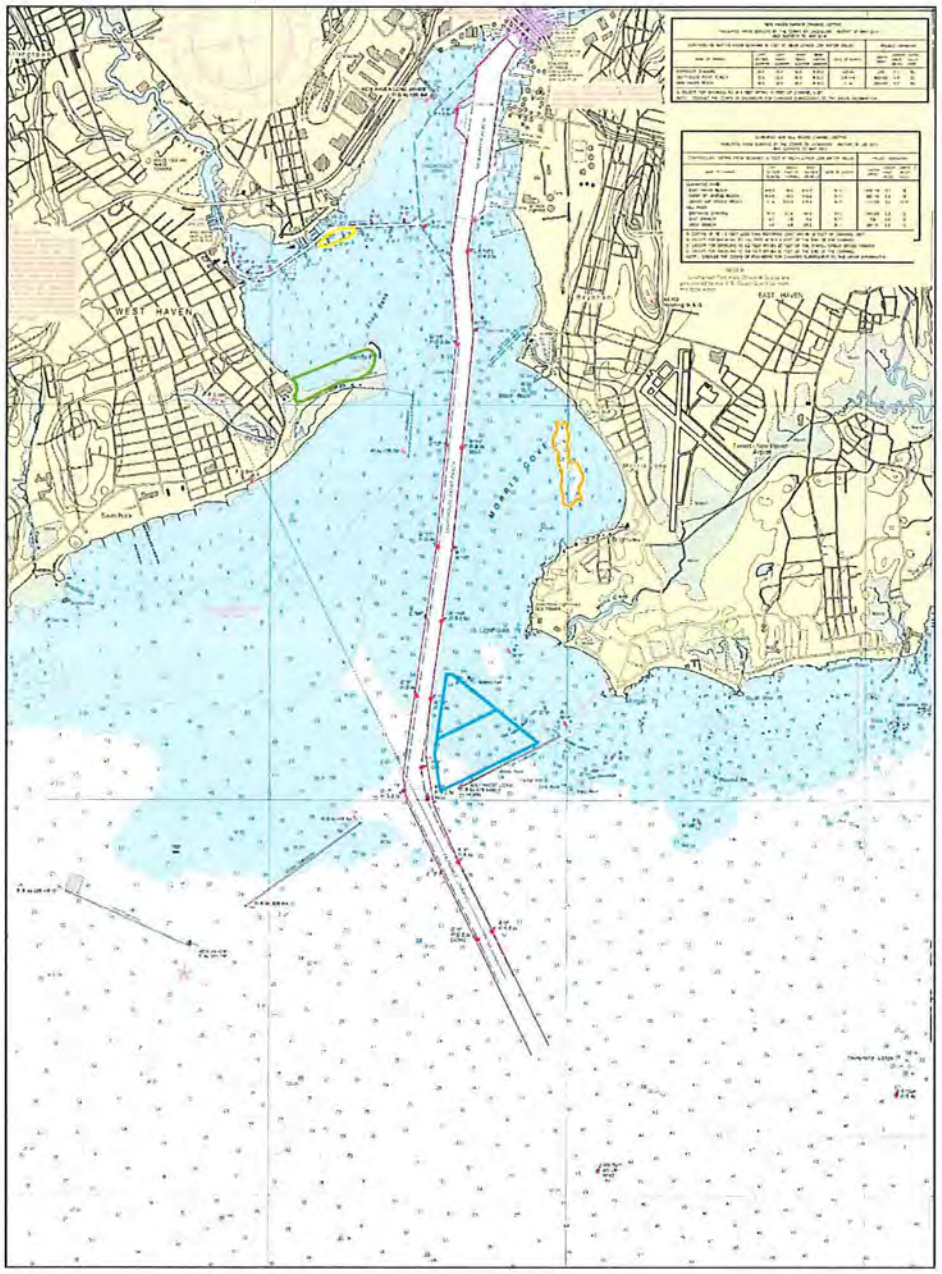


Figure 2. Navigation Improvement Features and Placement Site Locations



Legend

- Proposed Channel
- West River Pit Placement Site
- Morris Cove Placement Site
- Salt Marsh Creation Site
- Shellfish Improvement Area
- Rock Reef Placement Site

New Haven Harbor, CT

Navigation Improvement Project
Feasibility Study
Proposed Channel
& Placement Sites

DRAFT

0 2,000 4,000 Feet

Project Construction Sequence

As the project is in the feasibility phase, no specific construction sequence has been designed to date. Preliminary schedule design involves the following:

Construction Year One:

- Drilling and Blasting Activities
- Mechanical Dredging of Interior Channel with material placement at near shore sites and CLDS
- Hydraulic Dredging of Interior Channel with material placement at Sandy Point wetland creation area

Construction Year Two:

- Mechanical Dredging of Entrance Channel, Interior Channel, Turning Basin and Maneuvering Area with material placement at near shore sites and CLDS

Time of Year Restrictions

The following periods during which construction could occur are as follows:

• Dredging and Disposal	October 1 to January 31 in the inner harbor (north to the mid-point of Sandy Point) October 1 and April 1 in the outer harbor (mid-point of Sandy Point south to Long Island Sound)
• Blasting	October 1 – April 1

Construction Techniques

The following best management practices for construction will be utilized to ensure that the proposed project does not adversely affect any threatened or endangered species:

- Prohibiting blasting during passage of schools of fish or large fish (e.g., Atlantic sturgeon, Shortnose Sturgeon)
- Prohibiting blasting in the presence of marine mammals
- Using inserted delays of a fraction of a second per blast drill hole (25 millisecond delay currently specified)
- Placing material on top of boreholes (stemming) to reduce shock waves reaching the water column

Construction Monitoring

The following monitoring efforts will be utilized to avoid adverse effects to threatened and endangered species:

- NMFS-approved Marine Mammal Observers will be present during blasting events and on scows transiting to CLDS

- NMFS-approved Fisheries Observers will be present during blasting events. In the unlikely event that any sea turtles or sturgeon are observed within the safety zone during a blast event, all reasonable attempts to monitor the condition and behavior of the animal will be undertaken. These incidences will be reported immediately to NMFS [(1-866-755-NOAA) and Zachary Jylkka (zachary.jylkka@noaa.gov)] to determine whether the incident would require reinitiating Section 7 Consultation.

- Fish/Marine Mammal detecting system (i.e., sonar) will be used during blasting events

- Fish startle system will be used for 30 minutes prior to and up to 5 minutes before each blasting event

- Hydro acoustic monitoring of every blast event (monitors will be placed approximately 250 feet upstream and downstream stations from blast source to monitor noise levels and pressure levels)

- Any interactions with listed species will be reported as soon as possible (within 24-hours) to the NMFS Marine Animal Response Hotline at (866) 755-NOAA as well as incidental.take@noaa.gov. In addition, USACE will immediately report any injured or dead marine mammals, sea turtles, and/or sturgeons to NMFS at (866) 755-NOAA and incidental.take@noaa.gov.

Description of the Action Area

The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50CFR§402.02). For this project the action area consists of the areas proposed to be dredged in New Haven Harbor, the beneficial use sites within New Haven Harbor, the Central Long Island Sound Disposal Site, as well as the route travelled to and from the project to the CLDS, and all underwater areas where the effects of dredging and dredged material placement (e.g., increases in suspended sediment, loss of prey, and increased risk of vessel strikes) will be experienced.

Analyses of mechanical dredging activities using a clamshell style dredge bucket indicate that increased sediment levels at the near bottom will be fully dissipated at a distance of 2,300 feet from the dredge site if dredging silt (Bohlen *et al.*, 1979), but typical surface plumes only extend about 1,000 feet (USACE, 2015). As the project

sediments are a mix of sand and silt, the coarser-grained material is expected to settle out of the water column more rapidly. The open water placement activities are expected to produce turbidity plumes that will be fully dissipated at a distance of 6,500 feet from the placement (SAIC, 2005). Therefore, the action area consists of the dredge footprint, the 2,300-foot radius around each of the areas to be mechanically dredged, a 6,500-foot radius from the open water placement area, and the routes travelled by the barges/scows from the dredge site to the placement site. These areas are expected to encompass all of the direct and indirect effects of the proposed actions.

New Haven Harbor is largely surrounded by urbanized land. Three waste-water pollution control facilities (WPCF) in the cities of New Haven, West Haven, and North Haven release effluent into the Quinnipiac River and New Haven Harbor. Effects of the WPCFs in North Haven and West Haven are minimal as compared to effects on New Haven east shore WPCF (Bell and Romick, 2002). The intensity of this urbanization and associated industrialization has brought with it all the attendant problems of municipal and industrial pollution, ranging from sewage to oil spills.

The waters of New Haven Harbor are classified by the State of Connecticut as SB throughout the harbor. The term SB is for coastal waters of overall good quality. The Connecticut Class SB waters designated uses are for: marine fish, shellfish and wildlife habitat, commercial shellfish harvesting, recreation, industrial water supply, and navigation (CT DEEP, 2017).

Long Island Sound, which includes New Haven Harbor, supports a diverse assemblage of fish. Many of the fish species in Long Island Sound are commercially and recreationally important. Connecticut commercial fisheries, between 2010 - 2014, harvested on average 5 to 6 million pounds of catch from Long Island Sound annually (CT DEEP 2015). Commercial and recreational fisheries in Long Island Sound are valued at over one billion dollars (LIS Task Force 2003).

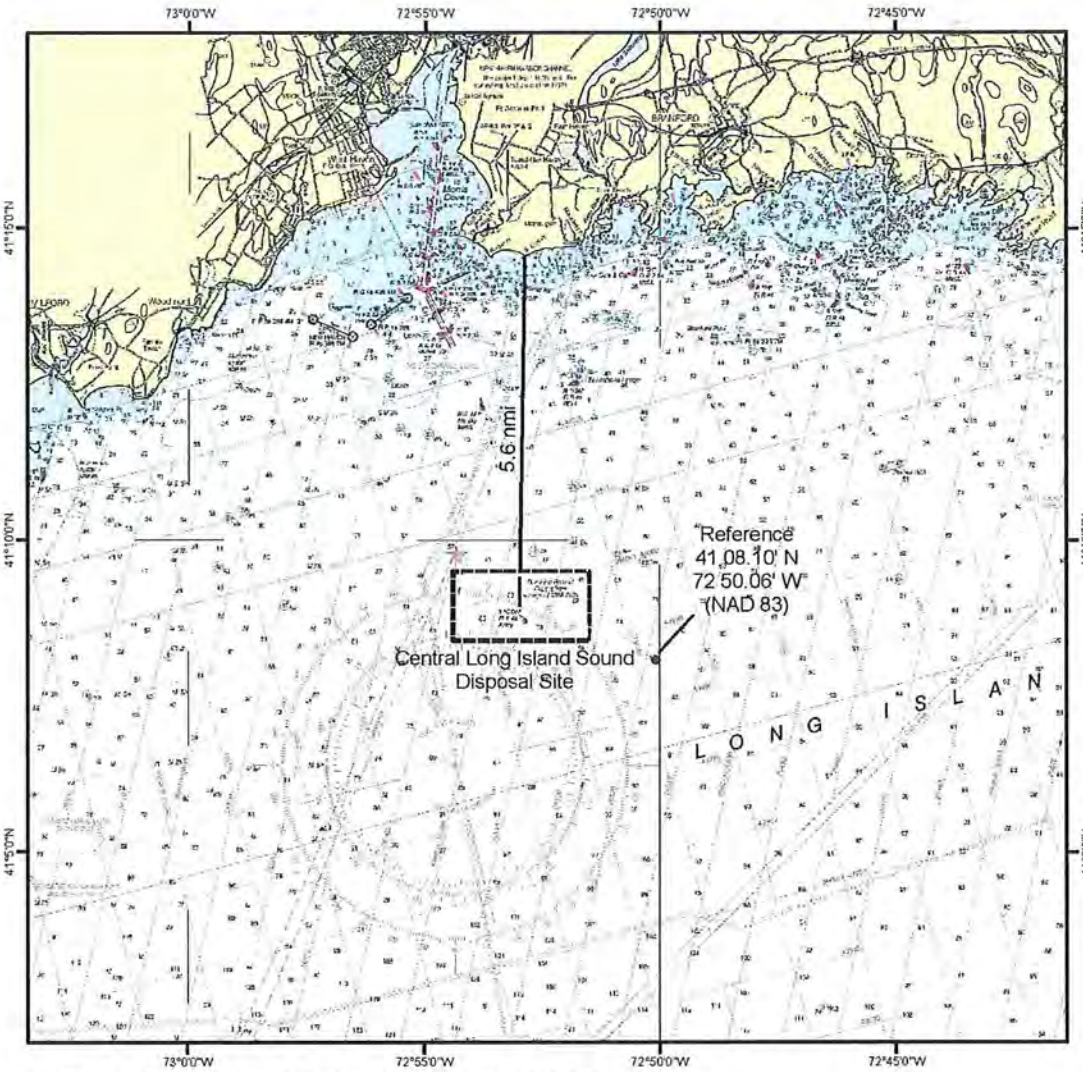
The most common year-round species of fish found in Long Island Sound include winter flounder, windowpane flounder, Atlantic menhaden, Atlantic silversides, butterfish, and scup. The most common anadromous species of fish (species that migrate from marine waters to freshwater streams and rivers) found in these waters include striped bass, alewife, blueback herring, white perch, and American shad.

Long Island Sound, a semi-enclosed estuary, is an important economic resource for both commercial and recreational/sport fisherman. The region is occupied by more than 83 fish species; however, only a few of them are considered year-round residents (Gottschall et al., 2000). Standard research tows for fish and shellfish conducted by the CTDEP between 1984 and 2000 document that the highest catch per unit effort (CPUEs) in Long Island Sound were found in central Long Island Sound

The Central Long Island Sound (CLDS) Disposal Site is located in Connecticut state waters approximately 5 nautical miles (6.5 miles) due south of South End Point, New Haven, Connecticut and over 10 nautical miles north of Shoreham Beach, New York.

The CLDS has the longest continuous record of use of any disposal site in the Long Island Sound with records of material being disposed of at this site from 1941-1945 and again from 1954 to the present. Overall, CLDS has received in excess of 13 million cubic yards of dredged material since 1941.

Figure 3. Central Long Island Sound Disposal Site.



CENTRAL LONG ISLAND SOUND DISPOSAL SITE

Description: The Central Long Island Sound Disposal Site (CLDS) is one of four regional dredged material disposal sites located in the waters of Long Island Sound. CLDS covers a 11.04 km² (3.2 nmi²) area and is centered at 41° 08.950' N, 72° 52.950' W (NAD 83). It is located approximately 10.89 km (5.6 nmi) south of South End Point, East Haven, Connecticut. Since 1977, the management strategy at CLDS has entailed the controlled placement of small to moderate volumes of sediment to form individual disposal mounds on the seafloor. The authorized disposal point (within the overall disposal area) is specified for each dredging project in other project documents.

D A M O S

DISPOSAL AREA MONITORING SYSTEM

SCALE 1:171,057

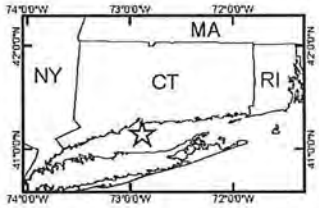
Kilometers

1 0 1 2 3 4 5 6 7

1 0 1 2 3

Nautical Miles

NOTE: This chart is not intended for use in navigation



CLDS is in a depositional area with a gradually sloping bottom ranging from a depth of 59 feet in the northwest corner to 72 feet in the southeast corner, with distinct disposal mounds from past dredged material placement activities rising to depths as shallow as 46 ft. (AECOM, 2013). The bottom sediments at the CLDS are composed of fine silts and clays characteristic of the low-energy environment found in deep areas of the western and central basins. The site is in an area of sediment accumulation, which is indicative of a generally low current regime (Bokuniewicz and Gordon, 1980).

The CLDS area has had extensive monitoring conducted of its benthic populations since 1979 (SAIC, 1989; SAIC, 1995, ENSR, 1998). As with many temperate benthic populations, benthic biota in the entire site undergoes seasonal fluctuations in densities, numbers of species, and dominants. A total of 184 species averaging 2,267.6 individuals per square meter have been identified at the CLDS site. The dominant species were the polychaete *Nephtys incisa*, and the bivalves *Mulinia lateralis* and *Yoldia limatula*.

The CLDS is removed from (6.3 miles) the near-shore estuarine environment that provides spawning, nursery, and productive feeding grounds for many marine resources, including summer and winter flounder. Divers have seen, in decreasing order of abundance, winter flounder, windowpane flounder, fourspot flounder, striped searobin, summer flounder, grubby sculpin and silver hake (SAIC, 1989). In fish trawls taken by CTDEP from 1992 to 1997, 35 species of finfish were identified. The top five dominants were butterfish (*Peprilus triacanthus*), winter flounder (*Pseudopleuronectes americanus*), scup (*Stenotomus chrysops*), bluefish (*Pomatomus saltatrix*) and windowpane flounder (*Scopthalmus aquosus*). Based on the CTDEEP data, lobsters, which were most abundant on muddy substrates, occurred Sound-wide in all seasons during the study period (i.e., 1984 to 2000) and were moderately abundant. However since that time lobster populations have declined dramatically in the sound. Commercial fin fishing activities at CLDS are limited due to the low populations of ground fish.

NMFS Listed Species and Critical Habitat in the Action Area

Per your letter of April 3, 2017 and using the Section 7 mapping tool, there are four species of sea turtles and two species of fish listed under the Endangered Species Act (ESA) that occur or have the potential to occur in the action area and may be adversely affected by the proposed action. ESA species include:

Sea Turtles

- Kemp's Ridley Turtle (*Lepidochelys kempii*) - Endangered (35 FR 18319; Recovery plan: NMFS *et al.* 2011
- Leatherback Turtle (*Dermochelys coriacea*) - Endangered (35 FR 8491; Recovery plan: NMFS & USFWS 1992)

- Loggerhead Turtle (*Caretta caretta*) - Threatened (76 FR 58868; Recovery plan: NMFS & USFWS 2008)
- Green Turtle (*Chelonia mydas*) - Threatened (81 FR 20057; Recovery plan: NMFS & USFWS 1991)

Fish

- Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) - Endangered except for Gulf Of Maine DPS - Threatened (77 FR 5880 and 77 FR 5914; Recovery plan: None published)
- Shortnose Sturgeon (*Acipenser brevirostrum*) (32 FR 4001; Recovery plan: NMFS 1998)

Sea Turtles

Four species of federally listed threatened or endangered sea turtles may be seasonally found in coastal waters of New England including the action area. These species include the threatened Northwest Atlantic Ocean distinct population segment (DPS) of loggerhead and North Atlantic DPS of green, and the endangered Kemp's ridley and leatherback. Sea turtles are generally distributed in coastal Atlantic waters from Florida to New England. As water temperatures of coastal New England rise in the spring, turtles begin to migrate north from their overwintering waters in the south. Sea turtles are expected to be found in the action area during the summer and fall months (May-November) when the water temperatures are at least 59° F (Shoop and Kenney, 1992) with the highest concentrations of turtles from May through October (Morreale, 1999; Morreale and Standora, 2005).

Atlantic Sturgeon

There are four DPSs of Atlantic sturgeon listed as endangered (New York Bight, Chesapeake Bay, Carolina, and South Atlantic) and one DPS listed as threatened (Gulf of Maine) under the ESA. The marine range for all five DPSs includes marine waters, coastal bays and estuaries from the Labrador Inlet in Labrador, Canada to Cape Canaveral, Florida. The presence of Atlantic sturgeon has been documented in the action area according to the NOAA Fisheries endangered species map. Available information on the distribution of Atlantic sturgeon indicates that a majority of the Atlantic sturgeon in the action area will be from the New York Bight (NYB) DPS with a small chance of any other DPS individuals occurring in the action area (Damon-Randall *et al.*, 2012).

Atlantic sturgeon are bottom feeders; diets of adult and migrant sub-adult Atlantic sturgeon include mollusks, gastropods, amphipods, annelids, decapods, isopods, and fish such as sand lance (Bigelow and Schroeder, 1953; ASSRT, 2007; Guilbard *et al.*, 2007; Savoy, 2005). The distribution of Atlantic sturgeon is strongly associated with prey availability. Therefore, Atlantic sturgeon may occur where suitable forage and

appropriate habitat conditions are present (e.g., soft substrate with higher densities of prey items). Long Island Sound may be an important feeding or resting area on-the-way to and from spawning areas in the Hudson River as adult and sub-adult Atlantic sturgeon have been seen or captured in the Sound. Atlantic sturgeon were caught in all three basins of Long Island Sound but were mainly located in the vicinity of Falkner Island (Savoy and Pacileo, 2003).

Eggs and larvae of Atlantic sturgeon are not expected in the marine action area, due to the fact that they spawn in freshwater portions of large rivers and their early life stages are not tolerant of salinity. Juvenile Atlantic sturgeon generally remain in their natal river; therefore, no juveniles should be present in the action area as it is not located in a river where sturgeon spawn. While in the estuary, sturgeon would be expected to occur primarily in outer New Haven Harbor.

Adult and sub-adult Atlantic sturgeon are known to overwinter outside of their natal rivers and a limited number of adult and sub-adult Atlantic sturgeon could be present foraging in the harbor during winter months. During winter months, adult Atlantic sturgeon primarily occupy deeper water offshore; they occupy the deepest waters during winter and early spring (November–March) and shallower waters during late spring to early fall (May–September) (Erickson *et al.,* 2011). Because the species uses a variety of habitats for foraging throughout the year, we expect Atlantic sturgeon to occupy waters that are generally deeper than what is available in the action area during the winter months, but will most likely move back into shallower near shore areas as the water temperature rises in the spring. Based on habitat conditions in the action area, we expect the presence of transient Atlantic sturgeon in the action area to be greater in April–November, but acknowledge that the species may be present year-round.

Shortnose Sturgeon

Shortnose sturgeon occur in rivers and estuaries along the east coast of the U.S. and Canada (SSSRT 2010). There are 19 documented populations of shortnose sturgeon, with the population in LIS closest to the action area occurring approximately 50 miles to the east in the Connecticut River. There is no critical habitat designated for this species. While movements between river systems have been documented in the Gulf of Maine, between the Connecticut and Hudson and in the Southeast, interbreeding between river populations is limited to very few individuals per generation; this results in morphological and genetic variation between most river populations (see Walsh et al. 2001, Grunwald et al. 2008, Waldman et al. 2002). This means that while individual shortnose sturgeon may move between rivers, very few shortnose sturgeon are spawning outside their natal river.

In fall 2014, a shortnose sturgeon of Connecticut River DPS was caught in the Merrimack River (Mass.) carrying a tag which was implanted in the Connecticut River in 2001 (NMFS comm. with Kieffer and Savoy 2014). However, the available tagging and tracking information is too limited to determine if Hudson and Connecticut River shortnose sturgeon are making regular movements outside of their natal rivers and

whether movement as far as the Merrimack River is a normal behavior. The genetic differentiation between these populations is thought to be a reflection of the rarity of these types of movements. However, the movement of a shortnose sturgeon from the Connecticut River to the Merrimack River, does indicate that occasional transient adult shortnose sturgeon moving between the Hudson and Connecticut or Merrimack Rivers could pass through the action area.

As with the Atlantic sturgeon, spawning and early life stages of the shortnose sturgeon only occur in freshwater habitats. However, adult shortnose sturgeon do not overwinter in the marine environment, instead spending the winter season in freshwater portions of large rivers. Because the action area consists solely of an estuarine environment, the best available information suggests that no life stages other than salinity tolerant adults undertaking migratory movements are expected to occur in the action area. Because adult shortnose sturgeon will feed on mollusks, crustaceans and other organisms on the estuarine bottom, and such may be present within the action area, it is feasible that shortnose sturgeon could opportunistically feed on a seasonal basis (April through November).

Effects Determination

Mechanical and Hydraulic Dredging

Entrapment

Mechanical dredging entails lowering the open bucket or clamshell through the water column, closing the bucket after impact on the bottom, lifting the bucket up through the water column, and emptying the bucket into a barge. The bucket operates without suction or hydraulic intake, moves relatively slowly through the water column and impacts only a small area of the aquatic bottom at any time. In order to be captured in a dredge bucket, an animal must be on the bottom directly below the dredge bucket as it impacts the substrate and remain stationary as the bucket closes. Species captured in dredge buckets can be injured or killed if entrapped in the bucket or buried in sediment during dredging and/or when sediment is deposited into the dredge scow. Species captured and emptied out of the bucket can suffer stress or injury, which can lead to mortality. As a mechanical dredge is not typically present in New Haven Harbor, the analyses below all refer to effects when added to baseline conditions.

A hydraulic dredge consists of a cutterhead on the end of an arm connected to a pump, which loosens the bottom sediments and entrains them in a water slurry that is pumped up from the bottom. The material is then discharged away from the channel (side cast), or is pumped via a pipeline to a dewatering area or disposal site. A hydraulic dredge is generally used for material that will be disposed of in an upland area or on a nearby beach, or for pumping any type of unconsolidated material into a confined (diked) disposal/dewatering area. Bottom dwelling species do have the potential to be entrained by the cutterhead and sucked through the hydraulic pipeline. As a hydraulic

dredge is not typically present in New Haven Harbor, the analyses below all refer to effects when added to baseline conditions.

Sea Turtles

Sea turtles are not known to be vulnerable to capture or entrainment in mechanical and hydraulic dredges, presumably because they are able to avoid the dredge bucket or cutterhead. Dredging efforts will occur in late fall and winter, so the likelihood of sea turtles co-occurring with an active dredge is low. Furthermore, the suction of the hydraulic dredge will not be activated until the head of the dredge is seated on the sea floor. Based on this information, effects to sea turtles from dredging are extremely unlikely, and are discountable.

Sturgeon

In 2012, the Corps provided NMFS with a list of all documented interactions between dredges and sturgeon reported along the U.S. East Coast; reports dated as far back as 1990 (USACE, 2012). This list included four incidents of sturgeon captured in dredge buckets. These include the capture of a decomposed Atlantic sturgeon in Wilmington Harbor in 2001. The condition of this fish indicated it was not killed during the dredging operation and was likely dead on the bottom or in the water column and merely scooped up by the dredge bucket. Another record was of the capture of an Atlantic sturgeon in Wilmington Harbor in 1998; however, this record is not verified and not considered reliable. The report also listed the live capture of an Atlantic sturgeon at the Bath Iron Works (BIW) facility in the Kennebec River, Maine in 2001 as well as a shortnose sturgeon captured at BIW in 2003 that was observed to have suffered death recently at the time of capture. One report of a live shortnose sturgeon captured in a dredge bucket at BIW in 2009 was not included in the report. Observer coverage at dredging operations at the BIW facility has been 100% for approximately 15 years, with dredging occurring every one to two years. Hundreds of mechanical dredging projects occur along the U.S. Atlantic coast each year and we are not aware of any other captures of sturgeon in mechanical dredges anywhere in the U.S prior to or after 2012.

The risk of interactions between sturgeon and mechanical dredges is thought to be highest in areas where large numbers of sturgeon are known to aggregate. The risk of capture may also be related to the behavior of the sturgeon in the area. While foraging, sturgeon are at the bottom of the river interacting with the sediment. This behavior may increase the susceptibility of capture with a dredge bucket. We also expect the risk of capture to be higher in areas where sturgeon are overwintering in dense aggregations as overwintering sturgeon may be less responsive to stimuli which could reduce the potential for a sturgeon to avoid an oncoming dredge bucket.

Most mobile organisms, including adult and juvenile Atlantic and shortnose sturgeon, are able to avoid mechanical dredge buckets. The slow movement of the dredge bucket through the water column and the relatively small area of bottom impacted by

each pass of the bucket makes the likelihood of interaction between a dredge bucket and an individual fish relatively low.

Based on all available evidence, the risk of sturgeon being captured in a mechanical dredge is low. The risk is further reduced because the action area is not known to support high densities of sturgeon and the areas to be dredged are not used for overwintering. Furthermore, the inclusion of a construction window of October 1 through April 1 will further decrease the likelihood of impacts to migrating sturgeon from mechanical dredging. Based on these factors, it is extremely unlikely that any sturgeon will be captured, injured or killed during mechanical dredging activities and effects to sturgeon are discountable.

Entrainment of sturgeon can occur when flow fields created near the suction intakes of hydraulic dredges exceed the capabilities of the fish to escape. Sturgeon entrainment or "takes" from dredging activities with observer programs are summarized in the U. S. Army Corps of Engineers Sea Turtle Data Warehouse (2013). From 1995 through January 2013, a total of 48 sturgeon takes (3 Gulf sturgeon, 11 shortnose sturgeon, 34 Atlantic sturgeon) have been recorded. Of these 3 Atlantic and 2 shortnose sturgeon were released alive, the remainder were mortalities. The majority of sturgeon takes were associated with hopper dredging (n=22) and mechanical clamshell dredging (n=3), operations; although takes by mechanical dredges are more appropriately classified as impingement rather than entrainment or "takes". During this period a single Atlantic sturgeon was entrained by a hydraulic pipeline (i.e. cutterhead) dredge (ERDC TR-14-12, 20XX). Given the low number of sturgeon entrainment interactions in hydraulic pipeline dredging efforts, as well as the expectation that only occasional transient sturgeon (i.e., no dense aggregations) will occur in the project area from October 1 – April 1, any effects of entrapment from the proposed hydraulic dredging activities on sturgeon are extremely unlikely, and are therefore, discountable.

Blasting

Rock removal for the proposed project will be accomplished by fracturing the rock through blasting and then dredging the rock with a mechanical bucket dredge. The rock removal operations will follow the management practices (endangered species observers, delayed charges, etc.) noted above and will be consistent with the practices developed for the Boston Harbor Navigation Improvement Project in Boston, MA. It is expected that blasting associated with this improvement project will take place over a period of about 4 to 6 weeks between October 1 and April 1.

Potential aquatic impacts associated with blasting include noise, thermal energy release, increased turbidity, damage to structures, and effects on aquatic life, all of which are expected to be minor and temporary in nature due to the precautions to minimize the shock wave and to scare aquatic life way from the blast areas. These impacts would be generated as a result of vibrations, explosion-induced surface water waves, or air overpressure. Underwater sound from explosions will be presented in terms of peak pressure levels (psi) and impulse levels (psi·s).

Any blast impacts to aquatic populations will be localized and temporary, with the most pronounced effect on aquatic species in the immediate vicinity of the blast site. Currently NMFS has no acoustic guidelines or criteria for effects of blasting on fish. However, based on Moser (1999) studies, peak pressure levels at or below 75.6 psi and peak impulse levels at or below 18.4 psi-msec will cause no injury or mortality to fish (NMFS 2012).

According to the underwater acoustic modeling for rock blasting in New Bedford Harbor (New Bedford, MA) for the construction of the South Terminal, the following radial distances to two threshold criteria were estimated for a range of charge weights between 30lbs and 150 lbs (Table 2). Threshold criteria are provided for peak pressure (75.6 psi) and peak positive impulse (18.4 psi/msec; NMFS 2012). Assuming the most conservative metric, radial distances for 30 to 150 lb charge weights could range from 187 to 291 feet respectively (Matthews and Zykov 2013). These estimated radial distances were considered to be overestimated for the conditions at the New Bedford Harbor. Model inputs specific to the New Bedford Harbor included water depth, geoacoustic properties, type of explosive, the charge weight, the geometry of the detonation (depth of the charge, distance to the receiver, and depth of the receiver), and the geoacoustic parameters of the substrate: density, compressional-wave (or P-wave) velocity, and attenuation coefficient.

Although model inputs were specific to the New Bedford Harbor, and there are likely some differences in the parameters between New Bedford Harbor and the New Haven Harbor channel, we believe the estimates are reasonable and applicable to the proposed project because of the large range of charge weights modeled. It is anticipated that the range of charge weights for the New Haven Harbor project will fall within the range noted in Table 2.

Table 2. Estimated radial distance to threshold criteria for peak pressure (75.6 psi) and peak positive impulse (18.4 psi/msec), New Bedford, MA.

Charge Weight (lb)	Distance to peak pressure injury criterion of 75.6 psi (feet)	Distance to impulse injury criterion of 18.4 psi·ms (feet)
30	182	187
50	201	219
100	222	268
130	228	283
150	231	291

Source: Matthews and Zykov 2013

Sea turtles

The effects of underwater explosives on sea turtles depends on many variables including charge size, charge type, and depth of the explosive charge; the size and

depth of the turtle in the water column; overall water column depth; and the distance between the turtle and the explosive charge (CSA 2004). Information regarding effects of underwater explosions to sea turtles is scarce (Viada et al. 2008). However, potential impacts may include behavioral modifications, injury, or mortality from high levels of sound pressure and/or shock waves from blasting if a sea turtle was present in the action area.

The U.S. Navy (2017) estimates that sea turtles will experience injury from exposure to impulsive noise or explosions at the following thresholds:

Temporary Threshold Shift (TTS) Threshold		**Permanent Threshold Shift (PTS) Threshold**	
SEL (weighted) (dB SEL)	Peak SPL (dB SPL)	SEL (weighted) (dB SEL)	Peak SPL (dB SPL)
189	226	204	232

A Biological Opinion (BO) prepared for removing structures on the outer continental shelf in the Gulf of Mexico (MMS and NMFS 2006) provides a thorough discussion of behavioral and physiological impacts from underwater explosions as well as a very useful monitoring protocol. This protocol includes impact zone radii for five blasting categories differentiated by charge size, water depth, and placement of charge. These impact zones were developed for the five threatened and endangered sea turtle species found in the Gulf of Mexico, loggerhead, leatherback, green, Kemp's ridley, and hawksbill. The range of impact zone radii is from 856 feet for the smallest charge size of 0 to 10 pounds placed below the mudline to 5,012 feet for the largest charge of greater than 200 up to 500 pounds placed above the mudline (MMS and NMFS 2006). These estimated distances were calculated using a 12 psi threshold criterion. Since these impact zone radii were estimated for deep outer continental shelf waters, and blasting was for an underwater structure as opposed to into rock, they may not be applicable to the proposed project, but are provided for context. Behavioral modification may occur with noise levels at or above 175 dB re 1 μPa SPL rms (McCauley et al. 2000; US Navy, 2017).

We believe 175 dB re 1 μPa SPL rms threshold for behavioral impacts is protective for sea turtles during underwater explosive work, and should be used to determine the corresponding monitoring/exclusion zone. In other words, to be conservative, the exclusion zone would be contained within the radial distance from the blast to where received sound levels decrease to less than 175 dB re 1 μPa SPL rms. Estimates of radial distance from project blasting out to the 175 dB re 1 μPa SPL rms isopleth or to the 12 psi isopleths from underwater blasting are not available.

If the estimated distances for blasting in the Gulf of Mexico are applicable to the improvement project area, potential impacts may occur over an approximately 900 foot radius around the blast point for sea turtles if they are present during blasting between October 1 and April 1. However, data indicates that the likelihood of sea turtles being

present in the blasting area during that timeframe is extremely low. Therefore, based on the rarity with which we expect sea turtles in the action area during blasting, combined with the presence of ESA-listed species observers who will survey the blast zone prior to detonations and the use of scare charges, we believe the risk of sea turtle injury from blasting is extremely unlikely, and therefore, discountable.

Sturgeon:

If sturgeon are present in the New Haven Harbor channel at the time of the blasting, injury or mortality from acoustic shock wave may potentially occur. In order to provide a rough estimate of radial distance of impacts for this Project, the results from the underwater monitoring model for New Bedford Harbor have been applied. However, it is important to note that underwater noise and shockwave pressure behave differently at different sites. Depending on the charge weight, and using the more conservative impulse threshold criteria, impacts of injury or mortality could occur for sturgeon out to a minimum of 187 to 291 feet from the blasting (Table 2). Even during the maximum extent of rock blasting, a zone of passage within the harbor will be available to allow sturgeons to avoid blasting impacts. In addition, USACE will incorporate specific blasting protective measures noted above.

Due to the combination of a low likelihood of sturgeon occurrence in the action area, and the fact that blasting activities should not inhibit any sturgeon movement through New Haven Harbor and within an available zone of passage, we conclude that injury to sturgeon is extremely unlikely, and therefore, discountable. Furthermore, any movement by sturgeon to avoid the negative impacts of rock blasting operations would be too small to be meaningfully measured or detected, and are therefore, insignificant.

Sediment Plume from Mechanical Dredging and Placement

Mechanical dredging will disturb sediments and cause a temporary increase in suspended sediment within the action area. Re-suspended sediment is expected to settle out of the water column within a few hours. Information on suspended sediment plumes associated with mechanical clamshell dredges indicate that the concentration of suspended sediments will be highest close to the bottom (445 mg/l) and will decrease rapidly higher in the water column (105 mg/l) and further from the dredge site (USACE, 2001). A study by Burton (1993) measured turbidity levels at 500, 1000, 2000, and 3300 feet from the dredge site. Based on these analyses, elevated suspended sediment levels of up to 445 mg/l may be present in the immediate vicinity of the clamshell bucket, and suspended sediment levels of up to 191 mg/l could be present within a 2,300 foot radius from the location of the clamshell dredge.

The exact size of the plume is influenced by the particular dredge used, the dredge operator, sediment type, strength of current and tidal stage and is likely to vary throughout the project. For example, a more pronounced effect would occur when dredging the channel inlet on an outgoing tide. The majority of the sediment would settle out within several hours, but some of the very fine particles could stay in

suspension for many days (Corps of Engineers, 1977; Christodoulou et al., 1974). However, disturbed sediments generally settle much more quickly in natural conditions due to particle collisions, flocculation and biological reworking (Humby and Dunn, 1975; Krone, 1972).

Within New Haven Harbor, turbidity would remain localized about the dredge and in the navigation channel (USACE 1996). Several studies have monitored sediment plumes associated with dredging projects along the Atlantic Coast. Turbidity levels associated with these sediment plumes typically range from 40-350 mg/L with the highest levels detected adjacent to the dredge bucket and concentrations decreasing with greater distance from the dredge (Anchor Environmental, 2003). Based on this information, the impacts should be limited in time and restricted primarily to the cove.

At the disposal sites, dredged material will be released from a scow or barge. The material will pass through several stages as it travels to the sea bottom. Several factors influence the behavior of the descending plume, including the properties of the sediment (e.g. silt, sand, clumps, etc.), water depth, water column stratification, and the interplay of the descending sediment with the water through which it passes. In general, the behavior of the plume can be described as occurring in three phases: convective descent, dynamic collapse, and passive diffusion.

Turbidity measurements at CLDS (Gordon, 1974) showed that when 2,000 cubic meters of dredged material were discharged in waters 20 meters deep, the density surge carried less than 18 percent of the material outside a circle of a 30 meter radius, and essentially none beyond about 120 meters. The residual turbidity in the water column, which drifts with the tidal stream, contained less than one percent of the material discharged (USACE, 1979). Monitoring studies performed during disposal operations at CLDS of suspended solids indicated that approximately one percent of the sediments remained suspended in the water column after disposal of clamshell dredged silty material (USACE, 1985), meaning that almost all of the dredged material travels and settles to the seafloor. Total suspended solids near the center of the sediment plume body have been observed to return to near background levels in 35 to 45 minutes (USACE and EPA, 2010: SAIC, 2005).

Sediment Plume – Hydraulic Dredging and Placement

Hydraulic dredging equipment will be used to remove silty material from the channel that will be used for marsh creation at the Sandy Point beneficial use site. Re-suspension of fine–grained material during hydraulic dredging is usually restricted to the vicinity of the dredge head and decreases rapidly with increasing distance from the operation. The cutterhead pipeline dredge is capable of removing sediments with relatively small amounts of re-suspension extending beyond the immediate vicinity of the dredge.

A cutterhead could suspend 25-250 mg/l of silty sediments within 100 to 400 feet down current of the dredge (Hayes, 1986). The discharge of material at the end of the

hydraulic pipeline at the placement area has the potential to suspend large amount of silt and clay. However, the anticipated methodology involves using the hydraulic dredge to fill geotubes in place with the silty material. The geotubes will be designed to retain all fine-grained material. Once the geotubes are filled, they will create a containment structure which will ring the perimeter of the marsh creation area. Hydraulic dredging will then be used to fill the area within the geotube containment area to elevations appropriate for salt marsh creation. Best management practices will be used to keep suspended sediments within the geotube containment area and minimize impacts to adjacent subtidal softbottom habitats.

Sediment Plume – Blasting

Blasting of rock from the proposed project will produce short term increases in turbidity as silts and clays overlaying and in the vicinity of each blast event are suspended during the underwater explosions and the release of gasses from the fractured rock. Teleki and Chamberlin (1978) reported elevated short-term turbidity levels associated with blasting in glacial tills in the shallow waters of Lake Erie, however elevated turbidities lasted only a matter of hours before returning to ambient conditions. Blasting activities are generally limited to one to two blasting events per day as the process of drilling holes, loading explosives, setting charges, and removing divers must be done sequentially and therefore requires significant time to accomplish. Therefore, blasting is not anticipated to contribute to significant levels of turbidity for extended periods of time during construction of the proposed project.

Overall, water quality impacts from dredging, blasting, and placement are anticipated to be minor and temporary in nature. The total suspended solids (TSS) within the water column naturally vary based on season, winds, and storm events. Once dredging, blasting, and placement operations are complete, the project area is expected to return to ambient conditions within a few hours as the sediments settle out of the water column (Clarke et al., draft).

Sea Turtles

No information is available on the effects of TSS on juvenile and adult sea turtles; however, elevated TSS levels could affect sea turtles if a plume causes a barrier to normal behaviors. As sea turtles are highly mobile and breathe air, they will be able to avoid any sediment plume they encounter with minor movements to alter their course away from the sediment plume. Thus, any effect on sea turtle movements is likely to be immeasurable and therefore insignificant.

Sturgeon

The life stages of sturgeon most vulnerable to increased sediment are eggs and non-mobile larvae which are subject to burial and suffocation. As noted above, no sturgeon eggs and/or larvae will be present in the action area. Sturgeon in the action area during dredging may avoid a sediment plume by swimming around it. However, if sturgeon do

interact with the plume, expected TSS levels (up to 445 mg/l) (USACE, 2015) are below those shown to have an adverse effect on fish (580 mg/l for the most sensitive species, with 1,000 mg/l more typical (Burton, 1993)).

Turbidity studies conducted during dredging projects provide values above baseline conditions; when these values are added to general baseline conditions (e.g., 2 to 15 mg/l, Boston Harbor (Battelle, 2009)) they are still within acceptable levels. Dredging related suspended sediments or turbidity plumes may differ in scope, timing, duration, and intensity from natural conditions (Clarke and Wilber, 2000). Major storms can displace larger amounts of sediments than dredging operations, and tend to occur one to three times a year. Natural disturbances are more frequent than most dredging operations at a particular area and dredging affects much smaller areas (i.e. a localization of impacts) than these major storms (Wilber and Clarke, 2001). Based on this information, any effects of suspended sediment from dredging activities on sturgeon resulting in minor movements to avoid the plume are not capable of being meaningfully measured, evaluated or detected; therefore, effects to sturgeon from turbidity related to dredging activities are insignificant.

Habitat modification

Effects to listed species can be caused by disturbance to the sea floor that reduces the availability of prey species or alters the composition of forage. Mechanical dredging, blasting, and unconfined open water placement, can affect future use of the action area by sea turtles and sturgeon by reducing prey species (such as worms, mollusks, and crustaceans) through the alteration of the existing biotic assemblages. The dredge and placement activities have the potential to impact up to 600 acres of bottom habitat. Green sea turtles forage on sea grasses and no sea grasses will suffer adverse effects from dredging or placement. Leatherback sea turtles feed on jellyfish. As jellyfish are pelagic species and not vulnerable to interactions with the dredge, there is not likely to be a reduction in the forage base for leatherbacks. Kemp's ridley and loggerhead sea turtles typically feed on crabs, other crustaceans and mollusks. Some of the prey species targeted by turtles and sturgeon, including crabs, are mobile; therefore, some individuals are likely to avoid the dredge and scows, but sessile infauna would be impacted.

Studies reviewed by Wilbur and Clarke (2007) demonstrate that benthic communities in temperate regions occupying shallow waters with a combination of sand, silt, or clay substrate reported recovery times between 1-11 months after dredging. Thus, we expect the benthic community within the project area to recover in less than one year and no permanent removal of potential forage organisms from the area. As the projected maintenance dredging cycle of the New Haven Harbor FNP is anticipated to be approximately every 10 years, benthic communities should stabilize between dredging events. Some species of benthic invertebrates that sturgeon and turtles feed on have limited mobility and could be temporarily buried during disposal operations. Some buried animals will be able to migrate upward through the sediment and

reestablish themselves. The surrounding areas where dredged material will be placed are expected to be recolonized by individuals from similar habitat nearby.

While there is likely to be some temporary reduction in the amount of prey in the dredge and placement areas, the action will result in the loss of only a small portion of the available forage in the action area, which extends from the dredge site to CLDS (6 miles). Therefore, sturgeon and sea turtles opportunistically foraging in the action area will be able to forage in other portions of the action area where benthic communities have not been removed or buried. In addition, dredging activities are not likely to alter the habitat in such a way as to prevent sturgeon from using the project area as a migratory pathway. As a result, effects on habitat modification from dredging and placement when added to typical baseline conditions will be too small to be meaningfully measured or detected, and are therefore insignificant.

Vessel Traffic

Collision with vessels is a source of anthropogenic mortality for sea turtles and sturgeon. The proposed project requires the use of a tug and scow to transit to the various placement sites, and will therefore lead to a temporary increase in vessel traffic during the construction period. However, the deepening of the New Haven Harbor should decrease the overall number of vessel trips that occur annually in the channel as several vessels that utilize the port will be able to access the terminals on all tides and not need to offload cargo in Long Island Sound (which causes multiple trips to and from the port by support vessels).

Sea Turtles

Interactions between vessels and sea turtles can result in injury or death. Most vessel interactions result from contact between sea turtles and boat propellers. Information is lacking on the type or speed of vessels involved in turtle vessel strikes. However, there does appear to be a correlation between the number of vessel struck turtles and the level of recreational boat traffic (NRC, 1990). Dredge vessels and scows have relatively shallow drafts and travel at slow speeds (i.e., less than 3 knots while dredging, less than 10 knots at any other time). While sea turtles occur at the water's surface and are therefore susceptible to interactions with shallow-draft vessels, sea turtles are highly mobile and have ample space and time to avoid any interaction with a project vessel. Additionally, trained observers will be present to scan for the presence of turtles during the transit of material to the placement sites. Therefore, effects of vessel traffic on sea turtles are extremely unlikely.

Sturgeon

When this project is completed, it will not result in an increased number of vessels in the action area, and thus, there is no increased risk of vessel strike in the future. We have also considered the likelihood that an increase in vessel traffic related to the project activities would generally increase the risk of interactions between sturgeon and vessels

in the action area, in addition to baseline conditions. The use of tugs and scows will cause a small, localized, temporary increase in vessel traffic between October 1 and April 15 of the years of construction. Given the small increase in vessel traffic above existing levels in New Haven Harbor and Long Island Sound, there will be no measurable or detectable increase in the risk of vessel strike, thus effects to sturgeon are insignificant. Furthermore, a trained marine mammal and sea turtle observer will be present during placement activities that occur during April, October, and November and will document vessel strikes and/or other effects to marine mammals or turtles during placement activities and transit to and from the disposal site.

Based on this information, we believe the effects of vessel traffic on sea turtles and sturgeon from the proposed project are insignificant and discountable.

Conclusions

Based on the analysis that all effects of the proposed action when added to baseline conditions will be insignificant and/or discountable, as well as the inclusion of a construction window of October 1 through April 1, that this project is not likely to affect threatened or endangered species in the project area. Furthermore, a trained marine mammal and sea turtle observer will be present during placement activities that occur during October, November, and April, and will document vessel strikes and/or other effects to marine mammals or turtles during placement activities and transit to and from the disposal site. The Corps used the best scientific and commercial data available to complete this analysis.

The information presented above constitutes our assessment of effects, which we believe sufficiently show that the proposed navigation improvement project may affect, but will not likely adversely affect any threatened or endangered species that may occur in the vicinities of the proposed dredging, blasting, and placement areas. We request your concurrence with our determination. If you need any further information you may contact Mr. Todd Randall at todd.a.randall@usace.army.mil or phone (978) 318-8518.

Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosure

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Literature Cited

AECOM. 2013. Monitoring Survey at the Central Long Island Sound Disposal Site, September and October 2011. DAMOS Contribution No. 192. U.S. Army Corps of Engineers, New England District, Concord, MA, 136 pp.

Anchor Environmental. 2003. Literature Review of Effects of Resuspended Sediments Due to Dredging Operations. Irvine, California.

Atlantic Sturgeon Status Review Team (ASSRT). 2007. Status Review of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*). National Marine Fisheries Service. February 23, 2007. 188 pp. <http://nero.noaa.gov/prot_res/CandidateSpeciesProgram/AtlSturgeonStatusReviewReport.pdf>.

Battelle. 2009. Final Summary Report Plume Monitoring, Boston Harbor Inner Harbor Maintenance Dredging Project. Submitted to US Army Corps of Engineers, New England District. June 2009, pp 98.

Bigelow, H.B., and W.C. Schroeder. 1953. Fishes of the Gulf of Maine. Fisheries Bulletin, U.S. Fish and Wildlife Service 53, Washington, D.C.

Bohlen, W.F., Cundy, D.F., and Tramontano, J.M. 1979. Suspended material distributions in the wake of estuarine channel dredging operations. Estuarine and Coastal Marine Science. 9: 699-711.

Buckley, J., and B. Kynard. 1985. Yearly movements of shortnose sturgeons in the Connecticut River. Transactions of the American Fisheries Society 114:813-820.

Bokuniewicz, H. J., and R. B. Gordon. 1980. Sediment transport and deposition in Long Island Sound. *Advances in Geophysics* 22: 69-106.

Burton, W. H. 1993. Effects of bucket dredging on water quality in the Delaware River and the potential for effects on fisheries resources. Versar, Inc., 9200 Rumsey Road, Columbia, Maryland 21045.

Carlson, T.J. and G.E. Johnson. 2009. Columbia River Channel Improvement Project Rock Removal Blasting: Monitoring Plan. PNNL-19076, submitted to the USACE Portland District, Portland, Oregon, by Pacific Northwest National Laboratory, Richland, Washington.

Christodoulou, G.C., W.F. Leimkuhler and A.T. Ippen. 1974. Mathematical Models of the Massachusetts Bay, Part III, Massachusetts Institute of Technology (MIT) Sea Grant, Parsons Laboratory Report 179.

Clarke, D. 2011. Sturgeon Protection. Presented to the Dredged Material Assessment and Management Seminar 24-26 May, 2011 Jacksonville, FL.

Clarke, D.G. and D.H. Wilber. 2000. Assessment of potential impacts of dredging operations due to sediment resuspension. DOER Technical Notes Collection (ERDC TN-DOER-E9), U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Clarke, D., K. Reine, and C. Dickerson. (draft report). Suspended Sediment Plumes Associated with Hopper Dredges at Sesuit Harbor, Massachusetts, USACE, ERDC, Vicksburg, MS.

Continental Shelf Associates, Inc. (CSA) 2004. Explosive removal of offshore structures - information synthesis report. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS Study MMS 2003-070. 181 pp. + app.

CT DEEP 2015c. State of Connecticut Water Quality Classifications of Surface Water. Department of Energy and Environmental Protection. Available at: http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707#NaturalResourcesManagement

CT DEEP. 2017a. Connecticut Department of Energy and Environmental Protection: Water Quality Maps. http://cteco.uconn.edu/maps/town/wtrqualcl/WtrQualCl_NewHaven.pdf

Corps of Engineers, New England Division. 1977. Unpublished Environmental Report on Maintenance Dredging of Boston Harbor, prepared by J.M. Cortell Associates, Inc., Waltham, Massachusetts.

Damon-Randall, K., Colligan, M., and J. Crocker. 2012. Composition of Atlantic sturgeon in rivers, estuaries, and in marine waters (white paper). NOAA/NMFS, Gloucester, MA: Protected Resources Division.

ENSR. 1998. Long Island Sound Study Section 103 Site Selection Evaluation. Prepared for U.S. Army Corps of Engineers, New England District, Concord, Massachusetts.

Erickson D. L. A. Kahnle, M. J. Millard, E. A. Mora, M. Bryja, A. Higgs, J. Mohler, M. DuFour, G. Kenney, J. Sweka and E. K. Pikitch. 2011. Use of pop-up satellite archival tags to identify oceanic-migratory patterns for adult Atlantic Sturgeon, *Acipenser oxyrinchus* Mitchell, 1815. J. Appl. Ichthyol. 27 (2011), 356–365.

Gordon, R.B. "Dispersion of Dredge Spoil Dumped in Near-Shore Waters," Estuarine and Coastal Marine Science, Vol. 2, 1974, pp. 349-358.

Gottschall, K., C. Giannini, D. Simpson, V. Crecco. 2000. Connecticut Lobster (*Homarus americanus*) Population Studies. Completion Report for Project Period 4/1/97 – 3/31/00. IJF Act (PL 99-659) CT Project 3-IJ-130. Award Number NA76FIO167.

Guilbard, F., Munro, J., Dumont, P., Hatin, D., and R. Fortin. 2007. Feeding ecology of Atlantic sturgeon and lake sturgeon co-occurring in the St. Lawrence estuarine transition zone. In American Fisheries Society Symposium (Vol. 56, p. 85). American Fisheries Society.

Hayes, D.F. 1986. Guide to Selecting a Dredge for Minimizing Resuspension of Sediment. Environmental Effects of Dredging Technical Notes: EEDP-09-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Humby, E.J. and J.N. Dunn. 1975. Sedimentary Processes Within Estuaries and Tidal Inlets. In: Pollution Criteria for Estuaries; Proceeding of the Conference held at the University of South Hampton, July 1973. (Eds.) P.R. Helliwell and J. Bossonyi. S. Wiley and Son, New York.

Krone, R.B. 1972. A Field Study of Flocculation as a Factor in Estuarial Shoaling Processes. Technical Bulletin 19. Committee on tidal Hydraulics, U.S. Army Corps of Engineers, Vicksburg, Miss.

Kynard, B. 1998. Twenty-two years of passing shortnose sturgeon in fish lifts on the Connecticut River: What has been learned? In: Fish migration and fish bypasses, M. Jungwirth, S. Shmutz, and S. Weiss, Editors. pp. 255-264.

Kynard, B., M. Kieffer, M. Burlingame, and M. Horgan. 2012. Studies on shortnose sturgeon. Final Report to Northeast Utilities Service Company, Berlin, CT and the City of Holyoke, MA.

Matthews, M.-N.R. and M. Zykov. 2013. *Underwater Acoustic Modeling of Construction Activities: Marine Commerce South Terminal in New Bedford, MA*. JASCO Document 00420, Version 6.0. Technical report by JASCO Applied Sciences for Apex Companies, LCC.

Morreale, S.J. 1999. Oceanic migrations of sea turtles. PhD Thesis. Cornell University. 2003. Assessing health, status, and trends in Northeastern sea turtle populations. Interim report: Sept. 2002-Nov. 2003.

Morreale, S.J. and E.A. Standora. 2005. Western North Atlantic waters: Crucial developmental habitat for Kemp's ridley and loggerhead sea turtles. Chel. Conserv. Biol. 4(4):872-882.

Moser, M.L. 1999. Cape Fear River Blast Mitigation Tests: Results of Caged Fish Necropsies. Final Report to CZR, Inc. under Contract to U.S. Army Corps of Engineers, Wilmington District.

National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS). 1998. Status review of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*). U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, and United States Fish and Wildlife Service. 126 pp.
National Marine Fisheries Service (NMFS), Protected Resources Division and U.S. Fish and Wildlife Service (USFWS). (1998). Final Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*).

NMFS 2016. GARFO Acoustics Tool
https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/i ndex.html

National Marine Fisheries Service (NMFS), Protected Resources Division and U.S. Fish and Wildlife Service (USFWS). (1991). Recovery Plan for U.S. Population of Atlantic Green Turtle (*Chelonia mydas*).

National Marine Fisheries Service (NMFS), Protected Resources Division and U.S. Fish and Wildlife Service (USFWS). (1992). Recovery Plan for Leatherback Turtles (Dermochelys coriacea) in the U.S. Caribbean, Atlantic, and Gulf of Mexico.

NMFS and USFWS. (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*), Second Revision. National Marine Fisheries Service, Silver Spring, MD.

National Marine Fisheries Service, U.S. Fish and Wildlife Service, and Secretariat of Environment and Natural Resources (NMFS, USFWS, and SEMARNAT). 2011. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second Revision. National Marine Fisheries Service. Silver Spring, Maryland 156 pp. + appendices.

National Research Council (NRC). 1990. Decline of the Sea Turtles: Causes and Prevention. National Academy Press, Washington, DC. 259 pp.

SAIC. 1989. Fishery Utilization of Open-water Disposal Sites: Information Compilation Interim report. SAIC Report No. SAIC-88/7549&C78. Submitted to U.S. Army Corps of Engineers, New England Division, 424 Trapelo Road, Waltham, MA.

SAIC, 1995. Sediment Capping of Subaqueous Dredged Material Disposal Mounds: An Overview of the New England Experience 1979-1993, s.l.: U.S. Army Corps of Engineers, New England Division, Waltham, Massachusetts. 101 pp.

SAIC. 2005. Disposal plume tracking and assessment at the Rhode Island Sound disposal Site. Summer 2004. DAMOS Contribution No. 167. US Army Corps of Engineers. New England District, Concord, MA 194 pp.

Savoy, T. and D. Pacileo. 2003. Movements and important habitats of subadult Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) in Connecticut waters. Transactions of the American Fisheries Society 132: 1-8.

Savoy, T. F. 2005. Population Estimate and Utilization of the Lower Connecticut River by Shortnose Sturgeon in The Connecticut River Ecological Study (1965-1973) revisited: ecology of the lower Connecticut River 1973-2003, P. M. Jacobson, W. C. Leggett, B. C. Marcy, Jr., and R. R. Massengill, Editors. American Fisheries Society, Monograph 9, Bethesda, Maryland. pp. 345-352.

SEFSC 2017. Sea turtle sightings and stranding network. Accessed March 6, 2017. https://www.sefsc.noaa.gov/species/turtles/strandings.htm)

Shoop, C.R. and R.D. Kenney. 1992. Seasonal distributions and abundances of loggerhead and leatherback sea turtles in waters of the northeastern United States. Herpetological Monographs 6: 43-67.

Shortnose Sturgeon Status Review Team (SSSRT). 2010. A Biological Assessment of shortnose sturgeon (*Acipenser brevirostrum*). Report to National Marine Fisheries Service, Northeast Regional Office. November 1, 2010. 417 pp.

Stein, A. B., Friedland, K. D., and M. Sutherland. 2004. Atlantic sturgeon marine bycatch and mortality on the continental shelf of the Northeast United States. North American Journal of Fisheries Management 24: 171-183.

Teleki, G., and A. Chamberlin. 1978. Acute effects of underwater construction blasting on fishes in Long Point Bay, Lake Erie. Journal of the Fisheries research Board of Canada. 35:1191-1198.

Wilber, D.L. and D.G. Clarke. 2001. Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. *North American Journal of Fisheries Management*. 21: 855-875.

Wilber, D.H., D. G. Clarke, and M. H. Burlas. 2006. Suspended Sediment Concentrations Associated with a Beach Nourishment Project on the Northern Coast of New Jersey. Jour. Coastal Research. 225:1035-1042.

Wilber, Dara H., and Douglas G. Clarke. 2007. Defining and assessing benthic recovery following dredging and dredged material disposal. Proceedings XXVII World Dredging Congress.603-618.

Wirgin, I., C. Grunwald, E. Carlson, J. Stabile, D.L. Peterson, and J. Waldman. 2005. Rangewide population structure of shortnose sturgeon *Acipenser brevirostrum* based on sequence analysis of mitochondrial DNA control region. Estuaries 28:406-21.

U.S. Army Corps of Engineers (USACE). 1979. Environmental Impact Statement and 404 Evaluation on Coastal Development for Navigation at New Haven Harbor, Connecticut.

USACE. 1985. Long Island Sound Studies Dredged Material Containment Facilities Feasibility Report, Public Review Draft.

USACE. 2001. Monitoring of Boston Harbor confined aquatic disposal cells. Compiled by L.Z. Hales, ACOE Coastal and Hydraulics Laboratory. ERDC/CHL TR-01-27.

USACE. 2012. Sturgeon Take Records from Dredging Operations 1990-2010. Unpublished Report submitted to NMFS Northeast Regional Office. May 2012. 5 pp.

USACE. 2015. Dredging and Dredged Material Management. Engineeering and Design. EM 1110-2-5025. July 31, 23015.

USACE. 1996. An Investigation of the Dispersion of the Sediments Resuspended by Dredging Operations in New Haven Harbor. Disposal Area Monitoring System (DAMOS) Contribution 112. New England Division, U.S. Army Corps of Engineers, Waltham, MA. Prepared by: W. Frank Bohlen, MM. Howard-Strobel, David. R. Cohen, Eric T. Morton, Science Applications International Corp., Newport, RI.

USACE and U.S. Environmental Protection Agency (EPA). 2010. Site Management and Monitoring Plan for the Historic Area Remediation Site. April 29, 2010. 77pp.

Viada, S.T., R.M. Hammer, R. Racca, D. Hannay, M.J. Thompson, B.J. Balcom, and N.W. Phillips. 2008. Review of potential impacts to sea turtles from underwater explosive removal of offshore structures. Environmental Impact Assessment Review. 28: 267-285.

Wirgin, I., Maceda, L., Grunwald, C., and T.L. King. 2015. Population origin of Atlantic sturgeon *Acipenser oxyrinchus* by-catch in U.S. Atlantic coast fisheries. Journal of Fish Biology: 1-20.

Connecticut
still revolutionary

Department of Economic and Community Development

State Historic Preservation Office

May 13, 2019

Mr. Marc Paiva, Archaeologist
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Subject: Proposed New Haven Harbor Navigation Improvement Project
New Haven, Connecticut

Dear Mr. Paiva,

The Connecticut State Historic Preservation Office (SHPO) has reviewed the referenced project in response to your request for our comments regarding potential effects to historic properties. Consultation with our office began during October of 2018 when our office was noticed about the Draft Integrated Feasibility Report and Environmental Impact Statement for this project. SHPO understands that the United States Army Corps of Engineers (USACE) plans to deepen the existing channel, widen the turning basin, widen the inner channel, and widen the channel bend. Dredged material will be deposited at six different locations: Morris cove, East Breakwater, West River, West Breakwater, the Central Long Island Sound Disposal Site, and Sandy Point Dike.

A combination of new archaeological surveys and a review of previously completed cultural resources investigations were taken into consideration to evaluate potential project impacts. All of the dredge disposal locations are either existing disposal sites or have been previously reviewed for cultural resources. Based on the information submitted to our office, it is unlikely that disposal at the identified locations will impact significant historic resources and no additional investigations are warranted. USACE completed side scan sonar surveys and obtained vibracore samples within the New Haven Harbor study area. A possible wreck/obstruction was identified adjacent to the channel side slope, but outside of the proposed improvements. SHPO recommends that no construction related activities occur within 150 feet of this possible wreck. If impacts to this area cannot be avoided, our office understands that additional archaeological examination of the site will be completed and additional consultation will follow. With these precautions taken into consideration for the potential wreck, SHPO concurs with USACE that that no historic properties will be affected by the proposed undertaking.

This office appreciates the opportunity to review and comment upon this project and appreciates the comprehensive effort that USACE has put forth on this project. These comments are provided in accordance with Section 106 of the National Historic Preservation Act, as amended. For additional information, please contact me at (860) 500-2329 or catherine.labadia@ct.gov.

Sincerely,

Catherine Labadia
Deputy State Historic Preservation Officer

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

June 7, 2019

Planning Division
Evaluation Branch

Mr. Michael Johnson, Deputy Tribal Historic Preservation Officer
Natural Resources Protection & Regulatory Affairs
Mashantucket Pequot Tribal Nation
550 Trolley Line Boulevard, P.O. Box 3202
Mashantucket, CT 06338-3202

Dear Mr. Johnson:

The U.S. Army Corps of Engineers, New England District has received your letter dated May 6, 2019 (copy enclosed) regarding the New Haven Harbor Navigation Improvement Project. We would like to provide the following responses to the questions that were raised in your letter.

1. **What dredging process will you use in the harbor?** The New Haven Harbor improvement project would use both a mechanical dredge and a hydraulic pipeline dredge. Mechanical dredging involves the use of a barge-mounted crane with a clamshell bucket, or a backhoe arm to dig the material from the harbor bottom. Typical dredging buckets come in various sizes from five cubic yards to thirty or more cubic yards. The material is placed in a scow for transport to the disposal site by tug. For open-water or ocean disposal, a split-hull scow is generally used for ease of disposal and to minimize the discharge plume. Material at the disposal site is typically discharged using preset coordinates monitored by the tug. Hydraulic pipeline dredges employ a mechanical cutter to break up the material, which is then excavated hydraulically and transported to the placement site through a pipeline.

2. **Does your procedure include an archaeological examination of the recovered material at or near the Central Long Island Sound (CLIS) site?** The CLIS site will be used solely for disposal of dredged material from the New Haven Harbor channel improvement project.

3. **Your letter indicates that "CLIS is unlikely to impact any significant historic properties." Could you please tell us how that determination was derived?** No dredging of material will occur at CLIS as part of the proposed project. CLIS will solely be used for the disposal of dredged material from the New Haven Harbor project. Since CLIS is a historic disposal site that has been used since the 1970's for the disposal of dredged material from New Haven with the placement of about 4.5 million cubic yards to

date, we feel that any historic properties that may have originally been present in the area have been disturbed or destroyed through continued use of the site.

4. **Could you please provide our office with a copy of the vibracore and side scan sonar survey, and who the firm was that provided the determination?** The vibracore and side scan sonar surveys were conducted in-house by the New England District Marine Programs Section with analysis of the cores by the project archaeologist. We are happy to provide you with a copy of the survey findings.

5. **While we do concur with CT SHPO asking for a 150-foot buffer around all sides of the possible wreck site, would it be possible to confirm what the site is?** Yes, New England District plans to conduct an archaeological assessment of the wreck site during our Project Engineering and Design phase of the project prior to construction. We will include your office in the findings from this assessment as well as any follow-up evaluation and coordination.

6. **May we obtain a copy of that 2009 archaeological survey for the West Haven Water Pollution Control Facility at Sandy Point?** New England District came upon the survey report at the Special Collections Library of the University of Connecticut. While we do not have a copy, our review of the report indicated that the wastewater treatment plant was built on imported fill with modern debris over altered wetland soils in highly disturbed contexts. CT SHPO agreed with the recommendation that no further work was required.

If you have any questions or wish to discuss this information further, please contact Mr. Marc Paiva, Archaeologist at marcos.a.paiva@usace.army.mil or 978-318-8796, or Ms. Barbara Blumeris, study manager at barbara.r.blumeris @usace.army.mil or 978-318-8737 at your convenience.

Sincerely,

for Christopher T. Hodgson

John R. Kennelly
Chief, Planning Division

Enclosure

The Mashantucket Pequot
Tribal Nation
Tribal Historic
Preservation Office

5/6/19

Department Of The Army
US Army Corps Of Engineers
New England District
696 Virginia Road, Concord Ma 01742-2751

Dear Barbara,

Thank You for the opportunity to consult on the New Haven Harbor Navigation Improvement Project. After our initial review of the project, we have some additional questions regarding the project. Per your letter, we understand that the project would entail:

- Deepening the Channel, Maneuvering area, and turning basin from -35 to -40 feet, Mean Lower Low Water.
- Widening the uring basin to the north 200 feet.
- Widening the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet.
- Widening the channel bend at the East Breakwater from 560 to 800 feet.

We further understand that dredged material removed from the project area Of Potential Effect (APE) would then be transported by dump Scow and placed at several near shore or open water sites.

With regards to the dredged material, **page 2** of your letter refers to disposing of the material most likely at CLIS:

- What dredging process will you use in the harbor?
- Does your procedure include an archaeological examination of the recovered material at or near the CLIS site?
- Your letter indicates *"CLIS is unlikely to impact and significant historic properties."* Could you please tell us how that determination was derived?

Page 2 mentions that Vibracore samples were taken in the APE, as well as side sonar scans, and that *"No evidence of habitation surfaces or artifacts of any type indicative of a Pre-Contact occupation were encountered."*

- Could you please provide our office with a copy of the survey, and who the firm was that provided the determination?

Page 2 of your letter, 3rd paragraph speaks to *"no other possible shipwreck or submerged sites were identified in the side sonar data."* outside of what has been determined as a "wreck/obstruction" which is outside the APE.

- While we do concur with CT SHPO asking for a 150' buffer around all sides of the possible wreck site, would it be possible to confirm what the site is?

Page 3 of your letter references an archaeological survey conducted in 2009 for the West Haven Water Pollution Control Facility to Sandy Point.

- May we obtain a copy of that 2009 archaeological survey?

Thank You.

Michael Kickingbear Johnson

Deputy Tribal Historic Preservation Office

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

April 3, 2019

Planning Division
Evaluation Branch

Marissa Turnbull, Tribal Historic Preservation Officer
Natural Resources Protection & Regulatory Affairs
Mashantucket Pequot Tribal Nation
550 Trolley Line Blvd., P.O. Box 3202
Mashantucket, CT 06338-3202

Dear Ms. Turnbull:

The U.S. Army Corps of Engineers (USACE), New England District is requesting your review of the proposed New Haven Harbor Navigation Improvement project in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. This is a follow-up to our previous letter of October 12, 2018 notifying your office that the New Haven Harbor, Connecticut, Navigation Improvement Project, Draft Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) was available for review. The attached figure shows the proposed project and the dredged material placement sites. The proposed project includes the following navigation improvement features:

- Deepening the channel, maneuvering area, and turning basin from -35 to -40 feet, Mean Lower Low Water
- Widening the turning basin to the north 200 feet
- Widening the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet.
- Widening the channel bend at the East Breakwater from 560 to 800 feet.

Dredged material removed from the project would be transported by dump scow and placed at several near shore or open water sites including:

- Morris Cove Borrow Pit
- Oyster Habitat Creation site at the East Breakwater
- West River Borrow Pit
- Rock placement site at West Breakwater (rock reef habitat creation)
- Open Water Placement at Central Long Island Sound Disposal Site (CLDS) with targeted placement to cover historic disposal mounds
- Sandy Point Dike, West Haven for salt marsh creation (approximately 850,000 cubic yards to be hydraulically pumped to the site).

Dredging for Navigational Improvements

USACE has conducted side scan sonar surveys and obtained vibracore samples of the navigation improvement areas within the New Haven Harbor study area. A possible wreck/obstruction site was located just outside of the main channel and adjacent to the channel side slope (see enclosed Inner Harbor figure). CT SHPO recommends a 150-foot buffer from all sides of the side scan sonar image of the possible wreck site. The current data is inconclusive to determine whether this site is a shipwreck or other obstruction. Since the location is outside of the current improvements to the channel, it will be avoided with a buffer during detailed design of the channel in the pre-construction engineering and design (PED) phase of the project. However, if during PED, it is determined that impacts to the area cannot be avoided, then an archaeological examination of the site would be required and we would coordinate with your office on the scope of the investigation, evaluation of results, and if necessary, measures to avoid, minimize or mitigate any adverse impacts to historic properties.

No other possible shipwreck or submerged sites were identified in the side scan sonar data. The vibracore samples were examined and consisted primarily of deep fill material overlaying the original sediments. No evidence of habitation surfaces or artifacts of any type indicative of a Pre-Contact occupation were encountered.

Disposal Sites

- Central Long Island Sound Disposal Site (CLIS)
- West River Borrow Pit
- Morris Cove Borrow Pit
- East Breakwater Oyster Habitat Creation Site
- West Breakwater, General Rock Placement Area

CLIS is a previously utilized disposal site for dredged material. Disposal of dredged material from the New Haven Harbor navigation improvement project at CLIS is unlikely to impact any significant historic properties.

Side scan sonar of the West River Borrow Pit was conducted in 2018. Aside from a modern submerged vessel (likely a sailboat – see enclosed Sunken Vessel PDF) at the West River, no known or recorded shipwrecks or submerged archaeological sites are located in the proposed West River site. The borrow site is unlikely to contain undisturbed historic properties. The Morris Cove site has been previously used for dredged material disposal and impacts to significant properties are not expected.

A review of the National Oceanic and Atmospheric Administration's Office of Coast Survey Electronic Navigation Charts (ENC) and Automated Wreck and Obstruction Information System (AWOIS) database did not identify any recorded shipwrecks or submerged historic properties in the vicinity of the proposed East Breakwater oyster habitat creation area or at the West Breakwater rock placement site. Impacts to historic properties, including the Southwest Ledge Lighthouse on the southwest end of the East Breakwater, are not anticipated.

-Sandy Point, Wetland Creation Site

Research conducted by the Public Archaeology Laboratory as part of the 2010 Long Island Sound Dredged Material Management Plan identified one potential shipwreck, the Laura S. Hatch, northwest of the Sandy Point dike area. A 150-foot buffer will be maintained around this site. As the wetland creation area is well to the south (roughly 2,000 feet) along the edge of Sandy Point, its development will not impact this wreck site. If the dimensions of the wetland site change and the buffer cannot be maintained around the shipwreck, further evaluation would be required including archaeological investigation and coordination with project stakeholders.

An archaeological survey of the West Haven Water Pollution Control Facility adjacent to Sandy Point was conducted in 2009. Originally built in 1969, the facility was expanding to the east along the former wetland areas that bordered Sandy Point. The original building was built with imported fill over wetland soils and this is documented in thick fill deposits containing modern debris in highly disturbed contexts closest to the structure with lesser amounts of debris away from the facility. No further archaeological work was recommended as part of the expansion project. Additionally, a sewage outfall pipe is located in the intertidal zone of Sandy Point and portions have been repaired and replaced since its construction in the late 1960's. Based on this data, creation of the proposed wetland area at Sandy Point will not impact historic properties.

In conclusion, the dredging and disposal activities associated with the proposed New Haven Harbor Navigation Improvement Study shall have no effect upon significant historic properties as defined by Section 106 of the NHPA and implementing regulations 36 CFR 800. We would appreciate your concurrence with this determination. In all cases, if unanticipated discoveries are found during implementation of the project, USACE will follow the post review discoveries guidance of the Advisory Council's regulations (36 CFR 800.13) and continue coordination with your office.

If you have any questions, please feel free to contact the Project Manager, Ms. Barbara Blumeris at (978) 318-8737 or Mr. Marc Paiva, Archaeologist at (978) 318-8796.

Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosures

SAME LETTER SENT TO (with enclosures):

Brian Jones, Ph.D., State Archaeologist
Connecticut State Museum of Natural History &
Connecticut Archaeology Center
University of Connecticut, Unit 3023
75 N. Eagleville Road
Storrs, CT 06269-3023

Mary Dunne, State Historic Preservation Officer
Connecticut State Historic Preservation Office
450 Columbus Boulevard, Suite 5
Hartford, CT 06103

James Quinn, Tribal Historic Preservation Officer
Mohegan Tribe Cultural Department
5 Crow Hill Road
Uncasville, CT 06382

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

April 3, 2019

Planning Division
Evaluation Branch

Brian Jones, Ph.D., State Archaeologist
Connecticut State Museum of Natural History &
Connecticut Archaeology Center
University of Connecticut, Unit 3023
75 N. Eagleville Road
Storrs, CT 06269-3023

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Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosures

SAME LETTER SENT TO (with enclosures):

Mary Dunne, State Historic Preservation Officer
Connecticut State Historic Preservation Office
450 Columbus Boulevard, Suite 5
Hartford, CT 06103

James Quinn, Tribal Historic Preservation Officer
Mohegan Tribe Cultural Department
5 Crow Hill Road
Uncasville, CT 06382

Marissa Turnbull, Tribal Historic Preservation Officer
Natural Resources Protection & Regulatory Affairs
Mashantucket Pequot Tribal Nation
550 Trolley Line Blvd., P.O. Box 3202
Mashantucket, CT 06338-3202

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

April 3, 2019

Planning Division
Evaluation Branch

Ms. Mary Dunne, State Historic Preservation Officer
Connecticut State Historic Preservation Office
450 Columbus Boulevard, Suite 5
Hartford, CT 06103

Dear Ms. Dunne:

The U.S. Army Corps of Engineers (USACE), New England District is requesting your review of the proposed New Haven Harbor Navigation Improvement project in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. This is a follow-up to our previous letter of October 12, 2018 notifying your office that the New Haven Harbor, Connecticut, Navigation Improvement Project, Draft Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) was available for review. The attached figure shows the proposed project and the dredged material placement sites. The proposed project includes the following navigation improvement features:

- Deepening the channel, maneuvering area, and turning basin from -35 to -40 feet, Mean Lower Low Water
- Widening the turning basin to the north 200 feet
- Widening the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet.
- Widening the channel bend at the East Breakwater from 560 to 800 feet.

Dredged material removed from the project would be transported by dump scow and placed at several near shore or open water sites including:

- Morris Cove Borrow Pit
- Oyster Habitat Creation site at the East Breakwater
- West River Borrow Pit
- Rock placement site at West Breakwater (rock reef habitat creation)
- Open Water Placement at Central Long Island Sound Disposal Site (CLDS) with targeted placement to cover historic disposal mounds
- Sandy Point Dike, West Haven for salt marsh creation (approximately 850,000 cubic yards to be hydraulically pumped to the site).

Dredging for Navigational Improvements

USACE has conducted side scan sonar surveys and obtained vibracore samples of the navigation improvement areas within the New Haven Harbor study area. A possible wreck/obstruction site was located just outside of the main channel and adjacent to the channel side slope (see enclosed Inner Harbor figure). CT SHPO recommends a 150-foot buffer from all sides of the side scan sonar image of the possible wreck site. The current data is inconclusive to determine whether this site is a shipwreck or other obstruction. Since the location is outside of the current improvements to the channel, it will be avoided with a buffer during detailed design of the channel in the pre-construction engineering and design (PED) phase of the project. However, if during PED, it is determined that impacts to the area cannot be avoided, then an archaeological examination of the site would be required and we would coordinate with your office on the scope of the investigation, evaluation of results, and if necessary, measures to avoid, minimize or mitigate any adverse impacts to historic properties.

No other possible shipwreck or submerged sites were identified in the side scan sonar data. The vibracore samples were examined and consisted primarily of deep fill material overlaying the original sediments. No evidence of habitation surfaces or artifacts of any type indicative of a Pre-Contact occupation were encountered.

Disposal Sites

- Central Long Island Sound Disposal Site (CLIS)
- West River Borrow Pit
- Morris Cove Borrow Pit
- East Breakwater Oyster Habitat Creation Site
- West Breakwater, General Rock Placement Area

CLIS is a previously utilized disposal site for dredged material. Disposal of dredged material from the New Haven Harbor navigation improvement project at CLIS is unlikely to impact any significant historic properties.

Side scan sonar of the West River Borrow Pit was conducted in 2018. Aside from a modern submerged vessel (likely a sailboat – see enclosed Sunken Vessel PDF) at the West River, no known or recorded shipwrecks or submerged archaeological sites are located in the proposed West River site. The borrow site is unlikely to contain undisturbed historic properties. The Morris Cove site has been previously used for dredged material disposal and impacts to significant properties are not expected.

A review of the National Oceanic and Atmospheric Administration's Office of Coast Survey Electronic Navigation Charts (ENC) and Automated Wreck and Obstruction Information System (AWOIS) database did not identify any recorded shipwrecks or submerged historic properties in the vicinity of the proposed East Breakwater oyster habitat creation area or at the West Breakwater rock placement site. Impacts to historic properties, including the Southwest Ledge Lighthouse on the southwest end of the East Breakwater, are not anticipated.

- Sandy Point, Wetland Creation Site

Research conducted by the Public Archaeology Laboratory as part of the 2010 Long Island Sound Dredged Material Management Plan identified one potential shipwreck, the Laura S. Hatch, northwest of the Sandy Point dike area. A 150-foot buffer will be maintained around this site. As the wetland creation area is well to the south (roughly 2,000 feet) along the edge of Sandy Point, its development will not impact this wreck site. If the dimensions of the wetland site change and the buffer cannot be maintained around the shipwreck, further evaluation would be required including archaeological investigation and coordination with project stakeholders.

An archaeological survey of the West Haven Water Pollution Control Facility adjacent to Sandy Point was conducted in 2009. Originally built in 1969, the facility was expanding to the east along the former wetland areas that bordered Sandy Point. The original building was built with imported fill over wetland soils and this is documented in thick fill deposits containing modern debris in highly disturbed contexts closest to the structure with lesser amounts of debris away from the facility. No further archaeological work was recommended as part of the expansion project. Additionally, a sewage outfall pipe is located in the intertidal zone of Sandy Point and portions have been repaired and replaced since its construction in the late 1960's. Based on this data, creation of the proposed wetland area at Sandy Point will not impact historic properties.

In conclusion, the dredging and disposal activities associated with the proposed New Haven Harbor Navigation Improvement Study shall have no effect upon significant historic properties as defined by Section 106 of the NHPA and implementing regulations 36 CFR 800. We would appreciate your concurrence with this determination. In all cases, if unanticipated discoveries are found during implementation of the project, USACE will follow the post review discoveries guidance of the Advisory Council's regulations (36 CFR 800.13) and continue coordination with your office.

If you have any questions, please feel free to contact the Project Manager, Ms. Barbara Blumeris at (978) 318-8737 or Mr. Marc Paiva, Archaeologist at (978) 318-8796.

Sincerely,

John R. Kennelly
Chief, Planning Division

Enclosures

SAME LETTER SENT TO (with enclosures):

Brian Jones, Ph.D., State Archaeologist
Connecticut State Museum of Natural History &
Connecticut Archaeology Center
University of Connecticut, Unit 3023
75 N. Eagleville Road
Storrs, CT 06269-3023

James Quinn, Tribal Historic Preservation Officer
Mohegan Tribe Cultural Department
5 Crow Hill Road
Uncasville, CT 06382

Marissa Turnbull, Tribal Historic Preservation Officer
Natural Resources Protection & Regulatory Affairs
Mashantucket Pequot Tribal Nation
550 Trolley Line Blvd., P.O. Box 3202
Mashantucket, CT 06338-3202

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

April 3, 2019

Planning Division
Evaluation Branch

James Quinn, Tribal Historic Preservation Officer
Mohegan Tribe Cultural Department
5 Crow Hill Road
Uncasville, CT 06382

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Mary Dunne, State Historic Preservation Officer
Connecticut State Historic Preservation Office
450 Columbus Boulevard, Suite 5
Hartford, CT 06103

Marissa Turnbull, Tribal Historic Preservation Officer
Natural Resources Protection & Regulatory Affairs
Mashantucket Pequot Tribal Nation
550 Trolley Line Blvd., P.O. Box 3202
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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

FEB 21 2019

John R. Kennelly
Chief, Planning Division
US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Re: Draft Environmental Impact Statement for the New Haven Harbor Federal Navigation Project in New Haven, Connecticut

Dear Mr. Kennelly:

We have reviewed the Draft Environmental Impact Statement (DEIS) Essential Fish Habitat (EFH) Assessment dated September 2018, regarding the proposed navigation improvements to the New Haven Harbor Federal Navigation Project (FNP) in New Haven, Connecticut. The existing New Haven FNP extends approximately five miles from Long Island Sound into New Haven Harbor and includes a main channel, maneuvering area, and turning basin. The New Haven FNP is currently authorized to a depth of -35 feet mean lower low water (MLLW) with channel widths varying form 400 feet to 800 feet along its length. The current authorized depth of the FNP is not adequate for larger ships using the harbor. The project seeks to deepen the existing channels and turning basin to a depth of -40 feet MLLW with 2 feet overdepth. Areas of the existing FNP will also be widened, including the inner channel from 400 to 500 feet, the entrance channel from 500 to 600 feet, and the East Breakwater bend section from 560 to 800 feet. The project will generate approximately 4.3 million cubic yards of soft sediment dredge material and approximately 43,500 cubic years of rock. You have evaluated multiple beneficial reuse projects to dispose of the dredge material. Dredge material will be placed to create a rock reef along the western breakwater in New Haven Harbor with the rocky dredge material and to create oyster habitat along the eastern border of the FNP. You also propose to create a tidal wetlands over an approximately 73.2 acre area at Sandy Point and fill two abandoned borrow pits (Morris Cove and West River). Any remaining material will be disposed of at Central Long Island Sound Disposal Site or within a confined aquatic disposal cell if it is deemed unsuitable.

You have determined that the proposed project will result in a loss of winter flounder EFH of 8.6 acres due to the proposed dredging and 60.6 acres due to proposed tidal wetland creation. As mitigation for these losses, you have proposed to create 57 acres of winter flounder EFH by filling the two abandoned borrow pits (Morris Cove and West River) to an elevation suitable to serve as winter flounder egg habitat.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) and the Fish and Wildlife Coordination Act require Federal agencies to consult with one another on projects like this project. Because the project involves EFH, the consultation process is guided by the EFH regulatory requirements under 50 CFR 600.920, which mandates the preparation of EFH assessments and generally outlines your obligations. We offer the following comments and recommendations for your consideration.

General Comments

New Haven Harbor and the surrounding waters of Long Island Sound contain productive fishery habitat that supports numerous important living marine resources including federally managed finfish and shellfish. Multiple managed fish species have EFH designated for multiple life history stages in the project vicinity and within the vicinity of the placement areas, including winter flounder, summer flounder, windowpane flounder, little skate, winter skate, and black sea bass. The proposed project would adversely affect the habitat value through direct removal of subtidal habitats, burial of benthic organisms and habitat by the disposal of dredged material and through the elevation of suspended sediments in the water column. Of particular concern are the proposed impacts to EFH for winter flounder sensitive life history stages (e.g. eggs, larvae, young-of-year). Winter flounder EFH that supports these reduced mobility life stages are more likely to be adversely affected by indirect, temporary effects of dredging activities (e.g. suspended sediments) while the projects direct effects (e.g. sediment removal, sediment disposal, or blasting) will result in both temporary and permanent impacts to winter flounder EFH.

Temporary adverse impacts

Winter flounder spawn in Connecticut waters beginning in January when water temperatures are approximately 2-5°C (Pereira et al. 1999). Winter flounder have demersal, adhesive eggs that sink and remain on the bottom until they hatch (Pereira et al. 1999). After hatching, flounder larvae are initially planktonic, but following metamorphosis they are negatively buoyant and are more abundant near the substrate (Pereira et al. 1999; Able and Fahay 1998). Young-of-the-year flounder tend to burrow in the soft-sediments in response to perceived threats rather than flee. Thus, they are not likely to swim away from a dredge, and run a high risk of being entrained. Eggs, larvae and young-of-year flounder are essentially non-dispersive resulting in spawning areas and nursery areas being located in close proximity to each other (Pearcy 1962; Crawford and Carey 1985). These sensitive life history stages could be directly impacted by sediment removal and placement activities, or by deposition of suspended sediments (Berry et al. 2004; Johnson et al. 2008). Blasting activities would have similar impacts, and may also result in adverse impacts to spawning activity.

Eggs and newly metamorphosed larvae that are located within a dredge footprint, blast debris impact area, and the disposal areas would be destroyed and could result in a considerable loss in a year class. Dredging and in-water disposal also result in elevated suspended sediments in the water column which have been documented to result in adverse impacts to various life stages of fish (Newcombe and Jensen 1996, Wilber and Clark 2001). Suspended sediments have also been shown to restrict and inhibit habitat use and function, including fish reproduction (Newcombe and MacDonald 1991). Settlement of suspended sediments onto winter flounder eggs can result in mortality, delayed hatching, and developmental defects to larvae (Klein-MacPhee et al. 2004; Berry et al. 2004). Decreased hatching success of eggs was observed when covered in as little as 1 mm of sediment, and burial in sediments greater than 2.5 mm has been demonstrated to cause a zero percent hatch rate (Berry et al. 2004). These adverse temporary impacts can be alleviated by implementing appropriate time of year (TOY) work restrictions to avoid impacts during the periods that the habitat is used.

To minimize these temporal impacts to winter flounder EFH, the proposed activities, including dredging, in-water sediment deposition, and blasting, should occur outside the time of year spawning and early life history stages are present in the project area. For this area of Long Island Sound, we recommend a work restriction from January 1 through May 31. Currently, you have proposed two different TOY work restrictions for dredging and placement activities in the inner and outer harbors.

North of Sandy Point you have proposed a February 1 to June 30 work restriction and south of Sandy Point you have proposed an April 1 to June 30 restriction. You have proposed a work period of October 1 to May 1, or May 2 to September 30 work restriction for the blasting activities that would occur south of Sandy Point. However, winter flounder are known to spawn in both regions of the harbor (Schultz et al 2007). Of the eggs collected within the inner and outer harbor, Schultz et al (2007) collected the highest numbers of eggs per site at locations within the outer harbor. Based on this, we do not agree that the proposed modified TOY restriction would adequately protect winter flounder EFH from adverse impacts south of Sandy Point. We recommend a TOY restriction of January 1 to May 31 be employed for all dredging and blasting activities.

As discussed in our May 1, 2017 letter, New Haven Harbor supports diadromous fish spawning migrations. Your currently proposed dredging TOY work restrictions extend until June 30 which would provide protection of diadromous spawning migrations. We support and recommend that the TOY restriction should extend until June 30, for an inclusive TOY work restriction of January 1 to June 30. Currently, you propose blasting activities to extend until May 1. As blasting activities would also create noise and turbidity impacts that could adversely impact diadromous fish spawning migrations, we recommend the blasting should not occur during the standard spring spawning migration TOY restriction of April 1 to June 30.

A list of additional BMPs to be incorporated to minimize blasting impacts were included in the EFH assessment, but a detailed blasting plan was not provided. It also does not appear that the aerial extent of blasting impacts has been fully assessed. While you discussed that benthic species adjacent to the blasting footprint are expected to be adversely impacted, you have not provided an assessment on the scope of these impacts, or measures that could be employed to minimize impacts associated with debris. A full blasting plan, with information on the expected extent of impacts and detailed measures to be employed to minimize these impacts should be provided for our review and comment.

Permanent adverse impacts

The EFH assessment states that a total of 69.2 acres of winter flounder egg habitat would be lost. The proposed dredging would result in an 8.6 acre loss and the proposed tidal wetland creation would result in an additional 60.6 acre loss. To offset these losses you have proposed to fill two historically used and currently abandoned borrow pits in the project vicinity, Morris Cove and West River. The proposed filling of the Morris Cove pit would create 42.0 acres and the West River filling would create an additional 15.0 acres of winter flounder egg habitat, resulting in a net loss of 12.2 acres of sensitive life history stage EFH. You also propose to create oyster habitat along the eastern edge of a portion of the FNP and a rocky reef adjacent to an existing breakwater on the western side of New Haven Harbor.

The loss of winter flounder egg EFH appears to be adequately offset with the proposed creation of tidal wetlands, filling of the abandoned borrow pits, and rocky reef and oyster habitats. The New England Fisheries Management Council recently updated their managed fish species EFH designations and tidal wetland habitats are now specifically designated as EFH for juvenile winter flounder, which is also a sensitive life history stage. Tidal wetlands are also designated as EFH for sensitive life history stages of multiple other managed fish species and provide important ecological services for many NOAA-trust resources. Depending on design, the proposed rocky reef and oyster habitat could provide complex habitat that would support multiple managed fish and prey species. However, the details, including plan views, of the proposed mitigation projects have not been provided. You have provided the square footage of the proposed tidal wetland creation and indicated that the borrow pits will be filled to an elevation of less than 5 meters to provide winter flounder egg

EFH, but no information has been provided on the extent or construction of the proposed rocky reef or oyster habitat. We agree that the proposed suite of mitigation projects should offset adverse impacts of the proposed FNP modifications. However, as the details of the projects have not been reviewed, further consultation will be required as the mitigation projects are developed to determine if additional conservation recommendations may be necessary.

Essential Fish Habitat Conservation Recommendations
The project area is designated as EFH under the MSA for several species, including winter flounder. As described above, the proposed project would have adverse effects on winter flounder EFH through dredging and filling subtidal habitats. Pursuant to Section 305(b)(4)(A) of the MSA, we recommend that you adopt the following EFH conservation recommendations to ensure minimal impacts to EFH:

1) To avoid impacts to sensitive life stages of winter flounder, no in-water activity should occur between January 1st and May 31st of any year.
2) A detailed blasting plan should be developed and provided for our review and comment. Based on our review of a blasting plan, additional EFH conservation recommendations may be required to adequately conserve and protect EFH.
3) The proposed mitigation project plans should be provided for our review and comment. Based on our review of the mitigation plans, additional EFH conservation recommendations may be required to avoid and minimize adverse impacts to EFH.

Please note that Section 305(b)(4)(B) of the MSA requires you to provide us with a detailed written response to these EFH Conservation Recommendations, including a description of measures adopted by you for avoiding, mitigating, or offsetting the impact of the project on EFH. In the case of a response that is inconsistent with our recommendations, Section 305(b)(4)(B) of the MSA also indicates that you must explain your reasons for not following the recommendations. Included in such reasoning would be the scientific justification for any disagreements with us over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects pursuant to 50 CFR 600.920(k).

Please also note that a distinct and further EFH consultation must be reinitiated pursuant to 50 CFR 600.920(l) if new information becomes available or the project is revised in such a manner that affects the basis for the above EFH Conservation Recommendations.

Fish and Wildlife Coordination Act Recommendations
In addition to the EFH provisions of the MSA, the Fish and Wildlife Coordination Act requires that we consult with each other on activities that impact fish and wildlife resources. As discussed above, the project area supports diadromous fish spawning migrations. In order to protect diadromous fish resources we recommend you adopt the time of year restriction noted below.

1) To protect diadromous species, dredging within the entrance channel should not occur between April 1 and June 30 of any year.

Endangered Species Act
A consultation, pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, may be necessary. Under the ESA, if the proposed project has the potential to affect listed species or designated critical habitat, and it is being approved, permitted or funded by a Federal agency, the lead Federal agency, or their designated non-Federal representative, is responsible for determining

whether the proposed action may affect the listed species or designated critical habitat. In this situation, you are responsible for this determination. If you determine the proposed action may affect listed species under our authority, the determination along with justification for their determination should be sent to the attention of the ESA Section 7 Coordinator at nmfs.gar.esa.section7@noaa.gov (NMFS Greater Atlantic Regional Fisheries Office, Protected Resources Division (PRD), 55 Great Republic Drive, Gloucester, MA 01930). After reviewing this information, we would then be able to conduct a consultation under section 7 of the ESA. If you determine the proposed action will not affect listed species under our authority, no further consultation with us is necessary. Should you have any questions about these comments or about the section 7 consultation process in general, please contact Zach Jylkka at Zachary.Jylkka@noaa.gov or (978) 282-8467.

Conclusion

We look forward to your response to our EFH recommendations on this project. If you have any questions regarding these comments and recommendations, please contact Alison Verkade at 978-281-9266, or at Alison.Verkade@noaa.gov.

Sincerely,

Louis A. Chiarella
Assistant Regional Administrator
for Habitat Conservation

cc: Zach Jylkka, PRD
Tom Nies, NEFMC
Chris Moore, MAFMC
Lisa Havel, ASMFC
Todd Randall, ACOE
Barbara Blumeris, ACOE
Nathan Margason, USEPA

References

Able, K.W. and M.P. Fahay. 1998. The first year in the life of estuarine fishes of the Middle Atlantic Bight. Rutgers University Press. New Brunswick, NJ

Berry, W.J., Hinchey, E.K., Rubinstein, N.I. and Klein-MacPhee, G. 2004. Winter flounder. *Pseudopleuronectes americanus*, hatching success as a function of burial depth in the laboratory. Ninth flatfish biology conference-poster presentation; 2004 Dec 1-2; Westbrook, CT. Woods Hole (MA): Northeast Fisheries Science Center Reference Document 04-13.

Chiasson, A.G. 1993. The effects of suspended sediment on rainbow smelt *(Osmerus mordax)*: a laboratory investigation. Can. J. Zool. 71:2419-2444.

Crawford, R.E. and Carey, C.G. 1985. Retention of winter flounder larvae within a Rhode Island salt pond. Estuaries 8:217-227.

Johnson, M.R., Boelke, c., Chiarella, L.A., Colosi, P.D., Greene, K., Lellis-Dibble, K., Ludeman, H., Ludwig, M., McDermott, S., Ortiz, J., Rusanowsky, D., Scott, M., Smith, J. 2008. Impacts to marine fisheries habitat from nonfishing activities In the northeastern United States. NOAA Technical Memorandum NMFS-NE-209. Woods Hole, MA. 328 p.

Klein-MacPhee, G., Macy, W.K. and Berry, W. 2004. In situ effects of suspended particulate loads produced by dredging on eggs of winter flounder (*Pseudopleuronectes americanus*). In: Ninth flatfish biology conference- oral presentation; 2004 Dec 1-2: Water's Edge Resort, Westbrook, CT. Woods Hole (MA): Northeast Fisheries Science Center Reference Document 04-13.

Newcombe, C.P. and Jensen, O.T. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. *North American Journal of Fisheries Management 16(4):693-727.*

Newcombe, C.P. and MacDonald, D.D. 1991. Effects of suspended sediments on aquatic ecosystems. *North American Journal of Fisheries Management* 11 :72-82. Pearcy, W.G. 1962. Ecology of an estuarine population of winter flounder, *Pseudopleuronectes americanus* (Waldbaum). Part I-IV. Bull. Bingham Oceanogr. Collect. 18(1): 5-78.

Northeast Fisheries Science Center. 2008. Assessment of 19 Northeast Groundfish Stocks through 2007: Report of the 3rd Groundfish Assessment Review Meeting (GARM III), Northeast Fisheries Science Center, Woods Hole, MA, August 4-8, 2008. US DOC, NOAA Fisheries, Northeast Fisheries Science Center Ref Doc. 08-15; 884 p.

Pereira, J.J., Goldberg, R., Ziskowski, J.J., Berrien, P.L., Morse, W.W. and Johnson, D.L. 1999. Essential Fish habitat Source Document: Winter Flounder, *Pseudopleuronectes americanus*, Life History and Characteristics. NOAA Technical Memorandum NMFS-NE-138. Northeast Fisheries Science Center, Woods Hole, MA.

Schultz, E.T., Pereira, J.J., and Auster, P.J. 2007. Determining Winter flounder Spawning Sites in Two Connecticut Estuaries. EEB Articles. Paper 19.

US EPA. U.S. Environmental Protection Agency. 2003. National management measures for the control of non-point pollution from agriculture. [Internet]. Washington (DC): US EPA Office of Water. EPA-841-B-03-004. [cited 2008 Jul 15]. Available from: http://www.epa.gov/owow/nps/agmm/index.html.

Wilber, D.H. and Clarke, D.G. 2001. Biological effects of suspended sediments: a review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries. *North American Journal of Fisheries Management* 21: 855-875.

Wildish, D.J. and Power, J. 1985. Avoidance of suspended sediment by smelt as determined by a new "single fish" behavioral bioassay. Bull. Environ. Contam. Toxicol. 34: 770-774.

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ANDREW M. CUOMO
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ROSSANA ROSADO
SECRETARY OF STATE

February 11, 2019

Mr. John Kennelly, Chief
Planning Division, New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Re: F-2018-1341 (DA)
U.S. Army Corps of Engineers/New England District (Corps) submission of a consistency determination - proposed New Haven Harbor Navigation Improvement Project. Quinnipiac River, New Haven Harbor, Long Island Sound, New Haven, Connecticut.
Concurrence with Consistency Determination

Dear Mr. Kennelly:

The Department of State (Department) has completed its review of the Corps' consistency determination for the proposed New Haven Harbor Navigation Improvement Project with the New York State Coastal Management Program (CMP). The Corps determined that the project is consistent to the maximum extent practicable with the 13 enforceable coastal policies of the Long Island Sound Coastal Management Program, a regional component of the CMP. (!5 CFR § 930.36(a)). Based upon the information submitted by the Corps, the Department concurs with the Corps' consistency determination. (15 CFR § 930.41(a)).

The Corps' Tentatively Selected Plan (TSP) for the proposed navigation improvement project involves the deepening and widening of the existing New Haven Harbor Federal Navigation Project (FNP) to -40' MLW and 200', 500 and 800' (variable widths). This will result in the removal of approximately 4.3 million cubic yards (mcy) of dredged material. The base plan that meets the National Economic Development (NED) plan allows for a portion of the material to be used beneficially at the following locations[1]:

• Morris Cove Borrow Pit – 623,310 cy
• West River Borrow Pits – 87,800 cy
• Create Oyster Habitat south of east breakwater – 351,300 cy
• Rock placement at west Breakwater (rock reef) – 32,700 cy
• The unsuitable material identified as Composites 6 and 7 are undergoing further evaluation at the time of the submission. The Corps has indicated that this material, once isolated, will be likely be placed within a confined aquatic disposal (CAD) cell within the Harbor.
• Up to 2,333,059 cy of remaining suitable material will be used to cover historic disposal mounds at the Central Long Island Sound Disposal Site (CLDS).

[1] See pp. ES-4, and 79-83 of the Corps' Integrated Feasibility Report and Environmental Impact Report, September 2018. https://www.nae.usace.army.mil/Portals/74/docs/Topics/New%20Haven/EIS/2-DraftNHH-EIS.pdf?ver=2018-09-27-164709-180

•Sandy Point salt-marsh creation and erosion mitigation proposal[2] is an additional alternative that will create up to 70 acres of salt marsh using approximately 843,500 cubic yards of suitable dredged material that would otherwise be placed at CLDS. This alternative does not meet NED and cannot be included in the base plan, however the non-federal sponsor(s) will cost-share the project.

The federal Coastal Zone Management Act implementing regulations provide for supplemental coordination for federal activities that were previously determined by the State agency to be consistent with the management program, but which have not yet begun. (15 CFR § 930.46). If the proposed New Haven Harbor Navigation Improvement Project proceeds with a substantial change, significant new circumstances or information becomes available, or information of substantial change made during the Department's review period and notice was not made available to the Department, then a supplemental coordination may be required. The Department requests that the Corps maintain communication and coordination efforts with the Department as the project moves forward.

The Department is encouraged by the diligent efforts of the Corps and State of Connecticut to implement disposal alternatives to open water disposal. The TSP for this proposal successfully reduces the open-water disposal of dredged material in Long Island Sound by 45%, or by 1,938,610 cy.

Please feel free to contact Jennifer Street at (518) 474-7247 or e-mail at: Jennifer.Street@dos.ny.gov and reference file no. F-2018-1341 (DA).

Sincerely,

Gregory L. Capobianco
Office of Planning, Development and
Community Infrastructure

GLC/jls

ecc: COE/New England District – Barbara Blumeris, Mark Habel, Todd Randall
COE/New York District - Regulatory
CT DEEP – Brian Thompson
CT Port Authority – Joe Salvatore
New Haven Port Authority – Judi Sheiffele
NYSDEC Region 1 – DEP
NYSDEC Div. Marine Resources – Dawn McReynolds, Cassandra Bauer

[2] See p. 81, 94, of the Corps' Integrated Feasibility Report and Environmental Impact Report, September 2018. https://www.nae.usace.army.mil/Portals/74/docs/Topics/New%20Haven/EIS/2-DraftNHH-EIS.pdf?ver=2018-09-27-164709-180

MEMORANDUM FOR THE RECORD

SUBJECT: Review and coordination of USACE's New Haven Harbor Navigation Improvement Project (NHHNIP) with the Federal Aviation Administration (FAA)

1. DATE: 07 February 2019

2. MEETING PARTICIPANTS:

Todd Randall, USACE - todd.a.randall@usace.army.mil
Michelle Ricci, FAA - michelle.ricci@faa.gov

3. DISCUSSION:

Mr. Randall and Ms. Ricci spoke via teleconference on February 7, 2019 to discuss the NHHNIP. Mr. Randall presented the attached presentation to inform FAA of the proposed project. Ms. Ricci noted that the FAA was appreciative of the coordination effort and noted that, as presented, the FAA had no comments on the proposed project. Ms. Ricci requested that USACE provide the FAA with copies of the Sandy Point salt marsh creation area plans once they are developed during the design phase of the project.

07 FEB 2019

Date

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DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=RANDALL.TODD.A.1241930480
Date: 2019.02.12 09:08:50 -05'00'

TODD RANDALL
Marine Ecologist

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT STUDY

INTEGRATED FEASIBILITY REPORT
AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX B
PROJECT AUTHORIZATION AND CONSTRUCTION HISTORY

NEW HAVEN HARBOR
NEW HAVEN, WEST HAVEN AND NORTH HAVEN
LIST OF AUTHORIZATIONS

Authorization	Work Authorized & Constructed	Construction Dates
Act of 30 August 1852	Removal of Middle Rock from the Eastern Entrance to New Haven Harbor to -17 Feet MLW	July 1953 – Sept 1867 To –14 to –15 Feet
Acts of 1866 & 1867		
River & Harbor Act of 11 July 1870	Completion of the Removal of Middle Rock and for the Removal of Southwest Ledge and Two Intermediate Rocks to –17 Feet MLW.	Middle Rock – Sept 1870 – Oct 1870 (Removed in Part)
Act of 9 March 1871	Channel 200 Feet Wide by -14 Feet MLW Across the Middle Bar Up to the Wharves at New Haven, and Removal of Luddington's Rock in the Western Approach to –17 Feet	13-Ft Channel – July 1871 – Sept 1873 Luddington Rock – Aug 1871 – Oct 1874
House Ex. Doc. #137, 42nd Cong., 2nd Session, 14 February 1872	Dredging a Channel for 5,000 LF Across the Bar at Fort Hale to -16 Feet MLW by 200 Feet Wide, and the Removal of the Big Boil Rock	Bar Channel – Aug 1872 -
Act of 3 March 1873	Construction of a Stone Jetty at the Beach South of Fort Hale, Extending from the MHW Line Seaward	Aug 1873 – FY 1875
River & Harbor Act of 3 March 1875	Widen the Upper 13-Foot Channel to 250 and 415 Feet.	March 1876 – Aug 1876
River & Harbor Act of 18 June 1878	16-Foot Channel across the Fort Hale Bar and up to Long Wharf, 400 to 500 Ft Wide	Aug 1878 – Nov 1878 Aug 1897 – Oct 1897
River & Harbor Act of 3 March 1879	Two Stone Breakwaters across the Outer Harbor to Create a Harbor of Refuge. Southwest Ledge Breakwater – 3,300 LF and Luddingtons Rock Breakwater – 4,200 LF (Not Built under this Authority)	Southwest Ledge Breakwater - April 1880 – Feb 1890 To 3,450 LF
River & Harbor Act of 2 August 1882	Stone & Timber Crib Dike 2,160 LF from the West Shore along Sandy Point Bar, with a Second 3,200 LF Stone "T" Leg Parallel to the Bar Channel.	May 1883 – Aug 1889

Annual Reports for 1880, App. C-3, Page 444, and 1891, App. D-7, Page 761	Extend and Widen the 16-Foot Channel above Long Wharf to Steamboat Wharf at 400 to 600 Feet Wide.	March 1880 – June 1891
Annual Report for 1886, Appendix D-5, Page 636	Widen the 13-Foot Channel between Long Wharf and Sewer Dock and Dredging an 8-Foot Anchorage 400 by 200 Feet between the Sewer and Railroad Docks	Aug 1885 – Oct 1885 Nov 1892 – April 1893
River & Harbor Act of 19 September 1890	Redesign of Luddingtons Rock Breakwater – 5,000 LF, Addition of a New West Breakwater – 4,200 LF, and New Northeast Shore Arm Breakwater – 1,200 LF (Northeast Breakwater Never Constructed)	Luddingtons Rock Breakwater – Feb 1891 – Feb 1915 West Breakwater – FY 1896 – Feb 1915
River & Harbor Act of 3 March 1899	Channel -20 Feet MLW by 400 Feet Wide from the Sound to Fort Hale, then 300 Feet Wide to Tomlinsons Bridge, with Three Inner Harbor Anchorage Areas, 1) 12-Ft Anchorage West of the Channel below the Bridge, 2) 16-Ft by 300-Ft Wide by 1,000-Ft Long Anchorage West of the Channel between Long Wharf and Sandy Point, and 3) East of the Channel at -20 Ft by 1,000 Ft Long by 300 Ft Wide between Fort Hale and Cranes Bar Point	20-Ft Channel and Anchorage – Dec 1899 – Mar 1903 - 1904 12-Ft Anchorage – FY 1901 – Mar 1903 16-Ft Anchorage – FY 1902 - Mar 1903
River & Harbor Act of 13 June 1902	Channels -12 Feet MLW, 200 Feet Wide Up the Quinnipiac River to Grand Avenue (Built to 8 Feet by 50 Feet above Ferry Street), and 200 Feet Wide Up the Mill River to above East Chapel Street, then Further Upstream in Two Branches Each at 75 Feet Wide Up to Grand Avenue	Mill River – May 1903 – April 1904 Quinnipiac River – FY 1903 – Oct 1904
River & Harbor Act of 3 March 1905	West River: Channel -9 Feet MLW by 100 Feet Wide from the West Limit of the -16-Foot Anchorage in New Haven Harbor Westward to Oyster Point, along the Oyster Point Wharves and Upstream in the West River to Kimberly Avenue.	May 1906 – Sept 1906
River & Harbor Act of 2 March 1907	Widen the 9-Foot West River Entrance Channel	May 1907
River & Harbor Act of 25 June 1910	Widen the 20-Foot Channel along East Limit for about 6,000 LF between the Upper	20-Ft Channel Widening – June 1912

	Bend and Tomlinson Bridge, Deepen the Existing 12-Foot Upper Anchorage to 15 Feet, and Provide a Channel 12 Feet MLW by 100 Ft Wide Leading Off the Northwest Limit of the Upper Anchorage East of the Canal Dock to Brewery Street, and the Removal of Several Rocks in Morris Cove.	15-Ft Anchorage – March 1911 – June 1912 12-Ft Brewery St Channel – March 1911 – FY 1911 Morris Cove – Jan 1911
April 21, 1910, by the Chief of Engineers	Project Modification to Eliminate the Morgan Point (Northeasterly) Shore Arm Breakwater from the Project, the Omission of any Further Extension of the Middle Breakwater	Deauthorization Annual Report for 1910, Page 122
River & Harbor Act of 25 July 1912	Quinnipiac River - Abandon Unconstructed 12-Foot Channel of 1904 above Ferry Street, Replaced by Channel -8 Feet by 75 to 100 Feet Wide from Ferry Street up to Grand Avenue Mill River - Widen the Confluence of the Two -12-Foot MLW Branch Channels, Widen the East Branch Channel to 100 Feet and Widen the West Branch Channel to 125 Feet up to 375 Feet from its Upstream End and 150 Feet Wide through the Turn	Quinnicpiac River – April 1913 – May 1913 Mill River – May 1913 – July 1913
River & Harbor Act of 25 July 1912	West River - 12-Foot Channel, Widen Bend at Oyster Point, Widen Channel to 125 Feet from Oyster Point to Kimberly Ave, to 150 Feet in the Turn at Mars Shipyard and the Approach to Kimberly Ave Bridge, and Extend the Channel at 75 Feet Wide above Kimberly Ave. to the Railroad Bridge, Widen through the Upper Turn to 100 Feet, and Adding a 6-Foot by 1.3 Acre Anchorage Basin on the South Channel Limit below the Mars Dock.	June 1913 – Dec 1913
River & Harbor Act of 4 March 1913	Widen the Upper Portion of the 20-Foot Main Channel by a Width Varying from 200 to 500 Feet	Sept 1913 – Oct 1915
River & Harbor Act of 3 July 1930	Quinnipiac River - 18-Foot by 200-Foot Wide Channel below Ferry Street and a 16-Foot by 200 Feet Wide Channel above Ferry Street to Grand Avenue.	Summer 1930 – July 1931

National Industrial Recovery Act of 6 September 1933 & River & Harbor Act of 30 August 1935	Deepening of the Main Channel to -25 Feet MLW up to Tomlinson Bridge at 400 Feet Wide in the Outer Reaches and 500 Feet Wide, Widened at the Bend through the Inner Reaches	Nov 1933 – July 1935
River & Harbor Act of 2 March 1945	Deepen Main Channel to -30 Feet MLW by 400 Feet Wide from the Sound to Fort Hale Park, then 500 Feet Wide, Widened at the Bend to 1,111 Feet, up to the Tomlinson Bridge. Also Two Anchorages West of the Channel below Long Wharf, -30 Feet by 1,100 Feet Wide by 4,900 to 2,700 Feet Long, and -16 Feet by 600 Feet Wide by 2,700 Feet Long	Never Constructed - Anchorage Areas Authorization Eliminated by Act of 1946
River & Harbor Act of 24 July 1946	Main Channel - Abandon the 30-Foot and Realigned 16-Foot West Anchorages, Deepen the Main Channel to -35 Feet to 300 Feet below Tomlinson Bridge, Relocate Upper Reach of Main Channel Eastward at 800 Feet Wide above New Haven Terminal Co. & 500 Feet between the Sound and the First Turn Inside the Breakwaters, and Enlarge the 16-Foot Anchorage to Incorporate Former Channel Areas. Quinnipiac River - Channel 22 Feet MLW by 250 Ft Wide Upriver to Ferry Street, then 250 to 400 Ft Wide to 1,000 above Ferry Street, with a 22-Foot Turning Basin at the Mill & Quinnipiac Confluence.	Main Ship Channel Sept 1947 – May 1950 Quinnipiac River – Never Constructed
Act of 16 August 1949, P.L. 234, 81st Congress, 1st Sess.	Declares as Non-Navigable the -12-Foot MLW by 100-Foot Wide Brewery Street Channel	Deauthorization
Act of 9 August 1955, P.L. 84-289, 84th Congress, 1st S, Ch. 649,	West River - Declares as Non-Navigable the Upper Portion of the West River Channel, above a Point 600 Feet Upstream of the Kimberly Avenue Bridge.	Abandonment
	1958 Groin Constructed at Lighthouse Point Beach by State and Corps	
Water Resources Development Act of 17 October 1986 §202(a)	Deepen the Main Channel to -40 Feet MLW by 500 Feet Wide Over its Entire 36,600 LF Length (Widening the Lower 20,900 LF From 400 to 500 Feet), Realigning 9,700 LF	Never Constructed

	of the Channel Slightly Eastward in the Upper Harbor to Ease a Bend, Widening the Channel at the Outer Bend at Southwest Ledge from 560 Feet to 780 Feet, and Providing a Common Turning Basin -40 Feet MLW in the Upper Harbor in a 1,200-Foot Wide Irregular Octagon	
Water Resources Development Act of 17 November 1986 §1002	Deauthorized the Unconstructed Deepening and Widening of the Lower Quinnipiac River Channel to above Ferry Street to 22 Feet, as Adopted by the Act of 1946. Also Deauthorizes Improvements Adopted by the River & Harbor Act of 25 June 1910, Including the 12-Foot Brewery Street Channel and the Deepening of the Upper Anchorage to -15 Feet MLW	Deauthorization
Chief of Engineers, 17 January 1995, under Authority of Section 103, River and Harbor and Flood Control Act of 23 October 1962	Stone Revetment Protection for the City Sewer Outfall Line along the Shoreward End of the Sandy Point Dike.	Sept 1995 – Dec 1995
16 April 2002 Fed Register Vol. 68 #123, 26 June 2003	Deauthorized the Unconstructed Project for Deepening the Main Channel to 40 Feet as Authorized by the Water Resources Development Act of 17 November 1986	Deauthorization

NEW HAVEN HARBOR - MILL RIVER, NEW HAVEN
LIST OF AUTHORIZATIONS

Authorization	Work Authorized & Constructed	Construction Dates
River & Harbor Act of 13 June 1902	Channels -12 Feet MLW, 200 Feet Wide Up the Mill River to above East Chapel Street, then Further Upstream in Two Branches Each at 75 Feet Wide Up to Grand Avenue	Mill River – May 1903 – April 1904
River & Harbor Act of 25 July 1912	Widen the Confluence of the Two -12-Foot MLW Branch Channels, Widen the East Branch Channel to 100 Feet and Widen the West Branch Channel to 125 Feet up to 375 Feet from its Upstream End and 150 Feet Wide through the Turn	Mill River – May 1913 – July 1913

NEW HAVEN HARBOR - WEST RIVER
NEW HAVEN AND WEST HAVEN
LIST OF AUTHORIZATIONS

Authorization	Work Authorized & Constructed	Construction Dates
River & Harbor Act of 3 March 1905	Channel -9 Feet MLW by 100 Feet Wide from the West Limit of the -16-Foot Anchorage in New Haven Harbor Westward to Oyster Point, along the Oyster Point Wharves and Upstream in the West River to Kimberly Avenue.	May 1906 – Sept 1906
River & Harbor Act of 2 March 1907	Widen the 9-Foot West River Entrance Channel	May 1907
River & Harbor Act of 25 July 1912	12-Foot Channel, Widen Bend at Oyster Point, Widen Channel to 125 Feet from Oyster Point to Kimberly Ave, to 150 Feet in the Turn at Mars Shipyard and the Approach to Kimberly Ave Bridge, and Extend the Channel at 75 Feet Wide above Kimberly Ave. to the Railroad Bridge, Widen through the Upper Turn to 100 Feet, and Adding a 6-Foot by 1.3 Acre Anchorage Basin on the South Channel Limit below the Mars Dock.	June 1913 – Dec 1913

Act of 9 August 1955, P.L. 84-289, 84th Congress, 1st Sess., Ch. 649	Declares as Non-Navigable the Upper Portion of the West River Channel, above a Point 600 Feet Upstream of the Kimberly Avenue Bridge.	Deauthorization

QUINNIPIAC RIVER, NEW HAVEN AND NORTH HAVEN
LIST OF AUTHORIZATIONS

Authorization	Work Authorized & Constructed	Construction Dates
River & Harbor Act of 13 June 1902	Channels -12 Feet MLW, 200 Feet Wide Up the Quinnipiac River to Grand Avenue (Built to 8 Feet MLW by 50 Feet Wide above Ferry Street)	Quinnipiac River – FY 1903 – Oct 1904
River & Harbor Act of 25 July 1912	Abandon Unconstructed 12-Foot Channel of 1904 above Ferry Street, Replaced by Channel -8 Feet by 75 to 100 Feet Wide from Ferry Street up to Grand Avenue.	Quinnipiac River – April 1913 – May 1913
River & Harbor Act of 3 July 1930	18-Foot by 200-Foot Wide Channel below Ferry Street and a 16-Foot by 200 Feet Wide Channel above Ferry Street to Grand Avenue.	Summer 1930 – July 1931
River & Harbor Act of 24 July 1946	Channel 22 Feet MLW by 250 Ft Wide Upriver to Ferry Street, then 250 to 400 Ft Wide to 1,000 above Ferry Street, with a 22-Foot Turning Basin at the Mill & Quinnipiac Confluence.	Never Constructed
Water Resources Development Act of 17 October 1986 §1002	Deauthorized the Unconstructed Deepening and Widening of the Lower Quinnipiac River Channel to above Ferry Street to 22 Feet, as Adopted by the Act of 1946.	Deauthorization

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX C
ECONOMICS

New Haven Harbor

Navigation Improvement Project

Integrated Feasibility Report and Environmental Impact Statement

Appendix C - Economic Analysis

New Haven, Connecticut

January 2020

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Introduction

This document presents the economic evaluations performed for the New Haven Harbor deepening and widening project, also known as the New Haven Harbor Navigation Improvement Study. The current federally authorized channel depth of New Haven Harbor is -35 feet mean lower low water (MLLW) with authorized channel widths of 400 feet. In December 2015, the U.S. Army Corps of Engineers (USACE) New England District signed a cost-sharing agreement with the New Haven Port Authority to begin the multi-year feasibility study to determine if deepening New Haven Harbor is both economically beneficial and environmentally acceptable to the nation. The USACE New England District together with the Deep Draft Navigation Planning Center of Expertise performed the economic analyses contained within this document in support of the feasibility study.

Economic Evaluation: Overview

Deep draft navigation policies allow projects to account for transportation cost reduction benefits in several ways. In the case of New Haven Harbor, the basis for the economic benefits are primarily captured in two ways. First, a project can reap benefits by achieving savings in loading practices. These type of benefits are common in a channel deepening project. With a deeper channel, the vessel can load more product and/or shift to a larger vessel class, also allowing for additional product per load. The heavier loading allows fewer vessels to transport the same amount of product, thereby reducing the number of round trips. The ocean-going portion of transportation cost savings typically consists of approximately 90 percent of project benefits in a channel deepening project. In other words, multiplying the number of vessel call reductions by round-trip transportation costs will yield the vast majority of benefits of a deepening project.

Key factors affecting the magnitude of loading practices benefits are:

- Miles applied in a round-trip route
- Vessel operating costs
- Vessel speeds
- Tons per vessel in both the future without-project condition (FWOP) and future with-project condition (FWP)

The tons per vessel analysis requires the following inputs:

- Specific commodities and their future growth rates
- Future loading practices by route and vessel class

The second category of benefits for this project is in-port time savings. These types of benefits are typically accrued by the reduction of transportation costs within a harbor. Reduced transportation costs may consist of a reduction in delays due to congestion, berth modifications affecting time at dock, and safety concerns, to name a few. Widening projects, including turning basins and bend easings, may influence both loading practices and time savings.

Key factors affecting the magnitude of in-port time savings benefits include:

- Pilot rules
- Channel dimensions and configuration
- Congestion

Data Sources and Key Assumptions

Data from Waterborne Commerce and the National Navigation Operations and Management Performance Evaluation and Assessment System (NNOMPEAS) was used to derive study assumptions and complete the economic analysis. A summary of key assumptions is provided below:

- For the economic analysis, route groups were assumed to service the same world regions currently begin served by the Port.
- Project construction was assumed to begin in year 2021.
- Year 2023 was identified as the base year (i.e., when economic benefits would begin to occur).
- The Tentatively Selected Plan (TSP) was identified based on the FY18 discount rate of 2.75%.
- This analysis assumes that all vessels must use 4 feet of underkeel clearance. This is based on discussions with the harbor pilots.

Existing Conditions

This section provides a summary of existing conditions for the hinterland, commodities, vessel traffic, and vessel size guidelines/pilot rules. The existing conditions are defined in this report as the project conditions that exist today plus any changes that are expected to occur prior to project year one, anticipated in 2023, which is referred to as the base year for comparison of alternatives to the without project condition and among proposed alternatives. It is the year the project is expected to be operational and accrue benefits.

Hinterland

New Haven, Connecticut is at the head of New Haven Harbor, a bay on the northern side of Long Island Sound. New Haven is about 68 nautical miles northeast of New York City and 179 nautical miles southeast of Boston, Massachusetts via the Cape Cod Canal. Three detached breakwaters protect the entrance of New Haven Harbor from Long Island Sound. The main ship channel extends from deep water in Long Island Sound to the head of the harbor near the Tomlinson Bridge. The main ship channel passes between the Ludington Rock Breakwater and the East Breakwater at the entrance to the harbor.

The port area of New Haven includes the portion of New Haven Harbor extending from Sandy Point on the west side and Fort Hale on the east to the head of the harbor and the navigable portions of the Mill, Quinnipiac and West Rivers. The Mill and Quinnipiac Rivers empty into the head of the harbor through a common mouth, and the West River enters the west side of the harbor about 1 mile below its head. New Haven Harbor is 4.5 miles long and varies from 1 to 4 miles in width.

The primary tributary area served by the harbor is the south central Connecticut region, encompassing 767 square miles and includes 46 cities and towns. The largest city is New Haven. The most significant natural resources in south central Connecticut are the harbor itself, the coastal terrain, the Quinnipiac, West and Mill Rivers that flow into New Haven Harbor, and Long Island Sound. The irregular coastline provides many fine beaches and sheltered covers for a variety of waterside recreation.

The Port of New Haven serves a hinterland including the greater New Haven region, the state of Connecticut, and much of the American Northeast. The port is a crucial import location for refined petroleum products, which supplies demand within Connecticut and the broader Northeast region. The Northeast maintains a large refinery production deficit and must rely heavily on imported volumes of petroleum products in order to meet demand. The majority of the landside acreage at the Port of New Haven is devoted to energy-related uses. This represents a long-term economic asset for the economy of the State of Connecticut.

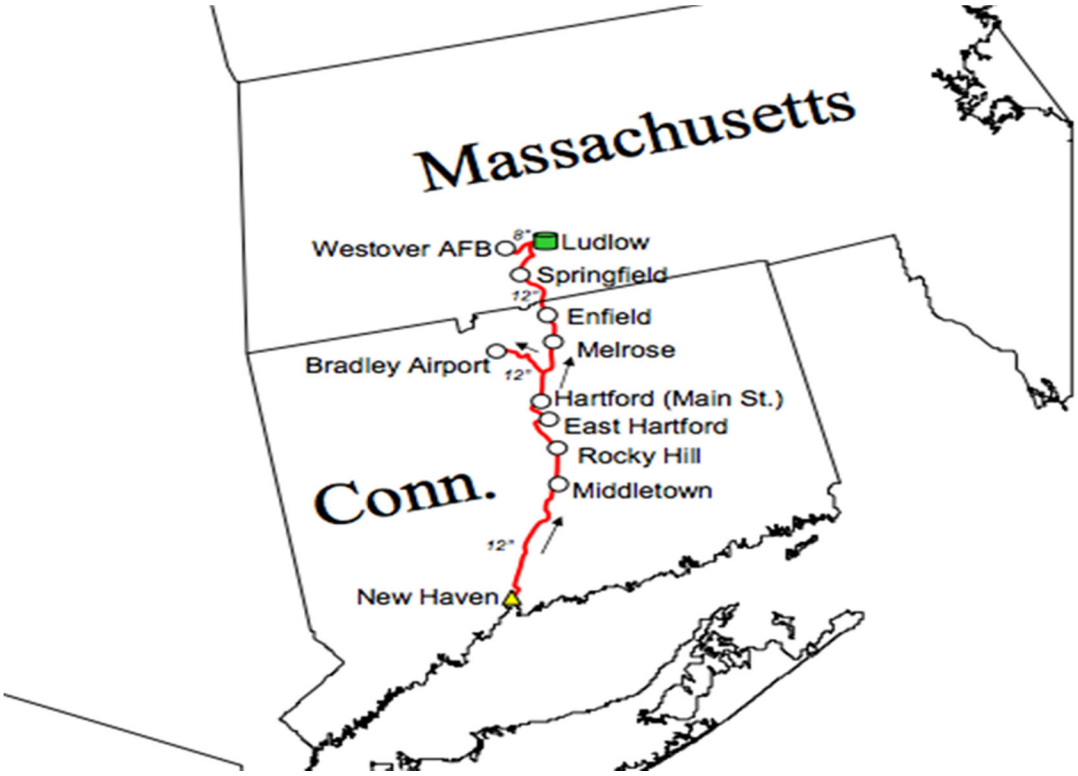
The highlighted areas in Figure 1 represent approximately 254 acres in or near the Port of New Haven – a majority of the landside acreage in the Port of New Haven area. These liquid bulk facilities provide aviation fuel, gasoline, ethanol and other petroleum products to Connecticut and the larger New England marketplace.

Figure 1 New Haven Energy & Liquid Bulk Facilities

New Haven also provides dry bulk and break bulk services. Salt, sand, and cement imports are the dominant bulk cargoes and virtually all volumes are for immediate local use. Scrap metal is Connecticut's largest single export commodity by weight. Approximately 1 million tons of scrap metal are produced annually within the State, with a large portion of that amount exported through the Port of New Haven. Scrap metal, by nature, is in a constant stage of production as it is the waste product of a variety of common goods or materials, including construction, automobiles, and household appliances. Therefore, in terms of future availability, it is likely to continue to be in good supply. Export volumes of scrap metal at New Haven have demonstrated sustained growth with volumes destined primarily to Turkey, Peru, and most recently, to Egypt and Saudi Arabia.

The port's proximity to deep water provides efficient transportation to the state of Connecticut and beyond via highway, rail, and pipeline. The port is accessible from the landside by Interstate 95, a transcontinental highway stretching from the northern border of Maine to the Florida Atlantic Coast, and Interstate 91, whose southern limit is the intersection with Interstate 95 and the northern terminus in Vermont. The Port is serviced by the Genesee and Wyoming Railroad, which connects with CSX, Norfolk Southern, and Canadian National Railroads. The Buckeye Pipeline currently serves Connecticut and Massachusetts through an approximately 100-mile long, 62,000 b/d pipeline that carries refined petroleum products from New Haven through central Connecticut and into Massachusetts. Running north from New Haven, the pipeline has Connecticut delivery locations in Middletown, Rocky Hill, East Hartford, Bradley International Airport, Melrose, and Enfield. It continues into Massachusetts with locations in Springfield, Ludlow, and the Westover Air Force Base (home to the Massachusetts Air National Guard). A map of Buckeye's Connecticut and Massachusetts pipeline is shown in Figure 2.

Figure 2 Buckeye Pipeline Connecticut/Massachusetts



Facilities and Infrastructure

The New Haven Port District currently encompasses 366 acres of waterfront land and nearby properties including six privately owned terminals.

Motiva Terminal

Motiva Terminal, located on the west side of New Haven Harbor approximately 1 mile south of the Tomlinson Bridge, handles commodities such as gasoline, diesel fuel, jet fuel, and ethanol that are imported by tankers and barges with the occasional export of petroleum products by barge. The 32-acre terminal includes an irregularly shaped timber pile and concrete-decked offshore wharf with a 900 foot by 20 foot pipeline trestle and timber walkway approach extending to two 22 foot by 29 foot concrete-pile breasting dolphins. There are two mooring dolphins on each side at the rear connected by catwalks. One 18 inch, one 16 inch, two 14 inch, four twelve inch, and two ten inch pipelines extend from the wharf to 21 steel storage tanks approximately 1,600 feet in the rear of the facility with a total capacity of 1.8 million barrels. The tankage is connected by a 12-inch inland pipeline owned by Jet Lines, Inc.

New Haven Terminal

New Haven Terminal is a bulk liquid petroleum storage terminal with a capacity of 2.5 million barrels. The terminal also features 184,500 square feet of warehouse storage space as well as land leased to a dry cargo stevedoring company and biodiesel production facility for their own businesses. One of New Haven Terminal's liquid bulk storage facilities (the New Haven facility) is located on the side of New Haven Harbor, approximately a half mile south of the Tomlinson Bridge. The other liquid storage facility (the East Haven facility) is 1.5 miles inland and is located in the town of East Haven. Both facilities provide direct access to I-91 and I-95. The New Haven facility is a 21.7-acre terminal consisting of 7.8 acres dedicated to a bulk liquid tank farm, 11.7 acres for dry cargo, and 2.2 acres primarily for truck access through the facility. The finger pier is approximately 650 feet long by 60 feet wide and extends westward into New Haven Harbor. The finger pier is also known as Harbor Terminal. Product pipelines run eastward, consisting of 15 docklines ranging in size from 4 inches to 16 inches in diameter. Two 16" pipelines are the supply lines to the East Haven inland facility. The pier can accommodate 2 ships, 2 barges, or one ship and one barge concurrently. The New Haven Facility also has a marginal wharf approximately 650 feet long that can only be used for dry cargo. This wharf is directly next to a paved lay down/storage area capable of holding all or part of a ship's cargo. A tank farm is situated on a land area of approximately 7.8 acres consisting of 22 above-ground storage tanks with a total capacity of 765,605 barrels. The New Haven terminal tank farm primarily handles fuel oils, diesel fuels, and kerosene. Commodities are transported to the terminal by vessel, barge, rail, truck, Buckeye Pipeline, and a local pipeline transfer between New Haven Terminal and neighboring facilities (Gateway, Gulf Oil, and Magellan). Dry Cargo warehouse space at the New Haven facility includes three buildings that offer a total of 184,500 square feet of storage.

The tank farm located at the East Haven facility comprises nearly 18.6 acres of the total 63.1 acre land area. A truck rack area in the southwest corner of the property occupies nearly 2.8 acres, while the remainder of the property is generally undeveloped. The tank farm includes 15 above-ground storage tanks, totaling 1.76 million barrels. Petroleum products currently handled at this facility are fuel oils, diesel fuels, and kerosene.

Magellan Waterfront Street Terminal

The Magellan facility located on Waterfront Street receives and ships petroleum products by barge and occasionally receives tankers carrying petroleum products. This facility has four 12-inch pipelines and one 8-inch pipeline extending from the wharf to 16 steel storage tanks at the rear of the facility that can store up to 770,000 barrels. There are 8 additional pipelines that extend to Forbes Avenue Pier and an inland pipeline.

Gateway Terminal

Gateway Terminal, the most active terminal in the port, is located on the western shore of New Haven Harbor, approximately 1,100 feet south of the Tomlinson Bridge, and is situated on eight acres with access to over 60 acres of indoor and outdoor storage area. Gateway operates four main dry and liquid berths for vessels and three berths for barges. Gateway Terminal handles over one million gallons of heating oil daily, supplying local schools, universities, hospitals, businesses, homes, and government facilities within Connecticut and southern New England. The North and South berths are located on Gateway Terminal's main finger pier. The finger pier was designed to accommodate vessels up to 70,000 DWT with a 36' draft at MLLW and LOA of 735 feet. Two high-speed gantry cranes are available to load and unload a variety of dry cargoes at a rate of up to 1,000 tons per hour. In addition, two 300' docks and a 225' wharf are available to use for the loading and unloading of dry bulk commodities for transport by tug and barge. Gateway currently stores approximately 500,000 tons per year for customers at its facility, storage yards, and warehouses. The terminal currently has over 200,000 square feet of warehouses. Products, such as salt, are received at the terminal and then trucked to all of Connecticut's DOT facilities. Gateway Terminal receives dry cargo such as aggregates, coal, steel billets, steel rail, rebar, scrap metal, and pumice. Gateway Terminal then delivers these commodities to customers in the Northeast, Midwest, and Eastern Canada by truck, rail or barge. Foreign shipments of these commodities are primarily delivered via Bulk Carriers, General Cargo Vessels, and Tankers. Gateway Terminal also operates a 650,000 barrel petroleum tank farm consisting of seven above-ground storage tanks. Liquid products handled included asphalt, diesel fuel, kerosene, diesel oils, and biofuels. A cement storage complex is also located at Gateway Terminal, consisting of three silos with an aggregate capacity of 27,000 tons.

Gulf Oil Terminal

Gulf Oil Terminal, located approximately 600 feet south of Tomlinson Bridge on the western shore, is a 9.3 acre facility operated by Gulf Oil Limited Partnership, a national branded supplier of motor fuels throughout the United States and one of the Northeast's largest wholesalers of refined petroleum products. Gulf Oil Terminals receives petroleum products by tankers and barges which are then transferred via pipeline to thirteen steel storage tanks in the rear of the terminal. The storage tanks are capable of storing up to 580,000 barrels of petroleum products. A 20-inch pipe line extends from the wharf to storage tanks. In addition, a 12-inch common carrier oil pipeline (Buckeye) is connected to the storage tanks and extends from New Haven northward to Hartford, Connecticut and Springfield, Massachusetts.

Magellan East Street Terminal

The Magellan facility on East Street receives petroleum products by barge and tanker and also ships petroleum products by barge. Two 12-inch pipelines and one 8-inch pipeline extend from the pier to 22 steel storage tanks located at the rear of the terminal. The storage tanks can store up to 1.4 million barrels of petroleum products. The tanks are connected to Westover Air Force Base, Massachusetts by a 12-inch inland pipeline owned by Jet Lines, Inc.

Summary of Terminal Facilities

Table 1 below displays terminal characteristics at the Port of New Haven.

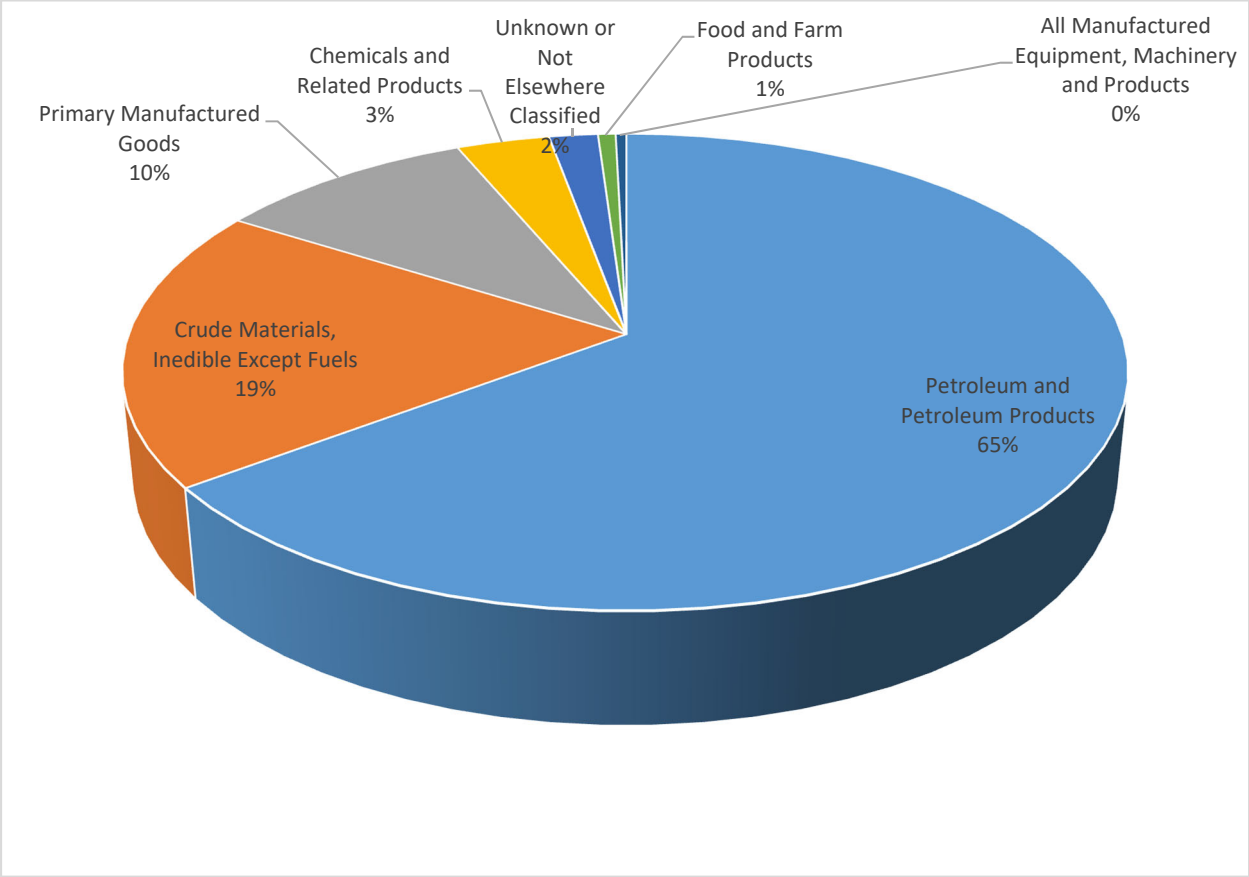
Table 1: Terminal Characteristics

Dock	Length (feet)	Depth (feet)	Maximum Vessels	VSU Capacity
Motiva Terminal	750	37	1	750
New Haven Terminal	2,040	39	2	2,040
Magellan Waterfront Street Terminal	750	36	1	750
Gateway Terminal	1,500	35	2	1,500
Gulf Oil Terminal	735	35	1	735
Magellan East Street Terminal	1,500	36	2	1,500

Commodities

In terms of total tonnage shipped and received, the Port of New Haven was the largest port in Connecticut and was the 2nd largest port in New England in 2016, ranking only behind the port of Boston. In 2016, its total freight traffic of 8.8 million tons represented about 24 percent of all waterborne commerce in New England and about 81 percent of all waterborne commerce in Connecticut. Figure 3 shows the distribution of tonnage by commodity for New Haven in 2016. Petroleum products imports have historically constituted approximately 66 percent of the channel tonnage.

Figure 3 Commodity Mix



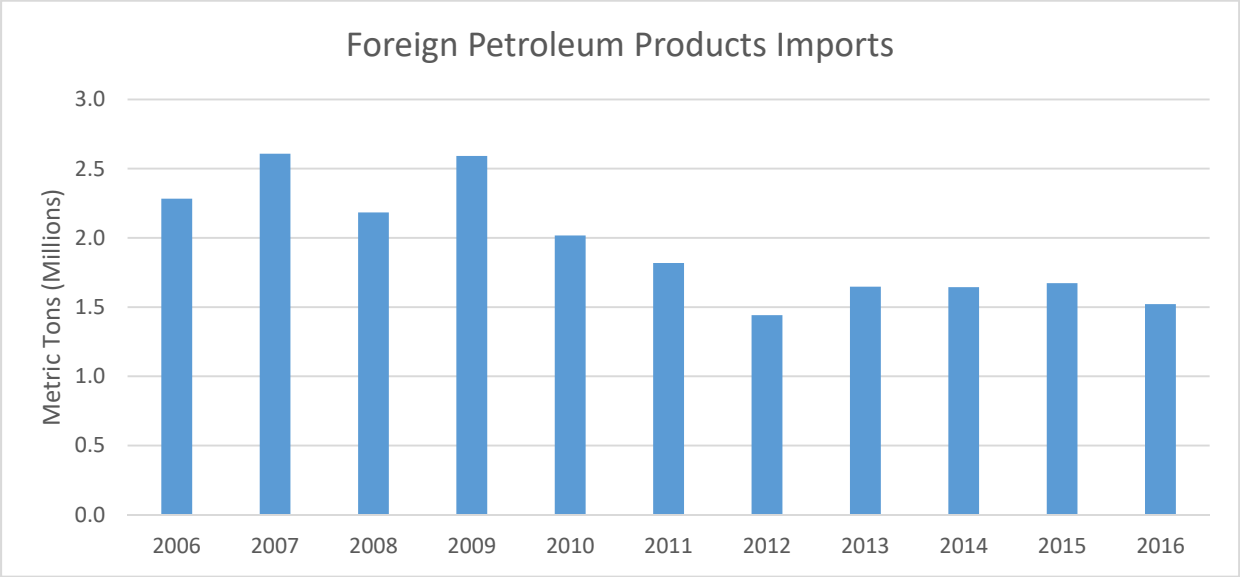
Source: Waterborne Commerce, 2016

Petroleum Products

New Haven Harbor is essentially a receiving port for petroleum products. During the 2012-2016 time period, petroleum products accounted for 81 percent of all waterborne commerce. These products were gasoline, jet fuel, kerosene, fuel oils, asphalt, and petroleum coke. The remaining 19 percent of waterborne commerce was comprised of coal, chemicals, crude materials, primary manufactured goods, food and farm products, manufactured equipment and machinery, and goods not elsewhere classified. Petroleum products are shipped to New Haven by shallow-draft coastal tankers and barges from Northeastern U.S. ports and by ocean-going, deep-draft tankers from foreign ports. In 2016, about 21 percent of inbound petroleum products were foreign imports and the remaining 79 percent were domestic receipts. Outbound domestic shipments of petroleum products from New Haven are generally carried in shallow draft coastal tankers and barges to other Long Island Sound ports. Inbound and outbound domestic shipments of petroleum products are not included in this analysis as the vessels would not benefit from channel improvements.

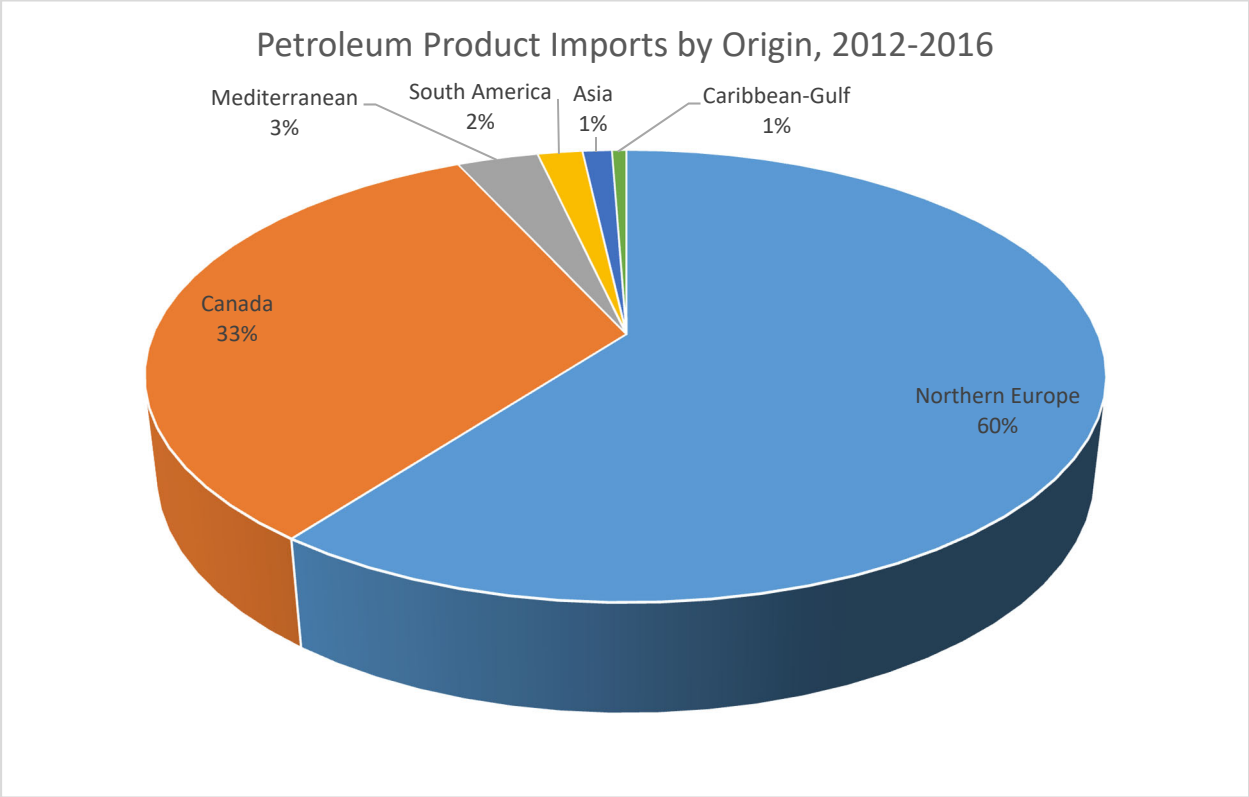
Table 2 shows foreign petroleum products import tonnage at New Haven. The Port of New Haven experienced a slight decrease in foreign petroleum product imports in 2016 but this is expected to be short-term. Figure 4 displays petroleum product import tonnage by origin.

Table 2 Foreign Petroleum Products Imports



Source: Waterborne Commerce

Figure 4 Petroleum Product Imports by Origin, 2012-2016



Source: Waterborne Commerce

Scrap Metal

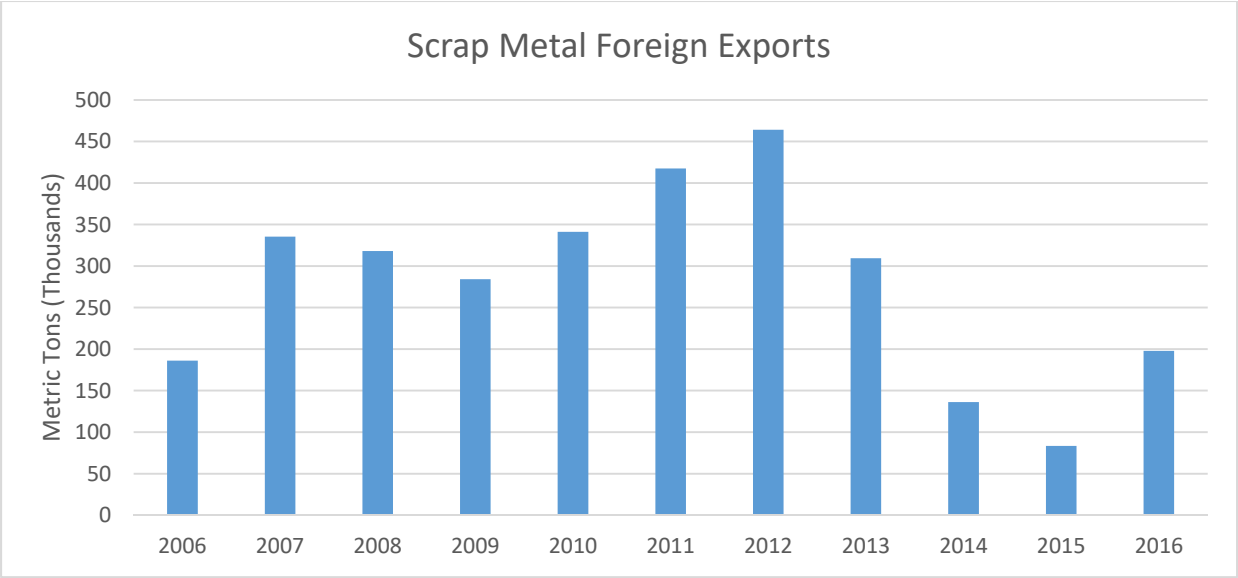
Scrap metal is Connecticut's largest single export commodity by weight. The market for scrap metal is highly competitive with few large producers (shredders) accounting for the majority of production volume/sales. An estimated 1 million tons of scrap metal are produced annually in the State of Connecticut, with a large portion exported through the Port of New Haven to destinations in Turkey, Peru, Egypt, and Saudi Arabia. The balance is exported, largely by truck, through New Jersey, Rhode Island and Philadelphia.

U.S exports of scrap metal dropped by 19 percent in 2014, a reflection of lesser quantities and a greater proportion of less costly scrap types in the export mix. Other factors included devaluation of foreign currencies against the U.S. dollar, and less robust demand for U.S. product in key scrap-consuming countries. However, U.S. scrap metal exports rebounded in 2017 and grew by over 23 percent year-on-year since 2014. Demand is strong enough that scrap metal prices have risen in recent years, driven by foreign demand for the material and a shortage of supply. This trend will likely continue as the economy gets stronger and demand for

metal increases, which supports higher prices. New Haven scrap metal exports increased by 60 percent between 2014 and 2016.

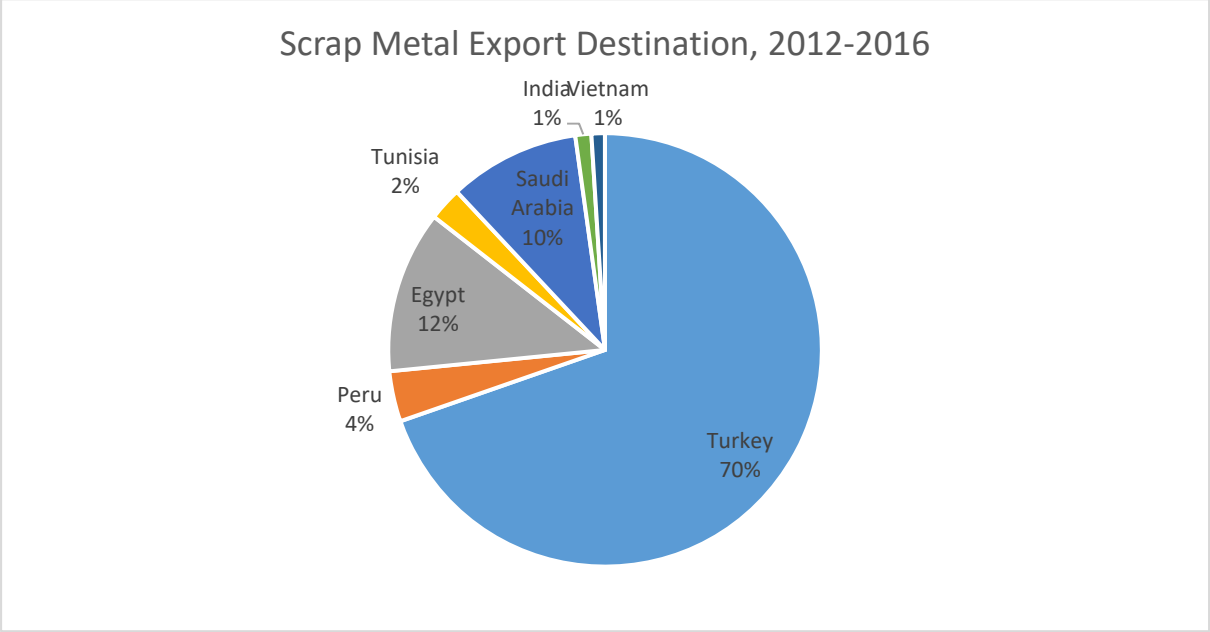
Table 3 and Figure 5 include historical scrap metal export data.

Table 3 Scrap Metal Foreign Exports



Source: Waterborne Commerce

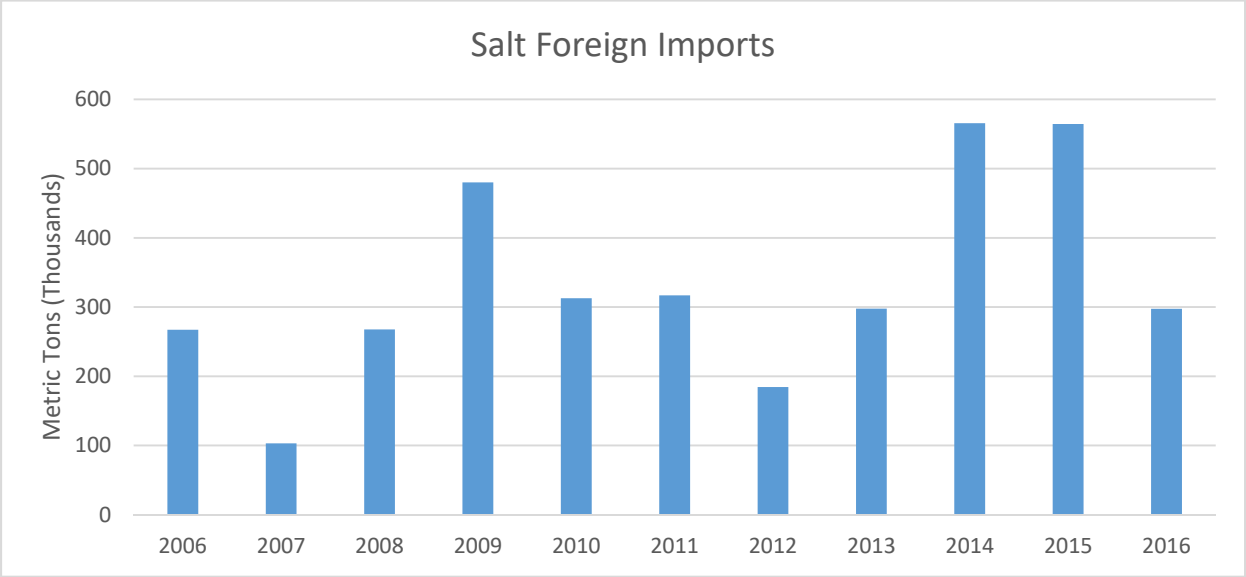
Figure 5 Scrap Metal Foreign Exports by Destination



Salt

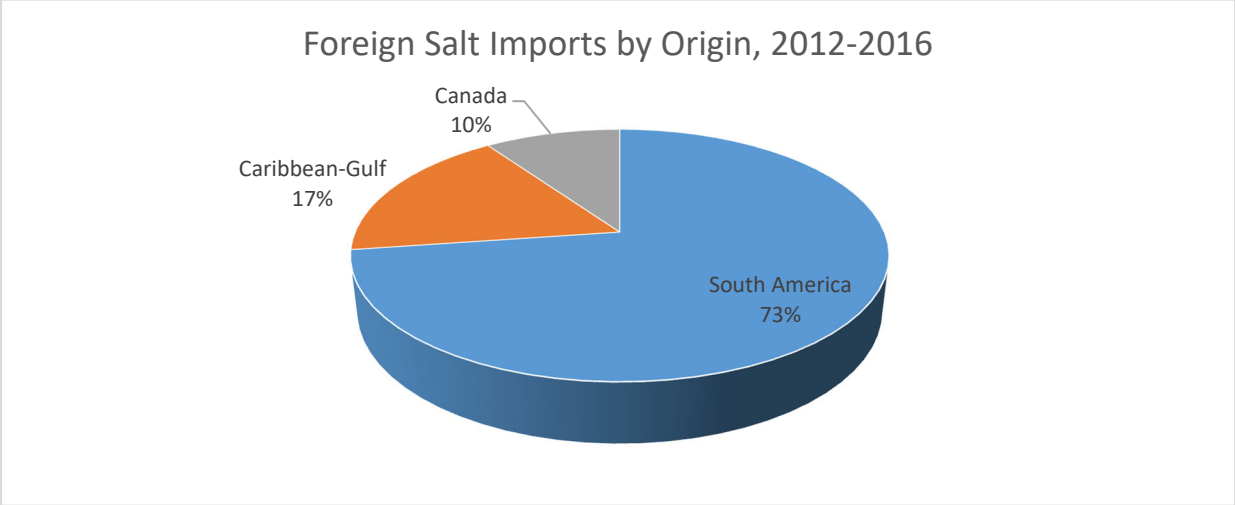
Salt is a major import at the port of New Haven, much of which is road salt used mostly by municipalities but also by commercial retailers for winter use. Gateway terminal built a storage facility for salt imports from Chile through Morton Salt. Table 4 shows inbound foreign salt import tonnage at New Haven. Figure 6 displays foreign salt imports by origin.

Table 4 Salt Foreign Imports



Source: Waterborne Commerce

Figure 6 Foreign Salt Imports by Origin, 2012-2016



Source: Waterborne Commerce

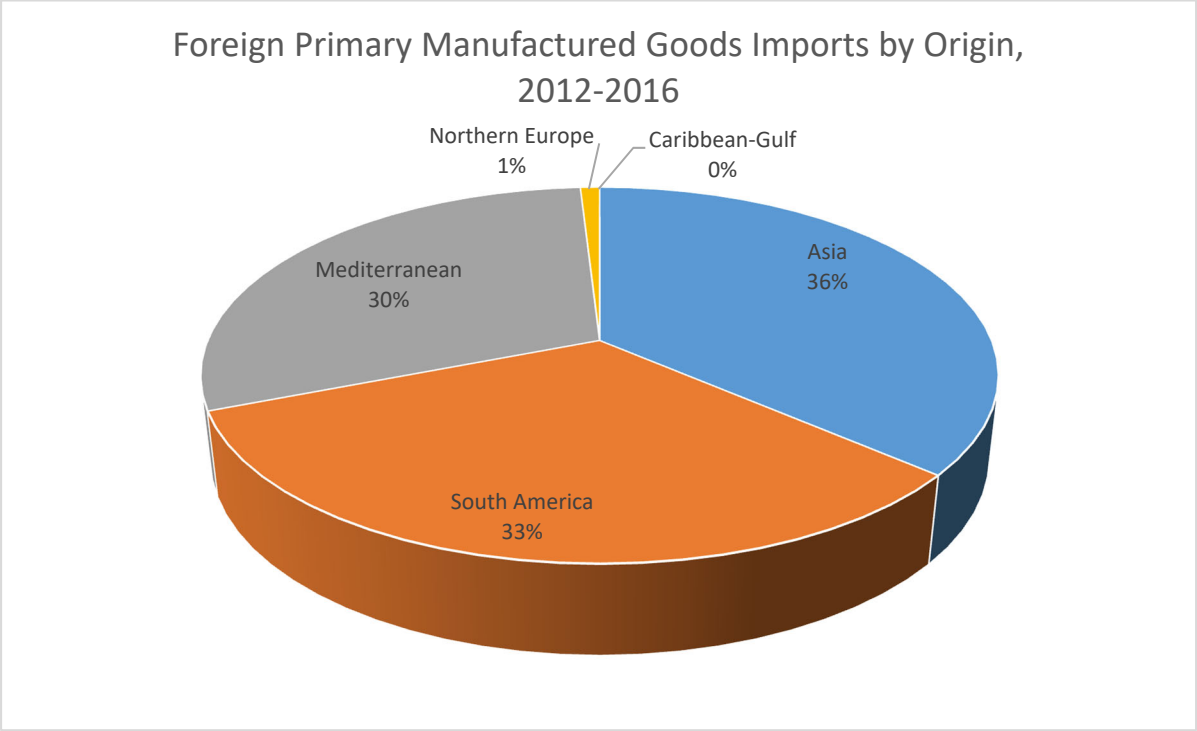
Primary Manufactured Goods

The Port of New Haven receives foreign imports of primary manufactured goods consisting of iron and steel products (primary forms, sheets, shapes, pipe & tube), aluminum, and fabricated metal products. Table 5 below displays inbound foreign primary manufactured goods import tonnage at New Haven. Figure 7 displays foreign primary manufactured goods imports by origin.

Table 5 Primary Manufactured Goods Foreign Imports

Source: Waterborne Commerce

Figure 7 Foreign Primary Manufactured Goods Imports by Origin, 2012-2016

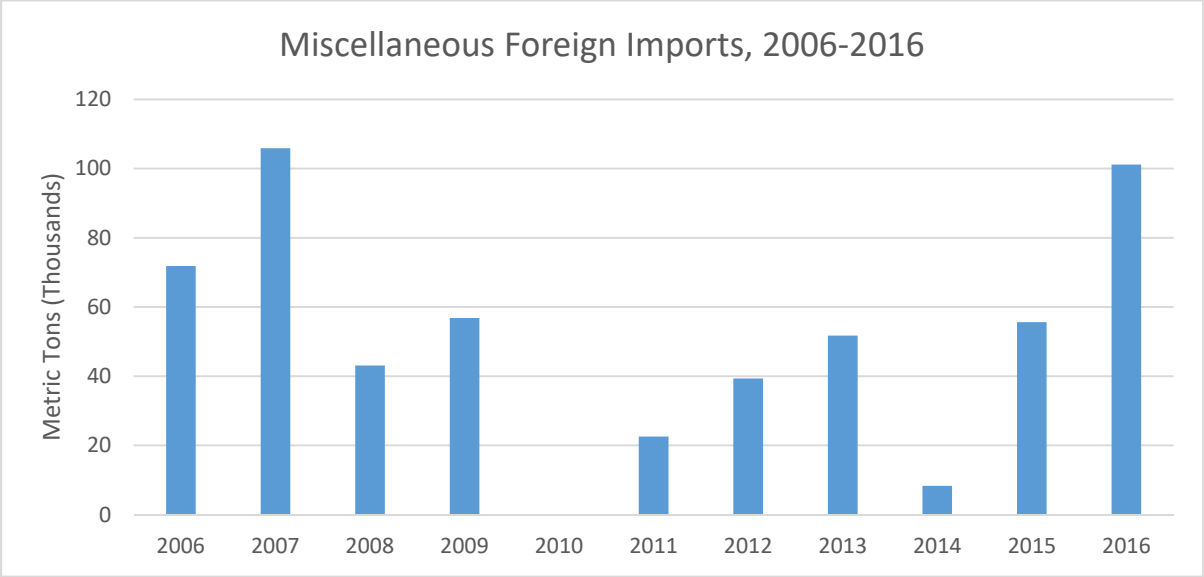


Source: Waterborne Commerce

Miscellaneous

The miscellaneous category of commodities includes all remaining tonnage (excludes petroleum products, scrap metal, salt, and primary manufactured goods.) Commodities in this category include all manufactured equipment and machinery, forest products, agricultural products, chemicals, and commodities that are unknown or not elsewhere classified. During the 2006-2016 timeframe, miscellaneous foreign imports represented only 2% of foreign import tonnage on average at the Port of New Haven. Table 6 displays foreign miscellaneous import tonnage.

Table 6 Miscellaneous Foreign Imports



Source: Waterborne Commerce

Vessel Traffic

The current depth of New Haven Harbor is -35 feet MLLW, and pilot rules in the channel require that each vessel must have four feet of underkeel clearance. With this configuration, inbound vessels with a draft of 31 feet or greater must either light-load, wait for the tide, or perform lightering operations in the Long Island Sound. The maximum tide range at New Haven is six feet, meaning that inbound vessels can have a maximum draft of 37 feet at high tide. If a vessel cannot wait on the tide or has a draft greater than 37 feet, then the vessel must anchor in the Long Island sound and unload cargo onto barges until its draft is shallow enough to transit the channel. In addition, weather conditions must be favorable for any lightering to take place at all. In the existing condition, five vessels were lightered (three Bulk Carriers and two Tankers). According to the harbor pilots, the lightering process can take up to 24 hours.

New Haven Harbor receives three vessel types: Tankers, Bulk Carriers, and General Cargo Ships. For this study, vessel classes were assigned for each vessel type based on deadweight tons. Bulk Carriers and General Cargo Ships are only handled at Gateway Terminal. Tankers are handled at all docks in New Haven Harbor. Figure 8 below displays average vessel class dimensions, the commodities carried by vessel class, and the number of calls per vessel class in the existing condition. The existing condition was developed using 5-year historical averages for commodities and vessel calls. Barges were modeled in HarborSym to analyze lightering practices.

Figure 8 Vessel Types and Classes

Vessel Type	Vessel Class	Avg. LOA	Avg. Beam	Avg. Design Draft	Capacity (metric tons)	Commodities	Number of Calls
Bulk Carrier	BLK-1	463.3	81.3	28.3	15-25k	Primary Manufactured Goods	4
Bulk Carrier	BLK-2	573.6	92.3	35.7	25-32k	Primary Manufactured Goods	8
Bulk Carrier	BLK-3	601.8	94.7	44.8	32-37k	Primary Manufactured Goods, Miscellaneous	6
Bulk Carrier	BLK-4	637.1	103.1	38.9	37-46k	Primary Manufactured Goods, Miscellaneous, Scrap Metal	7
Bulk Carrier	BLK-5	626.9	105.7	43.2	46k-55k	Scrap Metal, Salt, Primary Manufactured Goods, Miscellaneous	25
Bulk Carrier	BLK-6	656.0	105.3	43.3	55-60k	Salt	2
General Cargo Ship	GCC-1	467.0	70.0	26.5	5-15k	Miscellaneous, Primary Manufactured Goods	4
General Cargo Ship	GCC-5	519.0	86.0	33.0	20-27k	Primary Manufactured Goods	1
General Cargo Ship	GCC-6	599.0	94.0	35.6	27-35k	Miscellaneous, Primary Manufactured Goods	2
Tanker	TK-1	438.2	71.8	28.2	5-20k	Petroleum Products	13
Tanker	TK-4	600.3	101.0	40.2	30-45k	Petroleum Products, Miscellaneous	44
Tanker	TK-5	603.4	105.9	42.7	45-50k	Petroleum Products, Miscellaneous	14
Barge	Dry Cargo Barge	240.0	66.0	14.6	1-10k	Salt	3
Barge	Liquid Barge	459.0	72.6	28.6	2-30k	Petroleum Products	2

Vessel Traffic Distribution

The following Table 7 and Table 8 show the distributions of historic traffic under existing conditions. Table 7 displays the distribution of foreign tonnage by commodity type and year. Table 8 displays the import and export tonnage for 2016.

Table 7 Tonnage Distribution by Commodity Type

	2012	2013	2014	2015	2016
Miscellaneous	39,323	56,456	19,160	67,025	162,703
Petroleum Products	1,460,873	1,646,900	1,644,393	1,672,753	1,521,437
Primary Manufactured Goods	4,350	23,828	149,949	184,385	228,766
Salt	184,430	297,778	565,570	602,902	238,123
Scrap Metal	464,168	309,452	136,264	83,479	197,816
Total	2,153,144	2,334,414	2,515,336	2,610,544	2,348,845

Source: Waterborne Commerce, 2012-2016 (foreign metric tons)

Table 8 Imports and Exports Tonnage Distribution by Commodity Type

	2016 Imports	2016 Exports
Miscellaneous	162,703	0
Petroleum Products	1,521,437	0
Primary Manufactured Goods	228,766	0
Salt	238,123	0
Scrap Metal	0	197,816
Total	2,151,029	197,816

Source: Waterborne Commerce, 2016 (foreign metric tons)

Table 9 displays the number of transits and tonnage for commodities at New Haven Harbor.

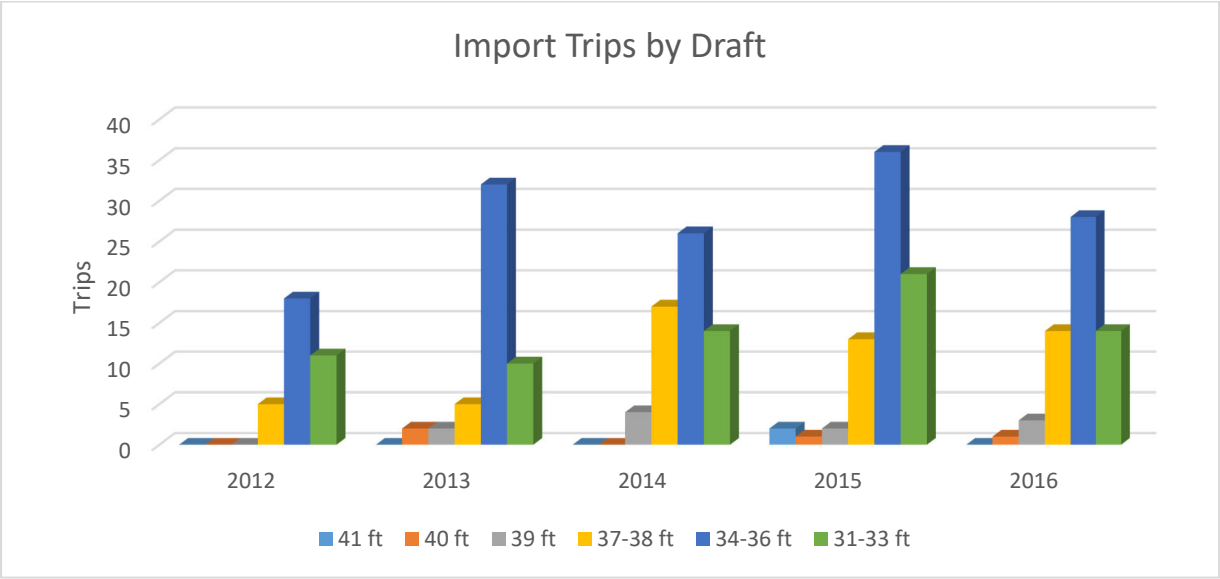
Table 9 Transit and Tonnage Distribution by Vessel Type

Vessel Type	Transits	Tonnage
Total Vessel Calls	**130**	**2,348,845**
Bulk Carrier	52	741,835
General Cargo Ship	7	13,760
Tanker	71	1,593,251
Import Calls	**121**	**2,151,029**
Bulk Carrier	43	544,019
General Cargo Ship	7	13,760
Tanker	71	1,593,251
Export Calls	**9**	**197,816**
Bulk Carrier	9	197,816
General Cargo Ship	0	0
Tanker	0	0

Source: Waterborne Commerce, 2016

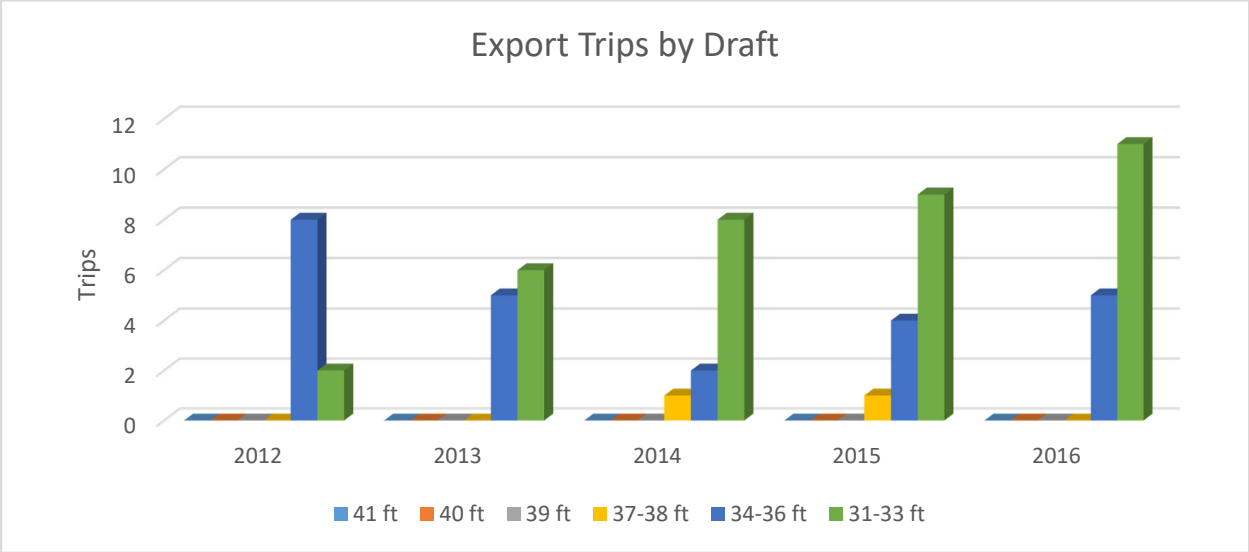
The following graphs show the number of trips by loaded draft.

Figure 9 Import Trips by Draft



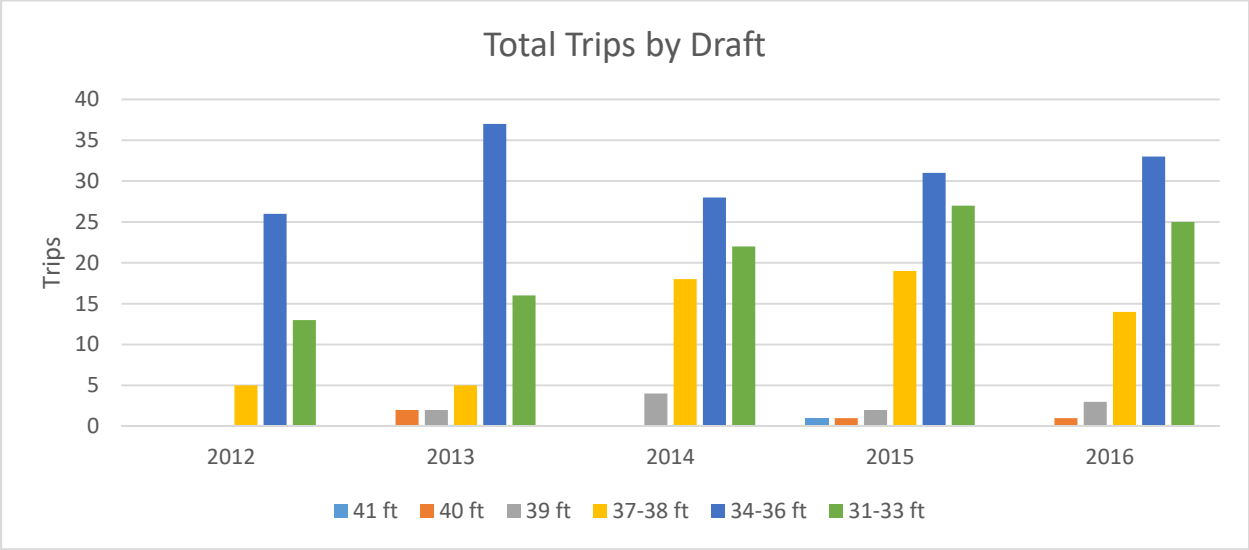
Source: Waterborne Commerce

Figure 10 Export Trips by Draft



Source: Waterborne Commerce

Figure 11 Total Trips by Draft



Source: Waterborne Commerce

Vessel Size Guidelines and Pilots Rules

Traffic at New Haven Harbor is limited to one-way traffic, according to the Connecticut Pilot Commission.

Underkeel clearance is determined by the discretion of the Pilots within the range recommended by the industry. For New Haven Harbor, vessels must have four feet of underkeel clearance.

As previously mentioned, the maximum tide range at New Haven Harbor is approximately six feet. A vessel may not transit the channel if its draft exceeds the depth of the channel using tide and underkeel clearance.

Pilots reserve the right to deny movement of any vessel during times of excessive wind, excessive current or at times of low water.

Future Without-Project Conditions

Commodities

Much of the commodities mix in the existing condition is expected to continue in the future without-project condition, as New Haven has a long history of importing petroleum products, salt, and primary manufactured goods.

The export of scrap metal is also a staple of New Haven Harbor, and is expected to continue in the future without-project condition.

Vessel Traffic

Discussion with shipping interests indicates that the most likely future if a project is not implemented is a continued use of vessels with current dimensions for the foreseeable future. In the long run, it is likely that smaller ships will be retired and New Haven shippers and receivers will be forced to use larger vessels, since it is projected that fewer small vessels will be built. The use of larger vessels would force implementation of nonstructural techniques by users of the Port because under ordinary conditions these large vessel would not be able to navigate the 35-foot channel. The fact that shipping interests did not point out a desire to increase use of nonstructural measures over the short run seems to indicate that these measure are already used to a maximum degree, are uneconomical to use, or are prohibited by institutional, logistical, or other constraints.

Several nonstructural measures are already being utilized at New Haven Harbor, such as waiting for the tide to increase the channel depth, light-loading, and lightering. Vessel operators use higher tides to allow movement of vessel that could not pass through the channel at low stages of the tide. Currently, almost all traffic moves within a few hours of high tide. Vessels with drafts in excess of 31 feet must wait for higher tide to move in the main channel.

At times, vessel operators lighter a portion of cargo to barges in Long Island Sound prior to entering the port. This technique is used because vessel draft would not allow passage over the 35-foot channel even at high stages of the tide. After offloading, both lightered vessels and barges deliver their cargos to harbor terminals that are located about 5 miles north of the harbor entrance. The lighterage requirements of a given vessel are dependent on the difference between the depth of the Sound offshores and the depth of the port's channel and the usable height of tide. Although added expenses are involved, lightering does allow for economies of scale through the use of larger vessels.

With continued use of larger vessels, these activities are expected to continue in the future.

Vessel Size Guidelines and Pilots Rules

Vessel size guidelines and Pilot rules are not expected to change in the future without-project condition.

Future With-Project Conditions

In the future with-project condition, vessels will load more efficiently when calling at New Haven Harbor. By utilizing deeper channel depths, it will require less vessels to transport the same amount of goods, thereby decreasing at-sea transit costs. Deeper channel depths will also reduce vessel waiting time for the tide, frequency of lightering events, or the amount of cargo that needs to be unloaded from a lightered vessel in order to transit the channel.

Hinterland

New Haven is expected to continue to serve the same hinterland in the future with-project condition and will continue to compete for the market with other Northeastern ports. Many factors influence the growth of a particular harbor: land side development and infrastructure, location of distribution centers for imports, source locations for exports, population and income growth and location, port logistics and fees, business climate and taxes, carrier preferences, labor stability and volatility, and business relationships. Harbor depth is just one of the many factors involved.

Commodities

Commodity Forecast

Commodity forecasts were prepared for petroleum products, scrap metal, salt, and primary manufactured goods. Due to uncertainty in the miscellaneous commodity group, the tonnage was held constant in the future without-project and future with-project condition at a 1-year average (2016 tonnage).

National forecast data and general indicators were assessed in relationship to the study area's historical commodity-specific tonnage flows for the purpose of evaluating the relationship between historical U.S. tonnage volumes and study area tonnage.

The outputs of the commodity projections were based on forecasts published by Global Insight, The U.S. Economy, The 30-Year Focus, 2018; and from indices developed from historical trend data. The commodity forecasts presented in this document were prepared in 2018.

The commodity forecast for petroleum products imports was derived using Global Insight's 30-Year Focus Report on the U.S. Economy. Salt and primary manufactured goods tonnages were derived from trend analysis. The forecast for scrap metal was derived based on trend analysis and data published by the World Steel Association. The growth rates derived and rooted in the published forecasts listed above were applied to baseline tonnages to compute tonnage by commodity for 2023, 2033, 2043, and 2053. Baseline tonnages were developed using 5-year historical data for petroleum products. These tonnages were applied to the loading pattern distributions to determine the number of calls needed to transport each commodity in the given years. These call lists were loaded into HarborSym to calculate transportation costs for the FWOP and FWP conditions.

Petroleum Products

The State of Connecticut does not have any petroleum reserves and does not produce or refine petroleum. More than two-thirds of the petroleum consumed in Connecticut is used in the transportation sector, primarily as motor gasoline. The residential sector, where nearly half of Connecticut households use fuel oil or other petroleum products as the primary energy source for home heating, consumes much of the rest of the petroleum used in the state.

The New England region is a net consumer of fuels, as there are no refineries operating in the area. The vast majority of New England's petroleum products are delivered to the region via tanker and barge from domestic and foreign supply sources. Import volumes, primarily received at coastal New England ports from eastern Canadian refineries, meet just over 45 percent of New England's total transportation fuels consumption.

Distillate fuel oil consumption in New England is driven primarily by on-highway use, as well as and residential and commercial use. Households in the New England are much more reliant on distillate fuel oil for space heating than in the rest of the country. In 2017, approximately 39% of homes in New England used heating oil as their primary fuel for space heating, and the residential and commercial sectors typically account for more than half of the region's total annual distillate consumption. Seasonal consumption of heating oil is met from a number of sources, including increased foreign imports, increased marine and truck deliveries from the Central Atlantic region, and drawdowns from inventory. New England distillate suppliers typically build heating oil inventories in the summer and fall months and draw down inventories during the coldest winter months—typically January and February. The unpredictability of winter weather and heating oil consumption makes New England more vulnerable to shortages.

Growth rates for the petroleum products forecast were based on growth rates used in IHS Global Insight's 30-Year Focus Report on the U.S. Economy. Since 1959, IHS has been serving customers ranging from governments and multi-national companies to smaller businesses and technical professionals in more than 180 countries. IHS Global Insight operates as a research firm to provide economic and financial coverage of countries, regions, and industries. It offers data collection of macro, regional, and global economics, financial markets and securities, U.S. economics, energy, industry, and international trade. When making global trade forecasts, GI employs sophisticated macroeconomic models which contain all commodities that have physical volume. The commodities are then grouped into 88 categories derived from the International Standard Industrial Classification system. GI tracks 66 major countries and then groups the remaining world trade partners into 12 regions according to their geographic location. Accordingly, they forecast 88 commodities traded among 78 countries or regions and include 582,528 potential trade flows. IHS Global Insight forecasts have been used for multiple USACE Deep Draft Navigation Projects.

Scrap Metal

U.S. exports of scrap metal have grown significantly over the past decade as the balance of steel production has shifted globally to the North Asia and Mediterranean regions. Global GDP and global steel production are a highly correlated economic-to-commodity pairing. Since 1990, the average 2.9% global GDP growth has been met by an average 2.8% increase in global steel production. As global demand for steel continues to grow, roundly in line with global GDP, this should continue to support a long-term average of 2-3% annual growth of U.S. scrap metal exports. Scrap metal, by nature, is in a constant stage of production as it is the waste product of a variety of common goods or materials, including construction, automobiles, and household appliances. Therefore, in terms of future availability, it is likely to continue to be in good supply.

U.S exports of scrap metal dropped by 19 percent in 2014, a reflection of lesser quantities and a greater proportion of less costly scrap types in the export mix. Other factors included devaluation of foreign currencies against the U.S. dollar, and less robust demand for U.S. product in key scrap-consuming countries. However, U.S. scrap metal exports rebounded in 2017 and grew by over 23 percent year-on-year since 2014. Demand is strong enough that scrap metal prices have risen in recent years, driven by foreign demand for the material and a shortage of supply. This trend will likely continue as the economy gets stronger and demand for metal increases, which supports higher prices. New Haven scrap metal exports increased by 60 percent between 2014 and 2016.

Salt

Salt is an important commodity for the Northeast, as it is used to deice roads and make them safer to travel on. As shown in Table 3, salt import tonnage varies year-by-year depending on weather conditions. During harsh winters, the Department of Transportation uses most of its salt inventory and has to order more. During warmer winters, the salt inventory is replenished in order to prepare for the next winter. In 2014 and 2015, the Northeast experienced very low temperatures and high snow fall, resulting in an increase in salt imports. In February 2018, the State of Connecticut experienced the coldest month on record.

Primary Manufactured Goods

New Haven Harbor has experienced significant growth in steel imports since 2012, primarily due to infrastructure projects occurring statewide. Between 2012 and 2016, New Haven Harbor foreign steel imports grew by an average annual growth rate of 256 percent. The majority of steel imports comes from China and Brazil and consists mostly of flat-rolled steel products.

Miscellaneous

A commodity forecast for the miscellaneous commodity group was not developed due to uncertainty in the commodity mixture and the historically low tonnage (approximately 2 percent of total foreign imports.) The amount of tonnage in the miscellaneous category was kept constant throughout the period of analysis.

Summary of Commodity Forecasts

The projected growth rates and tonnages are shown in Table 10 below. Fluctuations in the growth rates are subject to oil price variability, macroeconomic policies, exchange rate fluctuations, and a number of other factors. In order to analyze the variability in potential commodity forecasts, a Sensitivity Analysis was performed (see section "Economic Summary"). Commodity growth rates were developed using IHS Global Insight for petroleum products. Historical trend analysis was used to develop commodity growth rates for scrap metal, salt, and primary manufactured goods based on data provided by Waterborne Commerce Statistics. The miscellaneous commodity growth was held constant throughout the period of analysis. The growth rates were applied to baseline tonnages to compute tonnage by commodity for 2023, 2033, 2043, and 2053. These tonnages were applied to the loading pattern distributions to determine the number of calls needed to transport each commodity in the given years. These call lists were loaded into HarborSym to calculate transportation costs for the FWOP and FWP conditions.

Table 10 Commodity Forecast (Metric Tons)

Commodity Name	2016	2023	2033	2043	2053	CAGR 2016-2053
Petroleum Products Imports	1,521,437	1,665,406	1,895,023	2,156,299	2,453,598	1.3%
Scrap Metal Exports	197,816	227,228	276,990	337,649	411,593	2.0%
Salt Imports	238,123	284,992	368,389	476,190	615,537	2.6%
Primary Manufactured Goods Imports	228,766	255,651	299,630	351,174	411,584	1.6%
Miscellaneous Imports	162,703	162,703	162,703	162,703	162,703	0.0%
Total	**2,348,845**	**2,595,981**	**3,002,735**	**3,484,015**	**4,055,015**	**1.5%**

Vessel Traffic

Vessel Fleet

For this analysis, the fleet forecast distributions were derived using Waterborne Commerce data for the 2011-2016 time period for New Haven Harbor. The fleet for petroleum products is projected to have a maximum 50,000-DWT tankership with dimensions of 700 feet LOA, 106 feet beam, and 43 feet maximum summer load-line draft. The fleet for salt imports is projected to have a maximum 60,000-DWT bulk carrier with dimensions of 700 feet LOA, 106 feet beam, and 43.6 feet maximum summer load-line draft.

It is felt that utilization of vessels larger than 60-70,000 DWT would generally not occur because storage capacity and dock facilities at most terminals do not appear to be adequate for ships of this size. At this point in time, there are no firm commitments to substantially expand and improve facilities to handle such ships on a regular basis. The one exception is Gateway Terminal that has a berth designed to handle a 70,000 DWT vessel with 735 foot LOA and 110 foot beam.

Design Vessel

Per EM 1110-2-1613, the design vessel is defined as "…the largest ship of the major commodity movers expected to use the project improvements on a frequent and continuing basis." The design vessels for New Haven Harbor are assumed to be a 50,000-DWT tankership with dimensions of 700 feet LOA, 106 feet beam, and 43 feet maximum summer load-line draft and a 60,000 DWT bulk carrier with dimensions of 700 feet LOA, 106 feet beam, and 43.6 feet maximum summer load-line draft. The design vessel was chosen to ensure the designed channel with improvements would be able to safely accommodate the larger vessels that are likely to use the harbor, although in rare cases an even larger vessel could use the harbor. This selection is based on analysis of the world and regional fleet of tankerships and bulk carriers most likely to use New Haven Harbor over the study period. This is echoed in data from similar vessels that visit ports along the Northeastern Coast, including New York Harbor and Philadelphia Harbor.

Route Groups

Trade routes were grouped based on general world regions. Distances were calculated using Origin-Destination nautical miles data from NNOMPEAS. A prior port/next port depth analysis was conducted to determine if vessels calling at New Haven also called on other ports during its transit that could potentially impact loading practices at New Haven. It was found that only smaller, non-benefitting vessel classes called on ports with depths less than 40 feet MLLW.

Table 11 Nautical Miles by Route Groups

	Distance (Nautical Miles)		
Route Group	**Minimum**	**Most Likely**	**Maximum**
Default Route Group	1	1	1
Asia	17,714	23,014	25,730
Canada	946	1,403	18,564
Caribbean-Gulf	2,482	6,197	9,874
Mediterranean	6,180	9,801	11,030
Northern Europe	2,538	6,780	8,532
South America	4,558	8,861	14,172

Note: Canada route group includes distances for vessels transiting from the west coast of Canada to New Haven Harbor.

Alternatives for Economic Evaluation

Alternative plans were developed to address vessel delays and inefficient vessel loading issues throughout the channel. Alternatives analyzed were channel depths of 37 feet, 38 feet, 40 feet, and 42 feet. Costs were provided for the Federal Base Plan (the least costly dredged material placement option) to achieve these depths. In addition, a Beneficial Use Plan for some of the dredged material that is not a least-cost option was identified during the feasibility study. The Beneficial Use plan includes the Sandy Point Salt Marsh Creation as a dredged material placement option. The concept of this disposal alternative is to beneficially reuse dredged sediment for the purpose of creating new tidal wetland (salt marsh) area and shoreline erosion mitigation at Sandy Point. The Sandy Point project site is located along the western shore of the inner New Haven Harbor, just north and in the lee of a spit of land known as Sandy Point, in the vicinity of the West Haven Water Pollution Control Facility at 1 First Avenue, West Haven. The spit that extends along the southern boundary is currently undeveloped and is identified as a bird sanctuary. The Beneficial Use Plan is discussed in more detail in the main report and is not included in this economic analysis to identify the plan that reasonably maximizes net economic development benefits.

Calculation of Costs

The main report and engineering appendix should be referenced for specific details and assumptions regarding construction and O&M costs. Interest during construction (IDC) was calculated based on the Project First Cost and construction schedule.

Table 12 Project Cost Summary

Alternative	Project Costs (FY18 Price Level)	IDC	Total Investment	AAEQ Total Investment	AAEQ OMRR&R	Total AAEQ (FY18 Discount Rate)	Incremental AAEQ Costs
37 Feet	$28,465,000	$764,000	$29,229,000	$1,083,000	$126,000	$1,209,000	
38 Feet	$43,719,000	$1,178,000	$44,897,000	$1,663,000	$166,000	$1,829,000	$620,000
40 Feet	$59,707,000	$1,594,000	$61,301,000	$2,271,000	$254,000	$2,525,000	$696,000
42 Feet	$77,209,000	$2,056,000	$79,265,000	$2,936,000	$343,000	$3,279,000	$754,000

Transportation Cost Savings Benefit Analysis

The following section describes the economic analysis completed to determine the national economic development (NED) benefits of the proposed study measures. For the purposes of Deep Draft Navigation Economic Analysis per ER 1105-2-100, an NED benefit may include the following:

- Reduced cost of transportation through use of vessels (modal shift) , through safer or more efficient operation of vessels and/or use of larger and more efficient vessels (channel enlargement), and through use of new or alternate vessel routes (new channels or port shift)
- Increased net return to producers from access to new sources of lower cost materials, or access to new and more profitable markets (shift of origin or destination)
- Increased production through new or greater production opportunity (commercial fishing and offshore minerals), or new economic activities involving new commodity movements (induced movements)

The benefits described above are meant to increase shipping efficiency, leading to a reduction in the total cost of commodity transit. The reduction in transportation costs becomes a national economic benefit when the savings are passed on to the consumer.

The purpose of this analysis is to describe the benefits associated with the channel modification improvements for the project alternatives under consideration for New Haven Harbor. NED benefits were estimated by calculating the reduction in transportation cost for each alternative using the HarborSym Modeling Suite of Tools (HMST) developed by IWR. The HMST reflects USACE guidance on transportation cost savings analysis.

Within this section, the HMST and its application in the study are described in detail.

Methodology

Channel improvements result in reduced transportation cost by allowing a more efficient future fleet mix, resulting in at-sea and in-port cost savings. The HMST was designed to allow users to model these benefits. With a deepened channel, vessel fleet owners allocate their largest vessels to routes that have adequate traffic and reliable project depth. As New Haven Harbor is deepened, the reliability of the channel depth increases. The increased reliability is expected to encourage shippers to replace smaller less efficient vessels with the larger more efficient vessels on New Haven Harbor route services.

There are three primary effects from channel deepening that lead to changes in the future fleet at the Port of the New Haven. The first is an increase in a vessel's maximum practicable loading capacity. Channel restrictions limit a vessels capacity by limiting its draft. Deepening the channel reduces this constraint and the vessel's maximum practicable capacity increases towards its design capacity. This increase in vessel capacity results in fewer required vessel trips to transport the forecasted cargo. The second effect of increased channel depth is the increased reliability of water depth, which encourages the deployment of larger vessels to New Haven. The third effect is a consequence of the second. The increase in larger vessels displaces the less economically efficient vessels.

To begin, HarborSym was setup with the basic required variables. To estimate origin-destination (OD) cost saving benefits (or the reduction in transit costs associated with a drop in the total number of port calls caused by deeper loading or the use of a more efficient fleet mix), the HMST was used to generate a vessel call list based on the commodity forecast at New Haven for a given year and available channel depth under the various alternatives. The resulting vessel traffic was simulated using HarborSym, producing average annual vessel OD transportation costs. The recommended plan was identified by considering the highest net benefit based on the OD transportation cost saving benefits.

HarborSym Model Overview

IWR developed HarborSym as a planning level, general-purpose model to analyze the transportation costs of various waterway modifications within a harbor. HarborSym is a Monte Carlo simulation model of vessel movements at a port for use in economic analyses. While many harbor simulation models focus on landside operations, such as detailed terminal management, HarborSym instead concentrates on specific vessel movements and transit rules on the waterway, fleet and loading changes, as well as incorporating calculations for both within harbor costs and costs associated with the ocean voyage.

HarborSym represents a port as a tree-structured network of reaches, docks, anchorages, and turning areas. Vessel movements are simulated along the reaches and then exiting the port. Features of the model include intra-harbor vessel movements, tidal influence, the ability to model complex shipments, incorporation of turning areas and anchorages, and within-simulation visualization. The driving parameter for the HarborSym model is a vessel call at the port. A HarborSym analysis revolves around the factors that characterize or affect a vessel movement within the harbor.

Model Behavior

HarborSym is an event driven model. Vessel calls are processed individually and the interactions with other vessels are taken into account. For each iteration, the vessel calls for an iteration that falls within the simulation period are accumulated and placed in a queue based on arrival time. When a vessel arrives at the port, the route to all of the docks in the vessel call is determined. This route is comprised of discrete legs (contiguous sets of reaches, from the entry to the dock, from a dock to another dock, and from the final dock to the exit). The vessel attempts to move along the initial leg of the route. Potential conflicts with other vessels that have previously entered the system are evaluated according to the user-defined set of rules for each reach within the current leg, based on information maintained by the simulation as to the current and projected future state of each reach. If a rule activation occurs, such as no passing allowed in a given reach, the arriving vessel must either delay entry or proceed as far as possible to an available anchorage, waiting there until it can attempt to continue the journey. Vessels move from reach to reach, eventually arriving at the dock that is the terminus of the leg.

After the cargo exchange calculations are completed and the time the vessel spends at the dock has been determined, the vessel attempts to exit the dock, starting a new leg of the vessel call; rules for moving to the next destination (another dock or an exit of the harbor) are checked in a similar manner to the rule checking on arrival, before it is determined that the vessel can proceed on the next leg. As with the entry into the system, the vessel may need to delay departure and re-try at a later time to avoid rule violations and, similarly, the waiting time at the dock is recorded.

A vessel encountering rule conflicts that would prevent it from completely traversing a leg may be able to move partially along the leg, to an anchorage or mooring. If so, and if the vessel can use the anchorage (which may be impossible due to size constraints or the fact that the anchorage is filled by other vessels), then HarborSym will direct the vessel to proceed along the leg to the anchorage, where it will stay and attempt to depart periodically, until it can do so without causing rule conflicts in the remainder of the leg. The determination of the total time a vessel spends within the system is the summation of time waiting at entry, time transiting the reaches, time turning, time transferring cargo, and time waiting at docks or anchorages. HarborSym collects and reports statistics on individual vessel movements, including time in system, as well as overall summations for all movements in an iteration.

HarborSym was initially developed as a tool for analyzing channel widening projects, which were oriented toward determining time savings for vessels transiting within a harbor. It did not allow for assessing changes in vessel loading or in shipping patterns. The most recent release of HarborSym was designed to assist analysts in evaluating channel-deepening projects, in addition to the original model capabilities. The deepening features consider fleet and loading changes, as well as incorporating calculations for both within harbor costs and costs associated with ocean voyage.

Each vessel call has a known (calculated) associated cost, based on time spent in the harbor and ocean voyage and cost per hour. Also for each vessel call, the total quantity of commodity transferred to the port (both import and export) is known, in terms of commodity category, quantity, tonnage and value. The basic problem is to allocate the total cost of the call to the various commodity transfers that are made. Each vessel call may have multiple dock visits and multiple commodity transfers at each visit, but each commodity transfer record refers to a single commodity and specifies the import and export tonnage. Also, at the commodity level, the “tons per unit” for the commodity is known, so that each commodity transfer can be associated with an export and import tonnage. As noted above, the process is greatly simplified if all commodity transfers within a call are for categories that are measured in the same unit, but that need not be the case.

When a vessel leaves the system, the total tonnage, export tonnage, and import tonnage transferred by the call are available, as is the total cost of the call. The cost per ton can be calculated at the call level (divide total cost by respective total of tonnage). Once these values are available, it is possible to cycle through all of the commodity transfers for the vessel call. Each commodity transfer for a call is associated with a single vessel class and unit of measure. Multiplying the tons or value in the transfer by the appropriate per ton cost, the cost totals by class and unit for the iteration can be incremented. In this fashion, the total cost of each vessel call is allocated proportionately to the units of measure that are carried by the call, both on a tonnage and a value basis. Note that this approach does not require that each class or call carry only a commensurate unit of measure.

The model calculates import and export tons, import and export value, and import and export allocated cost. This information allows for the calculation of total tons and total cost, allowing for the derivation of the desired metrics at the class and total level. The model can thus deliver a high level of detail on individual vessel, class, and commodity level totals and costs.

Either all or a portion of the at-sea costs are associated with the subject port, depending on whether the vessel call is a partial or full load. The at-sea cost allocation procedure is implemented within the HarborSym Monte-Carlo processing and utilizes the estimate total trip cargo (ETTC) field from the vessel call information along with import tonnage and export tonnage. In all cases the ETTC is the user's best estimate of total trip cargo. Within the BLT and CLT, the ETTC field is estimated as cargo on board the vessel at arrival plus cargo on board the vessel at departure, in tons. ETTC can also be expressed as:

ETTC = 2*Cargo on Board at Arrival – Import tons + Export tons

There is a basic algorithm implemented to determine the fraction of at-sea costs to be allocated to the subject port. First, if ETTC for a vessel call is equal to zero or null, then none of the at-sea costs are associated with the port. The algorithm then checks if import or export tons are zero for a vessel call. If either are zero, then the following equation is applied to determine the at-sea cost allocation fraction associated with the subject port:

At-Sea Cost Allocation Fraction = (Import tons + Export tons)/ETTC

Finally, when both import and export tons are greater than zero, the following equation is applied to determine the at-sea cost allocation fraction associated with the subject port:

At-Sea Cost Allocation Fraction = 0.5 * (Import tons/Tonnage on board at arrival)

+ 0.5 * (Export tons/Tonnage on board at departure)

Where: Tonnage on board at arrival = (ETTC + Imports – Exports)/2

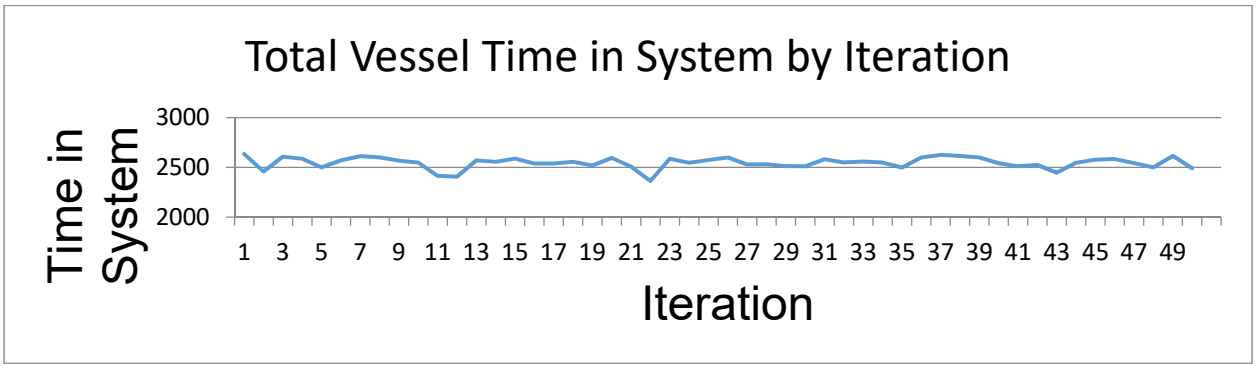
Tonnage on board at departure = Tonnage on board at arrival – Imports + Exports

HarborSym Data Inputs

Data requirements for running HarborSym are separated into six categories, as described below. Key data for New Haven Harbor are provided.

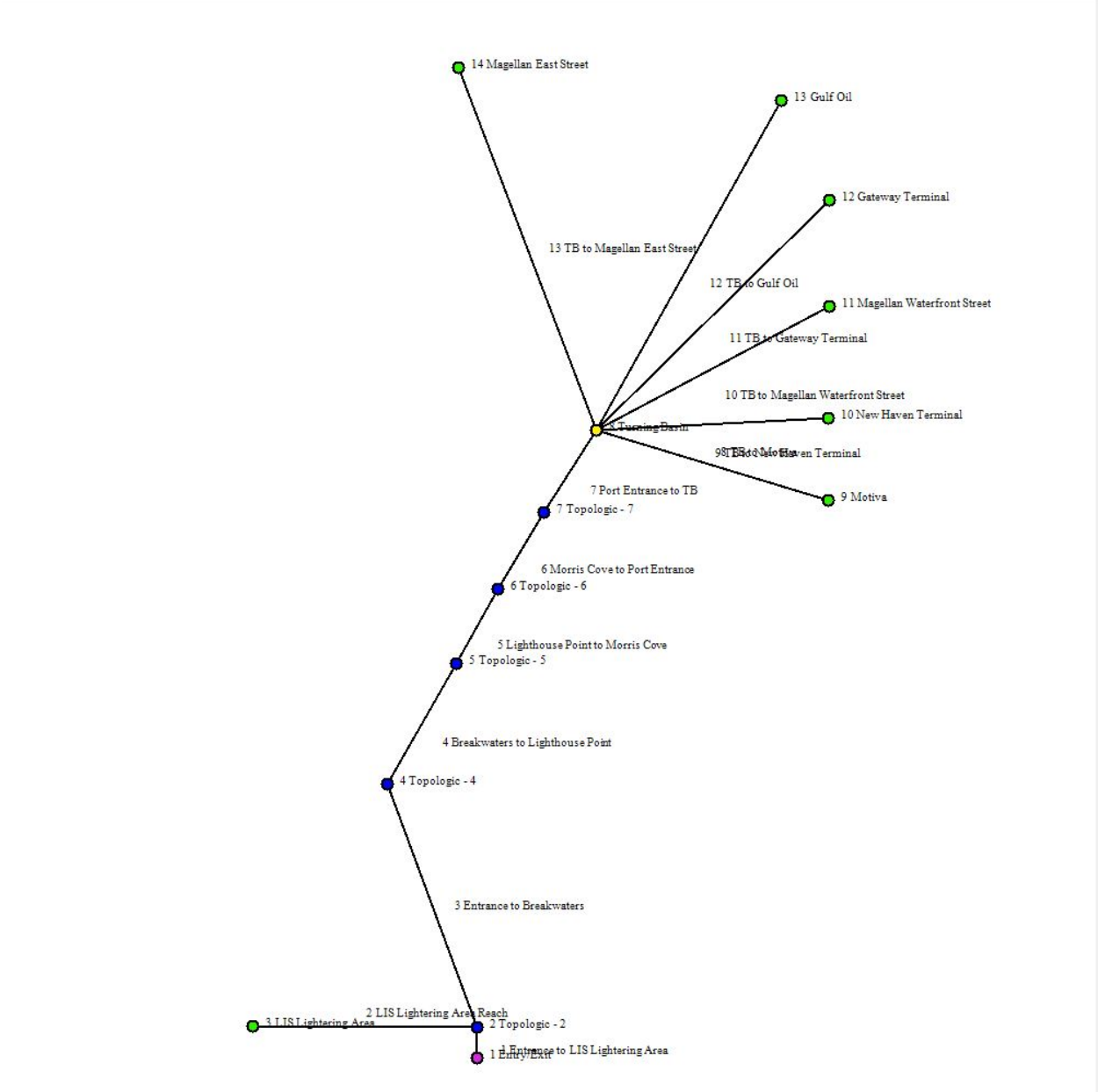
Simulation Parameters. Parameters include start date, the duration of the iteration, the number of iterations, the level of detail of the result output, and the wait time before rechecking rule violations when a vessel experiences a delay. The base year for the model was 2023. Model runs at 50 iterations were performed for the following years: 2023, 2033, 2043, and 2053. Model runs of forecast year 2023 showed a standard deviation of total vessel time in system of 57 hours through 50 iterations (Figure 12).

Figure 12 Total Vessel Time in Model by Iteration



Physical and Descriptive Harbor Characteristics. These data inputs include the specific network of New Haven Harbor such as the node location and type, reach length, width, and depth, in addition to tide and current stations. This also includes information about the docks in the harbor such as length and the maximum number of vessels the dock can accommodate at any given time. Figure 13 provides an overview of the reach-node network developed for this study.

Figure 13 HarborSym Node Network



General Information. General information used as inputs to the model include: specific vessel and commodity classes, route groups, specifications of turning area usage at each dock, and specifications of anchorage use within the harbor. Distances between the route groups were developed by evaluating the trade routes calling on New Haven Harbor. Those routes were separated into trade lanes based on their world region. The route group distance included in the analysis for each trade lane is calculated from the average distance for each trade route that was identified for the specific trade lane, as shown in Table 13.

Table 13 Nautical Miles by Route Group

	Distance (Nautical Miles)		
Route Group	**Minimum**	**Most Likely**	**Maximum**
Default Route Group	1	1	1
Asia	17,714	23,014	25,730
Canada	946	1,403	18,564
Caribbean-Gulf	2,482	6,197	9,874
Mediterranean	6,180	9,801	11,030
Northern Europe	2,538	6,780	8,532
South America	4,558	8,861	14,172

Note: Canada route group includes distances for vessels transiting from the west coast of Canada to New Haven Harbor.

Vessel Speeds. Table 14 presents the average vessel speed by reach group for all vessels. These speeds in reach were provided by the Connecticut Pilot's Association.

Table 14 Vessel Speed by Reach

Reach	Speed in Reach, Light (knots)	Speed in Reach, Loaded (knots)
Entrance to LIS Lightering Area	8	7
LIS Lightering Area Reach	8	7
Entrance to Breakwaters	8	7
Breakwaters to Lighthouse Point	8	7
Lighthouse Point to Morris Cove	8	7
Morris Cove to Port Entrance	8	7
Port Entrance to TB	6	5
TB to Motiva	3	2
TB to New Haven Terminal	3	2
TB to Magellan Waterfront Street	3	2
TB to Gateway Terminal	3	2
TB to Gulf Oil	3	2
TB to Magellan East Street	3	2

Vessel Operations. Hourly operating costs while in-port and at-sea were determined for all vessel classes. These are based on the most recent vessel operating costs developed by the Institute for Water Resources (IWR). The IWR data also includes inputs for at-sea speed by vessel class. These values are entered as a triangular distribution and presented in Table 15. Table 16 shows vessel docking and undocking times for each terminal.

Table 15 Vessel Speed at Sea

Description	Vessel Speed at Sea, Min (knots)	Sea, Most Likely (knots)	Vessel Speed at Sea, Max (knots)
BLK-1	11	12	13
BLK-2	11.3	12.3	13.3
BLK-3	11.5	12.5	13.5
BLK-4	11.7	12.7	13.7
BLK-5	11.8	12.8	13.8
BLK-6	11.9	12.9	13.9
GCC-1	11.4	12.4	13.4
GCC-3	11.9	12.9	13.9
GCC-5	12.9	13.9	14.9
GCC-6	13.4	14.4	15.4
TK-1	12.2	13.2	14.2
TK-3	12.1	13.1	14.1
TK-4	12.4	13.4	14.4
TK-5	12.2	13.2	14.2

Table 16 Vessel Docking Time

	Minimum Docking Time (Hours)	Maximum Docking Time (Hours)	Minimum Undocking Time (Hours)	Maximum Undocking Time (Hours)
Motiva Terminal	0.33	0.5	0.33	0.5
New Haven Terminal	0.5	0.67	0.5	0.67
Magellan Waterfront Street Terminal	0.33	0.5	0.33	0.5
Gateway Terminal	0.5	0.67	0.5	0.67
Gulf Oil Terminal	0.33	0.5	0.33	0.5
Magellan East Street Terminal	0.33	0.5	0.33	0.5

Reach Transit Rules. Vessel transit rules for each reach reflect restrictions on one-way traffic and draft constraints to simulate actual conditions in the port. The most significant changes to transit rules for this study are related to the allowance for deeper loading for all vessels.

Vessels Calls. The vessel call lists are made up of forecasted vessel calls for a given year. Each vessel call list contains the following information: arrival date, arrival time, vessel name, entry point, exit point, arrival draft, import/export, dock name, dock order, commodity, units, origin/destination, vessel type, Lloyds Registry, net registered tons, gross registered tons, dead weight tons, capacity, length overall, beam, draft, flag, tons per inch immersion factor, ETTC, and the route group for which it belongs.

The forecasted commodities for New Haven Harbor were allocated to the future vessel fleet. Historical loading data was used to inform a Load Factor Analysis which was used in determining the future vessel fleet's total number of calls, total cargo onboard, import and export totals, arrival and departure drafts, as well as at-sea cost allocations. A separate vessel fleet forecast was completed for each alternative plan. Vessel calls by vessel class for the Future Without-Project condition and the Future With-Project condition are shown in Table 17.

Table 17 Vessel Calls by Class

Vessel Class	Future Without Project	37 Feet	38 Feet	40 Feet	42 Feet
		2023			
BLK-1	4	1	0	1	0
BLK-2	8	6	6	4	4
BLK-3	6	5	4	4	4
BLK-4	7	6	6	5	5
BLK-5	26	25	24	21	21
BLK-6	3	3	3	3	3
GCC-1	4	2	2	2	2
GCC-5	1	0	0	0	0
GCC-6	2	1	1	1	0
TK-1	16	14	12	11	11
TK-4	51	42	41	39	38
TK-5	15	15	15	15	15
Dry Cargo Barge	4	1	0	0	0
Liquid Barge	2	0	0	0	0
Total	**149**	**121**	**114**	**106**	**103**
		2033			
BLK-1	4	1	1	1	1
BLK-2	10	8	8	6	6
BLK-3	6	5	4	4	4
BLK-4	8	7	7	5	4

BLK-5	28	27	27	24	23
BLK-6	4	4	4	4	4
GCC-1	4	2	2	2	2
GCC-5	1	0	0	0	0
GCC-6	2	1	1	1	1
TK-1	16	14	13	11	11
TK-4	57	50	49	42	41
TK-5	17	17	17	16	16
Dry Cargo Barge	5	1	0	0	0
Liquid Barge	3	0	0	0	0
Total	**165**	**137**	**133**	**116**	**113**
		2043			
BLK-1	4	2	1	1	1
BLK-2	14	12	12	7	7
BLK-3	6	5	4	4	4
BLK-4	8	8	8	6	6
BLK-5	28	28	27	24	24
BLK-6	7	7	7	7	7
GCC-1	5	2	2	2	2
GCC-5	1	0	0	0	0
GCC-6	2	1	1	1	1
TK-1	16	14	13	11	11
TK-4	60	52	52	46	43
TK-5	20	20	20	19	18
Dry Cargo Barge	6	1	0	0	0
Liquid Barge	3	0	0	0	0
Total	**180**	**152**	**147**	**128**	**124**
		2053			
BLK-1	4	1	1	1	1
BLK-2	19	15	15	9	9
BLK-3	8	7	6	6	6
BLK-4	8	8	8	8	7
BLK-5	28	28	27	24	24
BLK-6	10	10	10	10	10
GCC-1	5	2	2	2	2
GCC-5	1	0	0	0	0
GCC-6	2	1	1	1	0
TK-1	17	14	12	12	12

TK-4	67	56	56	49	48
TK-5	23	23	23	23	23
Dry Cargo Barge	8	1	0	0	0
Liquid Barge	3	0	0	0	0
Total	**203**	**166**	**161**	**145**	**142**

Origin Destination Transportation Cost Savings

Transportation cost benefits were estimated using the HarborSym Economic Reporter, a tool that summarizes and annualizes HarborSym results from multiple simulations. This tool collects the transportation costs from various model run output files and generates the transportation cost reduction for all project years, and then produces an Average Annual Equivalent (AAEQ).

Transportation costs were estimated for a 50-year period of analysis for the years 2023 through 2072. Transportation costs were estimated using HarborSym for the years 2023, 2033, 2043, and 2053. The present value was estimated by interpolating between the modeled years and discounting at the FY 2018 Federal Discount Rate of 2.75 percent. Estimates were determined for each alternative project depth.

Table 18 provides the annual transportation costs. For the Origin-Destination (OD) costs, at-sea costs comprise approximately 96 percent of the total costs. The transportation cost saving benefit summary is provided in Table 19. The AAEQ transportation cost saving benefits are provided in Table 20.

It should be noted that during the later phase of the study process, the construction schedule and base year changed. The preliminary analysis assumed a two-year construction duration beginning in 2021 and ending in 2023, meaning that the project would begin to accrue benefits in 2023 (the base year). Project construction is now estimated to begin in 2022 and end in 2024, which changed the base year to 2024.

Table 18 Annual Transportation Cost Allocated to Port

Year	Future Without Project	37 Feet	38 Feet	40 Feet	42 Feet
2024	**$54,080,467**	**$50,688,437**	**$49,301,082**	**$46,324,597**	**$46,098,855**
2025	$54,800,931	$51,419,633	$50,139,435	$47,044,380	$46,816,603
2026	$55,521,396	$52,150,830	$50,977,789	$47,764,162	$47,534,351
2027	$56,241,860	$52,882,026	$51,816,143	$48,483,945	$48,252,099
2028	$56,962,325	$53,613,223	$52,654,496	$49,203,727	$48,969,848
2029	$57,682,789	$54,344,420	$53,492,850	$49,923,510	$49,687,596
2030	$58,403,254	$55,075,616	$54,331,204	$50,643,292	$50,405,344
2031	$59,123,718	$55,806,813	$55,169,557	$51,363,075	$51,123,092
2032	$59,844,183	$56,538,010	$56,007,911	$52,082,857	$51,840,840
2033	$60,564,647	$57,269,206	$56,846,265	$52,802,640	$52,558,589
2034	**$61,285,111**	**$58,000,403**	**$57,684,618**	**$53,522,422**	**$53,276,337**
2035	$62,167,755	$58,785,148	$58,490,235	$54,353,580	$54,086,200
2036	$63,050,399	$59,569,893	$59,295,852	$55,184,739	$54,896,063
2037	$63,933,042	$60,354,638	$60,101,469	$56,015,897	$55,705,925
2038	$64,815,686	$61,139,382	$60,907,086	$56,847,055	$56,515,788
2039	$65,698,329	$61,924,127	$61,712,703	$57,678,213	$57,325,651
2040	$66,580,973	$62,708,872	$62,518,320	$58,509,371	$58,135,514
2041	$67,463,616	$63,493,617	$63,323,937	$59,340,529	$58,945,377
2042	$68,346,260	$64,278,362	$64,129,554	$60,171,687	$59,755,240
2043	$69,228,904	$65,063,107	$64,935,171	$61,002,845	$60,565,103
2044	**$70,111,547**	**$65,847,852**	**$65,740,788**	**$61,834,004**	**$61,374,966**
2045	$71,059,723	$66,727,406	$66,603,703	$62,756,611	$62,295,278
2046	$72,007,899	$67,606,960	$67,466,617	$63,679,219	$63,215,591
2047	$72,956,075	$68,486,514	$68,329,532	$64,601,827	$64,135,904
2048	$73,904,251	$69,366,068	$69,192,447	$65,524,434	$65,056,217
2049	$74,852,427	$70,245,622	$70,055,362	$66,447,042	$65,976,529
2050	$75,800,604	$71,125,176	$70,918,276	$67,369,650	$66,896,842
2051	$76,748,780	$72,004,729	$71,781,191	$68,292,257	$67,817,155
2052	$77,696,956	$72,884,283	$72,644,106	$69,214,865	$68,737,468
2053	$78,645,132	$73,763,837	$73,507,021	$70,137,473	$69,657,780
2054-2073	**$79,593,308**	**$74,643,391**	**$74,369,936**	**$71,060,080**	**$70,578,093**

Table 19 Annual Transportation Cost Saving Benefit

Year	37 Feet	38 Feet	40 Feet	42 Feet
2024	**$3,392,030**	**$4,779,385**	**$7,755,870**	**$7,981,612**
2025	$3,381,298	$4,661,496	$7,756,552	$7,984,328
2026	$3,370,566	$4,543,607	$7,757,234	$7,987,045
2027	$3,359,834	$4,425,718	$7,757,916	$7,989,761
2028	$3,349,102	$4,307,828	$7,758,598	$7,992,477
2029	$3,338,369	$4,189,939	$7,759,279	$7,995,193
2030	$3,327,637	$4,072,050	$7,759,961	$7,997,910
2031	$3,316,905	$3,954,161	$7,760,643	$8,000,626
2032	$3,306,173	$3,836,271	$7,761,325	$8,003,342
2033	$3,295,441	$3,718,382	$7,762,007	$8,006,058
2034	**$3,284,709**	**$3,600,493**	**$7,762,689**	**$8,008,775**
2035	$3,382,607	$3,677,520	$7,814,175	$8,081,555
2036	$3,480,506	$3,754,546	$7,865,660	$8,154,336
2037	$3,578,405	$3,831,573	$7,917,145	$8,227,117
2038	$3,676,303	$3,908,600	$7,968,631	$8,299,897
2039	$3,774,202	$3,985,626	$8,020,116	$8,372,678
2040	$3,872,101	$4,062,653	$8,071,602	$8,445,459
2041	$3,969,999	$4,139,679	$8,123,087	$8,518,239
2042	$4,067,898	$4,216,706	$8,174,573	$8,591,020
2043	$4,165,797	$4,293,733	$8,226,058	$8,663,801
2044	**$4,263,695**	**$4,370,759**	**$8,277,544**	**$8,736,582**
2045	$4,332,317	$4,456,021	$8,303,112	$8,764,445
2046	$4,400,940	$4,541,282	$8,328,680	$8,792,308
2047	$4,469,562	$4,626,543	$8,354,249	$8,820,171
2048	$4,538,184	$4,711,804	$8,379,817	$8,848,035
2049	$4,606,806	$4,797,066	$8,405,386	$8,875,898
2050	$4,675,428	$4,882,327	$8,430,954	$8,903,761
2051	$4,744,050	$4,967,588	$8,456,522	$8,931,625
2052	$4,812,672	$5,052,850	$8,482,091	$8,959,488
2053	$4,881,294	$5,138,111	$8,507,659	$8,987,351
2054-2073	**$4,949,916**	**$5,223,372**	**$8,533,227**	**$9,015,214**

Table 20 AAEQ Transportation Cost and Cost Savings

Alternative	AAEQ Transportation Cost	AAEQ Transportation Cost Reduction Benefit
Future Without Project	$67,859,000	
37 Feet	$63,799,000	$4,060,000
38 Feet	$63,345,000	$4,514,000
40 Feet	$59,735,000	$8,124,000
42 Feet	$59,370,000	$8,489,000

Economic Summary

The table below shows the summary for this economic analysis in 2018 dollars.

Table 21 Summary of Benefits and Costs

Alternative	Total AAEQ Costs	Total AAEQ Benefits	Total Net Benefits	Incremental Net Benefits	Benefit/Cost Ratio
37 Feet	$1,209,000	$4,059,000	$2,850,000		3.4
38 Feet	$1,829,000	$4,514,000	$2,685,000	-$165,000	2.5
40 Feet	$2,525,000	$8,124,000	$5,599,000	$2,914,000	3.2
42 Feet	$3,279,000	$8,489,000	$5,210,000	-$389,000	2.6

NED Plan

The National Economic Development (NED) plan is that plan that reasonably maximizes net annual benefits. The net annual benefits of an improvement plan are equal to its annual benefits minus its annual costs. The annual benefits, annual costs, benefit to cost ratio (BCR), and annual net benefits for each alternative were evaluated and compared using outputs calculated at the FY18 discount rate of 2.75 percent.

Table 21 above shows the summary for this economic analysis in 2018 dollars. The alternative that reasonably maximizes net annual benefits is the 40 foot alternative and is the NED plan. Net benefits equal $5,599,000 and the benefit/cost ratio is 3.2 at the FY18 discount rate.

Recommended Plan Benefit and Cost Update

Following identification of the NED plan, the USACE refined the design based on a ship simulation study conducted by the USACE's Engineer Research and Development Center (ERDC), Coastal Hydraulics Laboratory (CHL). See Appendix K and discussion in the Coastal Engineer Appendix. Design refinements for the ship simulation study were additional widening of the bend at the breakwater (800 feet versus initial proposal of 700 feet) and widening the existing turning basin 200 feet to the north rather than moving it fully to the north. The FY20 discount rate of 2.75 percent was used to update the benefits and costs. Table 22 below shows the refined cost summary while Table 23 below shows the updated benefits and costs.

Table 22 Refined Cost Summary

Alternative	Project Costs	IDC	Total Investment	AAEQ Total Investment	AAEQ OMRR&R	Total AAEQ
40 Feet Refined Design	$67,278,000	$1,792,000	$69,070,000	$2,558,000	$394,000	$2,952,000

Table 23 Updated Benefits and Costs – FY20 Discount Rate

	40 Foot Alternative
Average Annual Benefits	$8,124,000
Average Annual Costs	$2,952,000
Net Benefits	$5,172,000
BCR	2.8

Risk and Uncertainty

There is uncertainty that could potentially affect the BCR, primarily that commodity growth rates are uncertain. The projected growth rates published by the Department of Energy varies each year based on the policies of the current administration coming to fruition. It is possible that the current administration will have more favorable views toward the production and consumption of petroleum products.

Sensitivity Analysis

The Principle & Guidelines and subsequent ER1105-2-100 recognize the inherent variability to water resources planning. Navigation projects in particular are fraught with uncertainty about future conditions given ever-changing market conditions. Therefore, this economic evaluation includes a sensitivity analysis in which the most consequential assumptions pertaining to commodity and vessel traffic were adjusted to test the robustness of the final benefit evaluation. The HarborSym model used in the basic evaluation included variations or ranges for

many of the variables involved in the vessel costs, loading, distances, etc. However, it used only one commodity and fleet forecast, a key area of potential uncertainty. A sensitivity analysis was conducted to present results of a potentially different forecast of future commodity traffic at New Haven Harbor.

Sensitivity Scenario 1

The first scenario analyzed 1.3% growth in petroleum products throughout the 50-year period of analysis while the remaining commodities were held constant after the base year. Using all assumptions from the original analysis, the AAEQ benefits are $7,788,000. The AAEQ costs are $2,952,000. The net benefits are $4,836,000 and the BCR is 2.6.

Table 24 Sensitivity Scenario 1 Transportation Cost Savings

	2023	**2033**	**2043**	**2053**	**2072**
Petroleum Products (metric tons)	1,665,406	1,895,023	2,156,299	2,453,598	2,453,598
Remaining Commodities (metric tons)	930,575	930,575	930,575	930,575	930,575
Future Without Project Transportation Costs	$53,714,529	$57,413,278	$61,650,692	$66,575,110	$66,575,110
40 Foot Alternative Transportation Costs	$45,949,383	$49,422,247	$54,098,323	$58,795,524	$58,795,524
Transportation Cost Savings	**$7,765,146**	**$7,991,030**	**$7,552,369**	**$7,779,586**	**$7,779,586**

Table 25 Sensitivity Scenario 1 Summary of Benefits and Costs

	Total AAEQ Benefits	**Total AAEQ Costs**	**Total Net Benefits**	**Benefit/Cost Ratio**
40 Foot Alternative	$7,788,000	$2,952,000	$4,836,000	2.6

Sensitivity Scenario 2

The second scenario analyzed zero growth in all commodity categories. Benefits were held constant from the base year for the 50 year period of analysis. Using the same assumptions from the original analysis, the AAEQ benefits are $7,734,000. The AAEQ costs are $2,952,000. The net benefits are $4,782,000 and the BCR is 2.6.

Table 26 Sensitivity Scenario 2 Summary of Benefits and Costs

	Total AAEQ Benefits	Total AAEQ Costs	Total Net Benefits	Benefit/Cost Ratio
40 Foot Alternative	$7,734,000	$2,952,000	$4,782,000	2.6

Sensitivity Scenario 3

The third scenario analyzed a high-growth scenario. This sensitivity analysis assumed a 2.2% overall growth rate for New Haven Harbor for the 50 year period of analysis. In addition to growing the commodities in the original analysis at a higher growth rate (petroleum products, scrap metal, salt, and primary manufactured goods), the miscellaneous commodity group was analyzed at a 2% growth rate as opposed to zero-growth in the original analysis. Using the same assumptions from the original analysis, the AAEQ benefits are $8,696,000. The AAEQ costs are $2,952,000. The net benefits are $5,744,000 and the BCR is 2.9.

Table 27 Sensitivity Scenario 3 Summary of Benefits and Costs

	Total AAEQ Benefits	Total AAEQ Costs	Total Net Benefits	Benefit/Cost Ratio
40 Foot Alternative	$8,696,000	$2,952,000	$5,744,000	2.9

Socioeconomic and Regional Analysis

The socioeconomics of the community area are summarized in this section. The parameters used to describe the demographic and socioeconomic environment include recent trends in population for New Haven County and 27 towns that make up the immediate economic study area of New Haven Harbor.

Overview

Population

The New Haven-Milford Metropolitan Statistical Area (MSA) includes New Haven County and 27 towns. The MSA includes approximately 606 square miles of land. Table 28 provides population data for the United States, Connecticut and the New Haven-Milford MSA. The population has increased over the past 25 years, with the New Haven MSA increasing by approximately 6.9 percent, or an average growth rate of .3% per year from 1990 to 2015.

Table 28 Population

Area	Land Area (sq. miles)	1990	2000	2010	2015
United States	3,531,905	248,765,000	281,422,000	308,745,538	321,418,820
Connecticut	4,842	3,287,116	3,405,565	3,574,097	3,590,886
New Haven MSA	606	804,219	824,008	862,477	859,470

Employment and Income

In 2015, approximately 66.2 percent of the New Haven MSA population was in the labor force. The unemployment rate for the MSA was 5.3 percent as of December 2015, lower than the Connecticut employment rate and higher than the United States employment rate. The median household income of the New Haven MSA was $61,640, lower than Connecticut, but higher than the United States national average. The per capita income was $32,852, lower than the average for Connecticut and higher than the national average. Table 29 displays information about Employment and Income.

Table 29 Employment and Income

Area	Population in Labor Force (%)	Unemployment Rate	Median Household Income	Per Capita Income
United States	63%	5.0	$53,889	$28,930
Connecticut	67%	5.4	$70,331	$38,803
New Haven MSA	66%	5.3	$61,640	$32,852

Environmental Justice

An environmental justice analysis was conducted to assess whether the populations currently residing in the vicinity of the proposed New Haven Harbor Navigation Improvement Project can be defined as minority and/or low-income populations. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations."

The proposed New Haven Harbor Navigation Improvement project is located in New Haven County, Connecticut. According to the U.S. Bureau of Census 2017, New Haven County had an estimated population of 860,435. Minorities comprise approximately 22.1 percent of the population, most of whom are African Americans. Most of the Port related infrastructures are in the City of New Haven. The median household income was $62,715 for New Haven County residents.

Any individual with total income less than an amount deemed to be sufficient to purchase basic needs of food and shelter, clothing, and other essential goods and services is classified as poor. The amount of income necessary to purchase these basic needs is the poverty line or threshold and is set by the Office of Management and Budget (U. S. Census 2010). The 2010 poverty line for an individual under 65 years of age is $12,060. The poverty line for a three-person family with one child and two adults is $20,420. For a family with two adults and two children the poverty line is $24,600 (U. S. Census 2010).

The proposed harbor deepening would not increase the number of vessels moving through the port on a given year. Although vessel fleet forecast predicts an increase in the number of vessels moving through the port over time as a result of increasing demand, that increase is expected to occur in the Without Project Condition – independent of a harbor deepening project. With deepening of the harbor to a 40-foot depth, the total number of vessels would decrease (when compared to without project conditions) as vessels would be able to load more deeply under the improved conditions.

Since the number of vessels per year is not predicted to increase as a result of the deepening, no landside changes in emissions would occur as a result of the deepening. The Corps predicts a reduction in the number of vessels used to transport cargo for each year (when compared to without project conditions) if the harbor is deepened. As a result, total emissions would decrease in a given year if the harbor is deepened (when compared to without project conditions). Since overall air emissions in the port would decrease slightly as a result of the project (when compared to without conditions), there is no technical need for the project to conduct a detailed analysis of the how those emissions disperse. Additionally, since there would

be an overall decrease in emissions (including air toxins when compared to without project conditions), the Corps does not expect any National Ambient Air Quality Standards (NAAQS) violations as a result of harbor deepening. Therefore, a risk-based assessment of the health effects associated with the proposed action is not warranted. Any potential adverse effects of the presently permitted air emissions would be reduced if the harbor is deepened because of the reduction in vessels (when compared to without project conditions).

The Corps evaluated potential project impacts of the proposed harbor deepening and found that the information shows that the proposed action would not cause disproportionately high and adverse impacts to minority populations, low-income populations, or children.

Regional Economic Development Analysis

This report provides estimates of the economic impacts of Civil Works Budget Analysis for the New Haven Harbor, CT Navigation Improvement Project.

The U.S Army Corps of Engineers (USACE) Institute for Water Resources, the Louis Berger Group and Michigan State University has developed a regional economic impact modeling tool called RECONS (Regional ECONomic System) to provide estimates of regional and national job creation, and retention and other economic measures such as income, value added, and sales. This modeling tool automates calculations and generates estimates of jobs and other economic measures, such as income and sales associated with USACE's ARRA spending, annual Civil Work program spending and stem-from effects for Ports, Inland Water Way, FUSRAP and Recreation. This is done by extracting multipliers and other economic measures from more than 1,500 regional economic models that were built specifically for USACE's project locations. These multipliers were then imported to a database and the tool matches various spending profiles to the matching industry sectors by location to produce economic impact estimates. The tool will be used as a means to document the performance of direct investment spending of the USACE as directed by the American Recovery and Reinvestment Act (ARRA). The Tool will also allow the USACE to evaluate project and program expenditures associated with the annual expenditure by the USACE.

Table 30 provides the project information while Table 31 provides the economic impact regions for the New Haven Harbor Navigation Improvement analysis.

Table 30 Project Information

Project Name:	NEW HAVEN HARBOR, CT
Project ID:	3001689
Division:	NAD
District:	NEW ENGLAND DISTRICT
Type of Analysis:	Civil Works Budget Analysis
Business Line:	Navigation
Work Activity:	CWB - Navigation

Table 31 Economic Impact Regions

Regional Impact Area:	New Haven-Milford, CT MSA
Regional Impact Area ID:	181
Counties included	New Haven/
State Impact Area:	Connecticut
National Impact:	Yes

Results of the Economic Impact Analysis

The RED impact analysis was evaluated at three geographical levels: Local, State, and National for the 40-foot alternative. The local analysis represents the New Haven impact area which includes approximately 606 square miles of land. The State Level analysis includes the State of Connecticut. The National level includes the 48 contiguous United States.

Table 32 displays the overall spending profile that makes up the dispersion of the total project construction cost among the major industry sectors. The spending profile also identifies the geographical capture rate, also called Local Purchase Coefficient (LPC) in RECONS, of the cost components. The geographic capture rate is the portion of USACE spending on industries (sales) captured by industries located within the impact area. In many cases, IMPLAN's trade flows Regional Purchase Coefficients (RPC's) are utilized as a proxy to estimate where the money flows for each of the receiving industry sectors of the cost components within each of the impact areas.

Table 32 Input Assumptions (Spending and LPCs)

Category	Spending (%)	Spending Amount	Local LPC (%)	State LPC (%)	National LPC (%)
Dredging Fuel	6%	$4,020,205	12%	14%	90%
Metals and Steel Materials	4%	$2,833,915	24%	38%	90%
Textiles, Lubricants, and Metal Valves and Parts (Dredging)	2%	$1,384,005	14%	24%	65%
Pipeline Dredge Equipment and Repairs	5%	$3,427,060	20%	30%	100%
Aggregate Materials	3%	$1,911,245	79%	79%	97%
Switchgear and Switchboard Apparatus Equipment	0%	$197,715	17%	33%	80%
Hopper Equipment and Repairs	2%	$1,252,195	1%	10%	97%
Construction of Other New Nonresidential Structures	14%	$8,963,080	100%	100%	100%
Industrial and Machinery Equipment Rental and Leasing	7%	$4,811,065	79%	95%	100%
Planning, Environmental, Engineering and Design Studies and Services	5%	$3,031,630	88%	88%	100%
USACE Overhead	7%	$4,349,730	100%	100%	100%
Repair and Maintenance Construction Activities	4%	$2,702,105	100%	100%	100%
Industrial Machinery and Equipment Repair and Maintenance	11%	$6,920,025	72%	79%	100%
USACE Wages and Benefits	13%	$8,765,365	75%	100%	100%
Private Sector Labor or Staff Augmentation	15%	$10,083,465	100%	100%	100%
All Other Food Manufacturing	2%	$1,252,195	21%	22%	90%
Total	**100%**	**$65,905,000**	**-**	**-**	**-**

The USACE is planning on expending approximately $65,905,000 on the project. Of this total project expenditure $47,948,370 will be captured within the regional impact area. The rest will be leaked out to the state or the nation. The expenditures made by the USACE for various services and products are expected to generate additional economic activity in that can be measured in jobs, income, sales and gross regional product as summarized in the following table and includes impacts to the region, the State impact area, and the Nation. Table 33 is the overall economic impacts for this analysis.

The labor income represents all forms of employment earnings. In IMPLAN's regional economic model, it is the sum of employee compensation and proprietor income. The Gross Regional Product (GRP) which is also known as value added, is equal to gross industry output (i.e., sales or gross revenues The GRP, which is also known as value added, is equal to gross industry output (i.e., sales or gross revenues) less its intermediate inputs (i.e., the consumption of goods and services purchased from other U.S. industries or imported). The number of jobs equates to the labor income.

Table 33 Overall Summary Economic Impacts

Impacts	Impact Areas	Regional	State	National
Total Spending		$65,905,000	$65,905,000	$65,905,000
Direct Impact				
	Output	$47,948,370	$52,429,269	$64,440,455
	Job	538.27	565.74	614.16
	Labor Income	$30,960,027	$33,756,103	$37,256,881
	GRP	$35,398,348	$38,816,569	$43,877,078
Total Impact				
	Output	$88,154,334	$98,802,054	$171,547,758
	Job	854.21	921.44	1,333.26
	Labor Income	$45,423,614	$51,012,979	$72,210,770
	GRP	$60,717,615	$68,645,712	$104,419,084

Tables 34, 35, and 36 present the economic impacts by industry sector both for each geographical region. Note that Labor -5001- is the largest impact area at the regional, state, and national levels, implying that all the labor demand can be met at the regional level.

Table 34 Economic Impact at Regional Level

IMPLAN No.	Industry Sector	Sales	Jobs	Labor Income	GRP
	Direct Effects				
115	Petroleum refineries	$0	0.00	$0	$0
171	Steel product manufacturing from purchased steel	$252,395	0.56	$47,174	$56,740
198	Valve and fittings other than plumbing manufacturing	$28,326	0.09	$7,436	$13,983
201	Fabricated pipe and pipe fitting manufacturing	$40,749	0.12	$13,765	$21,346
26	Mining and quarrying sand, gravel, clay, and ceramic and refractory minerals	$935,044	4.94	$449,859	$559,090
268	Switchgear and switchboard apparatus manufacturing	$4,164	0.01	$1,000	$2,150
290	Ship building and repairing	$48	0.00	$20	$24
319	Wholesale trade businesses	$1,387,307	6.73	$583,774	$1,069,484
322	Retail Stores - Electronics and appliances	$5,120	0.05	$2,182	$3,023
323	Retail Stores - Building material and garden supply	$350,967	3.89	$166,287	$243,403
324	Retail Stores - Food and beverage	$8,722	0.14	$4,349	$6,350
326	Retail Stores - Gasoline stations	$100,796	0.83	$35,043	$67,068
332	Transport by air	$631	0.00	$201	$329
333	Transport by rail	$54,853	0.14	$17,735	$31,768
334	Transport by water	$19,127	0.04	$2,486	$8,365
335	Transport by truck	$546,837	4.08	$264,944	$316,125
337	Transport by pipeline	$562	0.00	$234	$228
36	Construction of other new nonresidential structures	$8,963,080	59.30	$3,589,937	$4,475,245
365	Commercial and industrial machinery and equipment rental and leasing	$3,811,910	8.04	$655,957	$2,038,350
375	Environmental and other technical consulting services	$2,669,665	27.91	$1,656,611	$1,666,028
386	Business support services	$4,342,693	65.88	$2,982,030	$2,950,322
39	Maintenance and repair construction of nonresidential structures	$2,699,423	20.56	$1,194,510	$1,465,770
417	Commercial and industrial machinery and equipment repair and maintenance	$4,965,969	34.34	$3,177,738	$3,722,377
439	* Employment and payroll only (federal govt, non-military)	$6,574,024	55.50	$6,009,522	$6,574,024
5001	Labor	$10,083,465	244.79	$10,083,465	$10,083,465
69	All other food manufacturing	$102,497	0.32	$13,768	$23,291
	Total Direct Effects	$47,948,370	538.27	$30,960,027	$35,398,348
	Secondary Effects	$40,205,963	315.94	$14,463,587	$25,319,267
	Total Effects	**$88,154,334**	**854.21**	**$45,423,614**	**$60,717,615**

Table 35 Economic Impact at State Level

IMPLAN No.	Industry Sector	Sales	Jobs	Labor Income	GRP
	Direct Effects				
115	Petroleum refineries	$0	0.00	$0	$0
171	Steel product manufacturing from purchased steel	$664,741	1.48	$124,243	$149,438
198	Valve and fittings other than plumbing manufacturing	$148,276	0.49	$38,925	$73,193
201	Fabricated pipe and pipe fitting manufacturing	$365,397	1.18	$123,428	$191,413
26	Mining and quarrying sand, gravel, clay, and ceramic and refractory minerals	$935,044	4.94	$449,859	$559,090
268	Switchgear and switchboard apparatus manufacturing	$35,277	0.09	$8,932	$18,505
290	Ship building and repairing	$114,410	0.43	$47,856	$56,713
319	Wholesale trade businesses	$1,444,921	7.01	$609,145	$1,114,345
322	Retail Stores - Electronics and appliances	$5,366	0.05	$2,301	$3,179
323	Retail Stores - Building material and garden supply	$350,967	3.89	$166,287	$243,403
324	Retail Stores - Food and beverage	$8,722	0.14	$4,349	$6,350
326	Retail Stores - Gasoline stations	$100,796	0.83	$35,043	$67,068
332	Transport by air	$971	0.00	$310	$507
333	Transport by rail	$54,853	0.14	$17,735	$31,768
334	Transport by water	$19,247	0.04	$2,513	$8,425
335	Transport by truck	$546,837	4.08	$264,944	$316,125
337	Transport by pipeline	$13,384	0.03	$5,573	$5,435
36	Construction of other new nonresidential structures	$8,963,080	59.30	$3,589,937	$4,475,245
365	Commercial and industrial machinery and equipment rental and leasing	$4,583,422	9.66	$871,134	$2,497,218
375	Environmental and other technical consulting services	$2,669,665	27.91	$1,656,611	$1,666,028
386	Business support services	$4,342,693	65.88	$2,982,030	$2,950,322
39	Maintenance and repair construction of nonresidential structures	$2,699,423	20.56	$1,194,510	$1,465,770
417	Commercial and industrial machinery and equipment repair and maintenance	$5,452,942	37.80	$3,489,354	$4,087,402
439	* Employment and payroll only (federal govt, non-military)	$8,722,872	74.67	$7,973,852	$8,722,872
5001	Labor	$10,083,465	244.79	$10,083,465	$10,083,465
69	All other food manufacturing	$102,497	0.32	$13,768	$23,291
	Total Direct Effects	$52,429,269	565.74	$33,756,103	$38,816,569
	Secondary Effects	$46,372,785	355.71	$17,256,875	$29,829,143
	Total Effects	**$98,802,054**	**921.44**	**$51,012,979**	**$68,645,712**

Table 36 Economic Impact at National Level

IMPLAN No.	Industry Sector	Sales	Jobs	Labor Income	GRP
	Direct Effects				
115	Petroleum refineries	$3,000,696	0.38	$121,157	$549,295
171	Steel product manufacturing from purchased steel	$2,052,813	4.61	$383,679	$461,485
198	Valve and fittings other than plumbing manufacturing	$709,709	2.39	$186,311	$350,331
201	Fabricated pipe and pipe fitting manufacturing	$2,706,520	10.36	$914,242	$1,417,812
26	Mining and quarrying sand, gravel, clay, and ceramic and refractory minerals	$944,081	5.00	$454,564	$564,770
268	Switchgear and switchboard apparatus manufacturing	$123,619	0.35	$31,451	$64,942
290	Ship building and repairing	$1,197,931	5.25	$501,074	$593,816
319	Wholesale trade businesses	$1,532,060	7.58	$647,517	$1,182,195
322	Retail Stores - Electronics and appliances	$6,327	0.06	$2,764	$3,785
323	Retail Stores - Building material and garden supply	$353,832	3.93	$167,672	$245,406
324	Retail Stores - Food and beverage	$8,765	0.14	$4,371	$6,381
326	Retail Stores - Gasoline stations	$108,543	0.94	$38,259	$72,491
332	Transport by air	$3,831	0.01	$1,222	$2,000
333	Transport by rail	$78,170	0.21	$25,972	$45,706
334	Transport by water	$22,009	0.04	$3,138	$9,791
335	Transport by truck	$987,556	7.86	$478,474	$570,903
337	Transport by pipeline	$44,207	0.09	$19,499	$18,757
36	Construction of other new nonresidential structures	$8,963,080	59.30	$3,589,937	$4,475,245
365	Commercial and industrial machinery and equipment rental and leasing	$4,804,037	11.54	$932,664	$2,628,431
375	Environmental and other technical consulting services	$3,031,228	31.69	$1,914,891	$1,925,268
386	Business support services	$4,348,357	65.98	$2,985,953	$2,954,204
39	Maintenance and repair construction of nonresidential structures	$2,701,335	20.58	$1,195,356	$1,466,809
417	Commercial and industrial machinery and equipment repair and maintenance	$6,917,682	53.01	$4,426,645	$5,185,337
439	* Employment and payroll only (federal govt, non-military)	$8,765,364	75.05	$8,012,695	$8,765,364
5001	Labor	$10,083,465	244.79	$10,083,465	$10,083,465
69	All other food manufacturing	$945,238	3.02	$133,907	$233,087
	Total Direct Effects	$64,440,455	614.16	$37,256,881	$43,877,078
	Secondary Effects	$107,107,304	719.10	$34,953,889	$60,542,006
	Total Effects	**$171,547,758**	**1,333.26**	**$72,210,770**	**$104,419,084**

Total New Haven Harbor Navigation Improvement Project economic impact for the State of Connecticut (Table 35) is composed of $98,802,254 in sales, approximately 921 jobs, $51 million in labor income and a contribution of $69 million to GRP.

Table 37 presents the demographic data of the impact region. In 2008, the combined metropolitan impact area of New Haven had a population of 848,827 with an area of 619 square miles and a total personal income of $40 billion.

Table 37 Impact Region Definition (2008)

Regional Impact Area ID:	**181**
Regional Impact Area Name:	New Haven-Milford, CT MSA
Impact Area Type	Metropolitan Impact Area
State Impact Region::	Connecticut

County	**FIPS**	**Area (sq. mi)**	**Population**	**Households**	**Total Personal Income (in millions)**
New Haven	09009	619	848,827	329,253	**$40,184**
Total		**619**	**848,827**	**329,253**	**$40,184**

Table 38 shows the impact region for 19 selected sectors. It displays the geographical capture amounts for the New Haven-Milford MSA, which is that portion of USACE spending that is captured in the impact area. The labor income represents all forms of employment earnings (in IMPLAN's regional economic model, it is the sum of employee compensation and proprietor income). The GRP is equal to gross industry output (i.e., sales or gross revenues) less its intermediate inputs (i.e., the consumption of goods and services purchased from other U.S. industries or imported). The number of jobs equates to the labor income. The total New Haven-Milford MSA is composed of $75 billion in output (sales), 462,559 employment, $26.5 billion in labor income and a contribution of $40.5 billion to GRP.

Table 38 Impact Region Profile (2008)

Regional Impact Area ID:	181
Regional Impact Area Name:	New Haven-Milford, CT MSA
Impact Area Type	Metropolitan Impact Area
State Impact Region::	Connecticut

Section	**Output (millions)**	**Labor Income (millions)**	**GRP (millions)**	**Employment**
Accomodations and Food Service	$1,871	$685	$1,017	28,764
Administrative and Waste Management Services	$1,672	$829	$1,072	24,368
Agriculture, Forestry, Fishing and Hunting	$170	$27	$130	1,590
Arts, Entertainment, and Recreation	$412	$130	$176	6,895

Construction	$3,997	$1,647	$1,804	27,184
Education	$3,943	$2,836	$3,120	49,790
Finance, Insurance, Real Estate, Rental and Leasing	$5,870	$1,638	$3,801	28,219
Government	$3,108	$2,241	$2,561	30,210
Health Care and Social Assistance	$6,544	$3,674	$4,280	69,122
Imputed Rents	$5,572	$764	$3,639	26,552
Information	$4,639	$868	$2,052	10,564
Management of Companies and Enterprises	$795	$386	$517	2,902
Manufacturing	$20,557	$4,111	$6,237	43,472
Mining	$90	$31	$49	304
Professional, Scientific, and Technical Services	$5,344	$2,662	$3,325	32,045
Retail Trade	$4,101	$1,682	$2,825	50,415
Transportation and Warehousing	$1,259	$542	$777	10,246
Utilities	$893	$140	$396	1,409
Wholesale Trade	$4,180	$1,608	$2,752	18,508
Total	**$75,017**	**$26,500**	**$40,529**	**462,559**

The following table shows the top ten industries that typically benefit from the types of expenditures made for this project by the USACE. This analysis was conducted at the national level and thus it cannot be guaranteed that these industries would be present in the regional impact area as analyzed.

Table 39 Top Ten Industries Affected By Work Activity (2008)

Rank	Industry (millions)	IMPLAN No.	% of Total Employment
1	* Employment and payroll only (federal govt, non-military)	439	**8 %**
2	Business support services	386	**7 %**
3	Construction of other new nonresidential structures	36	**6 %**
4	Food services and drinking places	413	**5 %**
5	Commercial and industrial machinery and equipment repair and maintenance	417	**4 %**
6	Real estate establishments	360	**3 %**
7	Wholesale trade businesses	319	**3 %**
8	Employment services	382	**3 %**
9	Maintenance and repair construction of nonresidential structures	39	**3 %**
10	Offices of physicians, dentists, and other health practitioners	394	**2 %**
			43 %

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX D
ENGINEERING AND DESIGN AND SITE GEOLOGY

New Haven Harbor, CT,

Navigation Improvement Study

Appendix D

Engineering and Design and Site Geology

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Existing Conditions

a. Existing Bathymetry:

For the purposes of this study, the existing conditions of New Haven Harbor is represented from the May 2014 USACE post-dredge hydrographic survey (NHH924_v.xyz). The May 2014 USACE survey does not cover the entire extent of the proposed turning basin. For the small portion of the turning basin, the 2013 Spec Survey was referenced (NHH921_v.xyz). The southern limits of the Entrance Channel are represented by the NCEI mix of multibeam, singlebeam, and sidescan data collected in the year 2000 (H11011.xyz). The NCEI file was converted from Lat/Long decimal degrees to NAD 83 CT State Plane feet. The elevation results were converted from meters to feet (H11101_CTStatePlane_FT.txt).

b. Existing Utilities:

The Cross-Sound Cable Company, LLC (Company) installed a 24 mile long, high voltage, direct current and fiber optic cable system within the seabed of Long Island Sound and New Haven Harbor. The horizontal and vertical location of the cable was provided by Mr. J. Leighfield from the Company after conducting the 2005 cable migration survey OSI Report #13ES036 dated 26 June 2013 (CSCListing_depths-rev3_toACOE2005-06-27.xls). The Company has conducted a cable migration survey every two years since the cable was installed in 2002. Based on the results of the cable migration study, the Company is confident that the cable has not migrated since installation.

The cable generally runs along the centerline of the Federal Navigation Channel within the harbor and was installed at or below -48 feet MLLW along its length except for the reach known as “Area 6/7”. This area is located between buoy R “10” and R “8” north of the harbor breakwaters.

In this location, “Area 6/7”, approximately 700 feet of cable length was installed at or below -41.5 feet MLLW. This “Area 6/7” corresponds to existing stationing 79+00 to 86+00.

The Cross Sound Cable (CSC) alignment exits the existing navigation channel at station 37+00 where the cable is a sweeping arch to the east. The CSC then crosses back across the harbor channel alignment approximately 8,400 feet to the south, beyond the existing channel limits, and beyond the proposed channel extension, at the -46 foot MLLW contour. Along this reach, the cable is installed only four feet below existing grade.

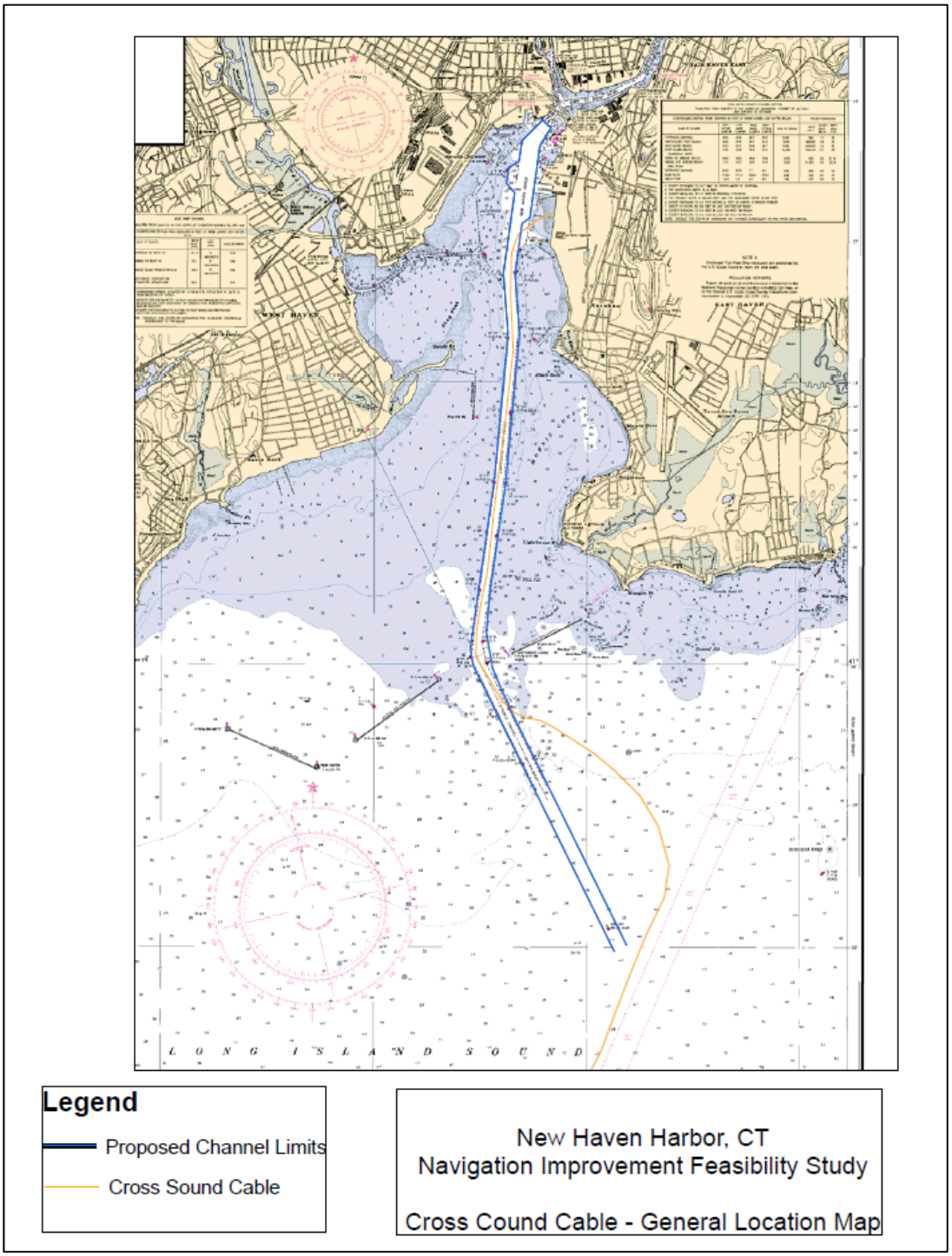

Figure 1 - Location of Cross Sound Cable

c. Existing Site Geology:

Previous explorations were conducted by USACE during the 1970s and 1980s. These results were presented in the 1986 FS report and the 1988 PED report. The boring locations shown on the site plans in section 3.7 and 3.8 of the Geology Attachment are approximate. The boring locations shown on the plans are from two sampling events. The 1988 boring locations were scaled off the figure shown in the

1988 PED Report. The 1988 borings are located sporadically throughout the entire navigation channel, however the majority of borings are located within the vicinity of the bend between the two breakwaters. The 2002 boring locations are from the Cross Sound Cable Project Area 6/7 Geotechnical Investigation Report prepared by Cross Sound Cable Company in October 2002. Area 6/7 is located just north of the bend. The boring locations included in the report were converted from NAD 83 LI Lambert State Plane feet to NAD 83 CT State Plane feet. Borings are depicted on Appendix D Figures 4, 5, 11, 12 and 13, as green dots.

Native materials that will likely be encountered during dredging include organic silts, silty sands with gravel, glacial till, and bedrock. The sediments represent deltaic and glaciolacustrine sediments deposited into Glacial Lake Connecticut, the precursor to Long Island Sound. During investigations in the 1970s and 1980s, soils collected from the inner portions of New Haven Harbor consisted of Holocene, black to gray, organic silt and clay (OH-OL) overlying reddish-brown silty medium-fine sand (SP-SM) and soils collected from the outer portions of New Haven Harbor consisted of black to gray organic silt and gray organic silt (OL-OH), underlain by gray, medium-fine sand, silty-fine sand, and reddish brown silty fine sand (SW-SM), underlain by Till, underlain by bedrock.

Bedrock encountered during borings was described as very hard, unweathered, highly to moderately fractured, gray, coarse to medium grained, gneiss. Rock Quality Designation (RQD) generally ranged from 50% to 90% (fair to good quality) and laboratory results for Unconfined Compressive Strength (UCS) ranged from 12,087 to 20,447 psi (Class B – High Strength intact rock). A 1974 seismic investigation identified bedrock with high seismic velocity, extending north from the 50-ft contour to the channel bend near the breakwater, thence roughly 4,000 feet further north into the harbor. A 1987 seismic investigation confirmed the presence of bedrock near the bend, but the extent of bedrock in the inner harbor was not documented due to the presence of gaseous organic sediments which limit seismic energy penetration.

An approximate bedrock surface was created from the contours shown in section 3.7 of the geology attachment from the 1988 PED report. Additionally, the 2002 borings were analyzed against the contours and were found to be consistent, and therefore not explicitly used in developing the rock surface in the 3D model. In the area of 6/7, the 1989 contours span a 40ft and 45ft contour and the 2002 borings show 42 ft within this area. This is consistent with the contours as the boring location is between the 40 and 45 ft contour. For the basis of preliminary quantities, the bedrock surface was used to estimate quantity of rock removal expected within the bend area. The quantities in rock include an additional two feet of required dredging, as well as a two foot overdepth allowance, per EM 1110-2-1613. Refer to section 3, Quantities, for further explanation regarding quantity calculation methodology.

Refer to Geology Attachment at the end of this document for more information.

II. Channel Design

The design engineer adapted the guidelines outlined in EM 1110-2-1613 dated 31 May 2006 for improving the New Haven Harbor deep-draft navigation project. The design goal is to provide safe, efficient, environmentally sound and cost-effective waterway for ships and other vessels. The guidance presented in EM 2220-2-1613 is based on average navigation condition and situations. During the design process, the design engineer has adapted these guidelines to the local, site-specific conditions of the project.

The key components of a designed channel are its depth, width and alignment which are dictated by the vessels expected to utilize the channel as well as physical conditions of the area. The New Haven Harbor Deep Draft channel design is categorized by four navigation reaches:

1. Entrance Channel
2. Channel Bend
3. Inner Channel
4. Turning Basin

a. Design Vessel:

The design width of the channel will be determined to accommodate the design ship representative of the project. Refer to Economics Appendix for design vessel information. For the purpose of the proposed channel design the vessel dimensions have a beam of 106 feet, length of 700 feet, and a maximum draft of 45 feet. (Note: The selected channel draft will be determined based on the economic evaluation of incremental depths deeper than the currently authorized channel depth of 35 ft MLLW depth.)

b. Alignment:

To minimize the improvement dredging quantity, the alignment of the improved channel generally follows the course of the existing authorized channel. However, the proposed channel alignment aims to improve navigability concerns identified by Mr. Charles Jonas, pilot for New Haven Harbor.

i. <u>Entrance Channel</u>

For the purpose of this study, the alignment of the entrance channel is and will remain controlled by the fixed green range lights located in West Haven (Light List Numbers 24020 (front) and 24025 (rear) at heights 34 and 68 feet above Mean High Water, respectively). The Entrance Channel is naturally deeper to the east, therefore widening the channel to the east may reduce dredge quantity when compared to widening the channel equally to the east and west. Widening the channel to the east would result in the need to move the existing West Haven land based range to the east as well. Preliminary coordination with the U.S. Coast Guard to discuss the process and ability of moving the range took place during the development of the TSP to determine if this is something that should be considered further in PED.

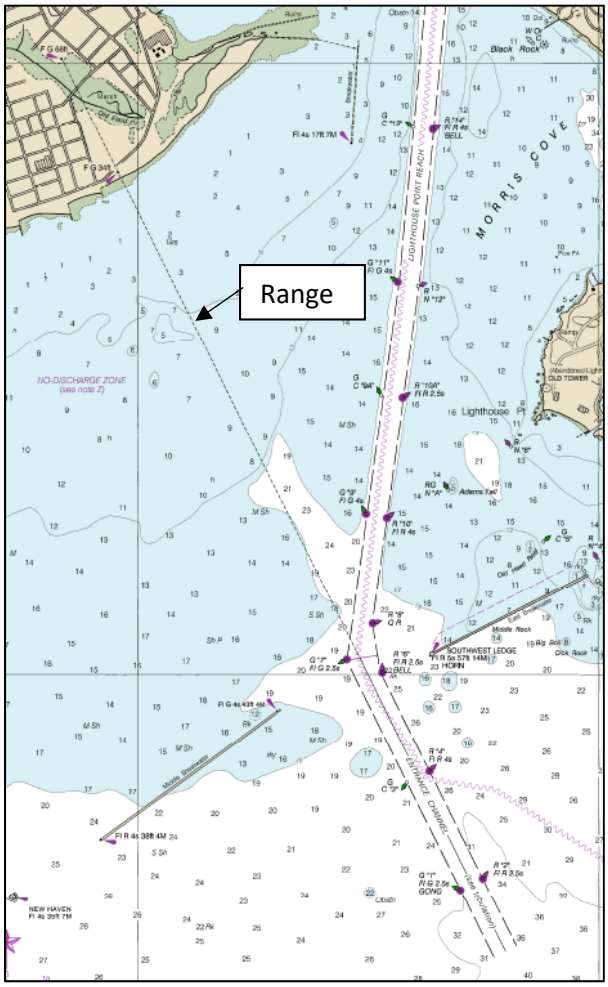

Figure 2 - New Haven Federal Navigation Entrance Channel

ii. <u>Interior Channel</u>

The existing alignment of the interior channel has small bends at existing stations 140+00, 201+00, and 231+00. According to New Haven Harbor pilot, Mr. Jonas, these small bends do not impede navigation. Typically, channel alignments are designed to be straight and limit any unnecessary bends. However, if the existing New Haven Harbor alignment was straightened, the new alignment would cross areas shoaled as much as -3.0 feet MLLW. For the purposes of this study, the proposed inner channel alignment mirrors the existing inner channel alignment to minimize required volume of dredge material to be removed for improvement.

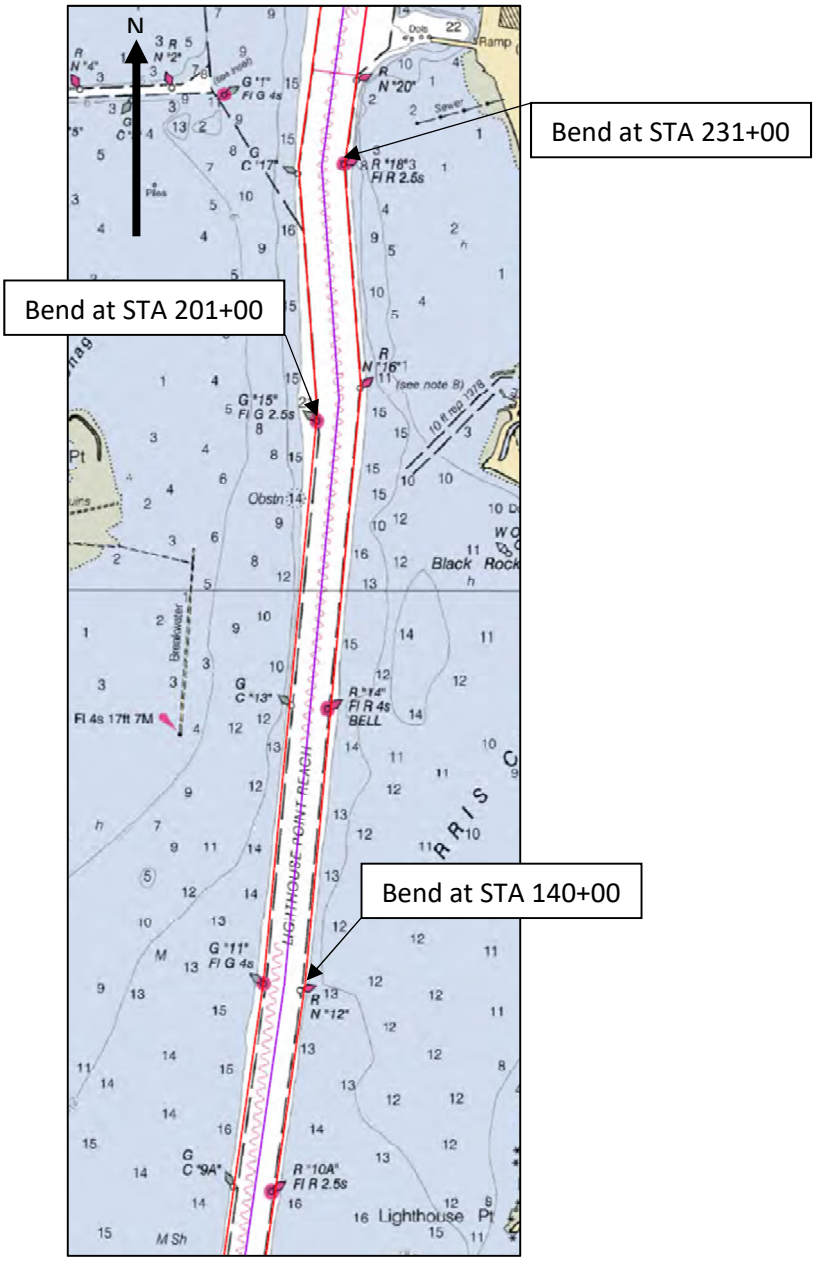

Figure 3 - New Haven Federal Navigation Channel Bends

iii. <u>Bend</u>

According to the New Haven Harbor pilots (Mr. Charles Jonas, personal communication), navigating the bend between the two jetties is challenging. The alignment of the bend is constricted by the two existing jetties, and the 35 degree angle is bound by the entrance and inner channel alignments. The proposed bend alignment will replicate the existing bend. However, improvements will be made in width, length and depth.

Figure 4 - Proposed New Haven Federal Navigation Channel Bend Widening

iv. <u>Turning Basin</u>

The existing authorized project at New Haven Harbor includes a maneuvering area east of the channel along the developed industrial waterfront, and a turning basin located within and west of the channel below its head. The existing turning basin shown on the existing plans was never formally authorized, having been adopted as an O&M modification, and has since been maintained by the U.S. Army Corps of Engineers. It is recommended that an improved turning basin be formally authorized as part of this project. The majority of the existing maneuvering area located east of the channel is also recommended for improvement to accommodate the needs of the terminals. However, the southern portion of the maneuvering area will not be deepened and will remain at the currently authorized 35 feet, as the only active terminal in this area—PSE&G to the south—currently only accepts barges. The proposed maneuvering area will be improved to facilitate safe movement of larger vessels in the busy upper channel reaches. Improving the maneuvering area is important, so that all terminals have access to the main channel, and terminal owners will maintain the same responsibility in maintaining their berths to at least the newly improved channel depths.

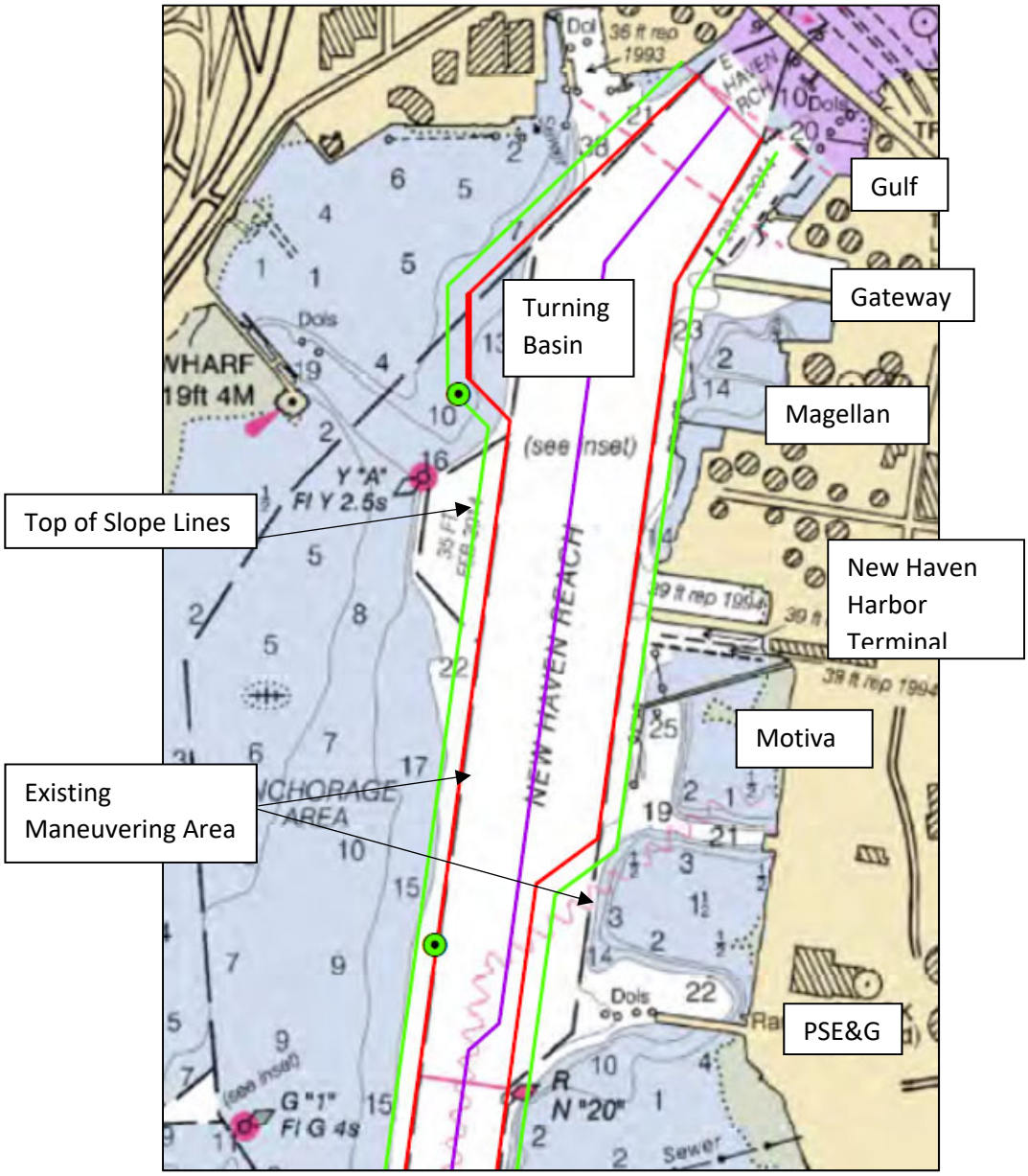

Figure 5 - Proposed New Haven Federal Navigation Turning Basin Changes

c. Channel Width:

This proposed channel width will vary with each navigation component as necessary to ensure the design vessel can make a safe transit under the environmental and operational conditions of each reach. The channel width required depends on the following factors (EM 1110-2-1613 – 31 May 2006):

1. Design ship beam, length and draft
2. Local piloted ship control
3. Channel cross section and alignment

4. River and tidal currents
5. Navigation traffic pattern (one or two-way)
6. Vessel traffic intensity and congestion
7. Wind and wave effects
8. Visibility
9. Quality and spacing of navigation aids
10. Composition of channel bed and banks
11. Variability of channel and currents
12. Speed of design ship

Figure 8.1 and Table 8.2 from EM 1110-2-1613 are key figures when designing channel width. The figures will be referenced as they apply to each reach of the New Haven Harbor improvement project below.

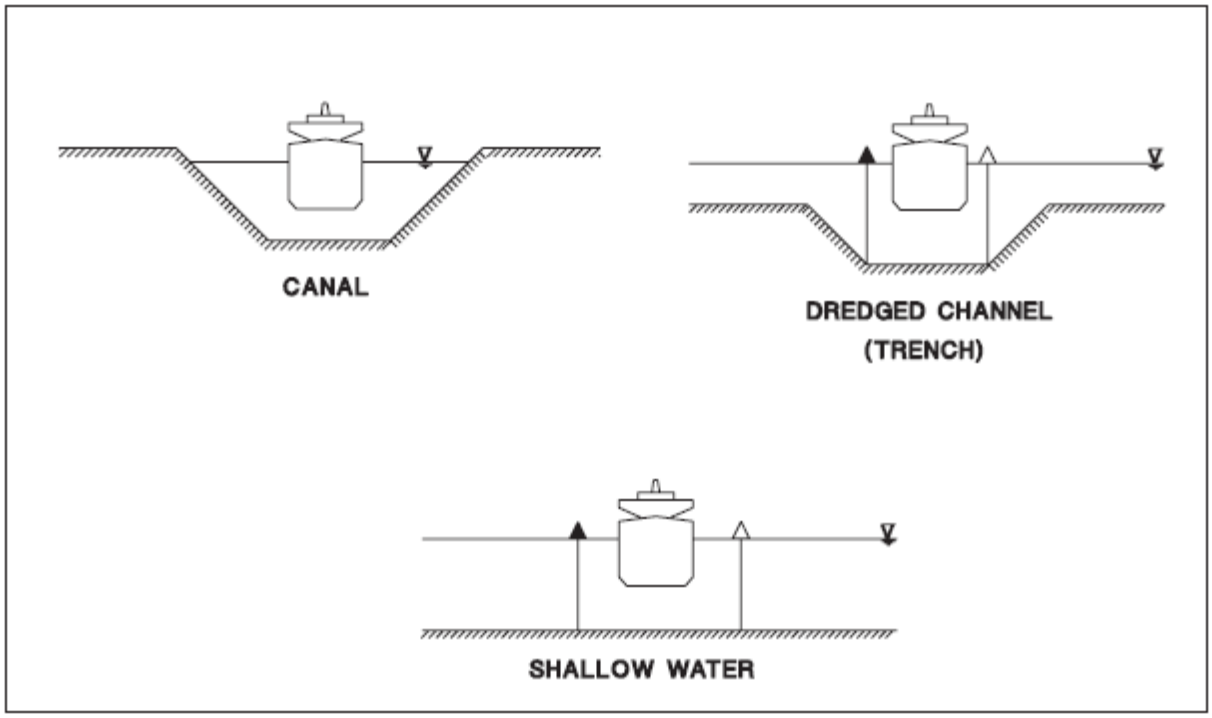

Figure 6 - Figure 8.1 Channel Cross Section (EM 1110-2-1613)

One-Way Ship Traffic Channel Width Design Criteria			
	Design Ship Beam Multipliers for Maximum Current, Knots		
Channel Cross Section	0.0 to 0.5	0.5 to 1.5	1.5 to 3.0
Constant Cross Section, Best Aids to Navigation			
Shallow	3.0	4.0	5.0
Canal	2.5	3.0	3.5
Trench	2.75	3.25	4.0
Variable Cross Section, Average Aids to Navigation			
Shallow	3.5	4.5	5.5
Canal	3.0	3.5	4.0
Trench	3.5	4.0	5.0

Figure 7 - Table 8.2 One-Way Ship Traffic Channel Width Design Criteria (EM 1110-2-1613)

Table 8-4 and Figure 8-3 from EM 1110-2-1613 are key figures regarding design channel turn configurations. The figures will be referenced as they apply to the design of the channel bend improvements, described below.

Table 8-4 Recommended Channel Turn Configurations			
Deflection Angle, Deg	Ratio of Turn Radius/ Ship Length	Turn Width Increase Factor (* Ship Beam)	Turn Type
0 - 10	0	0	Angle
10 - 25	3 - 5	2.0 - 1.0	Cutoff
25 - 35	5 - 7	1.0 - 0.7	Apex
35 - 50	7 - 10	0.7 - 0.5	Curved
>50	>10	0.5	Circle

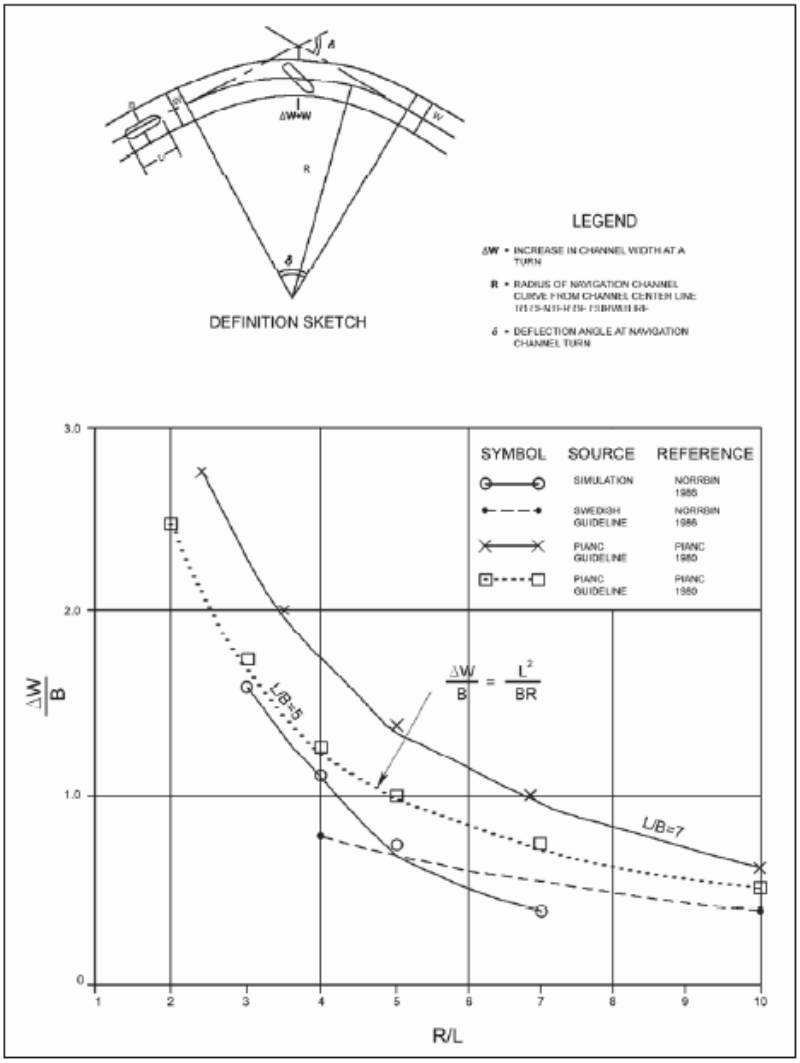

Figure 8-3. Channel width increase in turns

Figure 8 - Figure 8-3 Channel Width Increase in Turns (EM 1110-2-1613)

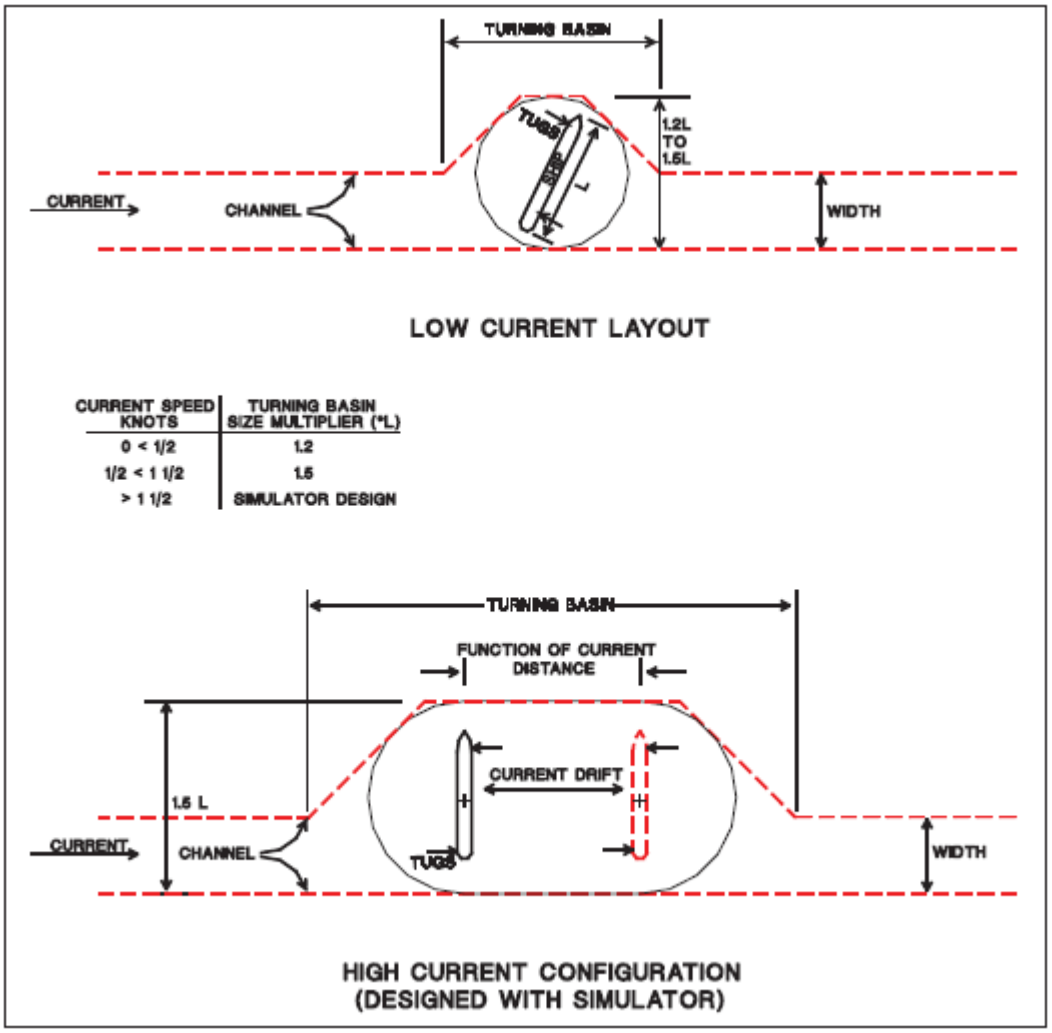

Figure 9 - Figure 9-1 Turning Basin Alternative Designs (EM 1110-2-1613)

i. <u>Interior Channel:</u>

The interior channel provides harbor access from the entrance channel to the port area. The traffic pattern in the interior channel is currently one-way, and one-way traffic is anticipated in the future.

The channel cross section of the inner channel is defined in Figure 8.1 as "Trench." Trench is defined as a dredged channel, with submerged banks on each side, usually provided with range markers and channel edge buoys or beacons.

The aids to navigation are considered excellent in the interior channel. Lights are located on every other buoy. For design, the maximum current within the interior channel is conservatively estimated at 2.0 knots. Refer to the Coastal Engineering section for more current and tide information. Tug assistance is also required in order to navigate the inner harbor channel. For the purposes of the TSP, the design assumed one tug assist within the interior channel. However, during the 7 November 2017 coordination meeting, the New Haven Harbor Gateway Terminal, including their tug operator, indicated that two tugs are typically utilized within the interior channel. Updates to the design and quantities were incorporated in Section V. to reflect the pilot's input during the Optimization Phase of the project.

Given the width design criteria outlined above in Table 8.2, the inner harbor channel width is calculated with the following assumptions:

One-Way Ship Traffic
Channel Cross Section: Trench
Maximum Current, Knots: 1.5 to 3.0
Constant Cross Section Best Aids to Navigation
BEAM MULTIPLIER: 4.0
Beam: 106 feet x 4.0 = 424 feet
Add One Tug: 424 feet + 48 feet = 472 feet
INNER CHANNEL WIDTH: 500 FEET

ii. Entrance Channel:

The maneuverability of ships in a given navigation situation is influenced by environmental forces and resulting movements caused by the speed and direction of river and tidal currents, wind, waves and channel banks. Given these influences, the maneuverability of the entrance channel will vary greatly from the inner channel. Width allowances in excess of the interior channel width to account for wave effects on horizontal ship motion is difficult to estimate.

For the purposes of developing the TSP, Table 8.2 was referenced to calculate the entrance channel width. Navigation in the entrance channel is adversely affected by strong and variable tidal currents, rough seas and swell, breaking waves and wind. New Haven entrance channel is known to have frequent fog which will cause visibility problems. In order to take poor visibility into account, Aids to Navigation were determined as average. The maximum current is estimate as 2.0 knots (Refer to Coastal Engineering Appendix for more information).

The channel cross section of the entrance channel is defined in Figure 8.1 as "Trench." Trench is defined as a dredged channel, with submerged banks on each side, usually provided with range markers and channel edge buoys or beacons. For the purposes of the TSP, the design assumed one tug assist at the exterior channel. However, during the 7 November 2017 coordination meeting the New Haven Harbor Gateway Terminal, including their tug operator, indicated that tugs are not utilized within the exterior channel. Instead, the tugs meet incoming vessels after the channel bend at the breakwaters in the vicinity of buoys G "9" and R "10." Updates to the design and quantities were incorporated to reflect the pilot's input during the Optimization Phase of the project, as shown in Section 5, Ship Simulation Refinements.

Since the improvement proposed involves deepening the channel, the entrance channel length was extended approximately 2,200 feet to reach the new proposed channel depth.

Given the width design criteria outlined above in Table 8.2, the entrance channel width is calculated with the following assumptions:

One-Way Ship Traffic
Channel Cross Section: Trench
Maximum Current, Knots: 1.5 to 3.0
Constant Cross Section Average Aids to Navigation
BEAM MULTIPLIER: 5.0

Beam: 106 feet x 5.0 = 530 feet
Add One Tug: 530 feet + 48 feet = 578 feet
ENTRANCE CHANNEL WIDTH: 600 FEET

iii. Channel Bend at Breakwaters:

Channels with bends are more difficult to navigate compared with straight reaches because of reduction in site distance, reduced effectiveness of aids to navigation, changing channel cross-sectional area, and greater effects from varying current and bank suction forces. The width of the ship path is dependent on the following (EM 1110-2-1613 – 31 May 2006):

1. Ship yaw angle while turning
2. Length and beam of the ship
3. Ship rudder angle
4. Possible use or nonuse of kick turning by the pilot
5. Location and spacing of aids to navigation in the turn.
6. Local current and other environmental conditions.

The existing channel bend at New Haven is 35 degrees and passed between the middle and eastern breakwaters. The channel cross section of the bend is asymmetric. This means that the channel cross section has different bank conditions on each side of the channel centerline. The banks are very steep and strong bank forces effects are experienced. Passing ships tend to drift away from channel centerline toward the steep bank. The bank conditions are even stronger when the larger draft ships are forced to enter New Haven Harbor on a rising tide, as they are when using tidal assistance to ensure adequate depth under keel. In this case, the ships are forced to navigate through the bend under high current conditions.

The swept path of a turning ship is dependent mainly on the channel turn radius and the ship length. Figure 8-3 from EM 1110-2-1613 presents a definition sketch of the relevant variables and a plot of channel width increase curves. The deflection angle of the channel turn may also be a factor resulting from the piloting and ship control difficulty while maneuvering a ship around a channel turn. The effects of bank suction at the channel bend have been noted by the pilots and are also very important to the design of the turn. However, the recommended turn design does not include bank effects, but the design of the turn was optimized based on the ship simulation in February 2018 (refer to section 5, Ship Simulation Refinements). Table 8-4 summarizes the recommendations on the channel turn configurations including channel width increases in the turn. The table includes recommended turn-to-ship length ratios as a function of turn deflection angles.

Given the width design criteria outlined above in Table 8.4, the bend width is calculated with the following assumptions:

Deflection Angle = 35 degrees → For a deflection angle 25-35 degrees
Ratio of Turn Radius/Ship Length = 4900 ft/700ft = 7 → For a Turn Width Increase Factor of 0.7
Turn Width Increase Factor* Beam = 0.7 * 106 feet =74.2;
Width + 74.2 = 600 +74.2 = 674.2 → Round up to 700'
BEND WIDTH: 700 FEET

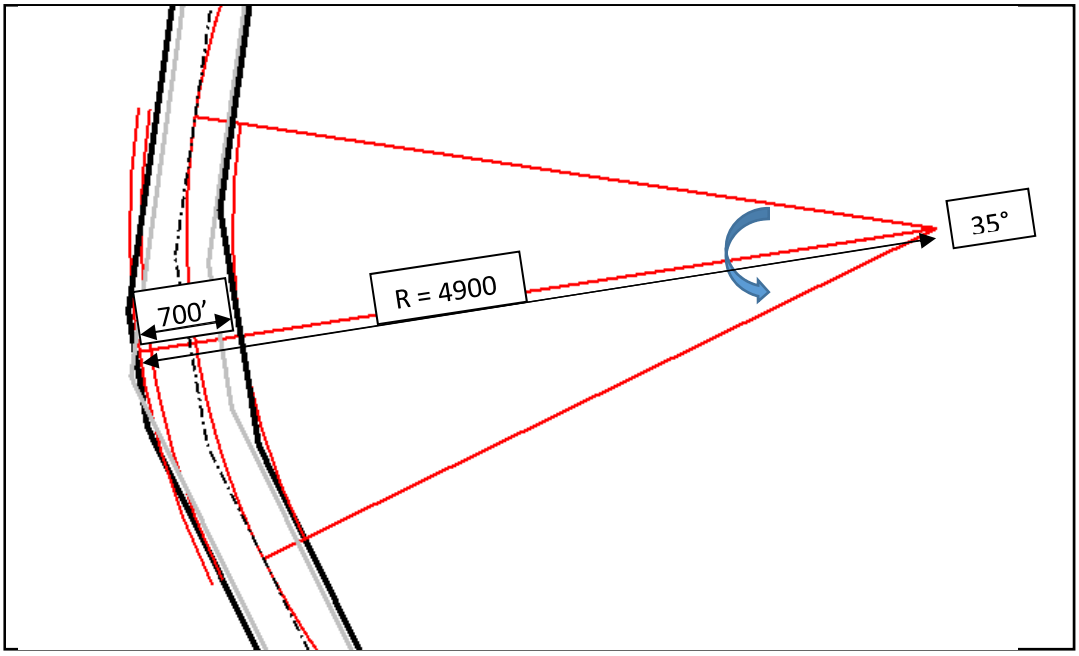

Figure 10 - Proposed New Haven Federal Navigation Channel Bend Design

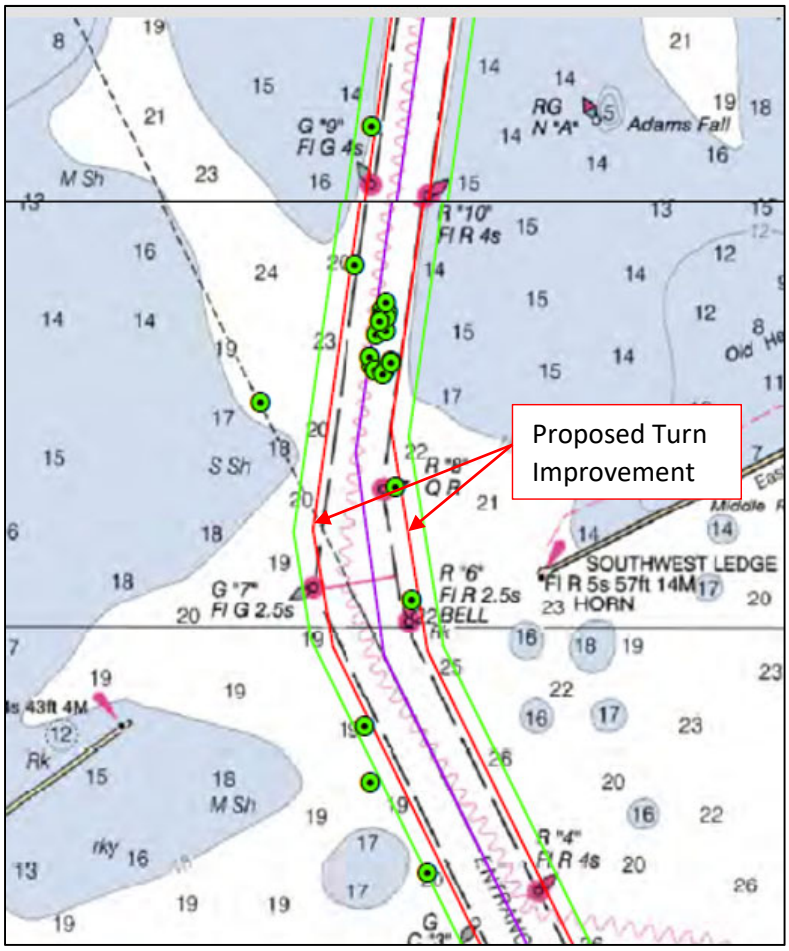

Figure 11 - Proposed New Haven Federal Navigation Channel Bend Improvement

A ship simulation reconnaissance trip was conducted at New Haven Harbor by ERDC and New England District on 7 November 2017. This meeting was attended by representative of the Connecticut Pilots, Gateway Terminal representatives including their tug operator, and the New Haven and State of Connecticut Port Authorities. During the meeting, the New England District described the alignment and width of the proposed improved turn (figure above). The Pilots recommended additional improvements to the turn be considered. The pilots used previous navigational records to show the strong bank forces in effect at the turn. In order to provide additional maneuverability within the turn, the pilots recommend lengthening the proposed turn on the east side from the R "6" buoy to the R "10" buoy as shown below. The ERDC ship simulation will test and verify the pilot's channel bend improvement recommendation. The design and quantities were updated based upon the results of the ship simulation during the Optimization Phase of the project, refer to Section 5, Ship Simulation Refinements.

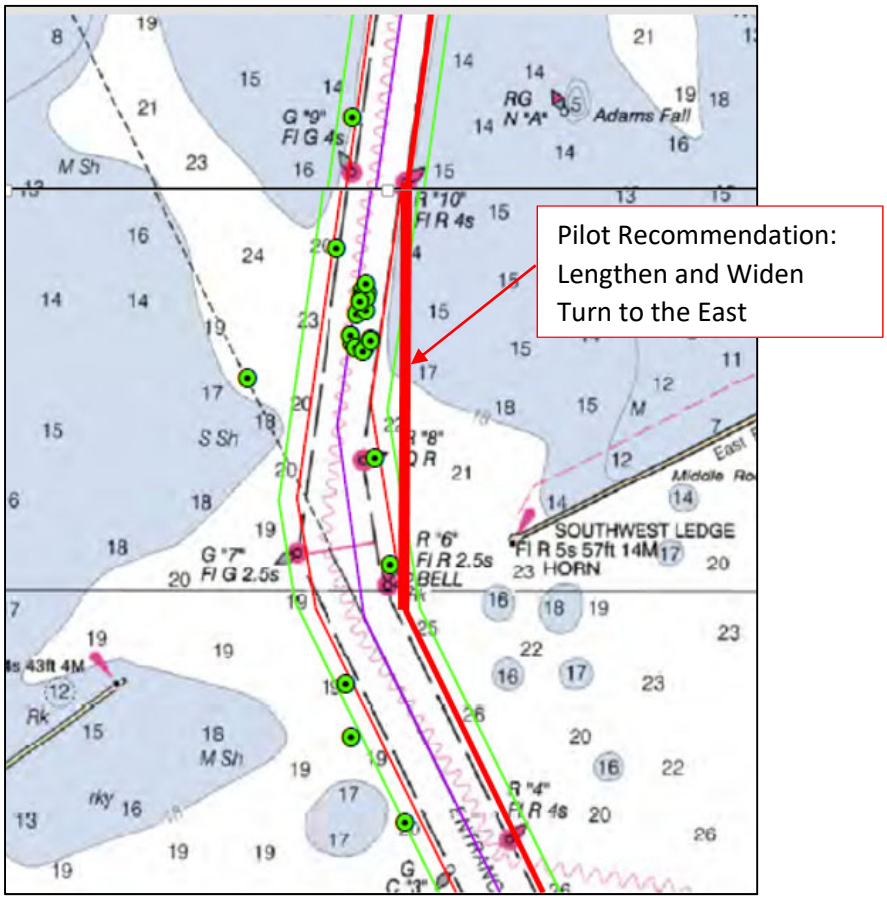

Figure 12 - New Haven Federal Navigation Channel Bend - Pilot Recommendation

iv. <u>Turning Basin:</u>

According to EM 1110-2-1613, the size of the turning basin should provide a minimum turning diameter of at least 1.2 times the length of the design ship where prevailing currents are 0.5 knot or less. If currents are 1.5 knots or more, the turning diameter should be at least 1.5 times the length of the design ship. Where traffic conditions permit, the turning basin should use the navigation channel as part of the basin area. The shape of the basin is usually trapezoidal or elongated trapezoidal with the

long side coincident with the prevailing current direction and the channel edge. The short side will be at least equal to the design multiple times the ship length. The ends will make angles of 45 degrees or less with the adjacent edge of the channel. Modification of the shape are acceptable to permit better sediment flushing characteristics to accommodate local operation considerations.

Given the width design criteria outlined above in Table 9.1, the Turning Basin diameter is calculated with the following assumptions:

Low Current Layout: 1.5 Knots
Turning Basin Size Multiplier: 1.5
Length of Ship 700 feet x 1.5 = 1050 feet → round up to 1100 feet
TURNING BASIN DIAMETER: 1100 FEET

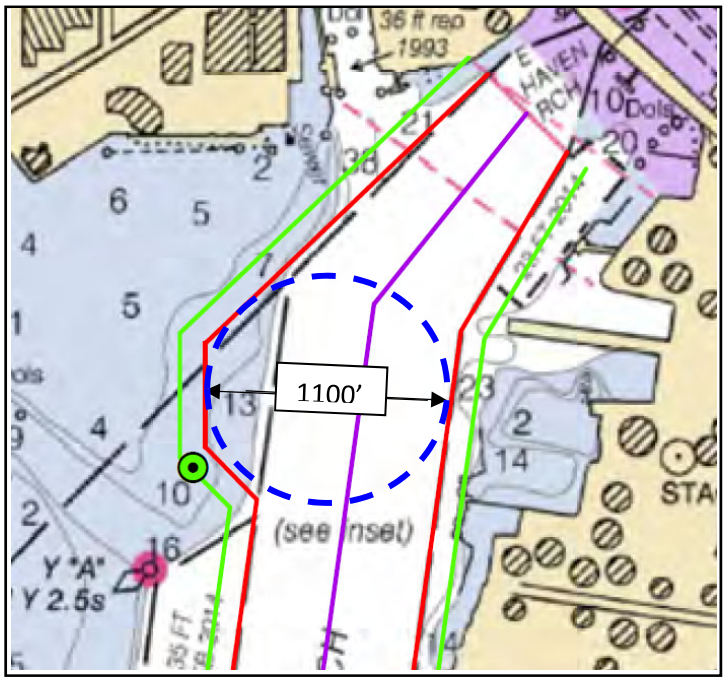

Figure 13 - Proposed New Haven Federal Navigation Turning Basin Design

d. Channel Depth:

Channel depth "should be adequate to safely accommodate ships with the deepest drafts expected to use the waterway" according to EM 1110-2-1613. This statement not only addressed the physical characteristics of the design vessels but the economic projects of usage. See the economics appendix for discussion of the current and future vessels. The physical concerns are the draft of the vessel and how it operates when underway. Vessels will ride deeper in the water when underway than when at berth. The term for this is "squat" and conditions affecting the amount of squat can be water depths or channel cross-section. Ships also are impacted by the wave conditions and tend to roll, pitch, or heave. For instance, a long vessel can pitch forward or back and increase the depth required at the bow or stern by a foot or more in addition to the swell or squat additives. The EM provides technical guidance related to the design depth and this is considered by including under-keel clearance* in the economics calculations. The alternatives analysis uses an economic approach of examining the costs of various

channel depths compared to the economic benefits. The existing authorized channel depth is 35 feet. Channel alternatives examined began at 37 feet MLLW design depth and went to a 42 feet MLLW design depth. Provision of 2 feet of overdepth is standard practice in estimating dredging quantities for mechanical dredging operations. In calculating the quantities for the alternatives, 2 feet of allowable overdepth (OD) was included in the dredging quantities for each alternative, except in areas where hard bottom (bedrock) was anticpated to be encountered. In those locations there is an additional 2 feet of required dredging along with a 2 foot overdepth allowance, per EM 1110-2-1613. For example, if the authorized depth of the channel was -40 MLLW, then the required depth in hard bottom locations would be -42 MLLW, and the overdepth allowance would be -44 MLLW.

*The New Haven Harbor pilots require at least 2 feet of under-keel clearance for harbor transit, and an additional 2 feet to account for squat and other vessel motion under normal conditions. Ship owners and underwriters may require additional clearance for certain vessels and cargos.

e. Cable Cover Requirements:

The required cable depth of -48 MLLW was prescribed per the NED Engineering Regulation, "Setting Pipeline and Cable Cover Requirements in Navigable Waters and Navigation Channels." The policy states that bottom cover associated with the initial installation of pipelines and cables under navigable waters and navigation channels shall be 48 inches in soil. These minimum bottoms cover requirements for pipelines and cables shall be measured from the maximum depth of dredging to the top of utility. In this case, the assumed maximum depth of dredging took into consideration future deepening of the channel to -40 MLLW, along with two feet of allowable over depth, and two feet of advanced maintenance. Therefore, maximum depth of dredging would be -44 MLLW, which would set the required depth of the cable at -48 MLLW.

III. Quantities

a. Total Dredge Quantities:

Using the hydrographic surveys from 2000 and 2014, the 1988 PED Report bedrock contours, and a proposed channel alignment with the widths identified above, quantities of material to be removed were developed using 3D models in Microstation's InRoads. The 1988 bedrock contours were created with both geophysical data and borings and rock is anticipated to be limited to the ares of the channel in the vicinity of the bend. The 3D model is an evaluation tool used in Bentley InRoads to compute cut and fill volumes. Cut and fill volumes obtained with this tool are calculated between two triangulated surfaces, or Digital Terrain Models (DTMs), by projecting the triangles from an existing surface onto a design surface and then computing the volume of each of the resultant prismoids. The volume calculated using the Triangle Volume method is the exact mathematical volume between the two selected surfaces. The accuracy of the results of the 3D model is limited only by the accuracy of the DTMs that are used. The volume calculation methodology utilized all available data and side slopes were assumed to be 3H:1V for channel design and volume calculations.

Table 1 - New Haven Federal Navigation Channel - Improvement Quantities

37-FT PROJECT	**Dredging Quantities (CY)**			**Dredging Areas (SF)**
	Cut	2-FT OD	Total	
Maintenance Dredging (EL 35):				35' Contour
Entrance Channel	0	4,000	4,000	0
Bend (Maintenance STA 45+00 to 85+00)***	200	4,300	4,500	Side Slopes (avg 2ft cut)
Interior Channel	1,500	48,600	50,100	Side Slopes (avg 2ft cut)
Maneuvering Area (within Improved footprint)	1,300	49,800	51,100	Side Slopes (avg 2ft cut)
Turning Basin (Located in Different location than Improved Turning Area)				
Total Maintenance Dredging	3,000	106,700	109,700	
Improvement Dredging (EL 37):				37' Contour*
Entrance Channel**	82,300	97,700	180,000	844,000
Bend (Ordinary Material)	10,900	236,700	247,600	619,400
Bend (Rock) (Required Cut to El 39)	4,400	2,200	6,600	39,600
Interior Channel	619,600	548,800	1,168,400	4,613,700
Maneuvering Area	4,100	272,800	276,900	3,415,300
Turning Basin (Located in 15' Anchorage)	209,500	23,400	232,900	228,100
Total Improvement Dredging	930,800	1,181,600	2,112,400	9,760,100
Total All Dredging	**933,800**	**1,288,300**	**2,222,100**	Improvement Areas include Maintenance Areas

*Rock "Dredge Area" measured from 39' Contour, per EM 1110-2-1613 for required rock dredging
**Used H11101 Survey for Entrance Channel Extension Quantities
*** Approx. 100 CY of Rock within Maintenance Bend Limits at EL -37. This quantity was subtracted from Maintenance Quantity

38-FT PROJECT	Dredging Quantities (CY)			Dredging Areas (SF)
	Cut	2-FT OD	Total	
Maintenance Dredging (EL 35):				35' Contour
Entrance Channel	0	4,000	4,000	0
Bend (Maintenance STA 45+00 to 85+00)***	200	4,300	4,500	Side Slopes (avg 2ft cut)
Interior Channel	1,500	48,600	50,100	Side Slopes (avg 2ft cut)
Maneuvering Area (within Improved footprint)	1,300	49,800	51,100	Side Slopes (avg 2ft cut)
Turning Basin (Located in Different location than Improved Turning Area)				
Total Maintenance Dredging	3,000	106,700	109,700	
Improvement Dredging (EL 38):				38' Contour*
Entrance Channel**	123,000	137,500	260,500	1,509,500
Bend (Ordinary Material)	198,000	101,500	299,500	667,500
Bend (Rock) (Required Cut to El 40)	6,600	9,500	16,100	52,400
Interior Channel	856,500	668,600	1,525,100	4,798,600
Maneuvering Area	129,500	301,600	431,100	3,451,500
Turning Basin (Located in 15' Anchorage)	221,100	23,600	244,700	228,100
Total Improvement Dredging	1,534,700	1,242,300	2,777,000	10,707,600
Total All Dredging	**1,537,700**	**1,349,000**	**2,886,700**	Improvement Areas include Maintenance Areas

*Rock "Dredge Area" measured from 40' Contour, per EM 1110-2-1613 for required rock dredging

**Used H11101 Survey for Entrance Channel Extension Quantities

*** Approx. 100 CY of Rock within Maintenance Bend Limits at EL -37. This quantity was subtracted from Maintenance Quantity

39-FT PROJECT	Dredging Quantities (CY)			Dredging Areas (SF)
	Cut	2-FT OD	Total	
Maintenance Dredging (EL 35):				35' Contour
Entrance Channel	0	4,000	4,000	0
Bend (Maintenance STA 45+00 to 85+00)***	200	4,300	4,500	Side Slopes (avg 2ft cut)
Interior Channel	1,500	48,600	50,100	Side Slopes (avg 2ft cut)
Maneuvering Area (within Improved footprint)	1,300	49,800	51,100	Side Slopes (avg 2ft cut)
Turning Basin (Located in Different location than Improved Turning Area)				
Total Maintenance Dredging	3,000	106,700	109,700	
Improvement Dredging (EL 39):				39' Contour*
Entrance Channel**	186,100	171,700	357,800	1,777,600
Bend (Ordinary Material)	247,700	132,000	379,700	1,183,700
Bend (Rock) (Required Cut to El 41)	10,600	12,900	23,500	110,800
Interior Channel	1,168,400	738,600	1,907,000	6,640,500
Maneuvering Area	276,900	312,800	589,700	3,451,500
Turning Basin (Located in 15' Anchorage)	232,900	23,700	256,600	228,100
Total Improvement Dredging	2,122,600	1,391,700	3,514,300	13,392,200
Total All Dredging	**2,125,600**	**1,498,400**	**3,624,000**	Improvement Areas include Maintenance Areas

*Rock "Dredge Area" measured from 41' Contour, per EM 1110-2-1613 for required rock dredging
**Used H11101 Survey for Entrance Channel Extension Quantities
*** Approx. 100 CY of Rock within Maintenance Bend Limits at EL -37. This quantity was subtracted from Maintenance Quantity

40-FT PROJECT	Dredging Quantities (CY)			Dredging Areas (SF)
	Cut	2-FT OD	Total	
Maintenance Dredging (EL 35):				35' Contour
Entrance Channel	0	4,000	4,000	0
Bend (Maintenance STA 45+00 to 85+00)***	200	4,300	4,500	Side Slopes (avg 2ft cut)
Interior Channel	1,500	48,600	50,100	Side Slopes (avg 2ft cut)
Maneuvering Area (within Improved footprint)	1,300	49,800	51,100	Side Slopes (avg 2ft cut)
Turning Basin (Located in Different location than Improved Turning Area)				
Total Maintenance Dredging	3,000	106,700	109,700	
Improvement Dredging (EL 40):				40' Contour*
Entrance Channel**	278,800	182,700	461,500	2,682,700
Bend (Ordinary Material)	309,100	146,800	455,900	1,485,500
Bend (Rock) (Required Cut to El 42)	16,100	16,600	32,700	147,300
Interior Channel	1,525,100	774,200	2,299,300	7,691,600
Maneuvering Area	431,100	319,500	750,600	3,451,500
Turning Basin (Located in 15' Anchorage)	244,700	23,900	268,600	228,100
Total Improvement Dredging	2,804,900	1,463,700	4,268,600	15,686,700
Total All Dredging	**2,807,900**	**1,570,400**	**4,378,300**	Improvement Areas include Maintenance Areas

*Rock "Dredge Area" measured from 42' Contour, per EM 1110-2-1613 for required rock dredging
**Used H11101 Survey for Entrance Channel Extension Quantities
*** Approx. 100 CY of Rock within Maintenance Bend Limits at EL -37. This quantity was subtracted from Maintenance Quantity

b. Sand Quantities:

Results from the most recent 2017 survey, and previous subsurface investigations conducted in 1977, 1988, and 2002 were analyzed to estimate the quantity of sand within the proposed dredge prism. Refer to the Geology Attachment at the end of this document for more information on the results of the subsurface investigations.

The borings were interpreted and classified with the ASTM D2487 soil classification system. Soils classified as SW, SP, SM and SC were compiled and treated as 'sand' for the purposes of the quantity estimate. The top and bottom elevation of the sand horizon was tabulated at each boring location. The sand horizon elevation between boring locations was qualitatively estimated. Utilizing the existing

boring information and utilizing best estimates between borings, the general sand horizon was estimated for each dredge reach. The shellfish creation area will be used to place material that is predominantly sand (>65-70%) and the area does not require narrowly graded sand.

As a general estimate, the team assumed that all quantity dredged from the entrance channel is sandy. This assumption is supported by the USGS sidescan sonar data presented in the Geology Attachment and the deltaic glacial environment. Within the bend area, a portion of the dredge area is considered sand. The interior channel, maneuvering area and turning basin does not have sand. Utilizing these generalizations, assume that 12% of the total dredge quantity will be sand.

Total Sand Quantity for Proposed Depths:

Table 2 - New Haven Federal Navigation Channel - Improvement Sand Quantities

Proposed Project	Total Quantity (CY)	Sand Quantity (CY)
37-FT Project	2,222,100	266,700
38-Ft Project	2,889,700	346,800
39-Ft Project	3,624,000	434,900
40-Ft Project	4,378,300	525,400

IV. Disposal Areas

a. Central Long Island Sound Disposal Site Historic Mound Restoration

The main disposal site recommended for the New Haven Deep Draft Improvement Project is the Central Long Island Sound (CLIS) Disposal Site. New Haven maintenance dredge material has been placed at CLIS Disposal Site from 1964 to the most recent maintenance dredging in 2014, and is located approximately 10.5 miles from the New Haven Turning Basin.

There are additional benefits of utilizing the improvement dredging material at CLIS Disposal Site. The improvement dredge material can be used to restore historic mounds within the disposal site. Refer to the environmental appendix for more information.

b. Morris Cove Borrow Pit

An October 2003 DAMOS (Disposal Area Monitoring System) report examined a potential disposal area for material dredged in New Haven Harbor. A small, man-made bottom depression, or borrow pit, located in Morris Cove in New Haven was created several decades ago when sand and gravel were mined for use as fill for the construction of Interstate Highway 95 through New Haven. The sediments were excavated along a north-northwest to south-southeast axis, resulting in a submerged pit approximately 650 feet wide and 2450 feet in length. Currently, water depths in the vicinity range from approximately 10 feet on the harbor substrate to 30 feet within the borrow pit. A large area of the pit has depths that are approximately 11 to 20 feet deeper than the surrounding harbor bottom, suggesting that the pit could contain a substantial amount of additional dredged material.

During January and May 2000, an estimated total of 18,500 cy of sediment dredged from the U.S. Coast Guard Base in East Haven, Connecticut, was placed in the borrow pit. The rationale for the placement of

dredged sediments within the Morris Cove borrow pit was to begin the process of re-establishing flat, uniform bottom topography and promoting improved water quality within Morris Cove. The USCG surveyed Morris Cove prior to and following the disposal. Pre-placement survey was collected in 1998 and the post-placement survey was collected in 2000. The combination of these surveys were used as the existing bathymetric conditions at Morris Cove (EXIST-SURF-1988-2000-MORRIS-COVE-MERGED.dtm).

The Morris Cove borrow pit has reportedly become a sink for organic detritus in New Haven Harbor. While the predominance of sandy substrate in the vicinity of the borrow pit is indicative of the influence of wave and tidal current energy acting on the bottom sediments, the borrow pit constitutes a distinct depression that may enhance deposition of fine-grained material. The pit's distinct margins tend to limit the flow within the pit and the volume of water exchanged.

The capacity of the Morris Cove borrow pit for the potential deposition of dredged material in the future remains quite large. Approximately 623,000 CY of silty dredged material is recommended to be strategically placed within the pit to fill it to a depth of -11.5 feet MLLW (MORRIS-COVE-SURFACE-AT-EL-11_5), roughly even with the surrounding ambient bottom.

New England District discussed potential dredge material disposal locations with David Carey of the Connecticut Department of Agriculture on December 20, 2017. Mr. Carey agrees that filling Morris Cove with suitable silty material is a beneficial re-use of dredge material, however he further suggests that the final finished surface should be a sandy material. In order to encourage shellfish production, Mr. Carey recommends capping Morris Cove with sandy material after the silty dredge material has been placed. The practicality of capping Morris Cove with sandy material will be further evaluated during the Optimization Phase of the project.

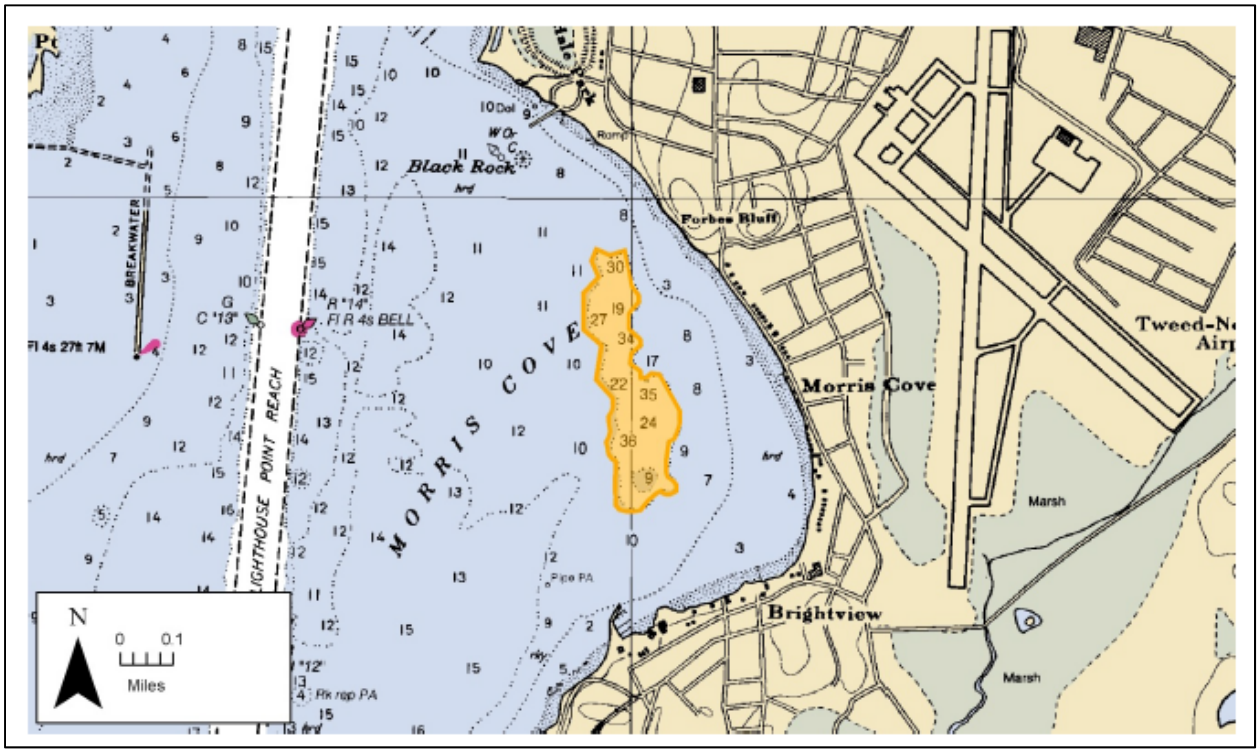

Figure 14 - Morris Cove Borrow Pit Disposal Area

c. East Breakwater Oyster Bed

New England District Staff and Mr. David Carey of the Connecticut Department of Agriculture, Bureau of Aquaculture identified the area behind the east breakwater as a potential new oyster bed area. The area behind the breakwater ranges from elevation -13 feet MLLW to -25 feet MLLW. The existing conditions behind the east jetty are represented by the results of the 2017 USACE sidescan survey effort. The final surface used to represent the existing conditions behind the east jetty is E_BW_ShellFishArea.dtm.

Mr. Carey recommended the placement area identified in the figure below. According to Mr. Carey, the final elevation of the oyster bed is not as important as the substrate of the oyster bed. The existing substrate within this area is silty, and in order for oyster bed establishment, the substrate must be a sandy material. The disposal recommendation for the New Haven Deep Draft improvement project is to place a minimum of 2-ft of sandy dredge material within the proposed placement area to encourage oyster bed development. Mr. Carey identified two areas; the South Area which is 4,076,000 SF, and the North area which is 1,794,000 SF. Utilizing a recommended 2-ft depth of sandy material placed on top of the native silty material, the East Breakwater Oyster bed has a capacity of beneficially re-using 434,800 CY of sandy dredge material. Depending upon the recommended project depth and total dredge quantity, the East Breakwater Oyster Bed will account for the placement of most, if not all, of the sandy dredge material for the New Haven deep draft improvement project.

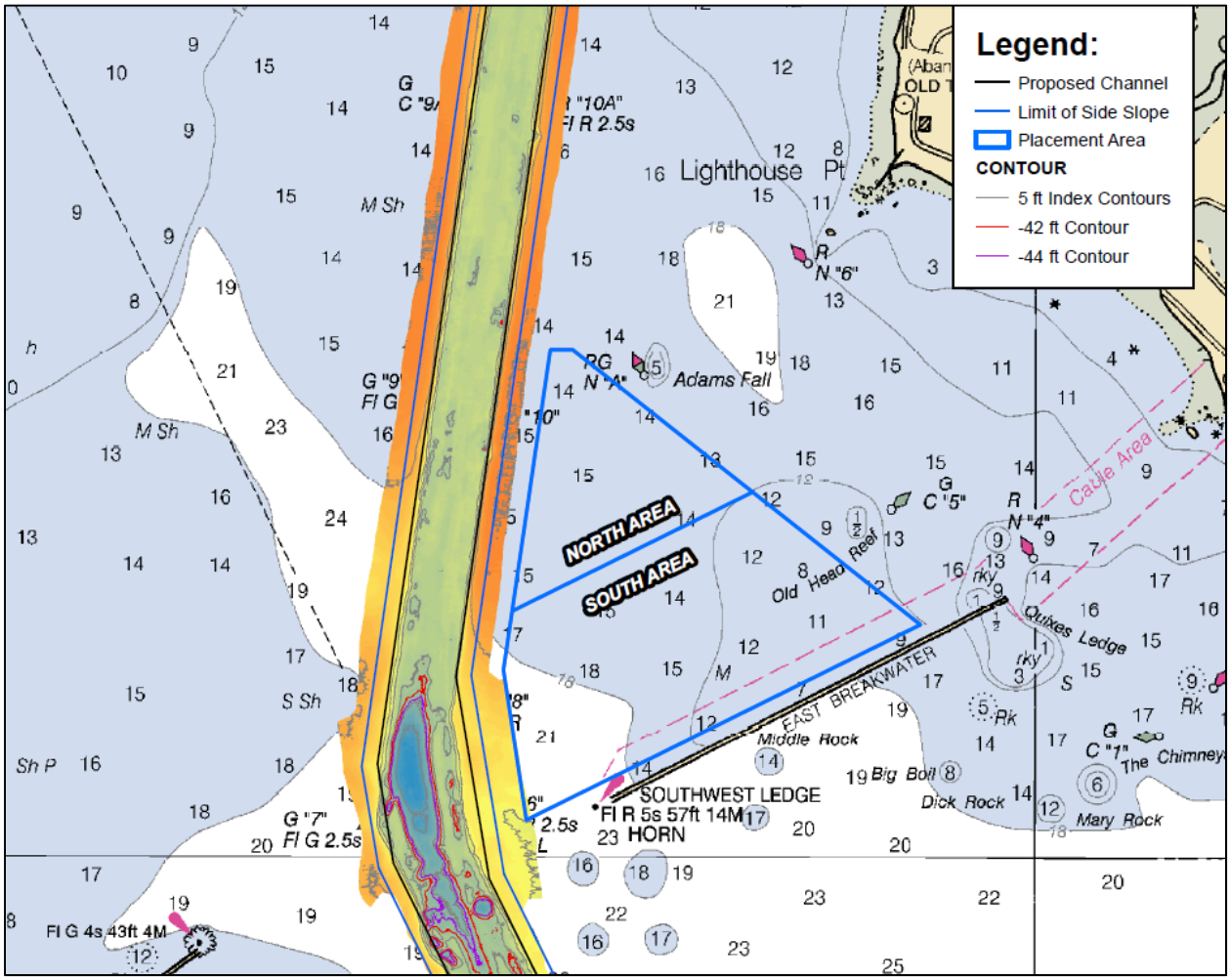

Figure 15 - East Breakwater Oyster Bed Disposal Area

d. West Breakwaters Rock Disposal

The proposed plan recommends that the rock removed from the improvement dredging project be placed at the land-side toe of the existing west breakwater. The rock will be beneficially re-used to bolster the existing breakwater structure. All of the removed rock will be placed on the western side of the west breakwater as shown in the figure below. There is one existing shellfish lease in that area.

The existing conditions behind the west and middle jetties are approximated using the NCEI mix of multibeam, singlebeam, and sidescan data collected in the year 2000 (H11011_OuterChannel) merged with 2015 USACE LiDAR of the West and Middle Jetties (EX_WestMidJetties_MLLW). The final surface used to represent the existing conditions behind the west jetty is EX_H11011_2015Lidar_MergedMLLW.dtm.

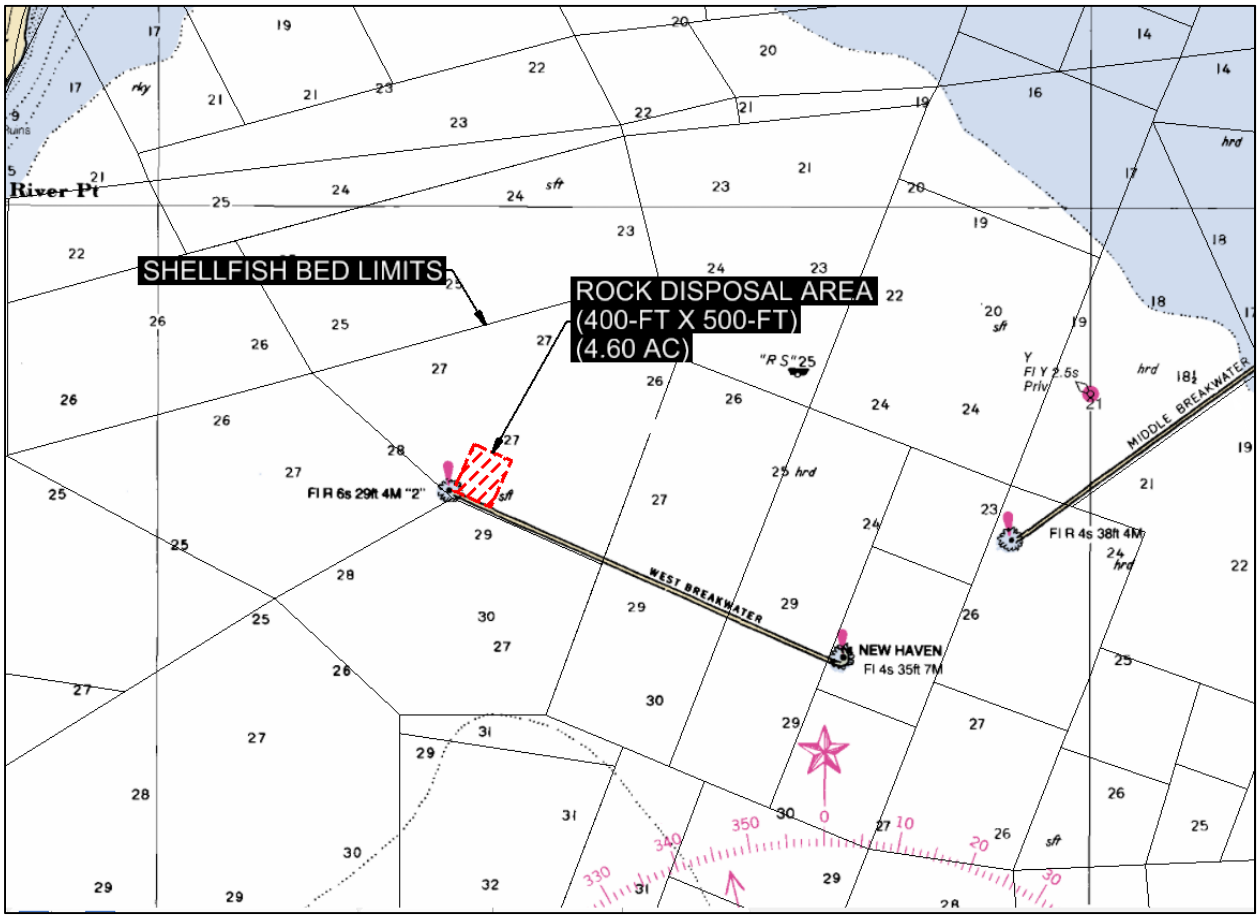

Figure 16 - West Breakwater Rock Disposal Area

e. Sandy Point Marsh Creation

CTDEEP proposed Sandy Point Marsh as a potential disposal alternative. The concept of this disposal alternative is to beneficially reuse dredged sediment for the purpose of creating new tidal wetland (salt marsh) area and shoreline erosion mitigation at Sandy Point. The Sandy Point project site is located along the western shore of the inner New Haven Harbor, just north and in the lee of a spit of land known as Sandy Point, in the vicinity of the West Haven Water Pollution Control Facility at 1 First Avenue, West Haven. The spit that extends along the southern boundary is currently undeveloped and is identified as a bird sanctuary.

A stone dike constructed by the USACE in the 1880s extends east from the end of the spit with an outer leg parallel to the entrance channel. The dike was constructed as a control feature to assist in keeping the channel from shoaling. An outfall pipe from the wastewater treatment plant extends through this area and discharges in deeper water offshore. Maintaining both the bird sanctuary and the outfall pipe will be important considerations during the design phase of this project.

The concept for Sandy Point Restoration area is to establish a structural perimeter boundary, fill the area with suitable silty dredged material through either mechanical or hydraulic means, and plant

wetland vegetation. The goal of the proposed disposal area would be to place the sediment to an elevation where intertidal wetland plant species would thrive.

Figure 17 - Sandy Point Marsh Creation Location

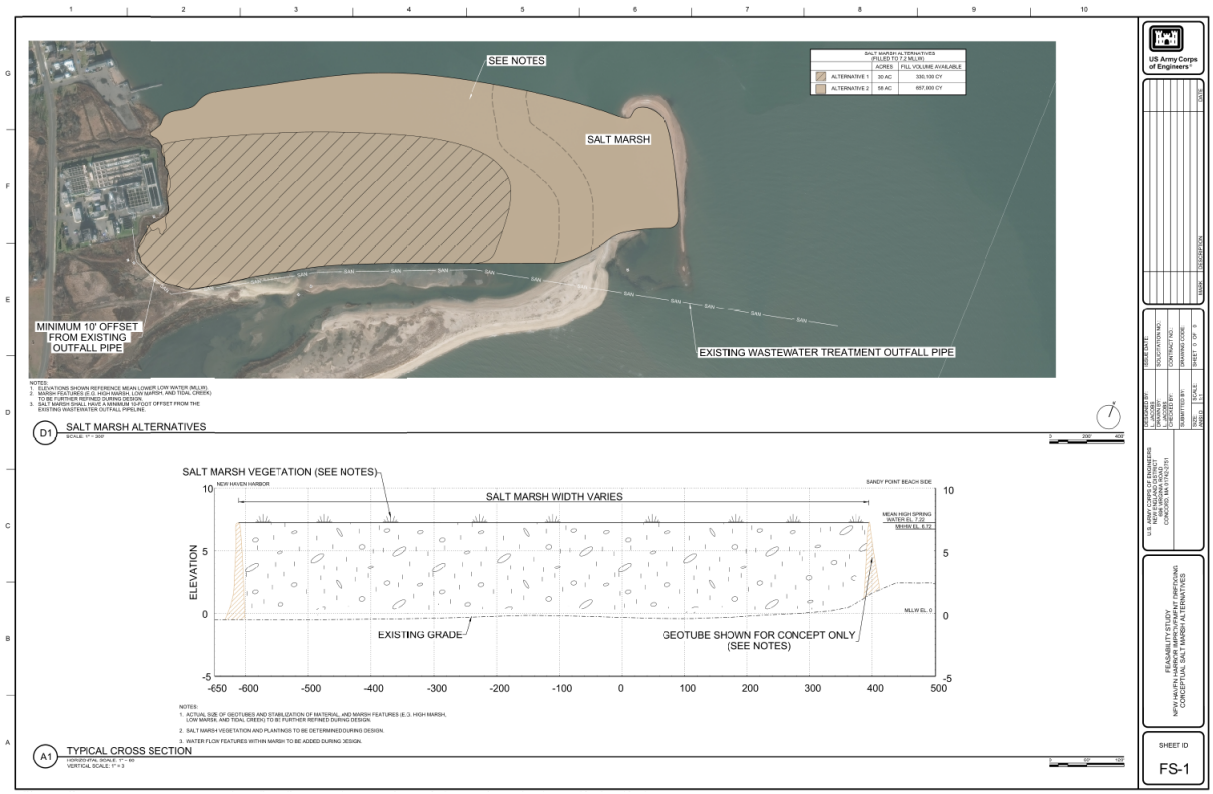

Figure 18 –Sandy Point Marsh Creation Footprint Alternatives

Two alternatives were analyzed. The first wetland creation alternative consisted of a 58 acre site, approximately 7,210 linear feet perimeter, and capable of holding 657,00 cubic yards of dredged material. The second wetland creation alternative consisted of a 30 acre site, approximately 5,110 linear feet perimeter, and capable of holding 330,100 cubic yards of dredged material. The 58 acre site is the preferred alternative because it maximizes the beneficial use of dredged material that would otherwise go to Central Long Island Sound Disposal Site and provides an additional 28 acres of salt marsh habitat over the smaller plan. The target elevation for the surface of the wetland is approximately 7.22 feet MLLW, which requires the elevation to be raised by a range of 2.5 feet to 7 feet within the proposed wetland creation area. This would enable the cell to receive a total of approximately 657,000 cubic yards of dredged sediment. This project would restore salt marsh to that section of shoreline.

V. Ship Simulation Refinements

A feasibility level ship simulator study was performed for the proposed channel improvements outlined in Section I for New Haven Harbor at the USACE Engineer Research and Development Center (ERDC), Coastal Hydraulics Laboratory (CHL) 13-16 February 2018. Representatives from ERDC, the Connecticut Pilots (Capt. David Charlie Jonas and Capt. DJ Toby), and the New England District participated for the duration of the simulation which tested the navigability of the proposed improvements using a limited set of design ships and tidal and wave forcing across the range of proposed project depths from 37 to 42 feet. Feedback from the pilots on the proposed design resulted in confirmation of the design widths

of the entrance and inner channels as well as the configuration of the maneuvering area. Iterative testing of the channel bend and turning basin designs resulted in the modifications described below.

a. Channel Bend at Breakwaters

The proposed bend widening was performed for the 37, 38, 40, and 42 foot project depths. While the widened condition allowed the pilots to make the turn at the breakwater entrance, the turn still required the pilots to use all their rudder, leaving no additional rudder control to respond to unexpected changes in environmental conditions (wind, waves, current, etc.) and little room for error. For this reason, the proposed bend design was widened by shifting the locations of the R “6” and R “8” buoys east 100 feet. This resulted in an increase in bend width from the proposed 700 ft width to 800 ft, and allowed the pilots to make the turn without bank effects. The proposed bend widening resulted in a significant increase of rock material.

b. Turning Basin

The proposed turning basin was tested using the longest of the simulator study’s three design ships, a 750 ft LOA tanker, with the assistance of two tugs coming off the Magellan T-Dock. The pilots indicated that the longest ships typically berth at the Magellan T-Dock at the center of the harbor. While the pilots were able to maneuver within the proposed turning basin at the head of the harbor, it was determined that the existing turning basin, with a small enlargement, would be better suited given its more central location. The proposed enlargement would lengthen the turning basin 200 feet by shifting it existing northeastern and northwestern corners approximately 200 feet toward the head of the harbor to points 1 and 2 as depicted in the figure below.

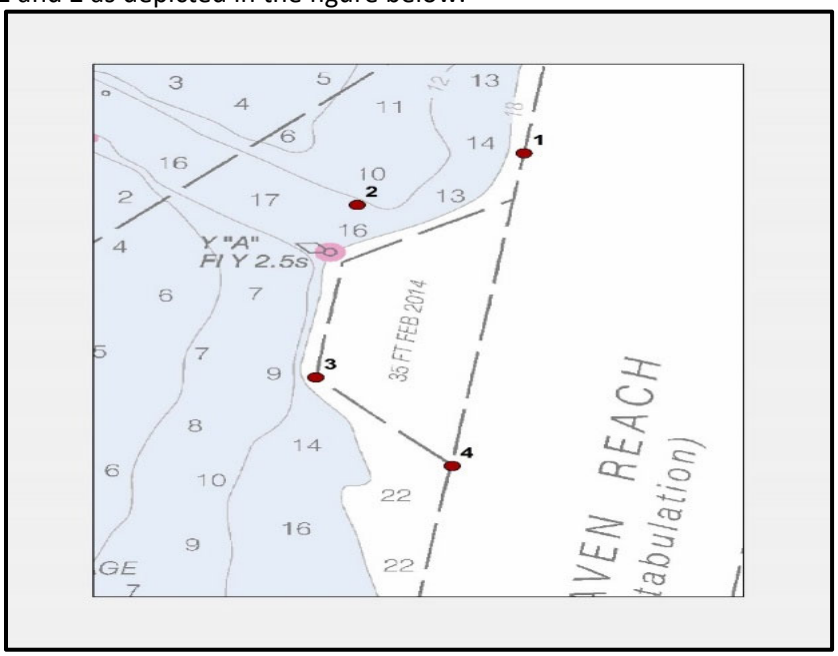

Figure 19 - Ship Simulation Effort – Proposed Adjustments to Turning Basin

c. Quantity Adjustments

Table 3 - Ship Simulation Effort – Channel Adjustment Quantities

40-FT PROJECT	Dredging Quantities (CY)			Dredging Areas (SF)
	Cut	2-FT OD	Total	
Maintenance Dredging (EL 35):				35' Contour
Entrance Channel	0	4,000	4,000	0
Entrance Channel Extension	0	0	0	
Bend (Maintenance STA 45+00 to 85+00)***	200	4,300	4,500	Side Slopes (avg 2ft cut)
Interior Channel	1,500	53,900	55,400	Side Slopes (avg 2ft cut)
Maneuvering Area (within Improved footprint)	2,400	41,700	44,100	Side Slopes (avg 2ft cut)
Turning Basin	1,300	9,100	10,400	
Total Maintenance Dredging	5,400	113,000	118,400	
Improvement Dredging (EL 40):				40' Contour*
Entrance Channel**	263,600	200,900	464,500	2,181,200
Entrance Channel Extension	14,700	39,100	53,800	752,756
Bend (Ordinary Material)	475,300	161,300	636,600	1,841,612
Bend (Rock) (Required Cut to El 42)	24,900	18,600	43,500	257,000
Interior Channel	1,537,400	776,000	2,313,400	8,138,400
Maneuvering Area	377,700	274,600	652,300	3,402,200
Turning Basin	117,900	40,200	158,100	412,300
Total Improvement Dredging	2,811,500	1,510,700	4,322,200	16,985,468
Total All Dredging	**2,816,900**	**1,623,700**	**4,440,600**	Improvement Areas include Maintenance Areas

*Rock "Dredge Area" measured from 42' Contour, per EM 1110-2-1613 for required rock dredging
**Used H11101 Survey for Entrance Channel Extension Quantities
*** Approx. 100 CY of Rock within Maintenance Bend Limits at EL -37. This quantity was subtracted from Maintenance Quantity

GEOLOGY ATTACHMENT

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Figure 3: Contour Map of the Bedrock Surface, New Haven-Woodmont Quadrangles, Connecticut, U.S. Geological Survey, Miscellaneous Field Studies Map MF-557A, 1:24,000, F.P. Haeni and **J.E.** Sanders, 1974 (MLW)

Figure 4: Quaternary Geologic Map of Connecticut and Long Island Sound Basin, U.S. Geological Survey, Scientific Investigation Map 2784, **1**:125,000, J.R. Stone et al., 2005.

Figure 5: Surficial Materials Map of Connecticut, U.S:Geological Survey, **1**:225,000, J.R. Stone et al, 992.

Figure 6: Sidescan Sonar Images, Surficial Geologic Interpretations, and Bathymetry of the Long Island Sound Sea Floor in New Haven Harbor and New Haven Dumping Ground, Connecticut, U.S. Geological Survey, Geologic Investigations Series Map.I-2736, L.J. Poppeet'

Figure 7a and 7b: Boring Locations, Soil and Bedrock Profiles, USACE NAE, PED Report, 1988.

Figure 8: Area 6/7 Boring Locations and Top of Rock Contours, New Haven Harbor, Connecticut, Cross Sound Cable Project, ESS, 2002.

1.0 Regional Bedrock Geology and Structure

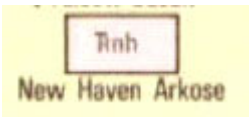
The bedrock surface underlying the New Haven area reflects mature drainage and dissection, with deep pre-glacial valleys developed in the rock, subsequently modified by glacial processes, with sediments deposited below or adjacent to the glacial ice sheet, further modifying the original topography.

Bedrock underlying the New Haven area is composed of two very different rock types, put in proximity to each other due to a fault, the Eastern Border Fault, which strikes East-Northeast to West-Southwest, and dips to the north (Figure 1). The younger rock is on the downthrown side to the north. The older rock is to the south.

The Eastern Border Fault forms the eastern and southern boundary of the Mesozoic Hartford Basin. Mesozoic sedimentary rock is located to the north and west of the Eastern Border Fault and older Precambrian metamorphic rock is located to the south and east of the Eastern Border Fault. The sense of displacement on the fault is down on the north/west side of the normal fault. The fault dips to the north and is shown by the dashed red line in Figure 1. The New Haven Harbor Federal Channel is located both north, and south, of the Eastern Border Fault. The Eastern Border Fault crosses New Haven Harbor at the approximate latitude of Morris Cove (Figure 1).

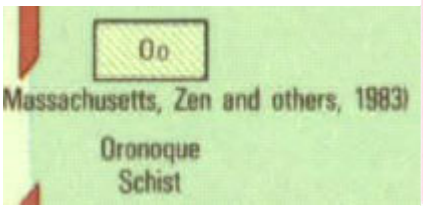
In general, New Haven Harbor is underlain by bedrock consisting of undivided schists and gneisses consisting of metasedimentary and meta-igneous rocks of Proterozoic to Devonian age.

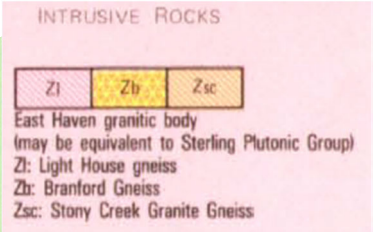
Most of New Haven Harbor is surrounded to the north, northwest, and northeast by New Haven Arkose (Tnh) consisting of red, poorly sorted sandstone and conglomerate. (Figure 1).



The Buttress Dolerite (Jb) is located east of New Haven Harbor. It consists of gabbro, traprock, and basalt. (Figure 1).

The Oronoque Schist (Oo) is located southwest of New Haven Harbor. It consists of granofels and gray/silver schist. (Figure 1)





The Light House Gneiss (Z1) is located south and southeast of New Haven Harbor. It consists of pink granitic gneiss. (Figure 1) and represents rock on the southeast side of the Eastern Border Fault.

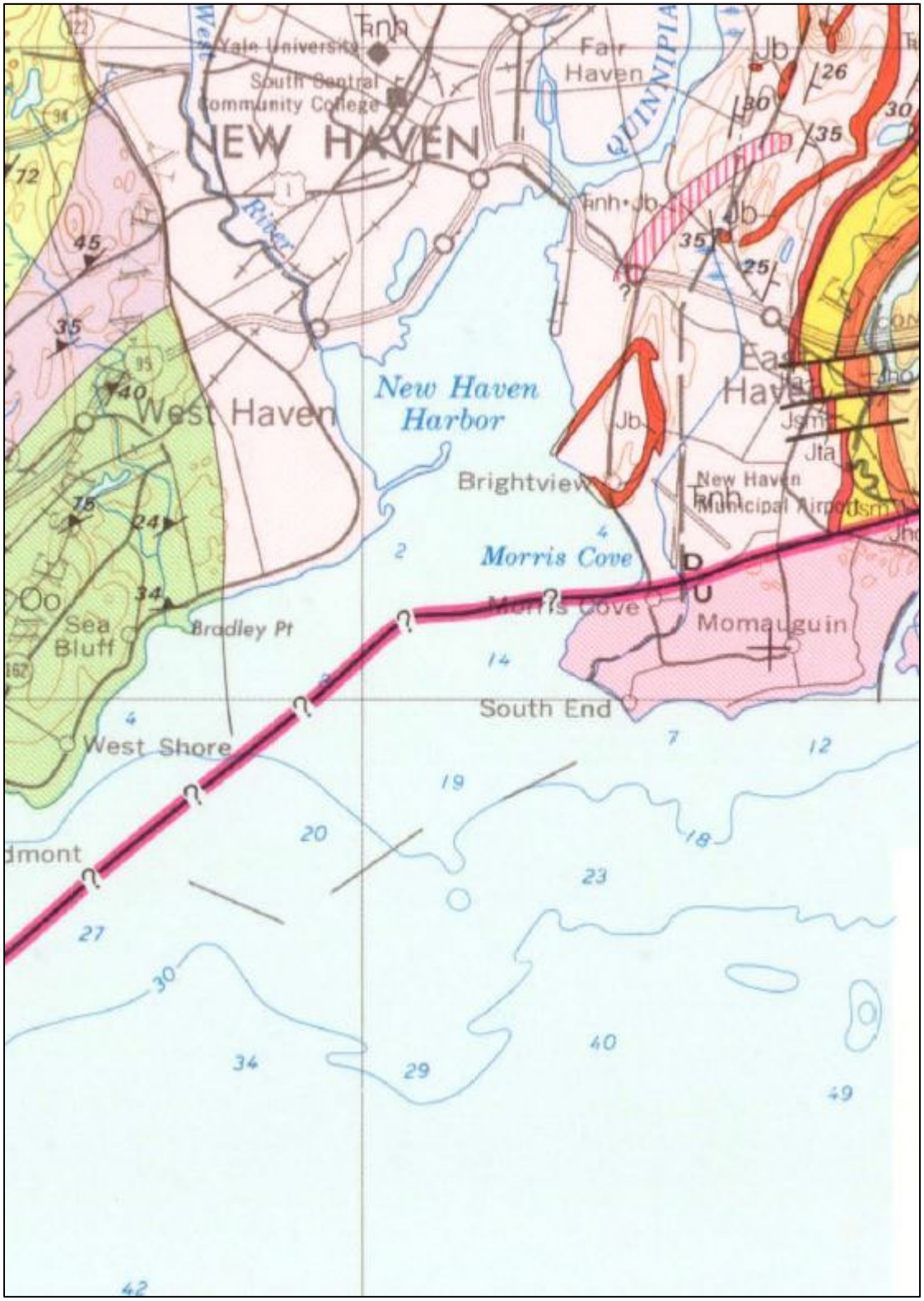


Figure 1: Bedrock Geological Map of Connecticut, Connecticut Geological and Natural History Survey and U.S. Geological Survey, 1:125,000, J. Rodgers, 1985.

The bedrock topography beneath New Haven Harbor consists of the large West Haven Bedrock Valley formed by the coalescence of three smaller V-shaped bedrock valleys associated with the West River, Quinnipiac River, and Farm River. The head of the large bedrock valley is at the approximate latitude of Morris Cove. The large valley strikes southwesterly parallel to the western edge of New Haven Harbor and parallel to the inferred orientation of the Eastern Border Fault (Figure 2 and Figure 3).

The fault zone, marking a sharp contrast between the sedimentary rock types to the north and the harder metamorphic rocks to the south, may have exerted structural control over river drainage development, resulting in the preferential erosion and deepening of the pre-glacial bedrock valley along the fault line. The presence of the harder, more resistant rock south of the fault also may help explain the point that juts out at South End, as well as the indentation at Morris Cove to the north, where glacial deposits fill the deep bedrock valley.

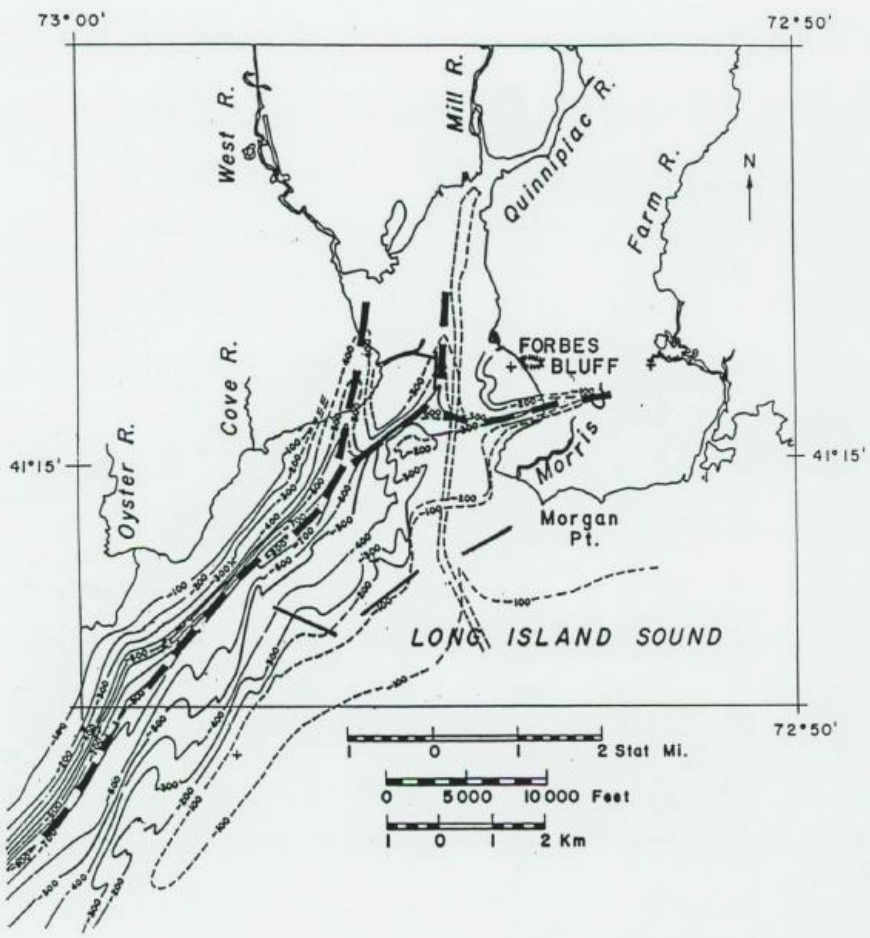


Figure 3. Contour map of buried bedrock surface, New Haven harbor and vicinity, CT. Contour interval, 100 ft. Based on data from continuous seismic-reflection profiles. Datum, mean high water.

Figure 2: Buried, Anomalously Deep V-Shaped Valley in Bedrock Surface, New Haven Harbor, Connecticut, Department of Geology, Hofstra University, J.E. Sanders, 1965.

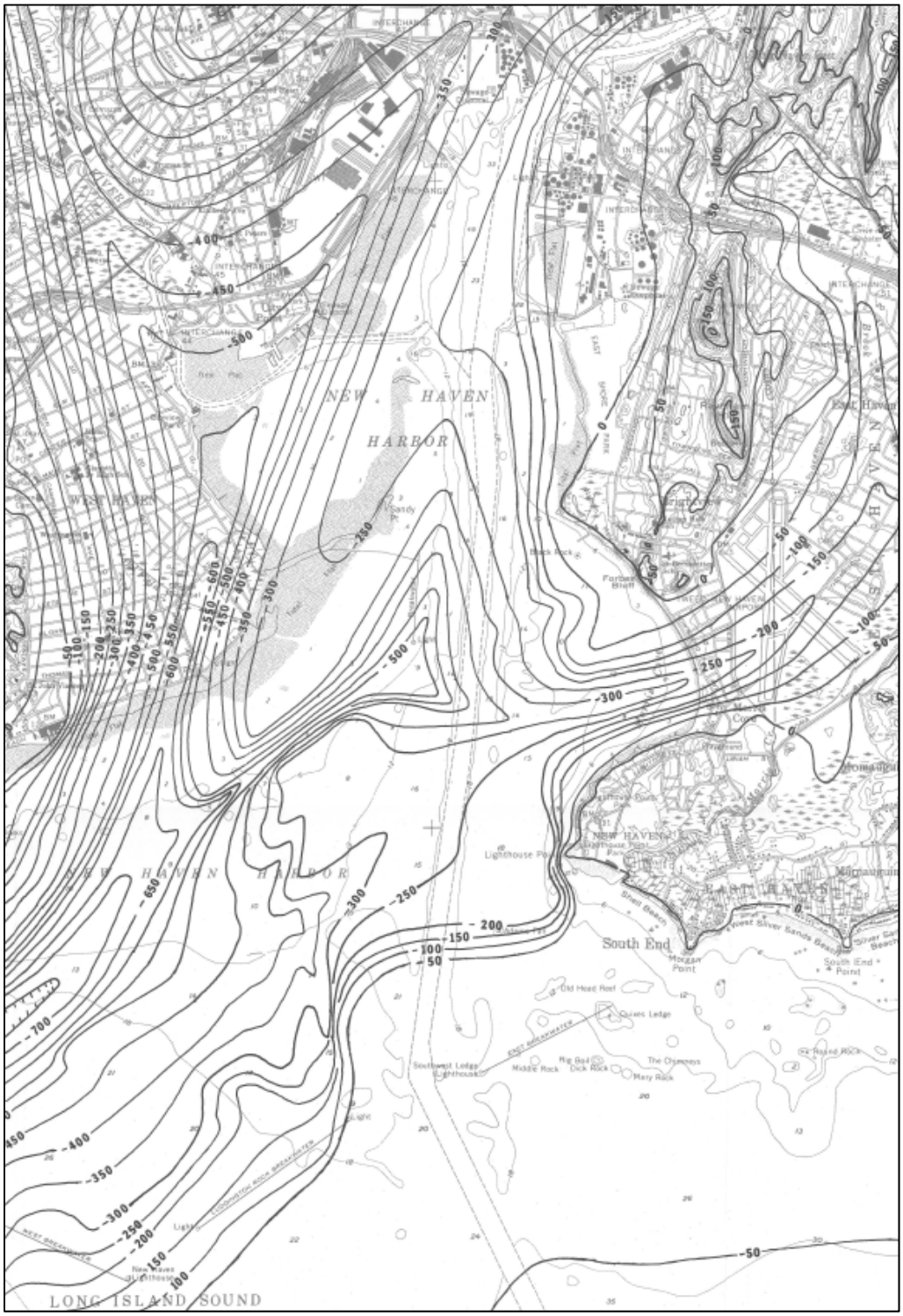


Figure 3: Contour Map of the Bedrock Surface, New Haven-Woodmont Quadrangles, Connecticut, U.S. Geological Survey, Miscellaneous Field Studies Map MF-557A, 1:24,000, F.P. Haeni and J.E. Sanders, 1974 (MLW)

2.0 Regional Surficial Geology

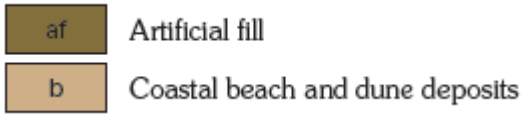
Glaciation resulted in a variety of material types deposited in varying depositional environments, such as: till deposited at the base of the ice; ablation till deposited by material melting out of glacial ice (supraglacial); and material deposited by meltwater, including glaciofluvial outwash deposited by flowing water, lacustrine silts and clays deposited in lakes formed by glacial ice and/or sediment dammed drainages; and deltas where drainages enter larger quiet water bodies and drop their sediment load. Glacial Lake Connecticut was formed by a glacial moraine dam and was the precursor to the current Long Island Sound. Deltaic and glaciolacustrine sediments from the meltwater of receeding glaciers were deposited in Glacial Lake Connecticut.

The surficial geology of the New Haven Uplands has been mapped by J.R. Stone et al (2005) and J.R. Stone et al (1992) and both are presented here as Figures 4 and 5. These maps are in general agreement and are complementary. The 2005 map is a Quaternary Geologic Map of Connecticut and Long Island Sound and the 1992 map is a Surficial Materials Map of Connecticut.

2.1 Surficial Geology of New Haven Uplands

Thin till (t) is located to the east/southeast and west/southwest of New Haven Harbor (Figure 4). Thin till (t) consists of areas where till is generally less than 10-15 ft. thick and includes areas of bedrock outcrop where till is absent. Thin till is predominantly an upper till that is loose to moderately compact, generally sandy, and commonly stony. Two till facies are present in some places; a looser, coarser-grained ablation facies, melted out from supraglacial position; and a more compact finer-grained lodgment facies deposited subglacially. In general, both facies of upper till were derived from the red Mesozoic sedimentary rocks of the central lowland of Connecticut and are finer-grained, more compact, less stony, and have fewer surface boulders than upper till derived from crystalline rocks of the eastern and western highlands (Figure 5).

Coastal Beach/Dune Deposits (b) are located to the east and west of New Haven Harbor (Figure 4). Beach Deposits (b) consisting of sand and gravel deposited along the shoreline by waves and currents and by wind action are located to the east and west of New Haven Harbor. The texture of beach deposits varies over short distances and is generally controlled by the texture of nearby glacial materials exposed to wave action. Beach deposits are generally well sorted and rarely more than a few feet thick. Many sand beaches along the Connecticut coast have been "restored"; these have not been distinguished from natural beaches on this map. However, extensive beaches that consist totally of "made-land" are mapped as artificial fill (Figure 5).



b Beach deposits

af Artificial fill

Holocene Tidal Marsh Deposits (sm) are located to the east and west of New Haven Harbor (Figure 4). These deposits consist of peat and muck interbedded with sand and silt, deposited in environments of low wave energy along the coast and in river estuaries. Marsh deposits are dominantly peat and muck, generally a few feet to 35 ft. thick. They are shown on the map only where greater than about 25 acres in area. In the major estuaries marsh deposits may overlie estuarine deposits which are sand and silt with minor organic material as much as 40-90 ft. thick. These deposits are generally underlain by the glacial material shown adjacent on the map; either till or sand and gravel. Where they are known or inferred to be underlain by sand or fines, they are shown on the map by various line patterns (Figure 5).

sm Tidal-marsh deposits

sm Salt-marsh and tidal-marsh deposits

2.2 Surficial Geology of New Haven Inner Harbor

Glaciofluvial deposits are present in the uplands to the north, northwest, and east of the harbor and are mapped as the New Haven Deposits and East Haven Deposits (Lcnh and lcenh). These deposits are associated with a sediment dammed lake (Figure 4).

lcnh New Haven deposits

lcenh East Haven deposits

These deposits were previously mapped as Sand Overlying Fines (S/f) (Figure 5). Sand is of variable thickness, commonly in inclined foreset beds and overlying thinly bedded fines of variable thickness. The sand represents glaciofluvial deltaic deposits overlying glaciolacustrine lake-bottom sediment. S/f is a subset of Stacked Coarse Deposits Overlying Fine Deposits (Figure 5).

s/f Sand overlying fines

Uncorrelated Meltwater Terrace Deposits of Distal Meltwater Streams (fd) are mapped in the uplands north of New Haven Harbor in the area of the Quinnipiac River (Figure 4).

fd Uncorrelated meltwater terrace deposits

These deposits were previously mapped as Sand and Gravel, Overlying Sand, Overlying Fines (Sg/s/f) in the uplands north of New Haven Harbor in the area of the Quinnipiac River. Sand and gravel is generally less than 20 ft. thick, horizontally bedded, and overlies thicker inclined beds of sand which in turn overlie thinly bedded fines of variable thickness. These are deltaic deposits overlying lake-bottom sediment. Sg/s/f is a subset of Stacked Coarse Deposits Overlying Fine Deposits (Figure 5).

sg/s/f Sand and gravel overlying sand overlying fines

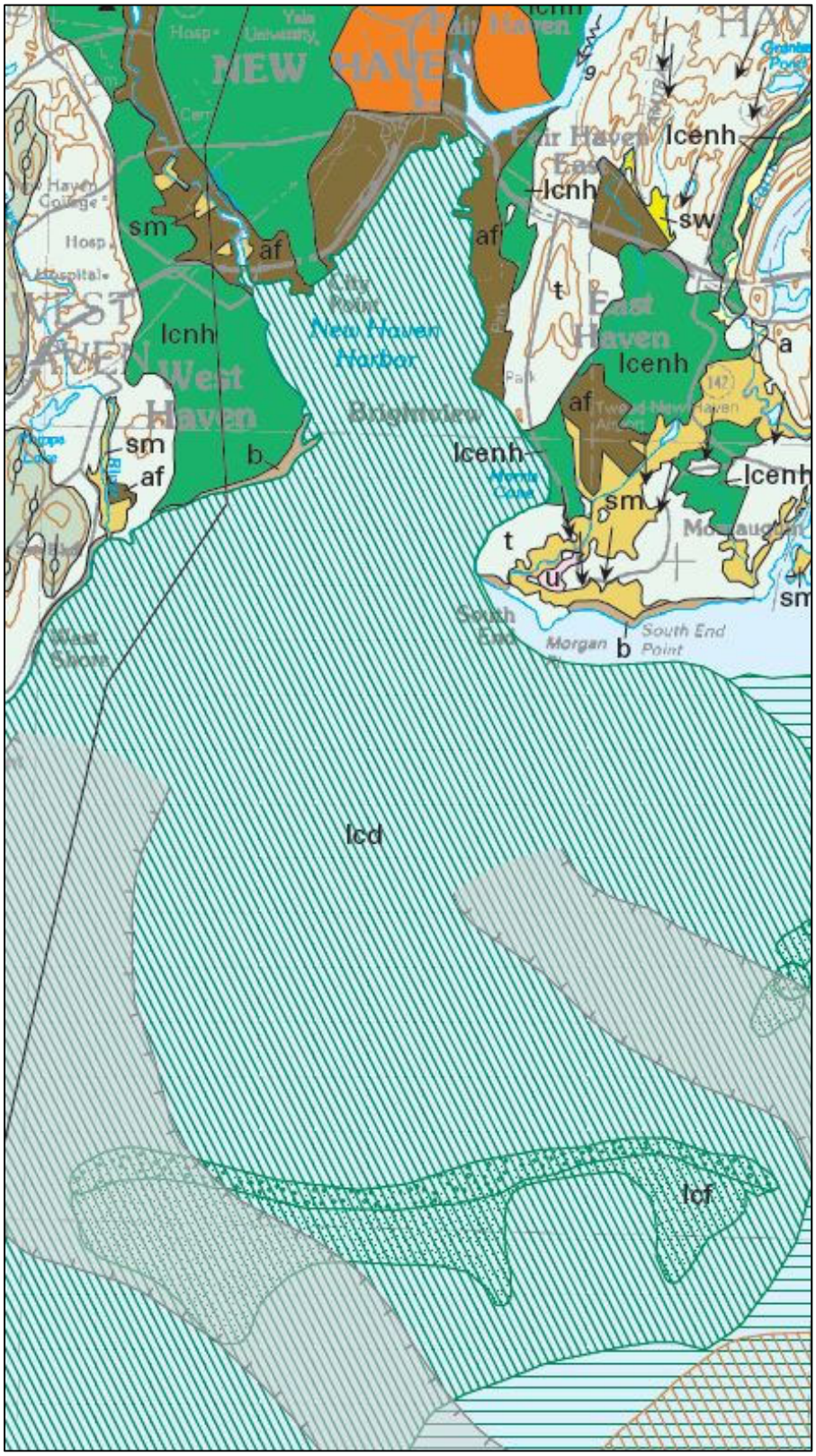


Figure 4: Quaternary Geologic Map of Connecticut and Long Island Sound Basin, U.S. Geological Survey, Scientific Investigation Map 2784, 1:125,000, J.R. Stone et al., 2005.

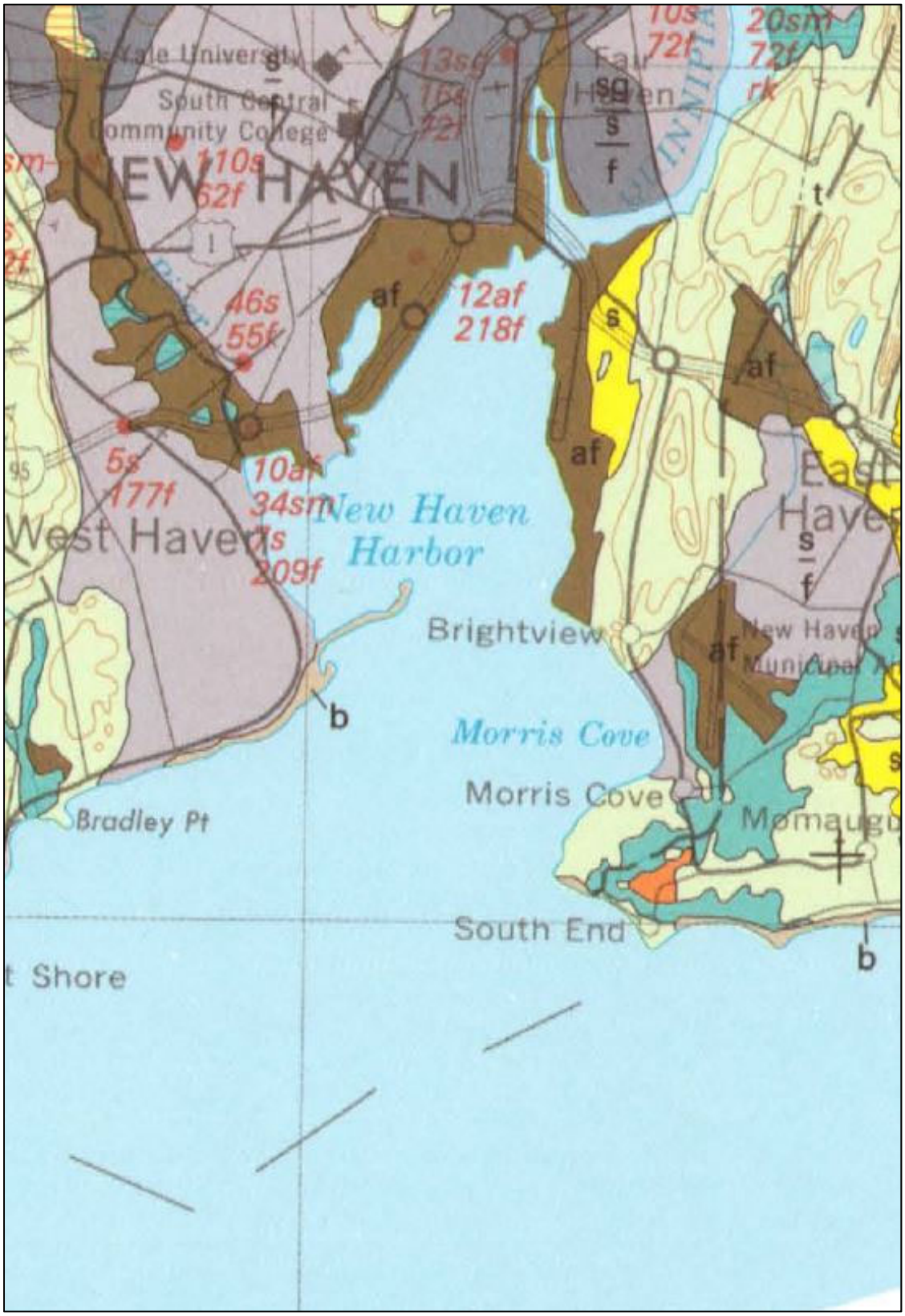


Figure 5: Surficial Materials Map of Connecticut, U.S. Geological Survey, 1:225,000, J.R. Stone et al, 1992.

2.3 Surficial Geology of New Haven Outer Harbor

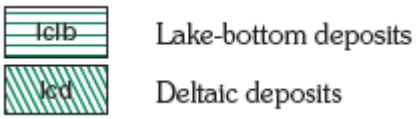
Glacial Lake Connecticut, the precursor to Long Island Sound, extended across what is now Long Island Sound, as the outlet was dammed by a recessional morraine. Deltas formed where rivers entered the lake (proximal), dropping their coarser sediment load, while silts and clays accumulated in the distal, quiet-water lacustrine environment.

The surficial geology consists of Offshore Submerged Deposits of Glacial Lake Connecticut, including Deltaic Deposits consisting of foreset and bottomset beds overlying lake-bottom sediments (Lcd). The Deltaic Deposits are due to deposition from the Quinnipiac River, the Mill River, and the West River into Glacial Lake Connecticut (Figure 4).

2.4 Surficial Geology of Long Island Sound

The Offshore Submerged Deposits of Glacial Lake Connecticut (Late Wisonsian) generally include the following deposits (from oldest/deepest to recent): Lake bottom deposits (lclb); Deltaic deposits (lcd); Coarse-grained proximal facies (lcf) and Fine-grained distal facies (lcf). The lake-bottom deposits are fine-grained, deposited in the deep quiet waters of Glacial Lake Connecticut, and are blanketed by deltaic sediments, deposited at the mouth of the river, with coarser material to the north (closer to the mouth), and finer material to the south (distal to the outlet). Depositional features are described below, in order from oldest to most recent.

Offshore Submerged Deposits of Glacial Lake Connecticut (Late Wisconsinan) include Deltaic Deposits (Lcd) depicted by diagonal green lines (Figure 4). These deposits are inferred from seismic-reflection data to be delta-foreset and bottomset facies of emergent deltaic deposits of coastal Connecticut. Deposits are up to 30 m (131 ft.) thick and are a dominant component of lake sediment in much of the northern nearshore area. Deposits locally overlie bedrock, undifferentiated drift, end moraine deposits, or lacustrine-fan deposits. Generally, however, they overlie and intertongue distally with varved clay lake-bottom facies (lclb). Internally, delta facies exhibits seaward-dipping, oblique-tangential reflectors. These progradational clinoform configurations occur most commonly on north-south-trending profiles. On east-west profiles, reflectors within delta facies are typically parallel to subparallel, horizontally stratified infill configurations with lows in basal bounding surfaces.

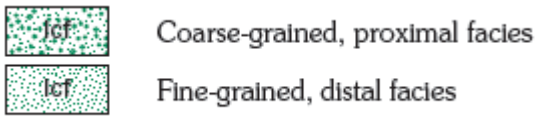


Coarse-grained, proximal facies are depicted by large green dots and Fine-grained, distal facies are depicted by small green dots. (Figure 4). Ice-marginal lacustrine fan deposits are present in the lower part of the glaciolacustrine section. These deposits overlie bedrock, Cretaceous strata, and, or, undifferentiated drift and are commonly in the same stratigraphic positon as moraine deposits. Fans occur locally throughout the basin, but are numerous and more extensive in wide central Long Island Sound.

Each lacustrine-fan sequence consists of two facies that have different seismic characteristics. Ice-proximal facies always occur in the northern part of the deposit, and distal facies always occur in the southern part. On the map, each facies is distinguished by its own pattern, but both with the Lcf label. Proximal facies are commonly an asymmetric, positive relief form with steeper southern slopes and gentler northern slopes. These deposits are inferred from seismic-reflection data to consist of coarse-grained sand and gravel in south-dipping beds and probably contain boulders (at least on the surface)

and ablation till in most proximal parts. Deposits are typically either seismically amorphous or display chaotic internal reflectors. However, multiple seismic-reflection profiles run in different directions across single fans reveal that internal reflectors, which have chaotic configuration on some crossings, appear as steeply dipping clinoforms on other crossings. The seismic data provide evidence that proximal facies contain coarse-grained stratified sediment as well as nonstratified ablation material. The surface of distal facies slopes gently southward from higher-standing proximal facies. These deposits are inferred from seismic-reflection data to consist of finer grained lacustrine beds similar to overlying lake clays but were deposited by turbidity underflow processes. The finer grained lacustrine beds are characterized by finely laminated, subparallel to parallel internal reflectors that fill underlying topographic lows.

Lacustrine fans were built beneath waters of Glacial Lake Connecticut by meltwater streams that issued from the grounding line of the ice sheet. On several seismic-reflection profiles, evidence of systematic northward retreat of ice is provided by shingled sequences of up to 10 ice-marginal fan deposits. In these sequences, proximal facies of one fan are overlain by distal facies of the next younger fan to the north



Offshore Submerged Deposits of Glacial Lake Connecticut (Late Wisconsinan) include Lake-Bottom deposits (Lclb) depicted by horizontal green stripes. (Figure 4). These deposits are inferred from seismic-reflection data to be varved silt and clay commonly 80m (262 ft.) thick and locally greater than 150 m (492 ft.) thick in deep valleys. These deposits dominate the glacial section in the southern half of the basin and variously overlie bedrock and, or, Cretaceous beds, undifferentiated drift, end-moraine deposits, and lacustrine-fan deposits. The unit is characterized by finely laminated, parallel internal reflectors that distinctively drape underlying topography. Several vibracores penetrated varved clay lake-bottom facies. One core (LISAT 6) contained 6.5 m (21 ft.) of typical glaciolacustrine varved sediment in silt-clay couplets, which range from 0.7 to 7.1 cm (0.5 to 3 in) thick with a mean thickness of 2.2 cm (1 in) and (if interpreted as annual) represent 280 years of lacustrine deposition in the interval sampled. Seismic-reflection data collected at the core location reveal that another 30 m (98 ft.) of lake-bottom clay facies is present in the section beneath the cored interval, and that local tidal scour has removed about 20m (66 ft.) of lake-bottom clay that formerly existed above the cored interval. In many places, reflectors within lake-bottom clay facies can be traced northward into deltaic facies.

Early Postglacial Deposits (Early Holocene, Late Wisconsinan) include Submerged marine deltaic deposits – Deltaic facies (md) and Delta-distal facies (mdd) depicted by orange diagonal stripes. Deltaic facies contain internal reflectors that consist of long, southwest-dipping, oblique-tangential clinoforms interpreted as sandy delta-foreset facies and packages of chaotic reflectors interpreted as coarser grained beds (locally delta-topset facies). Delta-foreset facies generally occur in prograded-fill configuration overlying a wave-cut unconformity, and are present -60 m (-197 ft.) and -42 m (-138 ft.) below sea level. Delta-topset facies occur as high as -30 m (-198 ft.) in altitude. The interpreted delta topset-foreset contact lies at about -42 m (-138 ft.). Deltaic beds occupy the eastern half of the deposit. The eastern area has undergone intensive modern tidal scour and only remnants of delta deposits remain. Delta-distal facies contain thin, parallel-laminated internal reflectors interpreted as delta-distal, fine grained facies. The deposits overlie a wave-cut unconformity in an onlap-fill configuration to as high as about -40m (-131 ft.). Relict shoreline features (beaches, bars, or spits) that lie at -42m (-138 ft.) in the southwest and -36 m (-118 ft.) in the northwest are associated with outer edges of delta-distal

facies. Continuous reflectors can be traced across delta-distal facies, indicating that these levels were isochronous. The difference in altitude of the paleoshoreline between north and south is attributed to glacio-isostatic tilting. The top of delta-distal facies is cut by a minor unconformity with up to 4 m (13 ft.) of relief. Vibracores penetrating the unconformity indicate delta-distal facies to be finely laminated, very fine sand.

md Submerged marine deltaic deposits—Deltaic facies

mdd Submerged marine deltaic deposits—Delta-distal facies

Early Postglacial Deposits (Early Holocene) include Submerged fluvial-estuarine, and channel-fill deposits depicted in gray (Ch). (Figure 4). Fluvial sediments are overlain by estuarine sediments (inferred from seismic-reflection data) up to 20 m (66 ft.) thick in channel-fill configuration overlying steep-sided, channel-shaped unconformities that truncate glacial-lake deposits. The lower part of the channel-fill sequence is complex and includes hummocky, lenticular, and short oblique clinoform reflectors suggesting a cut-and-fill origin. These deposits are interpreted from diatoms in vibracores (Szak, 1987) to be terrestrially derived fluvial sediment deposited when streams drained across a subaerially exposed lakebed. Map patterns of these channels show a paleodrainage system related to terrestrial valleys. Tributary channels draining southward from Connecticut and northward from Long Island join an east-draining trunk valley that has thalweg altitudes in the -40-m (-131-ft) range in the west and slopes to about -60m (-197 ft.) in the east where it exited the Long Island Sound basin at The Race. Fluvial facies are commonly overlain in the upper section of channel-fill by a parallel-laminated to seismically opaque unit interpreted to be fine-grained, estuarine sediment deposited as the rising postglacial sea entered the basin through the -60m (-197-ft) notch at The Race and spread to the west via a paleochannel system. Estuarine sediment extends outside the channel system in many places but is not mapped.

ch Submerged fluvial-estuarine, channel-fill deposits

2.5 Regional Grain Size Analyses

The USGS has estimated regional grain size in the outer portions of New Haven Harbor and Long Island Sound based upon the results of sidescan sonar studies. The distribution of sediments has been mapped as depicted in Figure 6. The USGS mapping documents the presence of sandy material occurring on the seafloor in the areas of the existing channel entrance and the proposed extension of the channel entrance.

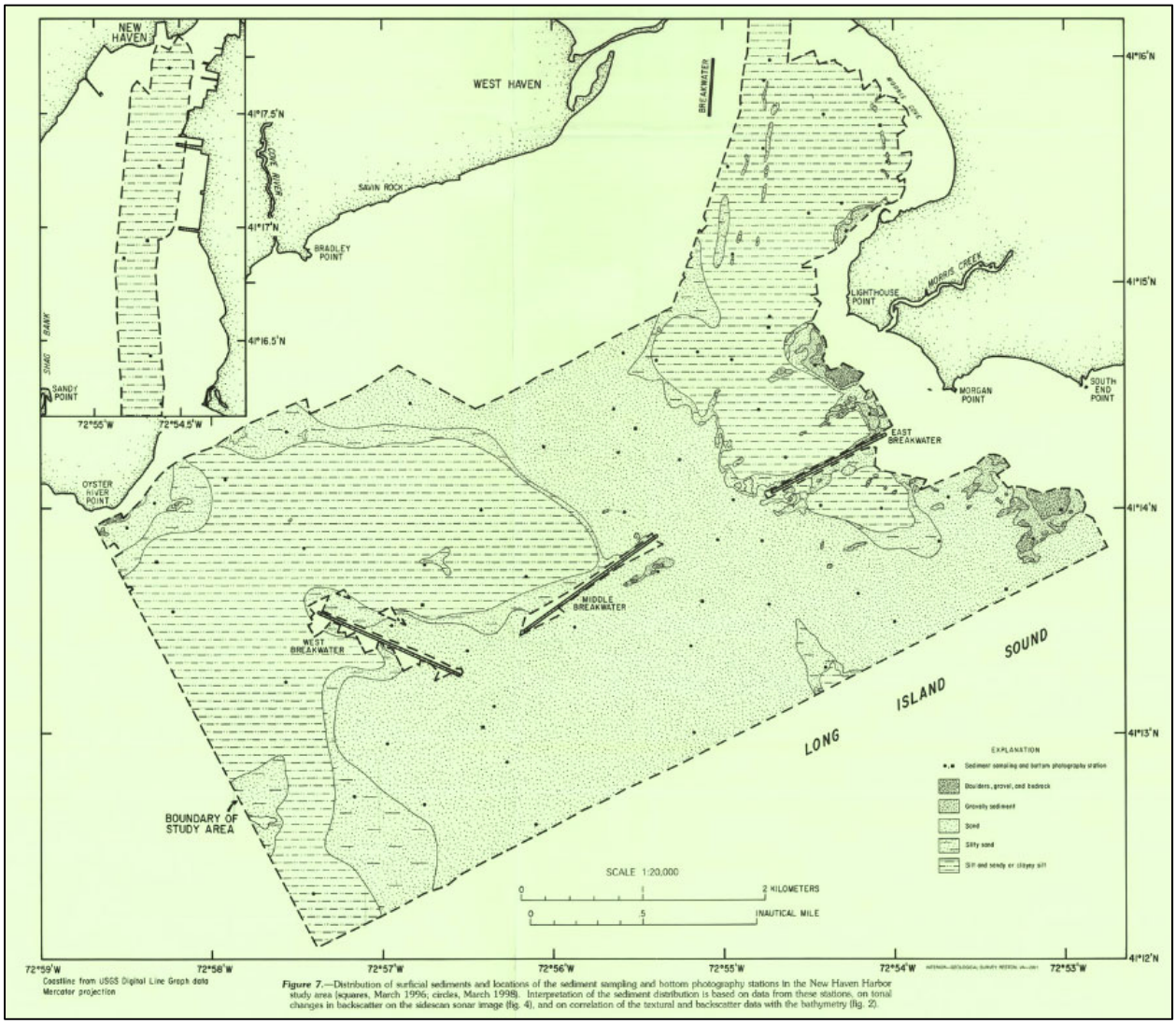


Figure 7.—Distribution of surficial sediments and locations of the sediment sampling and bottom photography stations in the New Haven Harbor study area (squares, March 1996; circles, March 1998). Interpretation of the sediment distribution is based on data from these stations, on tonal changes in backscatter on the sidescan sonar image (fig. 4), and on correlation of the textural and backscatter data with the bathymetry (fig. 2).

Figure 6.

EXPLANATION

- ●,■ Sediment sampling and bottom photography station
- Boulders, gravel, and bedrock
- Gravelly sediment
- Sand
- Silty sand
- Silt and sandy or clayey silt

Figure 6: Sidescan Sonar Images, Surficial Geologic Interpretations, and Bathymetry of the Long Island Sound Sea Floor in New Haven Harbor and New Haven Dumping Ground, Connecticut, U.S. Geological Survey, Geologic Investigations Series Map I-2736, L.J. Poppe et al., 2001.

2.6 Previous Site Specific Surficial Stratigraphy

The site specific stratigraphy of New Haven Harbor has been previously investigated by the USACE with boring programs in the 1970s and 1980s. These results were presented in the 1986 FS report and the 1988 PED report.

Hard copies of 1970s laboratory testing and boring logs were not located for this report. 1980s laboratory gradation testing was reported to be "On-file at NED office", but could not be located for this report.

Soils collected from the inner portions of New Haven Harbor consisted of Holocene, black to gray, organic silt and clay (OH-OL) overlying reddish-brown silty medium-fine sand (SP-SM). Soils collected from the outer portions of New Haven Harbor consisted of black to gray organic silt and gray organic silt (OL-OH), underlain by gray, medium-fine sand, silty-fine sand, and reddish brown silty fine sand (SW-SM), underlain by Till, underlain by bedrock.

Native materials that will likely be encountered during dredging include organic silts, silty sands with gravel, glacial till, and bedrock. The organic silt and clay represents Holocene deposition, while the underlying sand, and silty sands with gravel, represent deltaic and glaciolacustrine sediments deposited into Glacial Lake Connecticut, the precursor to Long Island Sound.

3.0 Previous Investigations

3.1 1974 Haley & Aldrich (H&A) Borings for Bolt, Beranck, and Newman, Inc. (BBN)

Three borings were conducted in bedrock. Boring Y-3A was located in the channel at approximate station 250+. Boring Y-4 was located outside of the channel at approximate station 270. Boring G-1 was located outside of the channel at approximate station 235.

Borings were conducted near the breakwater in area of Station 235+00 to 275+00. Six Borings were conducted.

In general, borings had very poor recovery (<50%). The main drilling problems were a result of the use of a floating spud barge held in place with anchors. Wave and tide interference, particularly near the outer breakwaters, resulted in poor recovery and poor characterization of bedrock. Bedrock was described as very hard, unweathered, highly to moderately fractured, gray, coarse to medium grained, ortho-gneiss.

3.2 1974 BBN Seismic Investigation

Bedrock was identified in the Federal Channel from the 50-ft contour north to the channel bend near the breakwater, thence roughly 4,000 feet further north into the harbor.

3.3 1977 UASCE-NED Study

The 1977 USACE-NED study concluded that approximately 1.2 million cubic yards of dredged material would be suitable for landfill applications and that no materials were suitable for beach nourishment.

These conclusions were based upon 10 drive samples collected at 2,500 ft. intervals along the length of the channel. No rock coring was conducted. Copies of boring logs for FD-1 through FD-10 were reported to be on file at NED. Copies of test data and laboratory grain size analyses were also reported to be on file at NED. However, hard copies of boring logs and laboratory gradations could not be located for this report.

3.4 1974 and 1977 Borings Summarized in 1981 FS Report

In the 1981 FS Report the anticipated types of materials to be encountered during dredging were summarized in the following excerpts:

a. Stations 15+00 to 55+00. On the basis of one boring in the reach, it is expected that all of the material to be dredged will consist of soft, black, and organic silt, OH. Material of this type is not suitable for beach replenishment or for use in landfills since it is slow draining and will remain soft for years after placement. Land disposal of this type of material requires a perimeter structure to retain the material and often causes an odor nuisance.

b. Stations 55+00 to 80+00. On the basis of one boring in this reach, it is estimated that about 50 percent of the material to be dredged will consist of silty fine sand and silty medium to fine sand. This material is considered suitable for use in landfill and the medium to fine sand portion is considered marginally suitable for beach replenishment. These sands are overlain by soft, black and gray organic silt (OH and OH) which are not considered suitable for use in landfills. It is estimated that about 200,000 cubic yards of sand will be dredged from this reach.

c. Stations 80+00 to 230+00. On the basis of six borings in this reach, it is expected that all of the material to be dredged will consist of soft, black and organic silt (OH and OL). As previously discussed, this material is not considered suitable for use in landfills.

d. Stations 230+00 to 275+00. This reach was explored by geophysical methods supplemented by six borings in 1974 by Bolt, Barenek and Newman, Incorporated. The results of this investigation indicate that dredged material will consist of approximately 500,000 cubic yards of rock, fine sand, medium to fine sand and organic silt. It is expected that of the total, approximately 395,000 cubic yards of fine and medium to fine sand is reclaimable for use in landfills.

e. Stations 275+00 to 380+00. On the basis of two borings in this reach, it is expected that most of the material to be dredged will consist of loose, black to dark gray silty medium to fine sand. It is expected that this material (approximately 700,000 cubic yards) will be suitable for use in landfills but will be too silty for beach replenishment.

It should be recognized that the subsurface information presented here is based on a limited number of borings. Therefore, estimates of quantities of materials and their location is considered preliminary in nature. A detailed subsurface exploration program to determine the character of materials, location and quantities will be undertaken at the advance engineering and design stages of the project. The locations of borings and environmental samplings are shown on Soil Profile, Figure 5.

In early 1974, After Dredge Hydrographic Survey of the entire ship channel and turning basin was conducted by the Corps. The drawings (4) show numerous soundings that formed lines or cross-sections taken every 100 feet on center, for about 6 miles. These four drawings shown as Figure 6 also present the proposed channel alignment and turning basin superimposed over the existing 35-foot project alignment. These same drawings (4) form the basis for estimating volumes of dredged materials. Furthermore, based on the design width of 500 feet needed to safely accommodate the range of vessel sizes expected to utilize the port, templetes were developed in consideration for depths of 40, 41, 42 and 45 feet, mlw, with 1 on 3 side slopes. All dredging quantities provide for an overdepth of 2 feet in unconsolidated materials and 4 feet in rock excavation. The estimated volumes for each retained structural plan are presented in Table 5 below.

3.5 1987 Atlantic Testing Laboratories (ATL) Borings

Only two of the 11 proposed borings were completed. One boring was located within the channel. No bedrock sampling or laboratory analyses were conducted. The main drilling problems were a result of the use of a floating spud barge held in place with anchors. Wave and tide interference, particularly near the outer breakwaters, prevented coring of bedrock.

Boring FD-87-2 was located in the channel at approximate station 240+00. FD-87-2 encountered the following sediments with increasing depth: 1) Soft organics 2) Gray, medium to fine sand, with a trace of silt, organics, and shells (SW) 3) Gray, coarse, medium, and fine sand with a trace of gravel, a trace of silt, a trace of organics, and a trace of shells (SW) and 4) Brown, coarse, medium, and fine sand, with little gravel, and a trace of silt (SW).

Boring FD-87-1 encountered the following sediments with increasing depth: 1) Soft organics and 2) Gray, medium to fine sand, with a trace of silt, a trace of organics, a trace of shells, and a trace of fine gravel (SW). No laboratory gradations were provide in the 1987 ATL report.

3.6 1987 Weston Geophysical Corporation Seismic Reflection and Refraction for ATL

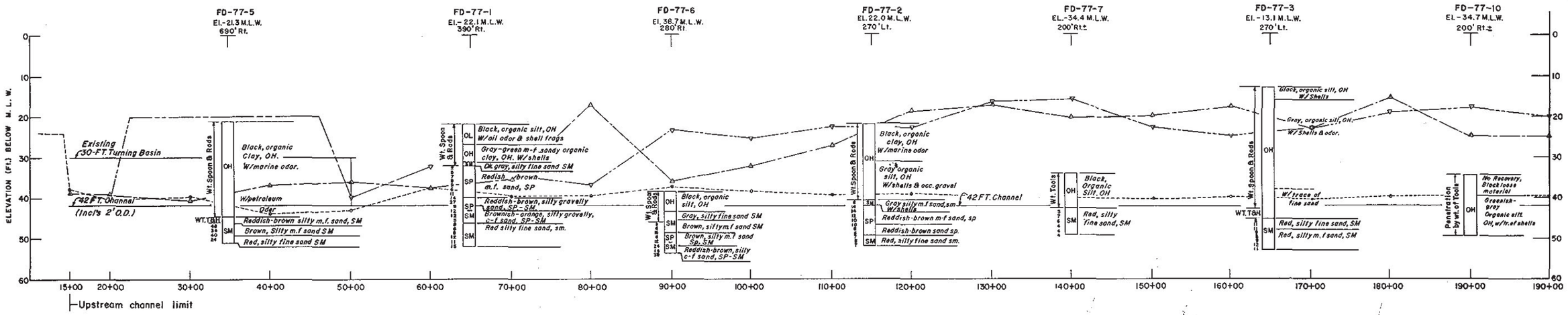
Gaseous organic sediments are located in the inner harbor, extending from stations 15+00 to 220+00. Therefore, there was limited, to no, energy penetration for reflection or refraction seismic studies in the inner harbor. However, gaseous sediments are not located near the channel bend in the area of shallow bedrock, so seismic studies work well in the bend and outer channel areas.

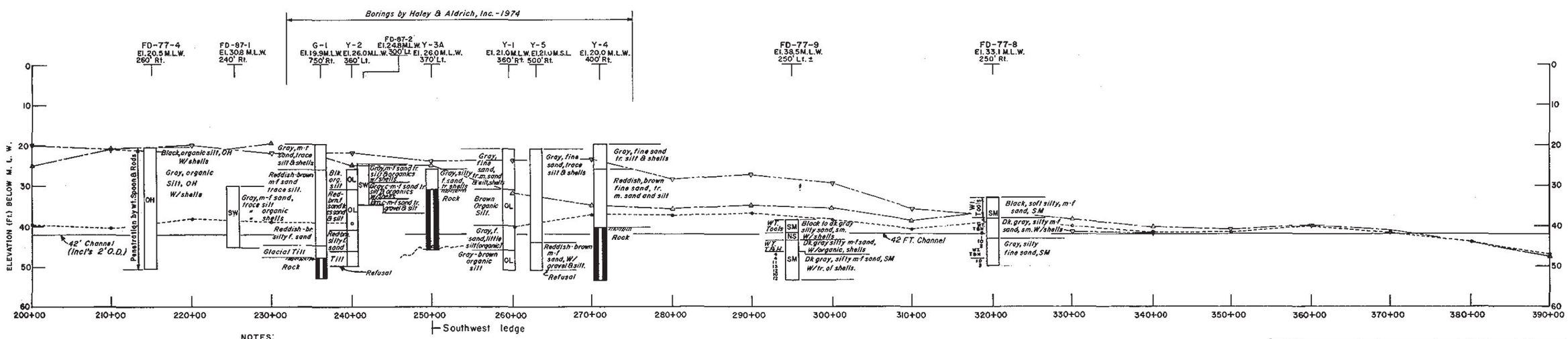
The seismic investigation used both a boomer seismic source and a sparker energy source for the seismic reflection survey. The channel located north of approximate Station 230 was not imaged due to gas charged sediments which are located north of Station 224+00.

For the refraction survey, air gun seismic sources were used along three lines. The lines were located on the east side, on the west side, and in the center of the channel. The eastern line extended to Station 310+00. The center line extended to Station 250+00 and the western line extended to Station 380+00 and in turning basin. The average seismic velocity of the bedrock was high, approximately 16,000 feet per second.

3.7 1988 PED Report

In the 1988 PED report, shallow bedrock was identified in three areas. The areas are: Station 230 -240 (FD-87-2 (240+)); Station 245-255 (Y-3A (250+)); and Station 273-274 (No borings). Rock was recovered, however, no rock mechanics testing was conducted. Therefore the engineering characteristics of the bedrock are unknown. Figure 7A is a soil profile from the 1988 PED report and Figure 7B is a bedrock profile from the 1988 PED report.





NOTES:

1. Soil classification conforms to Unified Soil Classification System.
2. Numbers to left of boring indicate number of blows per foot to drive a 2 inch solid spoon sampler using a 350 Lb. hammer with 18-inch free fall.

LEGEND:

Approximate Profile @ Channel ℄

" " " Left Side of Channel.

" " " Right Side of Channel.

FD-87-4 Boring #4 (1987)

SCALES: HORIZ: 1" = 500 FT. VERT: 1" = 10 FT.

GRAPHIC SCALES

1" = 10' 0 10' 20'

1" = 500' 0 1,250' 2,500'

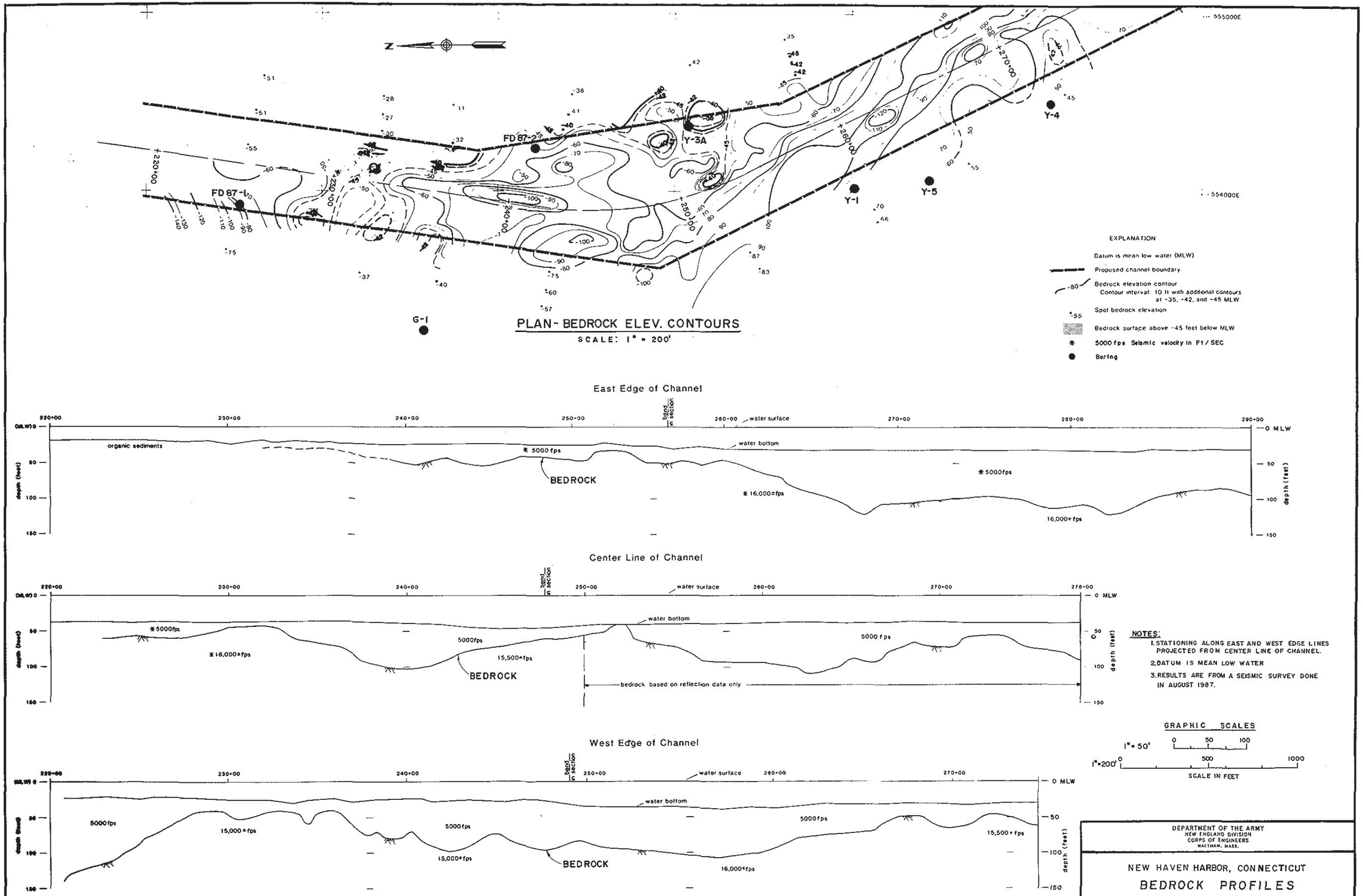
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

NEW HAVEN HARBOR, CONNECTICUT

FIGURE 7A

SOIL PROFILE

AUGUST 1988


N
555000E
554000E
FD 87-1
FD 87-2
Y-3A
Y-1
Y-5
Y-4
G-1
220+00
230+00
240+00
250+00
260+00
270+00
280+00
290+00
EXPLANATION
Datum is mean low water (MLW)
Proposed channel boundary
Bedrock elevation contour
Contour interval: 10 ft with additional contours at -35, -42, and -45 MLW
Spot bedrock elevation
Bedrock surface above -45 feet below MLW
5000 fps Seismic velocity in Ft/SEC
Boring
PLAN- BEDROCK ELEV. CONTOURS
SCALE: 1" = 200'
East Edge of Channel
organic sediments
water bottom
water surface
5000 fps
BEDROCK
16,000±fps
Center Line of Channel
15,500±fps
bedrock based on reflection data only
West Edge of Channel
0 MLW
depth (feet)
NOTES:
1. STATIONING ALONG EAST AND WEST EDGE LINES PROJECTED FROM CENTER LINE OF CHANNEL.
2. DATUM IS MEAN LOW WATER
3. RESULTS ARE FROM A SEISMIC SURVEY DONE IN AUGUST 1987.
GRAPHIC SCALES
1" = 50'
1"=200'
SCALE IN FEET
BEDROCK PROFILES
SCALE: 1" = 200' HORIZ.
1" = 50' VERT.
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
NEW HAVEN HARBOR, CONNECTICUT
BEDROCK PROFILES
FROM
SEISMIC SURVEY
FIGURE 7B
AUGUST 1988

3.8 2002 ESS, Inc. (October 22, 2002)

Cross Sound Cable Project: Area 6/7 Geotechnical Investigation, New Haven Harbor, New Haven, Connecticut: Environmental Science Services, Inc. and Ocean Surveys, Inc. for Cross-Sound Cable Company, LLC

ESS conducted 128 jet probes to map the extent and elevation of bedrock in Area 6/7. Area 6/7 is located upstream of the channel bend near the breakwaters. Sediment ranged from three to 15 feet thick. Sediments consisted of an upper layer of soft aqueous organic silt and clay sediment; a middle layer of dense fine to medium reddish-brown sand and gravel; and a lower layer of coarse sand and gravel till with some cobbles directly above bedrock.

ESS conducted 16 rock core borings in Area 6/7. Seven select rock core samples were laboratory tested for unconfined compressive strength (UCS), tensile strength, and unit weight. The bedrock consisted of light gray, medium to coarse grained, granodioritic gneiss with variable gneissic foliation.

The bedrock has been previously mapped as the Light House Gneiss. The Light House Gneiss is described as a pink or gray to red, medium grained, generally well foliated granitic gneiss of Proterozoic age (Figure 1).

The bedrock is generally hard and fresh to very slightly weathered. The Rock Quality Designation (RQD) generally ranged from 50% to 90% (fair to good quality). The total range of RQDs was 0% to 100%. The lowest RQDs were due to the presence of near vertical fractures. Fracture spacing was close to very close.

From the report's description of low RQD due to the presence of vertical fractures, it is unclear if the RQD method was correctly applied. For vertical fractures one should measure the length of the core centerline and not discount the entire length. It is also unclear if mechanical breaks were differentiated from natural breaks. If all breaks are assumed to be natural, this would result in a lower RQD which would result in underestimating the effort needed to remove the rock during dredging. Low RQDs might also be attributable to mechanical breaks from the use of a spud barge drilling platform rather than a jack-up barge or liftboat.

Laboratory results for UCS ranged from 12,087 psi to 20,447 psi. This range of UCS falls within Class B – High Strength intact rock. This range of UCS is most likely beyond the limits of cutter head dredgability and may also be beyond the productivity limits of backhoe dredgability.

Laboratory results for average splitting tensile strength ranged from 2,607psi to 4,062 psi with a bulk density of approximately 164 lbs. per cubic foot.

Based upon the laboratory results discussed above and RQDs greater than 50%, it is likely that rock will be removed via confined underwater blasting rather than by mechanical means.

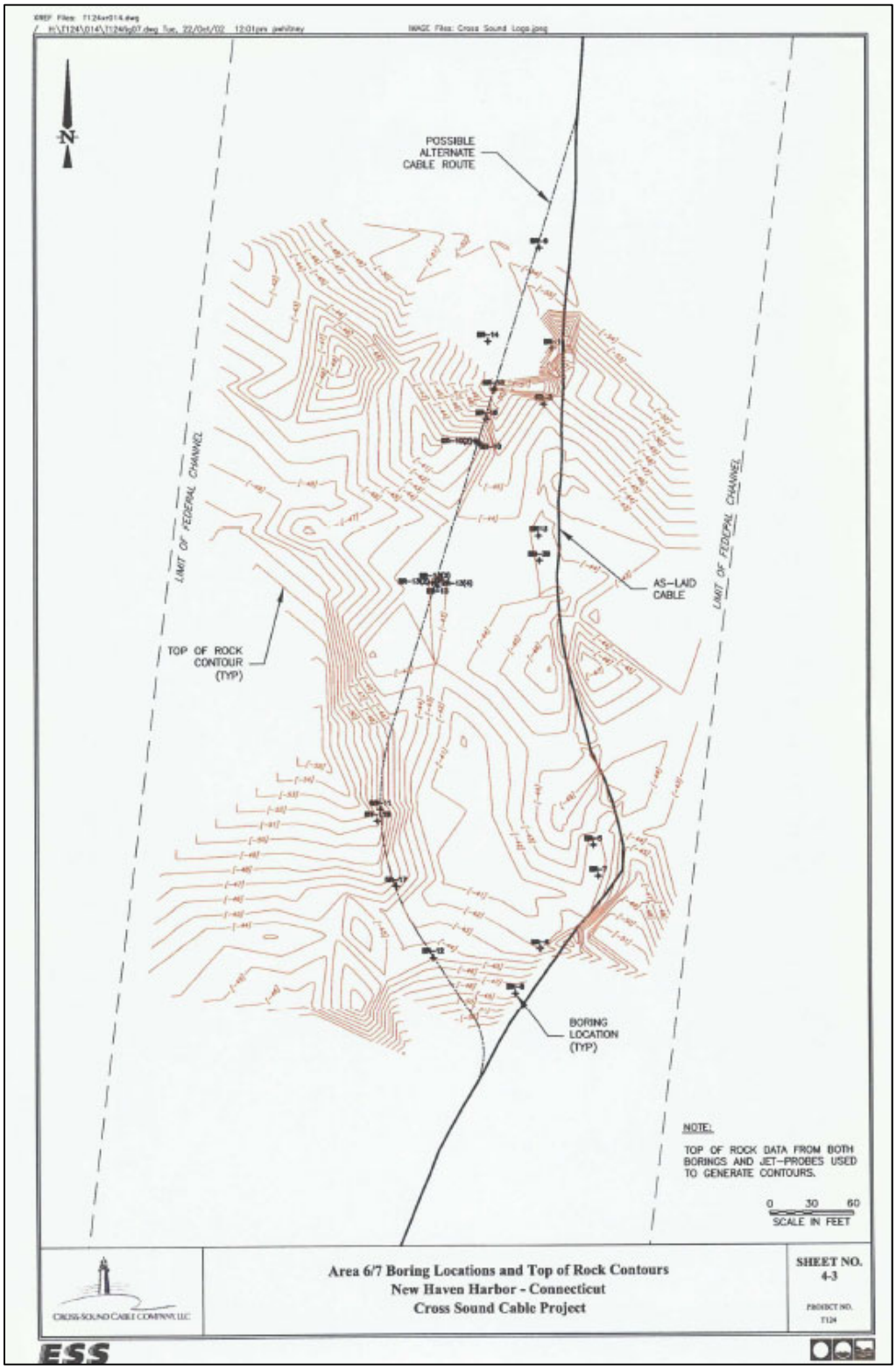


Figure 8: Area 6/7 Boring Locations and Top of Rock Contours, New Haven Harbor, Connecticut, Cross Sound Cable Project, ESS, 2002.

4.0 References:

Atlantic Testing Laboratories, Limited, 30 December 1987; ATL Report No.: CD024-1-1-88, Section 1, New Haven Harbor Improvements Project, New Haven, CT. Engineering Report for Subsurface Investigation performed at New Haven, CT.

ESS, Inc. October 22, 2002, Cross Sound Cable Project: Area 6/7 Geotechnical Investigation, New Have Harbor, New Haven, Connecticut: Environmental Science Services, Inc. and Ocean Surveys, Inc. for Cross-Sound Cable Company, LLC.

R.F. Flint, 1963, New Haven/Woodmont Quadrangles, CT. CT Geological Survey, Quadrangle Report 18, 1:24,000.

R.F. Flint, 1962, Geological Map of Branford, CT. CT Geological Survey, Quadrangle Report 14, 1:24,000.

F.P. Haeni and J.E. Sanders, 1974, Contour Map of the Bedrock Surface, New Haven-Woodmont Quadrangles, Connecticut, Miscellaneous Field Studies Map MF-557 A, United States Department of the Interior, Geological Survey.

NAE-NAV-CT-050-219-1981-Feasibility Report – contains grain size analyses. Page 414-416.

L.J. Poppe et al., 2001. Sidescan Sonar Images, Surficial Geologic Interpretations, and Bathymetry of the Long Island Sound Sea Floor in New Haven Harbor and New Haven Dumping Ground, Connecticut. Geologic Investigations Series Map I-2736 (Sheet 1 of 2), U.S. Department of the Interior, U.S. Geological Survey.

J. Rodgers, 1985, Bedrock Geological Map of Connecticut, Connecticut Natural Resources Atlas Series, Sheet 1 of 2, Scale 1:125,000.

J.R. Stone et al., 2005, Quaternary Geologic Map of Connecticut and Long Island Sound Basin, Scientific Investigations Map 2784, United States Geological Survey, Sheet 1 of 2, Scale 1:125,000.

J.R. Stone et al., 1992, Surficial Materials Map of Connecticut, United States Geological Survey, Sheet 1 of 2, Scale 1:125,000.

USACE-WES, 1988, Field Investigation of New Haven Harbor, Connecticut, Miscellaneous Paper HL-88-8, September 1988 Final Report.

Weston Geophysical Corporation, 1987, Geophysical Investigation, Proposed Channel Dredging Area, New Haven Harbor Channel, New Haven, Connecticut, Prepared for Atlantic Testing Laboratories, Inc.,. December 1987.

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX E
COASTAL ENGINEERING

NEW HAVEN HARBOR, CT
NAVIGATION IMPROVEMENT STUDY
FEASIBILITY STUDY

APPENDIX E

COASTAL ENGINEERING

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1.0 Study Overview

The New Haven Harbor Navigation Improvement Study investigated the feasibility of improving the New Haven Harbor, Connecticut Federal Navigation Project to decrease inefficiencies caused by tidal delays while promoting safe navigation for deep draft vessels servicing the Port of New Haven. The location of the study area can be seen in Figure 1-1. Within the study area are the cities of New Haven and West Haven, both of which are within southern New Haven County along the north shore of Long Island Sound.

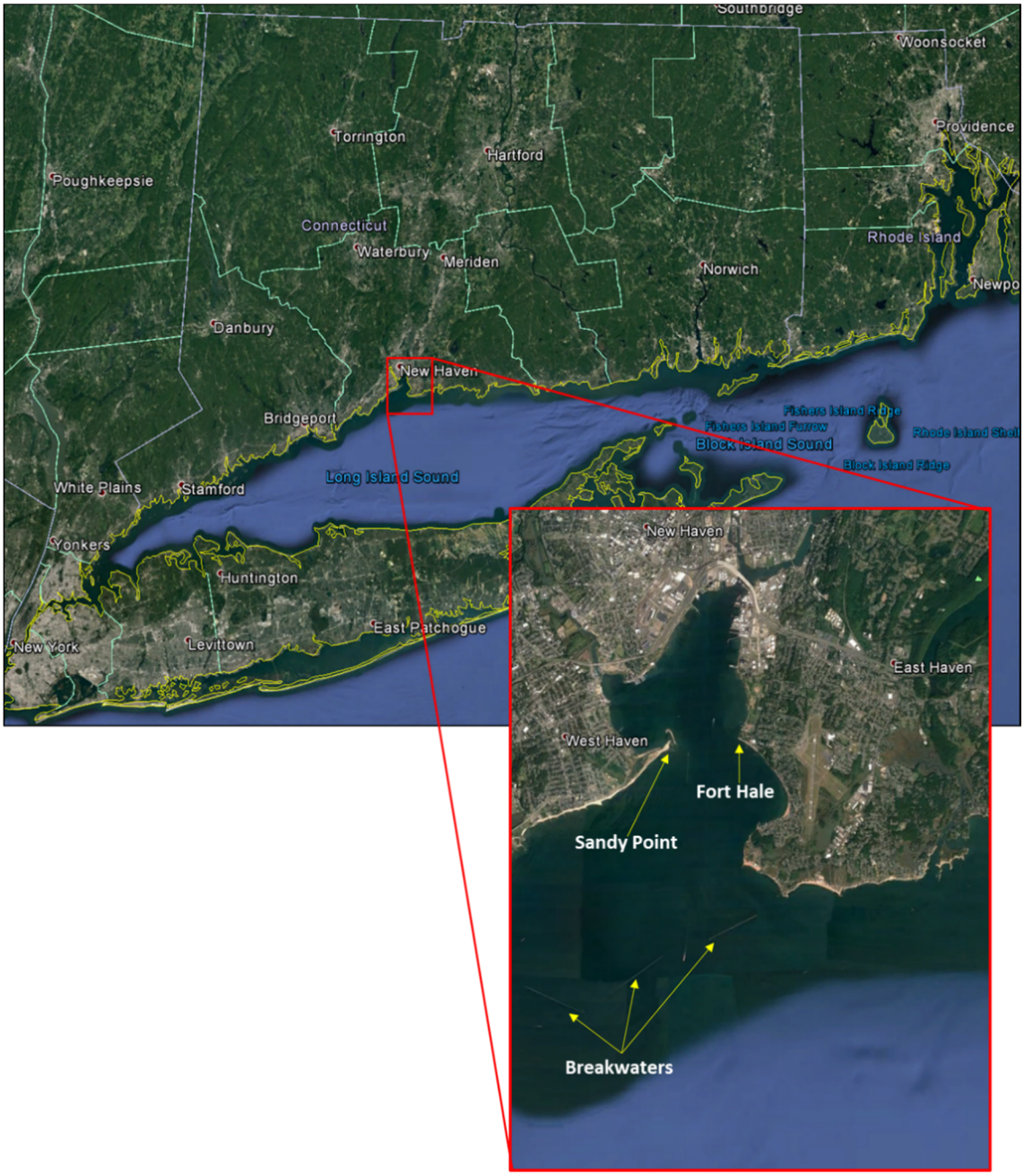

Figure 1-1. Study Location Map

To improve the Port's economic efficiency and the channel's navigability, the study considered structural improvements to the channel such as deepening, widening, and realignment, and placement options for dredged material. The study also evaluated the resilience of the Port of New Haven and existing and proposed features of the Federal Navigation Project to sea level change. The study relied upon existing available information and did not require the collection of additional data.

1.1 Study Area

New Haven Harbor, a bay on the northern side of Long Island Sound, is located 75 miles northeast of metropolitan New York City. Three detached breakwaters protect the entrance to New Haven Harbor from Long Island Sound. The deepwater entrance of the main ship channel to the harbor lies between the Luddington Rock (Central) Breakwater and the East Breakwater. The ship channel extends approximately 5.7 miles from deepwater in the Sound to the head of the harbor. The harbor terminals are situated in the inner portion of New Haven Harbor, north of Sandy Point on the west and Fort Hale on the east, below the head of the harbor. The Mill and Quinnipiac Rivers empty into the head of the harbor through a common mouth at Tomlinson Bridge (Route 1) while the West River enters the west side of the harbor about 1 mile below its head. All said, New Haven Harbor is approximately 4.5 miles long and varies from 1 to 4 miles in width.

Within the study area there are several fairly defined areas that can be considered separately. Brief descriptions of each area and its exposure to coastal forcings is provided below.

1.1.1 Port of New Haven

The Port of New Haven resides at the north end of the study area just south of the head of the harbor. The Port is comprised of a group of privately owned facilities, collectively administered by the New Haven Port Authority, primarily situated on the east side of the harbor south of the Interstate 95 highway corridor. The Port of New Haven and the harbor terminals included in the study area are shown in Figure 1-2. New Haven Harbor is the largest port in Connecticut and the second largest in New England, behind Boston, based on commercial tonnage. Petroleum products account for the majority of the tonnage, with the remainder consisting of scrap metal, steel, and minerals. The New Haven fuel facilities are part of the U.S. Government's Strategic Petroleum Reserve. Pipeline connections from the port handle jet fuel for Bradley International Airport and for the Massachusetts Air National Guard Base in Westover, Massachusetts. The port also benefits from its proximity to the interstate highway and rail freight networks. At the head of the harbor, the port is sheltered from strong winds and waves approaching from most directions, but does experience daily tidal water level fluctuations and, less frequently, storm surge generated by tropical and extratropical storms.

Figure 1-2. Port of New Haven Terminals

1.1.2 Main Ship Channel and Turning Basin

The main ship channel extends from deepwater in Long Island Sound through the harbor breakwaters to the head of New Haven Harbor. The federal navigation channel has been improved numerous times as

the port has grown with increased demands of commerce and to accommodate longer, deeper draft vessels. However, with the exception of maintenance dredging, there has been no modification to the navigation channel at New Haven Harbor since 1950 when dredging of the existing 35 foot MLLW main channel, shown in Figure 1-3, was completed. The entrance channel width in Long Island Sound is 500 feet and widens to 560 feet at the bend between the breakwaters. The channel width is 400 feet from the bend north past Fort Hale and Sandy Point, where it widens again to 500 feet. In the vicinity of the Port of New Haven, the channel and maneuvering area are 800 feet wide. The project also includes a 35 foot deep, trapezoidal-shaped turning basin west of the main channel across from New Haven Terminal.

Vessels transporting commodities to and from the port experience navigation difficulties due primarily to the limitation imposed by the existing 35 foot channel depth. Inbound ships are disproportionately affected as they enter New Haven Harbor fully-loaded, drawing more water. The presence of a rock bottom in part of the channel makes a 4 foot clearance mandatory for visiting ships. Therefore, with the existing channel depth at 35 feet MLLW, a ship must either come into port with a draft of 31 feet or less, or wait for proper tidal conditions before entering the harbor. At 0 MLLW, vessels are restricted to a 31 foot draft. Using the full 6 foot tide range, ships drawing up to 37 feet can transit the channel at high tide. In addition to tidal delays, ships drafting over 37 feet must first lighter in Long Island Sound to offload cargo to meet the depth restriction.

Other navigation difficulties include channel width and alignment problems associated with safely maneuvering today's larger ships within the confines of the existing channel, most notably at the channel's bend between the breakwaters (Figure 1-4). With the existing approach, inbound vessels favor the starboard side of the channel, lining up nearest the red buoys, in anticipation that they will be set by the east to west flood current and experience bank suction at the bend which pulls their stern to port. In order to make this turn and straighten up to make the next set of navigation buoys, ships have to make full use of their rudder and engine, leaving little room for adjustment or error.

Figure 1-3. New Haven Channel, NOAA Chart 12371

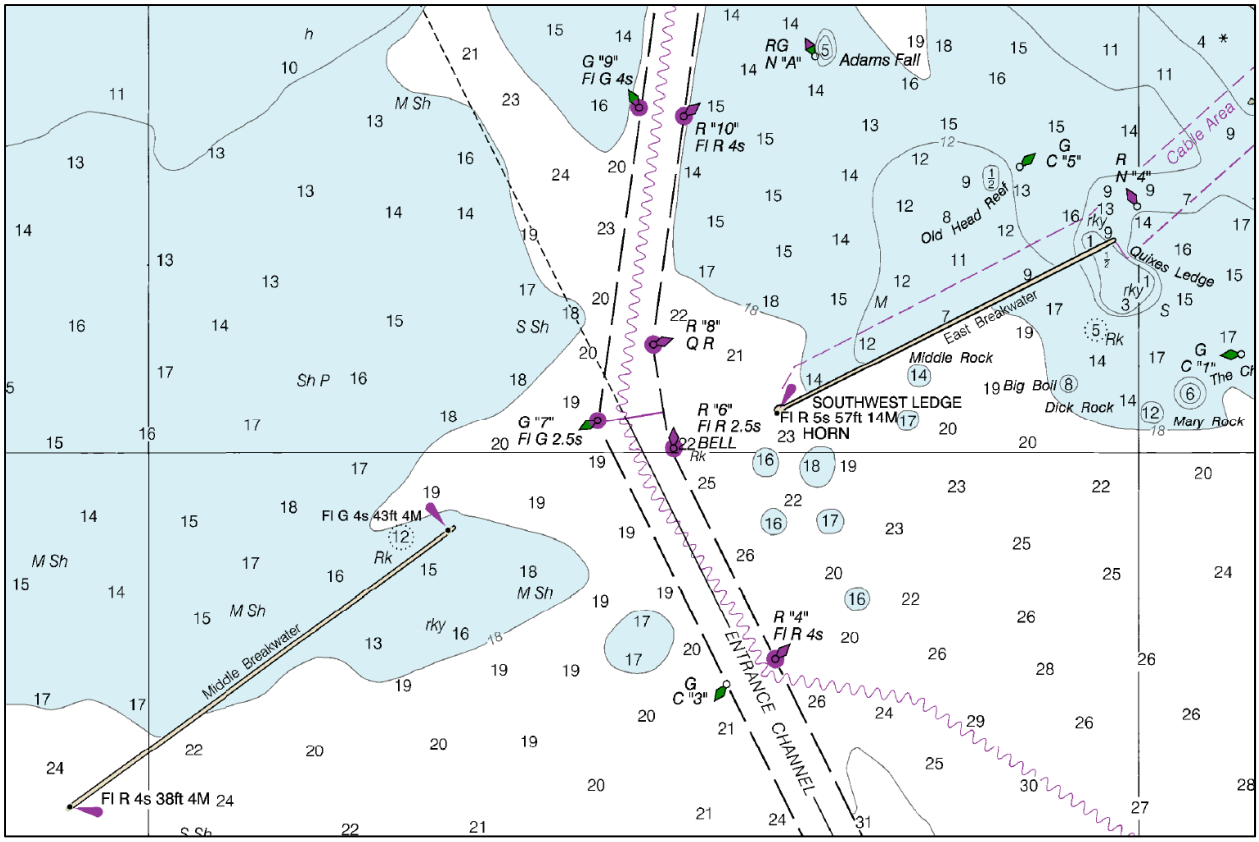

Figure 1-4. Channel Bend at Breakwaters

1.1.3 Offshore Breakwaters

The Federal Navigation Project also includes three armor stone breakwaters at the southern entrance to New Haven Harbor. These structures were constructed for making a harbor of refuge and authorized by the River and Harbor Acts of 3 March 1879 and 19 September 1890. Construction of the East Breakwater was started in 1880 and was completed to a length of 3,450 feet in 1890. The Middle or Luddington Rock Breakwater was started in 1891 and was completed to a length of 4,500 feet in 1896. Construction of the West Breakwater began in 1896 and was completed to a length of 4,200 feet in 1915. The breakwaters have a uniform cross section design with a crest elevation at 12.25 feet above MLLW. These structures provide a harbor of refuge at the mouth of the harbor and afford protection to the harbor from all but southwestern storms. The breakwaters also afford West Haven protection from southern and southeastern storms, thereby reducing storm damage to this area.

1.1.4 Sandy Point Dike

Sandy Point Dike is a training dike located on the west side of New Haven Harbor opposite Fort Hale. It was constructed as a federal project authorized by the River and Harbor Act of August 2, 1882 after attempts to keep the channel open by dredging alone were unsuccessful. The dike consists of a 2,140 foot shore arm extending easterly from a long sand spit known as Sandy Point and a 2,089 foot channel arm running north and south approximately parallel to the main harbor channel. The shore arm and one-half of the channel arm were built in 1888 and the structure was completed in 1890. The inner 1,294 feet of the shore arm consists of riprap while the outer 846 feet of the shore arm and the

northern 254 feet of the channel arm consists of two rows of piling filled with stone. The remaining 1,835 feet of the channel arm are built of rip rap, with a 20 foot ice breaker of heavy riprap at the north end of the channel arm.

Drawings indicate that the entire shore arm of the structure was built to or slightly above MHW. A small portion of the northernmost end of the channel arm was built to 1 foot above MHW and the remaining portion built to 2 feet above MHW. Records indicate that shortly after the structure was completed, it settled 1-2 feet in places. Today, the shore arm is almost entirely below Mean Sea Level, whereas the channel arm crest varies from Mean Sea Level where it meets the shore arm to slightly above MHW at its southern tip. Although the structure has settled in places it appears to be functioning properly relative to its authorized purpose to decrease the width of the waterway between Sandy Point and Fort Hale to lessen sediment deposition. Secondarily, the dike serves to arrest northeastern sand movement from West Haven.

1.2 Coastal Engineering Scope of Work

Supporting the study, coastal analysis and engineering work was completed and provided to the Project Delivery Team (PDT). The coastal engineering tasks included evaluation of existing conditions, future without project conditions, design of improvement alternatives, and assessments to determine the influence of the proposed modification on harbor hydrodynamics, sedimentation, and navigability. The information within this appendix describes this work and the information provided. As part of the Corps' SMART Planning process, earlier alternative screening was completed which limited and focused the level of analysis associated with the project. As part of the reduced level of analysis, an effort was made to use existing information where it remained applicable. This work focused on providing representative conditions for navigation in New Haven Harbor and Long Island Sound and assessing the projected impacts of climate change and sea level rise on the tentatively selected project. These analyses are detailed in this report.

2.0 Coastal Climatology and Setting

Due to its proximity to the coast, the south central Connecticut region generally has a warm summer cooled by coastal breezes and a vigorous winter moderated by the warming effects of the Atlantic Ocean currents and Long Island Sound. The harbor at New Haven, being tidal water, is essentially ice-free. The area is subject to occasional hurricanes and nor'easters. It is not uncommon for fog to set in over the harbor.

2.1 Tidal Regime and Water Levels

New Haven Harbor experiences semi-diurnal tides (two low and two high tides per day) with one high and low tide typically of greater magnitude than the other due to a slight diurnal shift. NOAA installed a tide gage (Station 8465705) in August of 1999. The mean tide range in the Harbor is 6.14 feet and the diurnal range is 6.7 feet. The tides, which are created by the gravitational pull of the moon, the sun, and the earth's rotations are responsible for most of the water levels observed. Occasionally, abnormally high or low water levels occur as a result of changes in atmospheric pressure, storm surge, the magnitude and direction of wind and/or waves, and other meteorological anomalies. Table 2-1 provides the tidal datums for New Haven at Station 8465705. In New Haven the highest water level observed

was 12.23 feet MLLW, which was during Hurricane Sandy on October 30, 2012. The lowest observed water level was -3.09 feet MLLW on December 12, 2000.

Table 2-1. New Haven Harbor Tide Range – NOAA Station 8465705

Condition	Elevation (feet, MLLW)	Elevation (feet, NAVD88*)
Mean Spring High Water (MSHW)	7.22	3.60
Mean Higher High Water (MHHW)	6.71	3.09
Mean High Water (MHW)	6.39	2.77
NAVD88	3.62	0.00
Mean Sea Level (MSL)	3.32	-0.30
Mean Tide Level (MTL)	3.32	-0.30
Mean Low Water (MLW)	0.24	-3.38
Mean Lower Low Water (MLLW)	0.00	-3.62

***North American Vertical Datum of 1988**

In addition to the daily tidal conditions at Station 8465705, extreme water levels are provided for New Haven Harbor at select output points from the North Atlantic Coast Comprehensive Study (NACCS). Table 2-2 contains statistical annual exceedance probability water levels at the NACCS save points shown in Figure 2-1. NACCS data was output in meters, Mean Sea Level and has been converted to feet, NAVD88. The year 1992 was used as the base year for the NACCS data because that is the midpoint of the most recent tidal epoch for which Mean Sea Level has been established (1983-2001).

Table 2-2. Annual Exceedance Probability (AEP) Water Levels from NACCS Study

NACCS Save Point		Annual Exceedance Probability Water Level (feet, NAVD88)						
Location	**Number**	0.99	0.98	0.2	0.1	0.05	0.02	0.01
New Haven Harbor	271	5.30	6.22	7.40	8.29	9.14	10.39	11.57
East Breakwater	276	5.21	6.12	7.27	8.06	8.81	9.80	10.78
Central (Luddington) Breakwater	277	5.25	6.17	7.31	8.10	8.86	9.84	10.79
West Breakwater	278	5.29	6.21	7.36	8.15	8.90	9.89	10.84

Figure 2-1. NACCS save point locations

2.2 Currents

Current data was measured by NOAA over 6 weeks as part of the Long Island Sound 2010 Current Survey at 3 locations in New Haven: the Tanker Terminal (LIS1022), Harbor Entrance (LIS1023), and Gateway Terminal (LIS1024) (Figure 2-2). At each location, currents were recorded at 6 minute intervals at 7, 9, and 8 foot depths respectively, and averaged. The depth-averaged average velocities are 0.19 knots at the Tanker Terminal, 0.38 knots in the entrance channel, and 0.26 at the Gateway Terminal. A critical location for maximum currents and navigability however is where the channel passes between the two breakwaters.

The 1988 New Haven Harbor Numerical Model Study conducted by the USACE Waterways Experiment Station Hydraulics Laboratory used the TABS-2 modeling system to derive current velocities and changes in water levels due to tides. The effects of wind, waves, and atmospheric pressure variations were not accounted for. The study observed a substantial current along the length of Long Island Sound is produced as tide levels rise (flood) and fall (ebb). This current flows parallel to the harbor breakwaters and is greatest midway between tidal extremes (high and low tides). Currents through the openings in the breakwaters show a significant increase in speed and change in direction with a substantial gradient in velocity field across the opening in the breakwaters that is reversed between flood and ebb. Once the flows pass through the opening, they leave the navigation channel and proceed over the shallower areas behind each breakwater, producing large eddies that move throughout the tidal cycle. This study's numerical model demonstrated that the currents are strongest between the breakwaters at peak ebb tide flow, approximately 2-3 hours after high tide (Richards, 1988). Model results at peak ebb and peak flood conditions are shown in Figure 2-3 and Figure 2-4, respectively. A hydrographic survey performed by Alyn Crandall Duxbury from Yale University found that the peak ebb tide currents through the breakwaters averaged 1.3 knots. Peak flood currents through the breakwaters averaged 0.9 knots approximately 2-3 hours after low tide (Duxbury) (Richards, 1988).

Results from the 1988 New Haven Harbor Numerical Model Study were used to inform currents applied at the north end of the harbor in the feasibility level ship simulator study. Wind and current databases from the existing NACCS ADCIRC model were otherwise deemed adequate for feasibility level testing in the ship simulator.

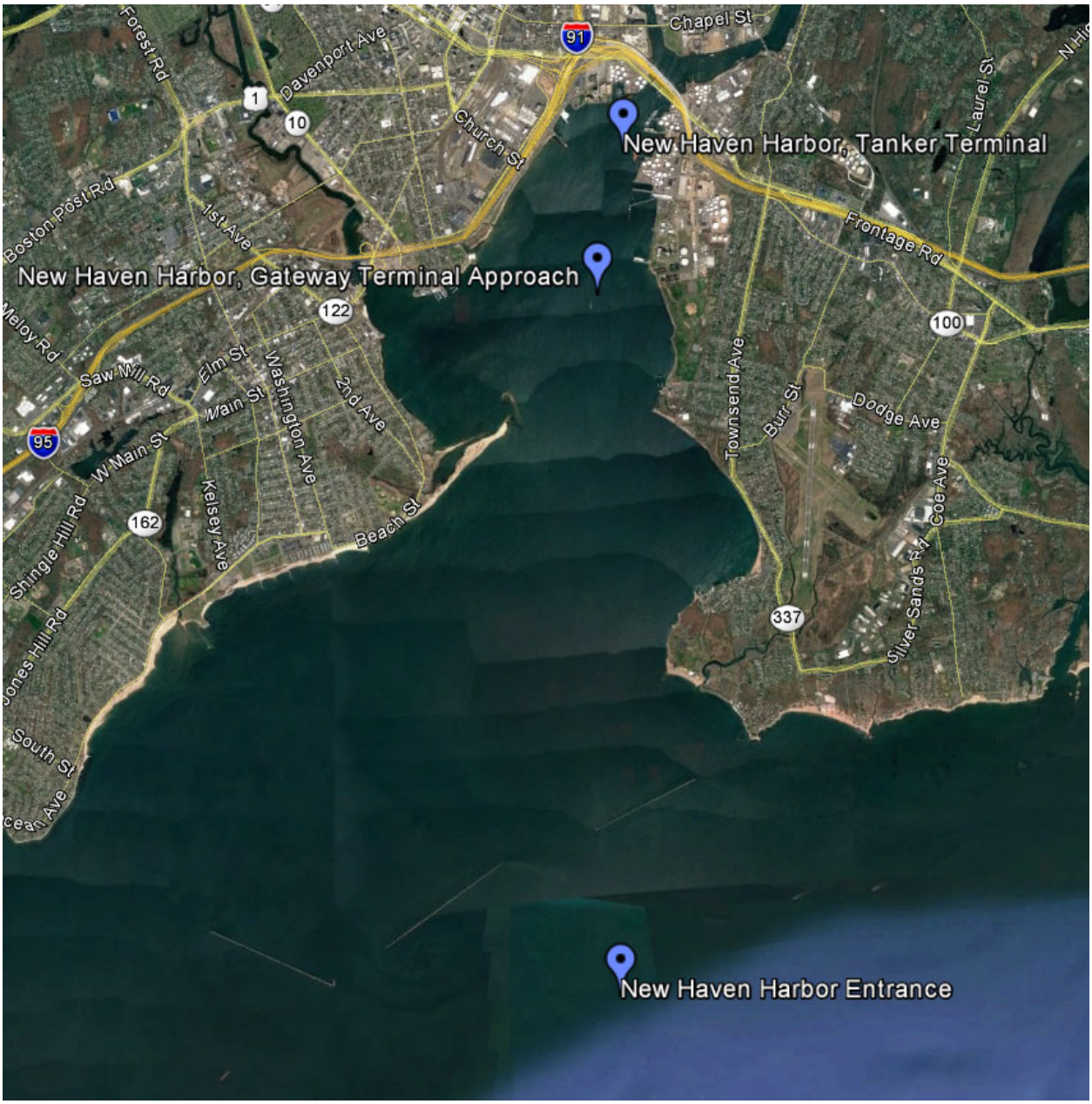

Figure 2-2. Current Station Map

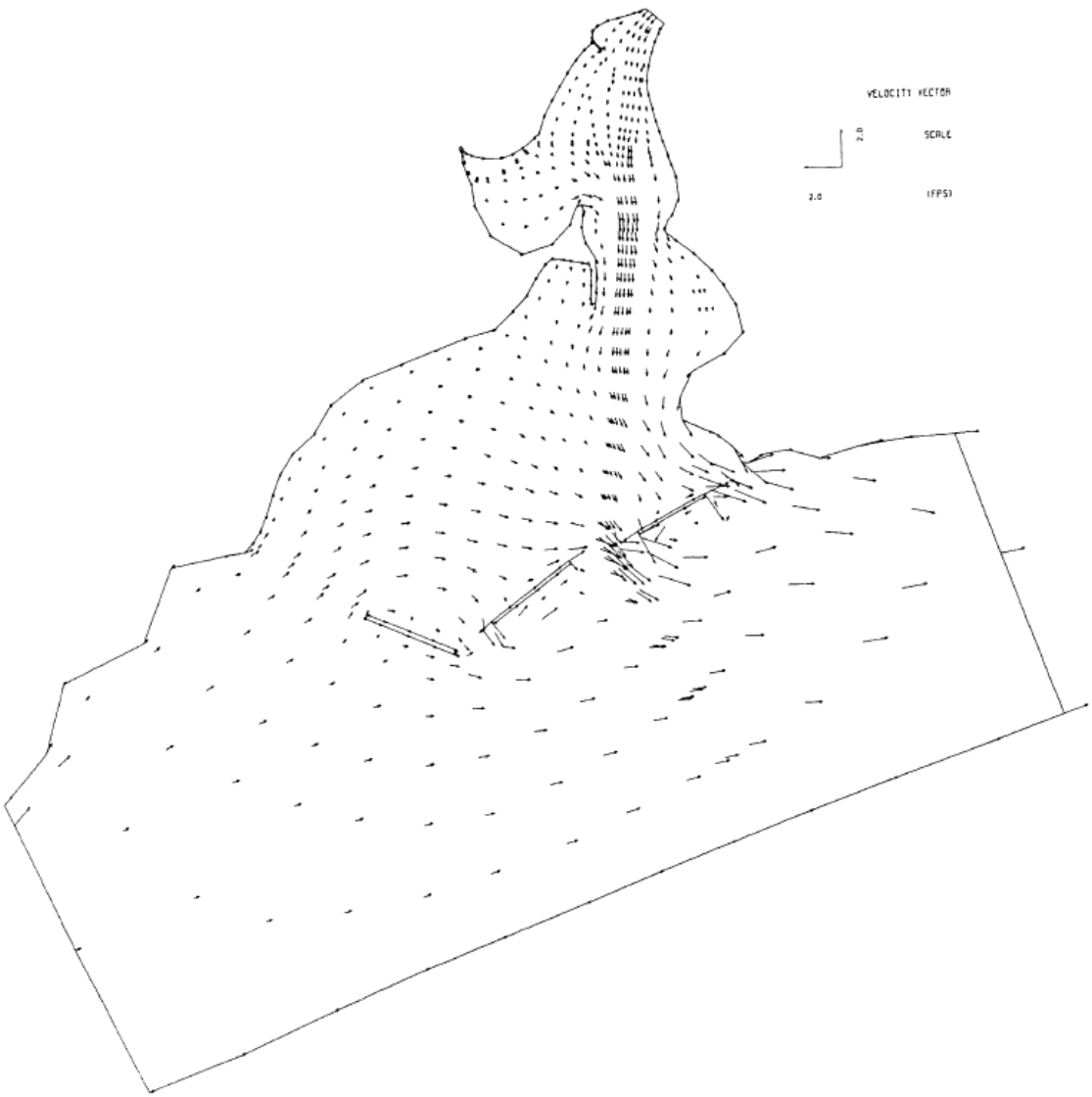

Figure 2-3. 1988 numerical model study results, maximum ebb condition

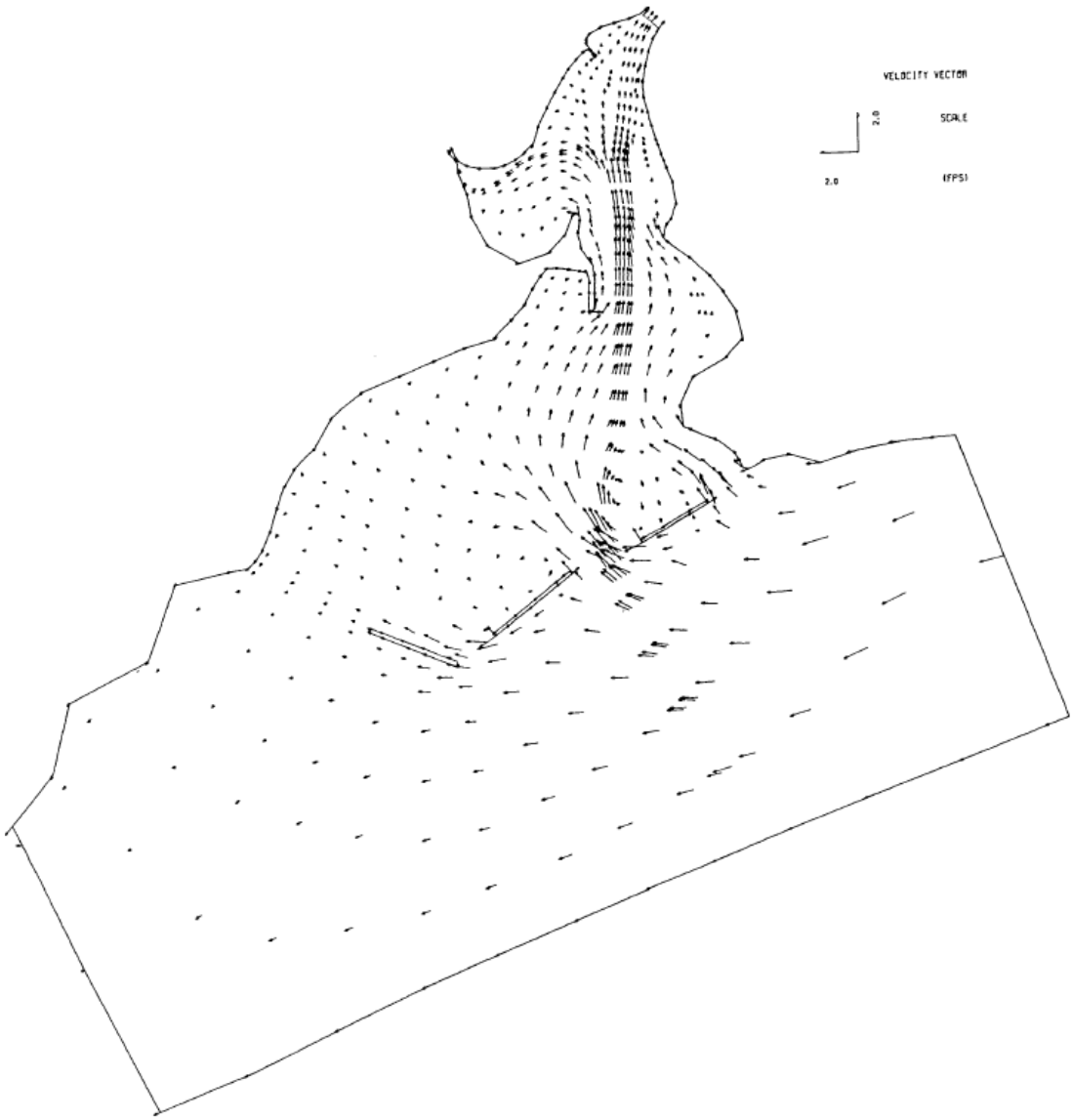

Figure 2-4. 1988 numerical model study results, maximum flood condition

2.3 Wind

Coastal wind data is collected at two stations in the vicinity of New Haven: Station NWHC3-8465705 within New Haven Harbor and Station 44039- Central Long Island Sound, located approximately 13 nautical miles east-southeast of the channel's breakwater crossing (Figure 2-5). All wind speeds were converted to knots at 10m equivalent height.

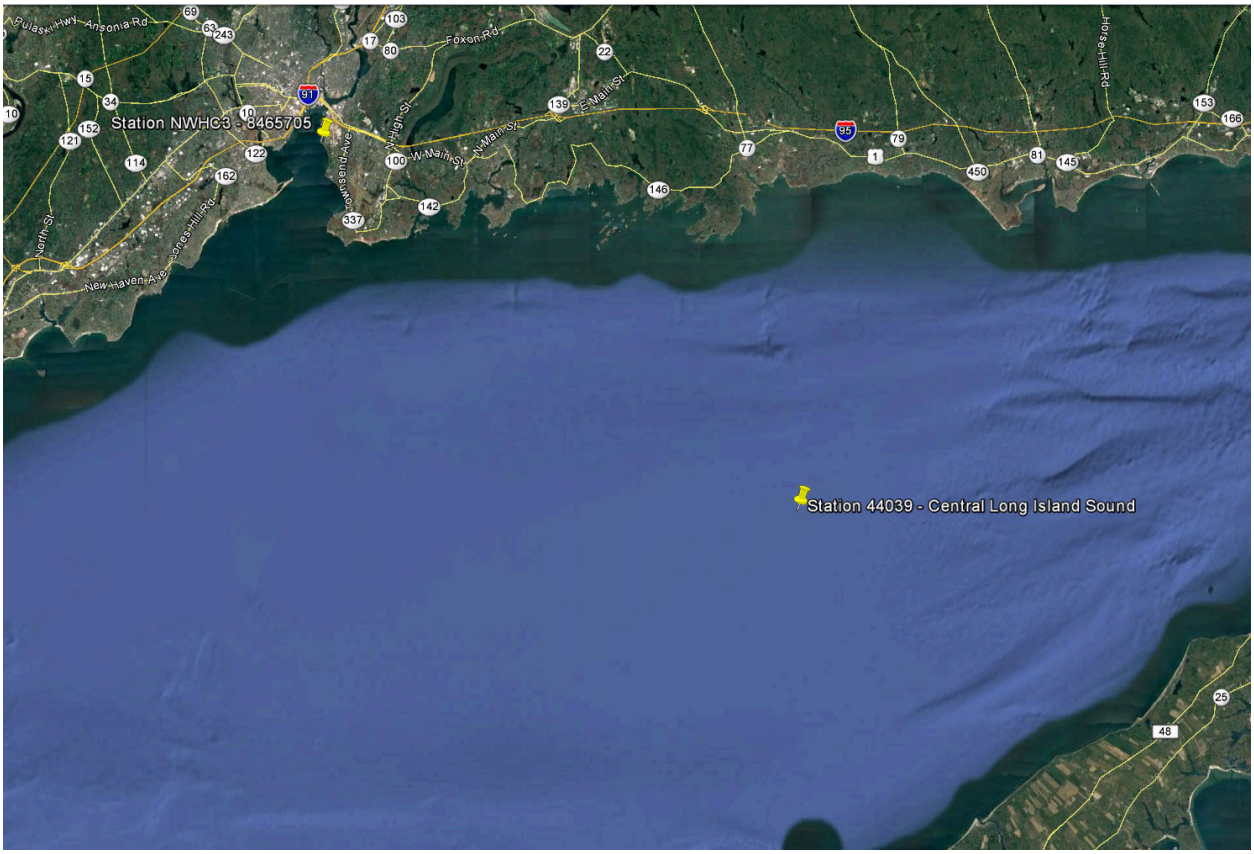

Figure 2-5. Wind station locations

New Haven Harbor is more sheltered than the Sound, with an average wind speed of 7.8 knots compared to the Sound's 12.7 knot average. Wind speed magnitude and direction generally vary with season within the harbor. Winter winds average 8.7 knots from the North. In the summer, winds are lighter at 6.6 knots from the Southwest. A similar seasonal trend is observed in Central Long Island Sound—winter winds average 15.6 knots from the West-Northwest; summer winds average 9.8 knots from the Southwest. Unlike the Harbor, however, prevailing winds in the Sound are out of the West. Seasonal wind characteristics for each station are presented as wind roses in Figure 2-6 and Figure 2-7.

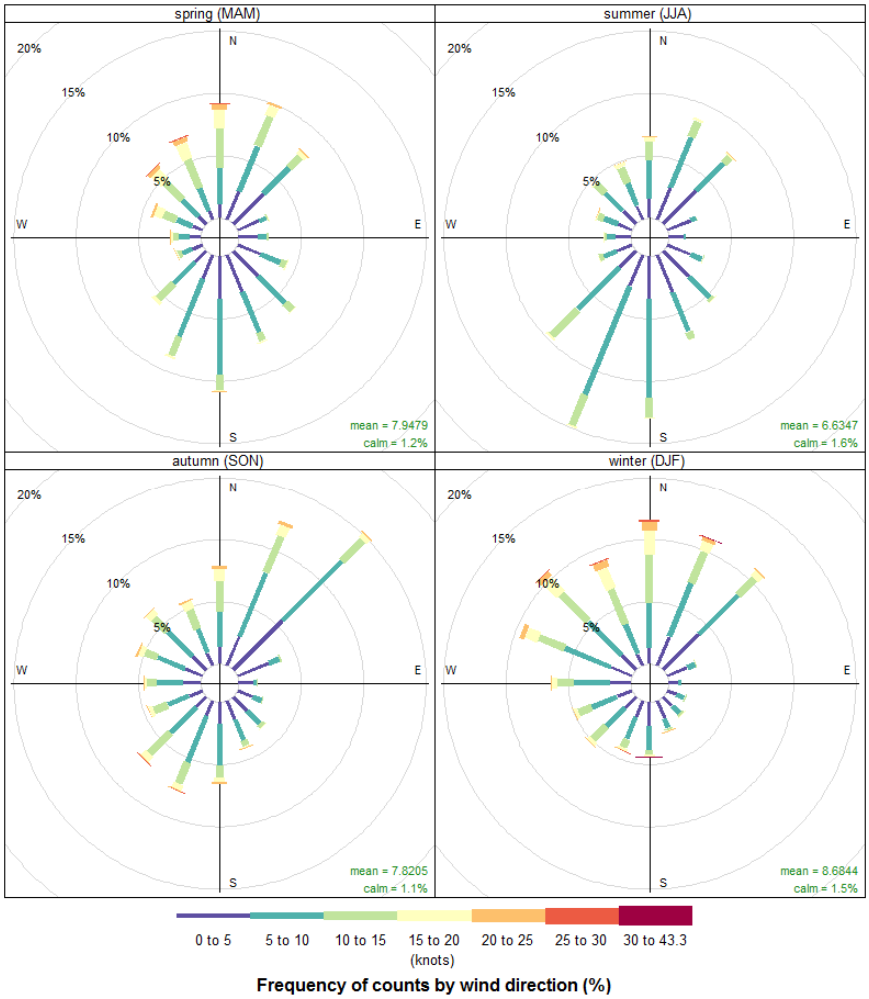

Figure 2-6. Station NWHC3-8465705, New Haven Harbor Seasonal Wind Roses

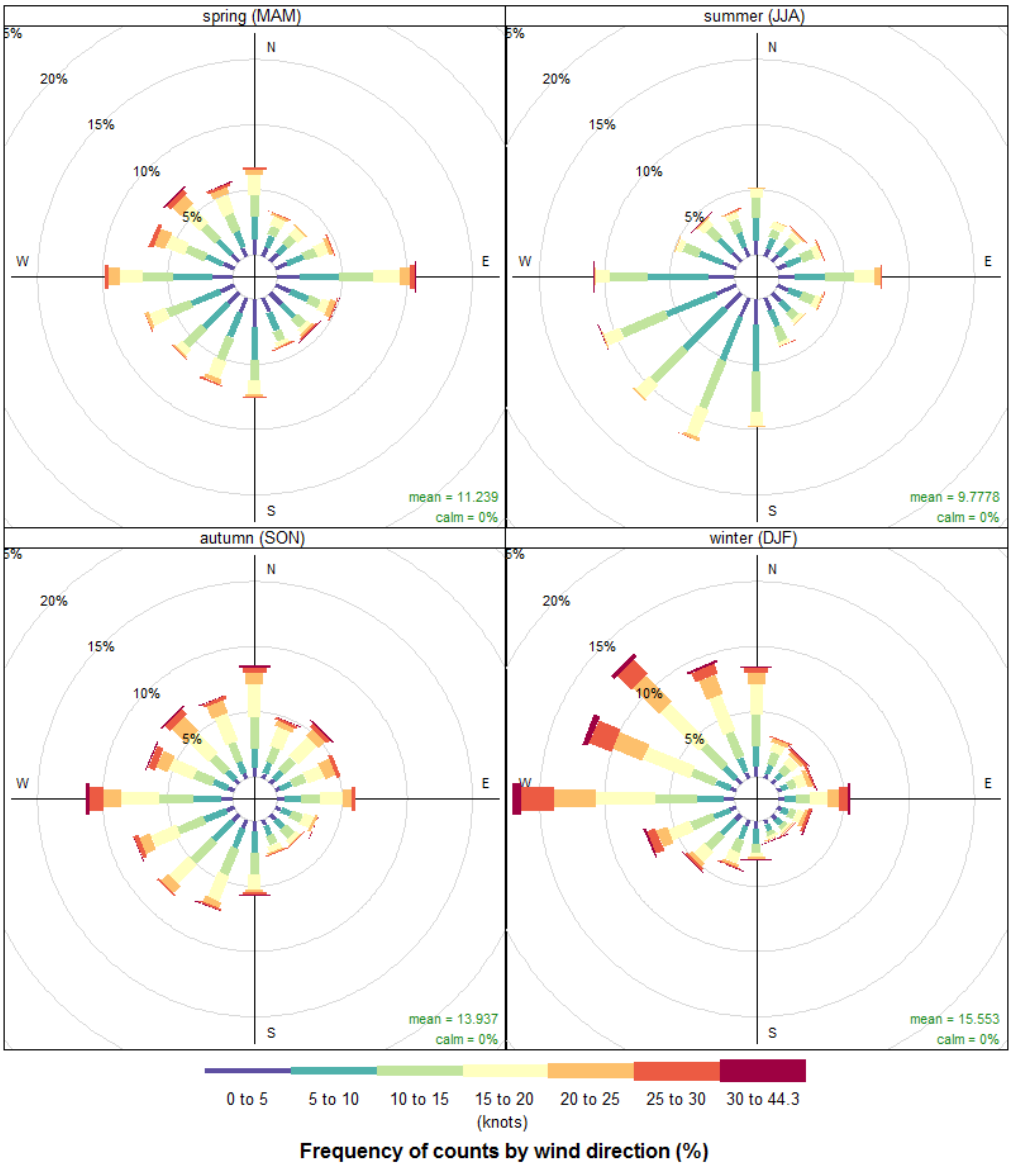

Figure 2-7. Station 44039, Central Long Island Sound Seasonal Wind Roses

2.4 Wave Climate

Long Island shelters the New Haven shoreline from long period waves from the Atlantic Ocean. Therefore, waves in the New Haven Harbor vicinity are fetch-limited only, driven by winds blowing over a length of the Sound. The breakwater system at the southern limits of the harbor provides protection within the harbor from waves approaching from southerly directions. Fetch and wave development are limited by topography in other directions. There are no wave records within New Haven Harbor and readily available wave data within Long Island Sound is limited. Station 44039 - Central Long Island Sound is the nearest wave buoy, recording wave heights, but not wave period or mean wave direction. Figure 2-8 shows the histogram of wave records from the Central Long Island Sound buoy.

From 2005-2016, the mean wave height was 0.46 meters (1.51 feet) and the significant wave height (Hs) was 0.87 meters (2.85 feet).

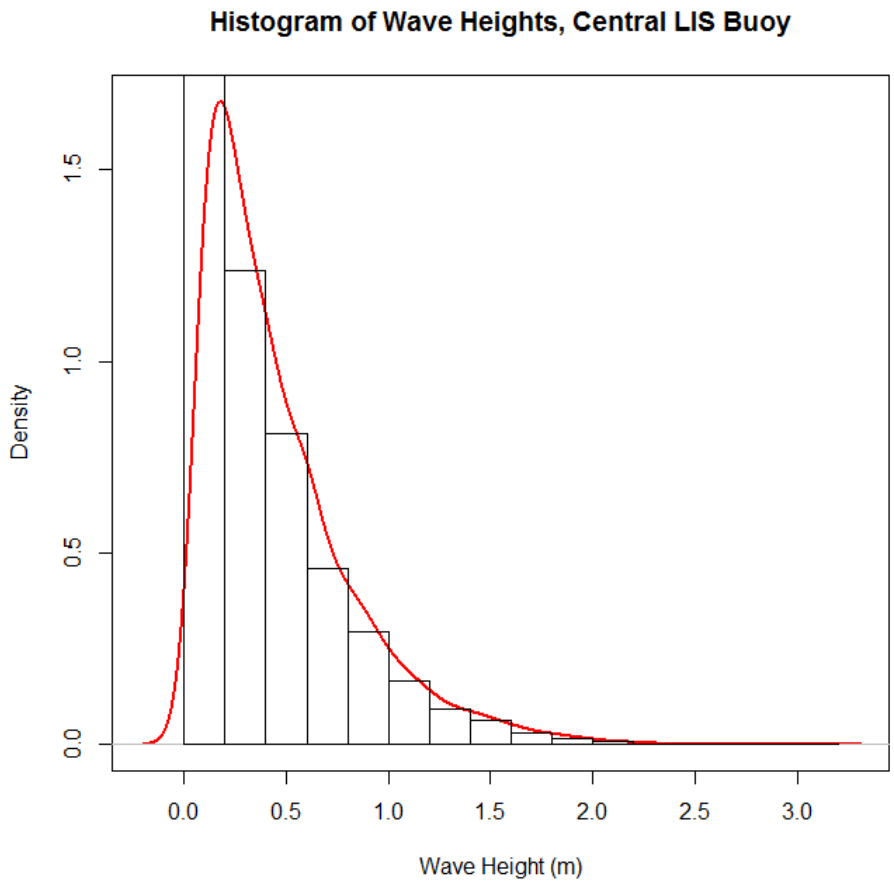

Figure 2-8. Station 44039 Wave Height Histogram

Other sources of wave data are available from past studies and wave modeling. The 1981 Supplemental Feasibility Report discussed the potential for 4 foot high, 5 second period waves in the harbor, but noted that these wave conditions have little effect on large ocean-going vessels. Wave heights associated with extreme storm events from the North Atlantic Coast Comprehensive Study at the harbor entrance breakwaters are provided in Table 2-3. Although these wave heights are greater, allowance for vessel pitch, roll, and heave due to wave forces are considered unnecessary because ships remain at sea or at berth and do not attempt to navigate the channel when severe storm conditions prevail.

Table 2-3. Annual Exceedance Probability Wave Heights from NACCS Study

NACCS Save Point		Annual Exceedance Probability Wave Height (feet)			
Location	**Number**	0.99	0.98	0.2	0.1
East Breakwater	276	4.3	6.4	7.5	8.2
Central (Luddington) Breakwater	277	4.7	6.9	7.9	8.6
West Breakwater	278	4.7	6.6	7.7	8.4

2.5 Sediment Transport and Shoreline Change

A number of small rivers empty into New Haven Harbor, including the Mill, Quinnipiac, and West Rivers, and Morris Creek, which contribute silty shoal material to the harbor. Since the 35 foot main channel was initially completed in 1950, maintenance dredging has occurred nine times, with smaller additional actions over the years to remove unclassified hard material. A summary of the main ship channel's maintenance history since the last improvement dredging is shown in Table 2-4. Harbor maintenance dredging within the main channel and maneuvering area last occurred in 2013-2014 with about 831,000 CY removed. Over the 63 year project life between 1950 and 2013, dredge records indicate a shoaling rate of about 88,000 CY annually.

Table 2-4. Project Maintenance Dredging History

Date	Work	Volume Dredged (CY)
1947-1950	Improvement Dredging to 35-Foot Main Channel	8,154,042
1957	Maintenance Dredging of the 35-Foot Main Channel	1,033,853
1961	Maintenance Dredging of the 35-Foot Main Channel	95,000
1964	Maintenance Dredging of the 35-Foot Main Channel	262,000
1973	Maintenance Dredging of the 35-Foot Main Channel	945,000
1979	Maintenance Dredging of the 35-Foot Main Channel	284,000
1983	Maintenance Dredging of the 35-Foot Main Channel	694,228
1993	Maintenance Dredging of the 35-Foot Main Channel	837,450
2003	Maintenance Dredging of the 35-Foot Main Channel	630,906
2013	Maintenance Dredging of the 35-Foot Main Channel	830,980

Aside from the fine grain material entering from the river systems, sediment transport along the study area is generally from west to east as indicated by the growth of Sandy Point to the northeast over time. This sand originated from updrift beaches in West Haven and the present form of the spit is undoubtedly influenced by the presence of Sandy Point dike.

3.0 Alternatives Considered

Considering the information from the previous sections, alternatives to improve harbor efficiency and navigability were considered as part of the planning process. Each of the measures is discussed in the sections below as well as their impacts on the harbor's hydrodynamics and navigability.

3.1 No Action

Selection of the no action alternative would hinder further development of the port and would reduce the port's economic effectiveness. It is assumed that the current vessel traffic in New Haven Harbor will continue to experience navigational difficulties with the existing 35 foot channel as they currently push its limits. And, as the trend toward larger vessels continues, a corresponding increase in frequency of lightering and tidal delays can be expected. There will continue to be a need for channel widening and enlargement of the turning basin to safely accommodate today's size vessels. Harbor pilots note that there is currently and will continue to be very little room for error and adjustment in navigating the bend in particular. Although navigability will be affected, taking no action would not alter the harbor's tidal dynamics and wave climate. It is assumed that harbor maintenance dredging would continue once every 10 years, consistent with the most recent dredging history.

3.2 Dredging and Disposal

Based on the vessel forecast and civil engineering calculations, the initial proposed channel improvements included deepening the channel over its length, widening the approach channel from 400 to 500 feet, widening the entrance channel from 500 to 600 feet and widening the channel bend between the breakwaters from 560 to 700 feet. The initial design also included expanding the turning basin near the head of navigation.

3.2.1 Dredging

Dredging to a range of depths from 37 to 42 feet was considered for the improvements described above. The recommended channel depth of 40 feet (approximately 4.3 million cubic yards of material to be dredged) was selected as it provided the greatest economic benefits. These improvements would permit transportation savings by allowing deep draft tankers and bulk cargo carriers to enter the harbor with fewer tidal restrictions and to maneuver more safety.

While the proposed improvements will increase access to and navigability of the channel, no discernable changes in tidal and wave hydrodynamics are expected. The 1988 Numerical Model Study conducted by the USACE Waterways Experiment Station Hydraulics Laboratory modeled the differences in tide and current velocities between the existing 35 foot channel and a similar 40 foot design channel. The results showed virtually no difference in tidal phase, amplitude and plane between the base and plan conditions. This was somewhat predictable since the harbor tide is dominated by the conditions in Long Island Sound with very little tidal phase or amplitude change within the harbor. As for current velocities and circulation patterns, the differences between the base and plan conditions were quite small. The

largest changes in velocity (approximately 0.1 fps) were observed within the deepened channels where the plan condition exhibited slightly lower current speeds, so navigation would not be adversely affected.

Historically, channel deepening and widening projects result in a net increase in Operations & Maintenance (O&M) dredging requirements (Rosati 2005; Vincente and Uva 1984). To account for changes in future shoaling rates and dredging needs, the dredging history of New Haven Harbor was reviewed. An increase to the current shoaling rate equal to 1 percent of the improvement dredging volume was initially assumed. This estimate may be conservative given the channel's current shoaling rate (88,000 CY/year) is approximately 1 percent of the last improvement dredging volume (8,154,042 CY), yet the channel had been incrementally deepened and widened several times prior. Expected shoaling rates were also estimated using the method outlined in ERDC/CHL CHETN-IV-64, "Coastal Inlet Navigation Channel Shoaling with Deepening and Widening." Using the current shoaling rate and the last improvement dredging volume as an approximation of the volume deficit, however, the relationship in the CHETN was found to overestimate the shoaling rate by a factor of 5.7. This is likely due to the fact that the main channel at New Haven is more of a trench through a shallow bay rather than a constrained inlet channel. Adjusting for the overprediction, the proposed improvement dredging is estimated to increase the shoaling rate by 46,000 CY/year. This is comparable to 1 percent of the improvement dredging volume, 43,000 CY, per year. Both estimates may be conservative given they are based off the total improvement volume along the entire channel and the project's maintenance history indicates little to no O&M dredging needed in the vicinity of the harbor breakwaters and the entrance channel.

The frequency of maintenance dredging is expected to remain at once every 10 years based on existing shoaling patterns. O&M dredging typically occurs on the east and west edges of the main channel from north of the ledge/hard bottom area near the entrance breakwaters up to the head of the harbor. Through this stretch, dredging is not required over the entire length nor the full width of the channel. The greatest shoaling occurs at the very head of the harbor just south of Tomlinson's Bridge, north of the majority of terminals, where there is little current and projected change in flow velocity. Where the greatest changes in flow velocity are predicted, in the vicinity of the breakwaters, there is little need for dredging due to the hard bottom substrate in this area. It is anticipated that these shoaling patterns will continue, with no changes to the sediment discharge loads of the harbor tributaries or the longshore sediment transport patterns.

3.2.2 Disposal

Dredging to the proposed depth and widths associated with the channel improvements requires the handling and disposal of nearly 4.3 million cubic yards of dredge material. While all sediment samples were clean and suitable for open water placement, all efforts were made to beneficially reuse dredge material in a cost effective manner and reduce the quantity of material designated for open water placement. Although the dredge material is chemically and biologically suitable, its physical composition with a large percent fines content makes it incompatible with beach placement opportunities. Each of the selected placement options for dredge material are described below.

Two borrow pits in New Haven Harbor—one in Morris Cove and the other off the West River Channel—have approximately 623,000 and 88,000 CY of capacity, respectively, to bring them up to adjacent grade.

The Morris Cove borrow pit is approximately 650 ft wide by 2450 ft in length. Depths within the pit are approximately 11 to 20 feet deeper than the surrounding bottom, suggesting the pit could contain a substantial amount of dredged material. The pit's distinct margins currently limit water flow within the pit and have created anoxic conditions with little flushing. By filling the pit, these anoxic conditions will be removed, improving bottom habitat. The West River borrow pit covers an area of approximately 8.2 acres and is up to 11 feet deeper than the surrounding bottom. Clean material within the harbor could be placed at either of these locations.

Dredge material from the entrance channel is sandier than the inner harbor material and will be used for oyster habitat creation behind the east breakwater. For the 40 foot deep channel improvement, approximately 351,000 CY of material from the entrance channel would be available for this use.

The sheltered mud flat north of Sandy Point Dike has previously been identified as a location for salt marsh creation in USACE's Long Island Sound Dredged Material Management Plan (2016) and the Connecticut Department of Energy & Environmental Protection's Section 1122 beneficial reuse pilot proposal. Using the proposed footprints from each, the Environmental Resources Section approximated the potential capacity for dredge material to be placed north of Sandy Point Dike using a fill elevation of 3.6 feet NAVD88 (7.2 feet MLLW) for high marsh. It is expected that the marsh creation at Sandy Point could accommodate approximately 657,000 CY of fine, suitable material, provided a form of containment is constructed north of Sandy Point. The containment will need to resist wave forces to ensure that the material stays within the marsh, and does not wash away. Options for containment included coconut fiber coir logs and fillable geotubes. Diking with sheetwall, rock, and other structural methods of containment were screened out due to their high cost of construction. Fillable geotubes were considered more resistant to wave forces over time than coir logs and were selected as the containment method for the tentatively selected plan.

The containment geotubes can be filled in place in water and dredged materials can be deposited within the containment footprint. Hydraulic placement techniques were assumed for filling the wetland cell. It should be noted that wetland cell construction requires a highly ordered and controlled sequence of dredge material placement to assure that wetland cells are not overloaded beyond the quantities required to achieve the target wetland surface elevation. Further, the time allotted for wetland cell development (i.e. placement of dredged materials, grading and initial planting) is a function of dredged material thickness. Greater dredged material thickness will increase the time required to reach a stable surface ready for planting and will decrease the probability of achieving any particular target surface elevation as dredge materials consolidate.

During Pre-Construction Engineering and Design (PED), the Water Management Section and Environmental Resources Section will see that the salt marsh creation design includes a system of channels with a range of widths and depths dictated by hydraulic analyses and empirical information for existing wetlands to accommodate the outflow from Old Field Creek. The materials excavated from these channels must be placed within the wetland cells in a manner that is consistent with the required final grades. Future O&M dredging material may be added to the proposed salt marsh to keep pace with sea level change.

Historically, material from maintenance dredging of New Haven Harbor has been suitable for open water placement. The nearest open water placement site is the Central Long Island Disposal Site (CLDS),

approximately 4.5 nautical miles south of the entrance channel buoy R "2". The remaining suitable material will be designated for open water placement and would be hauled by a bottom dump scow barge to CLDS to cap historic pre-NEPA disposal mounds.

At the channel bend between the breakwaters, rock ledge will require blasting. Blasted rubble will be placed behind the western breakwater to serve as a rock reef.

Table 3-1 summarizes the placement locations and quantities associated with the recommended plan to deepen New Haven Harbor to 40 feet. If the opportunity for salt marsh creation north of Sandy Point is included, the volume of dredge material designated for open water placement at CLDS is reduced by approximately twenty percent.

Table 3-1. Dredge Material Volumes by Placement Site

Placement Site	Volume (CY) for 40 FT Improvement, Federal Base Plan	Volume (CY) for 40 FT Improvement with Salt Marsh Creation
CLDS	3,173,490	2,516,490
Morris Cove Borrow Pit	623,310	623,310
West River Borrow Pit	87,800	87,800
Oyster Habitat	351,300	351,300
Rock Reef	32,700	32,700
Salt Marsh Creation	--	657,000
	4,268,600	4,268,600

4.0 Ship Simulation

A feasibility level ship simulator study (Appendix K) was performed for the proposed channel improvements outlined in Section 3.2 for New Haven Harbor at the USACE Engineer Research and Development Center (ERDC), Coastal Hydraulics Laboratory (CHL) 13-16 February 2018. Representatives from ERDC, the Connecticut Pilots (Capt. Charlie Jonas and Capt. DJ Toby), and the New England District participated for the duration of the simulation which tested the navigability of the proposed improvements using a limited set of design ships and tidal and wave forcing across the range of proposed project depths from 37 to 42 feet. Feedback from the pilots on the proposed design resulted in confirmation of the design widths of the entrance and inner channels as well as the configuration of the maneuvering area. Iterative testing of the channel bend and turning basin designs resulted in the modifications described below.

4.1 Channel Bend at Breakwaters

The proposed bend widening was performed for the 37, 38, 40, and 42 foot project depths. While the widened condition allowed the pilots to make the turn at the breakwater entrance, the turn still

required the pilots to use all their rudder, leaving no additional rudder control to respond to unexpected changes in environmental conditions (wind, waves, current, etc.) and little room for error. For this reason, the proposed bend design was widened by shifting the locations of the R “6” and R “8” buoys east 100 feet. This resulted in an increase in bend width from the proposed 700 foot width to 800 feet, and allowed the pilots to make the turn without bank effects. This proposed bend widening resulted in a significant increase of rock material and will be further optimized during the Feasibility Level Design phase.

4.2 Turning Basin

The proposed turning basin was tested conservatively using a 750 foot LOA tanker (50 feet longer than the design vessel used for the economic analysis), with the assistance of two tugs coming off the Magellan T-Dock. The pilots indicated that the longest ships typically berth at the Magellan T-Dock at the center of the harbor. While the pilots were able to maneuver within the proposed turning basin at the head of the harbor, it was determined that the existing turning basin, with a small enlargement, would be better suited given its more central location. The proposed enlargement would lengthen the turning basin 200 feet by shifting it existing northeastern and northwestern corners approximately 200 feet toward the head of the harbor to points 1 and 2 as depicted in Figure 4-1.

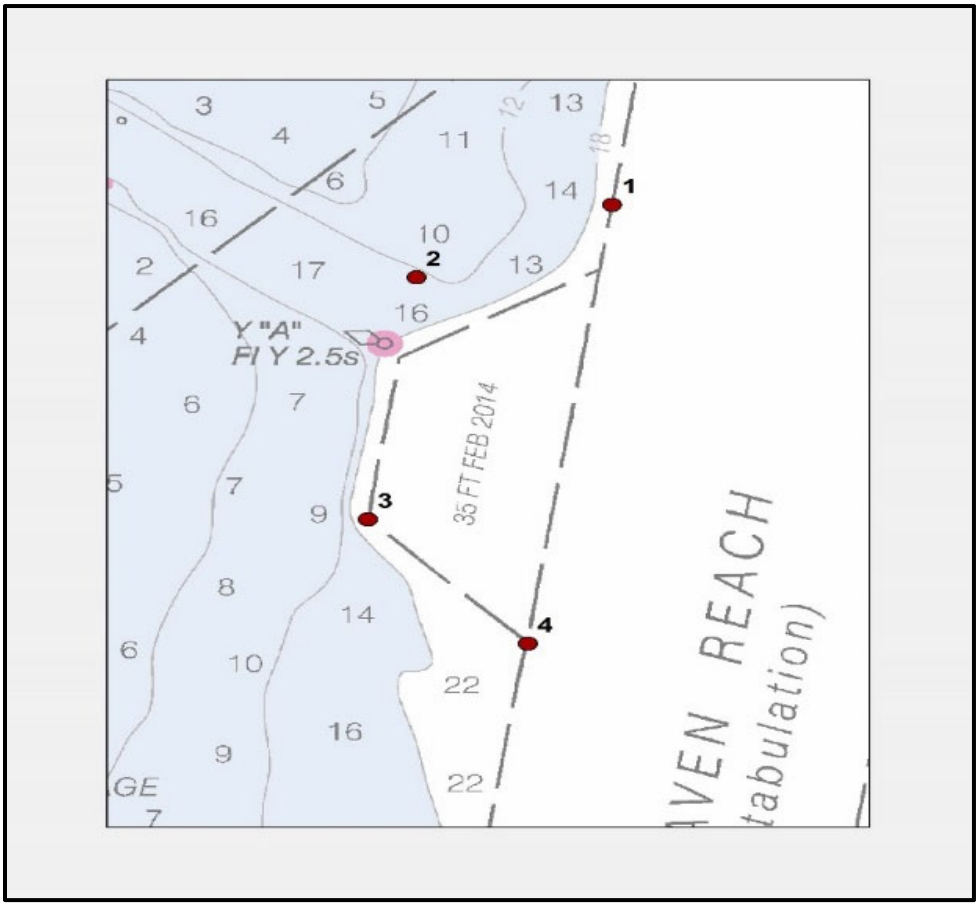

Figure 4-1. Ship Simulation Proposed Turning Basin

5.0 Sea Level Change

The USACE Sea Level Change Curve Calculator (2017.55) was used to predict three local relative sea level change (SLC) scenarios per ER 1100-2-8162: Incorporating Sea Level Change in Civil Works Programs. The purpose of the ER is to incorporate relative sea level changes into the project alternatives and design. The three SLC scenarios are illustrated by curves representing the low (historic) rate of SLC at the project area, an intermediate rate (modified NRC Curve I), and a high rate of SLC (modified NRC Curve III). All three local SLC curves include the global (eustatic) sea level rise rate (approximately 1.7 mm/year according to IPCC 2007) as well as local vertical land movement.

The length of tide station record is important to consider when estimating historic relative SLC because inter-annual, decadal, and multi-decadal variations in sea level are sufficiently large that misleading or erroneous sea level trends can be derived from periods of record that are too short. A minimum record length of 40 years is recommended to determine reasonable trends. For this reason, the nearest long-term NOAA tide gage, located approximately 16 miles southwest in Bridgeport, CT (Station 8467150, 84 year record), was deemed more suitable for estimating the historic SLC rate than the New Haven gage (17 year record). The historic mean sea level trend at Bridgeport from 1964 to 2016 is 0.00928 feet/year (2.83 mm/year) or 0.93 feet per century. The mean trend is shown in Figure 5-1 which was taken from the NOAA Sea Level Trend web page https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=8467150. As shown in the plot there are yearly and decadal cycles that cause the short term rate to vary. These observations illustrate that water levels are rising, but that the variations in the data are large, making it difficult to discern a statistically significant change from the historic rate or any of the future sea level rise scenarios at this time. Over the next 50 years (2023-2073), sea level at New Haven is projected to rise 0.46 feet, 0.97 feet, and 2.54 feet under the USACE low, intermediate, and high scenarios, respectively. Projections through 2123 are provided in Figure 5-2 and Table 5-1.

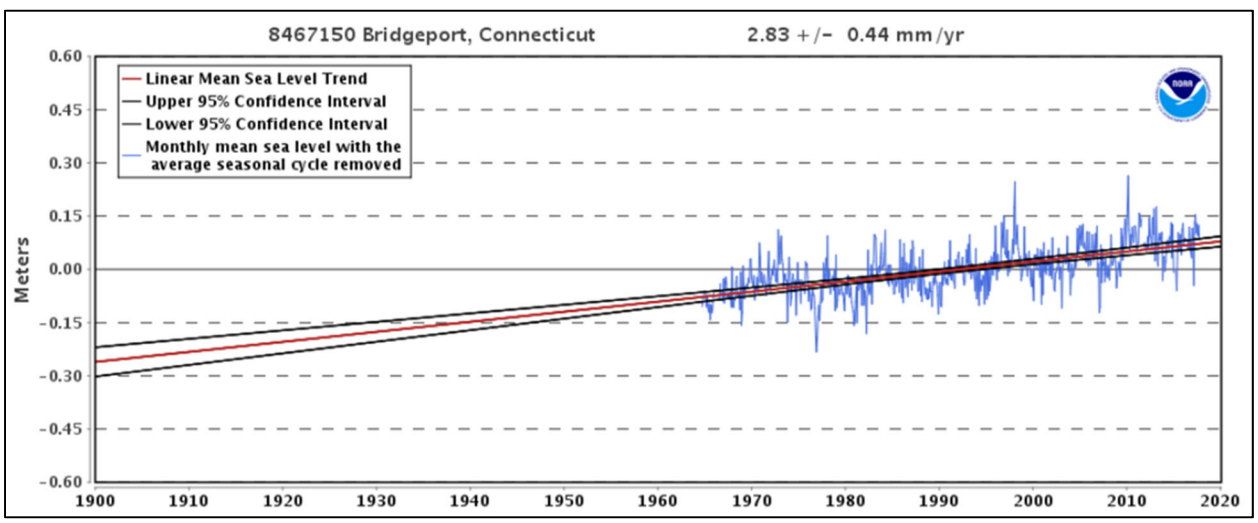

Figure 5-1. Historic sea level change at Bridgeport 1964-2016 (from NOAA/NOS CO-OPS)

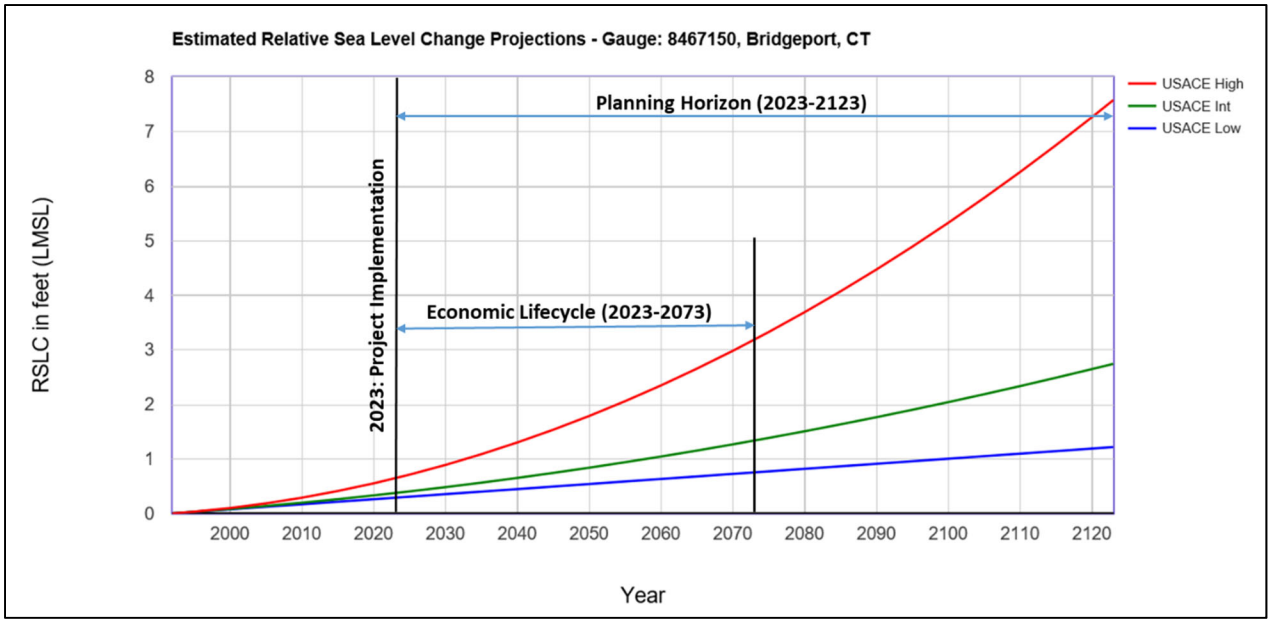

Figure 5-2. Relative Sea Level Change Projections at Bridgeport

Table 5-1. USACE sea level change rates – future scenarios

8467150, Bridgeport, CT
User Defined Rate: 0.00928 feet/yr
All values are expressed in feet relative to LMSL

Year	USACE Low	USACE Int	USACE High
1992	0.00	0.00	0.00
1995	0.03	0.03	0.03
2000	0.07	0.08	0.10
2005	0.12	0.14	0.18
2010	0.17	0.20	0.29
2015	0.21	0.26	0.41
2020	0.26	0.33	0.55
2025	0.31	0.40	0.71
2030	0.35	0.48	0.89
2035	0.40	0.56	1.09
2040	0.45	0.65	1.30
2045	0.49	0.74	1.53
2050	0.54	0.84	1.79
2055	0.59	0.94	2.06
2060	0.63	1.04	2.35
2065	0.68	1.15	2.65
2070	0.72	1.26	2.98
2075	0.77	1.38	3.32
2080	0.82	1.51	3.69
2085	0.86	1.63	4.07
2090	0.91	1.76	4.47
2095	0.96	1.90	4.89
2100	1.00	2.04	5.33
2105	1.05	2.18	5.78
2110	1.10	2.33	6.26
2115	1.14	2.49	6.75
2120	1.19	2.65	7.26
2123	1.22	2.74	7.58

5.1 Impacts of Sea Level Change

Sea level change will increase the navigable depth of the channel over time and, given the low sedimentation rate of the waterway, reduce the amount of maintenance dredging required to maintain the authorized channel depth. However, the amount of SLC alone would not significantly improve conditions in the waterway to achieve project objectives. Although sea level rise will provide a benefit to the project in the form of additional channel depth it may impact local service facilities (LSF) and port operations. Critical infrastructure elevations for each terminal were obtained from the New Haven Port Authority to assess anticipated project performance relative to the three SLC scenarios. The magnitude of SLC is expected to have a greater impact on the LSF than the navigation structures such as the harbor entrance breakwater system or Sandy Point Dike.

5.1.1 Local Service Facilities

With no bridge clearance concerns, the greatest potential risk associated with sea level change is inundation to the local service facilities (LSF), including the piers and utilities serving the berthing areas. Impacts to the LSF were assessed using the tidal datums at New Haven and the statistical water levels in New Haven Harbor from the North Atlantic Coast Comprehensive Study, combined with the predicted sea level change scenarios. The Mean Higher High Water (MHHW) level and the 99% annual exceedance probability (AEP; or 1-year annual recurrence interval) of the measured water level were added to each sea level change scenario. If sea level change coupled with the MHHW and the 99% AEP water level exceeded the deck height of the terminals on the waterway, it was assumed to be in a condition that would affect regular port operation and require structural modifications.

The 99% AEP event was selected to be representative of a storm which would hinder port operations or impede navigation of the channel. It was expected that any greater storm would also affect port operation and channel navigability.

The deck height of each terminal is given in Table 5-2 relative to the predicted water levels. For all SLC scenarios, the terminal deck elevations are presently high enough to avoid inundation at MHHW through 2073. All terminal deck elevations are also expected to exceed the 99% AEP water level under the low and intermediate SLC scenarios through 2073. However, LSF at one terminal, Magellan Pink Tanks, is expected to be inundated by the 99% AEP water level under the high SLC scenario by 2073. If the peak surge of the 99% AEP event were to coincide with MHW, water levels would be 0.3 ft greater. This would result in 0.2 ft of inundation at the deck of the Magellan Pink Tanks terminal in 2073 under the intermediate SLC curve. Under the high SLC curve, the 2073 99% AEP water level at MHW will exceed the deck elevations of two terminals, Magellan Pink Tanks and Gulf. At the Gulf terminal, however, the water level is projected to exceed the deck elevation by only 0.3 ft. Given the limited duration of inundation at high tide, and the marginal water level exceedance, the risk to the Magellan Pink Tanks terminal under the intermediate SLC scenario and the Gulf terminal under the high SLC scenario is low. Overall, this assessment indicates there is a low risk to the LSF at the project over the 50-year project life.

Looking out to 2123, inundation at MHHW is not projected to affect the terminals under the low and intermediate SLC scenarios. The MHHW level for the high SLC scenario, however, is expected to affect all terminals but Gateway and the Magellan T-Dock, unless infrastructure improvements are made. Under the low SLC scenario, all terminal LSF elevations will exceed the 99% AEP water level. The 99%

AEP water level is projected to impact LSF at Magellan Pink Tanks under the intermediate SLC scenario after 2075. However, LSF at all other terminals are not anticipated to be affected by the intermediate SLC scenario 99% AEP water level through 2123. The high SLC scenario projects LSF at all terminals in New Haven will be impacted by the 99% AEP water level in 2123. Figures 5-3 and 5-4 depict the changes in the MHHW and 99% AEP water levels over time relative to the two lowest terminal decks. LSF will become increasingly vulnerable to the effects of climate change and sea level rise beyond the 50-year project life.

Damages to LSF were not considered as part of this study. Any adaptation strategies to mitigate the effects of relative SLC will be the decision of the ports. However, given the importance of the port to the New Haven and regional economies, it is anticipated that the port and its infrastructure will remain protected throughout the project lifecycle.

Table 5-2. Terminal Deck Elevations and Projected Water Surface Elevations

Terminal	Deck Elevation (ft, NAVD88)	2073 Low/Int./High MHHW (ft, NAVD88)	2073 Low/Int./High 99% AEP (ft, NAVD88)	2123Low/Int./ High MHHW (ft, NAVD88)	2123 Low/Int./High 99% AEP (ft, NAVD88)
Motiva	9.6	3.8 / 4.4 / 6.3	6.1 / 6.6 / 8.5	4.3 / 5.8 / 10.7	6.5 / 8.0 / 12.9
Harbor	9.0				
New Haven	9.0				
Magellan T-Dock	12.3				
Gateway	11.0				
Gulf	8.5				
Magellan Pink Tanks	6.7				

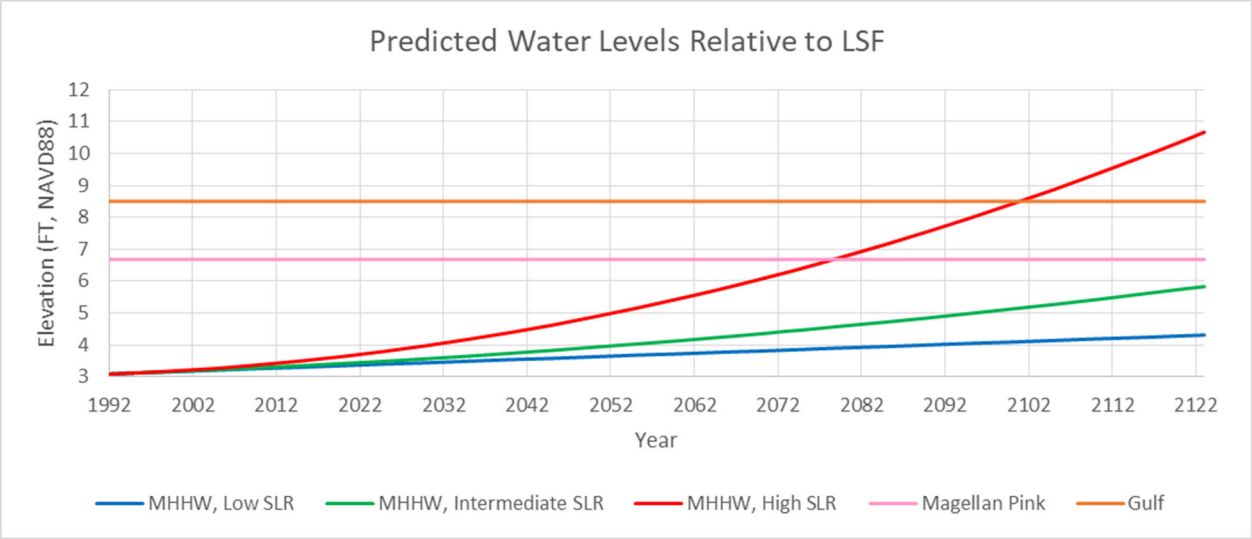

Figure 5-3. Mean Higher High Water Level and Terminal Deck Elevations

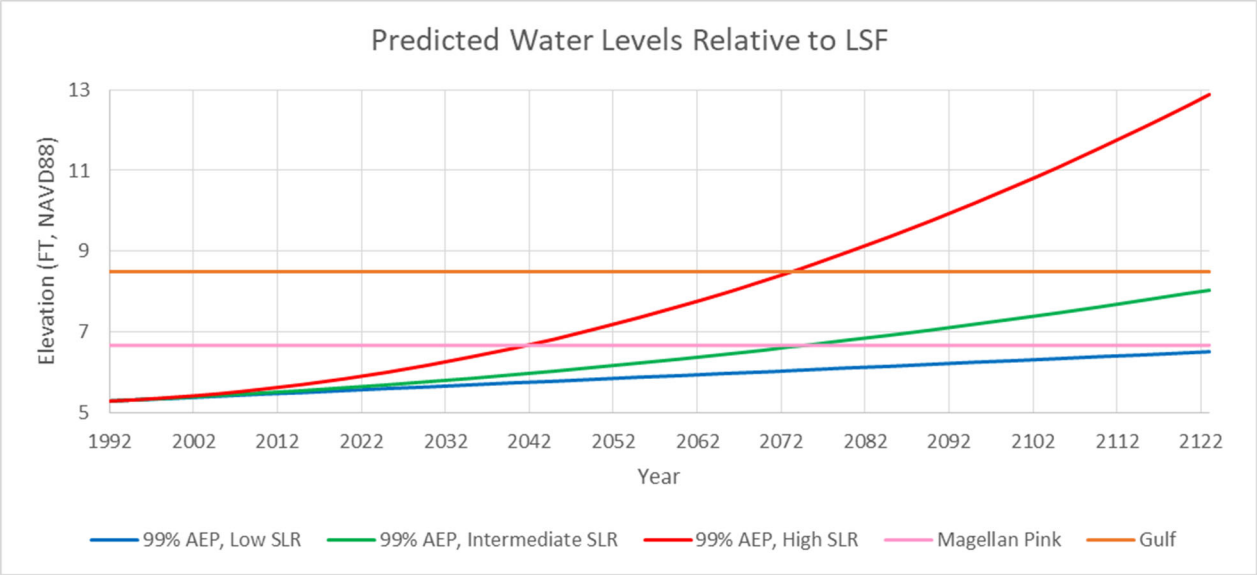

Figure 5-4. 1-Year Annual Exceedance Probability Water Level and Terminal Deck Elevations

5.1.2 Harbor Breakwaters

The three armor stone breakwaters at the harbor entrance currently provide a harbor of refuge at the mouth of the harbor and afford protection to the harbor from all but southwest storms. The breakwaters have a uniform cross section (Figure 5-5), with a 12 foot wide crest at elevation 12.25 feet MLLW and a seaward slope of 1:1.5 (vertical: horizontal). Sea level change will increase water levels and

reduce freeboard at the breakwaters. However, given the fetch-limited wave generation within Long Island Sound, wave conditions are not anticipated to increase with SLC. The breakwater armor stone sizing will therefore remain sufficient.

The impacts of rising sea levels on wave runup and overtopping on and wave transmission over the breakwaters from Long Island Sound into New Haven Harbor were examined for future MSL and MHHW water levels. Potential changes in wave diffraction through the breakwater openings were also investigated.

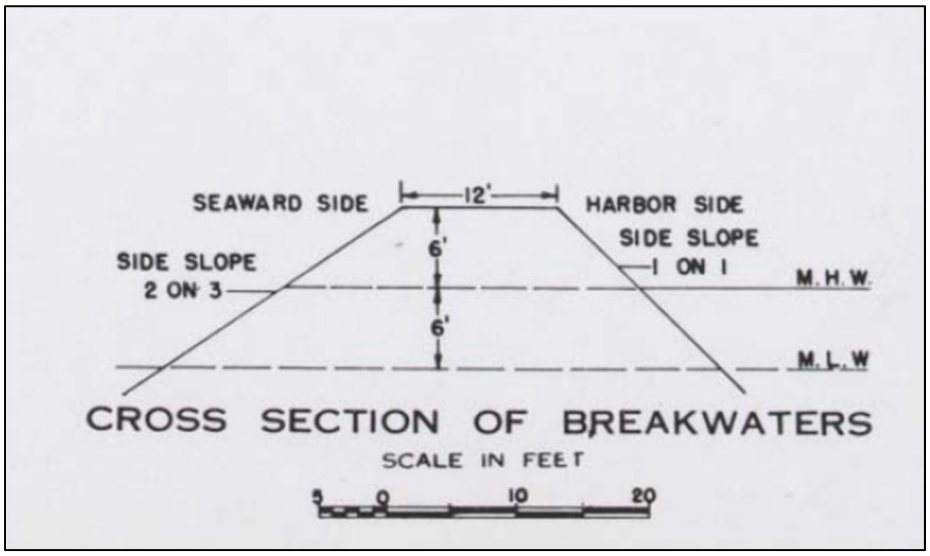

Figure 5-5. Harbor breakwater cross section

Wave transmission was calculated using CEM Equation VI-5-54. Overtopping rates were computed using CEM Equation VI-5-22. Wave transmission coefficients and volumetric overtopping rates are presented in Table 5-3 for MHHW and MSL water levels under present and future sea level rise conditions. While wave transmission over the breakwaters will increase, the wave heights within the harbor will continue to be significantly reduced compared to the wave heights in Long Island Sound. Similarly, wave overtopping rates are expected to increase, but not considerably enough to affect the structural integrity of the breakwaters or the harbor's navigability.

Table 5-3. SLC Impacts on Wave Transmission and Overtopping

	Freeboard (ft)		Wave Transmission Coefficient		Wave Overtopping Rate (cfs/ft)	
	MSL	MHHW	MSL	MHHW	MSL	MHHW
Present	8.9	5.5	--	0.05	0.011	0.118
2070 Low	8.5	5.1	--	0.07	0.015	0.163
2070 Intermediate	8.0	4.6	--	0.10	0.021	0.229
2070 High	6.5	3.1	--	0.19	0.060	0.655

Note: Wave transmission coefficients are not listed for present and future MSL's because wave overtopping is limited to such a degree that it does not result in wave transmission. For these cases, the wave transmission coefficient is effectively zero.

5.1.3 Sandy Point Dike

At present, the shore arm is mostly submerged at MSL while most of the channel arm is visible (emergent). However, at MHHW, the channel arm is mostly submerged. The purpose of the dike is to keep the channel cross section narrow enough to keep channel velocities up and prevent sedimentation of the channel. The dike's 2012 inspection noted structural settlement, as well as displacement and loss of stone riprap units. Generally, the top stones are missing and the slopes have flattened. However, the dike continues to function in accordance with its authorization.

Presently, the wave environment at Sandy Point Dike is fetch-limited and influenced little by water depth. Therefore, relative SLC is expected to have little impact on the dike's stability. As the dike does not function as a breakwater but instead constricts flow between Sandy Point and Fort Hale to keep the main navigation channel free from shoaling and given the structure's continued performance in spite of its deterioration, increases in sea level are not anticipated to compromise the dike's future performance through the economic and planning horizons of the proposed channel improvement.

6.0 Summary and Conclusions

The Water Management Section's coastal assessment inventoried available tidal and wave hydrodynamic data to inform the civil engineering design and ship simulation of the channel improvements. Alternatives were evaluated with changes to the harbor hydrodynamics and improvements to navigability in mind. The feasibility of the proposed design was also tested in ERDC CHL's ship simulator, with minor modifications suggested to the turning basin and channel bend through the breakwater, and its resilience to sea level change was evaluated. The proposed design will improve navigation of the channel and reduce inefficiencies associated with inadequate channel depth.

7.0 References

Cialone, M., Massey, T., Anderson, M., Grzegorzewski, A., Jensen, R., Cialone, A., Mark, D., Pevey, K., Gunkel, B., McAlpin, T., Nadal-Caraballo, N., Melby, J., and Ratcliff, J., (2015). "North Atlantic Coast Comprehensive Study (NACCS) Coastal Storm Model Simulations: Waves and Water Levels", Technical Report ERDC/CHL TR-15-14, January 2015, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Duxbury, A. C. (n.d.). *A Hydrographic Survey of New Haven Harbor 1962-1963.* Yale University, Brigham Oceanographic Laboratory. Connecticut Water Resources Commission.

EurOtop, 2016. Manual on wave overtopping of sea defences and related structures. An overtopping manual largely based on European research, but for worldwide application. Van der Meer, J.W., Allsop, N.W.H., Bruce, T., De Rouck, J., Kortenhaus, A., Pullen, T., Schuttrumpf, H., Troch, P. and Zanuttigh, B., www.overtopping-manual.com.

IPCC. (2007). *Climate Change 2007: Impacts, Adaptation, and Vulerability.* Intergovernmental Panel on Climate Change. Retrieved from https://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4_wg2_full_report.pdf

Melby, J. A. and Green, D., 2015. Coastal Hazards System (CHS) Web Tool – User Guide US Army Engineer Research and Development Center, 3909 Halls Ferry Rd, Vicksburg, MS 39180

Nadal-Caraballo, N., and Melby, J., 2014 "North Atlantic Coast Comprehensive Study Phase I: Statistical Analysis of Historical Extreme Water Levels with Sea Level Change" ERDC/CHL TR-14-7, September 2014, US Army Engineer Research and Development Center, 3909 Halls Ferry Rd, Vicksburg, MS 39180

Richards, D. R. (1988). *New Haven Harbor Numerical Model Study.* US Army Corps of Engineers, Hydraulics Laboratory. Vicksburg, MA: US Army Engineer Waterways Experiment Station.

Rosati, J.D. 2005. Coastal Inlet Navigation Channel Shoaling with Deepening and Widening. U.S. Army Corps of Engineers, Coastal Hydraulics Laboratory. ERDC/CHL CHETN-IV-64. June 2005.

U.S. Army Corps of Engineers (2002). Coastal Engineering Manual. Engineer Manual 1110-2-1100, U.S. Army Corps of Engineers, Washington, D.C. (in 6 volumes).

U.S. Army Corps of Engineers (2013). Incorporating sea level change in Civil Works Programs - Engineering Regulation ER No. 1100-2-8162.

USACE, New England Division (1981). Feasibility Report Including Final Environmental Impact Statement for New Haven Harbor, Connecticut, Coastal Development for Navigation.

USACE, New England Division (1981). Supplement Report To April 1981 Feasibility Report Including The Addendum To The Final Environmental Impact Statement for New Haven Harbor, Connecticut.

USACE, New England District (2016). Long Island Sound Dredged Material Management Plan (DMMP) and Final Programmatic Environmental Impact Statement (FPEIS), January 2016.

Vincente, C.M. and Uva, L.P. 1984. Sedimentation in dredged channels and basins--prediction of shoaling rates, "*Proceedings, 19th International Conference on Coastal Engineering.*" American Society of Civil Engineers, 1863-1878.

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX G
REAL ESTATE PLAN

US Army Corps of Engineers
New England District

Appendix G - Real Estate Plan

New Haven Harbor Navigation Improvement Project

New Haven, CT

Integrated Feasibility Report and Environmental Impact Statement

Prepared by:

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Attachment 1 – Real Estate Map

Attachment 2 – Shellfish Beds Map

Attachment 3 – Assessment of Non-Federal Sponsor's Real Estate Acquisition Capability

1. STATEMENT OF PURPOSE/PROJECT DESCRIPTION/AUTHORITY

Introduction: The U.S. Army Corps of Engineers (USACE) in partnership with the New Haven Port Authority and the Connecticut State Port Authority, and in cooperation with other Federal and State agencies, is conducting a feasibility study to examine navigation improvements to the existing New Haven Harbor (Connecticut) federal navigation project. The Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) documents the formulation, evaluation, and comparison of alternatives and identifies the proposed project. This Real Estate Plan (REP) is prepared in support of the IFR/EIS.

Study Purpose and Existing Federal Navigation Project: The purpose of the feasibility study is to determine if improvements to the constructed federal navigation project at the New Haven Harbor are warranted and necessary and, if deemed necessary, recommend improvements. The federal navigation project is shown in Figure 1.

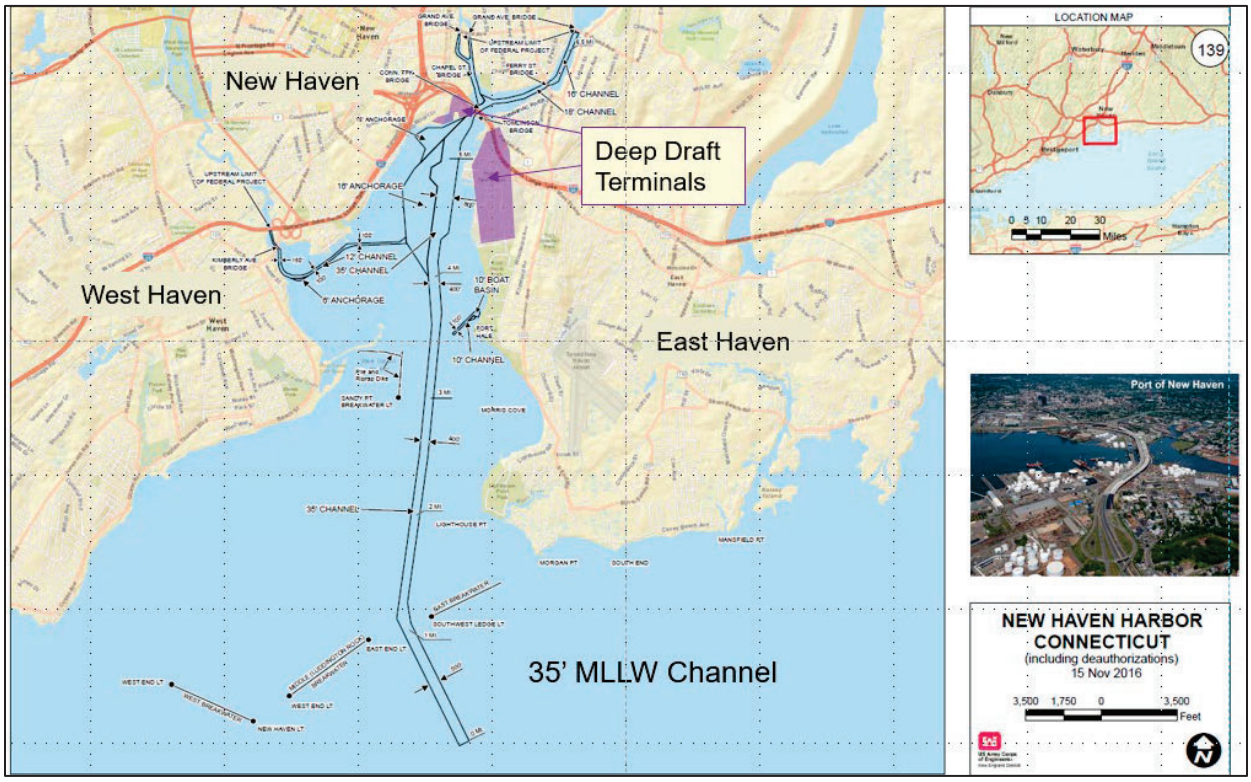


Figure 1 - Existing Federal Navigation Project, New Haven Harbor, CT

The current federally authorized New Haven Harbor navigation project includes the main ship channel, turning basin and maneuvering area authorized at a depth of -35 feet at mean lower low water (MLLW), three shallow draft channels, several anchorages, three breakwaters, and a training dike. While the project area includes multiple navigation features, the assessment focuses on the main ship channel, turning basin and maneuvering area, as these are the areas requiring improvements. The main ship channel extends from deep water in Long Island Sound, between the Middle (Luddington Rock) Breakwater and the East Breakwater, to the head of the New Haven Harbor.

Study Authorization: This study of the New Haven Harbor was directed by the United States Senate Committee on the Environment and Public Works resolution of 31 July 2007. "Resolved by the Committee on Environment and Public Works of the United States Senate, that the Secretary of the Army is requested to review the report of the Chief of Engineers on New Haven Harbor, Connecticut, published as House Document 517, 79th Congress, 2nd Session, and other pertinent reports, to determine whether modifications to the recommendations contained therein are advisable in the interest of navigation, sediment control, environmental restoration and preservation, and other related purposes at New Haven Harbor, Connecticut."

In addition, this study is supported in part by Section 216 of the Flood Control Act of 1970 which provides USACE with general authority to review completed civil works projects. "The Secretary of the Army, acting through the Chief of Engineers, is authorized to review the operation of projects the construction of which has been completed and which were constructed by the Corps of Engineers in the interest of navigation, flood control, water supply, and related purposes, when found advisable due to the significantly changed physical or economic conditions, and to report thereon to Congress with recommendations on the advisability of modifying the structures or their operation, and for improving the quality of the environment in the overall public interest".

Federal Objective: The federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements. In support of this federal objective, it is within both the National and USACE interest to participate in studies to improve commercial navigation. The "Federal Interest" decision in USACE planning is generally limited to instances where benefits of a potential project are expected to exceed the costs to the nation and the project is consistent with protecting the nation's environment. Because this is a single purpose navigation project, National Economic Development (NED) benefits are evaluated in terms of reduced navigation transportation costs. Development of the proposed project is based on identification of the plan that reasonably maximizes the net annual benefits. See Section 6 in the main report that discusses selection of the proposed project.

Proposed Project: The proposed project will deepen the existing federal navigation main channel, turning basin and maneuvering area from a depth of -35 feet to -40 feet MLLW. The proposed project also includes widening the existing channel by 100 feet, widening the existing turning basin 200 feet to the north, and widening the channel bend near the East Breakwater by 240 feet. The proposed project includes multiple open-water dredged material disposal sites, including utilization of material for salt marsh creation (beneficial use of dredge material) at an open water site along the south side of Sandy Point Spit in West Haven, two borrow pits, a shellfish creation area, and a rock reef creation site. See Figure 2.

Legend

- Proposed Channel Improvement
- Rock Reef Placement Site
- West River Pit Placement Site
- Morris Cove Pit Placement Site
- Salt Marsh Creation Site
- Shellfish Improvement Area

5,000 2,500 0 5,000 10,000 Feet

NEW HAVEN HARBOR
CONNECTICUT

FEASIBILITY REPORT/EIS

RECOMMENDED PLAN OF NAVIGATION IMPROVEMENT

Non-Federal Project Sponsor: The non-federal sponsor (NFS) for the proposed improvement project is the Connecticut Port Authority.

2. REAL ESTATE REQUIREMENTS

The proposed channel navigation improvements and open water dredged material disposal sites located below mean high water (MHW) do not require the acquisition of any real property.

For the saltmarsh creation site at Sandy Point the NFS must acquire the following real estate interests.

- A temporary work area easement (TWAE) for 2 years (access, staging, mobilization) (0.24+/- acre)

- A permanent road easement (2.62 +/-acres). The permanent road easement over and across an existing dirt road will ensure access to the newly created salt marsh for observation, maintenance and inspection activities. No upgrades or improvements to the existing roadway are intended or planned.

- Fee ownership of 1.53 +/- acres located between the MHW and mean higher high water (MHHW) along the south side of the Sandy Point spit to join the salt marsh creation site with the spit.

The NFS will be required to record the acquisition at the appropriate land records repository for the State of Connecticut. All required lands are owned by the city of West Haven and are within a single parcel identified on the City tax maps as parcel 036-0158-0-0000.

OWNERSHIP	PARCEL ID	PARCEL SIZE	DESCRIPTION
City of West Haven	036-0158-0-0000	66.4 Acres	Municipal Beach

The required real estate areas in parcel 036-0158-0-0000 are shown on Real Estate Plan Attachment 1 (Sheet RE-101), and summarized below.

REAL ESTATE REQUIREMENTS				
PARCEL ID.	**ACRES REQUIRED**	**TYPE OF ESTATE**	**USE**	**OWNER**
036-0158-0-0000	0.24	Temporary Easement	Temporary Work Area	City of West Haven
036-0158-0-0000	2.62	Permanent Easement	Road Access	City of West Haven
036-0158-0-0000	1.53	Fee	Edge of Salt Marsh	City of West Haven

The USACE standard estate language (as found in Exhibit 5-29 of ER 405-1-12) is as follows:

FEE (Estate 1)

The fee simple title to the land described in Schedule A, attached, subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

ROAD EASEMENT (Estate 11)

A perpetual non-exclusive and assignable easement and right-of-way in, on, over and across the land described in Schedule B, attached, for the location, construction, operation, maintenance, alteration, and replacement of a road and appurtenances thereto; together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the owners, their heirs and assigns, the right to cross over or under the right-of-way as access to their adjoining land at the locations indicated in Schedule B; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

TEMPORARY WORK AREA EASEMENT (TWAE) (Estate 15)

A temporary easement and right-of-way in, on, over and across the land described in Schedule C, attached, for a period not to exceed two (2) years, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a work area, including the right to move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the New Haven Harbor, CT Navigation Improvement Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

The TWAE proposed is for access, staging, and mobilization of equipment.

See Section 8 below for an explanation of why a gross appraisal report for the required LER was not completed.

The real estate requirements will be further defined during the pre-construction, engineering and design phase (PED), upon project approval.

3. EXISTING FEDERAL PROJECTS

New Haven is Connecticut's largest seaport and is located on the northern shore of Long Island Sound on the central Connecticut coast. The existing federal navigation project was adopted by the Act of 1852 and modified by the Acts of 1870, 1871, 1873, 1875, 1878, 1879, 1882, 1890, 1899, 1902, 1905, 1907, 1910, 1912, 1913, 1930, 1935, 1945, 1946, 1949, 1955, and 1986. The project, as completed in 1950, consists of (1) a 35-foot main channel, 400 to 500 feet wide, widened to 800 feet along the wharves to form a

maneuvering basin, (2) a 16-foot deep anchorage in the upper harbor west of the main channel, (3) a pile and stone dike extending easterly from Sandy Point, (4) 18 and 16-foot deep channels in the Quinnipiac River, (5) a 12-foot deep channel in the Mill River, and (6) a 12-foot deep channel and 6-foot deep anchorage in the West River. The Mill and Quinnipiac Rivers project segments were last maintained in 1982 and the West River in 1989. The project also includes three offshore stone breakwaters totaling about 12,100 feet long providing a refuge in the outer harbor.

The proposed project will deepen the existing federal navigation main channel, turning basin and maneuvering area from a depth of -35 feet to -40 feet MLLW. The proposed project also includes widening the existing channel by 100 feet, widening the existing turning basin 200 feet to the north, and widening the channel bend near the East Breakwater by 240 feet.

4. EXISTING FEDERALLY OWNED LANDS

There are no federally owned lands within the proposed project area.

5. LANDS OWNED BY THE NON-FEDERAL SPONSOR (NFS)

There are no lands in the proposed project area owned by the NFS, identified as the Connecticut Port Authority, as the project is primarily located in open water.

6. NAVIGATIONAL SERVITUDE

Navigational servitude is the right of the federal Government under the Commerce Clause of the U.S. Constitution to use, control, and regulate the navigable waters of the United States and the submerged lands thereunder for various commerce-related purposes including navigation and flood control. In tidal areas, the servitude extends to all lands below the MHW. In non-tidal areas, the servitude extends to all lands within the bed and banks of a navigable stream that lie below the ordinary high water level. As this project is for navigation purposes, the Government will exercise its rights under navigational servitude for all areas below MHW line, in order to maintain and improve the navigation channel. This includes the open water disposal sites. The navigational servitude is not considered a real property interest. The proposed project channel, turning basin, maneuvering area, Morris Cove borrow pit, the West River pit, the shellfish creation area, the rock reef creation site, and most of the salt marsh creation site are below the MHW line, and the necessary rights exist for construction, operation, and maintenance (O&M) under navigational servitude.

7. INDUCED FLOODING

There is nothing in the feasibility report to indicate that the constructed project features will induce flooding in new areas or increase flooding in existing flood prone areas.

8. BASELINECOST ESTIMATE FOR REAL ESTATE

The real estate requirements are currently being defined as part of the feasibility analysis. The REP will be updated when additional design plans become available and will be finalized during PED.

Because the value of real estate is not expected to exceed 15% of the total project costs, a rough order of magnitude (ROM) cost estimate for LERs was developed per ER 405-1-04 and Memorandum, CEMP-CR, 11 Jan 2019, Subject: Real Estate Policy Guidance Letter No. 31-Real Estate Support to Civil Works Planning for purposes of the feasibility report.

At this point in the study three requirements have been identified in accordance with the proposed salt marsh creation/beneficial use site: 1) a temporary work area easement required from the City of West Haven for contractor access, staging, and de-mobilization; 2) a permanent easement (road easement) over an existing dirt road, approximately 2.62 acres, more or less, to provide access for monitoring and future maintenance at the salt marsh creation/beneficial use site; and 3) fee acquisition of approximately 1.53 acres between MHW and MHHW for the placement of dredged material.

The area identified for the temporary work area easement is owned by the City of West Haven and is a 0.24 acre portion of Assessor's Parcel 036-0158-0-0000, 66.4 acres in total, described as Municipal Beach. Because only a minimal portion of the larger parcel will be encumbered by the TWAE and for only a two-year term, a nominal value of $2,500 was assigned to the easement.

The area required for the road easement is also a portion of the 66.4 acre City of West Haven Assessor's Parcel 036-0158-0-0000, Municipal Beach, owned by the City of West Haven. The road easement required is permanent; exclusive use of the road is not required.. The non-exclusive easement over and across the existing road is expected to have no impact on the value or use of the larger parcel.

Acquisition of approximately 1.53 acres in fee is required for the permanent placement of dredged materials to create the salt marsh. The land identified for the fee acquisition is also part of the City of West Haven Assessor's Parcel 036-0158-0-0000, Municipal Beach, owned by the City of West Haven. The land is intertidal and this was considered in assigning value to the land. Severing this portion for creation of the salt marsh is not expected to have any impact on the value or use of the larger parcel.

The baseline real estate cost estimates are annotated as follows: Temporary Work Area Easement (Estate 15) $2,500, Road Easement (Estate 11), $62,550 , Fee Ownership (Estate 1), $36,525, total $101,575, adding 15% contingent fee, results rounded $117,000. In addition, we project the following administrative costs: $25,000 for NFS administration costs + $25,000 for federal administration cost; total estimated, $167,000.

The Baseline Cost Estimate for Real Estate (BCERE) chart is on the following page.

Real Estate Costs		Non-Federal	Federal	Project Cost
	Baseline Cost Estimate for Real Estate (BCERE)			
	Cost Summary (rounded)	**$142,000**	**$25,000**	**$167,000**
	Incidental Cost (rounded)	$25,000	$25,000	**$50,000**
	Real Estate Acquisition Cost (rounded)	$117,000	$0	**$117,000**
01	**LANDS AND DAMAGES**			
01A	**Incidental Costs**	**$25,300**	**$25,300**	**$50,600**
	By Government		$22,000	$22,000
	- Survey Review		$3,800	$3,800
	- Appraisal Review		$4,500	$4,500
	- Legal Review		$4,600	$4,600
	- Administrative		$9,100	9,100
	-			
	By Non-federal Sponsor	$22,000		$22,000
	- Survey	$ 5,500		$5,500
	- Appraisal	$ 6,000		$6,000
	- Title search, insurance	$ 1,500		$1,500
	- Legal fees	$ 5,500		$5,500
	- Administrative	$ 3,500		$3,500
	Contingency (15%)	$3,300	$3,300	$6,600
01B	**Real Estate Acquisition Costs**	**$116,811**	**$0**	**$116,811**
	Land Payments	$101,575	$0	$101,575
	Utility Relocations	$ 0	$0	$ 0
	Damages	$ 0	$0	$ 0
	Contingency (15%)	$15,236	$0	$15,236

9. PUBLIC LAW 91-646 RELOCATIONS

All of the LERs identified for acquisition are owned by the city of West Haven and will not require the displacement or relocation of any persons or businesses in connection with the proposed project. This will be further reviewed and confirmed during PED phase.

10. MINERAL ACTIVITY

The PDT confirms there is no present or anticipated mining and drilling activity in the vicinity of the project that may affect project purposes and the operation thereof.

11. TIMBER RIGHTS

The PDT confirms that there are no timber rights required.

12. ASSESSMENT OF NON-FEDERAL SPONSOR ACQUISITION CAPABILITY

The Connecticut Port Authority (CPA), the NFS, is a quasi-public agency responsible for marketing and coordinating the development of the state's ports and maritime economy. The agency, created in 2014 by State Legislative action, moved the maritime transportation programs from the CT Department of Transportation (CTDOT) to the CPA and continues the Connecticut Department of Transportation's (CTDOT) commitment to investing in the state's port infrastructure. CTDOT and other state agencies have worked cooperatively and successfully with USACE on several successful navigation projects. Recent navigation improvement projects were completed in Connecticut at Clinton Harbor, Mystic River, Mianus River, North Cove in Old Saybrook, and Patchogue River in Westbrook.

The Real Estate Division worked with the NFS to complete the acquisition assessment checklist to ensure that the NFS is vested with sufficient power to acquire, hold title, and can work with Connecticut State Agencies with condemnation authority if needed. However, it is very unlikely that there will be a need to condemn lands for this project.

NFS is aware of requirements in the "ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY"; see Attachment 3 to this report.

13. ZONING

There are no zoning ordinances proposed to facilitate acquisition in connection with the proposed project.

14. ACQUISITION SCHEDULE

The project PED phase and construction schedule is included in Appendix F of the IFR/EIS and is dependent on future USACE HQ approval and Congressional project authorization. The real estate acquisition requirements will be further outlined during the PED phase, upon project approval.

As of this report, the actual construction date schedule is subject to project approval and Congressional authorization and appropriation. The current estimated schedule is as follows:

Acquisition Schedule	**Estimated**
Project Partnership Agreement (PPA) Executed	October 2021
USACE Provides NFS Notice to Proceed with Acquisition	October 2021
NFS' Authorization for Entry for Construction to USACE	February 2022
Certify Real Estate and Ready to Advertise	March 2022
Contract Award	April 2022
Start Construction	October 2022

15. UTILITY AND FACILITY RELOCATIONS

The PDT determined through review of maps and survey information that there are no facility or utility relocation requirements for implementation of the navigation improvement project.

There is an existing submarine power and fiber optic cable located in the New Haven Harbor existing federal navigation channel. The cable is owned by Cross Sound Cable, LLC (CSC) and is a made up of a bundle of cables that provide 330 MW of high voltage direct current and internet and phone data transfer. The cable connects from a terminal in New Haven, Connecticut to terminal in Shoreham, New York a distance of about 25 miles across Long Island Sound.

The USACE Regulatory Program issued a Section 10[1] permit for construction of the cross Sound cable (cable) to CSC. About 4 miles of the 25 mile long cable is located in the New Haven Harbor federal navigation channel. The permit required the cable be buried to at least -48 ft. MLLW in the federal channel. The cable burial relied on the jet plow method where high-pressure water is used to fluidize the sea floor to create a trench for the cable to fall into. During construction with the jet plow, a small length (700 feet) in the federal channel was not embedded to the required -48 feet MLLW due to encountering ledge that obstructed the achievement of the embedment depth. The USACE granted CSC a permit amendment that requires CSC to meet the -48 feet MLLW installation depth, at their cost, when corrective action is required by USACE. The Regulatory program is actively engaged with CSC to achieve the embedment depth required in the permit and, thus far, the utility is cooperating. If necessary, NAE Regulatory Division will refer an enforcement action to the Department of Justice. Project construction delay costs due to the utility's failure to cooperate are included in the Cost Schedule Risk Analysis used to determine the project cost contingency. No real estate costs for the cable will be incurred by the navigation improvement project.

16. ENVIRONMENTAL CONCERNS

During the feasibility study phase, an environmental impact statement (EIS) has been prepared. This includes information on environmental consequences of the proposed project. A draft Integrated Feasibility Report and EIS was issued for comment in September 2018 and the comment period closed in November 2018. At this point in the study, there are no known hazardous, toxic, or radioactive waste or CERCLA sites in the proposed project area. (CERCLA stands for the federal Comprehensive Environmental Response, Compensation, and Liability Act.)

17. ATTITUDES OF THE LANDOWNERS

The NFS and the State of Connecticut, the New Haven Port Authority, and the city of West Haven have expressed support for this navigation improvement project.

18. NOTIFICATION TO NON-FEDERAL SPONSOR

Subject to USACE HQ approval, Congressional authorization, and federal appropriation of funding required for the improvement project, the NFS will be required to execute a PPA for this project with USACE, including cost share responsibilities. Construction plans will be developed during PED phase and finalized following signing of the PPA. Upon plans finalization, the NFS will be provided with the notice to proceed by the Real Estate Division regarding the acquisition of all required real property interests for project purposes, including long term maintenance and operations.

---

[1] Note: The U.S. Army Corps of Engineers has the power to regulate non-federal use of navigable waters under Section 10 of the River and Harbor Act of 1899.

The risks of acquiring LERs before the execution of the PPA has been discussed with the NFS. The sponsor was notified in writing by letter dated January 10, 2020.

19. OTHER RELEVANT REAL ESTATE ISSUES

The harvesting of shellfish is an intensive aquaculture industry in the subtidal areas of New Haven Harbor. Shellfish species commercially managed and harvested in New Haven Harbor include the eastern oyster (Crassostrea virginica) and the hard-shell clam (Mercenaria mercenaria). The Connecticut Department of Agriculture's Bureau of Aquaculture (BOA) manages the shellfish beds seaward of the mean high water line under agreements with the New Haven Harbor municipalities (New Haven, West Haven, and East Haven), the BOA monitors and governs all parcels of seafloor within New Haven Harbor, as well as those outside of the breakwaters. There are 20 shellfish parcels that are in the channel improvement project area. See Attachment 2 Shellfish Beds Map. Aquaculture leases in the project area are subject to navigational servitude.

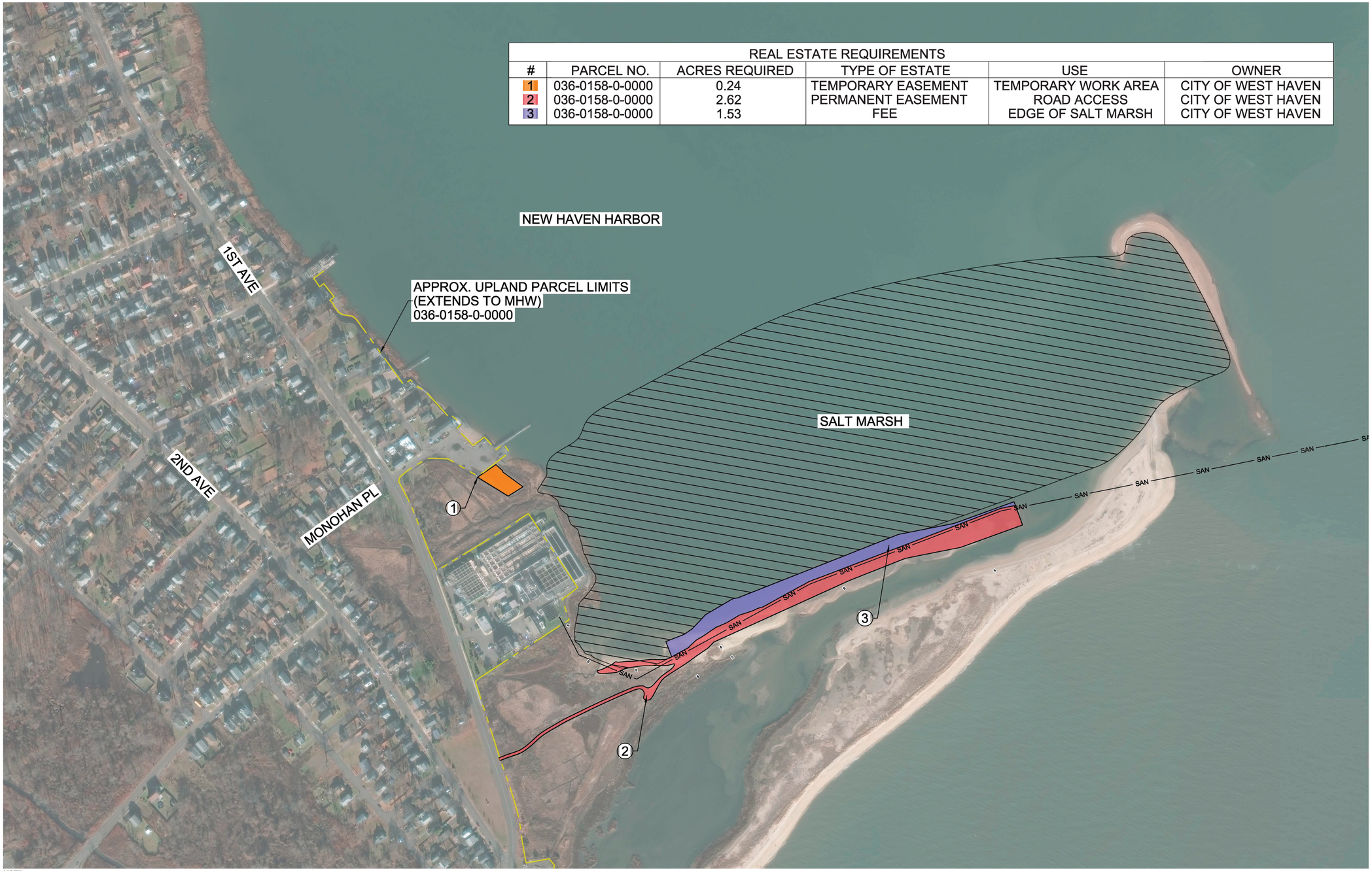
20. RISK ANALYSIS

Currently, there are no known significant risks associated with this project involving real estate.

Real Estate Plan

Attachments 1 - 3

Real Estate Plan - Attachment 1



REAL ESTATE REQUIREMENTS					
#	PARCEL NO.	ACRES REQUIRED	TYPE OF ESTATE	USE	OWNER
1	036-0158-0-0000	0.24	TEMPORARY EASEMENT	TEMPORARY WORK AREA	CITY OF WEST HAVEN
2	036-0158-0-0000	2.62	PERMANENT EASEMENT	ROAD ACCESS	CITY OF WEST HAVEN
3	036-0158-0-0000	1.53	FEE	EDGE OF SALT MARSH	CITY OF WEST HAVEN

NOTE:
1. ELEVATIONS SHOWN ARE IN MEAN LOWER LOW WATER (MLLW).

A1 REAL ESTATE - SANDY POINT MARSH CREATION SITE
SCALE: 1" = 200'

0 200' 400'

N

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

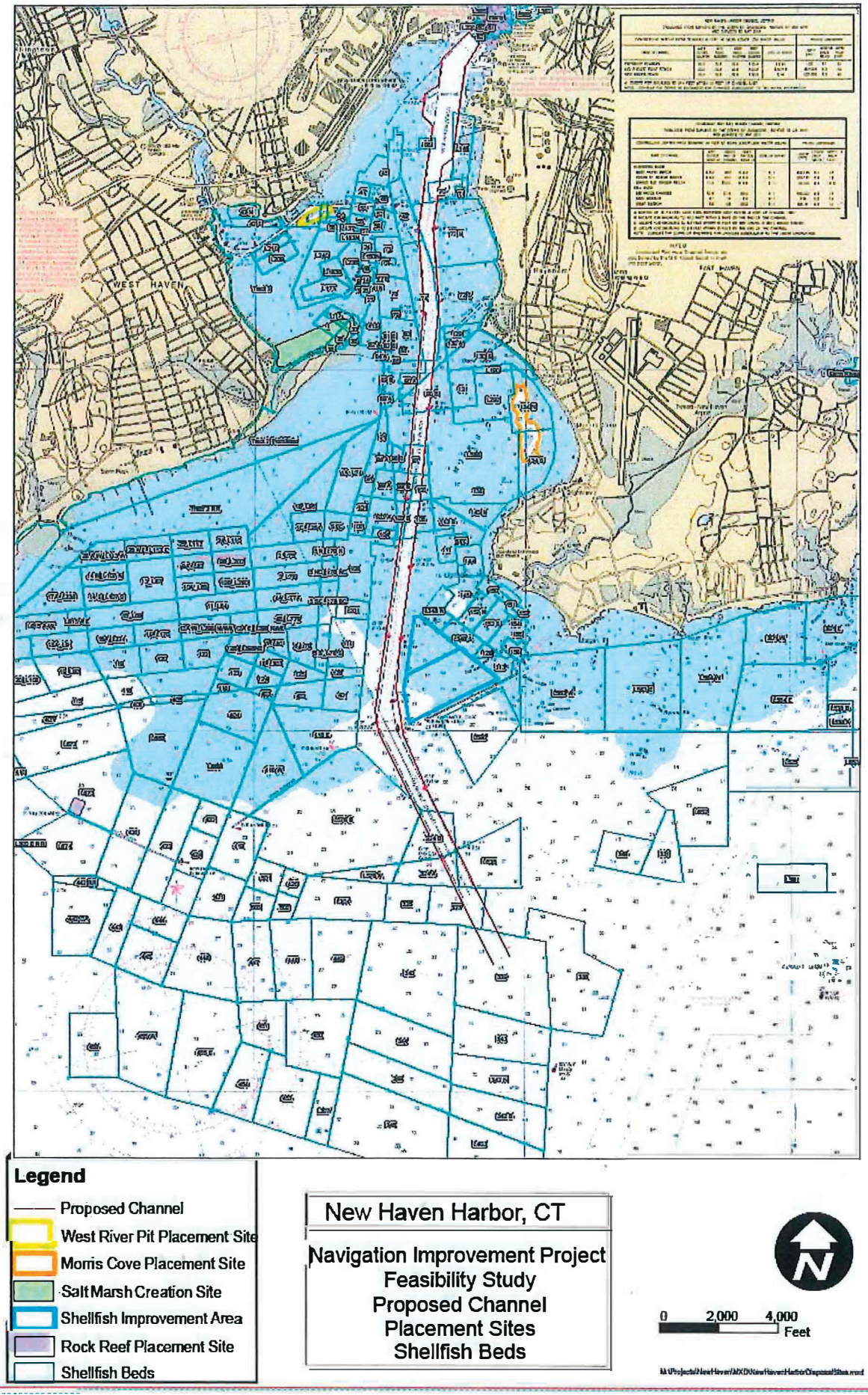
U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD, MA 01742-2751

DESIGNED BY: L. JACOBS
DRAWN BY: L. JACOBS
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
SCALE: 1:1
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
DRAWING CODE:
SHEET 1 OF 1

FEASABILITY STUDY
NEW HAVEN HARBOR IMPROVEMENT DREDGING
CONCEPTUAL - REAL ESTATE PLAN

SHEET ID
RE-101

Real Estate Plan - Attachment 2



Attachment 2 - Shellfish Parcel Map

Project Name: New Haven Harbor, CT, Navigation Improvement Project
Project Location: New Haven and West Haven, CT
Project Sponsor: Connecticut Port Authority

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

The preliminary real estate acquisition information is attached to this document.

Legal Authority: -

Name and title of sponsor's representative providing answers to this section.

Joe Salvatore – Program Manager

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes?
Yes - If yes, list the basis for the legal authority: Legislative Authority; CGS – Section 1-120(1) & CGS – Section 15-31b(a)
b. Does the sponsor have the power of eminent domain for this project?
No - If yes, list the basis for the legal authority: Will Coordinate with other State Agencies as needed
c. Does the sponsor have "quick-take" authority for this project? No – See "b" above
d. Are any of the lands/interests in land required for the project located outside the sponsor's political boundary? No
e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? Yes – City of West Haven

II. Human Resource Requirements:

Name and title of sponsor's representative providing answers to this section.

Joe Salvatore – Program Manager

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? No
b. If the answer to II. a. is "yes," has a reasonable plan been developed to provide such training? N/A
c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? Yes
d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? Yes
e. Can the sponsor obtain contractor support, if required in a timely fashion? Yes
f. Will the sponsor likely request USACE assistance in acquiring real estate?
Yes (If "yes," provide description) Assistance with coordination and planning

Project Name: New Haven Harbor, CT, Navigation Improvement Project
Project Location: New Haven and West Haven, CT
Project Sponsor: Connecticut Port Authority

III. Other Project Variables:

Name and title of sponsor's representative providing answers to this section.

Joe Salvatore – Program Manager

a. Will the sponsor's staff be located within reasonable proximity to the project site? Yes

b. Has the sponsor approved the project/real estate schedule/milestones? No

The project is in the feasibility planning stages therefore it is impossible to accurately estimate project acquisition milestones. Once the project is approved an acquisition strategy plan will be developed and this document updated accordingly. Approximate duration estimates provided below.

If the answer is no, please fill in the length of time it will take to complete these milestones after the New England District provides the appropriate real estate maps and estates. Some of milestones will overlap. When this happens the number of months needed to complete the next task should only include the additional months to complete that milestone. For example, you may order the title policies and the survey at the same time. If the survey will be completed in two months and the title policies will take three months you would put "2 months" in the survey milestone and "1 month" in the preliminary title policy milestone.

Survey legal interests and prepare legal descriptions: 0.5 month

Obtain preliminary title policies or other form of title information: 0.5 month

Appraise all of the property: 0.5 month

Have the appraisals reviewed by New England District: 0.5 month

Negotiate with the landowners: 0.5 month

Clear up title issues and close on the property or condemn the property: NA-Town owned land.

Take possession of the property interests: 0.5 month

Sponsor signs the Authorization for Entry for Construction: 0.5 month

Project Name: New Haven Harbor, CT, Navigation Improvement Project
Project Location: New Haven and West Haven, CT
Project Sponsor: Connecticut Port Authority

IV. Overall Assessment:

a. Has the sponsor performed satisfactorily on other USACE projects?
Connecticut Port Authority established in 2015. USACE and State of Connecticut have partnered successfully on projects in past.

b. With regard to this project, the sponsor is anticipated to be: fully capable

V. Coordination:

a. Has this assessment been coordinated with the sponsor? yes
b. Does the sponsor concur with this assessment? yes

VI. NOTES:

Prepared by:

(date) 4-29-2019
Maureen Davi
Realty Specialist
New England District

(date) 4-29-2019
Evan Matthews
Executive Director of the Connecticut Port Authority

Reviewed by:

(date) 4-29-2019
Gaelen Daly
Chief, Real Estate Division

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX H
ESSENTIAL FISH HABITAT ASSESSMENT

Essential Fish Habitat Assessment

New Haven Harbor

Navigation Improvement Project

New Haven, Connecticut

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Figure 2. Navigation Improvement Features and Placement Site Locations

ABBREVIATIONS AND ACRONYMS

A	adults
°C	degrees Celsius
cm	centimeter
District	U.S. Army Corps of Engineers, New York District DO
	dissolved oxygen
E	eggs
EFH	Essential Fish Habitat
EJ	early juveniles
F	fall
ft	feet
J	juveniles
L	larvae
LJ	late juveniles
m	meters
MAB	Mid-Atlantic Bight
MLW	Mean Low Water Mark
mm	millimeters
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act of 1976 NEFMC
	New England Fisheries Management Council
NGVD	National Geodetic Vertical Datum NMFS
	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration NOS
	National Ocean Services
ppt	parts per thousand
S	summer
SNE	southern New England
Sp	spring
TL	total length
W	winter
YOY	young-of-the-year

1.0 Introduction

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act, this assessment identifies the potential impacts of the United States Army Corps of Engineers (USACE), New England District's (District), proposed New Haven Harbor navigation improvement project on essential fish habitat (EFH) in the cities of New Haven and West Haven, New Haven County, Connecticut. The Magnuson-Stevens Act as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267) set forth a number of new mandates for the National Marine Fisheries Service (NMFS), regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat.

EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The regulations further clarify EFH by defining "waters" to include aquatic areas that are used by fish (either currently or historically) and their associated physical, chemical, and biological properties; "substrate" to include sediment, hard bottom, and structures underlying the water; and, areas used for "spawning, breeding, feeding, and growth to maturity" to cover a species' full life cycle.

2.0 Project Description

The existing New Haven Harbor Federal Navigation Project (FNP) is shown in Figure 1. Navigation features of the existing Federal Navigation Project include:

- A main ship channel, -35 feet MLLW, extending about 5 miles from deep water in Long Island Sound to the head of the harbor at the mouth of the Quinnipiac River, varying in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widened to 800 feet along the upper harbor terminals to provide a maneuvering area;
- A turning basin in the upper harbor west of the channel also at -35 feet MLLW;
- Two anchorages west of the main channel, at -15 and -16 feet MLLW;
- The Quinnipiac River Channel, at -18 feet MLLW (lower channel) and -16 feet MLLW (upper channel), and generally 200 feet wide;
- The Mill River Channel, at -12 feet MLLW, 200 feet wide, including two branches (east branch at 100 ft. wide, and west branch at 125 feet wide);
- The West River channel authorized at -12-feet MLLW, 100 to 150 feet wide, with a -6 foot MLLW anchorage;
- A pile and stone T-dike at Stony Point west of the main channel, 4,200 feet long; and
- Three offshore stone breakwaters, totaling 12,100 feet in length providing a refuge in the outer harbor.

Due to inefficiencies in large vessels transiting the harbor, USACE is considering navigation improvement to the New Haven Harbor FNP. The tentatively selected plan (TSP) for the New Haven Harbor Navigation Improvement project is the 40 ft. Plan. The TSP consists of the following General Navigation Feature Improvements:

General Navigation Feature Improvements

- Deepen the channel, maneuvering area, and turning basin from - 35 to -40 feet, MLLW
- Widen the turning basin to the north 200 feet
- Widen the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet entrance.
- Widen the bend at the East Breakwater from 560 to 800 feet

The improvement features are shown in Figure 2. The dredged material quantity estimate for the improvement dredging is shown in Table 1.

Table 1. TSP Dredged Material Quantity Estimates.

TSP (40-ft Plan)	Dredging Quantities (CY)		
	Cut	2-ft. Over depth	Total
Entrance Channel**	278,300	240,000	518,300
Bend (Ordinary Material)	475,300	161,300	636,600
Bend (Rock) (Required Cut to El 42)	24,900	18,600	43,500
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging	**2,811,500**	**1,510,700**	**4,322,200**

Dredged Material Placement Sites Base Plan

The following sites will be used for the placement of dredged material from the improvement project. These sites meet the Federal Standard of least cost environmentally acceptable and also represent beneficial use of the dredged material. The sites are:

- Morris Cove and West River Borrow Pits
- Create Oyster Habitat south of east breakwater
- Rock placement at west Breakwater (rock reef)
- Cover historic disposal mounds at CLDS

Salt Marsh Creation Additional Opportunity for Beneficial Use Site

In addition to the above placement sites the opportunity to use some of the dredged material that would go to CLDS to create about 58 acres of salt march was identified. This salt marsh creation site represents an increase in cost over the less expensive option of bringing the material to CLDS. The Non-Federal Sponsors support the salt marsh creation site and are willing to share in the incremental cost above the base plan.

All potential in harbor disposal sites are shown in Figure 2. The CLDS is not shown.

Figure 1. New Haven Harbor Federal Navigation Project.

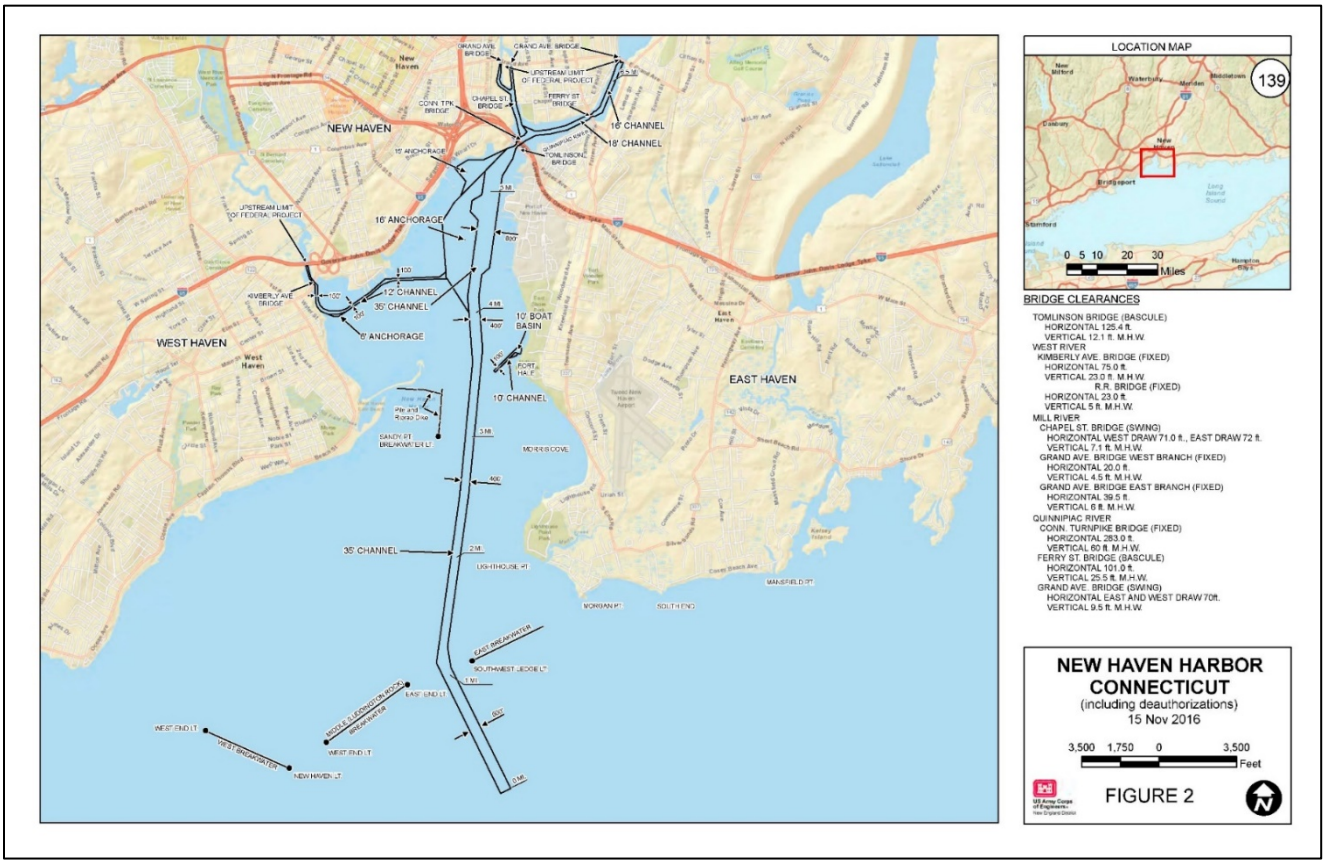
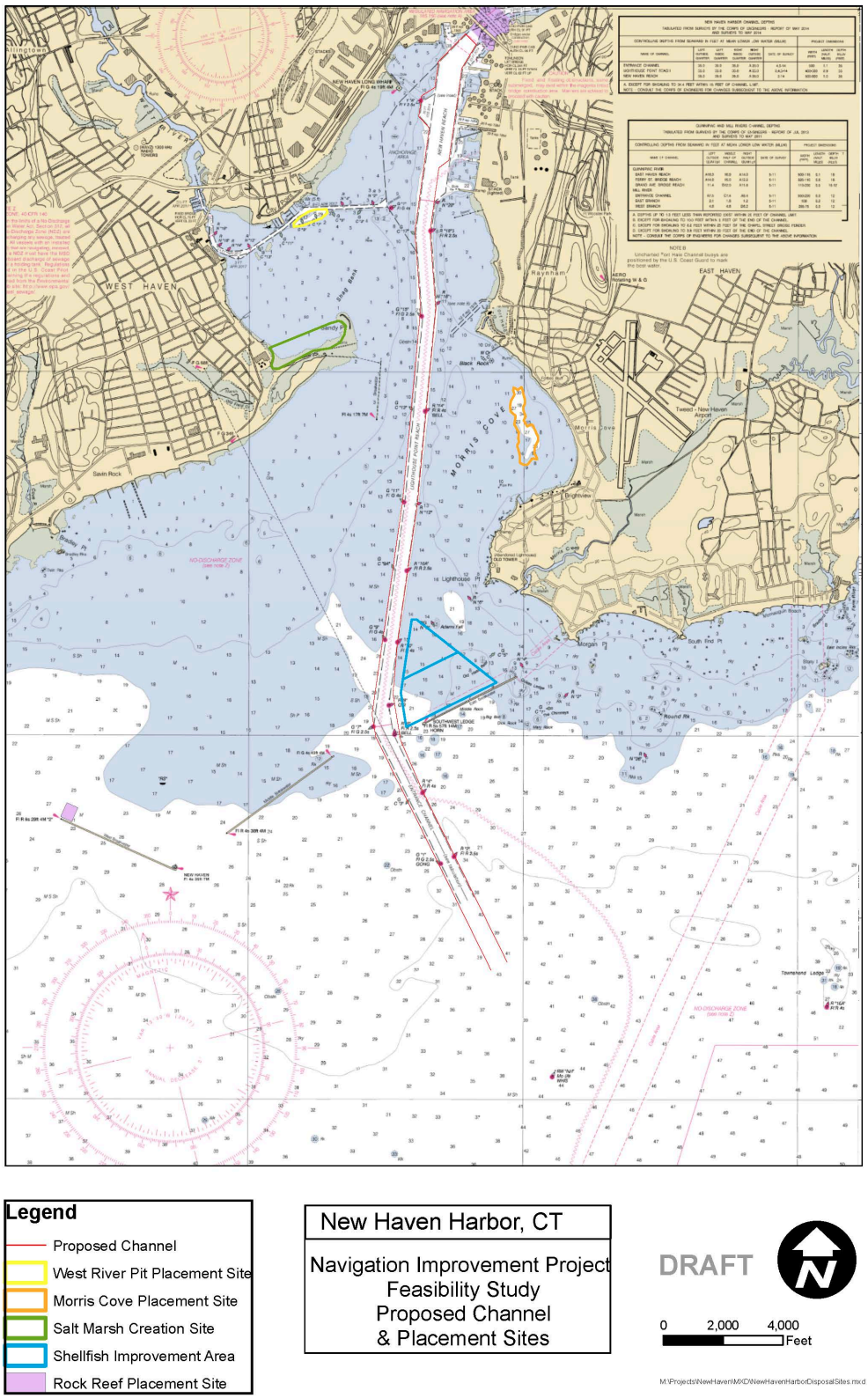


Figure 2. Navigation Improvement Features and Placement Site Locations.



3.0 Existing Environment

3.1 Physical Setting

The dredging and placement site locations (with the exception of portions of the Sandy Point marsh creation area) are estuarine subtidal bottoms, the majority of which are comprised of predominately silty material. A portion of the Sandy Point marsh creation area is silty and sandy intertidal bottom. Chapters 2 and 3 of the New Haven Harbor Navigation Improvement Project Environmental Impact Statement detail the existing environment of the proposed dredging areas as well as the placement areas.

The Long Island Sound estuary is unique in that it is open to the ocean at both ends (through Block Island Sound to the east and the lower Hudson River estuary to the west) and most of its fresh water input is located at the higher salinity eastern end (through the Connecticut and Thames River). Salinity at the western boundary of the Sound ranges from around 22 ppt in the spring to 27 ppt in the fall, increasing eastward to 30 to 31 ppt at the western end of the Sound. The project area is located approximately at the mid-point of the geographic range. Salinity in the project area and vicinity has been recorded at approximately 27.5 ppt in the spring. Thermal stratification in the Sound develops in the spring and breaks down in the fall. The surface temperatures in the open Sound range from 2 to 5°C in the winter and from 20 to 25°C in late summer.

New Haven Harbor experiences semi-diurnal tides. NOAA installed a tide gage (Station 8465705) in August of 1999. The mean tide range in the Harbor is 6.14 feet and the diurnal range is 6.7 feet. Table 2 below summarizes the tidal datums for New Haven at Station 8465705.

Table 2. New Haven Harbor Tide Range – NOAA Station 8465705

Condition	Elevation (feet, MLLW)	Elevation (feet, NAVD88*)
Mean Spring High Water (MSHW)	7.22	3.60
Mean Higher High Water (MHHW)	6.71	3.09
Mean High Water (MHW)	6.39	2.77
NAVD88	3.62	0.00
Mean Sea Level (MSL)	3.32	-0.30
Mean Tide Level (MTL)	3.32	-0.30
Mean Low Water (MLW)	0.24	-3.38
Mean Lower Low Water	0.00	-3.62

***North American Vertical Datum of 1988**

4.0 Essential Fish Habitat

4.1 Designated Species

New Haven Harbor and the Federal Navigation Project have the potential to provide habitat for fish species in the area. Per EFH source documents (NEFMC/NMFS, 2017), Table 3 denotes the federally managed species and their associated life stages that have EFH within the project area.

Table 3. Federally managed species and their associated life stages that have EFH within the project area.

Common Name	Scientific Name	Life Stages with EFH in Project Area
pollock	*Pollachius virens*	juveniles, adults
windowpane flounder	*Scopthalmus aquosus*	eggs, larvae, juveniles, adults
winter flounder	*Pseudopleuronectes americanus*	eggs, larvae, juveniles, adults
silver hake	*Merluccius bilinearis*	eggs, larvae, juveniles, adults
red hake	*Urophysis chuss*	eggs, larvae, juveniles, adults
little skate	*Leucoraja erinacea*	juveniles, adults
winter skate	*Leucoraja ocellata*	juveniles, adults
Atlantic sea herring	*Clupea harengus*	juveniles, adults

4.2 Individual Species Assessments

Atlantic Herring (*Clupea harengus*): Juveniles and Adults

Life History Information: Adult Atlantic sea herring migrate south into southern New England and mid-Atlantic shelf waters in the winter after spawning in the Gulf of Maine, on Georges Bank, and Nantucket Shoals. Juveniles and young of the year are abundant in LIS during the fall at depths of 30-60 m and preferred salinities of 30-32 ppt.

Occurrence in Project Area and Impacts: Juvenile and adult Atlantic herring are not expected to be within the project area in great numbers as their preferable depths are deeper than those found within the project areas and their preferred salinities area higher. Also these fish area highly mobile filter feeders and not closely associated with the benthos where potential impacts would be greatest. Constructing the proposed project is not expected to significantly impact this species.

Pollock (*Pollachius virens*): Juveniles and Adults

Pollock are not commonly caught in the surveys of LIS. In surveys conducted by the Connecticut Fisheries Division from 1984-2014 throughout LIS, only 68 adults were caught. Generally, juvenile pollock have been reported over a wide variety of substrates including sand, mud, or rocky bottom and vegetation and prefer salinities of 29-32 ppt, temperatures from 0-16 ^{o}C and depths of ranging from 5-150 m. Inshore subtidal and intertidal zones serve as an important nursery area for age 0 - 1 juveniles while juveniles aged 2+ move offshore, inhabiting depths of 130-150 m.

Adults exhibited little preference for bottom types and were found at salinities 31-34 ppt, temperatures of 0-14 ºC and depths ranging from 35-36 m. Adults tend to inhabit deeper waters in spring and summer than in winter and are found further offshore than juveniles.

Occurrence in Project Area and Impacts: The possibility exists that the juvenile life stage of this species may occur within the project area but would not be expected to occur in significant numbers within the project area due to preferred higher salinities. However, because pollock is a benthic species, juveniles might be susceptible to project impacts such as direct mortality during dredging, and turbidity and burial of prey species during material placement.

Because of the Pollock's mobility, impacts to adults are not expected to be common as pollock can feed at other nearby locations. Pollock are not expected to be common in the project area and therefore, significant short term or long term adverse impacts to this species are not expected from project implementation.

Red Hake (*Urophycis chuss*): All Life Stages

Life History Information: This species spawns along the continental shelf off southern New England and eastern Long Island. Larvae dominate the summer ichthyoplankton in the Mid Atlantic Bight and are most abundant on the mid-and outer continental shelf. Eggs and larvae are pelagic with demersal settlement beginning in the juvenile stage generally occurring in the fall. Juveniles seek shelter and commonly associate with scallops, surf clam shells, and seabed depressions. Juveniles were found in LIS in the spring although they were most abundant during the summer. Their preferred substrate was mud, water depths ranged between 5- 50 m, salinities were between 24-32 ppt, and temperatures between 2-22 ºC.

Adults were generally found in abundance within the Sound from spring to fall in water depths greater than 25 m, salinities between 20-33 ppt, and on mud substrates. Both juveniles and adults make offshore migrations during the winter months.

Occurrence in Project Area and Impacts: Eggs and larval red hake are not expected to be impacted by the proposed dredging or placement alternatives. Juvenile and adult red hake could be in the project area but would not be expected to be present in significant numbers. The depth and structure of the bottom habitat in the project area is not preferred by red hake, a demersal fish which spends most of its time on or very close to the bottom in association with scallops, surf clam shells, or seabed depressions. There would be temporary increases in turbidity at the project site which would be expected to displace individuals of this species at the various project sites if juveniles and adults were present. Insignificant short term impacts may occur. The deepening of the New Haven Harbor channel and the creation of oyster habitat may benefit juvenile and adult hake by creating a more preferred bottom habitat (i.e., deeper and more complex). Therefore, no more than short-term impacts to red hake and their associated EFH are expected.

Silver Hake (*Merluccius bilinearis*): All Life Stages

Life History Information: Silver hake are a demersal fish that occur in the Atlantic Ocean from Newfoundland to Cape Fear, North Carolina. This species is most abundant from Nova Scotia to New Jersey. Adult silver hake spawn from May through October with peaks in August. Silver hake feed primarily on fish, crustaceans, and squid. This species makes seasonal migrations from the continental slope during the fall and winter to near-shore waters during the spring and summer. Silver hake have

been found on most substrates (gravel to fine silt and clay) but are more common on silt and clay substrates. Silver hake occur in all areas of Long Island Sound but are more abundant during the spring (Lock and Packer 2004).

Occurrence in Project Area and Impacts: Eggs and larval silver hake are not expected to be impacted by the proposed dredging or placement alternatives. Juvenile and adult red hake could be present in the project area as New Haven Harbor contains mainly fine sediments throughout the harbor. There will be temporary increases in turbidity at the project site which would be expected to displace individuals of this species at the various project locations if juveniles and adults are present. However, the mobility of this species should allow for the majority of juveniles and adults to avoid construction areas. Long term impacts will include a loss of approximately 58 acres of intertidal and subtidal habitat (for the Sandy Point marsh creation alternative) as those areas will be converted to salt marsh habitat. This impact is not expected to significantly affect silver hake populations in LIS as the areas being converted to salt marsh are abundant throughout New Haven Harbor and LIS. Therefore, no significant impacts to silver hake and their EFH are expected due to the proposed project.

Windowpane (*Scophthalmus aquosus*): All Stages

Life History Information: This is a mid and inner-shelf species found primarily between Georges Bank and Cape Hatteras on fine sandy sediment. Spawning begins in February and March in inner shelf waters, and peaks in spring and autumn within the LIS. Spawning occurs in inner shelf waters, including many coastal bays and sounds, and on Georges Bank. In the Mid Atlantic Blight, eggs and larvae are planktonic, found in waters less than 70m deep from February- July and again in September- November.

Juveniles and adults are similarly distributed. They are found in most bays and estuaries south of Cape Cod throughout the year at a wide range of depths (1 to 110 m), bottom temperatures (3–12°C in the spring and 9–12°C in the fall), and salinities 15-33ppt. Juveniles that settle in shallow inshore waters move to deeper offshore waters as they grow. Adults occur primarily on sand substrates off Southern New England and Mid Atlantic Bight.

Bottom trawl surveys during the period 1992-1997 in Long Island Sound found that juvenile and adult windowpane were most abundant in spring (April-June). In spring, they were caught at bottom temperatures of 3-18 ºC and at salinities 21-31 ppt and depths less than 60 m. The distribution pattern in autumn (September-November) was similar to the pattern in the spring, but abundance was reduced. In autumn, windowpane adults were caught at bottom temperatures of 8-23 ºC, salinities of 18-32 ppt and depths less than 50m.

Occurrence in Project Area and Impacts: All life history stages may occur within the project area. If spawning does occur around the project area there is a low potential for adverse impacts to early life history stages as both larvae and eggs tend to occur closer to the surface than to the bottom. Construction activities that result in a temporary increase in turbidity may have an adverse impact on the windowpane because of this species' dependence on sight for foraging. This adverse effect is expected to be short term and localized. It is expected that juvenile and adults will avoid highly turbid conditions. Long term impacts will include a loss of approximately 58 acres of intertidal and subtidal habitat (for the Sandy Point marsh creation alternative) as those areas will be converted to salt marsh habitat. This impact is not expected to significantly affect windowpane populations in LIS as the areas being converted to salt marsh are abundant throughout New Haven

Harbor and LIS. Therefore, no significant impacts to windowpane flounder and their EFH are expected due to the proposed project.

Winter Flounder (*Pseudopleuronectes americanus*): All Stages

Life History Information: Winter flounder spawning occurs from mid-winter through early spring, peaking south of Cape Cod in February and March at depths of less than 5 m – 45 m. Eggs are found inshore in depths of .3–4.5 m and salinities ranging from 10–30 ppt. Eggs are adhesive and demersal and are deposited on a variety of substrates, but sand is the most common; they have been found attached to vegetation and on mud and gravel. Larvae are negatively buoyant and non-dispersive; they sink when they stop swimming. Thus, recently settled young of year (YOY) juveniles are found close to spawning grounds and in high concentrations in depositional areas with low current speeds.

YOY juveniles migrate very little in the first summer, move to deeper water in the fall, and remain in deeper cooler water for much of the year. Habitat utilization by YOY is not consistent across habitat types and is highly variable among systems and from year to year. Several field and lab studies suggest a "preference" for muddy/fine sediment substrates where they are most likely to have been deposited by currents. Adult winter flounder utilize a variety of substrates and prefer temperatures of 12-15 ^{o}C, and salinities above 22 ppt, although they have been shown to survive at salinities as low as 15 ppt. Mature adults are found in very shallow waters during the spawning season.

Occurrence in Project Area and Impacts: Winter flounder has EFH for all life stages in the project area. Winter flounder eggs are demersal and larvae are found near the bottom in shallow areas. Minimal levels of sedimentation can potentially have an adverse impact on early and/or critical life stages of fish as sediments have the potential to bury demersal eggs, while larvae may be trapped or buried by the sediments (Wilbur and Clarke, 2001). To protect these sensitive life stages (i.e., eggs and larvae) of winter flounder, dredging will only occur from October 1 to January 1 in areas within winter flounder essential fish habitat (i.e., shallower that 5 meters). Dredging will occur between October 1 and March 1 in areas outside of winter flounder essential fish habitat (i.e., deeper than 5 meters). Placement of material inside the New Haven Harbor breakwaters will occur from October 1 through January 1. Placement of material at CLDS will occur between October 1 and March 1.

Winter flounder spawn on various substrates and (within the proposed project area) in areas less than 5 meters deep. In order to quantify the proposed project's effects on the areal extent of winter flounder habitat that would be permanently affected, two specific calculations were made. The first, winter flounder habitat lost, was calculated by measuring subtidal areas that were at depths of 5 meters or shallower and were planned to be deepened by the proposed dredging efforts or filled by the creation of salt marsh. The second, winter flounder habitat gained, was calculated by measuring areas that were deeper than 5 meters (i.e., the borrow pits), but were planned to be filled to depths shallower than 5 meters deep. Table 4 below notes the values for each calculation. The net loss of winter flounder habitat, which is due in large part to the creation of 58 acres of salt marsh (51.6 acres of which is flounder habitat), is approximately 3.2 acres.

Table 4. Losses and Gains of Winter Flounder Essential Fish Habitat in New Haven Harbor from the proposed project.

	Winter Flounder EFH lost (acres)	**Winter Flounder EFH gained (acres)**
Main Channel and Turning Basin	8.6	0.0
Morris Cove Borrow Pit	0.0	42.0
West River Borrow Pit	0.0	15.0
Sandy Point Marsh Creation	51.6	0.0
Shellfish Habitat Creation Area	0.0	0.0
Rock Placement Area	0.0	0.0
TOTALS	**60.2**	**57.0**

Little Skate (*Leucoraja erinacea*): Juveniles and Adults

Life History Information: This species ranges from Nova Scotia, Canada to Cape Hatteras. It is most abundant in the northern section of the Mid-Atlantic Bight (MAB) and on the northeastern part of Georges Bank. Little skate exhibit seasonal movements. Adult and juvenile little skate move inshore during spring and autumn, and offshore in mid to late summer, and midwinter. They also move north and south with seasonal temperature changes along the southern fringe of their range. They may leave some estuaries for deeper water during warmer months. Little skates are common on sandy or gravelly substrates, but may occur on mud as well. They tend to bury themselves in depressions during the day and become active at night. Data is unavailable about the specific spawning habits of little skate along the New York shoreline, but it is known that they spawn biannually; typically in October and May.

Trawl surveys conducted from 1984-1994 in LIS found both adults and juveniles in spring and fall on transitional and sand bottoms at depths less than 9 m. Their preferred summer and fall depths were less than 27 m.

Occurrence in Project Area and Impacts: Both juveniles and adult skates may occur within the project area during those periods in which they are expected to move inshore. As both life stages of this species are motile, during construction they can avoid the area during periods of disturbance. Additionally, the majority of New Haven Harbor bottom is predominately fine (silt) material and not a preferred habitat for little skate. No significant impacts to little skate and their associated EFH are expected due to the construction of the proposed project.

Winter Skate (*Leucoraja ocellata*): Juveniles and Adults

Life History Information: Winter skates are found over a wide range extending from southern New England and the Mid-Atlantic Bight (MAB) to North Carolina. They exhibit seasonal movements by moving offshore in the summer and nearshore in the autumn. Egg deposition of winter skate occurs during the summer and fall off Nova Scotia and the Gulf of Maine. It continues into the winter (December and January) off southern New England. The preferred substrate of this species is sand

and gravel bottoms although they have been documented in areas with mud bottoms. Winter skates are most active at nights and remain buried in depressions during the day. General depths at which they are found range from the shoreline to 111m. Adults are typically found in most abundance on sand bottoms of LIS during the spring. Trawl surveys conducted from 1984-1994 report juveniles most abundant during the spring on sand bottom in LIS. Abundance increased again in for both juveniles and adults in October and November in depths ranging from 0-9 m and then in depths greater than 18 m in April-May.

Occurrence in Project Area and Impacts: Both juveniles and adult skates may occur within the project area during those periods in which they are expected to move inshore. As both life stages of this species are motile, they can avoid the area during periods of disturbance due to construction by moving to adjacent non- disturbed areas. Long term impacts will include a loss of approximately 58 acres of intertidal and subtidal habitat (for the Sandy Point marsh creation alternative) as those areas will be converted to salt marsh habitat. This impact is not expected to significantly affect overall winter skate populations in LIS as the areas being converted to salt marsh are abundant throughout New Haven Harbor and LIS. Therefore, no significant impacts to winter skate and their associated EFH are expected due to the proposed project.

4.3 Prey Species

The abundance and/or distribution of prey species for fish which EFH has been designated, may be impacted from dredging and placement activities. Many of these fish feed on organisms that live in or on the sediment and have the potential to be buried by the direct material placement and/or by removal during the dredging process. However, following project completion, the majority of the substrate type at the dredging locations and placement locations will be similar to current conditions, thus recolonization by organisms from adjacent areas are expected to occur. Therefore, the majority of impacts to fish species using these areas for forage, would be expected to be temporary.

The area encompassing the Sandy Point marsh creation area will be converted from intertidal and subtidal estuarine environment into salt marsh. Therefore, subtidal prey species in these areas will be permanently removed.

5.0 Impact Assessments

The improvement dredging of the New Haven Harbor Federal Navigation Project and the associated placement of dredged material at various beneficial use sites are not anticipated to have significant effects or long-term lasting effects on the "spawning, breeding, feeding, or growth to maturity" of the majority of managed species that have EFH within the project area. Winter flounder will experience a net loss of approximately 3.2 acres of EFH, however this loss will allow for the creation of approximately 58 acres of salt marsh in New Haven Harbor.

The proposed activities will have immediate, short-term, direct and indirect impacts on EFH for some of the designated fish species and life history stages that occur in the immediate project area and vicinity. This section identifies direct and indirect effects that could result from the proposed project.

5.1 Direct and Indirect Impacts

Dredging and Disposal

The proposed project would impact fish species in the project area. Effects of the proposed project include possible death and injury of fish, interference with fish movements, disruption of the forage base, and changes in water quality during dredging operations. Direct removal of soft bottom habitats will occur in the dredging areas and direct covering of soft bottom habitats will occur in the placement areas. Impacts to water quality will occur, however they are anticipated to be short-term and localized to within hundreds of feet of the dredging and disposal efforts.

Intermittent, short-term impacts to fish also include disturbance of fish throughout the water column within the localized area during dredging and disposal efforts. Due to their mobility, most fish would be expected to move out of an active dredging area or a dredged material burial area. The sediment plume associated with dredging and the plume following material placement would also have potential short-term water quality impacts that may also have indirect impacts on fish by temporarily altering certain finfish behaviors, such as migration, spawning, foraging, schooling, and predator evasion (O'Connor, 1991). Increased turbidity has also been associated with potential gill abrasion and respiratory damage (Saila, et al. (1971); Wilber & Clark (2001)).

Sediment characteristics and the life stage of species affect how sensitive species are to suspended sediment, with egg and larval stages tending to be the most sensitive (Johnson, et al., (2008); Berry *et al*. (2003), Wilber & Clark (2001)). During material placement, these impacts are limited both in duration and spatially due to the short time needed for dredged material to reach the bottom (Kraus (1991); Dragos & Lewis (1993); Dragos & Peven (1994)). Saila, et al. (1971) also point out that "aquatic animals are able to tolerate high concentrations of suspended sediments for short periods." Since the tolerance level for suspended solids is high in shallow and mid-depth coastal waters, and fish may experience major changes in turbidity during storms, Saila, et al. (1971) conclude that mortality due to elevated sediment concentrations in the water column resulting from dredged material placement is not likely.

Concentrations of sediments and the duration needed to cause impacts to fish resources are expected to be short-term and localized and as such, effects to fish sources and EFH in the proposed project areas

should be minimal.

As noted in the project description and in the impacts to winter flounder, approximately 51.6 acres of shallow subtidal habitat and 6.4 acres of intertidal habitat will be used to create salt marsh habitat within New Haven Harbor. This habitat conversion will be offset in part by filling two borrow pits in New Haven Harbor, however a net loss of 3.2 acres of subtidal winter flounder EFH and 6.4 acres of intertidal flat habitat will be realized.

Blasting

The extent of damage to fish populations by blasting depends primarily on the proximity to the blast and the presence or absence of a swim bladder. Fish with swim bladders (e.g., Atlantic herring) will be unable to adjust to the abrupt change in pressure propagated by the blast. If they are within a zone of influence, fish with swim bladders may be injured or killed. Fish without swim bladders (e.g., winter flounder) are less likely to be injured, and would likely sustain injuries only if they are in the immediate vicinity of the blast. Blasting may displace resident fishes, although this impact is expected to be only temporary. Blasting impacts will be avoided or minimized by the methods discussed in the following paragraphs.

Several precautionary measures, or best management practices (BMPs) will be put in place to avoid or minimize the incidence of injury to fish and marine mammals from blasting. These blasting mitigation measures include:

- Limiting blasting events to a period between October 1 and March 1
- Use of a fish detecting and startle system to avoid blasting when fish are present or transiting through the area;
- Requiring the use of sonar and the presence of a fisheries and marine mammal observer during blasting events;
- Prohibiting blasting during the passage of schools of fish, or in the presence of marine mammals, unless human safety is a concern;
- Using inserted delays of a fraction of a second per blast drill hole, and;
- Placing material on top of the borehole (stemming) to deaden the shock wave reaching the water column.

Given the BMPs noted above to minimize blasting impacts to fish resources, significant impacts from the proposed blasting efforts are not expected to significantly affect fisheries resources in the project area.

As the areas to be blasted are characterized as estuarine bottoms with veneers of silt on top of rock, and the proposed project is not anticipated to change shoaling and sedimentation dynamics within New Haven Harbor, post construction bottom characteristics are anticipated to return to preconstruction conditions within months of the cessation of blasting and rock removal activities. Therefore, any EFH that may have been impacted as a result blasting operations would be expected to return to pre-blast conditions, along with the functions and values of the areas as EFH, within several months of construction.

5.2 Cumulative Impacts

Cumulative impacts are those resulting from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Past actions in association with the New Haven Harbor FNP include the construction of navigation channels and anchorages in New Haven Harbor and the construction of the harbor's breakwaters. Past actions in New Haven Harbor include: the construction of bulkheads, rock revetments, seawalls, and groins along the harbor; filling of salt marsh and deforestation of forested uplands for residential and commercial development; the dredging of borrow pits in the harbor for sand and gravel reclamation; the construction of waste water treatment plants and a power generation station that discharge into the harbor; the placement of electrical transmission lines through the harbor; the development of a commercial shipping port; commercial and recreational navigation; and commercial fishing of the harbor.

There are no concurrent Federal or State projects being constructed in the project area or projects slated to occur in the near future. Reasonably foreseeable future actions include the continuation of maintenance of the FNP as needed as well as the majority of the activities described above. The effects of these previous and existing actions are generally limited to infrequent disturbances of the benthic communities and occasional impacts to water quality. Air quality, hydrology, and other biological resources are generally not significantly affected by these actions. The direct effects of this project are not anticipated to add to impacts from other actions in the area. Therefore, no significant cumulative impacts to EFH or EFH species are expected as a result of implementing the proposed action.

6.0 BIBLIOGRAPHY

Connecticut, Department of Energy and Environmental Protection. (CTDEEP). 2014. A Study of Marine Recreational Fisheries in Connecticut. F14AF00296 (F-54-R-34) Annual Performance Report. March 1, 2014 – February 28, 2015. (LIS Trawl Survey)

Cargnelli LM, Griesbach SJ, Packer DB, Berrien PL, Johnson DL, Morse WW. 1999. Essential fish habitat source document: Pollock, *Pollachius virens*, life history and habitat characteristics. NOAA Tech Memo 131; 30 p.

Chang S, Berrien PL, Johnson DL, and.Morse WW 1999. Essential fish habitat source document: windowpane, *Scophthalmus aquosus*, life history and habitat characteristics. NOAA Tech. Memo. NMFS-NE-137, 32 pp.

National Oceanic and Atmospheric Administration (NOAA). 1999. Guide to Essential Fish Habitat Designations in the Northeastern United States. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northeast Regional Office, Gloucester, MA.

Packer D.B., Zetlin CA, Vitaliano JJ. 2003. Essential fish habitat source document: Little skate, *Leucoraja erinacea*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 175; 66 p.

Packer DB, Zetlin CA, Vitaliano JJ. 2003. Essential fish habitat source document: Winter skate, *Leucoraja ocellata*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 179; 57 p.

Pereira JJ, Goldberg R, Ziskowski JJ, Berrien PL, Morse WW, Johnson DL. 1999. Essential fish habitat source document: *Winter flounder*, Pseudopleuronectes americanus, life history and habitat characteristics. NOAA Tech Memo NMFS NE 138; 39 p.

Steimle FW, Morse WW, Berrien PL, Johson DL. 1999. Essential fish habitat source document: Red Hake, *Urophycis chuss*, life history and habitat characteristics. NOAA Tech Memo NMFS NE 133; 34 p.

Appendix A: Essential Fish Habitat Worksheet

Action: New Haven Harbor Navigation Improvement Project

1. INITIAL CONSIDERATIONS			
EFH Designations	Y	N	Species
Is it located in or adjacent to EFH	X		Study area experiences resident and transient EFH designated species along with forage species of EFH designated species.
Is EFH designated for eggs?	X		Red hake, winter flounder, windowpane, and silver hake
Is EFH designated for larvae?	X		Red hake, winter flounder, windowpane, and silver hake
Is EFH designated for juveniles?	X		Red hake, winter flounder, windowpane, silver hake, pollock, winter skate and little skate
Is EFH designated for adults?	X		Red hake, winter flounder, windowpane, silver hake, pollock, winter skate and little skate
Is there HAPC at or near project site?		X	
Does action have the potential to adversely affect EFH of species or life stages checked above to any degree?	X		

2. SITE CHARACTERISTICS	
Site Characteristics	Description
Is the site intertidal/sub-tidal/water column?	Dredging site is subtidal; placement alternatives are both intertidal;and subtidal
What are the sediment characteristics?	The sediment characteristics are primarily silts. Some silty sand is also present.
Is there HAPC at the site, if so what type, size, characteristics?	No HAPC at the site.
What is typical salinity and temperature regime?	Salinity is approximately 27-28 ppt in the project site. Temperature ranges from 2 to 5°C in the winter and from 20 to 25°C in late summer
What is the normal frequency of site disturbance?	Irregular – disturbance through coastal storm events and tidal action.
What is the area of impact (work footprint & far afield)?	Varies – See Environmental Impact Statement

3. ASSESSMENT OF IMPACTS			
Impacts	Y	N	Description
Nature and duration of activity (s)			Dredging. Year one - 5 months, Year two – 5 months.
Will benthic community be disturbed?	X		Benthic communities in the direct project footprint of dredging and placement activities will be removed or buried during construction activities. Recolonization of benthic communities will occur following construction completion.
Will SAV be impacted?		X	No SAV in project area.
Will sediments be altered and/or sediment rates changed?	X		Improvement areas will remain silt. Shellfish and Marsh beneficial use sites will be altered.
Will turbidity increase?	X		There will be short-term and localized increases in water column turbidity during construction.
Will water depth change?	X		Improvement areas will be deepened from approximately -37 ft to -42 ft MLLW. Depths at beneficial use sites will all be made shallower.
Will contaminants be released into sediments or water column?		X	All the dredged material has been found suitable for open water placement.
Will tidal flow, currents or wave patterns be altered?		X	Improvement dredging will not alter hydrologic conditions in New Haven Harbor. Some currents and wave patterns may be altered in the vicinity of the marsh creation area.
Will ambient salinity or temperature regime change?		X	
Will water quality be altered?		X	
Will functions of EFH be impacted for:			If yes, list species, Life State and Habitat to be Impacted
Spawning	X		Winter flounder – all life stages – shallow subtidal
Nursery	X		Winter flounder – all life stages – shallow subtidal
Forage	X		Winter flounder – all life stages – shallow subtidal
Shelter	X		Winter flounder – all life stages – shallow subtidal
Will impacts be temporary or permanent?			Temporary (turbidity, loss of forage) and permanent impacts (cumulative loss of 3.2 acres of winter flounder EFH)

Will compensatory mitigation be used?		X	

4. DETERMINATION OF IMPACT		
		EFH Determination
Overall degree of adverse effects on EFH (not including compensatory mitigation) will be: (check the appropriate statement)		No more than minimal adverse effect on EFH- there is no need for further assessment. This worksheet is sufficient for consultation.
		Adverse effect on EFH is not substantial-use contents of this form to develop written assessment
	X	Adverse effect on EFH substantial-a written assessment and methods to avoid or minimize impacts must be provided expanding upon the impacts revealed in this form. Typically, this degree of impact will require an expanded consultation

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

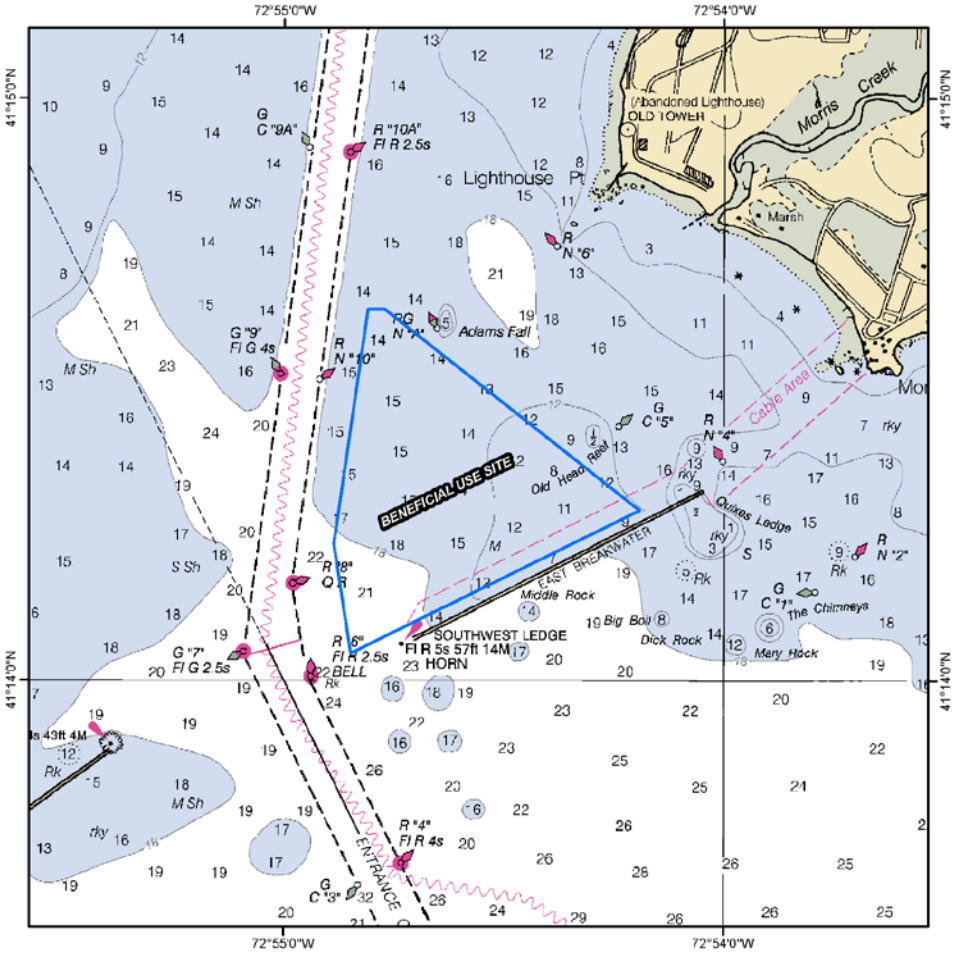
INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX I
BENTHIC RESOURCES

Environmental Sampling and Survey
In Support of Beneficial Use
Site Characterization

FINAL

New Haven Harbor Feasibility Study
Shellfish Habitat Creation Area
New Haven, CT



US Army Corps
of Engineers ®
New England District

March 2017

ENVIRONMENTAL SAMPLING AND SURVEY

IN SUPPORT OF

BENEFICIAL USE SITE CHARACTERIZATION

NEW HAVEN HARBOR FEASIBILITY STUDY

SHELLFISH HABITAT CREATION AREA

NEW HAVEN, CONNECTICUT

March, 2018

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APPENDICES

APPENDIX A: GRAIN SIZE ANALYSIS

1.0 INTRODUCTION

The Federal navigation project (FNP) in New Haven Harbor, located in New Haven, CT, consists partly of a main channel and maneuvering basin that were designed in the late 1940's and constructed in 1950 (Figure 1). The existing project depth is -35 feet at mean lower low water (MLLW). The New Haven Port Authority, in partnership with the Connecticut State Port Authority, requested that the New England District (NAE) of the US Army Corps of Engineers (USACE) conduct a Feasibility Study to evaluate whether navigation improvements, deepening and widening the channel and maneuvering basin, to the existing FNP at New Haven Harbor are warranted and in the Federal interest.

In May and August of 2017, field studies were conducted to: 1) provide baseline information on biological resources, specifically the benthic communities, of the proposed improvement portions of the study area; 2) define the existing sediment types and benthic community structure of a potential placement area being considered for beneficial use (shellfish habitat creation) (Figure 2); and 3) to evaluate the bathymetry and bottom characteristics of the potential shellfish habitat creation area.

2.0 MATERIALS AND METHODS

2.1 Bathymetry and Side Scan Sonar

Survey efforts were conducted on 2 May of 2017 by staff from the NAE Environmental Resources Section. Work was carried out onboard the R/V Nomad, a 25 foot SBI Defender outfitted for coastal survey operations. Vessel positioning was achieved using a Hemisphere Vector VS330™ Real Time Kinematic (RTK) position and heading system interfaced to a computer running Hypack® survey software for navigation. RTK corrections from the CTDOT/UCONN VRS network were received in real time through a cellular internet connection.

Hydroacoustic data was collected using an Edgetech 6205 multiphase echosounder with a 230/550 kHz side-scan and 230 kHz bathymetry frequency configuration. The Edgetech 6205 was interfaced with a Teledyne DMS10 motion sensor and the Vector VS330™ position and heading system. The sonar head was fixed to an adjustable survey boom mounted along the starboard side of the vessel. The face of the sonar head was adjusted to be 16 inches below the water surface. Prior to the start of the survey effort a patch test was conducted to correct for pitch, roll, and yaw deviations resulting from sensor misalignment and to account for the latency of the system. Conductivity, temperature, and depth (CTD) profiles were collected throughout the survey using a Sontek Castaway®–CTD and were uploaded to Hypack® to correct for speed of sound variations in the water column.

The hydroacoustic survey of the shellfish habitat creation area (Figure 3) was conducted using a line spacing of 200 feet in order to achieve full coverage of the site. Bathymetric and side-scan sonar data was viewed in real time on the survey vessel and recorded in Hypack®. The vessel operator navigated all transects at a speed of approximately 4 knots while recording data. Transects were run in opposite directions to minimize non-recording time.

Transect information including the number, filename, start and stop time, direction, and pertinent observations were recorded in a field log throughout the survey.

Bathymetric data was processed in Hypack® MBMax. The 230 kHz data from each transect was filtered to flag erroneous sonar returns (i.e. inaccurate bottom depth outputs resulting from acoustic artifacts, noise in the water column, or vegetation) and manually reviewed by a sonar technician for accuracy and to remove spurious points. Tide corrections were made in Hypack® by applying local tide model offsets from the NOAA Vertical Datum Transformation (VDatum) tool to the RTK orthametric heights recorded in the field. The finalized data set was exported from Hypack® MBMax as averaged soundings using a 3x3 foot grid spacing with depths referenced to Mean Lower Low Water (MLLW). This file was then used to generate depth contours and a triangular irregular network model in ESRI ArcGIS.

Side-scan sonar data from the 550 kHz channel of each transect was imported to Chesapeake Technology (CTI) SonarWiz 6 software for processing and analysis. Processing included digitizing of the first signal return to remove the water column portion of the sonar record, and adjustments for signal attenuation with distance using Time Varied Gain (TVG) corrections. The processed track lines were combined into a high resolution mosaic and used to interpret the surficial sediment type and delineate features of interest within the survey area.

2.2 Sediment Sampling for Grain Size and Benthic Community Analysis

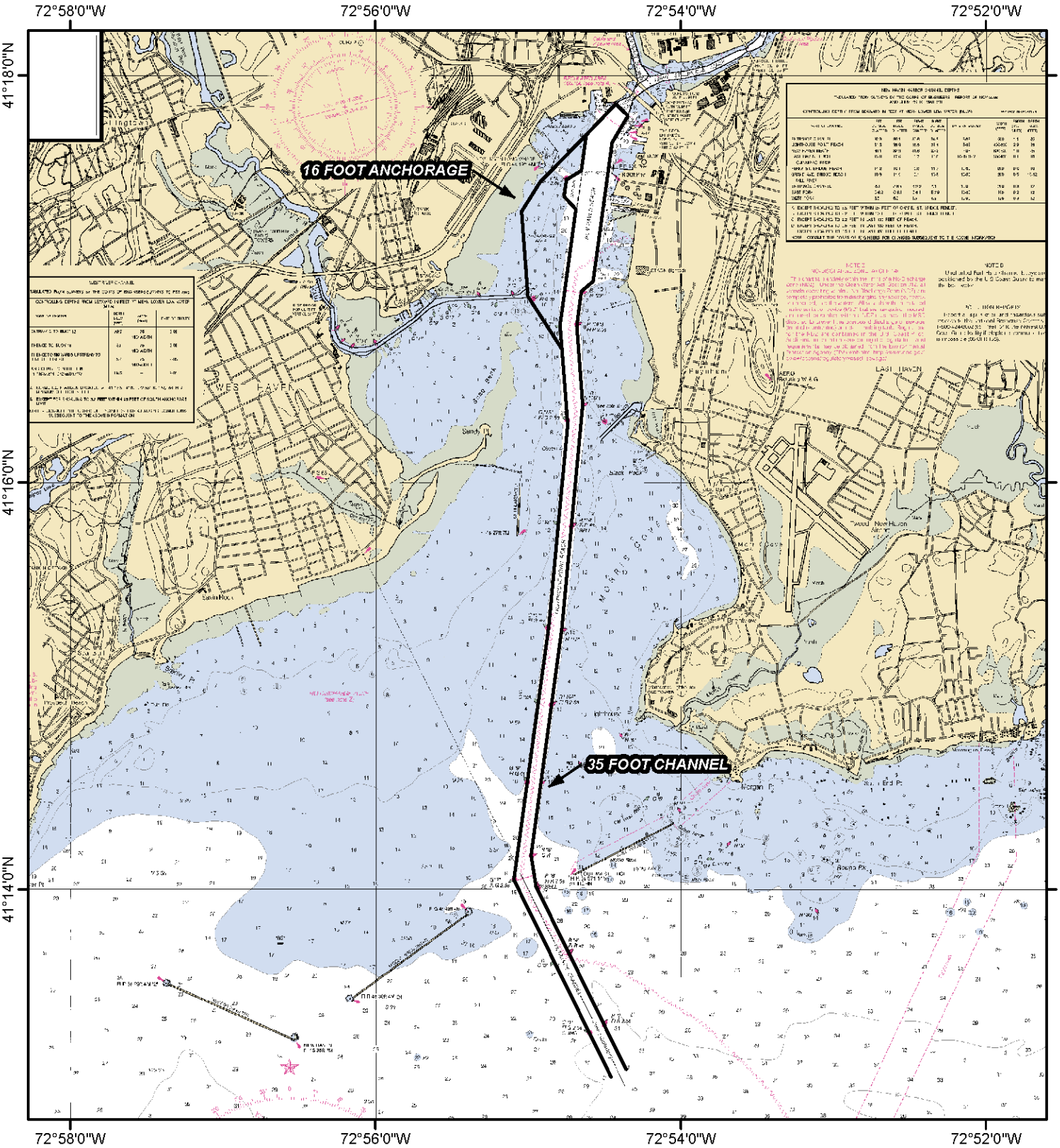
Sediment sampling activities were performed on 1 August of 2017 by staff from the NAE Environmental Resource Section. Work was carried out onboard the R/V Nomad using the same positioning and navigation equipment as in May of 2017.

Ten sample locations were established within the project area to collect samples for benthic community analysis. Seven stations were located within proposed improvement areas and three stations were located in the shellfish habitat creation area (Figure 4). At all ten stations, a 0.04 m^2 sized VanVeen grab sampler was used to collect benthic samples for community analysis. For the three stations located in the shellfish habitat creation area, a second grab was taken at each location for grain size analysis.

Each sample for benthic community analysis was sieved with seawater thorough a 0.5 mm sieve and preserved in 10% formaldehyde with 0.1% rose Bengal stain. Samples were kept in formaldehyde solution until processed at the NAE environmental laboratory located at Ft. Devens, MA. At the time of processing the samples were washed on a 0.5 mm sieve to remove the preservative and remaining fine sediment. The material was then sorted under a low-power dissecting microscope where organisms were removed from the sediments and transferred to jars containing 70% ethanol. Organisms were identified to the lowest taxon possible and enumerated.

Grain size analysis was also performed by the NAE environmental laboratory. Samples were prepared according to the guidance in ASTM D421-85, Dry Preparation of Soil

Samples for Particle-Size Analysis and Determination of Soil Constants, and analyzed according to ASTM D422-63, Standard Test Method for Particle-Size Analysis of Soils using sieve nos. 4, 10, 40, 100, and 200. There were no deviations from the established laboratory testing protocols.



US Army Corps
of Engineers
New England District

FIGURE 1:
NEW HAVEN HARBOR, NEW HAVEN, CT
FEDERAL NAVIGATION PROJECT

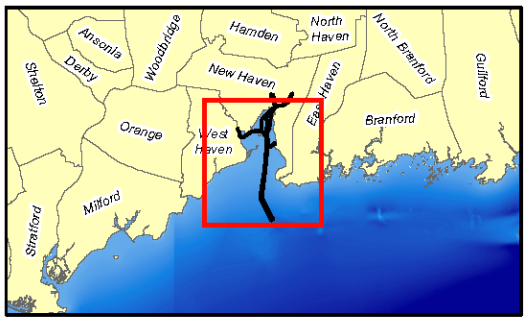
0 2,500 5,000 7,500 10,000 Feet

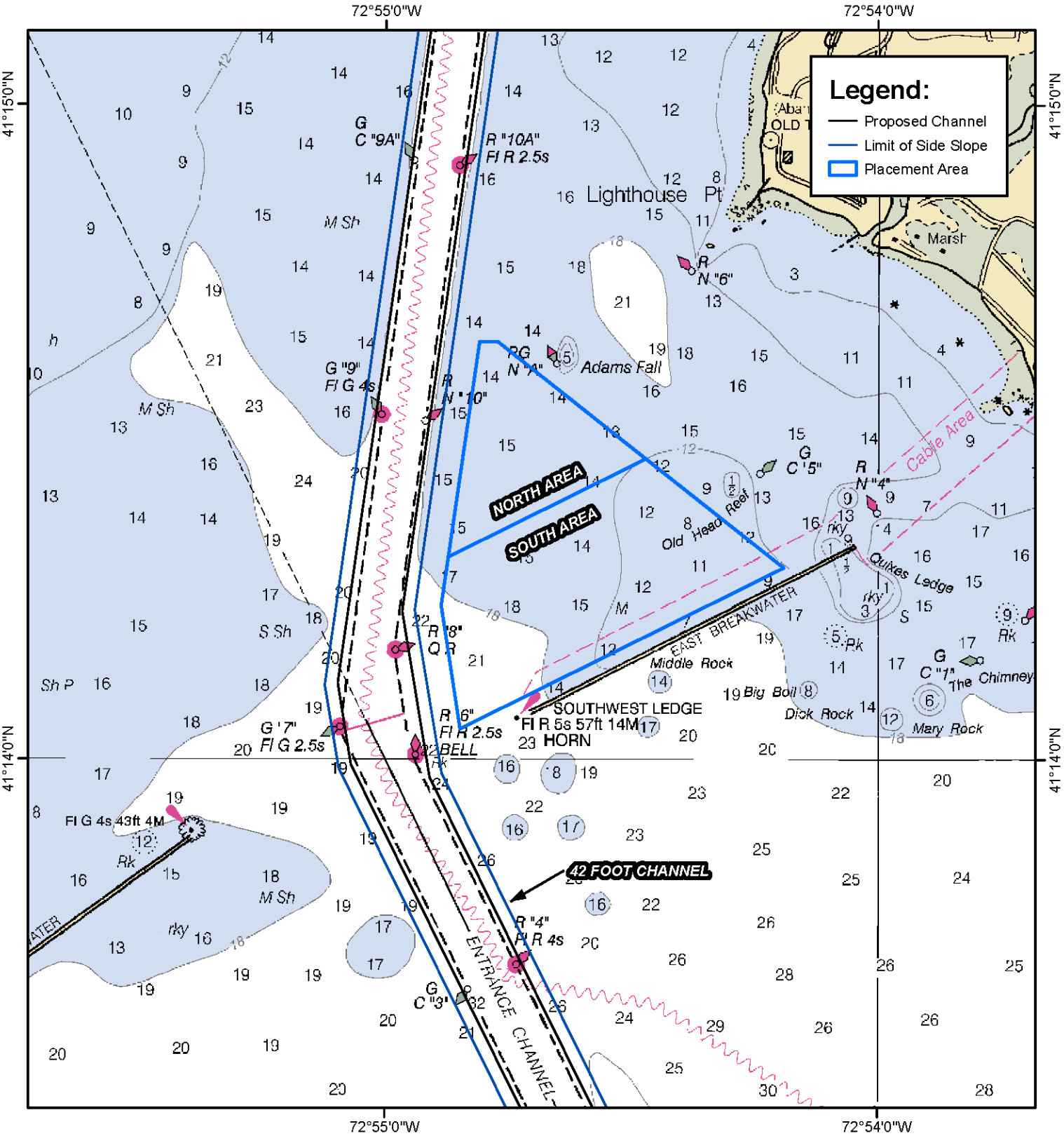
0 0.5 1 1.5 2 Miles

1:65,000

NOAA CHART 12371

GCS NAD1983





US Army Corps of Engineers
New England District

FIGURE 2:
NEW HAVEN HARBOR, NEW HAVEN, CT
SHELLFISH HABITAT CREATION AREA

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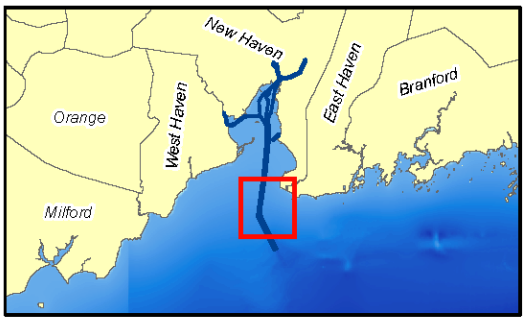
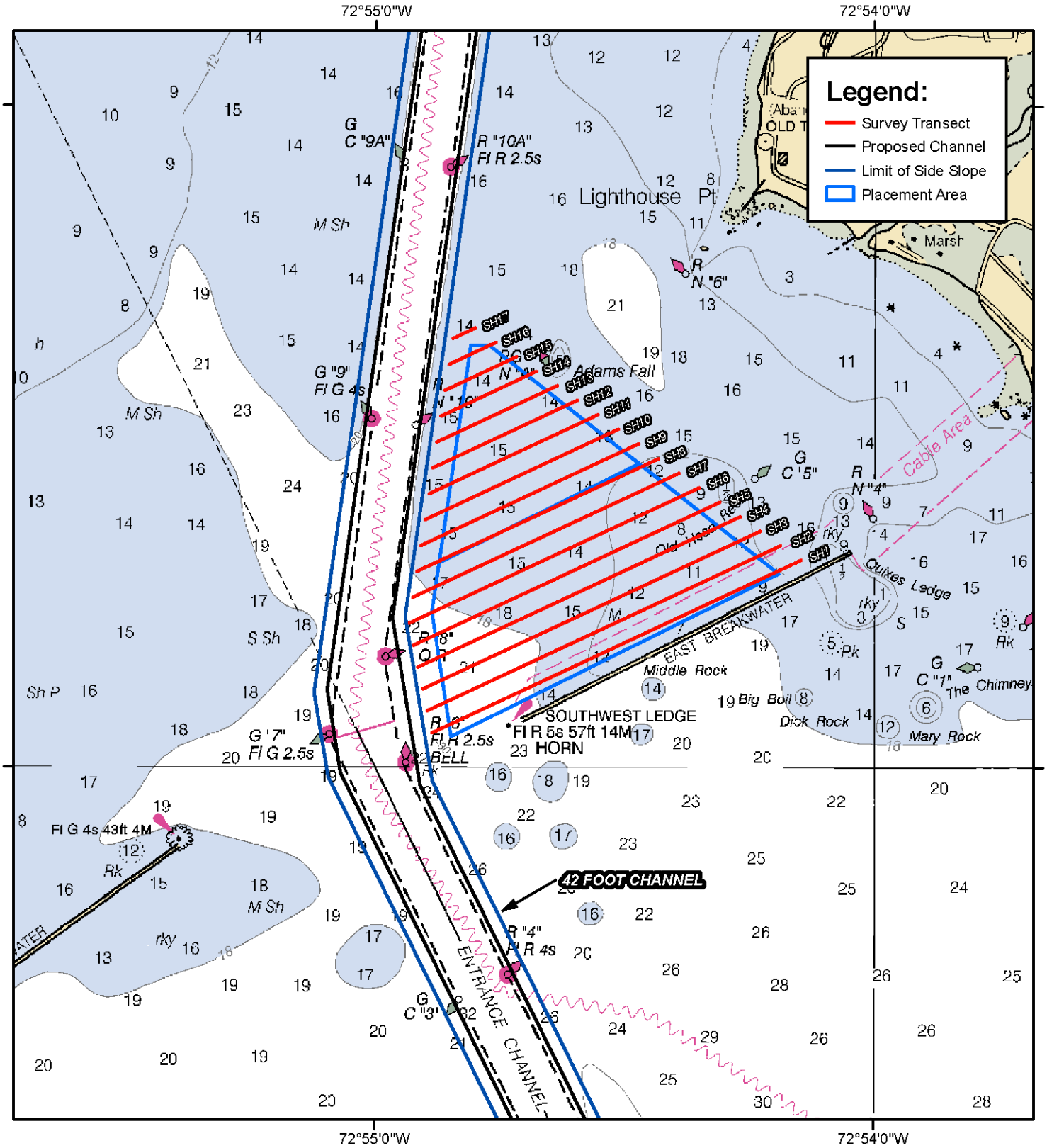
0 0.1 0.2 0.3 0.4 Miles
1:15,000

NOAA CHART 12371

GCS NAD1983





US Army Corps of Engineers
New England District

FIGURE 3:
NEW HAVEN HARBOR, NEW HAVEN, CT
SHELLFISH AREA SURVEY PLAN

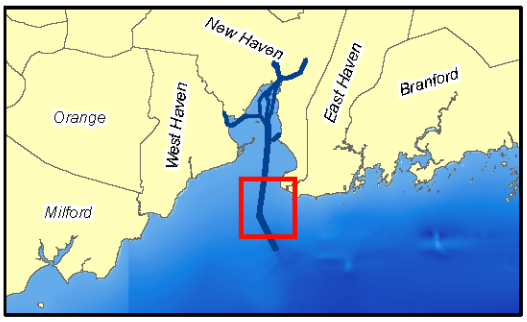
0 1,000 2,000 3,000 Feet

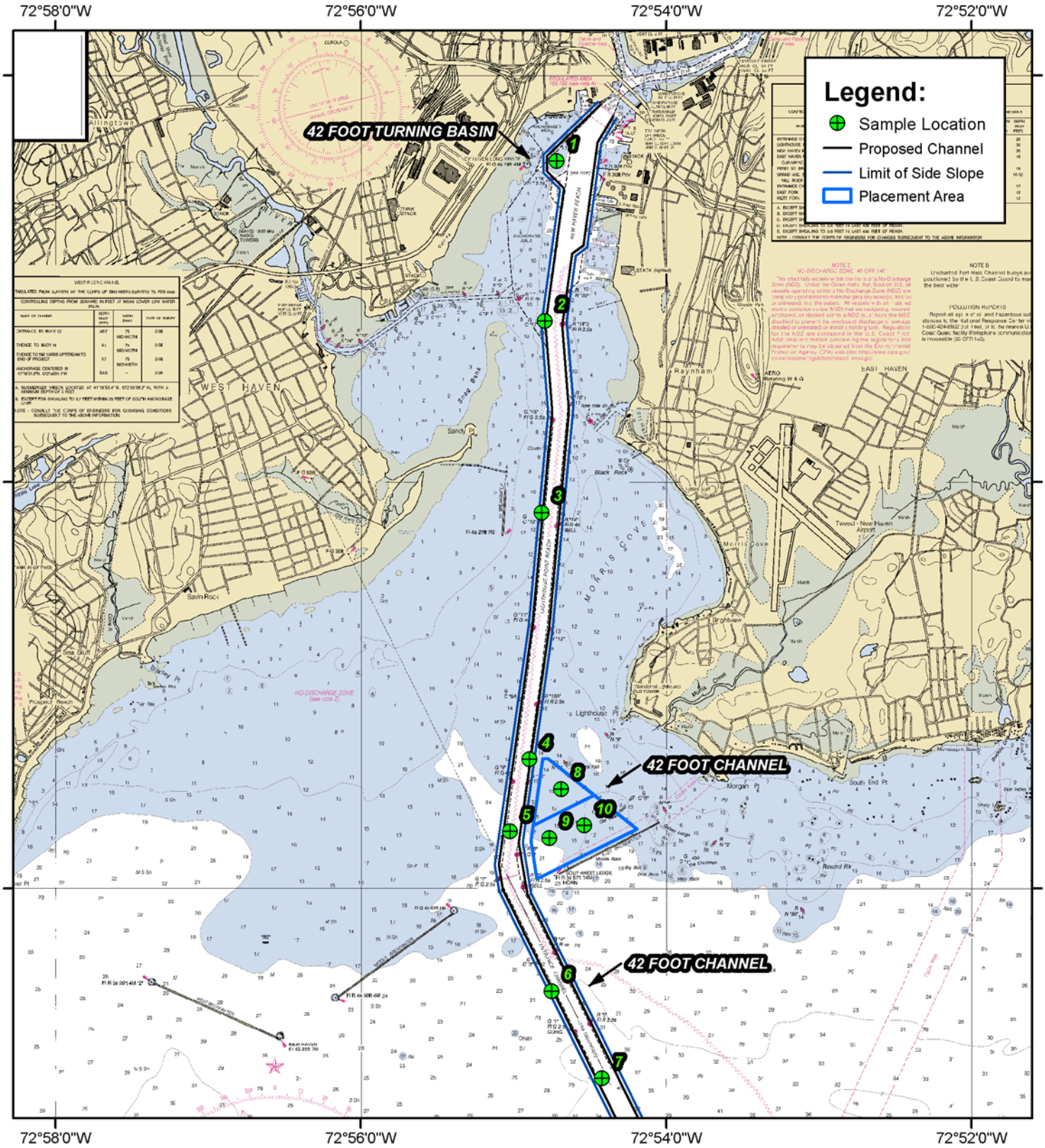
0 0.1 0.2 0.3 0.4 Miles

1:15,000

NOAA CHART 12371

GCS NAD1983





US Army Corps of Engineers
New England District

FIGURE 4:
NEW HAVEN HARBOR, NEW HAVEN, CT
2017 BENTHIC SAMPLE LOCATIONS

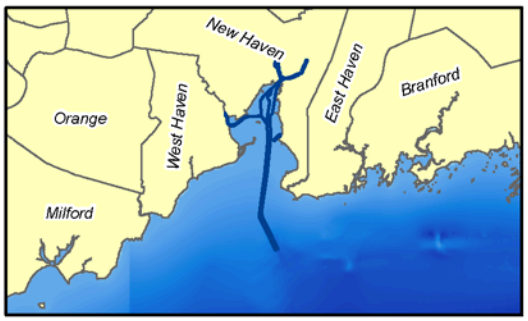
0 2,500 5,000 7,500 10,000 Feet

0 0.5 1 1.5 2 Miles

1:65,000

NOAA CHART 12371

GCS NAD1983



3.0 RESULTS AND DISCUSSION

This section summarizes results obtained from benthic community analysis of sediments from the within the New Haven Harbor improvement project and the potential shellfish habitat creation site. The physical testing of sediments and sidescan survey of the shellfish habitat creation site are also summarized.

3.1 Bathymetry and Side Scan Sonar

Water depths in the vicinity of the shellfish habitat creation area ranged from -11 to -29 feet MLLW. The seafloor in the survey area was characterized by a gentle slope to the west with a sharp transition to the deep area located in the southwest corner of the site. Interpretation of the side scan sonar data documented a uniform area of low backscatter corresponding to fine grained sediments in the northern portion of the survey area. The southern third of the site contained complex patches of high and low backscatter corresponding to areas of coarser sediment or shell within the ambient fine grained material. A band of coarse substrate was observed to extend approximately 1,000 feet into the site from the eastern boundary in the vicinity of the area marked as Old Head Reef on NOAA chart 12371. Other notable features identified in the side scan sonar mosaic included numerous well defined high-backscatter targets corresponding to rock along the tow of the eastern breakwater; and a long linear feature inshore of breakwater, interpreted to be a cable running from Morgan Point to the Southwest Ledge Lighthouse.

3.2 Benthic Community Analysis

Ten grab samples for benthic community analysis were processed at the NAE Environmental Laboratory. Counts of organisms by sample station are summarized in Tables 1 and 2.

New Haven Harbor Navigation Improvement Areas

The benthic communities of the improvement areas in the New Haven inner harbor area (i.e., areas of the harbor north of sandy point), represented by stations #1 and #2, contained a mix of opportunistic benthic species such as the polychaete *Streblospio benedicti*. The benthic communities in these silty sediment environment were generally low in diversity and dominated by only a few species (Table 1). The outer harbor stations (stations #3 - #7), which had silty-clayey sediments, contained a mix of opportunistic species and mid-successional stage organisms such as the tubiculous polychaetes *Clymenella torquata* and *Spiochaetopterus oculatus*. The communities in the outer harbor stations were higher in diversity than the inner harbor stations and individuals tended to be distributed among species more evenly.

Shellfish Habitat Creation Area

The benthic communities of the shellfish habitat creation area in the New Haven Harbor, represented by stations #7, #8, and #9 contained a mix of opportunistic benthic species

such as the polychaete species *Streblospio benedicti* and *Capitella* sp. as well as late-successional stage organisms such as the bivalve *Yoldia limatula*. The benthic communities in these silty sediment environment were generally moderate in diversity and contained an even distribution of individuals among species (Table 2).

3.3 Grain Size Analysis

Three sediment samples were analyzed for grain size distribution at the NAE Environmental Laboratory. The sediments collected from all stations within the shellfish habitat creation area were predominately silt with trace amounts of fine sand. The results of grain size analysis are summarized in Table 3. Grain size curves and full testing results are provided in Attachment 1.

Table 1. Benthic invertebrates collected from the New Haven Harbor Navigation Improvement Areas in May, 2017. Numbers are per 0.04 m^2

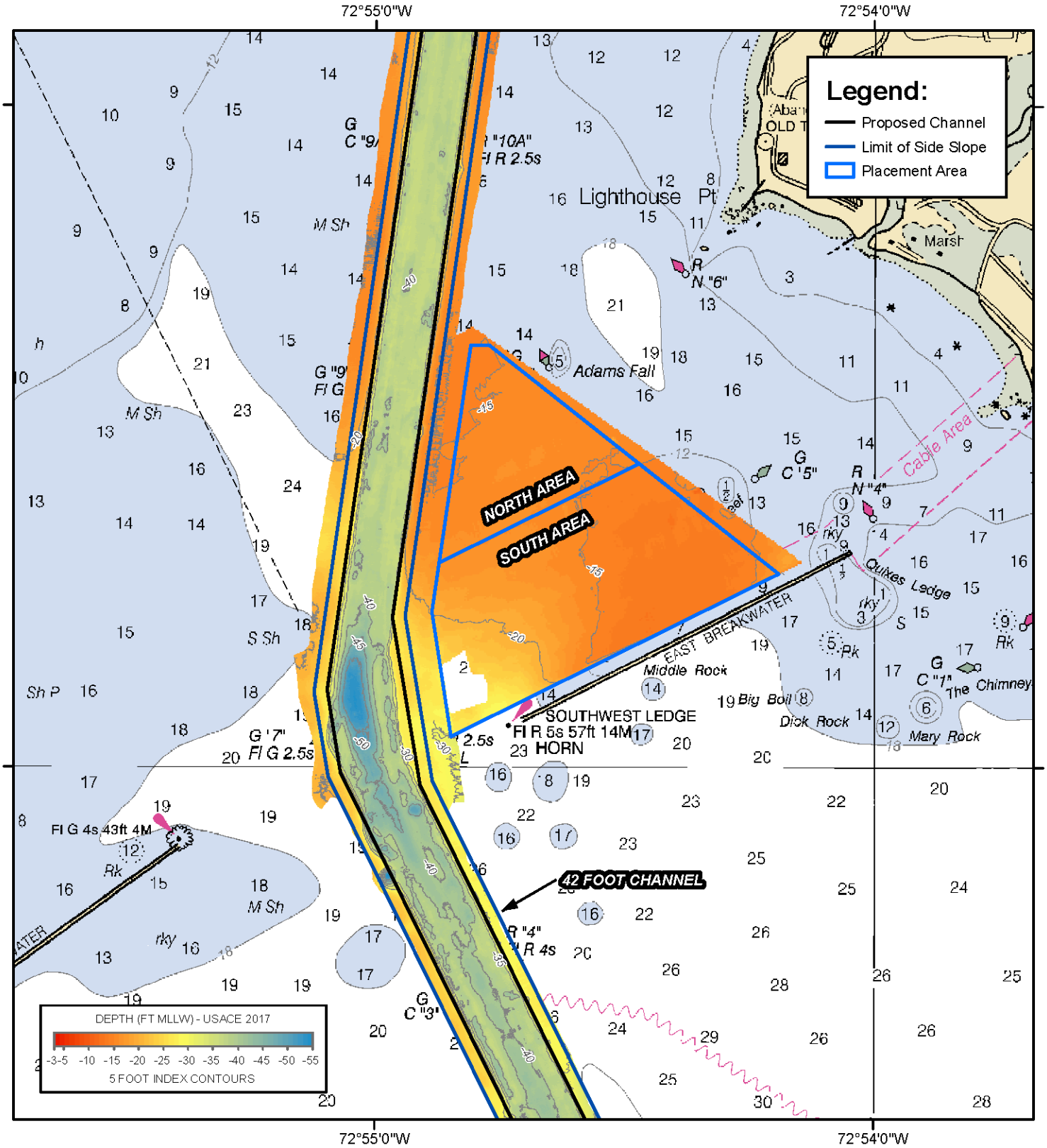
STATION NUMBER	1	2	3	4	5	6	7
ANNELIDA							
POLYCHAETA							
Aricidea sp.	-	-	-	-	-	-	1
Alitta succinea	-	1	2	5	-	-	2
Capitella sp.	-	-	4	-	-	3	4
Clymenella torquata	-	-	-	15	-	-	11
Diopatra cuprea	-	-	-	-	1	-	-
Glycinde solitaria	-	-	1	-	-	1	-
Leitoscoloplos fragilis	-	-	-	2	-	-	7
Nephtys incisa	-	1	-	-	-	-	-
Orbinia sp.	-	-	-	2	-	-	2
Pectinaria gouldii	1	-	-	-	-	-	-
Pherusa sp.	-	-	-	-	-	5	-
Polydora sp.	-	-	-	-	2	-	-
Spiochaetopterus oculatus	-	-	-	3	1	-	
Streblospio benedicti	13	7	9	4	6	-	4
OLIGOCHAETA							
Unidentified Oligochaete sp.	-	10	2	5	-	-	2
ARTHROPODA - CRUSTACEA							
AMPHIPODA							
Unidentified Gammaridae	-	-	-	1	3	2	-
Ampelisca abdita	3	-	-	8	-	6	74
Corophium sp.	-	-	-	1	-	3	-
CUMACEA							
Unidentified Cumacean	-	1	-	-	-	-	-
DECAPODA							
Pagurus longicarpus	-	-	-	-	-	2	-
Neopanope sp.	-	-	-	-	1	-	-
MOLLUSCA							
BIVALVIA							
Anadara ovalis	-	-	-	-	-	1	-
Ensis directus	-	-	-	-	-	-	1
Mulinia lateralis	-	-	-	4	-	-	-
Yoldia limatula	-	1	6	-	4	-	-
GASTROPODA							
Haminoea solitaria	-	6	2	1	-	-	-
Nassarius trivitatus	3	-	5	-	4	-	-
Urosalpinx cinerea	-	-	1	-	-	-	-
INDIVIDUALS / SAMPLE	**20**	**27**	**32**	**51**	**22**	**23**	**108**
SPECIES / SAMPLE	**4**	**7**	**9**	**12**	**8**	**8**	**10**

Table 2. Benthic invertebrates collected from the New Haven Harbor Shellfish Creation Area in May, 2017. Numbers are per 0.04 m^2

STATION NUMBER	8	9	10
ANNELIDA			
POLYCHAETA			
Alitta succinea	2	3	2
Capitella sp.	17	6	22
Glycinde solitaria	3	-	-
Leitoscoloplos fragilis	-	-	3
Nephtys incisa	1	4	-
Orbinia sp.	-	-	1
Pectinaria gouldii	1	-	1
Spiochaetopterus oculatus	-	2	6
Streblospio benedicti	21	-	15
OLIGOCHAETA			
Unidentified Oligochaete sp.	-	-	2
ARTHROPODA - CRUSTACEA			
AMPHIPODA			
Ampelisca abdita	-	1	-
CUMACEA			
Oxyurostylus smithii	3	-	-
MOLLUSCA			
BIVALVIA			
Mulinia lateralis	-	-	1
Yoldia limatula	7	6	15
GASTROPODA			
Haminoea solitaria	4	-	-
INDIVIDUALS / SAMPLE	**59**	**22**	**68**
SPECIES / SAMPLE	**9**	**6**	**10**

Table 3: Summary of Grain Size Results from the New Haven Harbor Shellfish Creation Area

Sample ID	%Cobble	%Gravel		%Sand			%Fines
		Coarse	Fine	Coarse	Medium	Fine	
Station 8	0.0	0.0	0.0	0.2	0.9	2.7	96.2
Station 9	0.0	0.0	0.0	0.1	1.7	5.8	92.3
Station 10	0.0	0.0	0.0	0.0	0.6	8.4	91.0



US Army Corps of Engineers
New England District

FIGURE 5:
NEW HAVEN HARBOR, NEW HAVEN, CT
SHELLFISH AREA BATHYMETRY

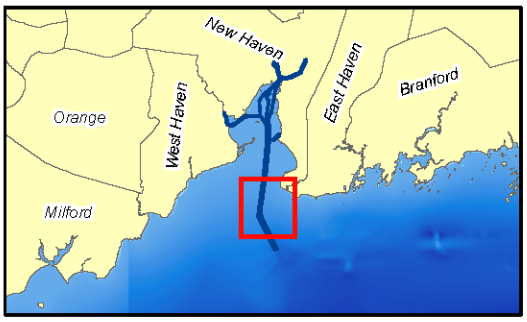
0 1,000 2,000 3,000 Feet

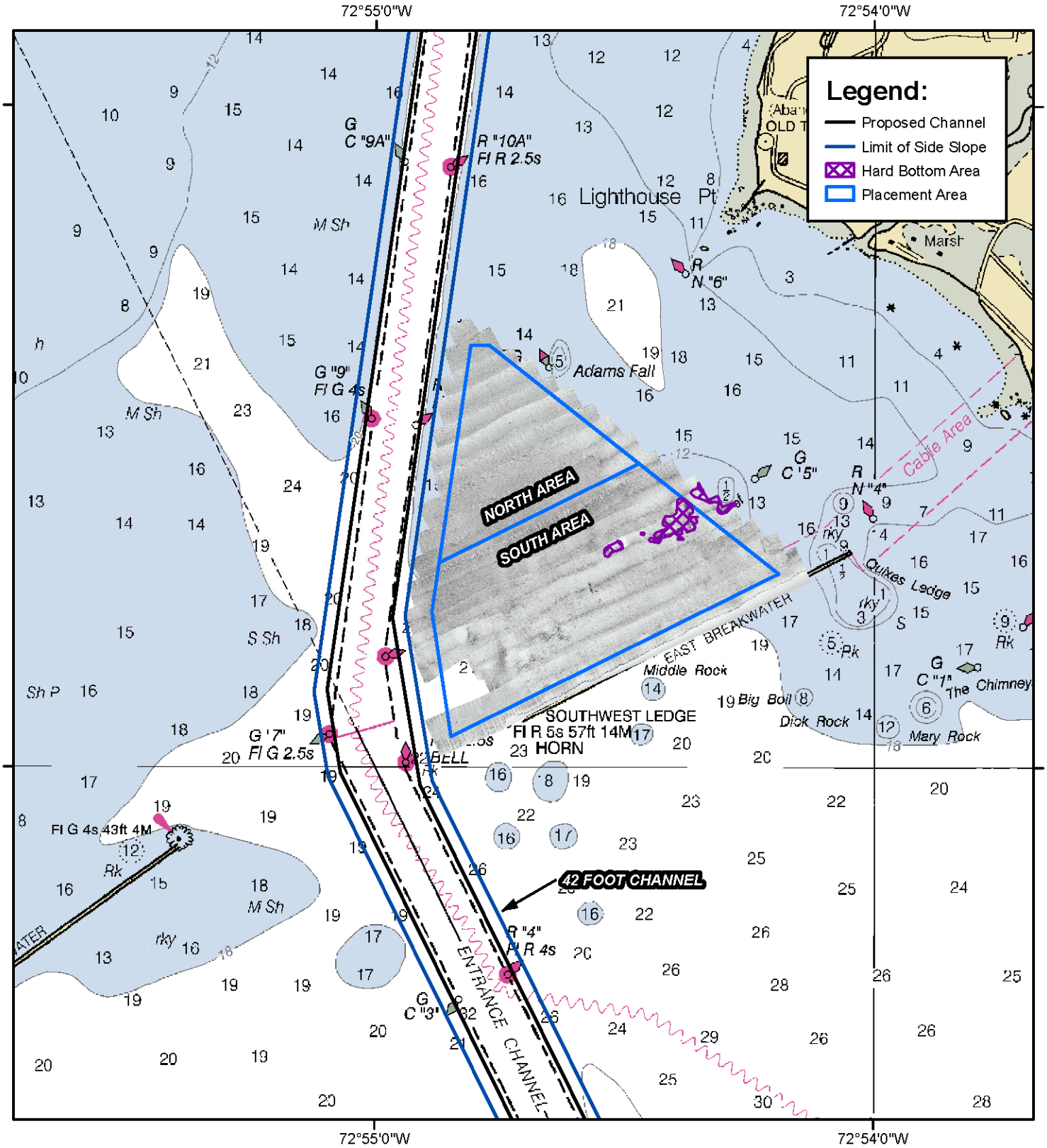
0 0.1 0.2 0.3 0.4 Miles

1:15,000

NOAA CHART 12371

GCS NAD1983





US Army Corps of Engineers
New England District

FIGURE 6:
NEW HAVEN HARBOR, NEW HAVEN, CT
SHELLFISH AREA SIDE SCAN SONAR

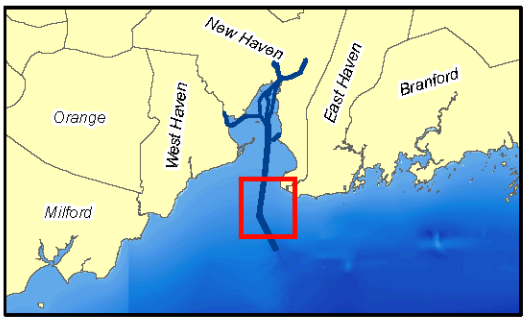
0 1,000 2,000 3,000 Feet

0 0.1 0.2 0.3 0.4 Miles

1:15,000

NOAA CHART 12371

GCS NAD1983



APPENDIX A

GRAIN SIZE CURVES
(ON FILE AT USACE-NAE)

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX J
SUITABILITY DETERMINATION

CENAE–PDE 23 May 2019

MEMORANDUM FOR: Barbara Blumeris, Project Manager, CENAE-PDP

SUBJECT: Suitability Determination for the New Haven Harbor Navigation Improvement and Maintenance Project, New Haven and West Haven, Connecticut.

1. **Summary:**

This memorandum addresses the suitability of dredged material from the proposed improvement and maintenance dredging of the New Haven Harbor Federal Navigation Project (FNP) for unconfined open water placement at the Central Long Island Sound Disposal Site (CLDS) and at beneficial use sites in and around New Haven Harbor. This determination is an addendum to a previous determination for the New Haven Harbor FNP dated 7 June 2018. The New England District (NAE) of the U.S. Army Corps of Engineers (USACE) finds that sufficient data has been provided to satisfy the evaluation and testing requirements of Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA) and Section 404 of the Clean Water Act (CWA). Based on an evaluation of the project site and the material proposed to be dredged, these sediments have been found to be suitable for unconfined open water placement as proposed.

2. **Project Description:**

The New England District conducted a feasibility study to evaluate improvements to the New Haven Harbor FNP. Aspects of the Tentatively Selected Plan include: deepening and widening the main ship channel, widening the channel bend at Southwest Ledge, straightening the channel bend downstream of the existing turning basin; and deepening and widening the turning basin. These combined actions would require the mechanical or hydraulic removal of up to 4,400,000 cubic yards of sediment (maintenance and improvement material) and up to 43,500 cubic yards of rock.

Dredged sediments are expected to be a mix of poorly graded sand and fine grained material within the existing channel profile and adjacent harbor seafloor with glaciofluvial deposits at depth. To the extent practical suitable dredged material will be beneficially reused for marsh creation at the Sandy Point Dike, oyster habitat creation behind the East Breakwater, filling existing sand borrow pits in Morris Cove and the West River, and to cover historic dredged material disposal mounds at the CLDS. Rock generated from the project is expected to be placed adjacent to and behind the West Breakwater to create a reef structure.

Details on the evaluated alternatives, Tentatively Selected Plan, and proposed placement sites can be found in the Draft Integrated Feasibility Report and Environmental Impact Statement (FR/EIS) for the project (USACE 2018).

In support of the FR/EIS NAE collected sediment vibracores in August 2017 and analyzed the sediment for the full suite of physical, chemical, and biological parameters specified in the Evaluation of Dredged Material Proposed for Ocean Disposal Testing Manual (Green Book, EPA/USACE 1991) and the Regional Implementation Manual (RIM, EPA/USACE 2004) at the stations shown on Figure 1. Based on the results of biological testing and subsequent risk assessment modeling NAE finalized a suitability determination on 7 June 2018 that found the majority of the New Haven Harbor material suitable for openwater placement with the exception of two composites in the expanded turning basin area. The 2018 suitability determination received concurrence from the U.S. Environmental Protection Agency Region 1 (EPA) and the Connecticut Department of Energy and Environmental Protection (CT DEEP).

Through the evaluation of project alternatives NAE refined the alignment and dimensions of the proposed project in 2018 after the completion of the initial sediment characterization effort. This supplemental suitability determination is intended to evaluate the elements of the Tentatively Selected Plan that differ from the originally proposed project including a reduction in the size and a shift in the location of the turning basin.

3. **Conceptual Site Model:**

NAE reviewed historic testing data, previous environmental assessments, water quality data, adjacent land-use information, and interviewed local officials to develop a conceptual site model (CSM) for New Haven Harbor (Figure 2). This CSM was used to characterize the system and to identify potential sources of contamination, site-specific contaminants of concern, exposure pathways, and biological receptors in order to inform the sampling and analysis of project sediments. The specific elements of the CSM were detailed in the 7 June 2018 suitability determination and resulted in a moderate to high risk ranking for the project according to the following matrix (adapted from USACE 2014):

Rank	Guidelines
Low	Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects.
Low-Moderate	Few or no sources of contamination but existing data is insufficient to confirm ranking.
Moderate	Contamination sources exist within the vicinity of the project with the potential to produce chemical concentrations that may cause adverse biological effects.
High	Known sources of contamination within the project area and historical data exists that has previously failed biological testing.

4. **Sampling, Testing, and Analysis:**

Based on the moderate to high risk ranking for the New Haven Harbor improvement and maintenance project, and the revised project alignment, NAE prepared a second sampling and analysis plan (SAP) for the project on 1 August 2018 which was coordinated with EPA Region 1 and CT DEEP. The SAP called for 13 sediment cores to be collected from the project areas. Sample stations are identified on Figure 3 and were located to characterize the revised turning basin and channel alignment (TB-1, TB-2, R', S', V', W'), define the extent of any possible unsuitable material in the inner harbor (US-1, US-2, DS-1, DS-2), and to evaluate a proposed Confined Aquatic Disposal (CAD) cell for the containment of potential unsuitable material (CAD-1, CAD-2, CAD-3).

NAE collected sediment vibracores between 22 and 25 October 2018. The cores were collected to the project depth of the Tentatively Selected Plan, -40 feet mean lower low water (MLLW), plus two feet of allowable overdepth. The cores were described in the field and individual sediment horizons were sub-sampled for grain size and bulk chemistry analysis. The remaining material was then composited based on geographic location and grain size for subsequent analysis of whole sediment toxicity, suspended particulate phase toxicity, and bioaccumulation. As Composite V'W' already passed the whole sediment toxicity and bioaccumulation assessment, documented in the 7 June 2018 suitability determination, this composite was only re-evaluated for suspended phase toxicity.

Grain size results were consistent with the previous sampling effort and were dominated by fine grained material in upper core segments with a sharp transition to coarse grained material at depth within the FNP (Table 1). Stations in the proposed CAD cell area transitioned from organic silt in the upper segments to a clayey silt at depth. Native sand and clay intervals were excluded from biological testing.

Table 1. Grain Size Results

Sample ID	% Gravel	% Sand			% Fines
		Coarse	Medium	Fine	
US-1 (0.0-5.5')	0.6	2.8	12.2	8.3	76.2
US-2 (0.0-5.0')	1.2	1.5	6.2	10.3	80.9
US-2 (5.0-6.0')	0.0	0.0	3.4	78.8	17.8
CAD-1 (0.0-4.0')	1.1	0.6	2.9	9.6	85.8
CAD-1 (4.4-8.0')	0.4	0.8	3.0	6.5	89.4
CAD-2 (0.0-5.3')	2.9	1.2	4.3	17.2	74.5
CAD-2 (5.3-10.8')	0.4	0.7	3.7	10.0	85.2
CAD-3 (0.0-5.5')	1.4	1.2	3.0	8.4	86.0
CAD-3(5.5-9.9')	0.8	1.4	7.0	14.4	76.4
DS-1 (0.0-7.0')	0.3	2.4	7.9	4.4	84.9
DS-2 (0.0-7.0')	0.0	0.1	0.5	2.1	97.4
TB-1 (0.0-5.2')	0.0	0.3	0.5	2.1	97.0
TB-1 (5.2-6.0')	0.0	0.0	0.3	56.0	43.8
TB-2 (0.0-6.0')	0.0	0.4	0.4	0.8	98.4

*Stations R', S', V', and W' analyzed for grain size in previous round of testing

As no project specific contaminants of concern were identified in the CSM, individual sub-samples were analyzed for the standard suite of contaminants specified in the RIM. Remaining sample material was composited into six samples to undergo whole sediment bioassays, suspended particulate phase toxicity tests, and bioaccumulation tests according to the SAP.

Bulk Sediment Chemistry Results

To examine sediment chemistry results in an ecologically meaningful context NAE compared the bulk sediment chemistry concentrations against applicable sediment quality guidelines (SQGs). Applicable SQG screening values for marine and estuarine sediments are the National Oceanic and Atmospheric Administration (NOAA) effects-range low (ERL) and effects-range median (ERM). ERL/ERM values are empirically derived guidelines that identify contaminant levels that indicate when the potential for toxic effects are unlikely (ERL) and when an increased probability of toxic effects is evident (ERM). These SQGs serve as a useful screening tool to inform the sampling and testing process but in order to evaluate the New Haven Harbor improvement project under the MPRSA and the CWA the suitability determination is based on the results of the biological testing presented in subsequent sections.

All contaminants of concern in the clayey silt intervals from the stations within the CAD cell area were either not-detected or detected at concentrations below the ERL. The overlying organic silt layer in the CAD cell area, and in the FNP stations, were also characterized by non-detects for the majority of pesticides

and polychlorinated biphenyls (PCBs) but had detectable concentrations of most metals, polycyclic aromatic hydrocarbons (PAHs), and individual PCBs and pesticides. Several of these concentrations exceeded the ERL value but there were only isolated exceedances of the ERM (mercury at CAD-3 and Total PCBs at DS-2 and W'). Bulk chemistry results, SQGs, and mean reference area concentrations for CLDS are presented in Appendix A.

Evaluating Potential Effects to Benthic Organisms

The CSM identified the uptake of placed dredged material by benthic organisms as a potential exposure pathway for the New Haven Harbor improvement project. Sediment toxicity of the composite samples was determined through a 10-day whole sediment acute toxicity test as described in the Green Book (EPA/USACE 1991). Mortality in the control sample of the 10-day whole sediment acute toxicity test was less than 20% for the amphipod (*Leptocheirus plumulosus)* and less than 10% for the mysid (*Americamysis bahia)*; therefore the test was valid based on criteria established in the Green Book.

Mean survivability for *L. plumulosus* ranged from 90% to 99% for the five evaluated composites and was not statistically different from the survivability of the amphipods exposed to reference sediment. The material proposed to be dredged is not considered acutely toxic to the amphipods used in this assessment.

Mean survivability for *A. bahia* ranged from 91% to 96% for the five evaluated composites and was not statistically different from the survivability of the mysids exposed to reference sediment. The material proposed to be dredged is not considered acutely toxic to the mysids used in this assessment. Results from the whole sediment toxicity test are presented in Appendix B.

Evaluating Potential Effects to Human Health

In order to assess the potential risk to human health through the exposure pathways identified in the CSM a 28-day bioaccumulation test was performed with the clam *Macoma nasuta* and marine worm *Nereis virens.* Results showed statistically significant increases of certain contaminants in tissue samples from clams exposed to project sediments when compared to tissue samples from clams exposed to reference area sediments including cadmium, lead, 4,4'-DDE, and several individual PAHs.

Copper was the only contaminant with a significant increase in worm tissue uptake. These tissue burden data were analyzed with the EPA Bioaccumulation Evaluation Screening Tool (BEST) model to determine the toxicological significance of bioaccumulation from exposure to the dredged sediment.

The BEST model includes an evaluation of the non-carcinogenic risk, carcinogenic risk, and any observed exceedances of Food and Drug Administration (FDA) thresholds to determine potential adverse impacts to human health from the consumption of lobster, fish, or shellfish exposed to project sediments. Modeling based on the tissue contaminant loads measured in the New Haven Harbor improvement project found that all contaminants were below the EPA Hazard Quotient for non-carcinogenic risk of 1.0, below the EPA carcinogenic risk threshold (1×10^{-4}), and were also less than established FDA action levels. Tissue body burden concentrations and BEST model outputs are provided in Appendix C.

Evaluating Potential Effects to Fish and Marine Invertebrates

The conceptual site model identified the uptake of contaminants from the water column during the placement of dredged material as a potential exposure pathway for the New Haven Harbor navigation improvement project. 33 U.S.C. §1416(f) requires that all Federal dredging projects, and all non-Federal projects of more than 25,000 cubic yards conducted under permit, and proposing to place dredged material in the waters of Long Island Sound, are subject to the requirements of the MPRSA. Since one of the proposed placement sites for the project, CLDS, is in Long Island Sound the dredged material has been evaluated based on the requirements of both the MPRSA and the CWA. The potential for water column toxicity was determined though a suspended particulate phase toxicity test as described in the Green Book (EPA/USACE 1991).

Suspended particulate phase toxicity results were used to determine the median lethal concentration (LC_{50}) for each species exposed to elutriates from the sediment composites. The tests were carried out in accordance with the method established in the Green Book using the mysid *Americamysis bahia,* the minnow *Menidia beryllina,* and the urchin *Arbacia punctulata*.

Porewater samples from all six composites had high levels of ammonia upon arrival at the laboratory. Elevated ammonia concentrations occur naturally in sediment and cause toxicity in the static environmental conditions of a laboratory suspended particulate phase test (Kennedy et al 2015). In open water conditions, such as the proposed placement areas, ammonia is a non-persistent compound that dissipates rapidly and is not considered a contaminant of concern for dredged material evaluations (Kennedy et al 2015).

MPRSA § 227.27 Limiting Permissible Concentration (LPC) (2) defines the LPC as the concentration of waste or dredged material in the receiving water which, after allowance for initial mixing, as specified in § 227.29, will not exceed a toxicity threshold defined as 0.01 of a concentration shown to be acutely toxic to sensitive marine organisms in a bioassay carried out in accordance with

approved EPA procedures. As stated in §227.27(a)(3) of the MPRSA when there is reasonable scientific evidence on a specific waste material to justify the use of an application factor other than 0.01 the alternative application factor shall be used in calculating the LPC. In cases where ammonia is the driver for an observed response in a suspended particulate phase test EPA Region 1 and NAE have agreed to use an alternate application factor of 0.05 to determine the LPC for a project.

Following the protocol developed by NAE and EPA Region 1 to identify potential toxicity from ammonia, NAE directed the laboratory to create a set of elutriate samples for the suspended particulate phase test and then purge the ammonia from a subset of the remaining sediment. Once unionized ammonia levels in the porewater of the purged sediment dropped below 0.1 ppm the laboratory created a second batch of elutriates to run parallel suspended particulate phase tests with the ammonia purged sediment.

Suspended particulate phase test results from the unpurged sediment showed negative effects on survival in all composites with LC_{50} values ranging from 3%-22% for the most impacted species (*Arbacia punctulata*). In contrast, the LC_{50} values from the ammonia purged sediment were >100% for all composites and all test species (Table 2). Based on this evaluation NAE identified unionized ammonia as the sole driver for the toxicity observed in the suspended particulate phase tests and applied the alternate application factor (0.05) to calculate the LPC. Suspended particulate phase toxicity results, elutriate chemistry concentrations, and unionized ammonia levels are presented in Appendix B.

To determine if the discharge of dredged material would meet the limiting permissible concentration NAE utilized the Short-Term Fate (STFATE) numerical model to analyze the disposal cloud as it is descends through the water column after release from a scow. Results of the STFATE evaluation using the lowest LC_{50} value predicted that the water column would attain the LPC within four hours of disposal and therefore meet the criteria in the testing protocol based on the disposal of 4,000 cubic yards of material at the CLDS.

A summary of biological testing results, water column evaluation, and risk assessment modeling is presented in Table 2 below. Supporting data is provided in Appendix A (bulk chemistry results and SQGs), Appendix B (biological testing results and elutriate chemistry), and Appendix C (tissue chemistry results and BEST model output).

Table 2. Summary of Biological Testing and Modeling Results for the New Haven Harbor Federal Navigation Improvement Project

Composite	Whole Sediment Toxicity		Suspended Particulate Phase Raw Elutriate LC_{50} (Ammonia Purged Elutriate LC_{50})			Water Column Modeling	Bioaccumulation Risk Modeling	Stations	Determination
	L. plumulosus	*A. bahia*	*A. bahia*	*M. berylina*	*A. punctulata*	STFATE	B.E.S.T. Result		
V'W'	PASS*	PASS*	>100% (>100%)	65% (>100%)	7% (>100%)	PASS	No Unacceptable Risk*	V', W'	Suitable
R'S'	PASS	PASS	>100% (>100%)	57% (>100%)	13% (>100%)	PASS	No Unacceptable Risk	R',S'	Suitable
Upstream	PASS	PASS	74% (>100%)	58% (>100%)	3% (>100%)	PASS	No Unacceptable Risk	US-1, US-2	Suitable
Downstream	PASS	PASS	>100% (>100%)	69% (>100%)	10% (>100%)	PASS	No Unacceptable Risk	DS-1, DS-2	Suitable
Turning Basin	PASS	PASS	73% (>100%)	56% (>100%)	5% (>100%)	PASS	No Unacceptable Risk	TB-1, TB-2	Suitable
CAD Cell	PASS	PASS	>100% (>100%)	>100% (>100%)	22% (>100%)	PASS	No Unacceptable Risk	CAD-1, 2, 3	Suitable

* Results based on previous round of testing
Limiting Permissible Concentration for STFATE calculated using the alternate application factor for ammonia (0.05)

5. **Suitability Determination:**

Based on the results of biological testing and subsequent risk assessment modeling no significant adverse impacts were found for the New Haven Harbor navigation improvement project. Based on the testing and evaluation requirements set forth in Section 103 of the Marine Protection, Research, and Sanctuaries Act and Section 404 of the Clean Water Act the sediments to be dredged from the New Haven Harbor navigation improvement project are considered suitable for unconfined open water placement as proposed.

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USACE – New England District

Regina Lyons, Manager
Ocean and Coastal Protection Unit
USEPA – Region 1

Concur: ☒ Do Not Concur: ☐

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Joseph Mackay, Chief
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USACE – New England District

Concur: X Do Not Concur: ☐

References:

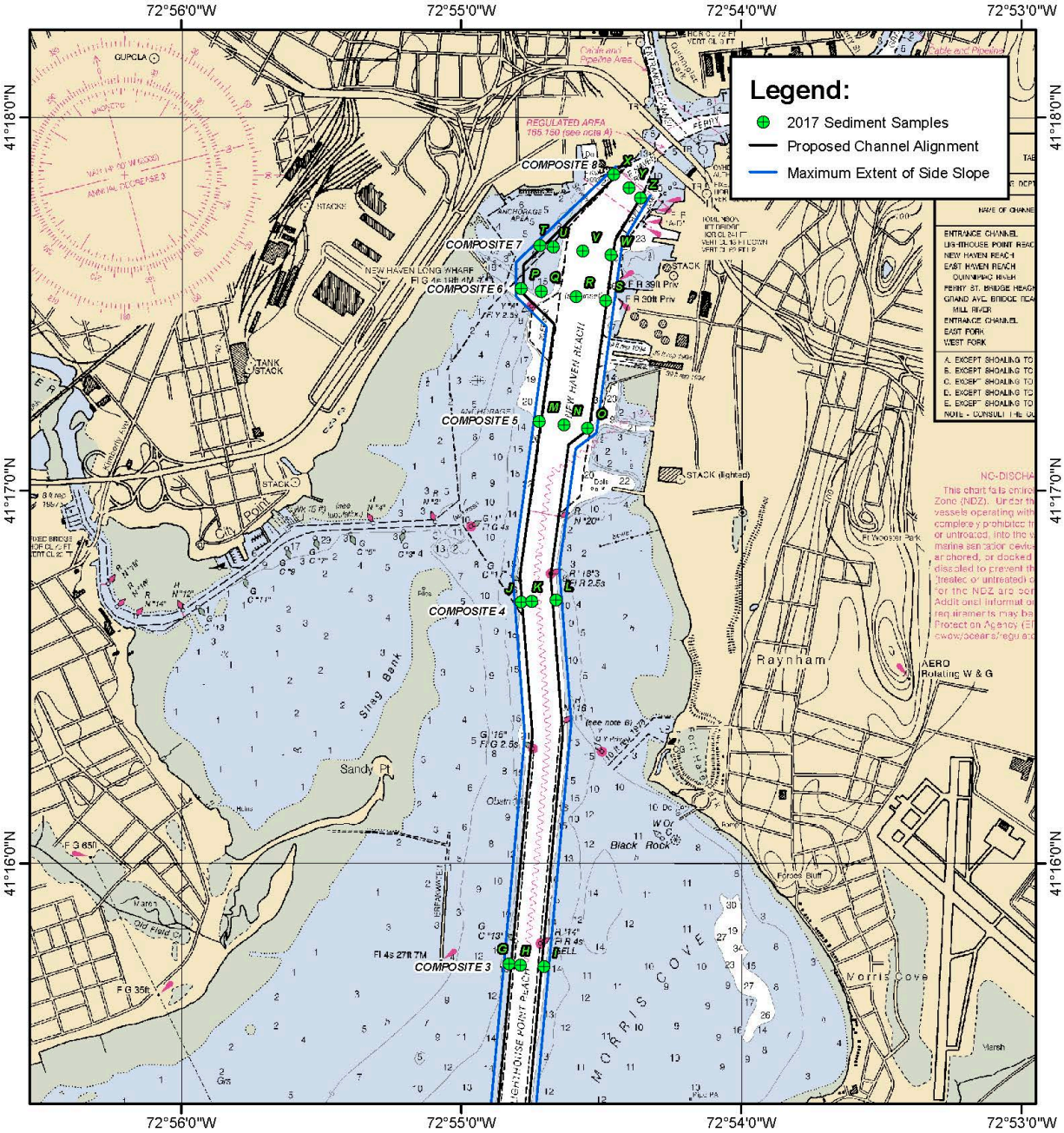
EPA/USACE 1991. Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual. Environmental Protection Agency, Office of Water and Department of the Army, United States Army Corps of Engineers. Washington, D.C.

EPA/USACE 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters. U.S. EPA Region 1, Boston, MA/U.S. Army Corps of Engineers, New England District, Concord, MA.

Kennedy, A.J., Lotufo, G.R., and Steevens, J.A. 2015. Review of Dredging Elutriate Application Factors: Relevance to Acute-to-Chronic Protection, Contaminant, and Endpoint Specificity. Dredging Operations Technical Support Program. U.S. Army Corps of Engineers, Engineering Research and Support Center. ERDC/EL TR-15-10. July 2015.

USACE 2014. Dredged Material Evaluation and Disposal Procedures, User Manual. Dredged Material Management Program, U.S. Army Corps of Engineers, Seattle District.

USACE 2018. Draft Integrated Feasibility Report and Environmental Impact Statement. New Haven Harbor Navigation Improvement Project, Connecticut. U.S. Army Corps of Engineers, New England District.



US Army Corps of Engineers
New England District

FIGURE 1:
NEW HAVEN HARBOR FNP, NEW HAVEN, CT
2017 SEDIMENT SAMPLE LOCATIONS AND PROPOSED ALIGNMENT

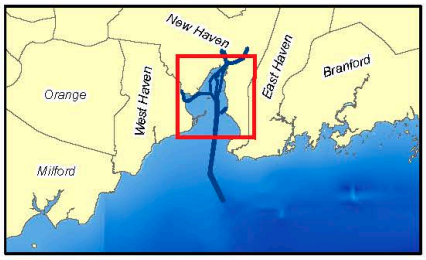
0 2,500 5,000 7,500 Feet

0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983



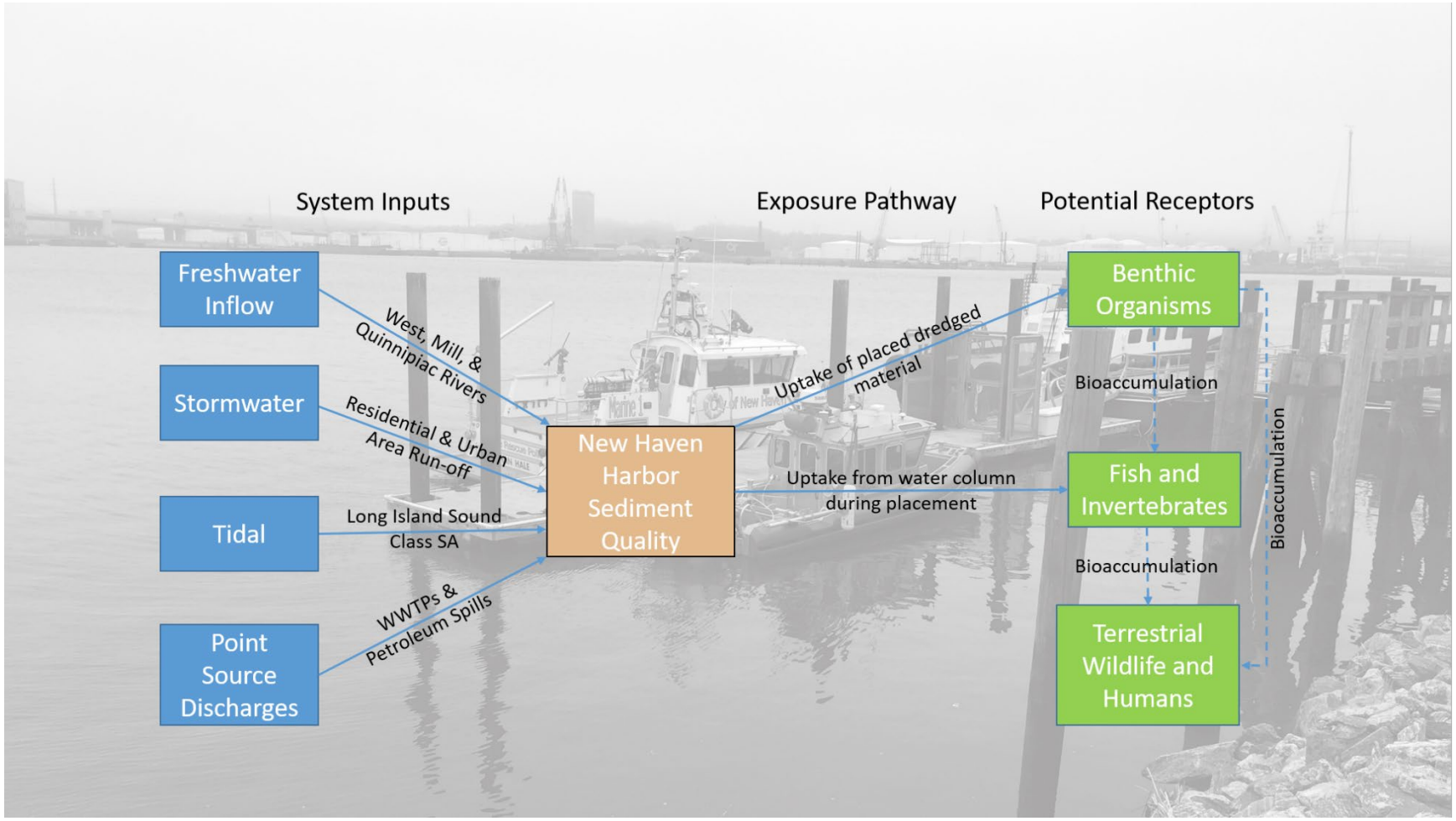
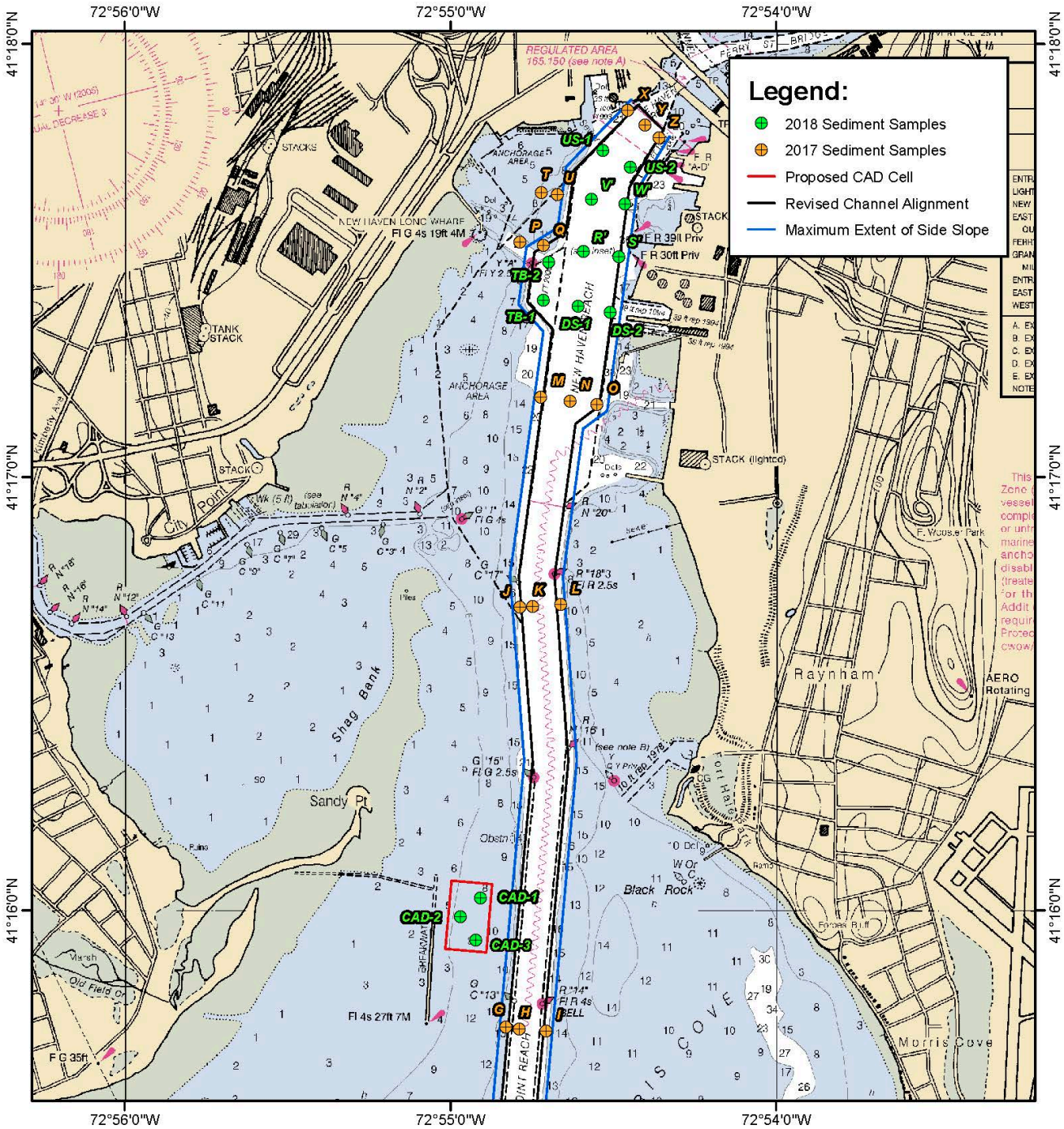


Figure 2. Conceptual Site Model for New Haven Harbor



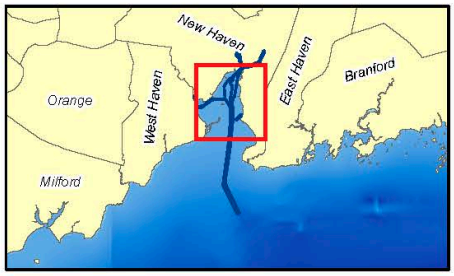
US Army Corps of Engineers
New England District

FIGURE 3:
NEW HAVEN HARBOR FNP, NEW HAVEN, CT
2018 SEDIMENT SAMPLE LOCATIONS AND PROPOSED ALIGNMENT

0 1,000 2,000 3,000 4,000 5,000 Feet
0 0.25 0.5 0.75 1 Miles
1:30,000

NOAA CHART 12371

GCS NAD1983



Appendix A

Sediment Chemistry Results

Appendix A
Sediment Chemistry Results

Analyte	Unit	ERL	ERM	CLDS Reference	CAD-1 0-4.0	CAD-1 4.4-9.0	CAD-2 0.5.3	CAD-2 5.3-10.8	CAD-3 0-5.5	CAD-3 6.1-9.9	DS-1 0-7.3	DS-2 0-7.0	R'	S'	TB-1 0-5.2	TB-1 5.2-6.0	TB-2	US-1 0-5.5	US-2 0.0-5.0	US-2 5.0-6.0	V'	W'
Total Solids (%)	%				42.7	50.7	43.6	50.4	45.8	55.4	37.4	37.5	40.8	41.2	37.5	73.4	36.6	36.3	42	74.9	32.1	38.9
Moisture (%)	%				57.3	49.3	56.4	49.6	54.2	44.6	62.6	62.5	59.2	58.8	62.5	26.6	63.4	63.7	58	25.1	67.9	61.1
Total Organic Carbon (%)	%			1.76	2.2	1.27	2.085	1.33	2.03	1.6	2.525	3.02	2.875	2.49	2.505	0.071	2.705	3.37	2.905	0.0165	2.92	3.065
Total Metals (mg/kg)																						
Arsenic, Total	mg/kg	8.2	70	5.9	9.64	7.2	10.3	7.38	9.33	7.29	9.97	9	9.5	7.85	8.12	1.64	9.42	10.3	9.43	1.31	10.4	8.24
Cadmium, Total	mg/kg	1.2	9.6	0.1	1.01	0.163 J	0.574	0.133 J	0.568	0.141 J	1.53	1.77	1.42	1.46	0.618	0.068 J	0.597	1	2.48	0.267 U	0.545 J	2.74
Chromium, Total	mg/kg	81	370	35.7	74.2	27.4	45.5	26.6	51.2	25.5	102	105	97.9	94.4	64.9	9.69	67.8	85.2	117	6.16	67.8	110
Copper, Total	mg/kg	34	270	26.1	139	10.5	75.6	8.63	103	10.5	135	134	144	132	86.7	11.9	89.7	129	178	5.2	86.2	189
Lead, Total	mg/kg	46.7	218	24.3	70.6	8.92	48.8	7.78	56.4	9.49	75.7	69.5	85	79.5	49.8	8.4	53.8	77.9	100	5.3	55.4	109
Nickel, Total	mg/kg	20.9	51.6	20.0	23.3	16.5	19.8	16.4	20	16.4	28.8	28	31.7	28.8	23.6	5.58	25	30.2	31.7	4.16	27.1	31.4
Zinc, Total	mg/kg	150	410	91.2	210	48.9	142	48.4	159	44.3	224	235	226	214	165	21.4	173	216	263	11.5 J	173	256
Mercury, Total	mg/kg	0.15	0.71	0.1	0.699	0.007 J	0.667	0.021 U	0.784	0.015 J	0.382	0.433	0.367	0.383	0.219	0.016	0.21	0.299	0.418	0.014 U	0.191	0.49
Organochlorine Pesticides (ug/kg)																						
4,4'-DDD	ug/kg	2	20	0.38	0.541 U	0.463 U	0.54 U	0.456 U	2.05	0.421 U	0.909	1.5	1.21	1.3	0.704	0.654 U	0.932	1.56	1.84	0.599 U	0.77	1.83
4,4'-DDE	ug/kg	2.2	27	0.56	1.52	0.463 U	0.942	0.456 U	0.926	0.421 U	3.6	4.93	4.66	4.2	2.03	0.654 U	1.93	3.77	6.16	0.599 U	1.62	5.72
4,4'-DDT	ug/kg	1	7	0.07	0.541 U	0.463 U	0.54 U	0.456 U	0.541	0.421 U	1.36	1.73	3.4	3.44	0.691	0.654 U	2.14	3.42	4.7	0.599 U	0.768	6.96
Total DDT		1.58	46.1	1.02	2.061	0.6945 U	1.482 0	0.684 U	3.517 0	0.6315 U	5.869 0	8.16 0	9.27 0	8.94 0	3.425 0	0.981 U	5.002 0	8.75 0	12.7 0	0.8985 U	3.158 0	14.51 0
Aldrin	ug/kg			0.03	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
cis-Chlordane	ug/kg				0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	1.04	0.754	0.662 U	0.654 U	0.656 U	1.38	1.49	0.599 U	0.825	2.16
cis-Nonachlor	ug/kg				0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	1.52	0.934	0.662 U	0.654 U	0.656 U	0.687	1.85	0.599 U	0.747 U	1.89
Dieldrin	ug/kg	0.02	8	0.15	0.541 U	0.463 U	0.54 U	0.456 U	0.533	0.421 U	0.799	1.81	0.953	1.2	0.662 U	0.654 U	1.79	1.25	1.12	0.599 U	0.954	1.12
Endosulfan I	ug/kg			0.04	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
Endosulfan II	ug/kg			0.47	1.38	0.463 U	0.887	0.456 U	0.989	0.421 U	2.92	0.652 U	5.46	6.3	1.46	0.654 U	0.656 U	3.97	10.2	0.599 U	1.29	12.4
Endrin	ug/kg			0.04	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
gamma-BHC	ug/kg				0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.688	0.883	0.662 U	0.654 U	0.656 U	0.998	1.23	0.599 U	0.747 U	1.54
Heptachlor	ug/kg			0.06	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
Heptachlor epoxide	ug/kg			0.04	1.08 U	0.927 U	1.08 U	0.913 U	1.05 U	0.843 U	1.32 U	1.3 U	1.17 U	1.19 U	1.32 U	1.31 U	1.31 U	1.26 U	1.14 U	1.2 U	1.49 U	1.19 U
Hexachlorobenzene	ug/kg				1.08 U	0.927 U	1.08 U	0.913 U	1.05 U	0.843 U	1.32 U	1.3 U	1.17 U	1.19 U	1.32 U	1.31 U	1.31 U	1.26 U	1.14 U	1.2 U	1.49 U	1.19 U
Methoxychlor	ug/kg			0.14	3.6	1.85 U	2.16 U	1.82 U	3.71	1.68 U	2.65 U	3.66	6.14	3.44	2.65 U	2.61 U	2.62 U	3.89	7.97	2.4 U	2.99 U	7.88
Oxychlordane	ug/kg				4.2	0.927 U	1.08 U	16.4	1.05 U	0.843 U	3.81	4.82	7.92	6.41	3.24	1.31 U	3.73	5.85	10.6	1.2 U	3.66	12.3
Toxaphene	ug/kg			14.62	27.2 U	23.3 U	27.1 U	22.9 U	26.3 U	21.2 U	33.2 U	32.7 U	29.4 U	30 U	33.2 U	32.8 U	32.9 U	31.7 U	28.6 U	30.1 U	37.5 U	29.9 U
trans-Chlordane	ug/kg				3.25	0.463 U	1.42	0.456 U	1.36	0.421 U	7.57	8.37	28.1	27	5.12	0.654 U	5.78	17.6	36	0.599 U	4.62	56.3
trans-Nonachlor	ug/kg				0.666	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.721	0.852	2.99	1.97	0.662 U	0.654 U	0.656 U	1.86	3.65	0.599 U	0.747 U	0.595 U
Polycyclic Aromatic Hydrocarbons (ug/kg)																						
Acenaphthene	ug/kg	16	500	2.02	54.1 U	9.27 U	54 U	9.13 U	52.4 U	8.43 U	66.2 U	82.3	40 J	46.2 J	66.2 U	13.1 U	65.6 U	51.4 J	51.2 J	12 U	74.7 U	67
Acenaphthylene	ug/kg	44	640	10.26	47.8 J	9.27 U	54 U	9.13 U	39.7 J	8.43 U	38.1 J	42.5 J	51.4 J	35.4 J	66.2 U	13.1 U	34 J	52.7 J	62.4	12 U	74.7 U	68.2
Anthracene	ug/kg	85.3	1100	10.15	91	9.27 U	49.3 J	9.13 U	113	8.43 U	58.1 J	128	95.4	105	45.5 J	13.1 U	51.5 J	104	119	12 U	46.5 J	146
Benz(a)anthracene	ug/kg			51.32	423	8.61 J	196	9.13 U	449	5.46 J	230	377	358	327	250	9.75 J	264	511	475	12 U	229	530
Benzo(a)pyrene	ug/kg	430	1600	81.02	522	8.76 J	228	9.13 U	557	4.33 J	273	337	420	356	303	12.1 J	323	522	521	12 U	282	583
Benzo(b)fluoranthene	ug/kg			73.98	461	8.37 J	200	9.13 U	484	5.25 J	292	421	448	370	362	14.5	403	595	613	12 U	329	640
Benzo(ghi)perylene	ug/kg			67.76	435	7.01 J	179	9.13 U	445	8.43 U	251	286	369	306	271	10.7 J	294	439	445	12 U	258	515
Benzo(k)fluoranthene	ug/kg			81.50	455	5.78 J	180	9.13 U	380	8.43 U	307	293	425	368	276	11.1 J	287	488	479	12 U	292	570
Chrysene	ug/kg	384	2800	69.38	462	7.87 J	209	9.13 U	476	4.38 J	291	446	435	382	324	11.1 J	327	624	590	12 U	338	673
Dibenz(a,h)anthracene	ug/kg			13.70	89.2	9.27 U	40.8 J	9.13 U	91.8	8.43 U	58.3 J	62.6 J	75.4	62.6	62.1 J	13.1 U	65.6	89.4	100	12 U	51.5 J	116
Fluoranthene	ug/kg	600	5100	107.20	769	16.2	348	9.13 U	848	11.5	499	818	811	762	493	17.2	564	1110	1060	12 U	505	1250
Fluorene	ug/kg	19	540	3.81	37.2 J	9.27 U	54 U	9.13 U	42.7 J	8.43 U	34.2 J	97.1	53.8 J	42.3 J	66.2 U	13.1 U	65.6 U	55.9 J	83.4	12 U	74.7 U	92.6
Indeno(1,2,3-cd)Pyrene	ug/kg			66.98	488	10.6	235	4.56 J	461	7.57 J	302	317	421	360	331	16.7	352	520	498	6.13 J	309	547
Naphthalene	ug/kg	160	2100	9.40	92.9	9.27 U	41.2 J	9.13 U	97	8.43 U	121	947	90	122	62.4 J	13.7	76.2	75.2	190	12 U	37.5 J	152
Phenanthrene	ug/kg	240	1500	41.48	250	8.47 J	134	9.13 U	326	4.62 J	183	365	290	176	159	8.6 J	188	323	321	12 U	161	417
Pyrene	ug/kg	665	2600	112.40	893	16.2	431	9.13 U	1050	9.62	469	705	710	678	448	24.5	516	954	914	12 U	466	1070
Total LMW PAHs		552	3160	86	532.4	20.045 0	265 0	13.68 U	631.5 0	15.145 0	450.95 0	1661.9 0	620.6 0	526.9 0	316.55 0	35.38 0	382.5 0	662.2 0	827 0	17.97 U	301.1 0	942.8 0
Total HMW PAHs		1700	9600	725	4997.2	91.715 0	2246.8 0	25.08 0	5241.8 0	54.425 0	2972.3 0	4062.6 0	4472.4 0	3971.6 0	3120.1 0	130.92 0	3395.6 0	5852.4 0	5695 0	33.085 0	3059.5 0	6494 0
Total PAHs		4022	44792	811	5529.6	111.76 0	2511.8 0	38.76 0	5873.3 0	69.57 0	3423.25 0	5724.5 0	5093 0	4498.5 0	3436.65 0	166.3 0	3778.1 0	6514.6 0	6522 0	51.055 0	3360.6 0	7436.8 0
Polychlorinated Biphenyl Congeners (ug/kg)																						
PCB 8	ug/kg			0.05	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.31 U	1.25 J	0.635 J	0.689 J	1.33 U	0.677 U	1.26 U	1.36 U	0.669 J	0.665 U	1.54 U	1.59
PCB 18	ug/kg			0.03	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.68	2.98	1.25	2.38	1.33 U	0.677 U	1.26 U	1.44	1.55	0.665 U	0.797 J	3.16
PCB 28	ug/kg			0.24	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	2	3.96	1.03 J	1.49	0.776 J	0.677 U	1.01 J	1.36 U	2.42	0.665 U	0.937 J	2.64
PCB 44	ug/kg			0.03	0.803 J	0.985 U	0.594 J	0.966 U	0.636 J	0.883 U	3.75	9.98	2.75	4.83	1 J	0.677 U	1.24 J	0.779 J	3.83	0.665 U	0.899 J	6.54
PCB 49	x ug/kg			0.03	0.731 J	0.985 U	0.595 J	0.966 U	0.63 J	0.883 U	3.33	6.28	2.27	4.43	1.08 J	0.677 U	1.59	0.802 J	3.6	0.665 U	1.18 J	7.42
PCB 52	ug/kg			0.04	0.739 J	0.985 U	1.22	0.966 U	0.632 J	0.883 U	3.85	8.39	2.77	7	1.04 J	0.677 U	1.38	1.25 J	6.72	0.665 U	1.37 J	9.76
PCB 66	ug/kg			0.48	0.671 J	0.985 U	0.639 J	0.966 U	0.533 J	0.883 U	3.71	6.84	1.87	2.96	1.34	0.677 U	1.83	0.801 J	3.77	0.665 U	1.8	5.7
PCB 87	x ug/kg			0.03	1.14 U	0.985 U	1.06 J	0.966 U	0.538 J	0.883 U	1.7	4.3	0.976 J	1.56	1.33 U	0.677 U	0.872 J	1.43	1.98	0.665 U	0.996 J	3.14
PCB 101	ug/kg			0.27	1.27	0.985 U	2.26	0.966 U	1.09	0.883 U	5.91	13.7	3.3	6.01	2.4	0.37 J	3.08	2.66	5.58	0.665 U	2.51	10.6
PCB 105	ug/kg			0.07	1.14 U	0.985 U	0.882 J	0.966 U	1.05 U	0.883 U	1.15 J	3.07	1.2 U	1.16 U	1.33 U	0.677 U	0.752 J	0.918 J	1.18	0.665 U	1.54 U	3.14
PCB 118	ug/kg			0.32	1.01 J	0.985 U	1.81	0.966 U	1.06	0.883 U	4.89	9.47	2.11	3.82	1.6	0.677 U	2.59	2.37	3.78	0.665 U	2.18	9.02
PCB 128	ug/kg			0.04	1.14 U	0.985 U	0.567 J	0.966 U	0.577 J	0.883 U	2.02	3.32	0.984 J	1.66	0.986 J	0.677 U	1.06 J	0.963 J	0.737 J	0.665 U	0.913 J	2.01
PCB 138	ug/kg			0.40	1.53	0.985 U	3.15	0.966 U	1.43	0.883 U	6.5	14.1	3.53	6.11	2.48	0.435 J	3.51	3.38	5.31	0.665 U	3.37	12.8
PCB 153	ug/kg			0.68	1.37	0.985 U	2.24	0.966 U	1.16	0.883 U	6.01	11.5	3.39	5.26	2.24	0.354 J	2.82	2.48	4.88	0.665 U	2.84	10.4
PCB 170	ug/kg			0.03	1.14 U	0.985 U	0.584 J	0.966 U	1.05 U	0.883 U	2.6	4.38	1.42	1.89	0.912 J	0.677 U	0.711 J	1.36 U	2.67	0.665 U	1.02 J	2.84
PCB 180	ug/kg			0.19	0.883 J	0.985 U	1.32	0.966 U	0.793 J	0.883 U	3.52	7.12	2.12	2.52	1.28 J	0.677 U	1.62	1.54	3.03	0.665 U	1.66	5.24
PCB 183	x ug/kg			0.03	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.07 J	2.04	0.683 J	0.766 J	1.33 U	0.677 U	1.26 U	1.36 U	0.941 J	0.665 U	1.54 U	1.66
PCB 184	x ug/kg			0.07	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.31 U	1.32 U	1.2 U	1.16 U	1.33 U	0.677 U	1.26 U	1.36 U	1.13 U	0.665 U	1.54 U	1.26
PCB 187	ug/kg			0.19	0.757 J	0.985 U	0.89 J	0.966 U	0.752 J	0.883 U	3.2	6.78	1.76	2.43	1.07 J	0.677 U	1.4	0.922 J	2.17	0.665 U	1.52 J	5.56
PCB 195	ug/kg			0.03	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.03 J	0.812 J	1.2 U	1.16 U	1.33 U	0.677 U	1.26 U	1.36 U	1.13 U	0.665 U	1.54 U	0.692 J
PCB 206	ug/kg			0.23	0.638 J	0.985 U	1.12 U	0.966 U	0.602 J	0.883 U	1.44	2.46	0.995 J	0.922 J	1.33 U	0.677 U	0.847 J	1.36 U	1.02 J	0.665 U	1.15 J	1.66
PCB 209	ug/kg			0.03	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	0.884 J	1.01 J	0.62 J	1.16 U	1.33 U	0.677 U	1.26 U	1.36 U	1.13 U	0.665 U	1.54 U	0.848 J
NOAA Total PCBs		22.7	180	6.76	23.92	8.87	35.69	8.69	22.21	7.96	108.95	222.24	62.26	101.69	38.24	7.39	50.23	43.09	99.76	5.98	49.01	188.40

Green shaded values exceed the ERL, yellow shaded values excceed the ERM.
One-half of the sample-specific method detection limit (MDL) is used to represent non-detects in calculation of totals.
Total Polychlorinated Biphenyls (PCBs) calculated as the sum of the 18 NOAA congeners multiplied by 2.
J - Estimated value.
U - Not detected at the laboratory reporting limit (RL), values presented are the RL.
x – Congener is not one of the 18 NOAA congeners included in Total PCBs.

Appendix B

Biological Testing Results

10-Day Whole Sediment Bioassay

A. bahia percent survival results

	Replicate Survival at the End of 10-Day Exposure (%)					Mean Survival (%)	Statistically Less Than CLDS Reference?	Difference in Survival >20% Less Than CLDS Reference?
	A	B	C	D	E			
Lab Control	100%	100%	100%	90%	100%	98%	--	--
CLDS Reference	10%	30%	75%	100%	100%	63%	--	--
R'S'	95%	95%	95%	90%	85%	92%	No	No
Upstream	85%	95%	90%	100%	85%	91%	No	No
Downstream	95%	90%	90%	85%	95%	91%	No	No
Turning Basin	90%	95%	100%	90%	100%	95%	No	No
CAD Cell	90%	100%	100%	100%	90%	96%	No	No

L. plumulosus percent survival results

	Replicate Survival at the End of 10-Day Exposure (%)					Mean Survival (%)	Statistically Less Than CLDS Reference?	Difference in Survival >20% Less Than CLDS Reference?
	A	B	C	D	E			
Lab Control	95%	100%	100%	95%	100%	98%	--	--
CLDS Reference	95%	100%	100%	15%	85%	79%	--	--
R'S'	100%	90%	90%	90%	100%	94%	No	No
Upstream	95%	100%	90%	95%	100%	96%	No	No
Downstream	90%	95%	85%	95%	95%	92%	No	No
Turning Basin	100%	100%	95%	100%	100%	99%	No	No
CAD Cell	90%	95%	100%	90%	95%	90%	No	No

Elutriate Chemistry Results

Analyte		CLDS-REF		V', W'		R', S'		Upstream		Downstream		Turning Basin		CAD Cell	
Total Metals (mg/L)															
Arsenic, Total		0.00066		0.0394		0.038677		0.02935		0.03803		0.03354		0.02174	
Selenium, Total		0.00056	U	0.00029		0.00031		0.00018		0.00023		0.00020		0.00014	
Chromium, Hexavalent		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Cadmium, Total		0.00008		0.00003		0.00003		0.00002		0.00003		0.00004	U	0.00004	U
Chromium, Total		0.00019		0.00039		0.00092		0.00109		0.00069		0.00035		0.00031	
Copper, Total		0.00085		0.00077		0.00131		0.00053		0.00124		0.00027		0.00099	
Lead, Total		0.00073		0.00052		0.00107		0.00041		0.00100		0.00020		0.00044	
Nickel, Total		0.0007		0.00056		0.00061		0.00039		0.00044		0.00025		0.00035	
Silver, Total		0.00011		0.00008	U	0.00007		0.00008	U	0.00006		0.00006		0.00008	U
Zinc, Total		0.0014	J	0.00157		0.00219		0.00129		0.00225		0.002	U	0.00126	
Mercury, Total		0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U
Organochlorine Pesticides (ug/L)															
4,4-DDT		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0011		0.0004	U	0.0005	U
Aldrin		0.001	U	0.001	U	0.001	U	0.0010	U	0.0014	U	0.0009	U	0.001	U
Chloropyrifos		0.001	U	0.001	U	0.001	U	0.0010	U	0.0014	U	0.0009	U	0.001	U
cis-Chlordane		0.0005	U	0.0007		0.0007		0.0041		0.0041		0.0011		0.0005	U
Dieldrin		0.0005	U	0.0011		0.0011		0.0007		0.0012		0.0004	U	0.0014	
Endosulfan I		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0009		0.0004	U	0.0005	U
Endosulfan II		0.0005	U	0.0009		0.0015		0.0025		0.0030		0.0011		0.0005	U
Endrin		0.0005	U	0.0005	U	0.0020		0.0005	U	0.0007	U	0.0004	U	0.0005	
gamma-BHC		0.0005	U	0.0028		0.0023		0.0005	U	0.0007	U	0.0004	U	0.0025	
Heptachlor		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0007	U	0.0004	U	0.0005	U
Heptachlor epoxide		0.001	U	0.001	U	0.001	U	0.001	U	0.0014	U	0.0009	U	0.001	U
Toxaphene		0.0263	U	0.025	U	0.0257	U	0.0251	U	0.0359	U	0.0247	U	0.0256	U
trans-Chlordane		0.0005	U	0.0010		0.0019		0.0005	U	0.0024		0.0008		0.0010	
Pentachlorophenol (ug/L)															
Pentachlorophenol		2.1	U	2.06	U	2.09	U	1.97	U	1.99	U	1.99	U	2.05	U
Polychlorinated Biphenyl Congeners (ug/L)															
PCB 8		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00144	U	0.00099	U	0.001	U
PCB 18		0.0011	U	0.001	U	0.001		0.00111		0.00165		0.00099	U	0.001	U
PCB 28		0.0011	U	0.002		0.001		0.00097		0.00225		0.00099	U	0.001	U
PCB 44		0.0011	U	0.001		0.001		0.00100	U	0.00260		0.00099	U	0.001	U
PCB 49	x	0.0011	U	0.001		0.001	U	0.00142		0.00287		0.00099	U	0.001	U
PCB 52		0.0011	U	0.001		0.001		0.00239		0.00527		0.00079		0.001	U
PCB 66		0.0011	U	0.001		0.001	U	0.00124		0.00266		0.00099	U	0.001	U
PCB 87	x	0.0011	U	0.001	U	0.001	U	0.00100		0.00198		0.00099	U	0.001	U
PCB 101		0.0011	U	0.001		0.001	U	0.00178		0.00440		0.00056		0.001	U
PCB 105		0.0011	U	0.001		0.001		0.00100	U	0.00140		0.00099	U	0.001	U
PCB 118		0.0011	U	0.001		0.001	U	0.00157		0.00433		0.00080		0.001	U
PCB 128		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00144	U	0.00099	U	0.001	U
PCB 138		0.0011	U	0.001		0.001		0.00185		0.00510		0.00066		0.001	U
PCB 153		0.0011	U	0.001		0.001	U	0.00159		0.00514		0.00066		0.001	U
PCB 170		0.0011	U	0.001	U	0.001	U	0.00090		0.00227		0.00099	U	0.001	U
PCB 180		0.0011	U	0.001		0.001	U	0.00138		0.00355		0.00087		0.001	U
PCB 183	x	0.0011	U	0.001	U	0.001	U	0.00085		0.00175		0.00099	U	0.001	U
PCB 184	x	0.0011	U	0.001	U	0.001	U	0.00100	U	0.00144	U	0.00099	U	0.001	U
PCB 187		0.0011	U	0.001	U	0.001	U	0.00115		0.00245		0.00099	U	0.001	U
PCB 195		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00143		0.00099	U	0.001	U
PCB 206		0.0011	U	0.001	U	0.001	U	0.00088		0.00163		0.00099	U	0.001	U
PCB 209		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00128		0.00099	U	0.001	U
Total PCBs		*0.009*	*U*	*0.025*		*0.022*		*0.026*		*0.078*		*0.013*		*0.018*	*U*

Results presented for composite samples are the mean of three replicate samples.
One-half of the sample-specific method detection limit (MDL) is used to represent non-detects in calculation of Total PCBs.
Total Polychlorinated Biphenyls (PCBs) calculated as the sum of the 18 NOAA congeners multiplied by 2.
B – Analyte found in laboratory blank.
J – Estimated value.
mg/L - Milligram per liter.
U – Not detected above the laboratory reporting limit (RL).
ug/L - Microgram per liter.
x – Congener is not one of the 18 NOAA congeners included in Total PCBs.

Summary of Ammonia Mitigation Data- Suspended Particulate Phase Tests

Composite ID	Hour	Date & Time Sampled	Temperature (°C)	pH (SU)	Salinity (‰)	Pore Water Ammonia (mg/L) Total	Pore Water Ammonia (mg/L) Unionized
Comp V', W'	24	10/25/18 1000	18.9	7.46	30	38	0.3361
Comp V', W'	48	10/26/18 1000	20.0	7.71	30	14	0.2371
Comp V', W'	72	10/27/18 1350	20.3	7.44	30	15	0.1406
Comp V', W'	96	10/28/18 1145	17.0	7.43	30	7.8	0.0560
Comp V', W'	120	10/29/18 1130	19.5	7.37	32	5.2	0.0387
Comp R', S'	24	10/25/18 1000	18.4	7.59	30	27	0.3095
Comp R', S'	48	10/26/18 1000	20.0	7.64	30	15	0.2168
Comp R', S'	72	10/27/18 1350	19.8	7.43	30	16	0.1413
Comp R', S'	96	10/28/18 1145	17.0	7.37	32	8.4	0.0520
Comp R', S'	120	10/29/18 1130	19.7	7.39	32	7.3	0.0577
Comp Upstream	24	10/27/18 1350	21.0	7.48	30	38	0.4108
Comp Upstream	48	10/28/18 1145	18.0	7.38	32	22	0.1499
Comp Upstream	72	10/29/18 1130	19.8	7.44	32	14	0.1250
Comp Upstream	96	10/30/18 0915	13.8	7.39	32	8	0.0409
Comp Downstream	24	10/27/18 1350	20.0	7.61	30	31.8	0.4293
Comp Downstream	48	10/28/18 1145	18.0	7.56	32	15	0.1542
Comp Downstream	72	10/29/18 1130	19.9	7.51	32	13	0.1372
Comp Downstream	96	10/30/18 0915	13.5	7.54	32	6.6	0.0465
Comp Turning Basin	24	10/25/18 1000	20.0	7.70	30	31	0.5132
Comp Turning Basin	48	10/27/18 1350	20.0	7.38	30	18	0.1439
Comp Turning Basin	72	10/28/18 1145	18.0	7.39	30	13	0.0917
Comp Turning Basin	96	10/29/18 1130	20.0	7.35	32	13	0.0959
Comp CAD Cell	24	10/26/18 1000	18.9	7.92	30	12	0.3011
Comp CAD Cell	48	10/26/18 1000	20.0	7.62	30	5.5	0.0760
Comp CAD Cell	72	10/27/18 1350	20.0	7.63	31	4.2	0.0590
Comp CAD Cell	96	10/28/18 1145	19.0	7.55	32	3	0.0325
Comp CAD Cell	120	10/29/18 1130	20.0	7.58	32	3	0.0374

Suspended Particulate Phase Testing – Bioassay Findings

Sample ID	*A. bahia*	*M. beryllina*	*A. punctulata*	
	LC50 (%)	LC50 (%)	LC50 (%)	EC50 (%)
Unmitigated Assays				
V', W' Elutriate	>100%	65%	7%	4%
R', S' Elutriate	>100%	57%	13%	4%
Upstream Elutriate	74%	58%	3%	3%
Downstream Elutriate	>100%	69%	10%	7%
Turning Basin Elutriate	73%	56%	5%	4%
CAD Cell Elutriate	>100%	>100%	22%	22%
Mitigated Assays				
V', W' Elutriate	>100%	>100%	>100%	>100%
R', S' Elutriate	>100%	>100%	>100%	>100%
Upstream Elutriate	>100%	>100%	>100%	>100%
Downstream Elutriate	>100%	>100%	>100%	>100%
Turning Basin Elutriate	>100%	>100%	>100%	>100%
CAD Cell Elutriate	>100%	>100%	>100%	>100%

Americamysis bahia – survival endpoint
Menidia beryllina – survival endpoint
Arbacia punctulata – survival and development endpoints

Appendix C

Tissue Chemistry Results and BEST Model Results

Tissue Analysis – Mean Chemical Concentrations and Statistical Findings for *M. nasuta* Tissue

Analyte	CLDS Reference	Composite 2 R',S'	Composite 3 Upstream	Composite 4 Downstream	Composite 5 Turning Basin	Composite 6 CAD Cell
Total Metals (mg/kg)						
Arsenic	2.3	1.9 NS	2.3 NS	1.8 NS	1.8 NS	1.7 NS
Cadmium	0.024 b	0.030 bS	0.027 bNS	0.025 bNS	0.026 bNS	0.028 bNS
Chromium	0.49 b	0.47 NS	0.38 bNS	0.46 NS	0.32 bNS	0.49 NS
Copper	1.9	2.1 NS	2.1 NS	2.2 NS	1.5 NS	2.2 NS
Lead	0.46	0.45 NS	0.40 NS	0.40 NS	0.31 NS	0.61 S
Mercury	0.0064 b	0.0031 abNS	0.0018 abNS	0.0023 abNS	0.0020 abNS	0.0074 bNS
Nickel	0.42	0.34 NS	0.36 NS	0.33 NS	0.32 NS	0.35 NS
Zinc	9.4	9.8 NS	10.7 NS	9.1 NS	8.8 NS	9.6 NS
Polycyclic Aromatic Hydrocarbons (ug/kg)						
Acenaphthene	2.3 a	2.3 ac	2.7 abc	2.3 ac	2.3 ac	2.4 ac
Acenaphthylene	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Anthracene	2.3 a	3.7 abc	7.4 bc	6.6 bc	2.3 ac	4.4 abc
Benzo(a)anthracene	3.6 ab	18 S	24 S	23 S	7.5 bS	28 S
Benzo(a)pyrene	2.3 a	7.7 bc	8.9 bc	9.6 bc	2.7 abc	17 c
Benzo(b)fluoranthene	2.8 ab	16 S	17 S	17 S	7.8 bS	23 S
Benzo(k)fluoranthene	2.3 a	8.2 bc	11 bc	11 bc	4.4 abc	17 c
Benzo(g,h,i)perylene	2.3 a	2.3 ac	3.8 abc	4.2 abc	2.3 ac	7.6 bc
Chrysene	2.8 ab	17 S	23 S	24 S	7.6 bS	30 S
Dibenzo(a,h)anthracene	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Fluoranthene	6.3 ab	55 S	98 S	83 S	29 S	78 S
Fluorene	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Indeno(1,2,3-c,d)pyrene	2.3 a	2.3 ac	2.7 abc	2.8 abc	2.3 ac	5.0 abc
Naphthalene	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Phenanthrene	4.2 ab	12.0 S	16 S	22 S	6.9 bS	11 bS
Pyrene	9.1 b	45 S	72 S	64 S	23 S	113 S
Total LMW PAHs [1]						
Total HMW PAHs [1]						
Total PAHs [1]	52	200	297	278	107	345
Polychlorinated Biphenyl Congeners (ug/kg)						
PCB 8	0.23 a	0.40 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 18	0.23 a	0.90 ac	1.8 c	1.5 c	0.62 ac	0.52 ac
PCB 28	0.23 a	2.2 abc	0.61 abc	0.80 bc	0.23 ac	0.24 ac
PCB 44	0.23 a	0.40 abc	0.35 abc	0.60 abc	0.23 ac	0.24 ac
PCB 52	0.23 a	1.2 c	1.4 c	1.8 c	0.23 ac	0.24 ac
PCB 66	0.23 a	0.63 bc	0.56 bc	0.90 bc	0.23 ac	0.24 ac
PCB 101	0.23 a	1.2 c	0.83 bc	1.4 c	0.38 abc	0.30 abc
PCB 105	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 118	0.23 a	0.61 bc	0.42 abc	0.90 bc	0.28 abc	0.29 abc
PCB 128	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 138	0.23 a	0.82 bc	0.72 bc	1.2 bc	0.33 abc	0.31 abc
PCB 153	0.23 a	0.79 bc	0.69 bc	1.0 bc	0.32 abc	0.28 abc
PCB 170	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 180	0.23 a	0.23 ac	0.22 ac	0.30 abc	0.23 ac	0.24 ac
PCB 187	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 195	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 206	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 209	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Total PCBs [1]	8.3	22	19	24	10	10
Pesticides (ug/kg)						
Aldrin	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
cis-Chlordane	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.30 ac	0.24 ac
trans-Chlordane	0.23 a	0.23 ac	2.1 c	1.5 c	1.0 ac	0.24 ac
cis-Nonachlor	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
trans-Nonachlor	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Oxychlordane	0.46 a	0.62 ac	0.56 ac	0.45 ac	0.46 ac	0.47 ac
Total Chlordanes	1.4	1.5	3.3	2.6	2.2	1.4
4,4'-DDT	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.29 ac	0.24 ac
4,4'-DDD	0.23 a	0.23 ac	0.22 ac	0.28 ac	0.23 ac	0.24 ac
4,4'-DDE	0.33 a	0.73 S	0.70 S	0.91 S	0.35 aNS	0.24 aNS
Total DDT [1]	0.79	1.2	1.1	1.4	0.87	0.71
Dieldrin	0.23 a	0.23 ac	0.22 ac	0.28 ac	0.23 ac	0.24 ac
alpha-Endosulfan	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
beta-Endosulfan	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Endosulfans [1]	0.46	0.46	0.44	0.45	0.46	0.47
Endrin	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Heptachlor	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Heptachlor epoxide	0.46 a	0.46 ac	0.44 ac	0.45 ac	0.46 ac	0.47 ac
Hexachlorobenzene	0.46 a	0.46 ac	0.44 ac	0.45 ac	0.46 ac	0.47 ac
Lindane	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Methoxychlor	0.93 a	0.92 ac	0.89 ac	0.91 ac	0.91 ac	0.94 ac
Toxaphene	12 a	12 ac	11 ac	11 ac	11 ac	12 ac

Results presented for CLDS Reference and Composites are the mean of five replicate samples.

1 - Totals calculated for informational purposes only using 1/2 MDL for non-detected values. Statistical analysis not conducted on total values and qualifiers not applied.

Statistical qualifiers -

a - Analyte not detected (below MDL) in at least one replicate; mean value was calculated using one-half the MDL for the non-detect.

b - Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.

c - Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS - Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.

S - Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05

Tissue Analysis – Mean Chemical Concentrations and Statistical Findings for *N. virens* Tissue

Analyte	CLDS Reference	Composite 2 R',S'	Composite 3 Upstream	Composite 4 Downstream	Composite 5 Turning Basin	Composite 6 CAD Cell
Total Metals (mg/kg)						
Arsenic	1.5	1.3 NS	1.5 NS	1.4 NS	1.4 NS	1.5 NS
Cadmium	0.029 b	0.028 bNS	0.029 bNS	0.028 bNS	0.022 bNS	0.024 bNS
Chromium	0.073 b	0.061 bNS	0.071 bNS	0.063 bNS	0.077 bNS	0.079 bNS
Copper	1.2	0.92 NS	1.1 NS	1.1 NS	1.1 NS	1.4 S
Lead	0.17	0.17 NS	0.19 NS	0.17 NS	0.13 NS	0.15 NS
Mercury	0.0016 a	0.0016 ac	0.0048 abc	0.0047 abc	0.0072 bc	0.0090 bc
Nickel	0.12	0.10 bNS	0.11 NS	0.13 NS	0.12 bNS	0.15 NS
Zinc	10.4	10.1 NS	6.7 NS	10.7 NS	13.6 NS	14.1 NS
Polycyclic Aromatic Hydrocarbons (ug/kg)						
Acenaphthene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Acenaphthylene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Anthracene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(a)anthracene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(a)pyrene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(b)fluoranthene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(k)fluoranthene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(g,h,i)perylene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Chrysene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Dibenzo(a,h)anthracene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Fluoranthene	2.3 a	4.4 abc	6.9 abc	6.9 abc	2.4 ac	6.0 bc
Fluorene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Indeno(1,2,3-c,d)pyrene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Naphthalene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Phenanthrene	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Pyrene	2.3 a	2.9 abc	4.7 abc	5.1 abc	2.4 ac	8.3 bc
Total LMW PAHs [1]						
Total HMW PAHs [1]						
Total PAHs [1]	37	39	44	44	38	47
Polychlorinated Biphenyl Congeners (ug/kg)						
PCB 8	0.23 a	0.23 ac	0.23 ac	0.52 ac	0.24 ac	0.23 ac
PCB 18	0.23 a	0.39 ac	0.23 ac	1.1 ac	0.24 ac	0.88 ac
PCB 28	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 44	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 52	0.23 a	0.63 bc	0.31 abc	0.98 bc	0.24 ac	0.23 ac
PCB 66	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 101	0.23 a	0.36 abc	0.46 abc	0.78 abc	0.32 abc	0.23 ac
PCB 105	0.23 a	0.28 abc	0.31 abc	0.22 ac	0.24 ac	0.23 ac
PCB 118	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 128	0.23 a	0.28 abc	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 138	1.1 b	1.9 S*	1.8 NS	2.6 S*	1.5 bNS	1.1 bNS
PCB 153	1.7	3.1 NS	3.0 NS	3.8 S*	2.5 NS	1.9 NS
PCB 170	0.40 ab	1.1 abNS	0.94 abNS	1.1 aNS	0.91 abS	0.23 aNS
PCB 180	1.4 b	3.1 S*	2.8 NS	3.3 NS	2.2 bNS	1.2 bNS
PCB 187	1.0 b	1.9 bNS	1.9 NS	2.4 S*	1.4 abNS	0.85 abNS
PCB 195	0.23 a	0.23 ac	0.33 abc	0.22 ac	0.24 ac	0.23 ac
PCB 206	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 209	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
Total PCBs [1]	17	30	28	37	23	18
Pesticides (ug/kg)						
Aldrin	0.23 a	0.23 ac	0.23 ac	0.28 ac	0.24 ac	0.23 ac
cis-Chlordane	0.23 a	0.23 ac	0.23 ac	0.49 ac	0.24 ac	0.23 ac
trans-Chlordane	0.23 a	0.23 ac	0.29 ac	0.40 ac	0.24 ac	0.23 ac
cis-Nonachlor	0.23 a	0.23 ac	0.23 ac	0.48 ac	0.24 ac	0.23 ac
trans-Nonachlor	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
Oxychlordane	0.46 a	0.46 ac	0.47 ac	0.45 ac	0.48 ac	0.47 ac
Total Chlordanes	1.4	1.4	1.5	2.0	1.4	1.4
4,4'-DDT	0.23 a	0.43 ac	0.23 ac	0.63 ac	0.24 ac	0.23 ac
4,4'-DDD	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
4,4'-DDE	0.23 a	0.23 ac	0.28 ac	0.22 ac	0.24 ac	0.23 ac
Total DDT [1]	0.69	0.89	0.75	1.1	0.71	0.70
Dieldrin	0.23 a	0.23 ac	0.23 ac	0.66 ac	0.24 ac	0.23 ac
alpha-Endosulfan	0.23 a	0.23 ac	0.23 ac	0.50 ac	0.24 ac	0.23 ac
beta-Endosulfan	0.23 a	0.23 ac	0.23 ac	0.45 ac	0.24 ac	0.23 ac
Endosulfans [1]	0.46	0.46	0.47	0.94	0.48	0.47
Endrin	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
Heptachlor	0.23 a	0.23 ac	0.23 ac	0.31 ac	0.24 ac	0.23 ac
Heptachlor epoxide	0.46 a	0.46 ac	0.47 ac	0.45 ac	0.48 ac	0.47 ac
Hexachlorobenzene	0.46 a	0.46 ac	0.47 ac	1.30 ac	0.48 ac	0.47 ac
Lindane	0.23 a	0.23 ac	0.23 ac	0.67 ac	0.24 ac	0.23 ac
Methoxychlor	0.92 a	0.91 ac	0.94 ac	0.90 ac	0.95 ac	0.93 ac
Toxaphene	12 a	11 ac	12 ac	11 ac	12 ac	12 ac

Results presented for CLDS Reference and Composites are the mean of five replicate samples.

1 - Totals calculated for informational purposes only using 1/2 MDL for non-detected values. Statistical analysis not conducted on total values and qualifiers not applied.

Statistical qualifiers -

a - Analyte not detected (below MDL) in at least one replicate; mean value was calculated using one-half the MDL for the non-detect.

b - Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.

c - Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS - Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.

S - Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05

* - Mean tissue body burden was not statistically different from the native organism mean body burden. Statistical significance accepted at α=0.05.

Project name: New Haven 2018 Supplemental S&T

Project number:

Model filename: NewHaven2018_S.best

Chemical filename: Chemical_List_for_EPA_Reg1_template (in progress).xlsx

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Selected Chemicals

Invertebrate Name Macoma nasuta

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
101					
105					
118					
1234678 HpDD					
1234678-HpCDD					
1234678-HpCDF					
123478-HxCDD					
123478-HxCDF					
123478-HxDD					
1234789-HpCDF					
123678-HxCDD					
123678-HxCDF					
123678-HxDD					
12378 PeCDD					
12378-PeCDF					
123789-HxCDD					
123789-HxCDF					
123789-HxDD					
128					

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
138					
153					
170					
18					
180					
187					
195					
206					
209					
234678-HxCDF					
23478-PeCDF					
2378 TCDD					
2378-TCDF					
28					
4,4'-DDD					
4,4'-DDE	X	X	X		
4,4'-DDT					
44					
52					
66					
8					
Acenaphthene					
Acenaphthylene					
Aldrin					
Aldrin+Dieldrin					
Anthracene					
Arsenic					
Benzo(a)anthracene	X	X	X	X	X
Benzo(a)pyrene					
Benzo(a)pyrene TEQ					
Benzo(b)fluoranthene	X	X	X	X	X
Benzo(g,h,i)perylene					
Benzo(k)fluoranthene					
Cadmium	X				
Chlordane+Heptachlo					
Chromium					
Chrysene	X	X	X	X	X
Copper					

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
DIOXINS/FURANS					
Dibenzo(a,h)					
Dieldrin					
Dioxin					
Endosulfans					
Endrin					
Fluoranthene	X	X	X	X	X
Fluorene					
Heptachlor					
Heptachlor epoxide					
Heptachlor+Heptachlo					
Hexachlorobenzene					
Indeno(1,2,3-c,d)					
Lead					X
Lindane					
Lv - Phenanthrene					
METALS					
Mercury					
Methoxychlor					
Mirex					
Naphthalene					
Nickel					
OCDD					
OCDF					
Oxychlordane					
PAH Total					
PAHS					
PCB 101					
PCB 105					
PCB 118					
PCB 128					
PCB 138					
PCB 153					
PCB 170					
PCB 18					
PCB 180					
PCB 187					
PCB 195					

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
PCB 206					
PCB 209					
PCB 28					
PCB 44					
PCB 52					
PCB 66					
PCB 8					
PCB Congeners					
PCB-105					
PCB-114					
PCB-118					
PCB-123					
PCB-126					
PCB-156					
PCB-157					
PCB-167					
PCB-169					
PCB-189					
PCB-77					
PCB-81					
PESTICIDES					
Phenanthrene	X	X	X	X	X
Pyrene	X	X	X	X	X
Silver					
Total Chlordanes					
Total DDT					
Total PCBs					
Toxaphene					
Zinc					
alpha-Endosulfan					
beta-Endosulfan					
bis (2-ethylhexyl)					
cis-Chlordane					
cis-Nonachlor					
trans-Chlordane		X			
trans-Nonachlor					

Selected Chemicals

Invertebrate Name Nereis virens

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
101					
105					
118					
1234678 HpDD					
1234678-HpCDD					
1234678-HpCDF					
123478-HxCDD					
123478-HxCDF					
123478-HxDD					
1234789-HpCDF					
123678-HxCDD					
123678-HxCDF					
123678-HxDD					
12378 PeCDD					
12378-PeCDF					
123789-HxCDD					
123789-HxCDF					
123789-HxDD					
128					
138					
153					
170					
18					
180					
187					
195					
206					
209					
234678-HxCDF					
23478-PeCDF					
2378 TCDD					
2378-TCDF					
28					
4,4'-DDD					
4,4'-DDE					

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
4,4'-DDT					
44					
52					
66					
8					
Acenaphthene					
Acenaphthylene					
Aldrin					
Aldrin+Dieldrin					
Anthracene					
Arsenic					
Benzo(a)anthracene					
Benzo(a)pyrene					
Benzo(a)pyrene TEQ					
Benzo(b)fluoranthene					
Benzo(g,h,i)perylene					
Benzo(k)fluoranthene					
Cadmium					
Chlordane+Heptachlo					
Chromium					
Chrysene					
Copper					X
DIOXINS/FURANS					
Dibenzo(a,h)					
Dieldrin					
Dioxin					
Endosulfans					
Endrin					
Fluoranthene					
Fluorene					
Heptachlor					
Heptachlor epoxide					
Heptachlor+Heptachlo					
Hexachlorobenzene					
Indeno(1,2,3-c,d)					
Lead					
Lindane					
Lv - Phenanthrene					

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
METALS					
Mercury					
Methoxychlor					
Mirex					
Naphthalene					
Nickel					
OCDD					
OCDF					
Oxychlordane					
PAH Total					
PAHS					
PCB 101					
PCB 105					
PCB 118					
PCB 128					
PCB 138					
PCB 153					
PCB 170					
PCB 18					
PCB 180					
PCB 187					
PCB 195					
PCB 206					
PCB 209					
PCB 28					
PCB 44					
PCB 52					
PCB 66					
PCB 8					
PCB Congeners					
PCB-105					
PCB-114					
PCB-118					
PCB-123					
PCB-126					
PCB-156					
PCB-157					
PCB-167					

	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
PCB-169					
PCB-189					
PCB-77					
PCB-81					
PESTICIDES					
Phenanthrene					
Pyrene					
Silver					
Total Chlordanes					
Total DDT					
Total PCBs					
Toxaphene					
Zinc					
alpha-Endosulfan					
beta-Endosulfan					
bis (2-ethylhexyl)					
cis-Chlordane					
cis-Nonachlor					
trans-Chlordane					
trans-Nonachlor					

Human Subreport

Human: Adult Angler

Total Estimated Risks From Organics(see EPA Table Xa)

Receptor: Adult Angler

Organism: Macoma nasuta

		Cancer Risk	Non-Cancer Risk
Composite 2 (R',S')		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	5.13E-6	4.72E-4
	Reference	1.45E-6	1.75E-4
		Total Lobster	
	Test	2.65E-5	2.44E-3
	Reference	7.49E-6	9E-4

		Cancer Risk	Non-Cancer Risk
		Macoma nasuta	
	Test	5.28E-6	5.19E-4
	Reference	1.5E-6	1.9E-4
Composite 3 (US-1,-2)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	6.2E-6	7.16E-4
	Reference	1.47E-6	1.75E-4
		Total Lobster	
	Test	3.2E-5	3.7E-3
	Reference	7.57E-6	9E-4
		Macoma nasuta	
	Test	6.42E-6	7.91E-4
	Reference	1.51E-6	1.9E-4
Composite 4 (DS-1,-2)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	5.79E-6	6.86E-4
	Reference	1.45E-6	1.75E-4
		Total Lobster	
	Test	2.99E-5	3.54E-3
	Reference	7.49E-6	9E-4
		Macoma nasuta	
	Test	5.98E-6	7.56E-4
	Reference	1.5E-6	1.9E-4
Composite 5 (TB-1,-2)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	2.46E-6	1.55E-4
	Reference	1.43E-6	5.26E-5
		Total Lobster	
	Test	1.27E-5	7.97E-4
	Reference	7.39E-6	2.72E-4

		Cancer Risk	Non-Cancer Risk
		Macoma nasuta	
	Test	2.53E-6	1.73E-4
	Reference	1.47E-6	5.9E-5
Composite 6 (CAD-1,-2,-3)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	8.7E-6	7E-4
	Reference	1.43E-6	5.26E-5
		Total Lobster	
	Test	4.49E-5	3.61E-3
	Reference	7.39E-6	2.72E-4
		Macoma nasuta	
	Test	8.98E-6	7.85E-4
	Reference	1.47E-6	5.9E-5

Total Estimated Risks From Organics(see EPA Table Xa)

Receptor: Adult Angler

Organism: Nereis virens

		Cancer Risk	Non-Cancer Risk
Composite 2 (R',S')		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	0	0
	Reference	0	0
		Total Lobster	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	0	0
	Reference	0	0
Composite 3 (US-1,-2)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	0	0
	Reference	0	0
		Total Lobster	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	0	0
	Reference	0	0
Composite 4 (DS-1,-2)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	0	0
	Reference	0	0

		Cancer Risk	Non-Cancer Risk
		Total Lobster	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	0	0
	Reference	0	0
Composite 5 (TB-1,-2)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	0	0
	Reference	0	0
		Total Lobster	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	0	0
	Reference	0	0
Composite 6 (CAD-1,-2,-3)		Nereis virens	
	Test	0	0
	Reference	0	0
		Fish Fillet	
	Test	0	0
	Reference	0	0
		Total Lobster	
	Test	0	0
	Reference	0	0
		Macoma nasuta	
	Test	0	0
	Reference	0	0

Seafood Non-Cancer Risks (see EPA Table 6a, Columns F & G)

Receptor: Adult Angler

Organism: Macoma nasuta

			Non-Cancer Risk
Composite 2 (R',S')	Cadmium	Test	2.13E-3
		Reference	2.09E-3
Composite 6 (CAD-1,-2,-3)	Lead	Test	0
		Reference	0

Seafood Non-Cancer Risks (see EPA Table 6a, Columns F & G)

Receptor: Adult Angler

Organism: Nereis virens

			Non-Cancer Risk
Composite 6 (CAD-1,-2,-3)	Copper	Test	0
		Reference	0

FDA Action Limit/Tolerance (see EPA Table 3, Columns D & E)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	FDA Action Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 2 (R',S')	Total PCBs	2E3	4.09E1
Composite 2 (R',S')	Mercury	1E0	2.3E-3
Composite 2 (R',S')	Total DDT	5E3	1.57E0
Composite 2 (R',S')	Total Chlordanes	3E2	1.83E0
Composite 3 (US-1,-2)	Total PCBs	2E3	4.16E1
Composite 3 (US-1,-2)	Mercury	1E0	1.8E-3
Composite 3 (US-1,-2)	Total DDT	5E3	1.86E0
Composite 3 (US-1,-2)	Total Chlordanes	3E2	5.8E0
Composite 4 (DS-1,-2)	Total PCBs	2E3	5.4E1
Composite 4 (DS-1,-2)	Mercury	1E0	2.3E-3
Composite 4 (DS-1,-2)	Total DDT	5E3	2.3E0
Composite 4 (DS-1,-2)	Total Chlordanes	3E2	4.51E0
Composite 5 (TB-1,-2)	Total PCBs	2E3	2.17E1
Composite 5 (TB-1,-2)	Mercury	1E0	2E-3
Composite 5 (TB-1,-2)	Total DDT	5E3	1.44E0
Composite 5 (TB-1,-2)	Total Chlordanes	3E2	3.77E0
Composite 6 (CAD-1,-2,	Total PCBs	2E3	2.11E1
Composite 6 (CAD-1,-2,	Mercury	1E0	7.4E-3
Composite 6 (CAD-1,-2,	Total DDT	5E3	1.19E0
Composite 6 (CAD-1,-2,	Total Chlordanes	3E2	2.12E0

FDA Action Limit/Tolerance (see EPA Table 3, Columns D & E)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	FDA Action Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 2 (R',S')	Total PCBs	2E3	5.85E1
Composite 2 (R',S')	Mercury	1E0	1.3E-3
Composite 2 (R',S')	Total DDT	5E3	1.25E0
Composite 2 (R',S')	Total Chlordanes	3E2	1.67E0
Composite 3 (US-1,-2)	Total PCBs	2E3	6.23E1
Composite 3 (US-1,-2)	Mercury	1E0	4.84E-3
Composite 3 (US-1,-2)	Total DDT	5E3	1.26E0
Composite 3 (US-1,-2)	Total Chlordanes	3E2	2.22E0
Composite 4 (DS-1,-2)	Total PCBs	2E3	8.2E1
Composite 4 (DS-1,-2)	Mercury	1E0	4.73E-3
Composite 4 (DS-1,-2)	Total DDT	5E3	1.76E0
Composite 4 (DS-1,-2)	Total Chlordanes	3E2	3.15E0
Composite 5 (TB-1,-2)	Total PCBs	2E3	5.16E1
Composite 5 (TB-1,-2)	Mercury	1E0	7.2E-3
Composite 5 (TB-1,-2)	Total DDT	5E3	1.21E0
Composite 5 (TB-1,-2)	Total Chlordanes	3E2	2.14E0
Composite 6 (CAD-1,-2,	Total PCBs	2E3	3.99E1
Composite 6 (CAD-1,-2,	Mercury	1E0	9E-3
Composite 6 (CAD-1,-2,	Total DDT	5E3	1.18E0
Composite 6 (CAD-1,-2,	Total Chlordanes	3E2	2.1E0

Ecological Effects Level (see EPA Table 8a.1, Columns D & E)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 2 (R',S')	Anthracene	3.75E3	2.82E0
Composite 2 (R',S')	PAH Total	1E4	1.57E2
Composite 2 (R',S')	Total PCBs	4E3	4.09E1
Composite 2 (R',S')	Aldrin	2.99E2	1.86E-1
Composite 2 (R',S')	Dieldrin	4.37E0	2.51E-1
Composite 2 (R',S')	Endosulfans	2.86E0	3.72E-1
Composite 2 (R',S')	Arsenic	1.26E1	1.49E0
Composite 2 (R',S')	Cadmium	3.03E0	2.48E-2
Composite 2 (R',S')	Chromium	1.18E1	3.81E-1
Composite 2 (R',S')	Copper	9.6E0	1.67E0
Composite 2 (R',S')	Lead	1.19E1	3.64E-1
Composite 2 (R',S')	Mercury	2E-1	2.3E-3
Composite 2 (R',S')	Nickel	3.8E0	2.79E-1
Composite 2 (R',S')	Zinc	1.52E3	8.3E0
Composite 2 (R',S')	Total DDT	3E3	1.57E0
Composite 3 (US-1,-2)	Anthracene	3.75E3	7.44E0
Composite 3 (US-1,-2)	PAH Total	1E4	2.97E2
Composite 3 (US-1,-2)	Total PCBs	4E3	4.16E1
Composite 3 (US-1,-2)	Aldrin	2.99E2	2.22E-1
Composite 3 (US-1,-2)	Dieldrin	4.37E0	3E-1
Composite 3 (US-1,-2)	Endosulfans	2.86E0	4.44E-1
Composite 3 (US-1,-2)	Arsenic	1.26E1	2.31E0
Composite 3 (US-1,-2)	Cadmium	3.03E0	2.72E-2
Composite 3 (US-1,-2)	Chromium	1.18E1	3.84E-1
Composite 3 (US-1,-2)	Copper	9.6E0	2.07E0
Composite 3 (US-1,-2)	Lead	1.19E1	3.98E-1
Composite 3 (US-1,-2)	Mercury	2E-1	1.8E-3
Composite 3 (US-1,-2)	Nickel	3.8E0	3.56E-1
Composite 3 (US-1,-2)	Zinc	1.52E3	1.07E1
Composite 3 (US-1,-2)	Total DDT	3E3	1.86E0
Composite 4 (DS-1,-2)	Anthracene	3.75E3	6.65E0
Composite 4 (DS-1,-2)	PAH Total	1E4	2.78E2
Composite 4 (DS-1,-2)	Total PCBs	4E3	5.4E1
Composite 4 (DS-1,-2)	Aldrin	2.99E2	2.27E-1

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 4 (DS-1,-2)	Dieldrin	4.37E0	3.77E-1
Composite 4 (DS-1,-2)	Endosulfans	2.86E0	4.55E-1
Composite 4 (DS-1,-2)	Arsenic	1.26E1	1.84E0
Composite 4 (DS-1,-2)	Cadmium	3.03E0	2.54E-2
Composite 4 (DS-1,-2)	Chromium	1.18E1	4.64E-1
Composite 4 (DS-1,-2)	Copper	9.6E0	2.19E0
Composite 4 (DS-1,-2)	Lead	1.19E1	3.98E-1
Composite 4 (DS-1,-2)	Mercury	2E-1	2.3E-3
Composite 4 (DS-1,-2)	Nickel	3.8E0	3.32E-1
Composite 4 (DS-1,-2)	Zinc	1.52E3	9.09E0
Composite 4 (DS-1,-2)	Total DDT	3E3	2.3E0
Composite 5 (TB-1,-2)	Anthracene	3.75E3	2.29E0
Composite 5 (TB-1,-2)	PAH Total	1E4	1.07E2
Composite 5 (TB-1,-2)	Total PCBs	4E3	2.17E1
Composite 5 (TB-1,-2)	Aldrin	2.99E2	2.29E-1
Composite 5 (TB-1,-2)	Dieldrin	4.37E0	3.09E-1
Composite 5 (TB-1,-2)	Endosulfans	2.86E0	4.58E-1
Composite 5 (TB-1,-2)	Arsenic	1.26E1	1.85E0
Composite 5 (TB-1,-2)	Cadmium	3.03E0	2.62E-2
Composite 5 (TB-1,-2)	Chromium	1.18E1	3.23E-1
Composite 5 (TB-1,-2)	Copper	9.6E0	1.53E0
Composite 5 (TB-1,-2)	Lead	1.19E1	3.12E-1
Composite 5 (TB-1,-2)	Mercury	2E-1	2E-3
Composite 5 (TB-1,-2)	Nickel	3.8E0	3.15E-1
Composite 5 (TB-1,-2)	Zinc	1.52E3	8.83E0
Composite 5 (TB-1,-2)	Total DDT	3E3	1.44E0
Composite 6 (CAD-1,-2,	Anthracene	3.75E3	4.41E0
Composite 6 (CAD-1,-2,	PAH Total	1E4	3.45E2
Composite 6 (CAD-1,-2,	Total PCBs	4E3	2.11E1
Composite 6 (CAD-1,-2,	Aldrin	2.99E2	2.35E-1
Composite 6 (CAD-1,-2,	Dieldrin	4.37E0	3.17E-1
Composite 6 (CAD-1,-2,	Endosulfans	2.86E0	4.7E-1
Composite 6 (CAD-1,-2,	Arsenic	1.26E1	1.71E0
Composite 6 (CAD-1,-2,	Cadmium	3.03E0	2.8E-2
Composite 6 (CAD-1,-2,	Chromium	1.18E1	4.88E-1
Composite 6 (CAD-1,-2,	Copper	9.6E0	2.17E0
Composite 6 (CAD-1,-2,	Lead	1.19E1	6.07E-1

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 6 (CAD-1,-2,	Mercury	2E-1	7.4E-3
Composite 6 (CAD-1,-2,	Nickel	3.8E0	3.52E-1
Composite 6 (CAD-1,-2,	Zinc	1.52E3	9.65E0
Composite 6 (CAD-1,-2,	Total DDT	3E3	1.19E0

Ecological Effects Level (see EPA Table 8a.1, Columns D & E)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 2 (R',S')	Anthracene	3.75E3	1.85E0
Composite 2 (R',S')	PAH Total	1E4	3.18E1
Composite 2 (R',S')	Total PCBs	4E3	5.85E1
Composite 2 (R',S')	Aldrin	2.99E2	1.85E-1
Composite 2 (R',S')	Dieldrin	4.37E0	2.5E-1
Composite 2 (R',S')	Endosulfans	2.86E0	3.7E-1
Composite 2 (R',S')	Arsenic	1.26E1	1.04E0
Composite 2 (R',S')	Cadmium	3.03E0	2.34E-2
Composite 2 (R',S')	Chromium	1.18E1	5.3E-2
Composite 2 (R',S')	Copper	9.6E0	7.61E-1
Composite 2 (R',S')	Lead	1.19E1	1.47E-1
Composite 2 (R',S')	Mercury	2E-1	1.3E-3
Composite 2 (R',S')	Nickel	3.8E0	8.74E-2
Composite 2 (R',S')	Zinc	1.52E3	9.12E0
Composite 2 (R',S')	Total DDT	3E3	1.25E0
Composite 3 (US-1,-2)	Anthracene	3.75E3	2.34E0
Composite 3 (US-1,-2)	PAH Total	1E4	4.43E1
Composite 3 (US-1,-2)	Total PCBs	4E3	6.23E1
Composite 3 (US-1,-2)	Aldrin	2.99E2	2.34E-1
Composite 3 (US-1,-2)	Dieldrin	4.37E0	3.16E-1
Composite 3 (US-1,-2)	Endosulfans	2.86E0	4.68E-1
Composite 3 (US-1,-2)	Arsenic	1.26E1	1.49E0
Composite 3 (US-1,-2)	Cadmium	3.03E0	2.94E-2
Composite 3 (US-1,-2)	Chromium	1.18E1	7.14E-2
Composite 3 (US-1,-2)	Copper	9.6E0	1.07E0
Composite 3 (US-1,-2)	Lead	1.19E1	1.92E-1
Composite 3 (US-1,-2)	Mercury	2E-1	4.84E-3
Composite 3 (US-1,-2)	Nickel	3.8E0	1.12E-1
Composite 3 (US-1,-2)	Zinc	1.52E3	6.65E0
Composite 3 (US-1,-2)	Total DDT	3E3	1.26E0
Composite 4 (DS-1,-2)	Anthracene	3.75E3	2.25E0
Composite 4 (DS-1,-2)	PAH Total	1E4	4.35E1
Composite 4 (DS-1,-2)	Total PCBs	4E3	8.2E1
Composite 4 (DS-1,-2)	Aldrin	2.99E2	2.84E-1

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 4 (DS-1,-2)	Dieldrin	4.37E0	8.89E-1
Composite 4 (DS-1,-2)	Endosulfans	2.86E0	9.44E-1
Composite 4 (DS-1,-2)	Arsenic	1.26E1	1.45E0
Composite 4 (DS-1,-2)	Cadmium	3.03E0	2.82E-2
Composite 4 (DS-1,-2)	Chromium	1.18E1	6.34E-2
Composite 4 (DS-1,-2)	Copper	9.6E0	1.14E0
Composite 4 (DS-1,-2)	Lead	1.19E1	1.69E-1
Composite 4 (DS-1,-2)	Mercury	2E-1	4.73E-3
Composite 4 (DS-1,-2)	Nickel	3.8E0	1.32E-1
Composite 4 (DS-1,-2)	Zinc	1.52E3	1.07E1
Composite 4 (DS-1,-2)	Total DDT	3E3	1.76E0
Composite 5 (TB-1,-2)	Anthracene	3.75E3	2.38E0
Composite 5 (TB-1,-2)	PAH Total	1E4	3.81E1
Composite 5 (TB-1,-2)	Total PCBs	4E3	5.16E1
Composite 5 (TB-1,-2)	Aldrin	2.99E2	2.38E-1
Composite 5 (TB-1,-2)	Dieldrin	4.37E0	3.22E-1
Composite 5 (TB-1,-2)	Endosulfans	2.86E0	4.76E-1
Composite 5 (TB-1,-2)	Arsenic	1.26E1	1.44E0
Composite 5 (TB-1,-2)	Cadmium	3.03E0	2.18E-2
Composite 5 (TB-1,-2)	Chromium	1.18E1	7.74E-2
Composite 5 (TB-1,-2)	Copper	9.6E0	1.12E0
Composite 5 (TB-1,-2)	Lead	1.19E1	1.33E-1
Composite 5 (TB-1,-2)	Mercury	2E-1	7.2E-3
Composite 5 (TB-1,-2)	Nickel	3.8E0	1.17E-1
Composite 5 (TB-1,-2)	Zinc	1.52E3	1.36E1
Composite 5 (TB-1,-2)	Total DDT	3E3	1.21E0
Composite 6 (CAD-1,-2,	Anthracene	3.75E3	2.33E0
Composite 6 (CAD-1,-2,	PAH Total	1E4	4.7E1
Composite 6 (CAD-1,-2,	Total PCBs	4E3	3.99E1
Composite 6 (CAD-1,-2,	Aldrin	2.99E2	2.33E-1
Composite 6 (CAD-1,-2,	Dieldrin	4.37E0	3.14E-1
Composite 6 (CAD-1,-2,	Endosulfans	2.86E0	4.66E-1
Composite 6 (CAD-1,-2,	Arsenic	1.26E1	1.54E0
Composite 6 (CAD-1,-2,	Cadmium	3.03E0	2.44E-2
Composite 6 (CAD-1,-2,	Chromium	1.18E1	7.94E-2
Composite 6 (CAD-1,-2,	Copper	9.6E0	1.39E0
Composite 6 (CAD-1,-2,	Lead	1.19E1	1.48E-1

	Contaminant	Ecological Effect Level (mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 6 (CAD-1,-2,	Mercury	2E-1	9E-3
Composite 6 (CAD-1,-2,	Nickel	3.8E0	1.52E-1
Composite 6 (CAD-1,-2,	Zinc	1.52E3	1.41E1
Composite 6 (CAD-1,-2,	Total DDT	3E3	1.18E0

FDA Level of Concern (see EPA Table 7a, Columns B & D)

Receptor: Adult Angler

Organism: Macoma nasuta

	Contaminant	FDA Level of Concern(mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 2 (R',S')	Arsenic	8.6E1	1.49E0
Composite 2 (R',S')	Cadmium	3.7E0	2.48E-2
Composite 2 (R',S')	Chromium	1.3E1	3.81E-1
Composite 2 (R',S')	Lead	1.7E0	3.64E-1
Composite 2 (R',S')	Nickel	8E1	2.79E-1
Composite 3 (US-1,-2)	Arsenic	8.6E1	2.31E0
Composite 3 (US-1,-2)	Cadmium	3.7E0	2.72E-2
Composite 3 (US-1,-2)	Chromium	1.3E1	3.84E-1
Composite 3 (US-1,-2)	Lead	1.7E0	3.98E-1
Composite 3 (US-1,-2)	Nickel	8E1	3.56E-1
Composite 4 (DS-1,-2)	Arsenic	8.6E1	1.84E0
Composite 4 (DS-1,-2)	Cadmium	3.7E0	2.54E-2
Composite 4 (DS-1,-2)	Chromium	1.3E1	4.64E-1
Composite 4 (DS-1,-2)	Lead	1.7E0	3.98E-1
Composite 4 (DS-1,-2)	Nickel	8E1	3.32E-1
Composite 5 (TB-1,-2)	Arsenic	8.6E1	1.85E0
Composite 5 (TB-1,-2)	Cadmium	3.7E0	2.62E-2
Composite 5 (TB-1,-2)	Chromium	1.3E1	3.23E-1
Composite 5 (TB-1,-2)	Lead	1.7E0	3.12E-1
Composite 5 (TB-1,-2)	Nickel	8E1	3.15E-1
Composite 6 (CAD-1,-2,	Arsenic	8.6E1	1.71E0
Composite 6 (CAD-1,-2,	Cadmium	3.7E0	2.8E-2
Composite 6 (CAD-1,-2,	Chromium	1.3E1	4.88E-1
Composite 6 (CAD-1,-2,	Lead	1.7E0	6.07E-1
Composite 6 (CAD-1,-2,	Nickel	8E1	3.52E-1

FDA Level of Concern (see EPA Table 7a, Columns B & D)

Receptor: Adult Angler

Organism: Nereis virens

	Contaminant	FDA Level of Concern(mg/kg)	Steady State Corrected Mean Tissue Concentration (mg/kg)
Composite 2 (R',S')	Arsenic	8.6E1	1.04E0
Composite 2 (R',S')	Cadmium	3.7E0	2.34E-2
Composite 2 (R',S')	Chromium	1.3E1	5.3E-2
Composite 2 (R',S')	Lead	1.7E0	1.47E-1
Composite 2 (R',S')	Nickel	8E1	8.74E-2
Composite 3 (US-1,-2)	Arsenic	8.6E1	1.49E0
Composite 3 (US-1,-2)	Cadmium	3.7E0	2.94E-2
Composite 3 (US-1,-2)	Chromium	1.3E1	7.14E-2
Composite 3 (US-1,-2)	Lead	1.7E0	1.92E-1
Composite 3 (US-1,-2)	Nickel	8E1	1.12E-1
Composite 4 (DS-1,-2)	Arsenic	8.6E1	1.45E0
Composite 4 (DS-1,-2)	Cadmium	3.7E0	2.82E-2
Composite 4 (DS-1,-2)	Chromium	1.3E1	6.34E-2
Composite 4 (DS-1,-2)	Lead	1.7E0	1.69E-1
Composite 4 (DS-1,-2)	Nickel	8E1	1.32E-1
Composite 5 (TB-1,-2)	Arsenic	8.6E1	1.44E0
Composite 5 (TB-1,-2)	Cadmium	3.7E0	2.18E-2
Composite 5 (TB-1,-2)	Chromium	1.3E1	7.74E-2
Composite 5 (TB-1,-2)	Lead	1.7E0	1.33E-1
Composite 5 (TB-1,-2)	Nickel	8E1	1.17E-1
Composite 6 (CAD-1,-2,	Arsenic	8.6E1	1.54E0
Composite 6 (CAD-1,-2,	Cadmium	3.7E0	2.44E-2
Composite 6 (CAD-1,-2,	Chromium	1.3E1	7.94E-2
Composite 6 (CAD-1,-2,	Lead	1.7E0	1.48E-1
Composite 6 (CAD-1,-2,	Nickel	8E1	1.52E-1

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NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX K
SHIP SIMULATION REPORT

New Haven Harbor Feasibility Level Simulations Study Report

1. INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL) has completed a Feasibility Level Screening Simulation Program (FLSSP) to assist the USACE New England District (CENAE) and the New Haven Port Authority (NHPA) in evaluating proposed bend widening, channel widening, and turning basin dimensions in New Haven Harbor, Connecticut. The study was performed at CHL's ship/tow simulator on 13-16 February 2018.

2. OVERVIEW

New Haven Harbor (NHH) is a Federal Navigation Project on the northern side of Long Island Sound (LIS) (Figure 1). It is the largest deep draft port in Connecticut and the highest volume port on LIS. The NHH has 6 terminals and 12 berths with over 6,000 feet of quay length. Deep draft vessel traffic includes tankers and bulker carriers. The authorized depth for the channel and the existing turning basin is -35 feet at mean lower low water (MLLW). The project includes three offshore stone breakwaters at the entrance to the harbor. The entrance channel is 500 feet wide and the channel in the interior of New Haven Harbor is 400-feet-wide widening to 800 feet along the terminal to provide a maneuvering area. The draft plan prior to the FLSSP ship simulations was channel width of 600 feet in the entrance channel in LIS, and 700 feet at the breakwater bend tapering down to the 500 foot width in the inner harbor and includes the widening to 800 feet along the terminals (Figures 1 and 2). The proposed bend widening prior to ship simulations is illustrated in Figure 3. The proposed depths are between 37 feet and 42 feet MLLW.

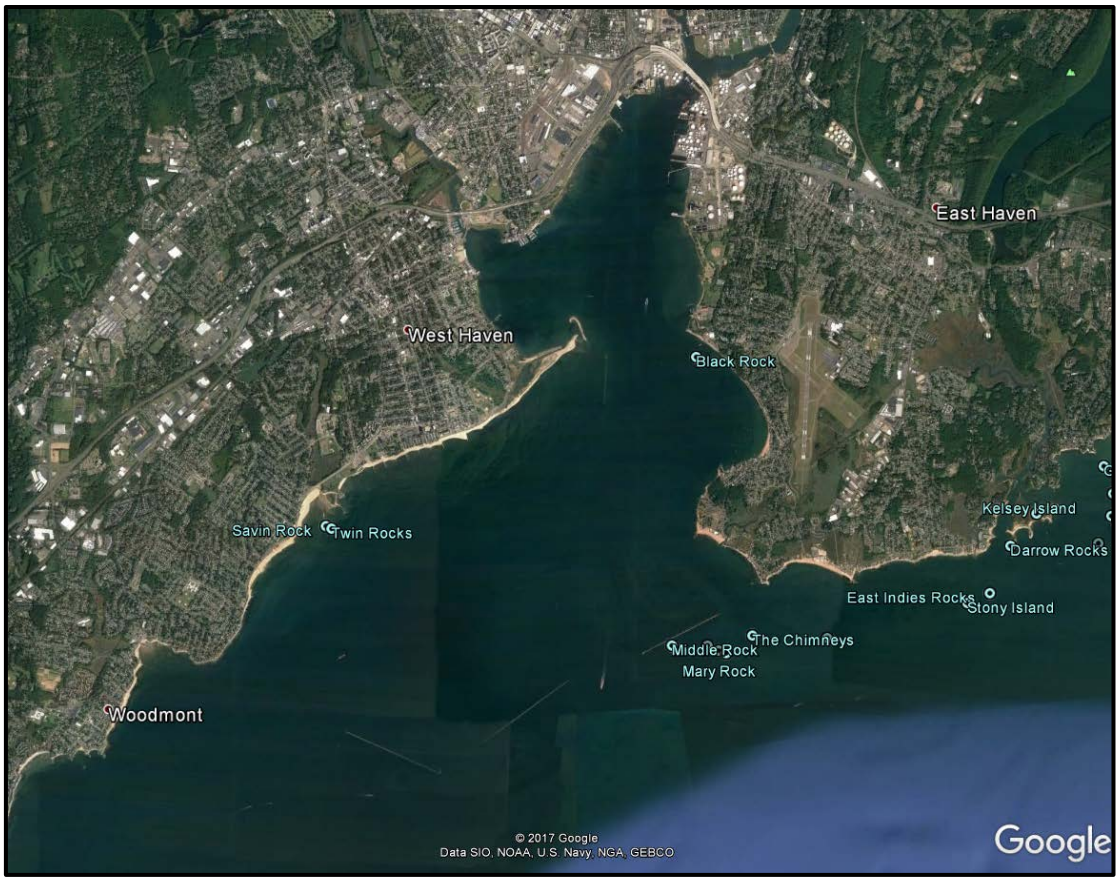


Figure 1. Location Map

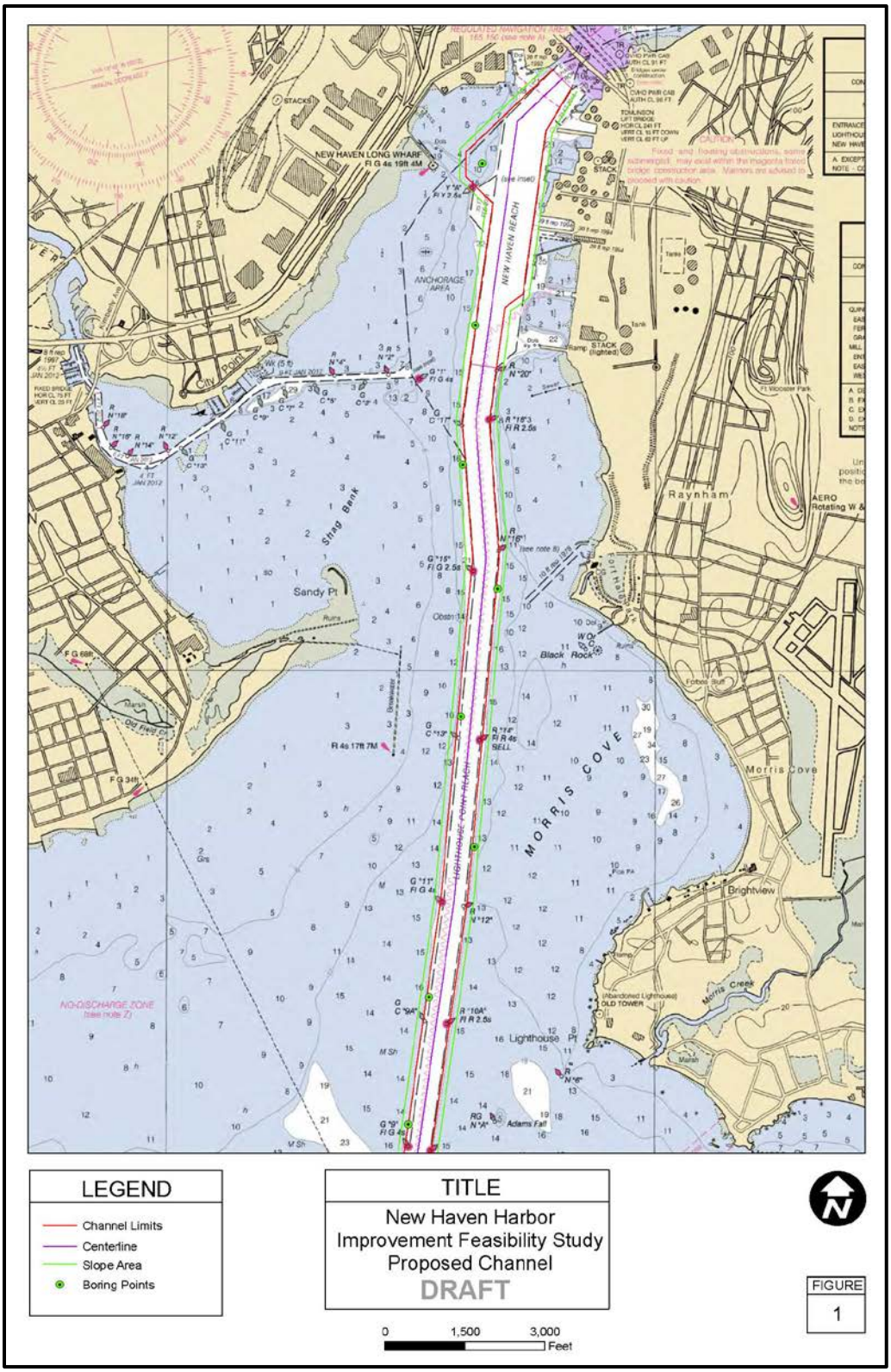


Figure 2. Draft Plan Prior to FLSSP Ship Simulations, Harbor Channel and Turning Basin

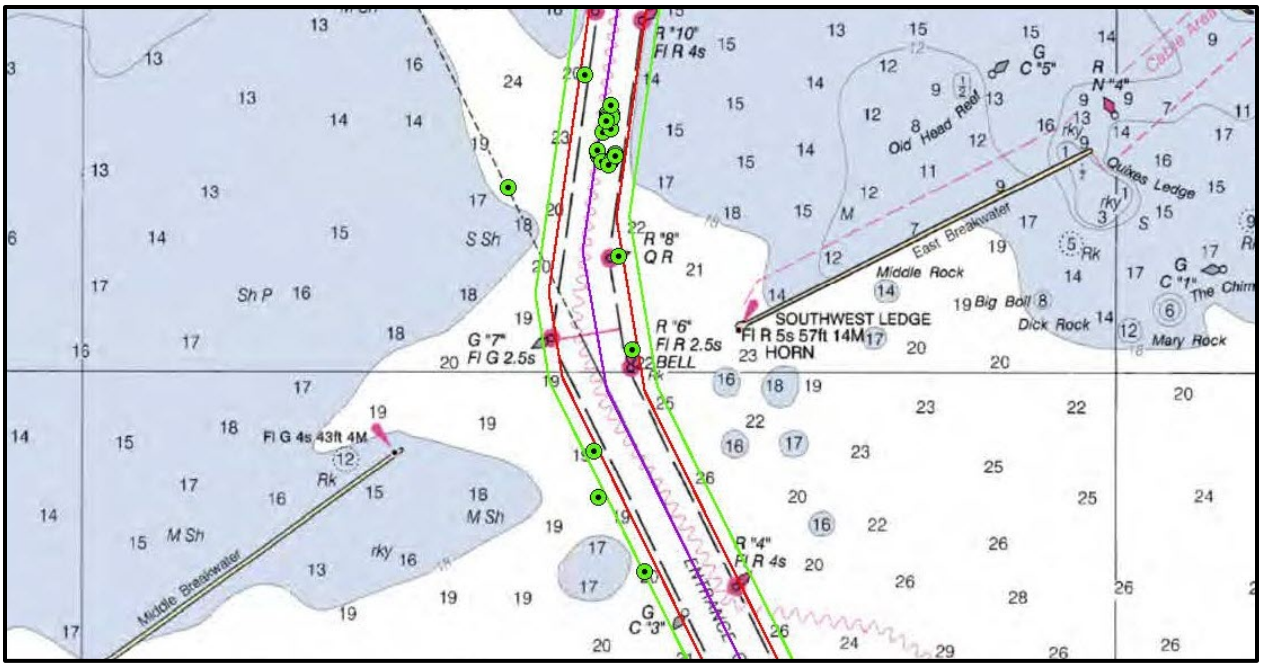


Figure 3. Draft Plan prior to FLSSP Ship Simulations, Entrance Channel and Bend

3. PURPOSE

The FLSSP provides a means of conducting expert elicitations. The use of real-time simulation provides an iterative framework within which to examine ideas and possible solutions within the confines of a laboratory experiment. At the conclusion of each simulation results from the simulation can be discussed, modifications made, and then rerun. The FLSSP is conducted in order to provide essential information for the study process and to stay within the time and cost constraints of USACE's SMART Planning. To reduce time and cost, lower resolution databases are used for ship simulation and data processing is minimized. Lower resolution databases require less costly database development and also allow database modification to be done quickly during the simulation week. A low resolution database can be modified (widened, re-aligned, tapered, etc.) within a few hours. This is critical so that ideas suggested by the pilots or others can actually be tested with the same pilots. Conclusions drawn from actual data should be limited and done very carefully due to the low resolution modeling and the assumptions used during modeling. In addition, once the meetings had occurred the pilots often performed "what if" tests to check bank effects or other forces. Data processing is limited to a presentation of track plots and run sheets, enclosed as Appendix A, to document what was done. The most important analysis is the group discussion at the conclusion of the FLSSP.

4. PARTICIPANTS

The FLSSP included representatives from ERDC, the Connecticut Pilots (CP), and CENAE. The individuals listed participated for the duration of the simulation testing unless otherwise noted.

ERDC: Keith Martin, Mary Claire Allison, Morgan Johnston, and Kiara Pazan

Pilots: Captain Charlie Jonas and Captain Donald J. Toby

CENAE: Barbara Blumeris and Lisa Winter

5. CONSIDERATIONS

For reasons previously stated, model development was done in fairly low resolution. Below are the parameters and assumptions used during testing

a. Currents for max ebb and flood were obtained from an ADCIRC model that had been run only for existing.

b.The visual scenes consisted of the background terrain and a few selected building/facility features.

c. Wind conditions were set at run time at 8 knots out of the Northwest.

d. Simulated ships were limited to ships already in ERDC's ship database. The ships used are shown in Table 1. Pilot cards are included in Appendix B. The container version of the M/S Magnitogorsk, CNTNR03L, was used to simulate the size of the medium range tankers and handy size bulk carriers calling on NHH. The bulker version of the M/S Magnitogorsk, BULKC06L, drafting 37.8 feet and M/T Danita, TANK10L, were used as the design ships for the FLSSP.

Table 1. Simulated Ships Used During Simulations

Model	Name	LOA (Feet)	BEAM (Feet)	DRAFT (Feet)
BULKC06L	M/S Magnitogorsk	705.4	104.3	37.8
TANK10L	M/T Danita	750.0	105.8	45.9
CNTNR03L	M/S Magnitogorsk	664.0	101.7	28.3

6. SIMULATED SCENARIOS

The draft plan channel widths, bend widener, and turning basin dimensions were developed by CENAE personnel in coordination with the Connecticut Pilots. The draft plan channel width is 600 feet in the entrance channel in LIS, and 700 feet at the breakwater tapering down to the 500 foot width in the harbor (Figures 2 and 3). The draft plan bend widening is illustrated in Figure 3. The channels would be widened equally to either side of the center line of the channels. The proposed depths tested ranged between 37 feet and 42 feet MLLW.

7. RESULTS

a. Tuesday morning was primarily devoted to pilot familiarization and model adjustment. Data was recorded during these exercises but it is of little value in channel width evaluation because the purpose of the runs was to evaluate the simulator databases and not the actual channel configurations. As such that is not included with this report. Four recorded testing runs were performed at the end of the day.

b. The visual and environmental (wind and currents) databases were deemed adequate for feasibility level testing. The currents were set by hand in the simulator software in the upper portion of the harbor as the ADCIRC model resolution did not have sufficient current resolution and the existing currents align with channel and are less than 0.5 knots in magnitude.

c. Tug operations were carried out by ERDC personnel at the simulator operational stations. The operator received tug commands from the pilots via radio as they would in real life.

d. Track plots and run sheets for the FLSSP are included as an attachment to this memorandum. All exercises were one-way transits either inbound or outbound. All turning basin runs sailed outbound from the docks. Figure 4 is a photograph taken from the bridge of the design ship entering the harbor.

e. On the run sheets, note that the “Time” blank is not always filled. This blank is merely used as bookkeeping tool for simulator personnel post-processing the data.

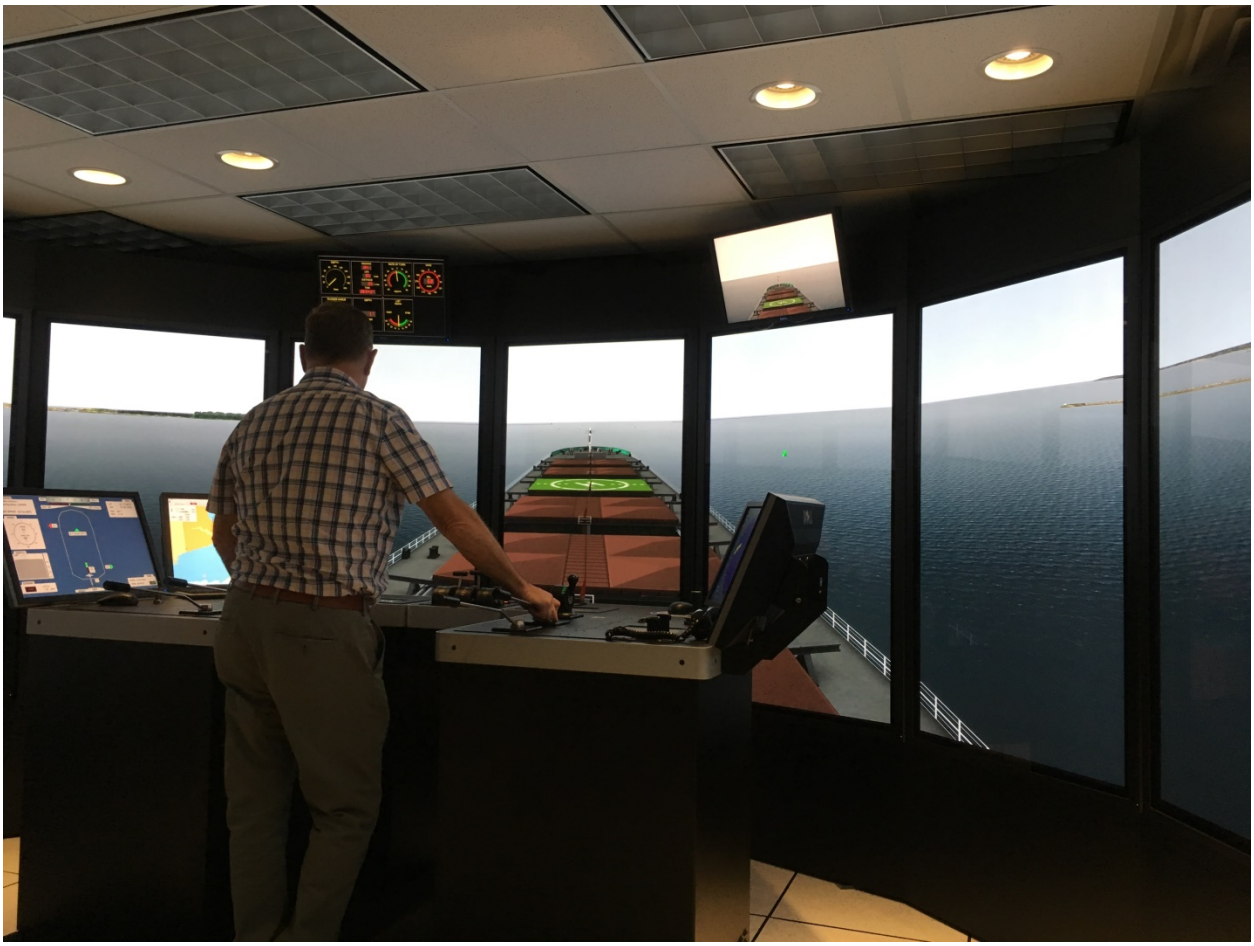


Figure 4. View from Bridge A. Inbound ship entering the harbor

8. DISCUSSION

The final FLSSP discussion was held on the Thursday afternoon, 15 February 2018, after completion of the exercises that morning. Everyone listed in paragraph 4 above attended this discussion.

The simulation program was a screening tool used to determine the channel width of the Tentatively Selected Plan (TSP). Thursday afternoon's discussion represent the conclusions of the FLSSP.

9. TURNING BASIN DISCUSSION

In the initial plan the turning basin in the upper section of the harbor had a proposed new location north of the existing turning basin (see Figure 1 above). After some preliminary simulation runs and discussions with the pilots, it was determined that with a small enlargement the present-day existing turning basin location better suited the ship maneuvering than relocating the turning basin as originally proposed. The enlargement of the existing turning basin would involve moving the northern angled line as shown by points 1 and 2 in Figure 5.

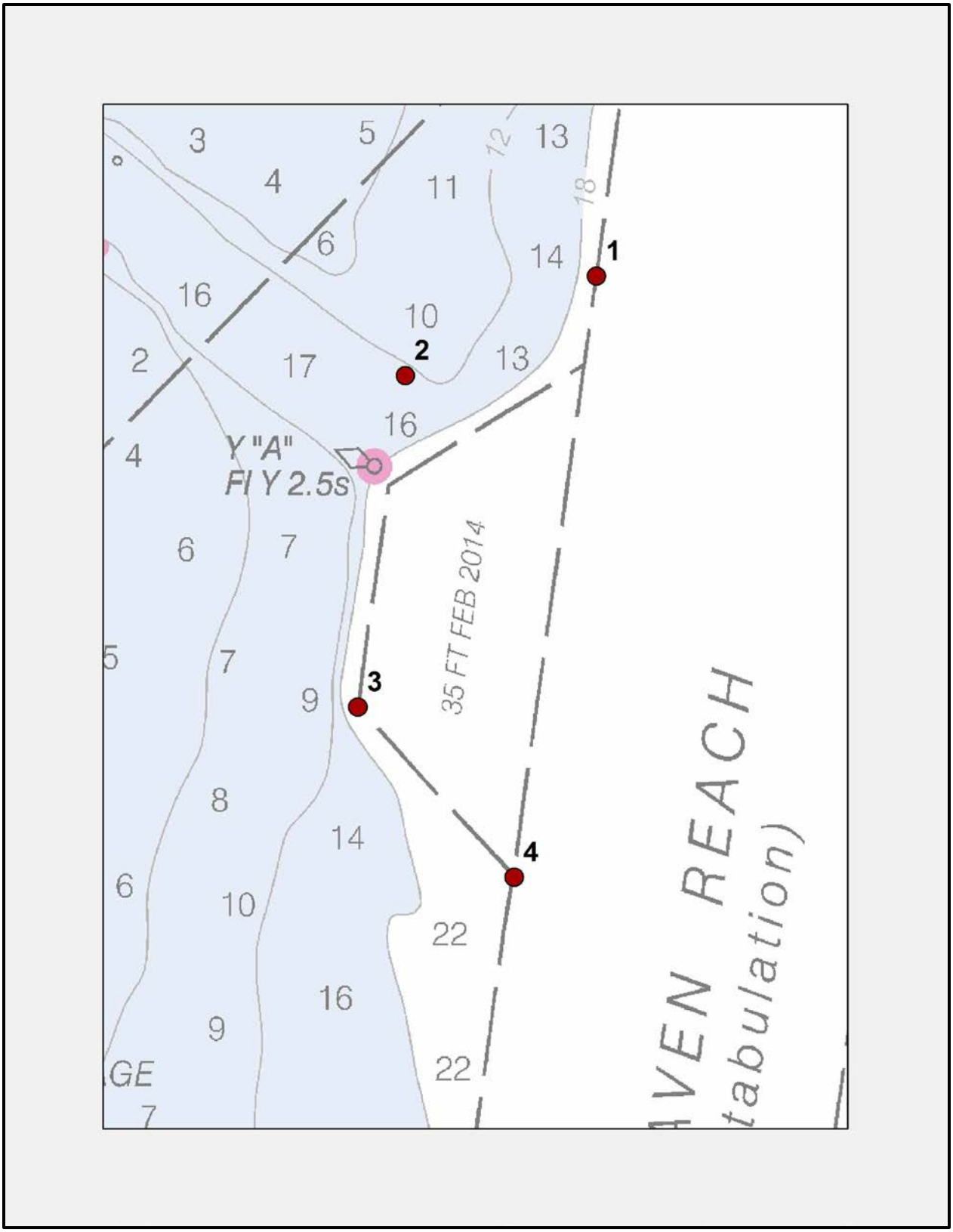


Figure 5. Proposed enlargement of the turning basin

10. CHANNEL DISCUSSION

The following conditions were agreed upon, discussed, and are recommended for the feasibility level design.

a. The proposed 600 foot channel width in the entrance channel was deemed feasible as a result of the simulations performed for the bend widening alternative which started or ended in the entrance channel.

b. The bend widening alternative was performed for the 37, 38, 40, and 42 foot depths. While the widened condition did allow the pilots to make the turn at the breakwater entrance, the pilots had to place the rudder in the “hard over” position leaving no additional room on the rudder control to respond to any unexpected change in environmental conditions (wind, waves, etc.).

c. As a result of the bend widener runs, buoys 6 and 8 were moved 100 feet directly east of the initially proposed position. The result was a bend width of 780 feet instead of the proposed 700-foot width. When tested these new positions allowed the pilots to hold a maximum of 20° rudder throughout the transit through the breakwaters leaving room on the rudder to respond to unexpected events. In Appendix A, runs with the 780 foot bend are referred to as the modified widener.

d. An additional two runs were performed on Friday, 16 February 2018 to test moving the 6 and 8 buoys 50 feet east from the originally proposed positions. This buoy alignment required more than 20° of rudder to complete the maneuver. While still feasible, these buoy locations allowed significantly less room on the rudder than the scenario where the buoys were moved 100 feet.

e. The harbor channel proposed width of 500 feet was deemed feasible as result of simulation testing. A 450 foot width was tested between buoy pairs 9/10 alpha and 13/14. The two runs tested showed the pilots were able to recover after the bend widener with the narrower channel but more testing in the design phase would need to be performed to determine the safety of this width.

f. , Pilots Jonas and Toby were comfortable with the design using the buoy movement described above in item c, the 600 foot entrance channel width, and the 500 foot harbor channel width. More testing in design would be required to determine if the narrower harbor channel described in item e is safe for navigation. The pilots were not comfortable with only a 50 foot eastward movement of the location of the 6 and 8 buoys.

g. The Turning Basin location indicated as the most practicable by the FLSSP is the (Existing Basin location or the Head of Harbor location) with the modification shown in Figure 5.

No data analysis was included as part of the FLSSP as the purpose was to examine the feasibility of various aspects of the New Haven Harbor proposed design in the CHL simulator and to use the pilot feedback as input for developing a range for feasible

widening. A more rigorous testing of the design will be conducted during the PED. The visual databases will be updated to include more detail.

11. FEASIBILITY PHASE RECOMMENDATIONS

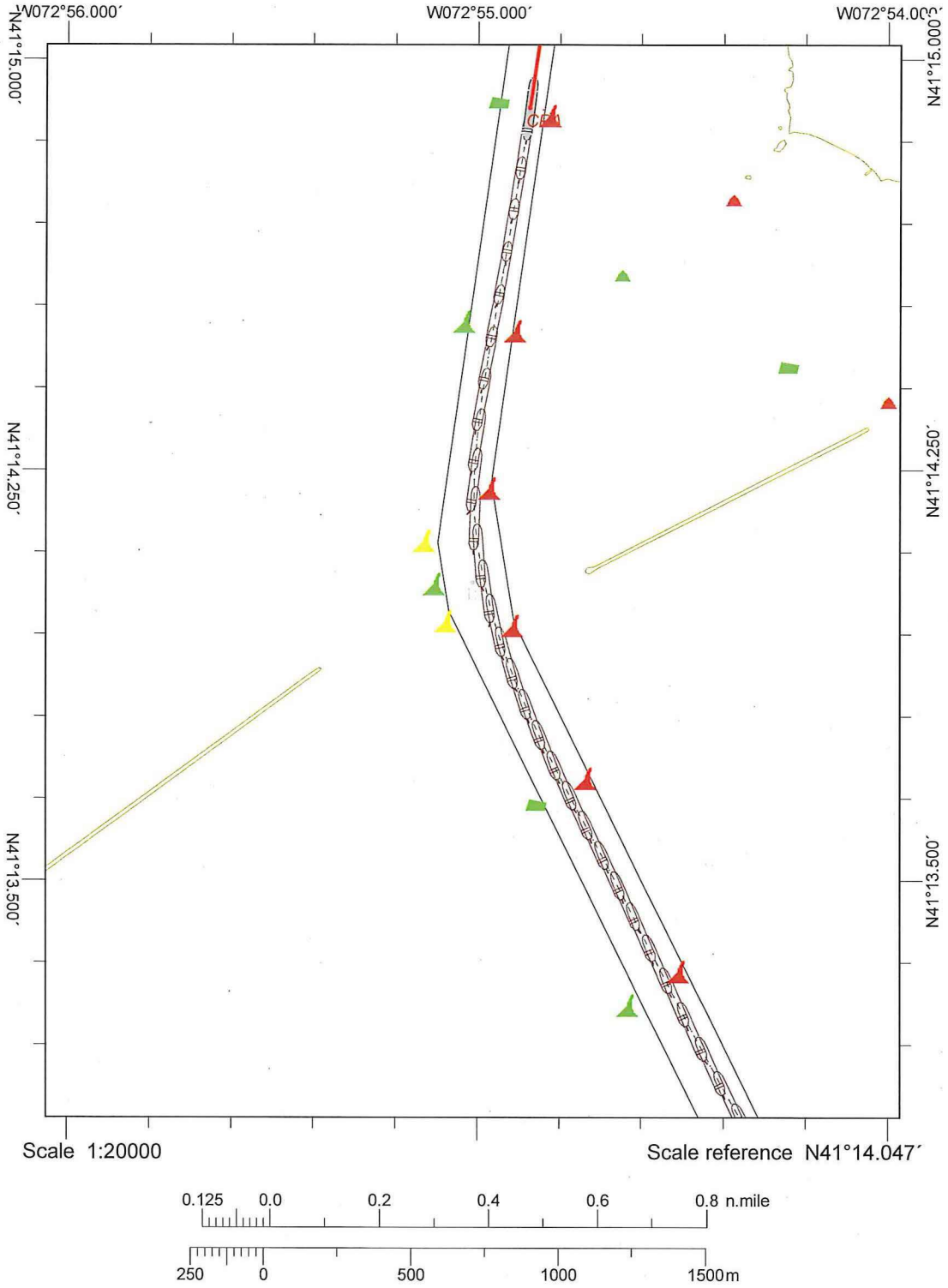
For the feasibility phase, USACE NAE and the NHPA should consider using the following project dimensions. These dimensions could be refined further in the PED phase ship simulations.

a. Entrance Channel Width – 600 Feet

b. Channel Width through the Breakwater Bend – 780 Feet

c. Channel Width through the Inner Harbor – 500 Feet

d. Turning Basin Location – Existing Basin with modification (see Figure 5)



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – 700 ft width*

Date: 02/13/18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5 m

Wind Condition: 1 ~~NW8K~~ NW8K 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

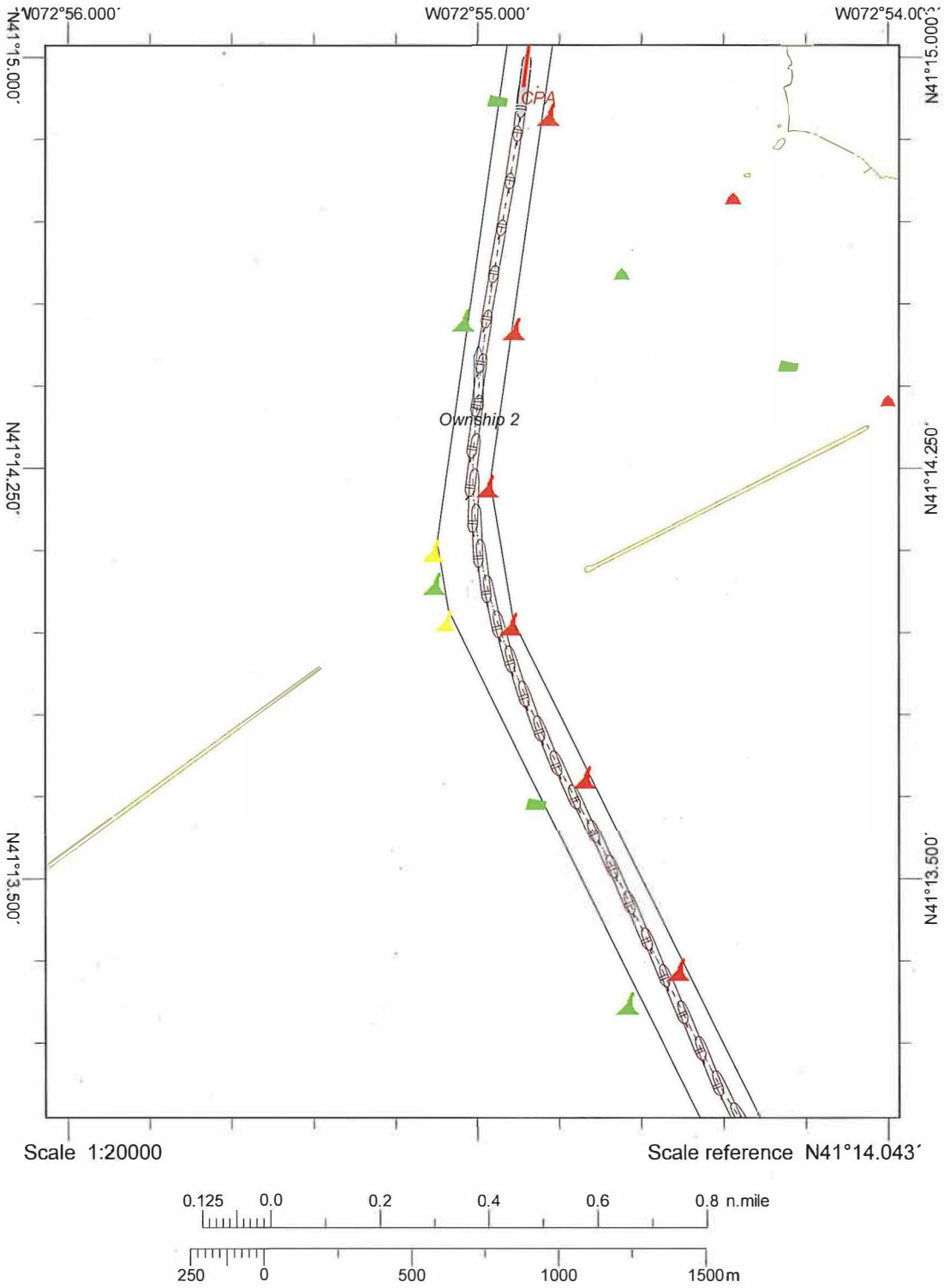
Filename: B-P2-F-NW8_I-1-1

Start Time: 15:03

End Time: 15:18

Comments:

DIDN'T EXPERIENCE ANY SUCTION IN VICINITY OF TURN (#3 BUOY) BECAUSE THE CHANNEL WAS WIDER — LESS EFFORT TO KEEP SHIP NEAR MIDDLE OF CHANNEL



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – 700 ft width*

Date: 13 Feb 2018

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5m

Wind Condition: 1 **NW8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

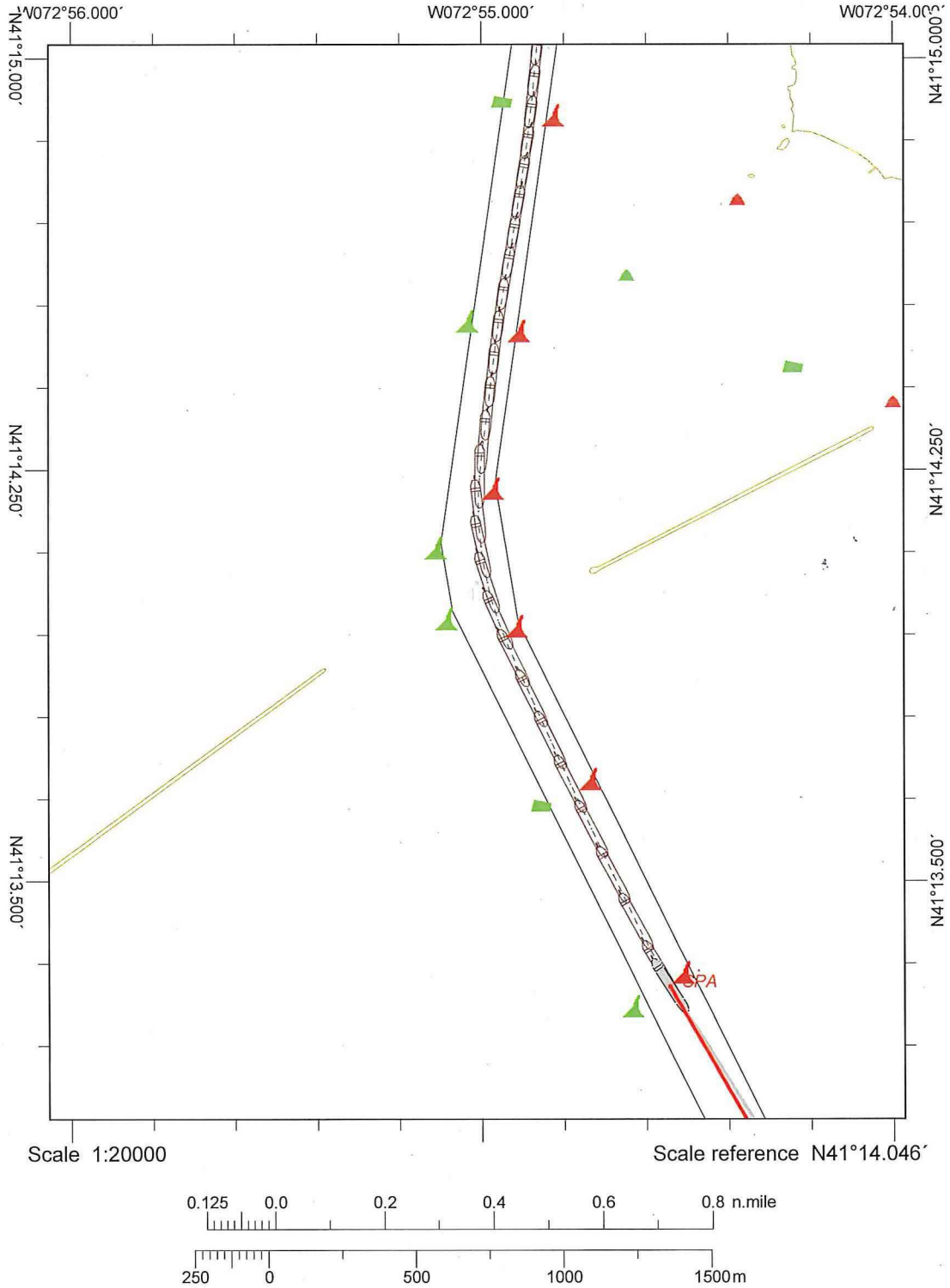
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P2-F-NW8-I-2-1

Start Time:

End Time:

Comments:
wider channel helped 100% with no suction during the turn after the #7 Buoy.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – 700 ft width*

Date: 02/13/18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 **N 8K** (W) 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

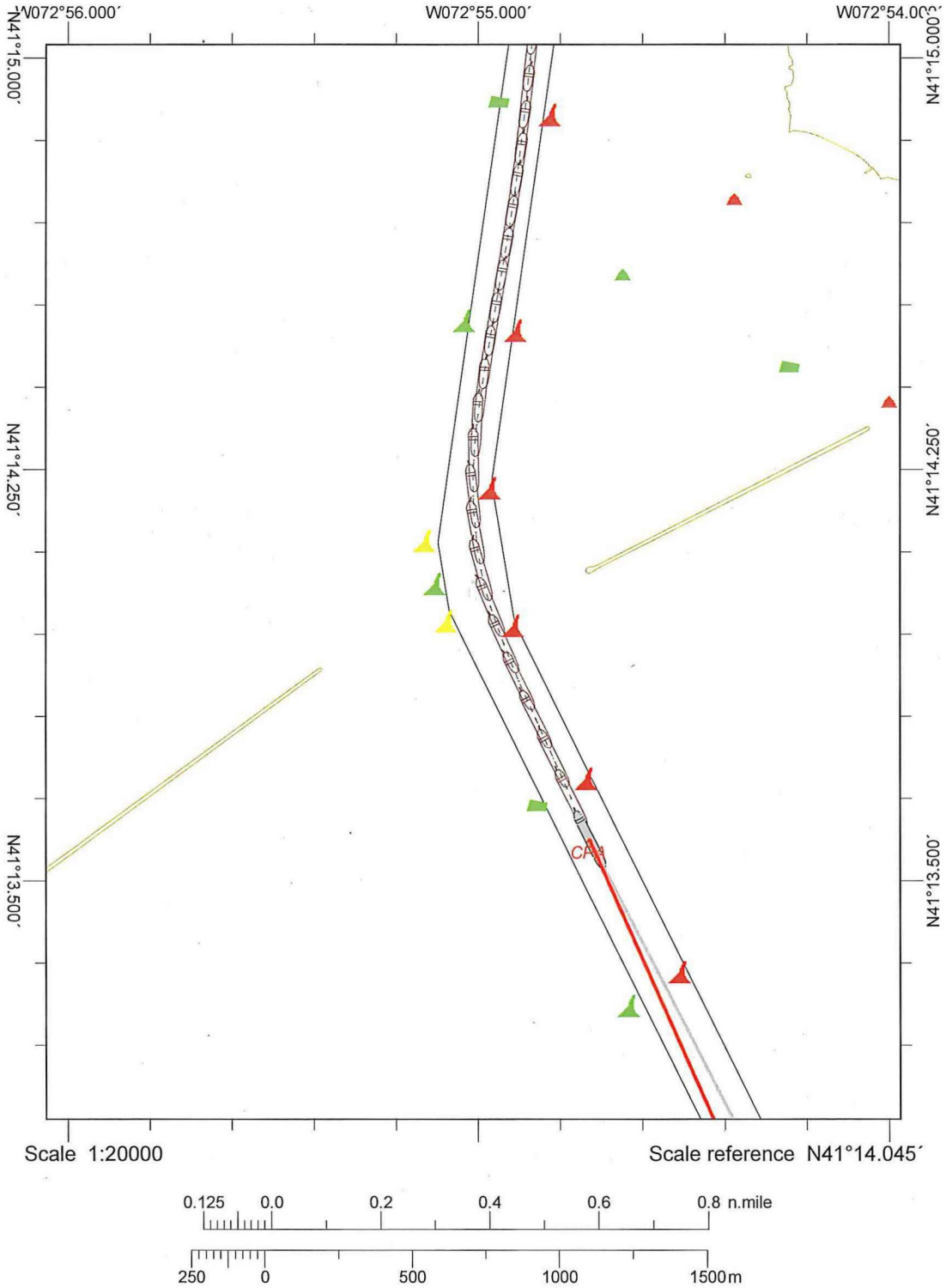
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P2-F-NW8-O-1-1

Start Time: 1524

End Time: 1609

Comments: ADDITIONAL WIDTH MADE TOO TURN @ #7 BUOY (VETTIES) A LOT EASIER



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – 700 ft width*

Date: 13 Feb 2018

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:**

Wind Condition: 1 **NW 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

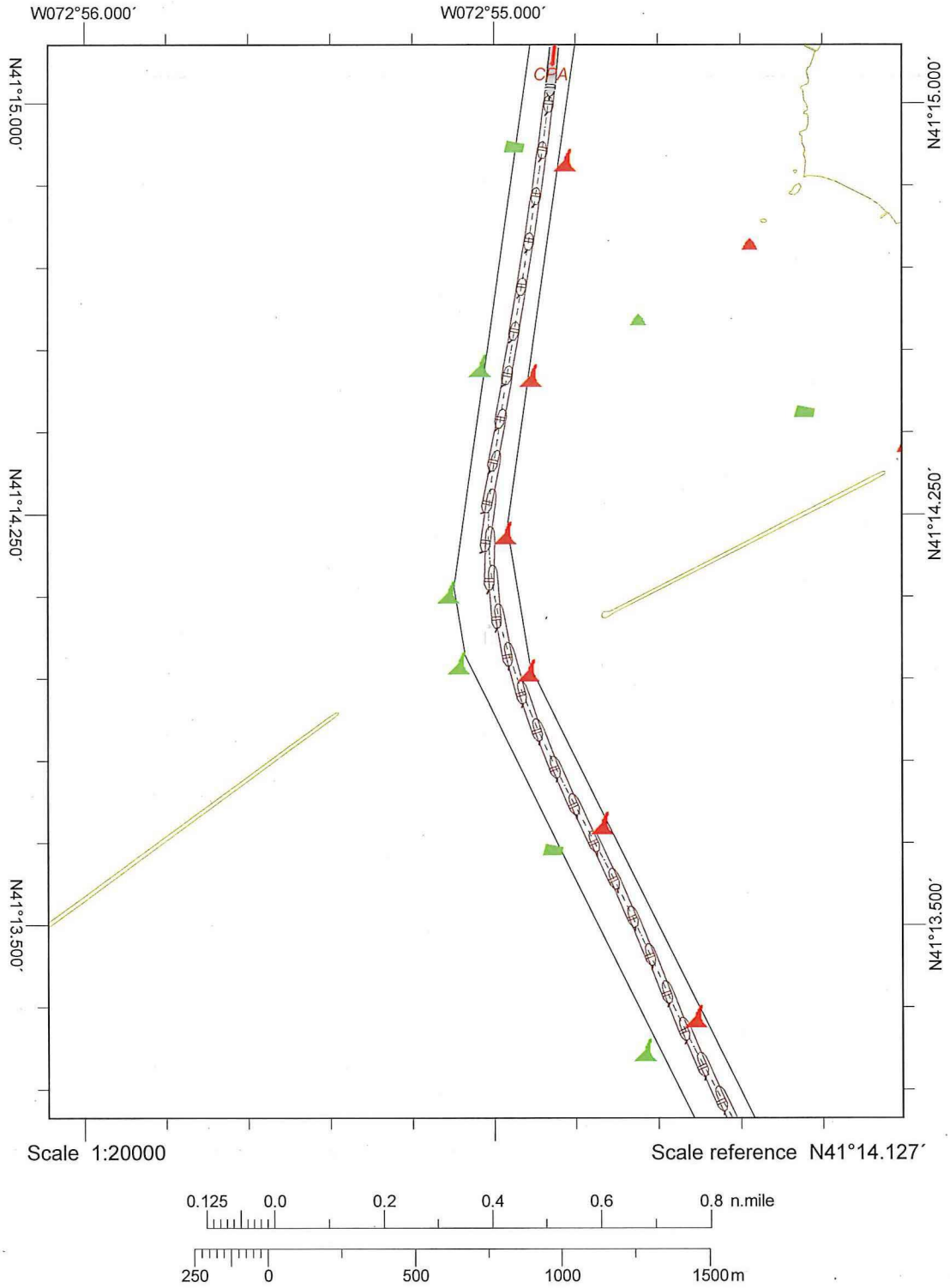
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P2-F-NW8-O-2-1

Start Time:

End Time:

Comments:



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – 700 ft width*

Date: 2/14/18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide **F**lood ~~**E**bb~~ **Added Tide:** 1.5m

Wind Condition: ~~1 N 8K~~ NW8 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot 1) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

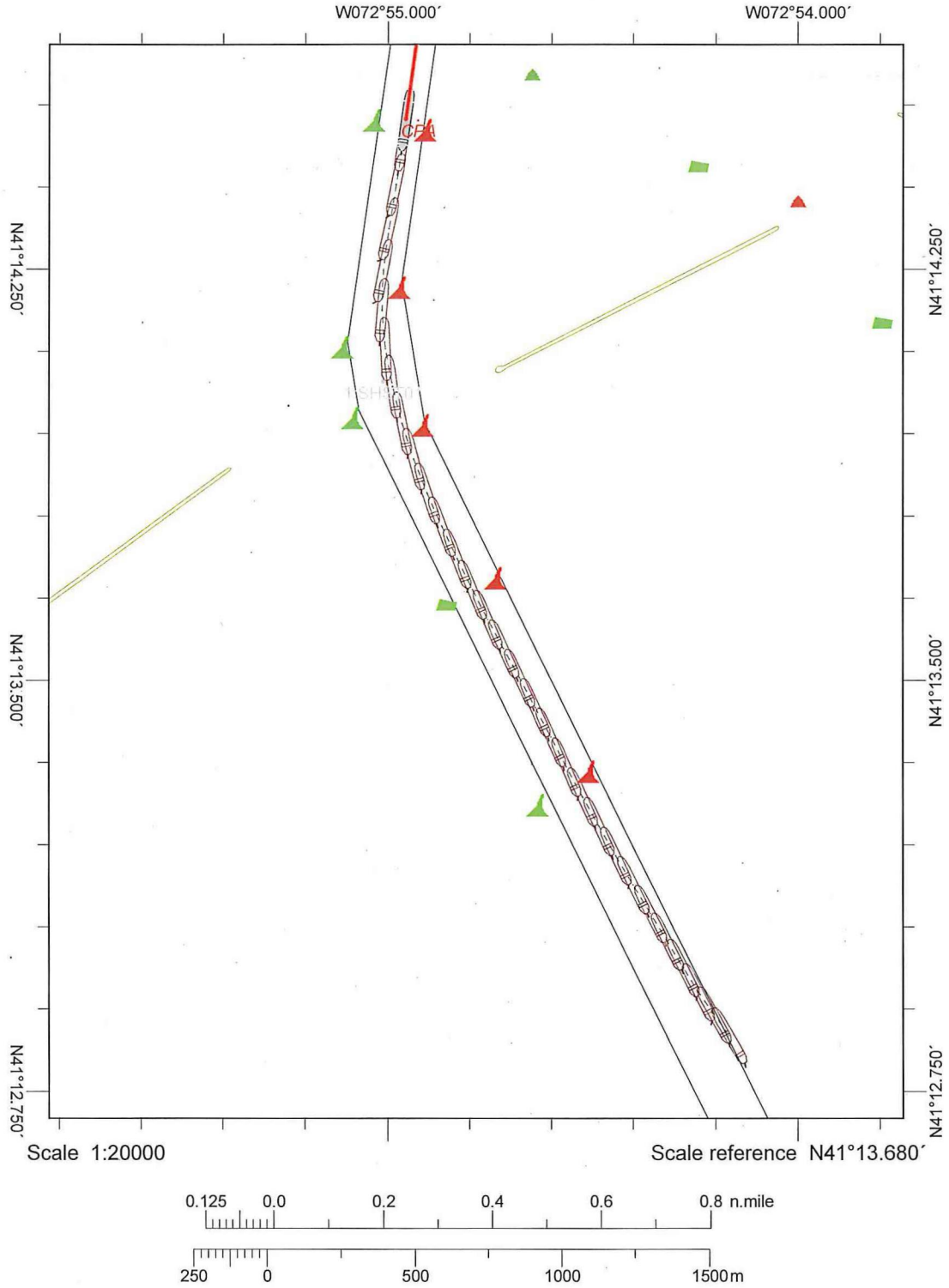
Filename: B - P3 - F - NW8 - I - 1 - 1

Start Time:

End Time:

Comments:

THIS SIZE/DRAFT SHIP WAS FINE MAKING TURN AT JETTIES BUT TO BREAK TURN RUDDER WAS HARD TO PORT AND ENGINE ON FULL AHEAD.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – 700 ft width*

Date: 14 Feb 2018

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5 m

Wind Condition: 1 **NW8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

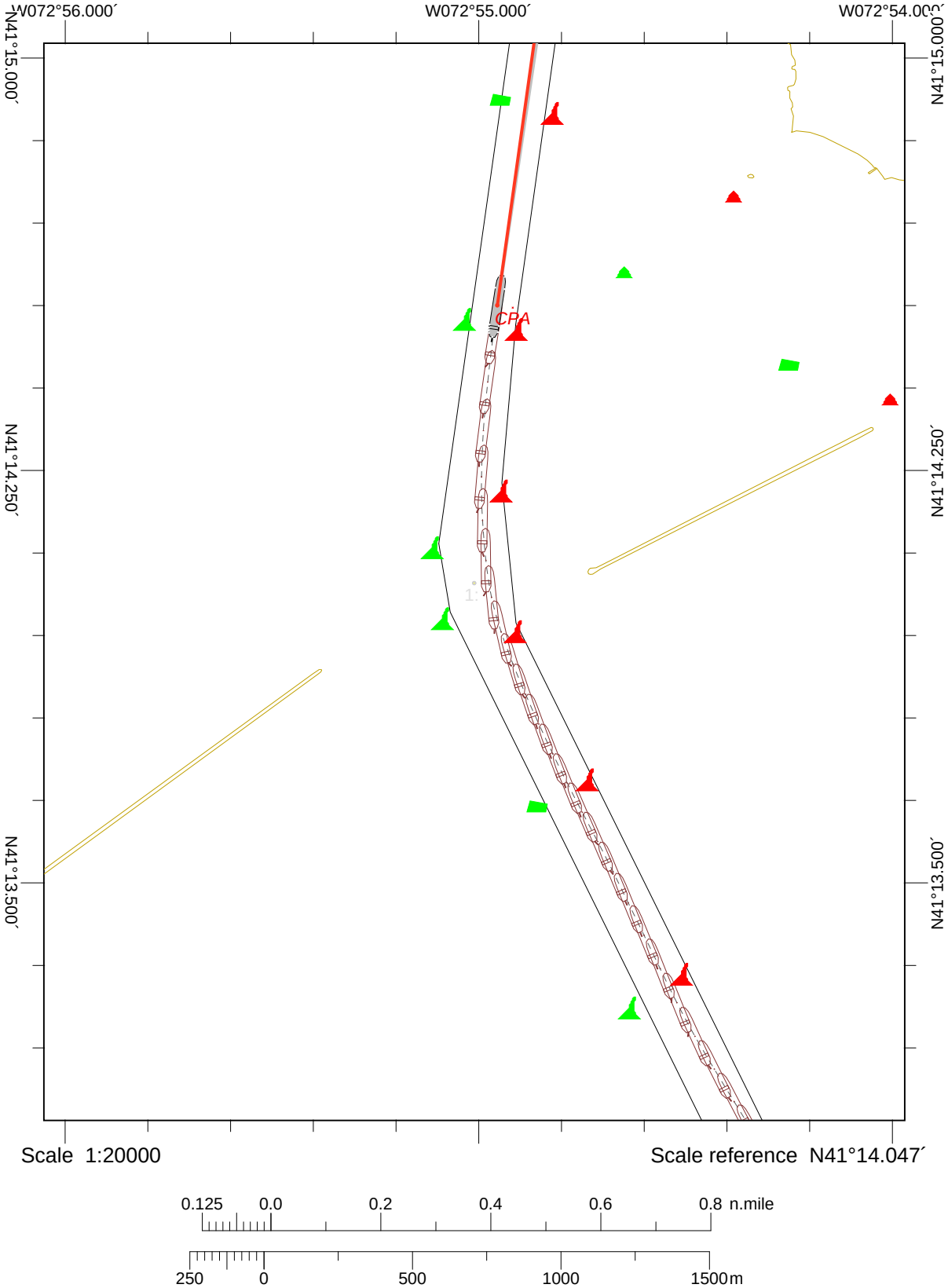
Filename: B-P3-F-NW8-I-2-1

Start Time: [redacted]

End Time:

Comments:

wider channel definitely helps.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener –* [redacted]

Date: 2-14-18

Test Matrix Run Number: **Repetition:** 2

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 ~~**N 8K**~~ NW 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

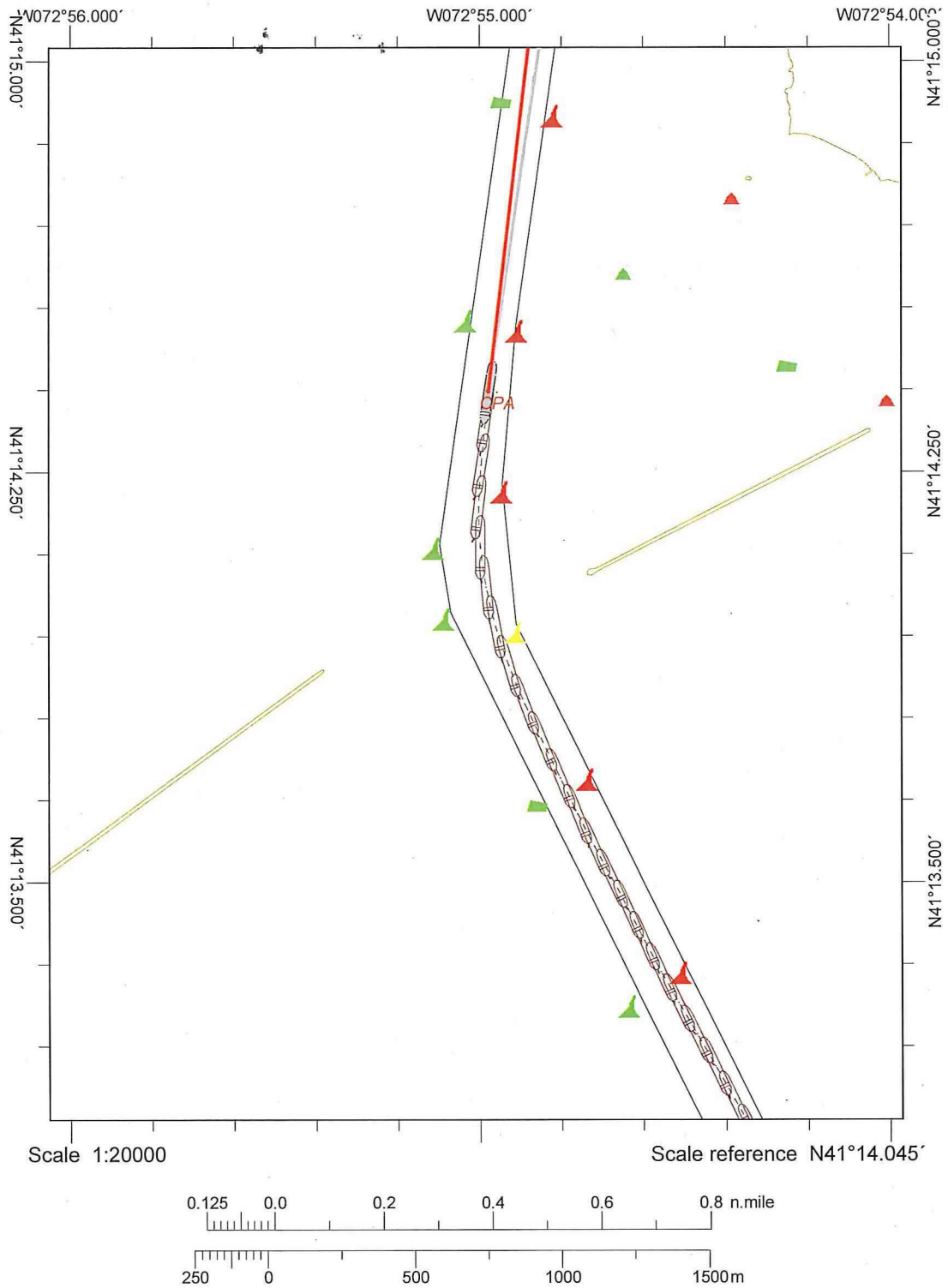
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P3-F-NW8K-I-1-2

Start Time:

End Time:

Comments: moved 8 buoy 100 ft to east



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener – [redacted]*

Date: 2/14/18

Test Matrix Run Number: **Repetition:** 2

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide: **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 **NW8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

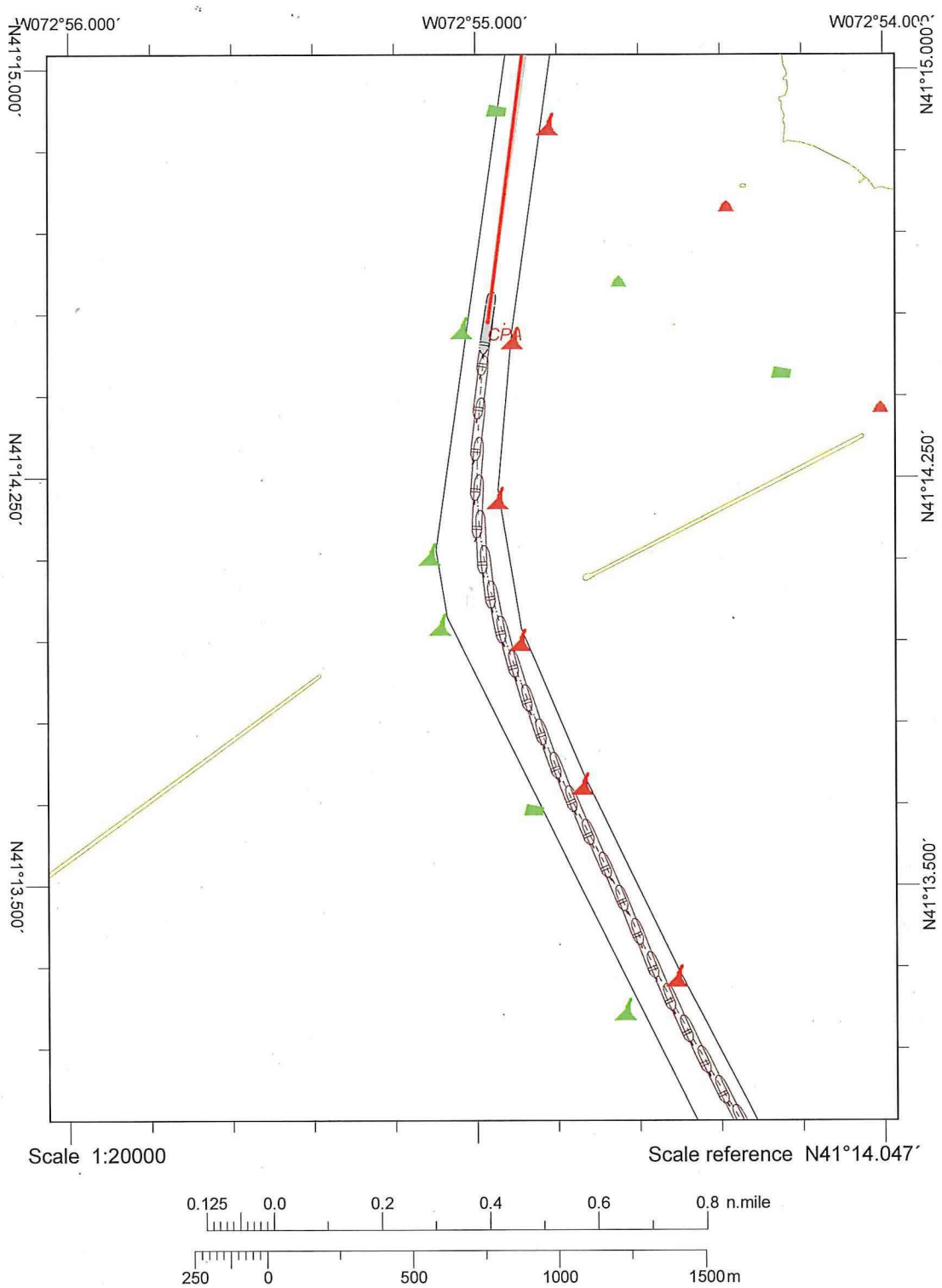
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P3-F-NW8-I-2-2

Start Time:

End Time:

Comments: Moved 8 buoy east 100 ft



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* – [redacted]

Date: 2-14-18

Test Matrix Run Number: **Repetition:** 3

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 ~~N 8K~~ NW 8K 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

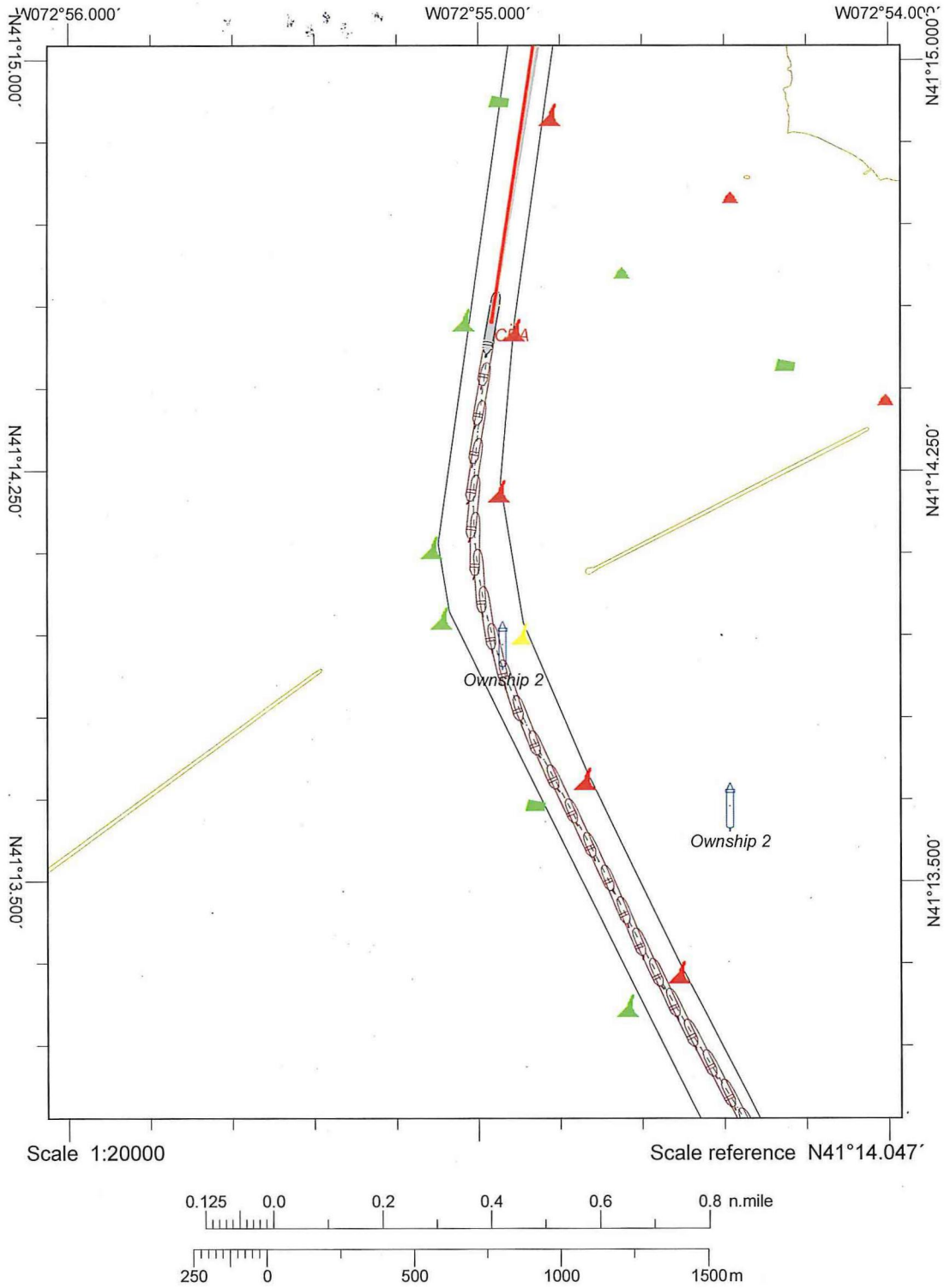
Filename: B-P3-F-NW8 -I-1-3

Start Time:

End Time:

Comments: Moved buoy 6-8 100 ft to east.

MOVING THE 6Y & BUOYS TO THE EAST MADE THE TURN EASIER TO CHECK — 20% RUDDER MAX NO COUNTER TURN & LESS THAN 8 KNOTS



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener –* [redacted]

Date: 14 Feb 2018

Test Matrix Run Number: **Repetition:** 3

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 **NW 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P3-F-NW8~~F~~2-3

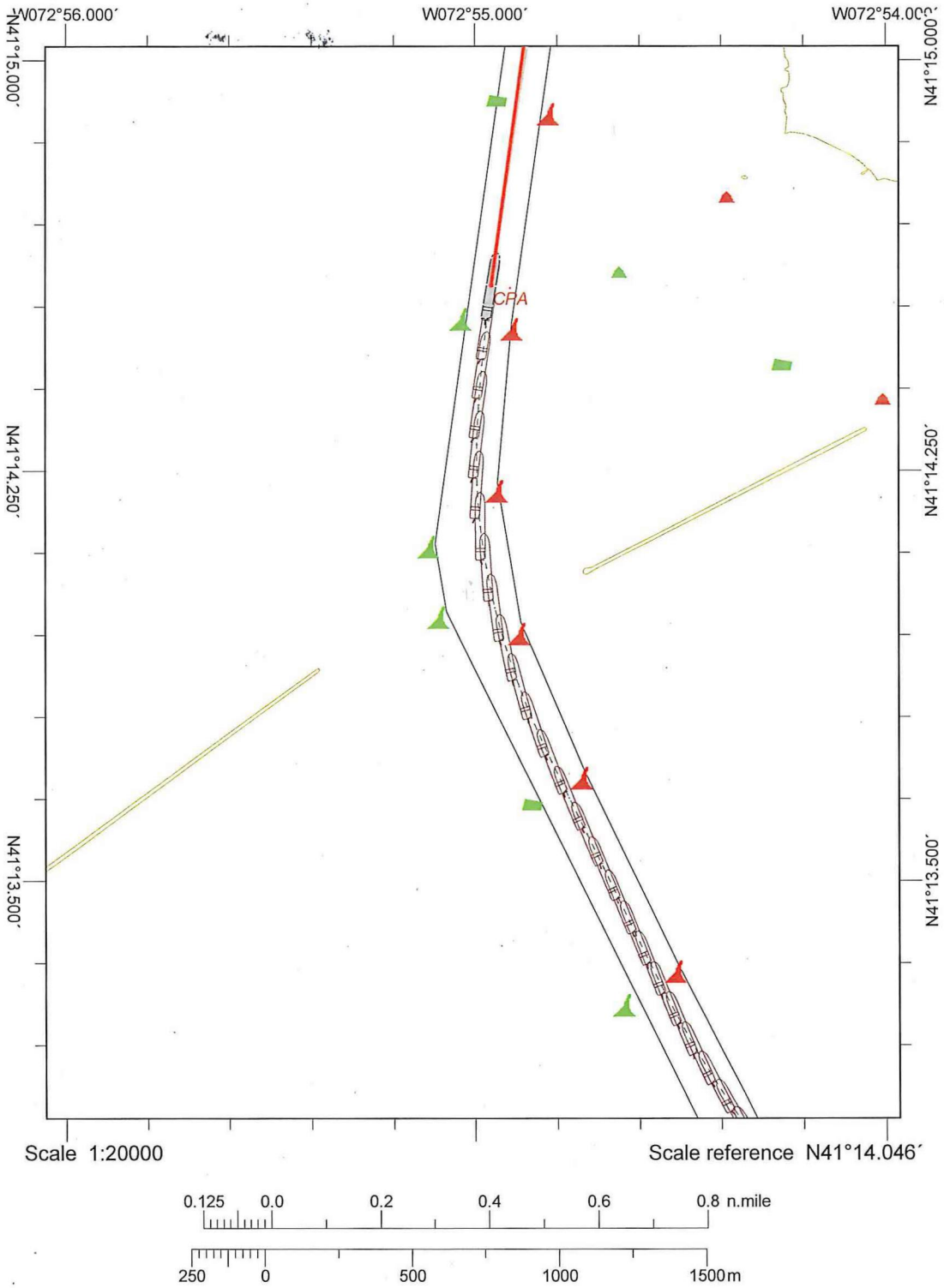
Start Time:

End Time:

Comments: Buoys 6 & 8 moved 100 ft to the east

N41.13.973
W72.54.888

N41.14.227
W72.54.944



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* – [redacted]

Date: 2-14-18

Test Matrix Run Number: **Repetition:** 4

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : Flood Ebb **Added Tide:** 1.5

Wind Condition: 1 **N 8K** (NW) 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: Inbound Outbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

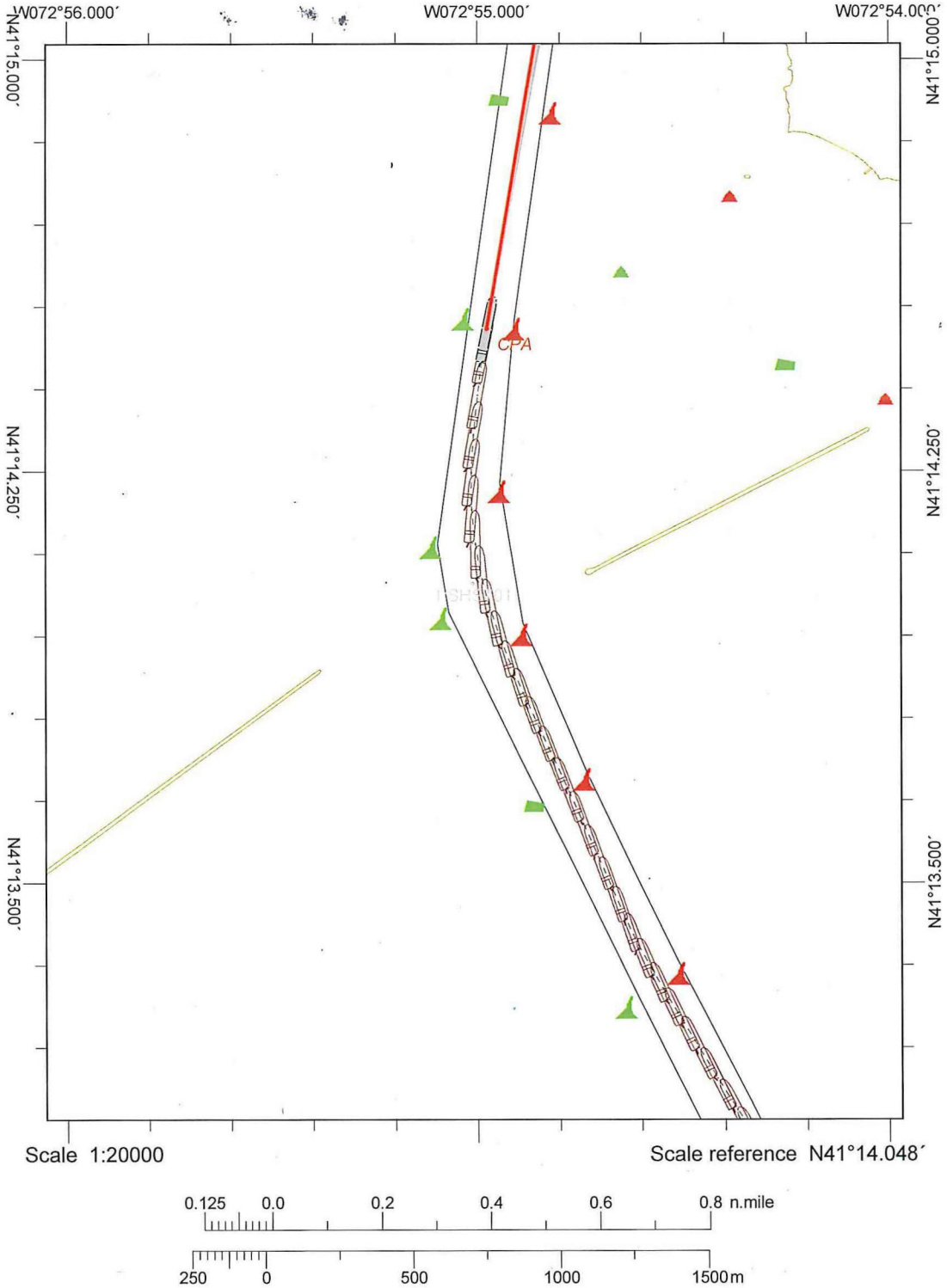
Filename: B-P3-F-NW8K-I-1-4

Start Time:

End Time:

Comments:

THIS LENGTH / DRAFT HANDLED TURN. CHECK UP OK — USED ONLY 20° LEFT RUDDER AT 8 KNOTS TO COUNTER SWING AFTER MAKING TURN



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* - [redacted]

Date: 14 Feb 2018

Test Matrix Run Number: **Repetition:** 4

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : Flood Ebb **Added Tide:** 1.5

Wind Condition: 1 **NW 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: Inbound Outbound

PILOT: Capt. Charles Jonas (Pilot 1) Capt. Donald Toby (Pilot 2)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

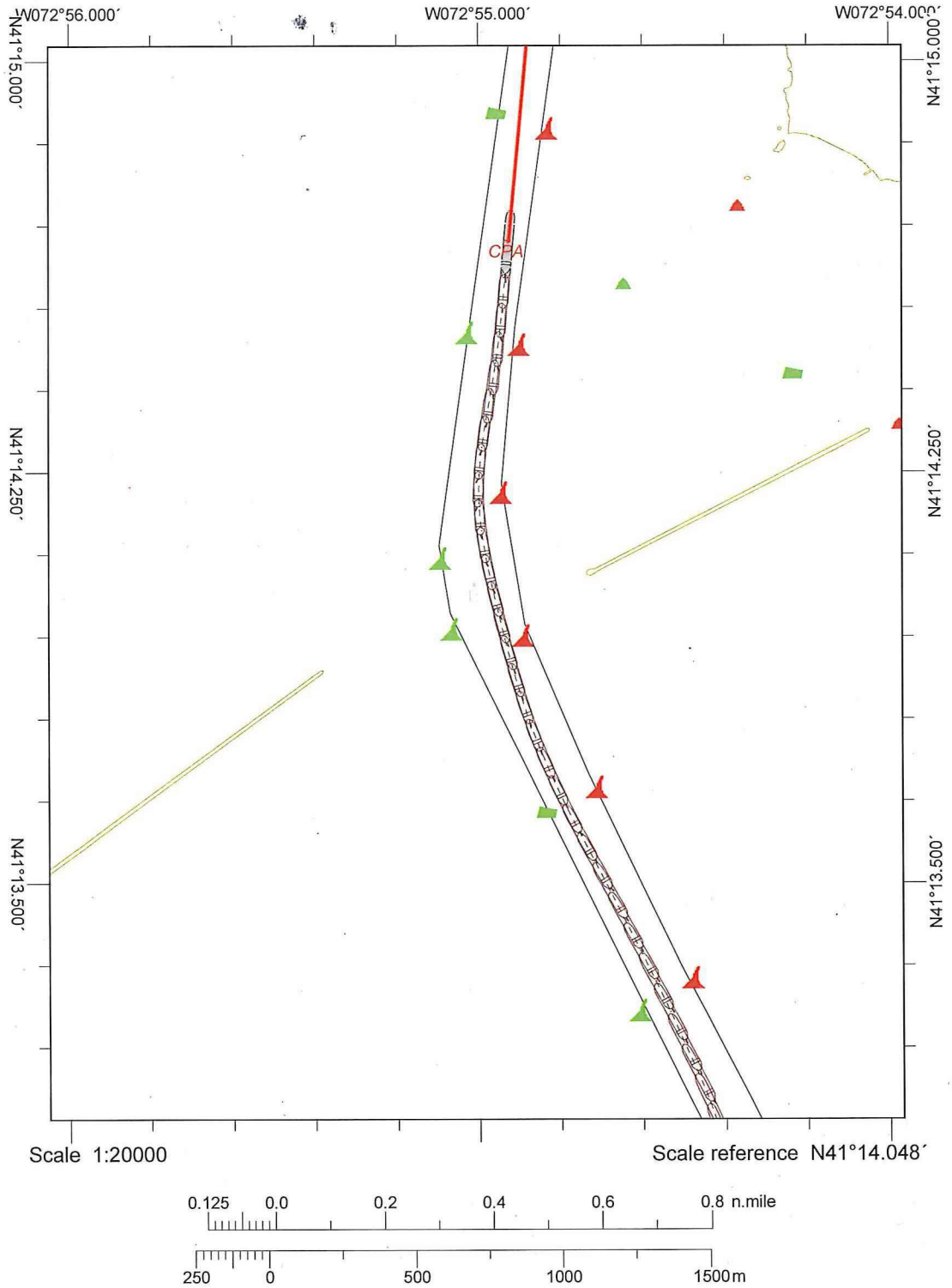
Filename: B-P3-F-NW8-I-2-4

Start Time:

End Time:

Comments:

With Deeper ship: Tried using 20° rudder to stbd
But felt I had to put hard rudder to complete turn.
got set a lil bit to green side after turn but it
was not horrible with 20° rudder to stop swing with
a kick ahead. Wider channel is det Better
With 6 & 8 Buoy 100 ft wide.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* - [redacted]*ith*

Date: 2-15-18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(37ft) **P2**(38ft) **P3**(41ft) **P4**(42ft) P7 (42 ft)

modified widener

Test Matrix Run Number: **Repetition:**

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** —

Wind Condition: 1 ~~N 8K~~ NW 8K 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

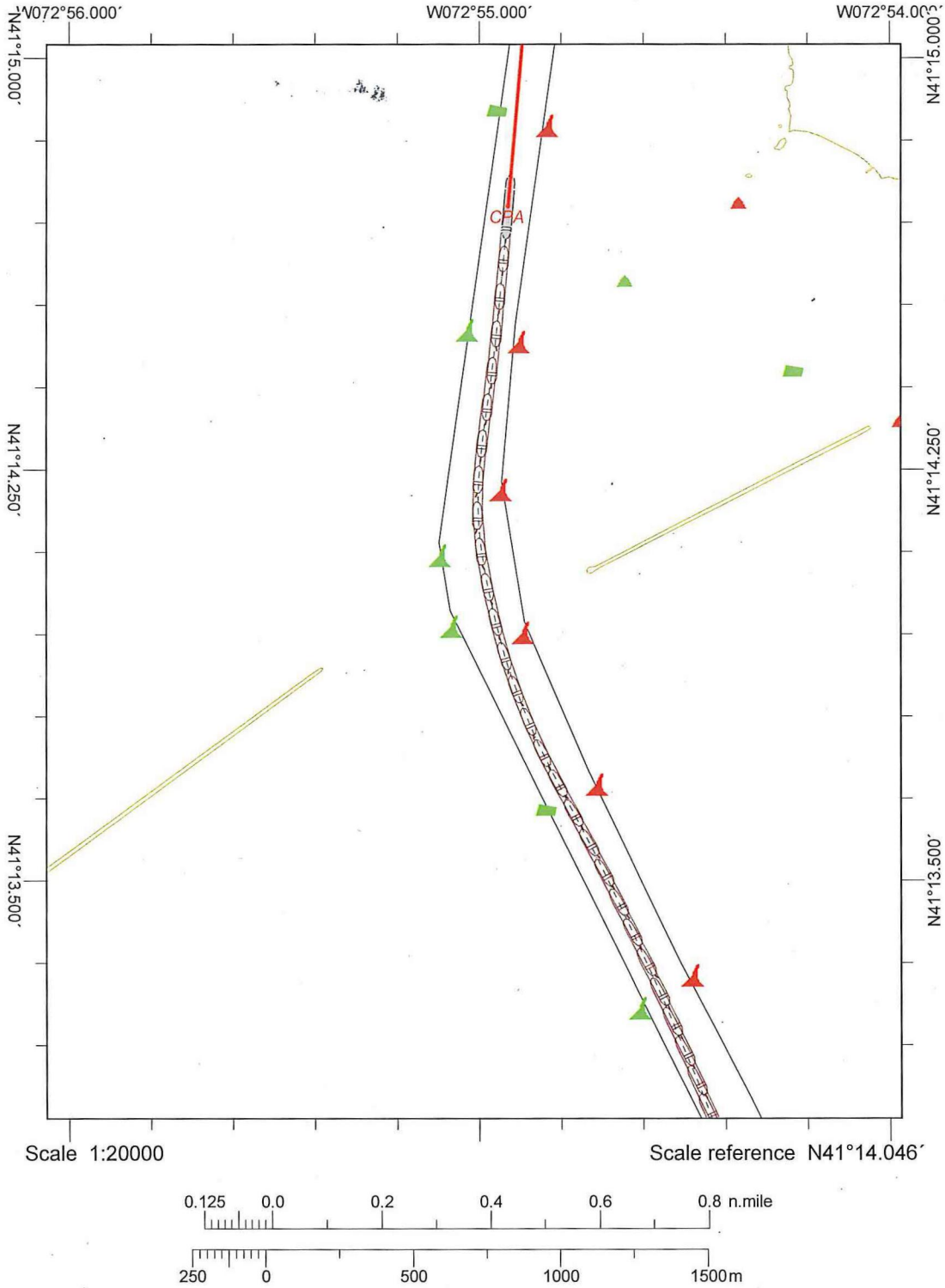
Filename: B-P7-E-NW8-I-1-1

Start Time:

End Time:

Comments:

VESSEL HANDLED GOOD AT THIS DRAFT — USED ONLY 20° OF RUDDER TO MAKE + BREAK THE TURN AT THE VERTIES — ALSO MADE TURN MANEUVER @ 7.0 KTS



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* [redacted]

Date: 15 Feb 2018

Test Matrix Run Number: **Repetition:**

Channel Alternative: **P0**(Ex) **P1**(37ft) **P2**(38ft) **P3**(41ft) **P4**(42ft) P7-42'

modified widener

Test Matrix Run Number: **Repetition:** 1

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:**

Wind Condition: 1 **NW8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

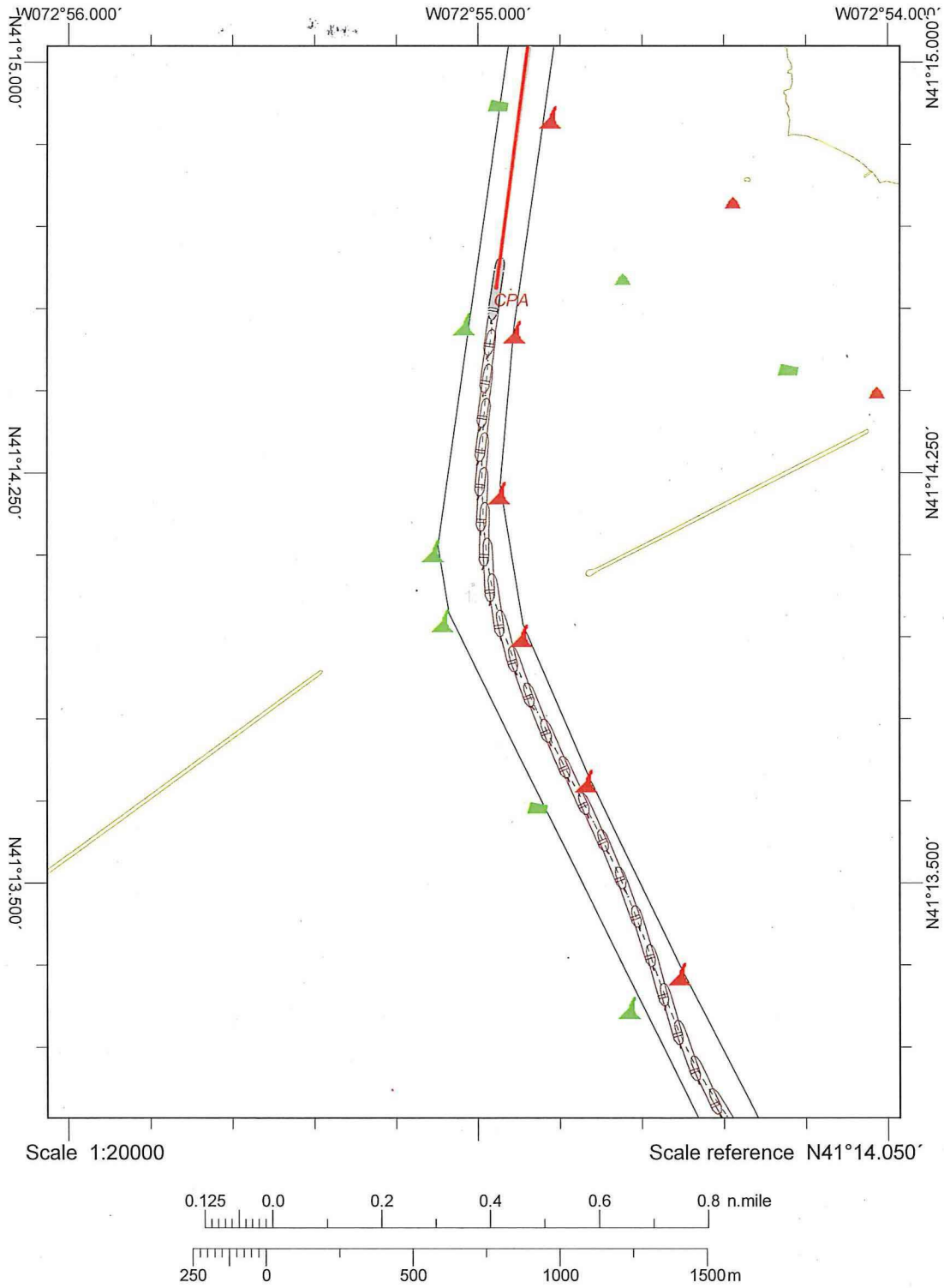
Filename: B-P7-E-NW8-I-2-1

Start Time: 1055

End Time:

Comments:

Nice & easy turn of 20° rudder with no major kicks ahead. had to check ~~rudder~~ swing once but shifting rudder but short normal.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* [redacted]*th*

Date: 2-15-18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(37ft) **P2**(38ft) **P3**(41ft) **P4**(42ft) P7 (42 ft)

Modified widener

Test Matrix Run Number: **Repetition:**

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:**

Wind Condition: 1 ~~**N 8K**~~ NW 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

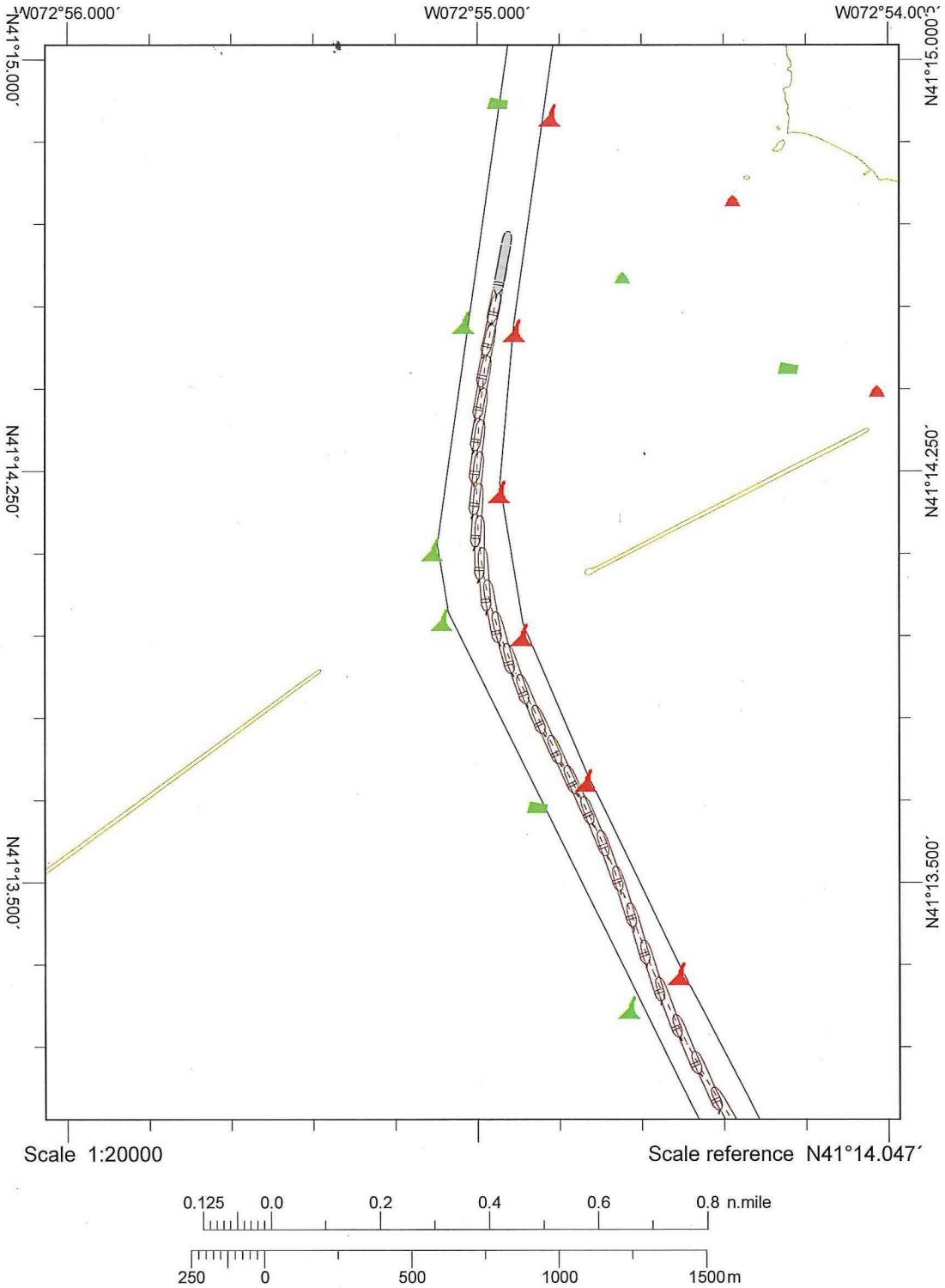
Filename: B-P7-F-NW8-I-1-1

Start Time:

End Time:

Comments:

SHIP HANDLED GOOD AT TURN
ONLY NEED 20° OF RUDDER + 7-8 KNOTS



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* - [redacted]

Date: 15 Feb 2018

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(37ft) **P2**(38ft) **P3**(41ft) ~~**P4**~~(42ft) P7 modified widener

Test Matrix Run Number: **Repetition:**

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 0

Wind Condition: 1 ~~**N 8K**~~ NW 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: ~~Capt. Charles Jonas (Pilot 1)~~ Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P7-F-NW8-I-2-1

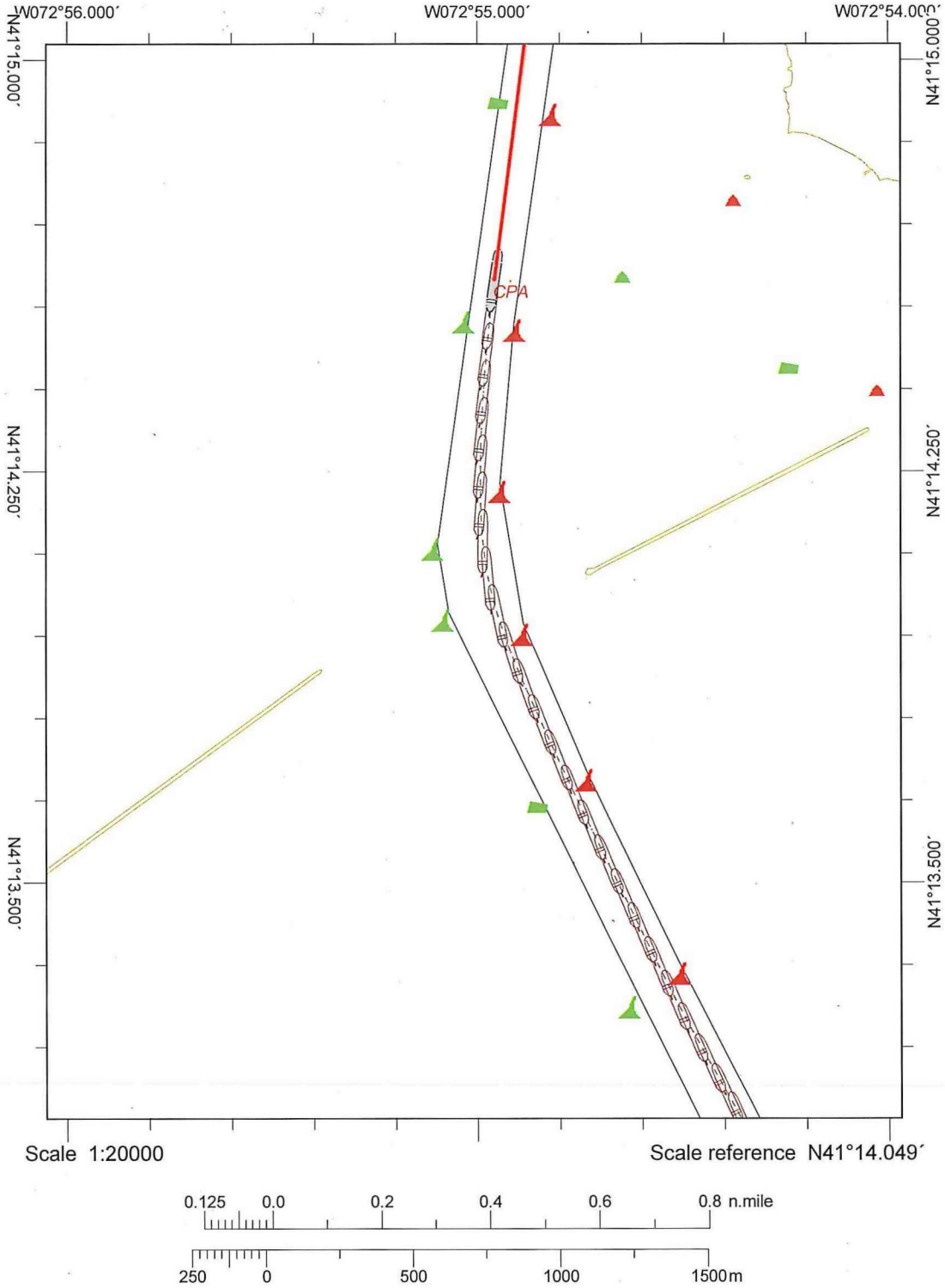
Start Time: 1135

End Time:

Comments:

extra depth helped, nice easy turn 20° whole time no kicks ahead. didnt have to use hard to port and kick ahead to full to stop the swing.

~~whole time steady~~



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* [redacted]

Date: 2-15-18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

modified widener

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : Flood Ebb **Added Tide:** 1.0

Wind Condition: 1 ~~N~~ NW 8K 2 SW 8K 3 SW 13K 4 WNW 13K

Heading: Inbound Outbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B-P5-F-NW8-I-1-1

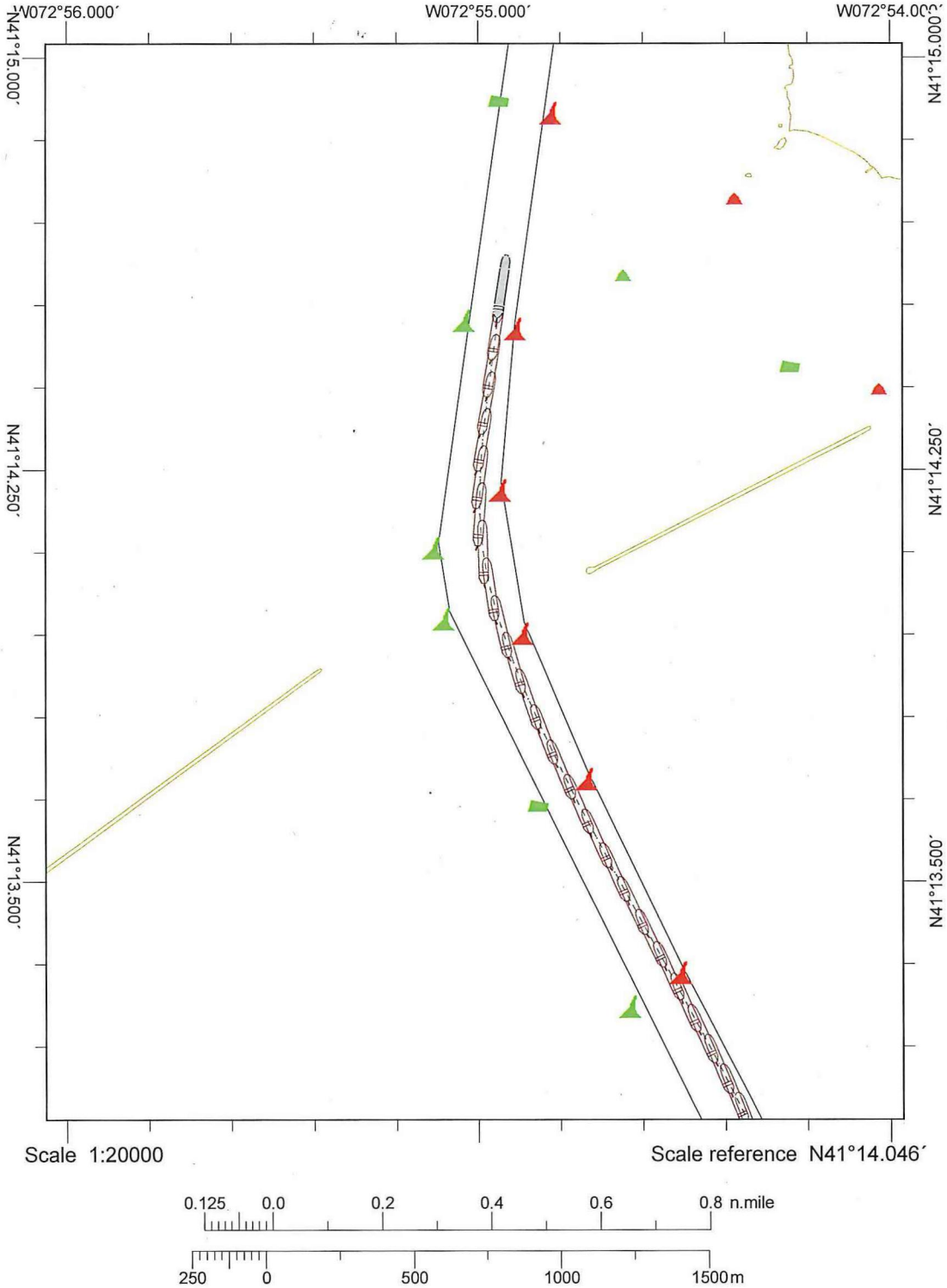
Start Time:

End Time:

Comments:

ONLY USED 20° RUDDER + MADE TURN AT 7-8 KNOTS

— COMFORTABLE MANEUVER



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* – [redacted]

Date: 15 Feb 2018

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L* modified widener

Tide : Flood Ebb **Added Tide:** 1.0

Wind Condition: NW 1 **N 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: Inbound Outbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

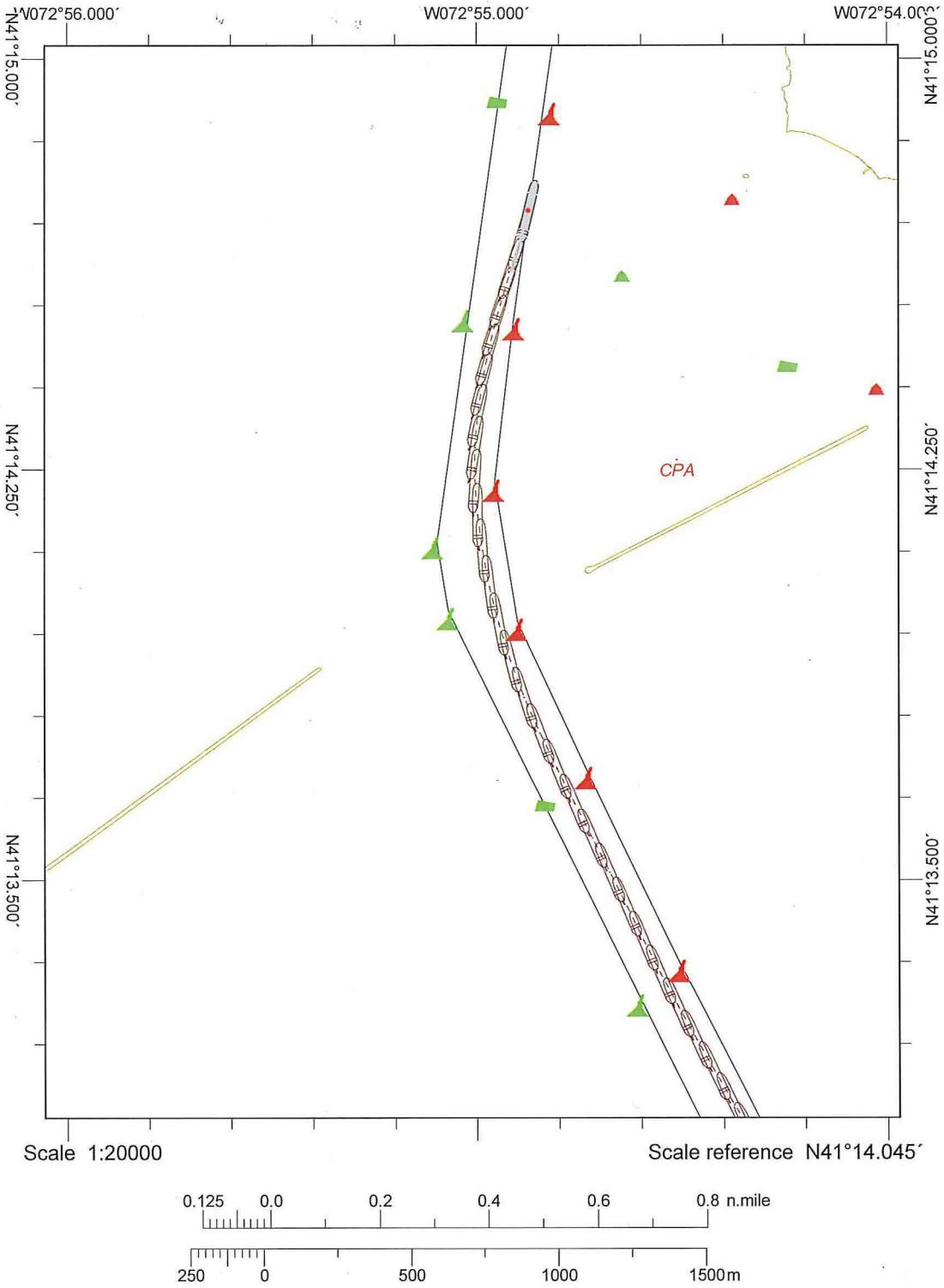
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: B- P5-F-NW8-I-2-1

Start Time: 1205

End Time:

Comments:



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* - [redacted]*h*

Date: 16 Feb 2018

Test Matrix Run Number: **Repetition:** 2

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : Flood Ebb **Added Tide:**

Wind Condition: 1 **NW 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: Inbound Outbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

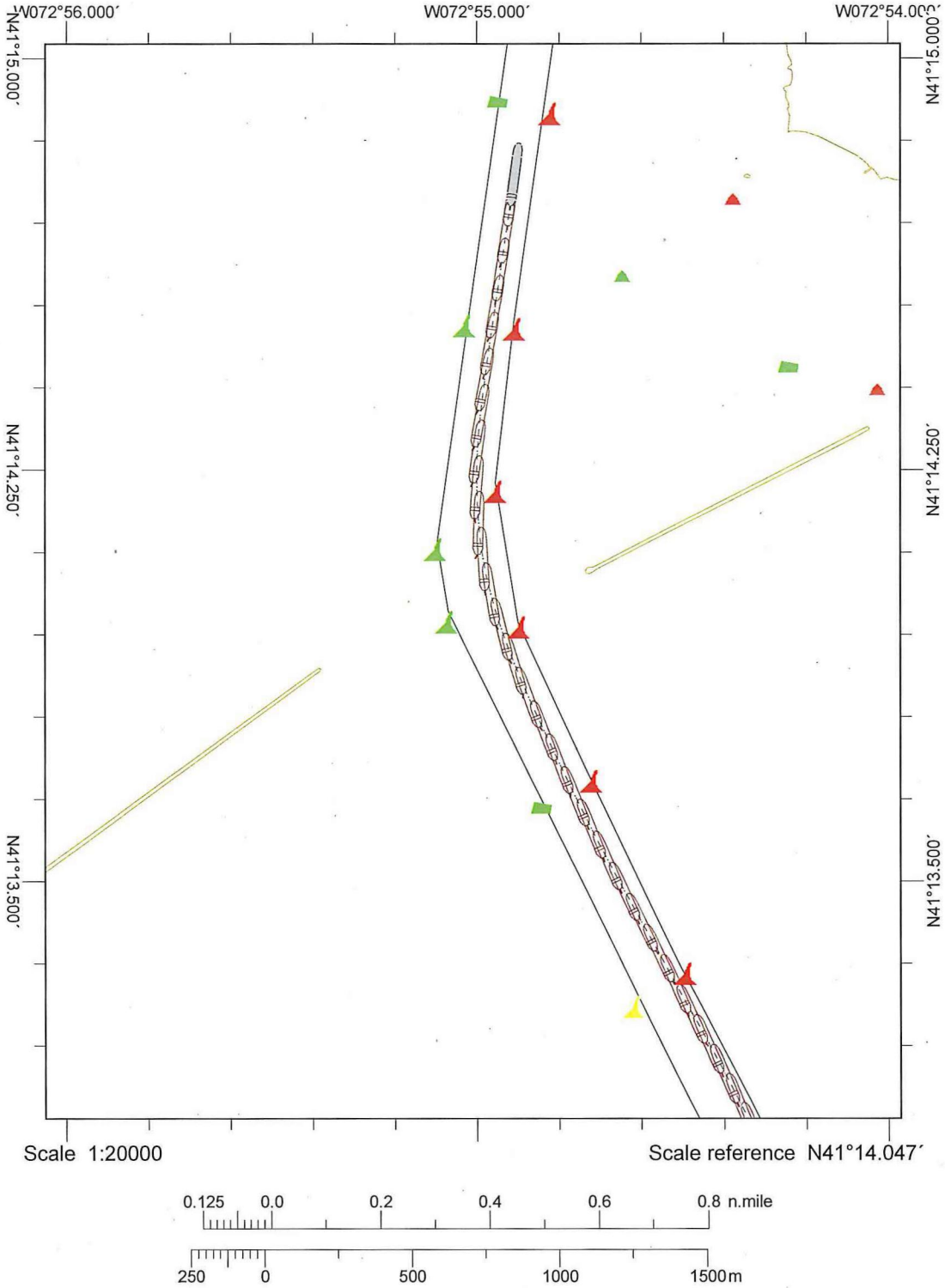
Filename: B-P7-F-NW8-I-1-2

Start Time:

End Time:

Comments: Buoys 6/8 only moved 50 ft to east

THERE IS NO SAFETY FACTOR ON THIS ROUTE — USED 20° OF RUDDER FOR TURN + CHECK UP — 20° WAS NOT ADEQUATE TO CHECK UP SWING



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area B: *Bend Widener* [redacted]

Date: Feb 16, 2018

Test Matrix Run Number: **Repetition:** 2

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : Flood Ebb **Added Tide:**

Wind Condition: 1 N~~8~~W 8K 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: Inbound Outbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

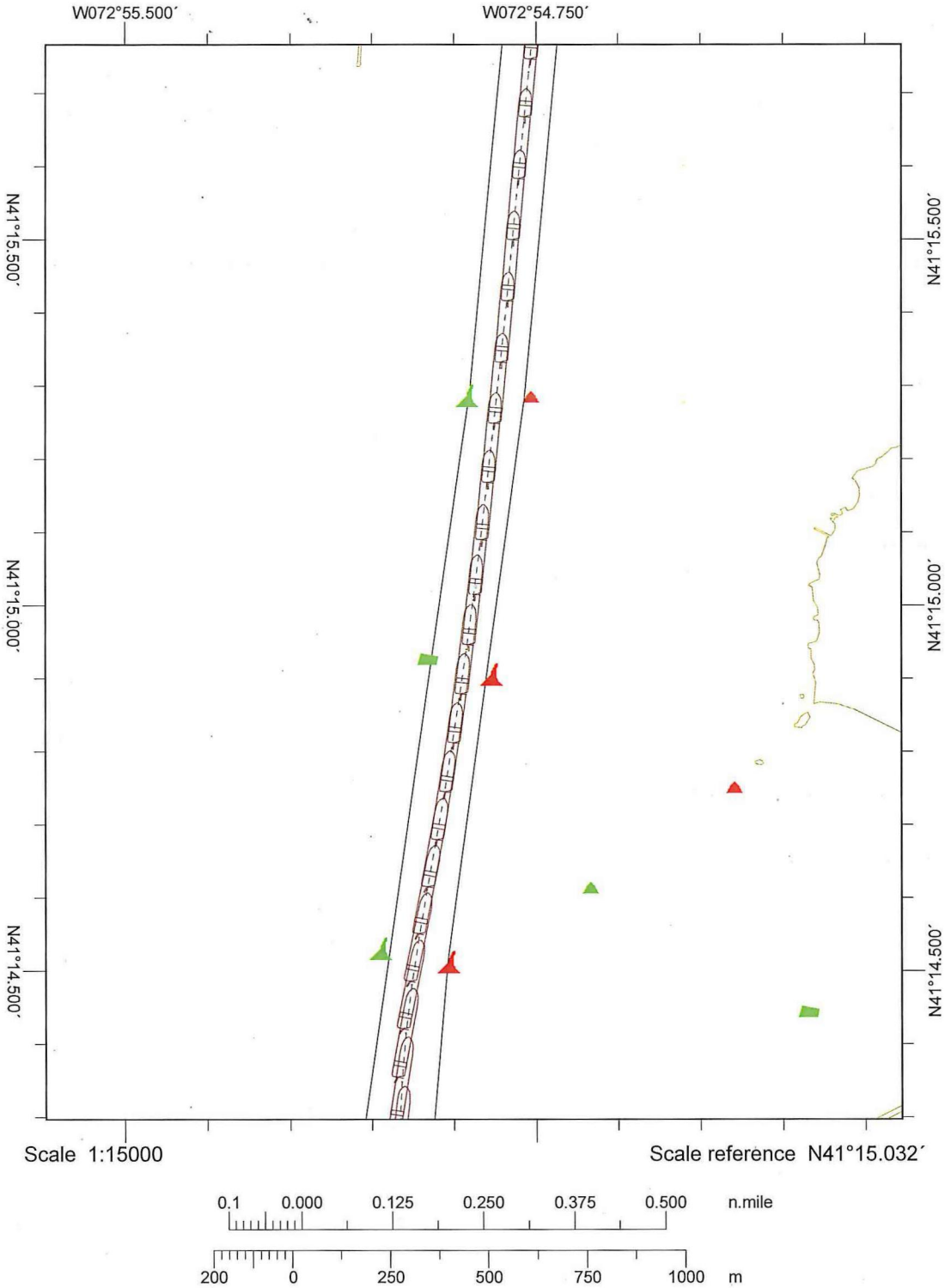
Filename: B - P7 - F - NW 8 - I - 2 - 2

Start Time:

End Time:

Comments: Buoys 6+8 only moved 50ft to east

Turn went well [redacted] but the #8 Buoy having 50ft made a difference for the last part of turn b/c it did not open up like before and had to get a lot closer to the 6+8 buoy to complete the turn.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area C: *Harbor Channel* ~~500~~ 450 *ft width* From 9/10a to 15/16

Date: 2-14-18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 ~~N~~ NW **8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

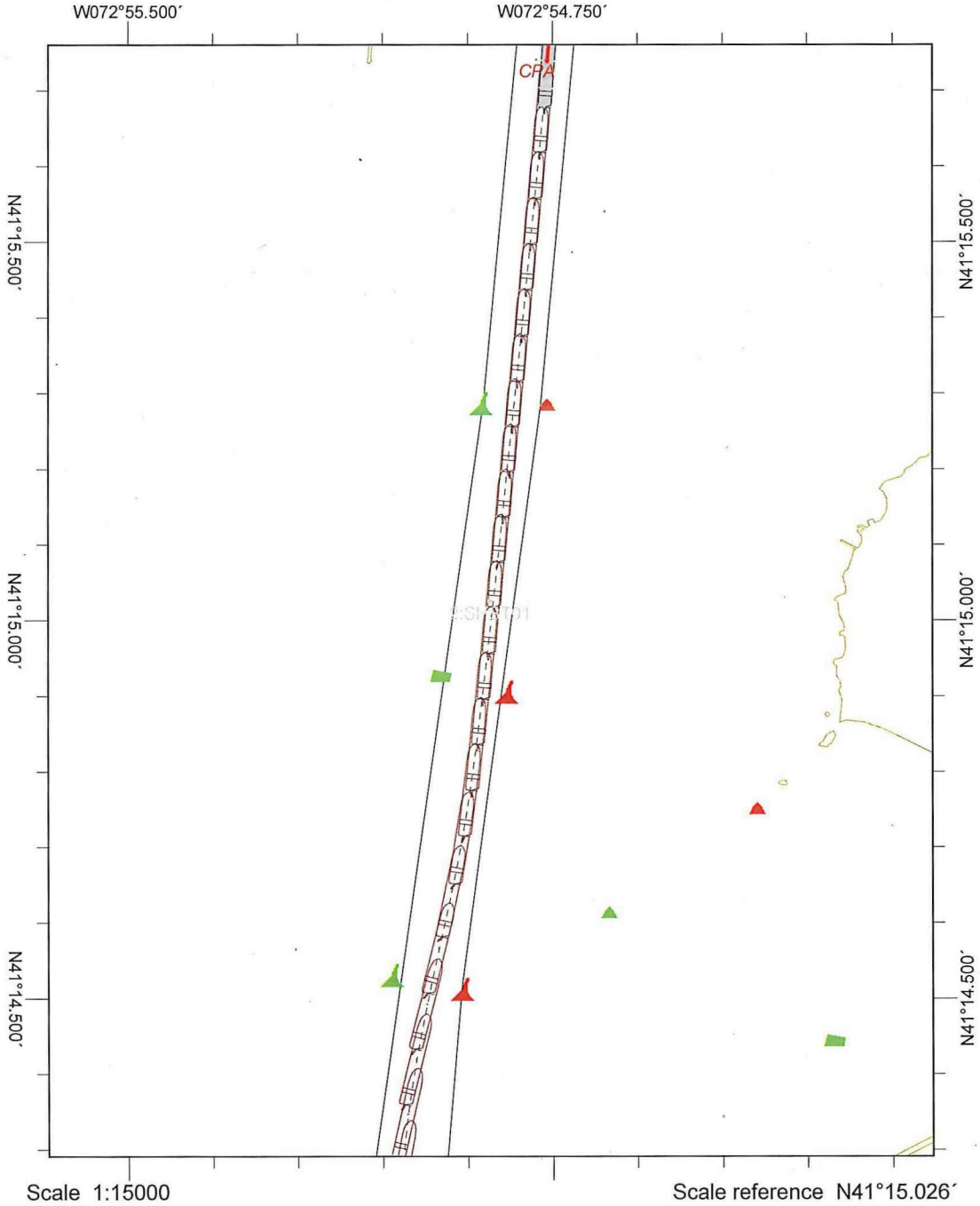
Filename: C-P3-F-NW8-I-1-1

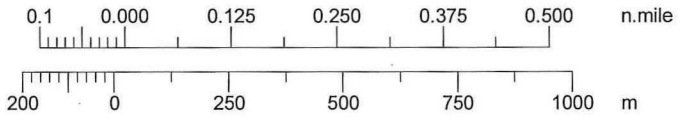
Start Time:

End Time:

Comments:

THIS LOA/DRAFT IS OK IN THE 450ft CHANNEL HOWEVER, IN THIS AREA THE HORIZONTAL CLEARANCE IS ALSO REDUCED BY 70 to 80ft FOR BEAM OF TUGS + WHEN THE TUGS ARE COMING A/S THEY CREATE SOME SUCTION





Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area C: *Harbor Channel – ~~500 ft~~ 750 width* from 9/10a to 15/16

Date: 14 Feb 2014

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 1.5

Wind Condition: 1 **N 8K** W 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

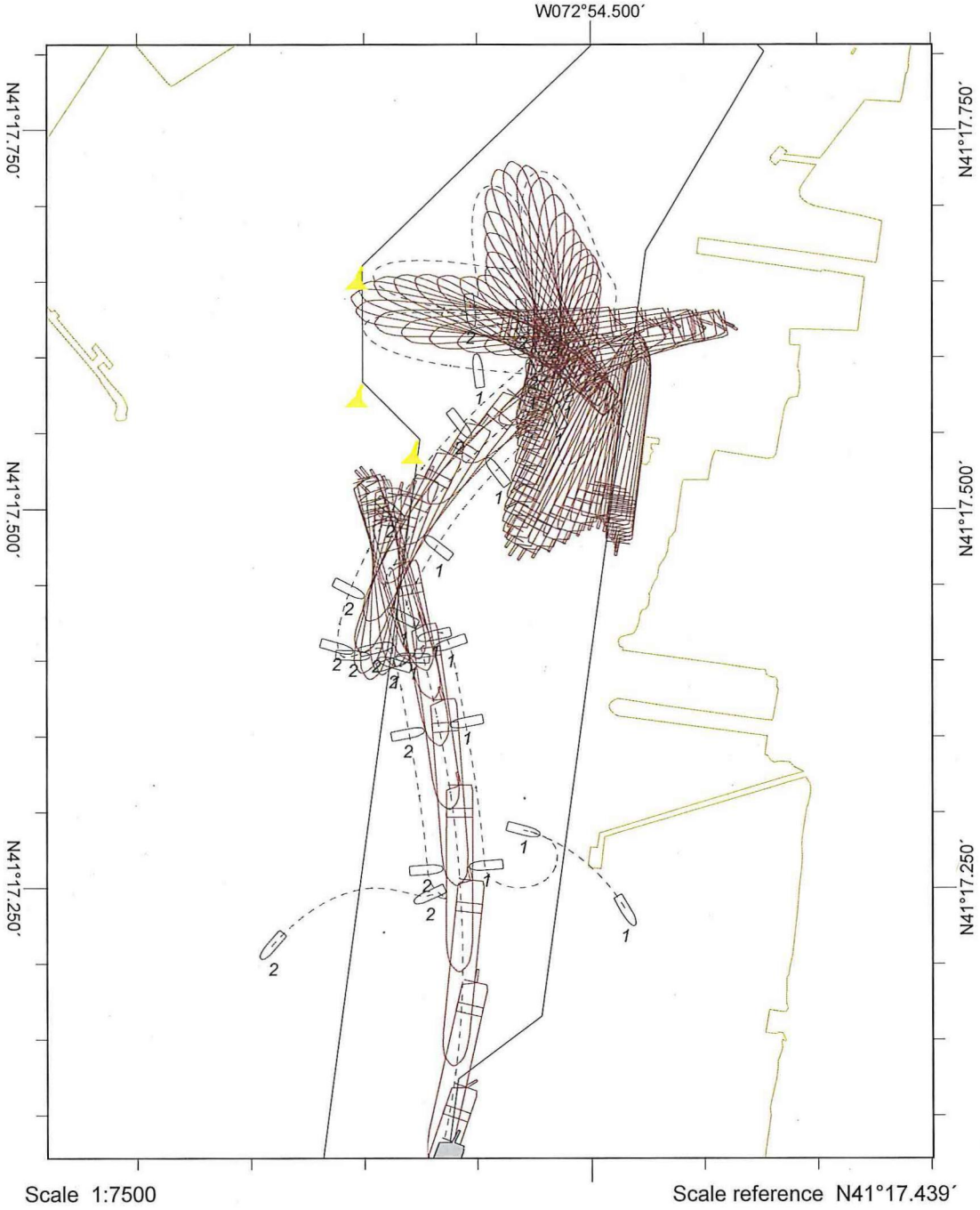
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

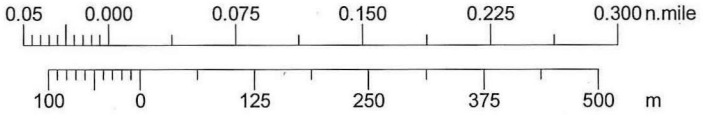
Filename: C - P3 - F - NW8 - I - 2 - 1

Start Time:

End Time:

Comments:





Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area D: *Turning Basin*

Date: 02/13/18

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft) FB 20M

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood (created) **E**bb **Added Tide:**

Wind Condition: ~~1 N 8K~~ NW8K 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

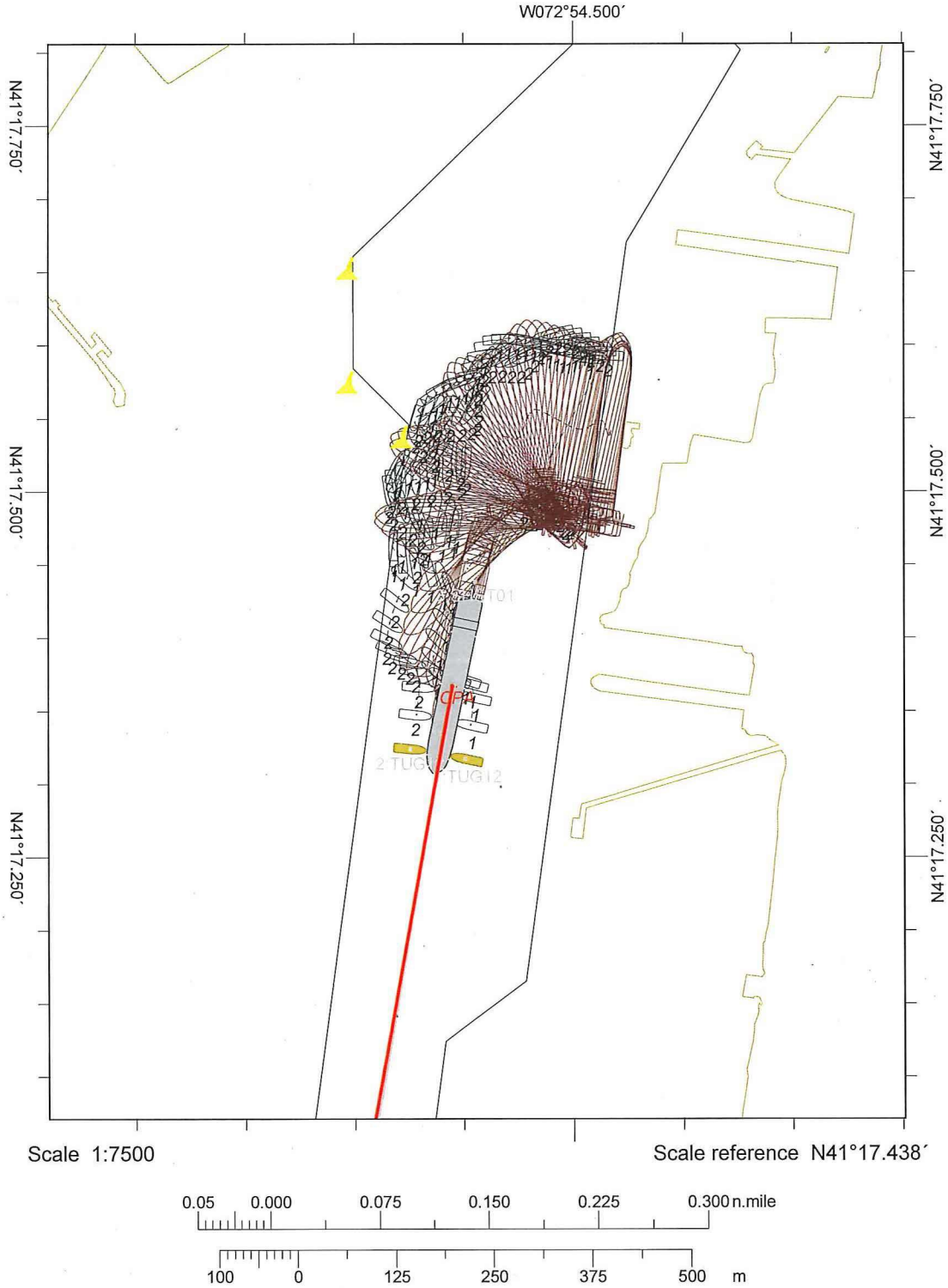
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: D - ~~P3~~ P2 - F - NW8 - O - 1 - 1

Start Time: 1646

End Time: ~~1646~~ 1748

Comments: MODEL WAS WAY TOO SLUGGISH, THE DRAFT ON THE MODEL WAS WAY TOO DEEP FOR THIS MANEUVER.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area D: *Turning Basin*

Date: 13 Feb 2018

Test Matrix Run Number: **Repetition:** 1

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** Flat Bottom

Wind Condition: 1 **N 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

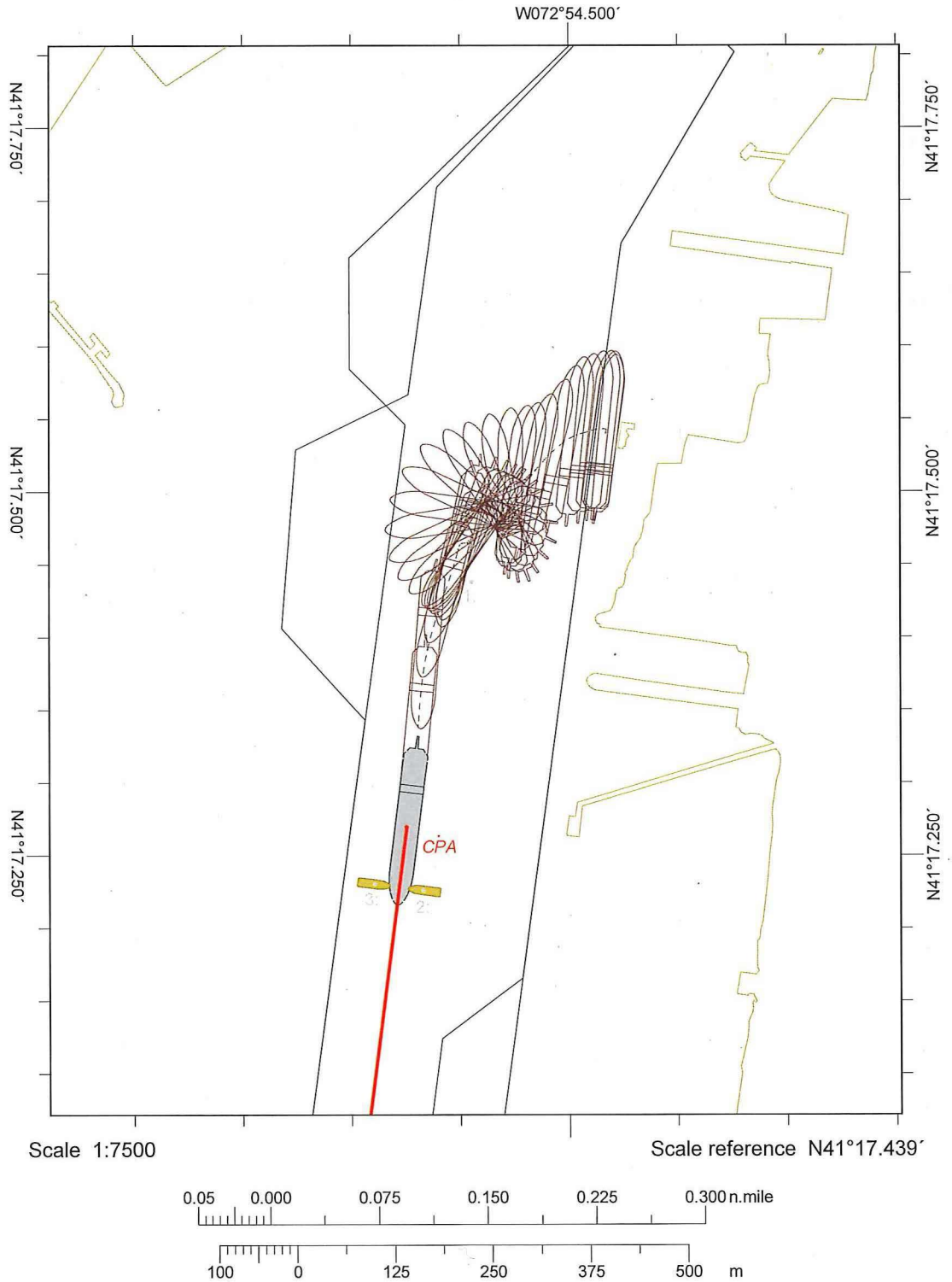
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: D-P2-F-NW8-O-2-1

Start Time:

End Time:

Comments:
Turned ship like normal at Magellan T. Dock. RPM/Bell commands were very sluggish and slow to respond with giving kicks. Tugs were very slow pushing ship around with ship at draft of 37'.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area D: *Turning Basin*

Date: 02/14/18

Test Matrix Run Number: **Repetition:** 2

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft) FB ~~20M~~ 15M

Design Ship: **1** *BULK06L* **2** *TANK10L* 3. CNTNR03L

Tide : **F**lood Made **E**bb **Added Tide:**

Wind Condition: 1 ~~**N 8K**~~ NW 8K 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

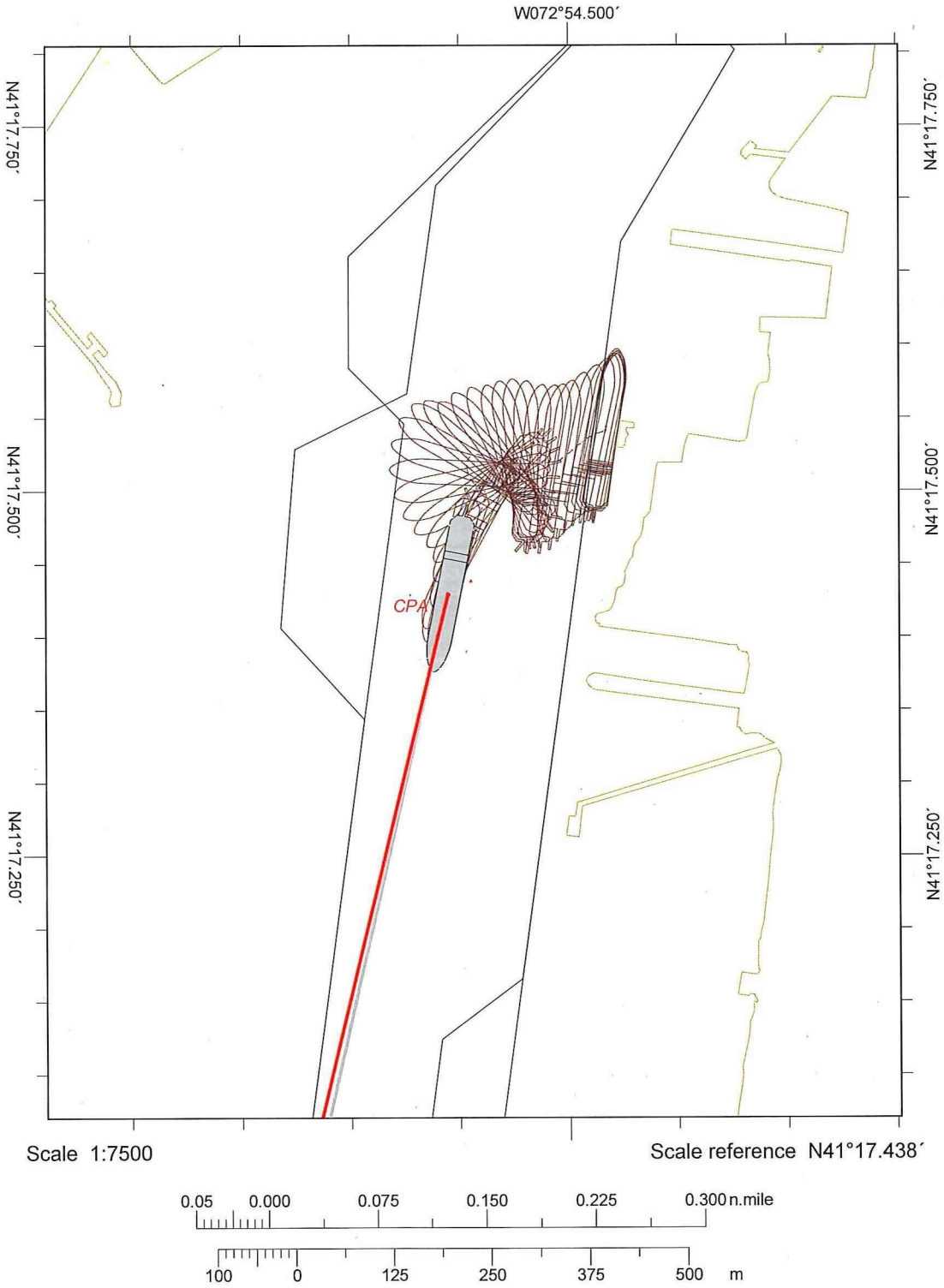
Filename: D - P2 - F - NW8 - O - 1 - 2

Start Time:

End Time:

Comments:

*Using 30 Ton max fog — TURNING BASIN WAS MORE THAN ADEQUATE FOR THIS SIZE/DRAFT SHIP —



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area D: *Turning Basin*

Date: 14 Feb 2018

Test Matrix Run Number: **Repetition:** 2

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L* 3 CNTNR03L

Tide : **F**lood **E**bb **Added Tide:** Flat Bottom 15m

Wind Condition: 1 **N 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

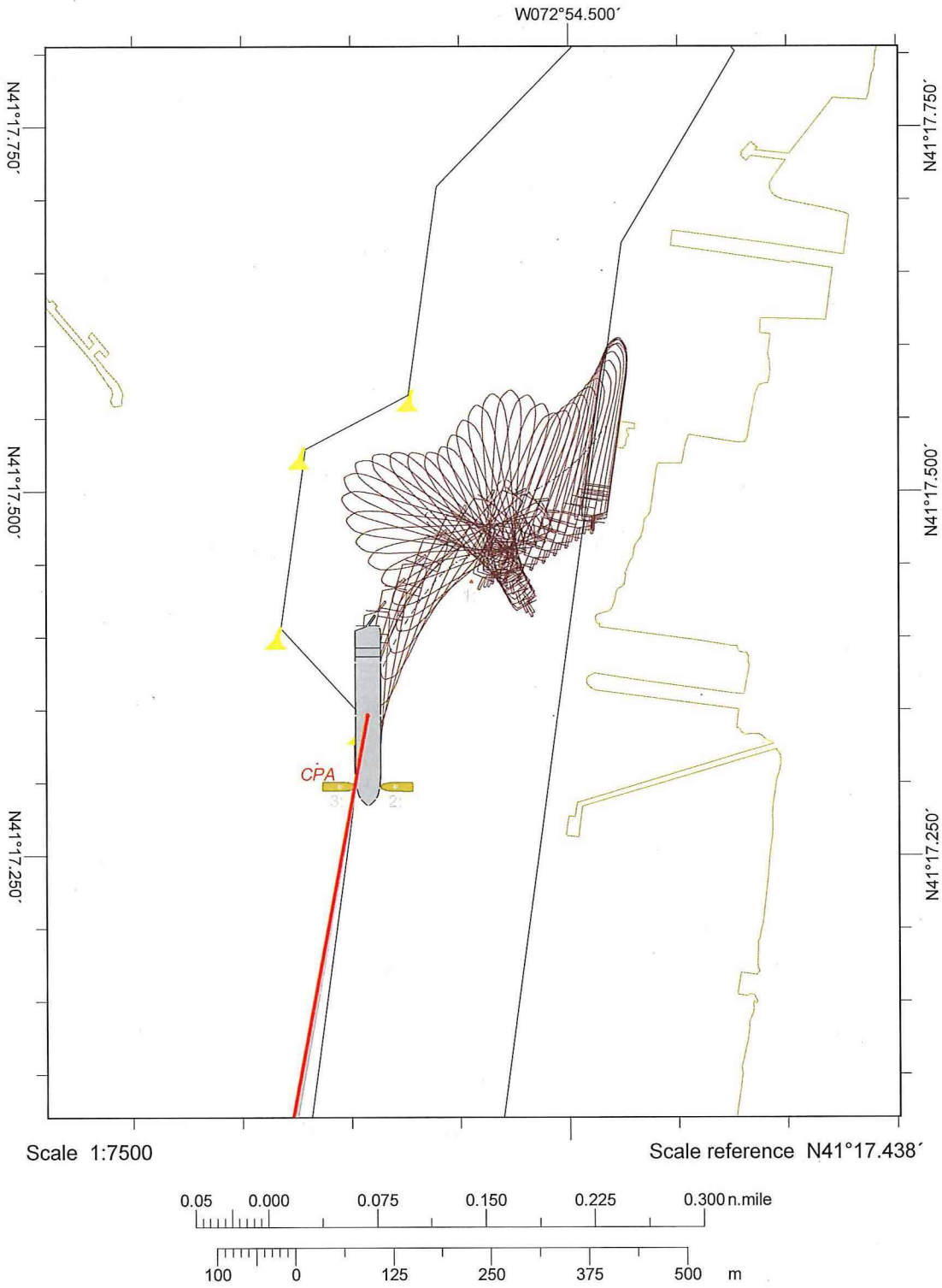
Filename: D-P2-F-NW8-O-2-2

Start Time:

End Time:

Comments: USING CNTNR03L as it better represents draft of ships using turning basin and 40-ton tug (4000Hp)

Changed turning Basin was useful in not having to worry about stern getting close to dock with ship at 660 ft long.



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area D: *Turning Basin*

Date: 02/14/18

Test Matrix Run Number: **Repetition:** 3

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft) FB 15.5m

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : Made **F**lood **E**bb **Added Tide:**

Wind Condition: NW8 ~~1 N 8K~~ 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

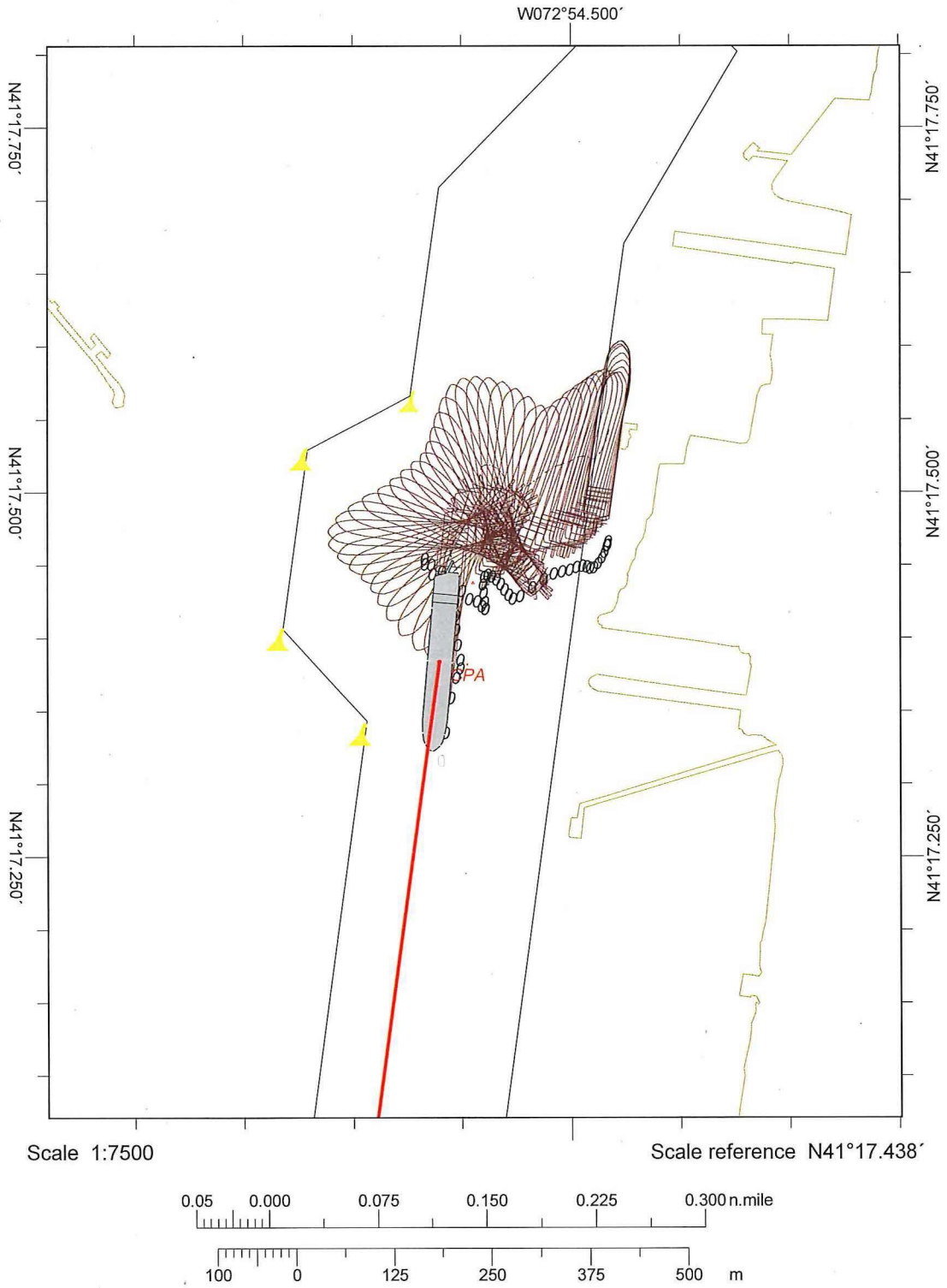
Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: D - P2 - F - NW8 - O - 1 - 3

Start Time: 1058

End Time: 1135

Comments: NEW TURNING BASIN IS ADEQUATE FOR THIS SIZE/DRAFT SHIP



Line sample period (s)	30
Course marker every	00:30
Heading marker period (s)	30
Shape outline every	00:30

New Haven Harbor Feasibility Study

Area D: *Turning Basin*

Date: 2/14/18

Test Matrix Run Number: **Repetition:** 3

Channel Alternative: **P0**(Ex) **P1**(36ft) **P2**(37ft) **P3**(38ft) **P4**(39ft) **P5**(40ft) **P6**(41ft) **P7**(42ft)

Design Ship: **1** *BULK06L* **2** *TANK10L*

Tide : **F**lood **E**bb **Added Tide:** 15.5 flat bottom

Wind Condition: 1 **NW 8K** 2 **SW 8K** 3 **SW 13K** 4 **WNW 13K**

Heading: **I**nbound **O**utbound

PILOT: Capt. Charles Jonas (Pilot **1**) Capt. Donald Toby (Pilot **2**)

Filename = Area + Alternative + Tide + Wind + Heading +Pilot + Repetition

Filename: D-P2-F-NW8-O-2-3

Start Time:

End Time:

Comments: Larger ship (TANK10L) and 4000 Hp Tugs
Extra Room preferred

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX L
RECORD OF NON-APPLICABILITY

Appendix L

Air Quality Analysis

RECORD OF NON-APPLICABILITY (RONA)

Emissions Calculations for:

New Haven Harbor Navigation Improvement Project
New Haven, Connecticut

GENERAL CONFORMITY - RECORD OF NON-APPLICABILITY

Project/Action Name:	New Haven Harbor Navigation Improvement Project New Haven, Connecticut
Project/Action Point of Contact:	Joseph B. MacKay, Chief, Environmental Resources Section Phone: 978-318-8142

General Conformity under the Clean Air Act, Section 176 has been evaluated for the project described above according to the requirements of 40 CFR 93, Subpart B. The requirements of this rule are not applicable to this project/action because:

Total direct and indirect emission from this project/action are estimated at less than 100 tons for Ozone per year, and are below the conformity threshold value established at 40 CFR 93.153(b) of 100 tons/year of Ozone;

AND

The project/action is not considered regionally significant under 40 CFR 93.153(i).

Supporting documentation and emissions estimates are:

(X) ATTACHED
(X) APPEAR IN THE NEPA DOCUMENTATION (Section 7.12)
( ) OTHER

SIGNED MACKAY.JOSEPH.B.1228795425 Digitally signed by MACKAY.JOSEPH.B.1228795425 Date: 2019.09.05 10:57:26 -04'00'

Joseph B. MacKay, Chief, Environmental Resources Section

Emissions Calculations for the New Haven Harbor Navigation Improvement Project

General Conformity Review and Emission Inventory for the New Haven Harbor Improvement Project
Estimates from Project Manager & Cost Engineer
5-Jun-18

YEAR 2021

1	2	3	4	5	6	7	8	9	10	11
	Project Emission Sources and Estimated Power						NOx Emission Estimates		VOC Emission Estimates	
Equipment/Engine Category	# of Engines	hp	LF	hrs/year	# of Calendar Years	hp-hr	NOx EF (g/hp-hr)	NOx Emissions (tons)	VOC EF (g/hp-hr)	VOC Emissions (tons)
Mechanical Dredge	1	5000	0.43	1773	1	3,811,950	9.200	38.66	1.300	5.46
Work Tug (Mechnical Dredge attendant)	1	250	0.43	1773	1	190,598	9.200	1.93	1.300	0.27
Crew/Survey Workboat	2	100	0.43	1773	1	152,478	9.200	1.55	1.300	0.22
Derrick	2	150	0.43	1773	1	228,717	9.200	2.32	1.300	0.33
Towing Tugboat	1	3000	0.43	1773	1	2,287,170	9.200	23.19	1.300	3.28
Dump Scow	2	50	0.43	1773	1	76,239	9.200	0.77	1.300	0.11
Hydraulic Dredge	1	1700	0.43	0	1	-	9.200	0.00	1.300	0.00
Work Tug (Hydraulic Dredge Attendant)	2	150	0.43	0	1	-	9.200	0.00	1.300	0.00
Crew/Survey Workboat	1	100	0.43	0	1	-	9.200	0.00	1.300	0.00
Derrick	2	150	0.43	0	1	-	9.200	0.00	1.300	0.00
Booster	1	1600	0.43	0	1	-	9.200	0.00	1.300	0.00
Work Tug (Blast Attendant)	1	250	0.43	805	1	86,538	9.200	0.88	1.300	0.12
Towing Vessel (Blasting)	1	3000	0.43	805	1	1,038,450	9.200	10.53	1.300	1.49
Total Emissions							**NOx Total**	**79.83**	**VOC Total**	**11.28**

	hrs	%
Dredge Interior Channel	1773	90%
Blasting	805	60%

Horsepower Hours
hp-hr = # of engines*hp*LF*hrs/day*days of operation

Load Factors
Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile. LFs used are from EPA (2010) Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. US EPA, NR-005d, 47 pp.

Emission Factors
NOx Emissions Factor for Off-Road Construction Equipment is 9.20 g/hp-hr
VOC Emissions Factor for Off-Road Construction Equipment is 1.30 g/hp-hr

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

General Conformity Review and Emission Inventory for the New Haven Harbor Improvement Project
Estimates from Project Manager & Cost Engineer
5-Jun-18

YEAR 2022

1	2	3	4	5	6	7	8	9	10	11
	Project Emission Sources and Estimated Power						NOx Emission Estimates		VOC Emission Estimates	
Equipment/Engine Category	# of Engines	hp	LF	hrs/year	# of Calendar Years	hp-hr	NOx EF (g/hp-hr)	NOx Emissions (tons)	VOC EF (g/hp-hr)	VOC Emissions (tons)
Mechanical Dredge	1	5000	0.43	1695	1	3,644,250	9.200	36.96	1.300	5.22
Work Tug (Mechnical Dredge attendant)	1	250	0.43	1695	1	182,213	9.200	1.85	1.300	0.26
Crew/Survey Workboat	2	100	0.43	1695	1	145,770	9.200	1.48	1.300	0.21
Derrick	2	150	0.43	1695	1	218,655	9.200	2.22	1.300	0.31
Towing Tugboat	1	3000	0.43	1695	1	2,186,550	9.200	22.17	1.300	3.13
Dump Scow	2	50	0.43	1695	1	72,885	9.200	0.74	1.300	0.10
Hydraulic Dredge	1	1700	0.43	1350	1	986,850	9.200	10.01	1.300	1.41
Work Tug (Hydraulic Dredge Attendant)	2	150	0.43	1350	1	174,150	9.200	1.77	1.300	0.25
Crew/Survey Workboat	1	100	0.43	1350	1	58,050	9.200	0.59	1.300	0.08
Derrick	2	150	0.43	1350	1	174,150	9.200	1.77	1.300	0.25
Dozer	1	440	0.43	1350	1	255,420	9.200	2.59	2.300	0.65
Booster	1	1600	0.43	1350	1	928,800	9.200	9.42	1.300	1.33
Work Tug (Blast Attendant)	1	250	0.43	530	1	56,975	9.200	0.58	1.300	0.08
Towing Vessel (Blasting)	1	3000	0.43	530	1	683,700	9.200	6.93	1.300	0.98
Total Emissions							**NOx Total**	**99.06**	**VOC Total**	**14.28**

	hrs	%
Dredge Interior Channel	195	10%
Dredge Bend (ordinary)	250	30%
Dredge manuv Area	1050	100%
Dredge turning Basin	200	100%
	1695	
Hydraulic Dredge	1350	100%
Blasting	530	40%

Horsepower Hours
hp-hr = # of engines*hp*LF*hrs/day*days of operation

Load Factors
Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile. LFs used are from EPA (2010) Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. US EPA, NR-005d, 47 pp.

Emission Factors
NOx Emissions Factor for Off-Road Construction Equipment is 9.20 g/hp-hr
VOC Emissions Factor for Off-Road Construction Equipment is 1.30 g/hp-hr

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

General Conformity Review and Emission Inventory for the New Haven Harbor Improvement Project
Estimates from Project Manager & Cost Engineer
5-Jun-18
YEAR 2023

1	2	3	4	5	6	7	8	9	10	11
	Project Emission Sources and Estimated Power						NOx Emission Estimates		VOC Emission Estimates	
Equipment/Engine Category	# of Engines	hp	LF	hrs/year	# of Calendar Years	hp-hr	NOx EF (g/hp-hr)	NOx Emissions (tons)	VOC EF (g/hp-hr)	VOC Emissions (tons)
Mechanical Dredge	1	5000	0.43	1910	1	4,106,500	9.200	41.64	1.300	5.88
Work Tug (Mechnical Dredge attendant)	1	250	0.43	1910	1	205,325	9.200	2.08	1.300	0.29
Crew/Survey Workboat	2	100	0.43	1910	1	164,260	9.200	1.67	1.300	0.24
Derrick	2	150	0.43	1910	1	246,390	9.200	2.50	1.300	0.35
Towing Tugboat	1	3000	0.43	1910	1	2,463,900	9.200	24.99	1.300	3.53
Dump Scow	2	50	0.43	1910	1	82,130	9.200	0.83	1.300	0.12
Hydraulic Dredge	1	1700	0.43	0	1	-	9.200	0.00	1.300	0.00
Work Tug (Hydraulic Dredge Attendant)	2	150	0.43	0	1	-	9.200	0.00	1.300	0.00
Crew/Survey Workboat	1	100	0.43	0	1	-	9.200	0.00	1.300	0.00
Derrick	2	150	0.43	0	1	-	9.200	0.00	1.300	0.00
Booster	1	1600	0.43	0	1	-	9.200	0.00	1.300	0.00
Work Tug (Blast Attendant)	1	250	0.43	0	1	-	9.200	0.00	1.300	0.00
Towing Vessel (Blasting)	1	3000	0.43	0	1	-	9.200	0.00	1.300	0.00
Total Emissions							**NOx Total**	**73.71**	**VOC Total**	**10.42**

	hrs	%
Dredge Bend (ordinary)	580	70%
Dredge Bend (rock)	75	100%
Dredge Entrance Channel	910	100%
Dredge Entrance Channel Extension	345	100%
	1910	

Horsepower Hours
hp-hr = # of engines*hp*LF*hrs/day*days of operation

Load Factors
Load Factor (LF) represents the average percentage of rated horsepower used during a source's operational profile. LFs used are from EPA (2010) Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling. US EPA, NR-005d, 47 pp.

Emission Factors
NOx Emissions Factor for Off-Road Construction Equipment is 9.20 g/hp-hr
VOC Emissions Factor for Off-Road Construction Equipment is 1.30 g/hp-hr

Emissions (g) = Power Demand (hp-hr) * Emission Factor (g/hp-hr)

Emissions (tons) = Emissions (g) * (1 ton/907200 g)

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX M
COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION
NEW YORK

COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION FOR THE IMPROVEMENT DREDGING OF THE NEW HAVEN HARBOR FEDERAL NAVIGATION PROJECT (NEW HAVEN, CONNECTICUT)

SEPTEMBER 18, 2018

SUBMITTED TO: **STATE OF NEW YORK**
DEPARTMENT OF STATE
COASTAL ZONE MANAGEMENT PROGRAM

PREPARED BY: **US ARMY CORPS OF ENGINEERS**
ENGINEERING/PLANNING DIVISION
ENVIRONMENTAL RESOURCES SECTION

PROJECT: Improvement Dredging of New Haven Harbor, New Haven, Connecticut, Federal Navigation Project. Improvement dredging of the 35-foot-deep main channel and the 35-foot-deep turning basin.

DESCRIPTION OF WORK:

The existing New Haven Harbor Federal Navigation Project (FNP) is shown in Figure 1. Navigation features of the existing Federal Navigation Project include:

- A main ship channel, -35 feet MLLW, extending about 5 miles from deep water in Long Island Sound to the head of the harbor at the mouth of the Quinnipiac River, varying in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widened to 800 feet along the upper harbor terminals to provide a maneuvering area;
- A turning basin in the upper harbor west of the channel also at -35 feet MLLW;
- Two anchorages west of the main channel, at -15 and -16 feet MLLW;
- The Quinnipiac River Channel, at -18 feet MLLW (lower channel) and -16 feet MLLW (upper channel), and generally 200 feet wide;
- The Mill River Channel, at -12 feet MLLW, 200 feet wide, including two branches (east branch at 100 ft. wide, and west branch at 125 feet wide);
- The West River channel authorized at -12-feet MLLW, 100 to 150 feet wide, with a -6 foot MLLW anchorage;
- A pile and stone T-dike at Stony Point west of the main channel, 4,200 feet long; and
- Three offshore stone breakwaters, totaling 12,100 feet in length providing a refuge in the outer harbor.

Due to inefficiencies in large vessels transiting the harbor, USACE is considering navigation improvement to the New Haven Harbor FNP. The tentatively selected plan (TSP) for the New Haven Harbor Navigation Improvement project is the 40 ft. Plan. The TSP consists of the following General Navigation Feature Improvements:

General Navigation Feature Improvements

- Deepen the Channel and Turning Basin from - 35 to -40 feet, MLLW
- Widen the turning basin to the north 200 feet
- Widen the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet.
- Widen Bend at Breakwater from 560 to 800 feet

The improvement features are shown in Figure 2. The dredged material quantity estimate for the improvement dredging is shown in Table 1.

Table 1. TSP Dredged Material Quantity Estimates.

TSP (40-ft Plan)	Dredging Quantities (CY)		
	Cut	2-ft. Over depth	Total
Entrance Channel**	278,300	240,000	518,300
Bend (Ordinary Material)	475,300	161,300	636,600
Bend (Rock) (Required Cut to El 42)	24,900	18,600	43,500
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging	**2,811,500**	**1,510,700**	**4,322,200**

Dredged Material Placement Sites Base Plan

The following sites will be used for the placement of dredged material from the improvement project. These sites are considered the Federal base plan and also represent beneficial use of the dredged material. The sites are:

- Morris Cove and West River Borrow Pits
- Create Oyster Habitat south of east breakwater
- Rock placement at west Breakwater (rock reef)
- Cover historic disposal mounds at CLDS

Salt Marsh Creation Additional Opportunity for Beneficial Use Site

In addition to the above placement sites the opportunity to use some of the dredged material that would go to CLDS to create about 70 acres of salt march was identified. This salt marsh creation site represents an increase in cost over the less expensive option of bringing the material to CLDS. The Non-Federal Sponsors support the salt marsh creation site and are willing to share in the incremental cost above the base plan.

Additionally, a confined aquatic disposal (CAD) cell may be developed within the harbor to hold any unsuitable dredge material (i.e., material that is not suitable for open water placement) that may be generated by the project.

All potential in harbor disposal sites are shown in Figure 2. The CLDS is not shown.

Figure 1. New Haven Harbor Federal Navigation Project.

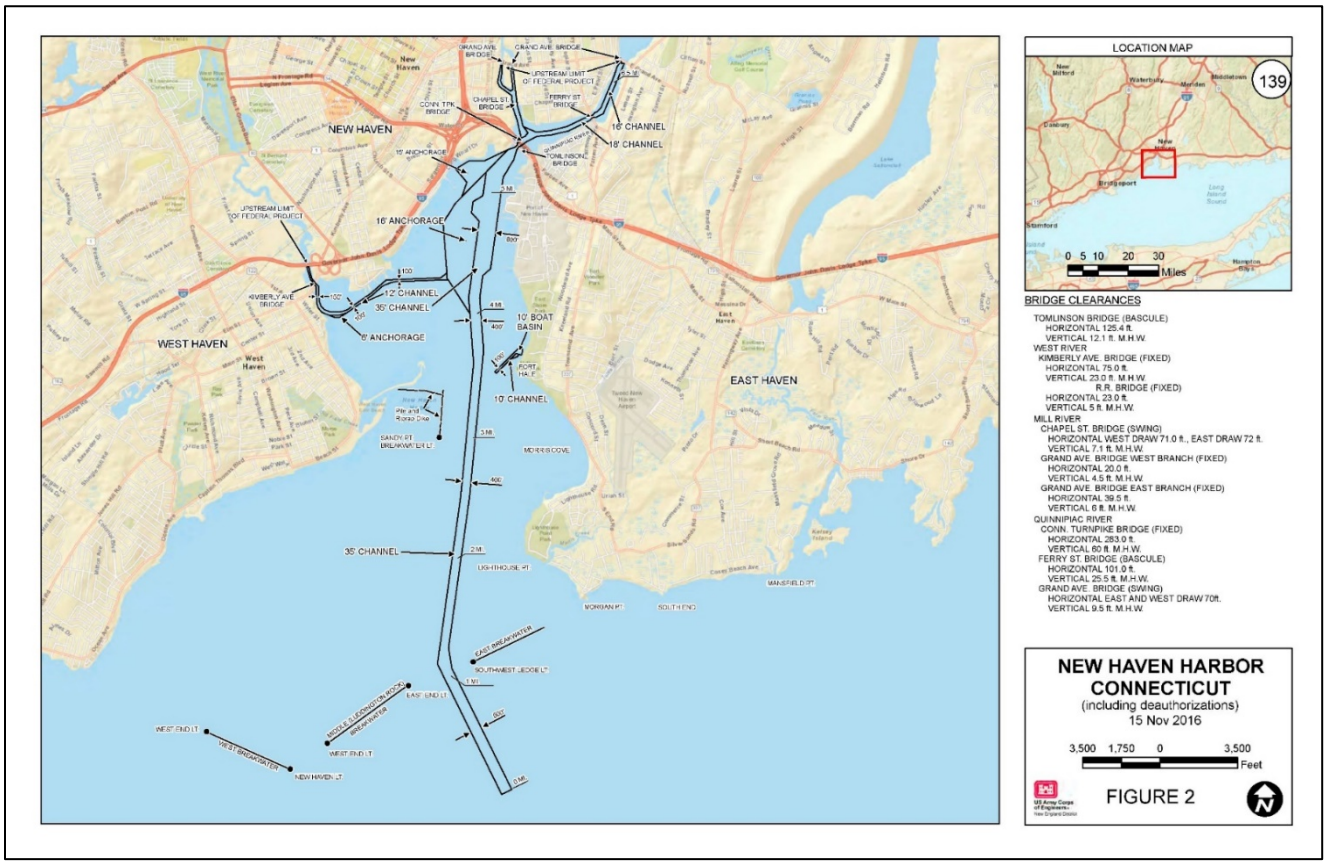
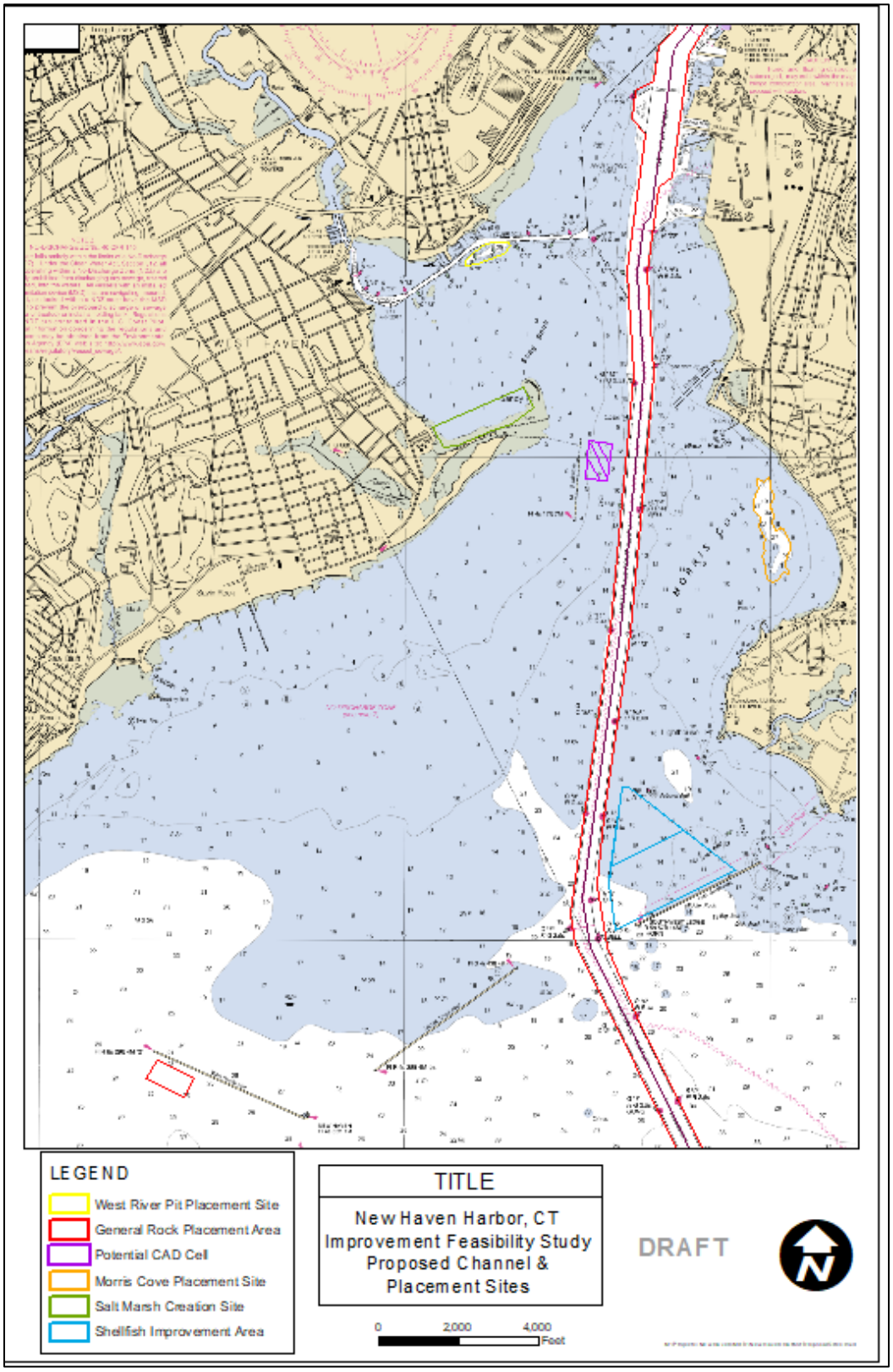


Figure 2. Navigation Improvement Features and Placement Site Locations.



NEW YORK STATE POLICY CONSISTENCY:

Policy 1. Restore, revitalize, and redevelop deteriorated and underutilized waterfront areas for commercial, industrial, cultural, recreational and other compatible areas.

Improvement dredging of this Federal Navigation Project will promote Coastal Zone Management (CZM) policy goals by improving the authorized project dimensions to assure continued safe and economic use of the waterway. A well-maintained and functional channel and turning basin facilitates maritime traffic in the area, prevents possible groundings and personnel injuries, and contributes to the vitality of the economy of the region.

Policy 2. Facilitate the siting of water-dependent uses and facilities on or adjacent to coastal waters.

The proposed improvement dredging will facilitate the development and continuation of water-dependent uses and facilities on or adjacent to coastal waters by providing adequate water depth to assure continued safe and economic use of the waterway. The continued and improved access to this channel promotes the economic viability of the region by facilitating overall regional navigation and encourages the development of water-dependent facilities and vicinity support services.

Policy 3. Further develop the State's major ports of Albany, Buffalo, New York, Ogdensburg and Oswego as centers of commerce and industry, and encourage the siting, in these port areas, including those under the jurisdiction of State public authorities, of land use and development which is essential to, or in support of, the waterborne transportation of cargo and people.

Not applicable.

Policy 4. Strengthen the economic base of smaller harbor areas by encouraging the development and enhancement of those traditional use and activities, which have provided such areas with their unique maritime identity.

Improvement dredging of the subject project will maintain and enhance activities in this in the region by providing adequate depth of water for New Haven Harbor, thereby enhancing waterborne transportation for commercial and recreational vessels. The proposed improvement dredging will facilitate the development and continuation of water-dependent uses and facilities on or adjacent to New Haven Harbor's coastal waters.

Policy 5. Encourage the location of development in areas where public service and facilities essential to such development are adequate.

New Haven Harbor is highly developed, commercially important port. Adequate facilities to accommodate all marine related activities are present.

Policy 6. Expedite permit procedures in order to facilitate the siting of development activities at suitable locations.

Not applicable.

Policy 7. Significant coastal fish and wildlife habitats will be protected, preserved, and, where practical, restored so as to maintain their viability as habitats.

It is determined that improvement dredging of this project with disposal at multiple beneficial use sites in the harbor and at the CLDS will have no significant adverse environmental impacts on water quality, marine resources, wildlife, recreation, aesthetics and flood protection. An Environmental Impact Statement and Clean Water Act Section 404 (b) 1 evaluation have been prepared for this project.

Policy 8. **Protect fish and wildlife resources in the coastal area from the introduction of hazardous wastes and other pollutants which bioaccumulate in the food chain or which cause significant sublethal or lethal effects on those resources.**

Portions of the he dredged material will be beneficially reused in New Haven Harbor and portions will be transported by scows to the Central Long Island Sound Disposal Site. The dredging and disposal actions of the proposed project will adhere to all State and Federal requirements governing those actions. The material has been tested according to all relevant protocols to ensure that there will be no bioaccumulation of contaminants causing sublethal or lethal impacts. Therefore, there will be no significant adverse impact on the coastal area and the adjacent ecosystem. The vital economic, social and environmental interests of the Federal, State and its citizens are safeguarded.

Policy 9. Expand recreational use of fish and wildlife resources in coastal areas by increasing access to existing resources, supplementing existing stocks, and developing new resources.

Not applicable.

Policy 10. Further develop commercial finfish, shellfish and crustacean resources in the coastal area by encouraging the construction of new, or improvement of existing on-shore commercial fishing facilities, increasing marketing of the State's seafood products, maintaining adequate stocks, and expanding aquaculture facilities.

Not applicable.

Policy 11. Buildings and other structures will be sited in the coastal area so as to minimize damage to property and the endangering of human lives caused by flooding and erosion.

Not applicable.

Policy 12. Activities or development in the coastal area will be undertaken so as to minimize damage to natural resources and property from flooding and erosion by protecting natural protective features including beaches, dunes, barrier islands and bluffs.

This improvement dredging activity, with beneficial reuse of the dredged material and disposal at the CLDS, will have minimal, or no, damage to natural resources and property. It is anticipated that there will be no flooding or erosion as a result of this project. It is anticipated there will be no long-term adverse impacts to nearby beaches, dunes, barrier islands, or bluffs.

Policy 13. The construction or reconstruction of erosion protection structures shall be undertaken only if they have a reasonable probability of controlling erosion for at least thirty years as demonstrated in design and construction standards and/or assured maintenance or replacement programs.

Not applicable. There are no erosion protection structures in this project.

Policy 14. Activities and development including the construction or reconstruction of erosion protection structures shall be undertaken so that there will be no measurable increase in erosion or flooding at the site of such activities or development, or at other locations.

Not applicable. There are no erosion protection structures in this project. It is anticipated that there will be no increase in erosion or flooding at the site as a result of this dredging activity.

Policy 15. Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes, which will supply beach material to land adjacent to such waters and shall be undertaken in a manner, which will not cause an increase in erosion of such land.

There will be no significant interference with the natural coastal processes which would supply beach material to land adjacent to the Federal channel and turning basin. The dredged material is fine-grained silt and clay – not suited for beaches. Erosion of land is not anticipated.

Policy 16. Public funds shall only be used for erosion protective structures where necessary to protect human life, and new development which requires a location within or adjacent to an erosion hazard areas to be able to function, or existing development; and only where the public benefits outweigh the long term monetary and other costs including the potential for increasing erosion and adverse effects on natural protective features.

This is a Federal improvement dredging project, and does not include any erosion protective structures that specifically target shoreline protection. However, the creation

of salt marsh with dredged material will add to New Haven Harbor's ability to dampen the effects of coastal erosion and flooding.

Policy 17. Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible.

This is a Federal improvement dredging project, and does not include any erosion protective structures that specifically target shoreline protection. However, the creation of salt marsh with dredged material will add to New Haven Harbor's ability to dampen the effects of coastal erosion and flooding.

Policy 18. To safeguard the vital economic, social and environmental interests of the State and of its citizens, proposed major actions in the coastal area must give full consideration to those interests, and to the safeguards which the State has established to protect valuable coastal resource areas.

The dredging and placement actions of the proposed project will adhere to all Federal and State requirements governing those actions. The aquatic environment adjacent to the dredging site will be affected only temporarily, with minimal disturbance to fish and wildlife and their habitats in the coastal area. The balance between economic development and environmental interests will be achieved. The preservation of the ecological systems will be safeguarded. The final impact in the coastal area and the adjacent ecosystem will be insignificant. Thus, this action is consistent with the CZM Policy.

Policy 19. Protect, maintain, and increase the level and types of access to public water-related recreation resources and facilities.

Improvement of the channel and turning basin will result in improved access for recreational and commercial vessels, including transient boaters.

Policy 20. Access to the public-owned foreshore and to lands immediately adjacent to the foreshore or the water's edge that are publicly-owned shall be provided and it shall be provided in a manner compatible with adjoining uses.

The improvement dredging of the channel will not reduce or eliminate the existing level of public coastal lands or waters.

Policy 21. Water dependent and water enhanced recreation will be encouraged and facilitated and will be given priority over non-water uses along the coast.

Water dependent and water enhanced recreation may increase following the improvement dredging.

Policy 22. Development when located adjacent to the shore will provide for water-related recreation whenever such use is compatible with reasonably anticipated demand for such activities and its compatible with the primary purpose of the

development.

Not Applicable

Policy 23. Protect, enhance and restore structures, districts, areas or sites that are of significance in history, architecture, archeology or culture of the State, its communities or the Nation.

No known archaeological, scientific, prehistorical or historical data are expected to be lost due to work accomplished under the proposed improvement dredging operation or beneficial use alternatives. The Central Long Island Sound disposal site has been previously used.

Policy 24. Prevent impairment of scenic resources of state wide significance.

This project will not impair scenic resources.

Policy 25. Protect, restore or enhance natural and man-made resources which are not identified as being of statewide significance, but which contribute to the overall scenic quality of the coastal area.

Not applicable.

Policy 26. Conserve and protect agricultural lands in the State's coastal area.

Not applicable.

Policy 27. Decisions on the siting and construction of major energy facilities in the coastal area will be based on public energy needs, compatibility of such facilities with the environment, and the facility's need for a shore front location.

Not applicable.

Policy 28. Ice management practices shall not interfere with the production of hydroelectric power, damage significant fish and wildlife and their habitats, or increase shoreline erosion or flooding.

Not applicable.

Policy 29. Encourage the development of energy resources on the Outer Continental Shelf, in Lake Erie and in other water bodies, and ensure the environmental safety of such activities.

Not applicable.

Policy 30. Municipal, industrial, and commercial discharge of pollutants, including but not limited to, toxic and hazardous substances, into coastal waters will conform to State and National water quality standards.

Not applicable.

Policy 31. State coastal area policies and management objectives of approved local Waterfront Revitalization Programs will be considered while reviewing coastal water classifications and while modifying water quality standards; however those waters already over-burdened with contaminants will be recognized as being a development constraint.

Not applicable.

Policy 32. Encourage the use of alternative or innovative sanitary waste systems in small communities where the costs of conventional facilities are unreasonably high, given the size of the existing tax base of these communities

Not applicable.

Policy 33. Best management practices will be used to ensure the control of storm water runoff and combined sewer overflows draining into coastal waters.

Not applicable.

Policy 34. Discharge of waste materials into coastal waters from vessels subject to State jurisdiction into coastal waters will be limited so as to protect significant fish and wildlife habitats, recreational areas and water supply areas.

Discharge of sewage, garbage, rubbish and other solid and liquid materials from dredging equipment will not be allowed.

Policy 35. Dredging and dredged material disposal in coastal waters will be undertaken in a manner that meets existing State dredging permit requirements, and protects significant fish and wildlife habitats, scenic resources, natural protective features, important agricultural lands, and wetlands.

The dredging and disposal actions of the proposed project will adhere to all federal requirements governing those actions. A Water Quality Certificate will be obtained from the State of Connecticut Department of Energy and Environmental Protection. In addition, the proposed project is being coordinated with the U.S. EPA, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service, and the New York Department of State.

Policy 36. Activities related to the shipment and storage of petroleum and other hazardous materials will be conducted in a manner that will prevent or at least minimize spills into coastal waters; all practicable efforts will be undertaken to

expedite the cleanup of such discharges; and restitution for damages will be required when these spills occur.

The dredge contractor is required to submit an "Environmental Protection Plan", including a “Spill Control Plan”, which includes the procedures to be taken in the event that an oil spill has occurred, prior to the commencement of work. Thus, this action will be consistent with Coastal Zone Management policy.

Policy 37. Best management practices will be utilized to minimize the non-point discharge of excess nutrients, organics and eroded soils into coastal waters.

The project will be managed in a manner that will comply to the maximum extent practicable with the requirements of the State of Connecticut’s Water Quality Certificate and those of the Federal Agencies.

Policy 38. The quality and quantity of surface water and groundwater supplies, will be conserved and protected, particularly where such waters constitute the primary or sole source of water supply.

Not applicable.

Policy 39. The transport, storage treatment and disposal of solid wastes, particularly hazardous wastes, within coastal areas will be conducted in such a manner so as to protect groundwater and surface water supplies, significant fish and wildlife habitats, recreation areas, important agricultural lands and scenic resources.

Not applicable. This improvement dredging and disposal project will not involve the transportation of solid or hazardous wastes.

Policy 40. Effluent discharged from major steam electric generating and industrial facilities into coastal waters will not be unduly injurious to fish and wildlife and shall conform to State water quality standards.

Not applicable.

Policy 41. Land use or development in the coastal area will not cause National or State air quality standards to be violated.

The proposed project has been designed to conform to all applicable State air quality standards and is therefore consistent with this policy.

Policy 42. Coastal Management policies will be considered if the State reclassifies land areas pursuant to the prevention of significant deterioration regulations of the Federal Clean Air Act.

Not applicable.

Policy 43. Land use or development in the coastal area must not cause the generation of significant amounts of the acid rain precursors: nitrates and sulfates.

Not applicable.

Policy 44. Preserve and protect tidal and fresh water wetlands and preserve the benefits derived from these areas.

He proposed dredging effort will not impact any freshwater or tidal wetlands. The beneficial use of the dredged material generated from the proposed action will enhance tidal wetlands. Thus, these actions are consistent with CZM policy.

Consistency Determination: Based upon the foregoing, the Corps has determined that the proposed action is consistent with New York Department of State's Coastal Zone Management Program.

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX N
COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION
CONNECTICUT

COASTAL ZONE MANAGEMENT CONSISTENCY DETERMINATION FOR THE IMPROVEMENT DREDGING OF THE NEW HAVEN HARBOR FEDERAL NAVIGATION PROJECT (NEW HAVEN, CONNECTICUT)

SEPTEMBER 18, 2018

SUBMITTED TO: STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION

PREPARED BY: US ARMY CORPS OF ENGINEERS
ENGINEERING/PLANNING DIVISION
ENVIRONMENTAL RESOURCES SECTION

PROJECT: Improvement Dredging of New Haven Harbor, New Haven, Connecticut, Federal Navigation Project. Improvement dredging of the 35-foot-deep main channel and the 35-foot-deep turning basin.

DESCRIPTION OF WORK:

The existing New Haven Harbor Federal Navigation Project (FNP) is shown in Figure 1. Navigation features of the existing Federal Navigation Project include:

- A main ship channel, -35 feet MLLW, extending about 5 miles from deep water in Long Island Sound to the head of the harbor at the mouth of the Quinnipiac River, varying in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widened to 800 feet along the upper harbor terminals to provide a maneuvering area;
- A turning basin in the upper harbor west of the channel also at -35 feet MLLW;
- Two anchorages west of the main channel, at -15 and -16 feet MLLW;
- The Quinnipiac River Channel, at -18 feet MLLW (lower channel) and -16 feet MLLW (upper channel), and generally 200 feet wide;
- The Mill River Channel, at -12 feet MLLW, 200 feet wide, including two branches (east branch at 100 ft. wide, and west branch at 125 feet wide);
- The West River channel authorized at -12-feet MLLW, 100 to 150 feet wide, with a -6 foot MLLW anchorage;
- A pile and stone T-dike at Stony Point west of the main channel, 4,200 feet long; and
- Three offshore stone breakwaters, totaling 12,100 feet in length providing a refuge in the outer harbor.

Due to inefficiencies in large vessels transiting the harbor, USACE is considering navigation improvement to the New Haven Harbor FNP. The tentatively selected plan (TSP) for the New Haven Harbor Navigation Improvement project is the 40 ft. Plan. The TSP consists of the following General Navigation Feature Improvements:

General Navigation Feature Improvements

- Deepen the Channel and Turning Basin from - 35 to -40 feet, MLLW
- Widen the turning basin to the north 200 feet
- Widen the channel to from 400 to 500 feet inner channel and 500 to 600 feet entrance channel
- Widen Bend at Breakwater from 560 to 800 feet

The improvement features are shown in Figure 2. The dredged material quantity estimate for the improvement dredging is shown in Table 1.

Table 1. TSP Dredged Material Quantity Estimates.

TSP (40-ft Plan)	Dredging Quantities (CY)		
	Cut	2-ft. Over depth	Total
Entrance Channel**	278,300	240,000	518,300
Bend (Ordinary Material)	475,300	161,300	636,600
Bend (Rock) (Required Cut to El 42)	24,900	18,600	43,500
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging	**2,811,500**	**1,510,700**	**4,322,200**

Dredged Material Placement Sites Base Plan

The following sites will be used for the placement of dredged material from the improvement project. These sites are considered the Federal base plan and also represent beneficial use of the dredged material. The sites are:

- Morris Cove and West River Borrow Pits
- Create Oyster Habitat south of east breakwater
- Rock placement at west Breakwater (rock reef)
- Cover historic disposal mounds at CLDS

Salt Marsh Creation Additional Opportunity for Beneficial Use Site

In addition to the above placement sites the opportunity to use some of the dredged material that would go to CLDS to create about 70 acres of salt march was identified. This salt marsh creation site represents an increase in cost over the less expensive option of bringing the material to CLDS. The Non-Federal Sponsors support the salt marsh creation site and are

willing to share in the incremental cost above the base plan.

Additionally, a confined aquatic disposal (CAD) cell may be developed within the harbor to hold any unsuitable dredge material (i.e., material that is not suitable for open water placement) that may be generated by the project.

All potential in harbor disposal sites are shown in Figure 2. The CLDS is not shown.

Figure 1. New Haven Harbor Federal Navigation Project.

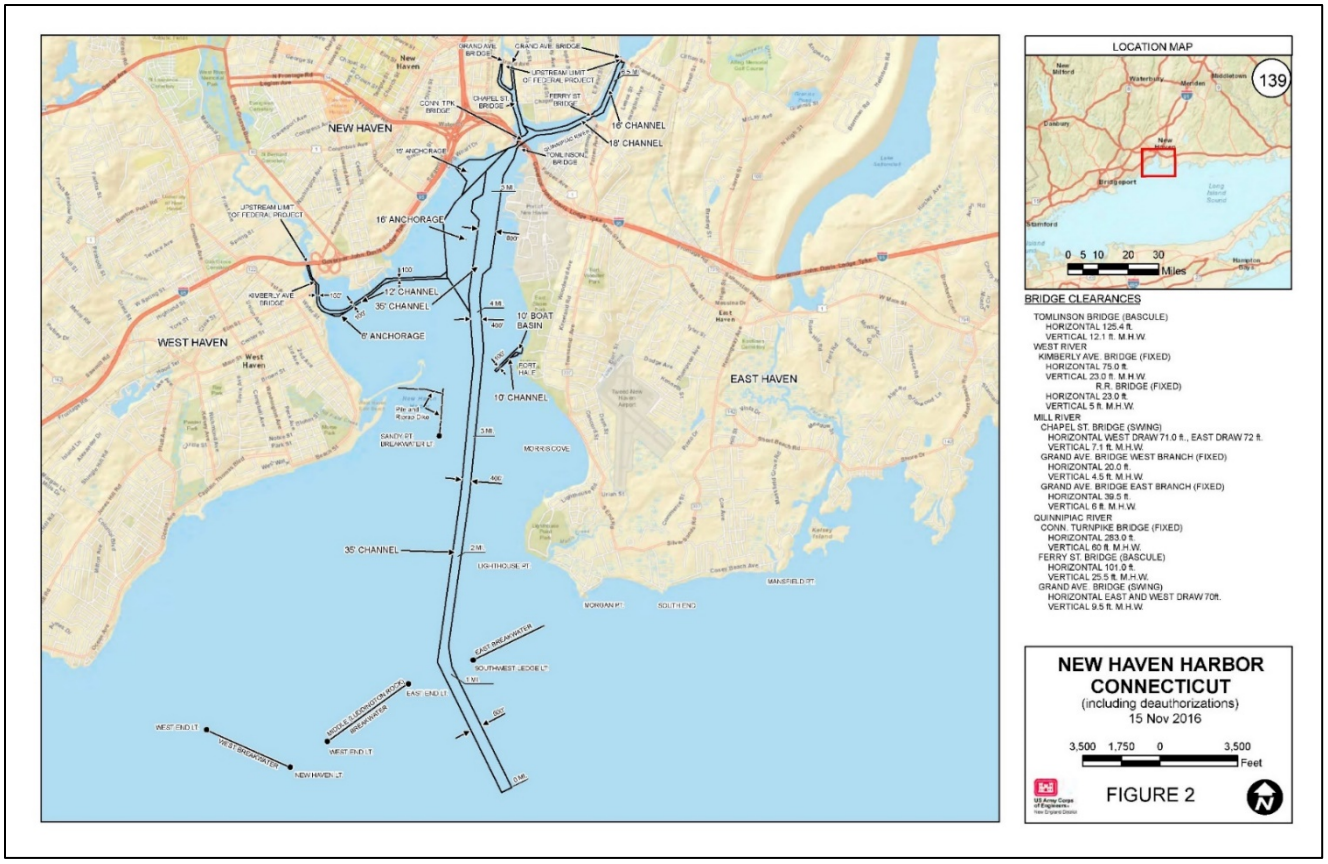
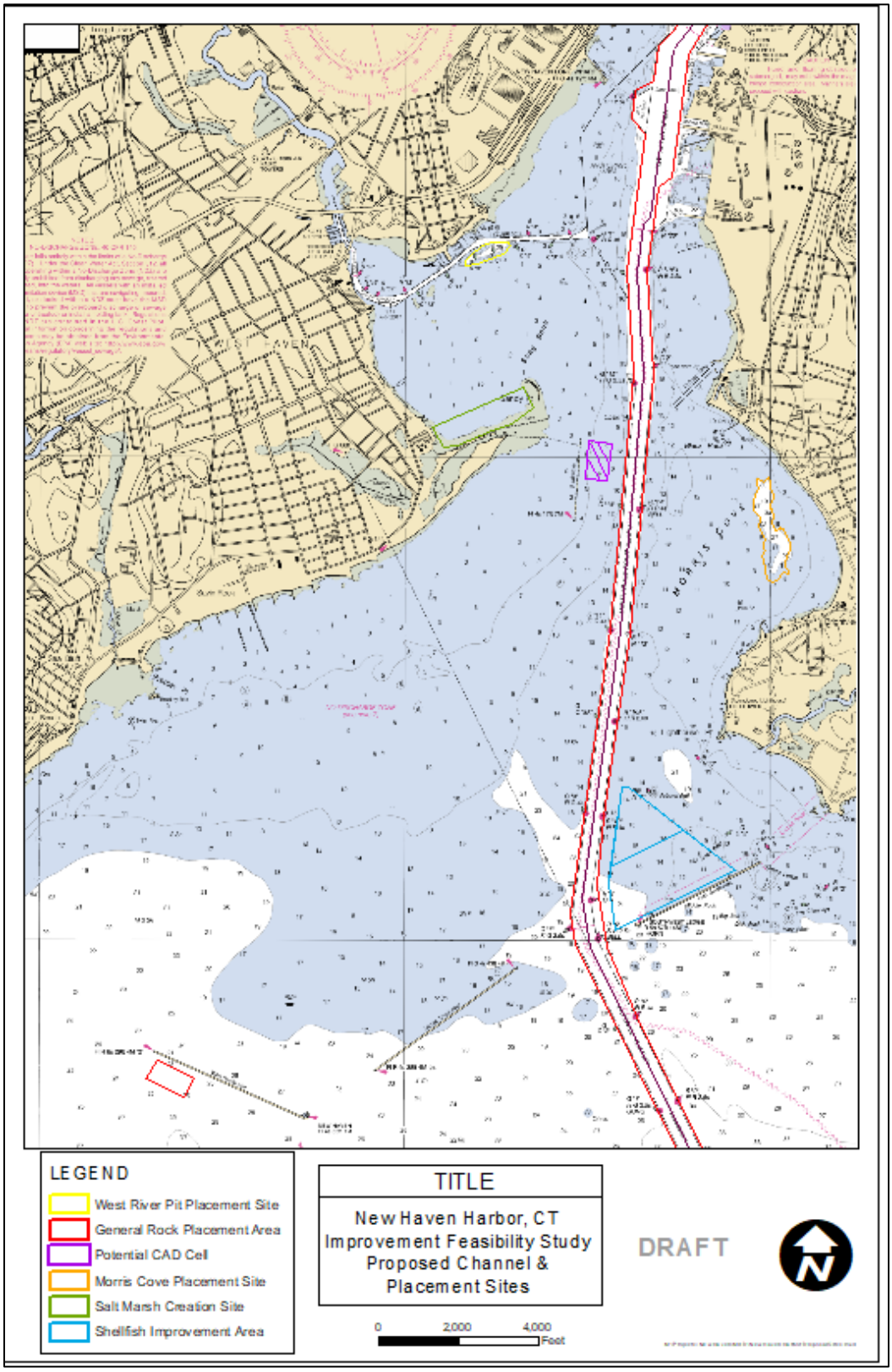


Figure 2. Navigation Improvement Features and Placement Site Locations.



Connecticut State Policies

Resource Policies

General Resources

1. To preserve and enhance coastal resources in accordance with the policies established by chapters 439(Environmental Protection Department and State Policy), 440 (Wetlands and Watercourses), 446i (Water Resources), 446k (Water Pollution Control), 447 (State Parks and Forests), 474 (Pollution), and 477 (Flood Control and Beach Erosion). CGS Section 22a-92(a) (2)

Compliance: The improvement dredging of the Federal Navigation Project in New Haven Harbor with disposal at multiple beneficial use sites in the harbor and at the CLDS will have no significant long term adverse environmental impacts on coastal resources. An Environmental Impact Statement and Clean Water Act Section 404(b)1 evaluation have been prepared for this project.

2. The general assembly hereby declares that the policy of the state of Connecticut is to conserve, improve and protect its natural resources and environment and to control air, land and water pollution in order to enhance the health, safety and welfare of the people of the state. CGS Section 22a-1 as referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will not produce significant long term air, land, or water pollution. All impacts associated with the project have been deemed to be short-term and non-significant.

3. It is hereby found and declared that there is a public trust in the air, water and other natural resources of the state of Connecticut and that each person is entitled to the protection, preservation and enhancement of the same. CGS Section 22a-15 as referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will not produce significant long term effects to natural resources of the state of Connecticut. All impacts associated with the project have been deemed to be short-term and non-significant.

4. The commissioner shall carry out the environmental policies of the state and shall have all powers necessary and convenient to faithfully discharge this duty. In addition to, and consistent with the environment policy of the state, the commissioner shall (a) promote and coordinate management of water, land and air resources to assure their protection, enhancement and proper allocation and utilization; (b) provide for the protection and management of plants, trees, fish, shellfish, wildlife and other animal life of all types, including the preservation of endangered species; (c) provide for the protection, enhancement and management of the public forests, parks, open spaces and natural area preserves; (d) provide for the protection, enhancement and management of inland, marine and coastal water resources, including, but not limited to, wetlands, rivers, estuaries and

shorelines; (e) provide for the prevention and abatement of all water, land and air pollution including, but not limited to, that related to particulate, gases, dust, vapors, noise, radiation, odors, nutrients and cooled or heated liquids, gases and solids; (f) provide for control of pests and regulate the use, storage and disposal of pesticides and other chemicals which may be harmful to man, sea life, animals, plant life or natural resources; (g) regulate the disposal of solid waste and liquid waste, including but not limited to, domestic and industrial refuse, junk motor vehicles, litter and debris, which methods shall be consistent with sound health, scenic environmental quality and land use practices; (h) regulate the storage, handling and transportation of solids, liquids and gases which may cause or contribute to pollution; and (I) provide for minimum state-wide standards for the mining, extraction or removal of earth materials of all types. CGS Section 22a-5, referenced by CGS Section 22a-92(a) (2)

Compliance: The improvement dredging of this project with disposal at multiple beneficial use sites in the harbor and at the CLDS will have no significant adverse environmental impacts on air quality, water quality, marine resources, wildlife, recreation, aesthetics and flood protection. Any unsuitable dredged material that is identified and required to be dredged for the proposed project will be managed through the use of a contained aquatic disposal cell to prevent impacts to Connecticut's resources. The proposed project will not add to the pollution of any of Connecticut's resources. An Environmental Impact Statement and Clean Water Act Section 404 (b) 1 evaluation have been prepared for this project.

Beaches & Dunes

5. To preserve the dynamic form and integrity of natural beach systems in order to provide critical wildlife habitats, a reservoir for sand supply, a buffer for coastal flooding and erosion, and valuable recreational opportunities. CGS Section 22a-92 (b) (2) (C)
Compliance: The improvement dredging of the New Haven Harbor FNP will not significantly impact natural beach systems in the harbor. The placement of dredged material at the Sandy Point beneficial use site will add 73 acres of saltmarsh habitat to the harbor's ecosystem that will function to provide critical habitat, coastal flooding buffering, and recreational opportunities for the state.

6. To insure that coastal uses are compatible with the capabilities of the system and do not unreasonably interfere with natural processes of erosion and sedimentation. CGS Section 22a-92(b)(2)(C) prevent, loss of life, property and revenue to municipalities and the state from taxation by the construction of protective works on or near shores and beaches within such areas. As title to the land between high and low watermark is vested in the state, it is further found and declared to be in the public interest to secure such exposed areas by the most economical and effective means for safeguarding life and protecting property and, because it is uneconomical and ineffective for the general purpose for an individual landowner to attempt to maintain protective installations separated from and lacking co-extension with those of abutting properties, that it is in the public interest to provide ways and means for collective and cooperative action to alleviate the dangers and destruction common to such exposed areas. It is further found and declared that because of the recurrence of severe flooding of many of the waterways of the state and their tributaries,

taking a huge toll in life and property, extensive flood protection measures must be inaugurated. It is, therefore, found and declared to be in the public interest that encroachment limits along waterways be established and any flood control features at dams and reservoirs be utilized as a part of the construction and installation of any flood control project. CGS Section 25-69, referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will not interfere with the natural processes of erosion and sedimentation in New Haven Harbor. Additionally, the project will not affect flooding in the system.

7. To encourage the restoration and enhancement of disturbed or modified beach systems. CGS Section 22a-92(b) (2) (C)

Compliance: The proposed project will beneficially use dredged material to create salt marsh habitat in the harbor. The creation of salt marsh will enhance the beach system of the harbor by adding to the diversity of habitat available in the New Haven Harbor ecosystem.

8. To require as a condition in permitting new coastal structures, including but not limited to, groins, jetties or breakwaters, that access to, or along, the public beach below mean high water must not be unreasonably impaired by such structures and to encourage the removal of illegal structures below mean high water which unreasonably obstruct passage along the public beach. CGS Section 22a-92(c) (1) (K)

Compliance: Public access to beach areas below mean high water will not be impaired as a result of this project.

Bluffs & Escarpments

9. To manage coastal bluffs and escarpments so as to preserve their slope and toe. CGS Section 22a-92(b) (2) (A)

Compliance: No coastal bluffs or escarpments will be impacted by the proposed project.

10. To discourage uses which do not permit continued natural rates of erosion. CGS Section 22a-92(b) (2) (A)

Compliance: Natural rates of erosion in the system will not be impaired by the proposed project.

11. To disapprove uses that accelerate slope erosion and alter essential patterns and supply of sediments to the littoral transport system. CGS Section 22a-92(b) (2) (A)

Compliance: The proposed project will not affect sediment transport in the system.

Coastal Hazard Area

12. To manage coastal hazard areas so as to insure that development proceeds in such a manner that hazards to life and property are minimized. CGS Section 22a-92(b) (2) (F)

Compliance: No coastal hazard areas will be affected by this project.

13. To promote nonstructural solutions to flood and erosion problems except in those instances where structural alternatives prove unavoidable and necessary to protect existing inhabited structures, infrastructural facilities or water-dependent uses. CGS Section 22a-92(b) (2) (F)

Compliance: The creation of salt marsh with dredged material will add to the system's ability to dampen the effects of coastal erosion and flooding.

14. To maintain the natural relationship between eroding and depositional coastal landforms. CGS Section 22a-92(b) (2) (J)

Compliance: The proposed project will not affect the natural relationship between eroding and depositional coastal landforms.

15. To minimize the adverse impacts of erosion and sedimentation on coastal land uses through the promotion of nonstructural mitigation measures. CGS Section 22a-92(b) (2) (J)

Compliance: The creation of salt marsh with dredged material will add to the system's ability to dampen the effects of coastal erosion and flooding.

16. Structural solutions are permissible when necessary and unavoidable for the protection of infrastructural facilities, water-dependent uses, or existing inhabited structures, and where there is no feasible, less environmentally damaging alternative and where all reasonable mitigation measures and techniques have been provided to minimize adverse environmental impacts. CGS Section 22a-92(b) (2) (J)

Compliance: Not applicable.

17. To maintain, enhance, or, where feasible, restore natural patterns of water circulation and fresh and saltwater exchange in the placement or replacement of culverts, tide gates or other drainage or flood control structures. CGS Section 22a-92(c) (2) (B)

Compliance: The natural patterns of water circulation in the project area will not be affected.

18. It is hereby found and declared that, because of the occurrence of severe storms accompanied by winds up to hurricane force, abnormal high tides and tide flooding, the lives and property of residents and other persons within areas exposed to such hazards are endangered, and that, in the interest of public health, safety and general welfare, it is necessary to minimize, and as far as possible to prevent, loss of life, property and revenue to municipalities and the state from taxation by the construction of protective works on or near shores and beaches within such areas. As title to the land between high and low

watermark is vested in the state, it is further found and declared to be in the public interest to secure such exposed areas by the most economical and effective means for safeguarding life and protecting property and, because it is uneconomical and ineffective for the general purpose for an individual landowner to attempt to maintain protective installations separated from and lacking co-extension with those of abutting properties, that it is in the public interest to provide ways and means for collective and cooperative action to alleviate the dangers and destruction common to such exposed areas. It is further found and declared that because of the recurrence of severe flooding of many of the waterways of the state and their tributaries, taking a huge toll in life and property, extensive flood protection measures must be inaugurated. It is, therefore, found and declared to be in the public interest that encroachment limits along waterways be established and any flood control features at dams and reservoirs be utilized as a part of the construction and installation of any flood control project. CGS Section 25-69, referenced by CGS Section 22a-92(a) (2)

Compliance: Not applicable.

19. Land areas fronting on the ocean, or on bays, inlets and coves, or bordering on rivers in which tides occur, that are subject to the full force of storms; or land areas in direct contact with storm waves, including banks, bluffs, cliffs, promontories and headlands or similar topographical or geological formations, that are subject to erosion through wave action; or open beach areas, including spits, dunes and barrier beaches, that are subject to loss of sand through high waves, strong currents or scouring wave action; or land areas subject to inundation during storms or vulnerable to storm damage because of geographic situation, may be classed as exposed areas within the meaning of Sections 25-69 to 25-75, inclusive. The limits of such areas shall be the extent of the natural configuration of the land surface not necessarily co-extensive with political boundaries, and shall include privately-owned and municipally-owned properties upon which public money may be spent and public debt incurred for the protection and conservation thereof, and taxes levied to support expenditures for such purposes. CGS Section 25-70, referenced by CGS Section 22a-92(a) (2)

Compliance: Not applicable.

20. The commissioner shall establish, along any tidal or inland waterway or flood-prone area considered for stream clearance, channel improvement or any form-of flood control or flood alleviation measure, lines beyond which, in the direction of the waterway or flood-prone area, no obstruction or encroachment shall be placed by any person, firm or corporation, public or private, unless authorized by said commissioner. The commissioner shall issue or deny permits upon applications for establishing such encroachments based upon his findings of the effect of such proposed encroachments upon the flood carrying and water storage capacity of the waterways and floodplain, flood heights, hazards to life and property, and the protection and preservation of the natural resources and ecosystems of the state, including but not limited to ground and surface water, animal, plant and aquatic life, nutrient exchange, and energy flow, with due consideration given to the results of similar encroachments constructed along the reach of waterway. CGS Section 22a-342, referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project involves the improvement dredging of an existing Federal Navigation Project. No encroachments into waterways will occur.

21. To require as a condition in permitting new coastal structures, including but not limited to, groins, jetties or breakwaters, that access to, or along, the public beach below mean high water must not be unreasonably impaired by such structures and to encourage the removal of illegal structures below mean high water which unreasonably obstruct passage along the public beach. CGS Section 22a-92(c) (1) (K)

Compliance: Not applicable**.**

Coastal Waters & Estuarine Embayment's

22. It is found and declared that the pollution of the waters of the state is inimical to the public health, safety and welfare of the inhabitants of the state, is a public nuisance and is harmful to wildlife, fish and aquatic life and impairs domestic, agricultural, industrial, recreational and other legitimate beneficial uses of water, and that the use of public funds and the granting of tax exemptions for the purpose of controlling and eliminating such pollution is a public use and purpose for which public moneys may be expended and tax exemptions granted, and the necessity and public interest for the enactment of this chapter and the elimination of pollution is hereby declared as a matter of legislative determination. CGS Section 22a-422, as referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will not cause pollution to the waters of the state.

23. To manage estuarine embayment's so as to insure that coastal uses proceed in a manner that assures sustained biological productivity, the maintenance of healthy marine populations and the maintenance of essential patterns of circulation, drainage and basin configuration. CGS Section 22a-92(c) (2) (A)

Compliance: Short-term and highly localized affects to marine resources are expected. However, the proposed project will not significantly affect the biological productivity of New Haven Harbor. Essential patterns of circulation, drainage and basin configuration will not be affected.

24. To protect, enhance and allow natural restoration of eelgrass flats except in special limited cases, notably shellfish management, where the benefits accrued through alteration of the flat may outweigh the long-term benefits to marine biota, waterfowl, and commercial and recreational finfisheries. CGS Section 22a-92(c) (2) (A)

Compliance: The proposed project will not affect eelgrass resources.

25. The commissioner of environmental protection shall adopt, and may thereafter amend, standards of water quality applicable to the various waters of the state or portions thereof as provided in subdivision (a) of Section 22a-6. Such standards shall be consistent with the

federal Water Pollution Control Act and shall be for the purpose of qualifying the state and its municipalities for available federal grants and for the purpose of providing clear and objective public policy statements of a general program to improve the water resources of the state; provided no standard of water quality adopted shall plan for, encourage or permit any wastes to be discharged into any of the waters of the state without having first received the treatment available and necessary for the elimination of pollution. Such standards of quality shall: (1) apply to interstate waters or portions thereof within the state; (2) apply to such other waters within the state as the commissioner may determine is necessary; (3) protect the public health and welfare and promote the economic development of the state; (4) preserve and enhance the quality of state waters for present and prospective future use for public water supplies, propagation of fish and aquatic life and wildlife, recreational purposes and agricultural, industrial and other legitimate uses; (5) be consistent with health standards as established by the state department of health. CGS Section 22a-426(a), as referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will not affect the water quality classification of New Haven Harbor. Minor short-term and highly localized impacts to water quality will occur. However, no long term affects to water quality will occur.

Developed Shorefront

26. To promote, through existing state and local planning, development, promotional and regulatory programs, the use of existing developed shorefront areas for marine-related uses, including but not limited to commercial and recreational fishing, boating and other water-dependent commercial, industrial and recreational uses. CGS Section 22a-92(b) (2) (G)

Compliance: The proposed improvement dredging will facilitate the development and continuation of water-dependent uses and facilities on or adjacent to coastal waters by providing adequate water depth to assure continued safe and economic use of the waterway. The continued and improved access to this channel promotes the economic viability of the region by facilitating overall regional navigation and encourages the development of water-dependent facilities and vicinity support services.

Freshwater Wetlands & Watercourses

27. It is, therefore, the purpose of Sections 22a-36 to 22a-45, inclusive, to protect the citizens of the state by making provisions for the protection, preservation, maintenance and use of the inland wetlands and watercourses by minimizing their disturbance and pollution; maintaining and improving water quality in accordance with the highest standards set by federal, state or local authority; preventing damage from erosion, turbidity or siltation; preventing loss of fish and other beneficial aquatic organisms, wildlife and vegetation and the destruction of the natural habitats thereof; deterring and inhibiting the danger of flood and pollution; protecting the quality of wetlands and watercourses for their conservation, economic, aesthetic, recreational and other public and private uses and values; and protecting the state's potable fresh water supplies from the

dangers of drought, overdraft, pollution, misuse and mismanagement by providing an orderly process to balance the need for the economic growth of the state and the use of its land with the need to protect its environment and ecology in order to forever guarantee to the people of the state, the safety of such natural resources for their benefit and enjoyment and for the benefit and enjoyment of generations yet unborn. CGS Section 22a-36 as referenced by CGS Section 22a-92(a) (2)

Compliance: Not applicable**.**

28. In carrying out the purposes and policies of Sections 22a-36 to 22a-45, inclusive, including matters relating to regulating, licensing and enforcing of the provisions thereof, the commissioner shall take into consideration all relevant facts and circumstances, including but not limited to: (1) The environmental impact of the proposed action; (2) The alternatives to the proposed action; (3) The relationship between short-term uses of environment and the maintenance and enhancement of long-term productivity; (4) Irreversible and irretrievable commitments of resources which would be involved in the proposed activity; (5) The character and degree of injury to, or interference with, safety, health or the reasonable use of property which is caused or threatened; and (6) The suitability or unsuitability of such activity to the area for which it is proposed. CGS Section 22a-41(a), referenced by CGS Section 22a-92(a) (2)

Compliance: The improvement dredging of the Federal Navigation Project in New Haven Harbor with disposal at multiple beneficial use sites in the harbor and at the CLDS will have no significant long term adverse environmental impacts on coastal resources. An Environmental Impact Statement and Clean Water Act Section 404 (b) 1 evaluation have been prepared for this project.

Intertidal Flats

29. To manage intertidal flats so as to preserve their value as a nutrient source and reservoir, a healthy shellfish habitat and a valuable feeding area for invertebrates, fish and shorebirds. CGS Section 22a-92(b) (2) (D)

Compliance: The proposed project will beneficially reuse dredged material to create salt marsh in the New Haven Harbor system. Some intertidal areas will be changed to salt marsh habitat. However, the new salt marsh will be designed to incorporate intertidal flat features within the tidal creeks that feed the marsh. No net loss of intertidal flat area is expected.

30. To encourage the restoration and enhancement of degraded intertidal flats. CGS Section 22a-92(b) (2) (D)

Compliance: The proposed project will beneficially reuse dredged material to create salt marsh in the New Haven Harbor system. Some intertidal areas will be changed to salt marsh habitat. However, the new salt marsh will be designed to incorporate intertidal flat features within the tidal creeks that feed the marsh. No net loss of intertidal flat area is expected.

31. To allow coastal uses that minimize change in the natural current flows, depth, slope, sedimentation and nutrient storage functions. CGS Section 22a-92(b) (2) (D)

Compliance: The proposed project should not significantly change natural current flows, slope, sedimentation and nutrient storage functions of the project area. The deepening and widening of the navigation channel in New Haven Harbor will increase the water depths within the channel by approximately 5 feet.

32. To disallow uses that substantially accelerate erosion or lead to significant despoliation of tidal flats. CGS Section 22a-92(b) (2) (D)

Compliance: The proposed project will not substantially accelerate erosion or lead to significant despoliation of tidal flats. While some intertidal areas will be converted to salt marsh, the new salt marsh will be designed to incorporate intertidal flat features within the tidal creeks that feed the marsh. No net loss of intertidal flat area is expected.

33. To require as a condition in permitting new coastal structures, including but not limited to groins, jetties or breakwaters, that access to, or along, the public beach below mean high water must not be unreasonably impaired by such structures. CGS Section 22a-92(c) (1) (K)

Compliance: Not applicable. No new structures are being constructed.

Islands

34. To manage undeveloped islands in order to promote their use as critical habitats for those bird, plant and animal species which are indigenous to such islands or which are increasingly rare on the mainland. CGS Section 22a-92(b) (2) (H)

Compliance: Not applicable**.**

35. To maintain the value of undeveloped islands as a major source of recreational open. CGS Section 22a-92(b) (2) (H)

Compliance: Not applicable**.**

36. To disallow uses which will have significant adverse impacts on islands or their resource components. CGS Section 22a-92(b) (2) (H)

Compliance: Not applicable**.**

Rocky Shorefront

37. To manage rocky shorefronts so as to insure that development proceeds in a manner which does not irreparably reduce the capability of the system to support a healthy

intertidal biological community; to provide feeding grounds and refuge for shorebirds and finfish, and to dissipate and absorb storm and wave energies. CGS Section 22a-92(b) (2) (B)

Compliance: Not applicable**.**

Shellfish Concentration Area

38. To manage the state's fisheries in order to promote the economic benefits of commercial and recreational fishing, enhance recreational fishing opportunities, optimize the yield of all species, prevent the depletion or extinction of indigenous species, maintain and enhance the productivity of natural estuarine resources and preserve healthy fisheries resources for future generations. CGS Section 22a-92(c) (1) (I)

Compliance: The proposed project will not jeopardize the state's fisheries resources. Direct impacts from the project include short-term and highly localized impacts to water quality and benthic resources in the project footprint. However, all impacts are not considered significant and existing conditions should fully return following construction of the project. The creation of 73 acres of salt marsh in the New Haven Harbor system is expected to enhance the natural estuarine resources in the project area by adding to the diversity of habitat found in the system. Additionally, the beneficial use placement options will enhance habitat for fisheries resources in New Haven Harbor by creating shellfish habitat (i.e., the oyster creation area and the filling of the borrow pits) and adding an area of rock reef habitat.

39. The department of health services is empowered to prohibit the taking or harvesting of shellfish in certain tidal flats, shores and coastal waters whenever it finds by examinations and surveys that such flats, shores or coastal waters are contaminated or polluted to the extent that the waters do not meet standards of purity established by said department, and that shellfish obtained therefrom may be unfit for food and dangerous to the public health. Such closure may be permanent, temporary or contingent upon the occurrence of specified events. CGS Section 19a-98(a)

Compliance: Not applicable. No shellfish will be harvested as a result of this project.

40. The department of health services may inspect shellfish beds and areas in this state where shellfish are grown or harvested for market, all boats, tools and appliances used in the production and preparation of shellfish for market and all wharves or buildings where shellfish are opened, packed and prepared for sale or shipment. It may prescribe regulations for the sanitary growth, production and preparation of shellfish for market. CGS Section 19a-96

Compliance: Not applicable.

41. Nothing in Sections 19a-95 to 19a-101, inclusive, shall prohibit the taking of shellfish by commercial harvesters from permanently closed areas when they are removed for transplanting to approve areas under permits issued by the department of health services

and under supervision of state and local health agencies having jurisdiction. CGS Section 19a-101

Compliance: Not applicable.

Shorelands

42. To regulate shoreland use and development in a manner which minimizes adverse impacts upon adjacent coastal systems and resources. CGS Section 22a-92(b) (2) (I)

Compliance: The improvement dredging of the Federal Navigation Project in New Haven Harbor with disposal at multiple beneficial use sites in the harbor and at the CLDS will have no significant long term adverse environmental impacts on coastal resources. An Environmental Impact Statement and Clean Water Act Section 404 (b) 1 evaluation have been prepared for this project.

Tidal Wetlands

43. To preserve tidal wetlands and to prevent the despoliation and destruction thereof in order to maintain their vital natural functions. CGS Section 22a-92(b) (2) (E)

Compliance: No tidal wetlands will be lost or impacted as a result of the proposed project. The project will create approximately 73 acres of salt marsh habitat within the New Haven Harbor system.

44. To encourage the rehabilitation and restoration of degraded tidal wetlands. CGS Section 22a-92(b) (2) (E)

Compliance: The proposed project will create approximately 73 acres of salt marsh habitat within the New Haven Harbor system.

45. Where feasible and environmentally acceptable, to encourage the creation of wetlands for the purpose of shellfish and finfish management, habitat creation and dredge spoil disposal. CGS Section 22a-92(b) (2) (E)

Compliance: The proposed project will beneficially use dredged material from the improvement of the New Haven Harbor FNP to create approximately 73 acres of salt marsh.

46. It is declared that much of the wetlands of this state have been lost or despoiled by unregulated dredging, dumping, filling and like activities and despoiled by these and other activities, that such loss or despoliation will adversely affect, if not entirely eliminate, the value of such wetlands as sources of nutrients to finfish, crustacea and shellfish of significant economic value; that such loss or despoliation will destroy such wetlands as habitats for plants and animals of significant economic value and will eliminate or substantially reduce marine commerce, recreation and aesthetic enjoyment and that such loss of despoliation will, in most cases, disturb the natural ability of tidal wetlands to

reduce flood damage and adversely affect the public health and welfare; that such loss or despoliation will substantially reduce the capacity of such wetlands to absorb silt and will thus result in the increased silting of channels and harbor areas to the detriment of free navigation. Therefore, it is declared to be the public policy of this state to preserve the wetlands and to prevent the despoliation and destruction thereof. CGS Section 22a-28 as referenced by CGS Section 22a-92(a) (2)

Compliance: No tidal wetlands will be lost or impacted as a result of the proposed project. The project will create approximately 73 acres of salt marsh habitat within the New Haven Harbor system.

47. To disallow any filling of tidal wetlands and nearshore, offshore and intertidal waters for the purpose of creating new land from existing wetlands and coastal waters which would otherwise be undevelopable, unless it is found that the adverse impacts on coastal resources are minimal. CGS Section 22a-92(c) (1) (B)

Compliance: No tidal wetlands will be filled as a result of the proposed project.

48. In granting, denying or limiting any permit the commissioner or his duly designated hearing officer shall consider the effect of the proposed work with reference to the public health and welfare, marine fisheries, shellfisheries, wildlife, the protection of life and property from flood, hurricane and other natural disasters, and the public policy set forth in Sections 22a-28 to 22a-35 inclusive. The fact that the department of energy and environmental protection is in the process of acquisition of any tidal wetlands by negotiation or condemnation under the provisions of Section 26-17a, shall be sufficient basis for denial of any permit. CGS Section 22a-33 as referenced by CGS Section 22a-92(a) (2) Activities Policies

Compliance: The proposed project is being coordinated with federal, state, and municipal resource agencies to insure the effects of the project minimize impacts to all resources in the project area.

General Development

49. To insure that the development, preservation or use of the land and water resources of the coastal area proceeds in a manner consistent with the capability of the land and water resources to support development, preservation or use without significantly disrupting either the natural environment or sound economic growth. CGS Section 22a-92(a) (1)

Compliance: The proposed project will not significantly disrupt the natural resources or the economic viability of the project area.

50. To resolve conflicts between competing uses on the shorelands adjacent to marine and tidal waters by giving preference to uses that minimize adverse impacts on natural coastal resources while providing long-term and stable economic benefits. CGS Section 22a-92(a) (4)

Compliance: The proposed project has been designed to minimize impacts to natural resources. The improvement dredging effort is designed to add economic benefits to the Port of New Haven.

51. It is hereby found and declared that there is a continuing need in the state for: (1) Economic development and activity to provide and maintain employment and tax revenues, promote the export of products and services beyond state boundaries, encourage innovation in products and services, and support or broaden the economic base of the state, the control, abatement and prevention of pollution to protect the public health and safety, and the development and use of indigenous and renewable energy resources to assist industrial and commercial businesses in meeting their energy requirements; (2) the development of recreation facilities to promote tourism, to provide and maintain employment and tax revenues and to promote the public welfare; (3) the development of commercial and retail sales and services facilities in urban areas to provide and maintain construction, permanent employment and tax revenues, to improve conditions of deteriorated physical development, slow economic growth and eroded financial health of the public and private sectors in urban areas and to revitalize the economy of urban areas; (4) assistance to public service businesses providing transportation and utility services in the state; (5) development of the commercial fishing industry to provide and maintain employment and tax revenues; and (6) assistance to nonprofit and governmental entities in financing facilities providing health, educational, charitable, community, cultural, agricultural, consumer or other services benefiting the citizens of the state; that the availability of financial assistance and suitable facilities are important inducements to industrial, commercial and nonprofit enterprises to remain or locate in this state and to provide economic development projects, recreation projects, urban projects, public service projects, commercial fishing projects, health care projects and nonprofit projects; that there are significant barriers inhibiting access by the authority and eligible financial institutions to the public capital markets and expansion of the secondary loan market to assist in financing economic development and other projects in the state; that the exercise by the authority of the powers in this chapter will promote economic development by increasing access to the public capital markets for the authority and eligible financial institutions; and that therefore the necessity in the public interest and for the public benefit and good for the provisions of this chapter is hereby declared as a matter of legislative determination. It is further found and declared that there is a necessity in the state of creating a department of economic development to coordinate and be responsible for matters affecting the growth of business and industry in the state and the maintenance and development of industry in the state as well as the promotion of tourism in the state and for the establishment and creation of an authority to assist the department and the state to carry out the needs and policies of the state as set forth in this section. It is further found and declared that existing, pending and proposed federal legislation has limited and restricted and may further limit and restrict the power of the authority to issue obligations the interest on which is exempt from federal income taxation; that the ability of the authority to issue obligations to provide financing for projects is essential to the maintenance and expansion of employment and the tax base in the state and to the economic development and health, education and general welfare of the state; and that the

issuance of obligations the interest on which may be includable in the holder's gross income for the purposes of federal income taxation serves a needed public purpose; and therefore the necessity in the public interest and for the public benefit and good for the provisions of this chapter is hereby declared as a matter of legislative determination. CGS Section 32-23c

Compliance: The proposed project has been designed to minimize impacts to natural resources. The improvement dredging effort is designed to add economic benefits to the Port of New Haven.

Boating

52. To encourage increased recreational boating use of coastal waters, where feasible, by (i) providing additional berthing space in existing harbors, (ii) limiting non-water-dependent land uses that preclude boating support facilities, (iii) increasing state-owned launching facilities, and (iv) providing for new boating facilities in natural harbors, new protected water areas and in areas dredged from dry land. CGS Section 22a-92(b) (1) (G)

Compliance: The proposed project will not significantly affect recreational boating in New Haven Harbor.

53. To protect coastal resources by requiring, where feasible, that such boating uses and facilities (i) minimize disruption or degradation of natural coastal resources, (ii) utilize existing altered, developed or redevelopment areas, (iii) are located to assure optimal distribution of state-owned facilities to the statewide boating public and (iv) utilize ramps and dry storage rather than slips in environmentally sensitive areas. CGS Section 22a-92(b) (1) (H)

Compliance: The proposed project will not significantly affect natural coastal resources in the project area. The project has been designed to minimize impacts to resources and maximize efficiencies to navigation in the main channel of the Federal Navigation Project.

54. To protect and where feasible, upgrade facilities serving the commercial fishing and recreational boating industries. CGS Section 22a-92(b) (1) (I)

Compliance: Not applicable.

55. To maintain existing authorized commercial fishing and recreational boating harbor space unless the demand for these facilities no longer exists or adequate space has been provided. CGS Section 22a-92(b) (1) (I)

Compliance: The proposed project is not expected to affect the space within the harbor designated for commercial and recreational fishing space.

56. To design and locate, where feasible, proposed recreational boating facilities in a manner which does not interfere with the needs of the commercial fishing industry. CGS Section 22a-92(b) (1) (I)

Compliance: Not applicable.

57. In performance of his duties under part II the commissioner shall (1) Classify all waters and all vessels for the purpose of establishing uniformity in the regulation of such waters and such vessels; (2) prescribe uniform navigation aids for state waters and regulate the use of such aids; (3) establish restricted zones or sea lanes within navigable waters and adopt regulations pertaining thereto for the purpose of protecting the natural ecology of such waters and the abutting shoreline from environmental damage resulting from marine accidents which cause the release of petroleum products or other hazardous substances and materials into the waters of the state, provided before establishing such lanes, zones and regulations the commissioner shall consider at least the following factors: (i) The danger in transporting the type of material; (ii) the evidence of deleterious incidents arising from the transportation of such hazardous materials; (iii) available alternatives; (iv) the public need; and (v) the effect on interstate commerce; and further provided any such regulations promulgated by the commissioner shall list and define the substance and materials which are classified as hazardous; (4) prescribe uniform standards for safety devices and equipment required by part II and certify the types of devices and equipment which meet such standards; (5) designate and assist the several towns in designating prohibited and restricted boating areas and waters limited to special boating purposes and prescribe uniform standards for the marking and regulation of such areas; (6) adopt such regulations respecting water skiing and underwater swimming and diving as he finds necessary for public safety; (7) study, plan and recommend the development of boating facilities, safety education and means of improving boating safety; (8) in cooperation with the department of health, investigate matters relating to and recommended means of improving boating sanitation; (9) cooperate with the department of transportation and the bureau of aeronautics concerning regulations governing the operation of seaplanes on state waters; (10) cooperate with the United States and the several states in promoting uniformity of boating laws and regulations and their administration and enforcement, and (11) subject to the applicable provisions of chapter 54 and Section 4-117 and the limitations of part II, adopt such regulations to provide for public safety and environmental quality as he finds necessary to administer and enforce the provisions of said part and to promote the safe use and protection of waters and the safe operation of vessels, provided the commissioner shall make no regulations respecting the operation of vessels on Long Island Sound except as are necessary to secure inshore waters and establish and secure restricted areas. CGS Section 15-121(b)

Compliance: The proposed project will not significantly affect natural resources, harbor safety, or recreational opportunities in New Haven Harbor.

Coastal Recreation & Access

58. To encourage public access to the waters of Long Island Sound by expansion, development and effective utilization of state-owned recreational facilities within the coastal area that are consistent with sound resource conservation procedures and constitutionally protected rights of private property owners. CGS Section 22a-92(a) (6)

Compliance: Not applicable.

59. To make effective use of state-owned coastal recreational facilities in order to expand coastal recreational opportunities including the development or redevelopment of existing state-owned facilities where feasible. CGS Section 22a-92(c) (1) (J)

Compliance: The proposed project will beneficially use dredged material to create salt marsh within New Haven Harbor. This will provide recreational opportunities to harbor users as well as to natural resources that use the area.

60. To require as a condition in permitting new coastal structures, including but not limited to groins, jetties or breakwaters, that access to, or along, the public beach below mean high water must not be unreasonably impaired by such structures. CGS Section 22a-92(c) (1) (K)

Compliance: Not applicable.

61. In making grants-in-aid for open space land acquisition or development to the commissioner of environmental protection shall: (a) Seek to achieve a reasonable balance among all parts of the state in the relative adequacy of present areas devoted to recreational and conservation purposes and the relative anticipated future needs for additional areas devoted to recreational and conservation purposes; (b) give due consideration to special park requirement needs of urban areas; (c) wherever possible, give priority to land which will be utilized for multiple recreational and conservation purposes; (d) give due consideration to coordination with the plans of departments of the state and regional planning agencies with respect to land use or acquisition and (e) give primary consideration to the needs of municipalities that have formed local housing partnerships pursuant to the provisions of Section 8- 336f. CGS Section 7-131f

Compliance: Not applicable.

62. To such extent as may be necessary to assure the proper operation and maintenance of areas and facilities acquired by municipalities or regional authorities pursuant to any program participated in by this state under authority of Sections 22a-21 to 22a-26, inclusive, such areas and facilities shall be publicly maintained for outdoor recreation or natural resources purposes, and such city or other local governmental unit shall give such assurances to the state as may be required by the commissioner of environmental protection, that it has available sufficient funds to meet its share of the cost of the project and that the acquired or developed areas will be operated and maintained at municipal or regional expense for public outdoor recreation or natural resources use. CGS Section 22a-27 as referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will beneficially use dredged material to create salt marsh within New Haven Harbor. This will provide recreational opportunities to harbor users as well as to natural resources that use the area.

Coastal Structures & Filling

63. To require that structures in tidal wetlands and coastal waters be designed, constructed and maintained to minimize adverse impacts on coastal resources, circulation and sedimentation patterns, water quality, and flooding and erosion, to reduce to the maximum extent practicable the use of fill, and to reduce conflicts with the riparian rights of adjacent landowners. CGS Section 22a-92(b) (1) (D)

Compliance: Not applicable, no structures are being built.

64. To disallow any filling of tidal wetlands and nearshore, offshore and intertidal waters for the purpose of creating new land from existing wetlands and coastal waters which would otherwise be undevelopable, unless it is found that the adverse impacts on coastal resources are minimal. CGS Section 22a-92(c) (1) (B)

Compliance: No tidal wetlands will be lost or impacted as a result of the proposed project. The project will create approximately 73 acres of salt marsh habitat within the New Haven Harbor system.

65. To require as a condition in permitting new coastal structures, including but not limited to, groins, jetties or breakwaters, that access to, or along, the public beach below mean high water must not be unreasonably impaired by such structures. CGS Section 22a-92(c) (1) (K)

Compliance: Not applicable, no structures are being built.

66. To encourage the removal of illegal structures below mean high water which unreasonably obstruct passage along the public beach. CGS Section 22a-92(c) (1) (K)

Compliance: Not applicable**.**

67. To maintain, enhance, or where feasible, restore natural patterns of water circulation and fresh and saltwater exchange in the placement or replacement of culverts, tide gates or other drainage or flood control structures. CGS Section 22a-92(c) (2) (B)

Compliance: Natural patterns of water circulation will not be affected by the proposed project.

68. The commissioner of environmental protection shall regulate dredging and the erection of structures and the placement of fill, and work incidental thereto, in the tidal, coastal, or navigable waters of the state waterward of the high tide line. Any decisions made by the commissioner pursuant to this section shall be made with due regard for indigenous aquatic life, fish and wildlife, the prevention or alleviation of shore erosion and coastal flooding, the use and development of adjoining uplands, the improvement of coastal and inland navigation for all vessels, including small craft for recreational purposes, the use and development of adjacent lands and properties and the interests of the state, including

pollution control, water quality, recreational use of public water and management of coastal resources, with proper regard for the rights and interests of all persons concerned. CGS Section 22a-359(a), as referenced by CGS Section 22a-92(a) (2)

Compliance: Submission of this Coastal Zone Management Consistency Determination to the Connecticut Department of Energy and Environmental Protection for review and concurrence signifies compliance with this policy.

Cultural Resources

69. To require reasonable mitigation measures where development would adversely impact historical, archaeological or paleontological resources that have been designated by the state historic preservation officer. CGS Section 22a-92(b) (1) (J)

Compliance: The proposed project will not affect any historical, archaeological or paleontological resources in the project area.

70. Any municipality may, by vote of its legislative body and in conformance with the standards and criteria formulated by the Connecticut historical commission, establish within its confines an historic district or districts to promote the educational, cultural, economic and general welfare of the public through the preservation and protection of the distinctive characteristics of buildings and places associated with the history of or indicative of a period or style of architecture of the municipality, of the state or of the nation. CGS Section 7-147a (b)

Compliance: Not applicable.

71. The legislative body of any municipality may make appropriations for the purpose of carrying out the provisions of Sections 7-147a to 7-147k, inclusive. CGS Section 7-147a(c)

Compliance: Not applicable.

72. Any municipality or private organization may acquire, relocate, restore, preserve and maintain historic structures and landmarks and may receive funds from the state and federal government for such purposes. Grants-in-aid may be made to owners of historic structures or landmarks in an amount not to exceed fifty percent of the non-federal share of the total cost of such acquisition, relocation, historic preservation and restoration. Grants-in-aid shall be made through an assistance agreement signed by the owners. Subsequent to the execution of any such assistance agreement, advances of funds may be made by the commissioner to the owner of such an historic structure or landmark. CGS Section 10- 321a

Compliance: Not applicable.

73. It is found that the lower Connecticut River and the towns abutting the river possess unique scenic, ecological, scientific and historic value contributing to public enjoyment,

inspiration and scientific study, that it is in the public interest that the provisions of this chapter be adopted to preserve such values and to prevent deterioration of the natural and traditional riverway scene for enjoyment of present and future generations of Connecticut citizens and that the powers of the commissioner of environmental protection, conferred by the provisions of Section 22a-25, should be exercised in the furtherance of the purposes hereof in conformity with his general responsibility to preserve the natural resources of the state. CGS Section 25-102a

Compliance: Not applicable.

74. The commission may, using such funds as may be appropriated to it or available from any other source, acquire by gift, grant, bequest, devise, lease, purchase or otherwise historic structures or landmarks, including such adjacent land as may be necessary for the comfort and safety of the visiting public, which the commission determines to be of national or state historical importance and to be of such concern to the public at large that they should be held forever in good condition for visitation by the public and for the protection of the heritages of the people of this state and nation. The commission may restore, maintain and operate such properties in such a condition as to render them suitable for public visitation and to inform the public of the historic event or circumstance connected therewith. The commission may charge reasonable visitation fees in order to help defray the cost of maintenance and operation. CGS Section 10-321d

Compliance: Not applicable.

Dams, Dikes & Reservoirs

75. All dams, dikes, reservoirs and other similar structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this chapter. CGS Section 22a-401 formerly CGS Section 25-110, as referenced by CGS Section 22a-92(a) (2)

Compliance: Not applicable**.**

76. The commissioner or his representative, engineer or consultant shall determine the environmental impact of the construction work on the inland wetlands of the state, in accordance with the provisions of Sections 22a-36 to 22a-45, inclusive, and the need for a fish way in accordance with the provisions of Section 26-136, and examine the documents and inspect the site, and, upon approval thereof, the commissioner shall issue a permit authorizing the proposed construction work under -such conditions as the commissioner may direct. CGS Section 22a-403 formerly CGS Section 25-112 as referenced in CGS Section 22a-92(a) (2)

Compliance: Not applicable**.**

Dredging & Navigation

77. To encourage, through the state permitting program for dredging activities, the maintenance and enhancement of existing federally maintained navigation channels, basins and anchorages. CGS Section 22a-92(c) (1) (C)

Compliance: The project involves the deepening and widening of an existing Federal navigation channel to improve navigation efficiencies for the port of New Haven.

78. To discourage the dredging of new federally maintained navigation channels, basins and anchorages. CGS Section 22a-92(c) (1) (C)

Compliance: The proposed project involves the improvement (i.e., deepening and widening) of an existing federal navigation project.

79. To reduce the need for future dredging by requiring that new or expanded navigation channels, basins and anchorages take advantage of existing or authorized water depths, circulation and siltation patterns and the best available technologies for reducing controllable sedimentation. CGS Section 22a-92(c) (1) (D)

Compliance: The proposed project involves the improvement (i.e., deepening and widening) of an existing federal navigation project. The typical maintenance dredging interval in New Haven Harbor is approximately every 10 years. The improvement dredging is not expected to alter the general maintenance cycle for the harbor.

80. To disallow new dredging in tidal wetlands except where no feasible alternative exists and where adverse impacts to coastal resources are minimal. CGS Section 22a-92(c) (1) (E)

Compliance: The proposed project involves the improvement (i.e., deepening and widening) of an existing federal navigation project. The project has been designed to minimize impacts to natural resources.

81. The commissioner of environmental protection shall regulate the taking and removal of sand, gravel and other materials from lands under tidal and coastal waters with due regard for the prevention or alleviation of shore erosion, the protection of necessary shellfish grounds and finfish habitats, the preservation of necessary wildlife habitats, the development of adjoining uplands, the rights of riparian property owners, the creation and improvement of channels and boat basins, the improvement of coastal and inland navigation for all vessels including small craft for recreational purposes and the improvement, protection or development of uplands bordering upon tidal and coastal waters, with due regard for the rights and interests of all persons concerned. CGS Section 22a-383 as referenced by CGS 22a-92(a) (2)

Compliance: The proposed project involves the improvement (i.e., deepening and widening) of an existing federal navigation project. The only material removal associated with this project is

related to the improvement of the navigation channel. The project has been designed to minimize impacts to natural resources.

82. Harbor masters shall have the general care and supervision of the harbors and navigable waterways over which they have jurisdiction, subject to the discretion and control of the commissioner of transportation, and shall be responsible to the commissioner for the safe and efficient operation of such harbor and navigable waterways in accordance with the provisions of this chapter. The commissioner may delegate, any of his powers and duties under this chapter to such harbor masters or to any existing board of harbor commissioners, but shall at all times be vested with responsibility for the overall supervision of the harbors and navigable waterways of the state. CGS Section 15-1

Compliance: The proposed navigation improvement project is being coordinated with the New Haven and West Haven harbor masters.

Energy Facilities

83. The legislature finds that power generating plants and transmission lines for electricity and fuels, community antenna television towers and telecommunication towers have had a significant impact on the environment and ecology of the state of Connecticut; and that continued operation and development of such power plants, lines and towers, if not properly planned and controlled, could adversely affect the quality of the environment, the ecological, scenic, historic and recreational values of the state. The purposes of this chapter are: to provide for the balancing of the need for adequate and reliable public utility services at the lowest reasonable cost to consumers with the need to protect the environment and ecology of the state and to minimize damage to scenic, historic, and recreational values; to provide environmental quality standards and criteria for the location, design, construction and operation of facilities for the furnishing of public utility services at least as stringent as the federal environmental quality standards and criteria, and technically sufficient to assure the welfare and protection of the people of the state; to encourage research to develop new and improved methods of generating, storing and transmitting electricity and fuel and of transmitting and receiving television and telecommunications with minimal damage to the environment and other values described above; to require annual forecasts of the demand for electric power, together with identification and advance planning of the facilities needed to supply that demand and to facilitate local, regional, state-wide and interstate planning to implement the foregoing purposes. CGS Section 16-50g

Compliance: Not applicable**.**

84. In a certification proceeding, the council shall render a decision upon the record either granting or denying the application as filed, or granting it upon such terms, conditions, limitations or modifications of the construction or operation of the facility as the council may deem appropriate. The council's decision shall be rendered within twelve months of the filing of an application concerning a facility described in subdivisions (1) to (3), inclusive, of subsection (a) of Section 16-50i or subdivision (4) of said subsection if the

application was incorporated in an application concerning a facility described in subdivision (1) of said subsection, and within one hundred eighty days of the filing of any other application concerning a facility described in subdivision (4) of said subsection and an application concerning a facility described in subdivisions (5) and (6) of said subsection, provided such time periods may be extended by the council by not more than one hundred eighty days with the consent of the applicant. The council shall file, with its order, an opinion stating in full its reasons for the decision. The council shall not grant a certificate, either as proposed or as modified by the council, unless it shall find and determine: (1) A public need for the facility and the basis of the need; (2) the nature of the probable environmental impact, including a specification of every significant adverse effect, whether alone or cumulatively with other effects, on, and conflict with the policies of the state concerning the natural environment, ecological balance, public health and safety, scenic, historic and recreational values, forests and parks, air and water purity and fish and wildlife; (3) why the adverse effects or conflicts referred to in subdivision (2) of this subsection are not sufficient reason to deny the application; (4) in the case of an electric transmission line, (A) what part, if any, of the facility shall be located overhead, (B) that the facility conforms to a long-range plan for expansion of the electric power grid of the electric systems serving the state and interconnected utility systems and will serve the interests of electric system economy and reliability, and (C) that the overhead portions of the facility, if any, are consistent with the purposes of this chapter, with such regulations as the council may adopt pursuant to subsection (a) of Section 16-50t, and with the Federal Power Commission "Guidelines for the Protection of Natural Historic Scenic and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities" or any successor guidelines and any other applicable federal guidelines; (5) in the case of an electric or fuel transmission line, that the location of the line will not pose an undue hazard to persons or property along the area traversed by the line. CGS Section 16-50p (a)

Compliance: Not applicable.

Fisheries

85. To manage the state's fisheries in order to promote the economic benefits of commercial and recreational fishing, enhance recreational fishing opportunities, optimize the yield of all species, prevent the depletion or extinction of indigenous species, maintain and enhance the productivity of natural estuarine resources and preserve healthy fisheries resources for future generations. CGS Section 22a-92(c) (1) (I)

Compliance: The proposed project is not expected to adversely affect fisheries resources in the New Haven Harbor Federal Navigation Project or any of the material placement sites under consideration for the project. The creation of salt marsh habitat within New Haven Harbor will add to the diversity of habitats within the ecosystem and enhance fish and wildlife resources.

86. The party States, for the purpose of promoting the restoration of Anadromous Atlantic salmon, hereinafter referred to as Atlantic salmon, to the Connecticut River basin by the development of a regional program for stocking, protection, management, research and

regulation, do hereby establish the Connecticut River Atlantic Salmon Commission. CGS Section 26-302, Article I

Compliance: Not applicable.

Fuel, Chemical & Hazardous Materials

87. To minimize the risk of oil and chemical spills at port facilities. CGS Section 22a-92(b) (1) (C)

Compliance: The improvement dredging of New Haven Harbor will increase navigation safety for vessels transiting to the Port of New Haven. This will reduce the risk of oil and chemical spills to vessels in the harbor. The improvement dredging is not expected to increase the number of vessels calling on the port. Therefore, the risk of a higher chance of oil and chemical spills will not be elevated because of increased port traffic.

88. To disallow the siting within the coastal boundary of new tank farms and other new fuel and chemical facilities which can reasonably be located inland. CGS Section 22a-92(b) (1) (E)

Compliance: The proposed project will increase navigation efficiencies in New Haven Harbor. No new portside facilities are expected as a result of the proposed project.

89. To require any new storage tanks which must be located within the coastal boundary to abut existing storage tanks or to be located in urban industrial areas and to be adequately protected against floods and spills. CGS Section 22a-92(b) (1) (E)

Compliance: Not applicable.

90. To minimize the risk of spillage of petroleum products and hazardous substances. CGS Section 22a-92(c) (1) (A)

Compliance: The improvement dredging of New Haven Harbor will increase navigation safety for vessels transiting to the Port of New Haven. This will reduce the risk of oil and chemical spills to vessels in the harbor. The improvement dredging is not expected to increase the number of vessels calling on the port. Therefore, the risk of a higher chance of oil and chemical spills will not be elevated because of increased port traffic.

91. To provide effective containment and clean up facilities for accidental spills. CGS Section 22a-92(c) (1) (A)

Compliance: Not applicable.

92. To disallow offshore oil receiving systems that have the potential to cause catastrophic oil spills in the Long Island Sound estuary. CGS Section 22a-92(c) (1) (A)

Compliance: Not applicable.

93. The commissioner of environmental protection shall, to the extent possible, immediately, whenever there is discharge, spillage, uncontrolled loss, seepage or filtration of oil or petroleum or chemical liquids or solid, liquid or gaseous products or hazardous wastes upon any land or into any of the waters of the state or into any offshore or coastal waters, which may result in pollution of the waters of the state, damage to beaches, wetlands, stream banks or coastal areas, or damage to sewers or utility conduits or other public or private property or which may create an emergency, cause such discharge, spillage, uncontrolled loss, seepage or filtration to be contained and removed or otherwise mitigated by whatever method said commissioner considers best and most expedient under the circumstances. The commissioner shall also determine the person, firm or corporation responsible for causing such discharge, spillage, uncontrolled loss, seepage or filtration. CGS Section 22a-449(a), as referenced by CGS Section 22a-92(a) (2)

Compliance: The proposed project will not produce discharge, spillage, uncontrolled loss, seepage or filtration of oil or petroleum or chemical liquids or solid, liquid or gaseous products or hazardous wastes into waters in the project area.

94. The commissioner may: 1) License terminals in the state for the loading or unloading of oil or petroleum or chemical liquids or solid, liquid or gaseous products or hazardous wastes and shall adopt, in accordance with Chapter 54, reasonable regulations in connection therewith for the purposes of identifying terminals subject to licensure and protecting the public health and safety and for preventing the discharge, spillage, uncontrolled loss, seepage or filtration of oil or petroleum or chemical liquids or solid, liquid or gaseous product or hazardous wastes. Each license issued under this section shall be valid for a period of not more than one year commencing July first, unless sooner revoked by the commissioner and there shall be charged for each such license or renewal thereof a fee established by regulation and sufficient to cover the reasonable cost of the state of inspecting and licensing such terminals; 2) provide by regulations for the establishment and maintenance in operating condition and position of suitable equipment to contain as far as possible the discharge, spillage, uncontrolled loss, seepage or filtration of any oil or petroleum or chemical liquids or solid, liquid-or gaseous products or hazardous wastes; 3) inspect periodically all hoses, gaskets, tanks, pipelines and other equipment used in connection with the transfer, transportation or storage of oil or petroleum or chemical liquids or solid, liquid or gaseous products or hazardous wastes to make certain that they are in good operating condition, and order the renewal of any such equipment found unfit for further use. Any person, firm or corporation which operates any such terminal in this state on or after the first day of July following the effective date of regulations adopted pursuant to this subsection, without a license issued by the commissioner, shall be fined one hundred dollars per day during any period of unlicensed operation. CGS Section 22a-449(b), as referenced by CGS Section 22a-92(a) (2)

Compliance: Not applicable.

95. The safe and sanitary disposal of toxic or hazardous wastes shall be the responsibility of the generator and shall be accomplished in a manner approved by the commissioner. CGS 22a-220(a)

Compliance: Not applicable.

96. The commissioner of environmental protection shall (1) provide and maintain necessary equipment and train adequate emergency response personnel for the purpose of oil spill containment and removal within the lower Connecticut river and adjacent shoreline area; and (2) assist in and coordinate the development of oil spill containment and removal contingency plans for the towns located within the lower Connecticut river and adjacent shoreline area. CGS Section 25-102t (b)

Compliance: Not applicable.

Open Space & Agricultural Lands

97. It is hereby declared (a) that it is in the public interest to encourage the preservation of farm land, forest land and open space land in order to maintain a readily available source of food and farm products close to the metropolitan areas of the state (b) that it is in the public interest to prevent the forced conversion of farm land, forest land and open space land to more intensive uses as the result of economic pressures caused by the assessment thereof for the purposes of property taxation at values incompatible with their preservation as such farm land, forest land and open space land, and (c) that the necessity in the public interest of the enactment of the provisions of Sections 7-131c and 12-107b to 12-107e, inclusive, is a matter of legislative determination. CGS Section 12-107a

Compliance: Not applicable.

98. The general assembly finds that the growing population and expanding economy of the state have had a profound impact on the ability of public and private sectors of the state to maintain and preserve agricultural land for farming and food production purposes, that unless there is a sound, state-wide program for its preservation, remaining agricultural land will be lost to succeeding generations and that the conservation of certain arable agricultural land and adjacent pastures, woods, natural drainage areas and open space is vital for the well-being of the people of Connecticut. CGS Section 22-26aa

Compliance: Not applicable.

99. Connecticut is a state of relatively small area, undergoing rapid industrialization and rapid diminution of areas remaining in their natural condition. It is, therefore, declared to be the public policy that carefully selected areas of land and water of outstanding scientific and educational interest be preserved. In implementation of this policy, there is established a Connecticut system of natural area preserve. CGS Section 23-5a as referenced by CGS Section 22a-92(a) (2)

Compliance: The improvement dredging of the Federal Navigation Project in New Haven Harbor with disposal at multiple beneficial use sites in the harbor and at the CLDS will have no significant long term adverse environmental impacts on coastal resources. An Environmental Impact Statement and Clean Water Act Section 404 (b) 1 evaluation have been prepared for this project.

Ports & Harbors

100. To promote, through existing state and local planning, development, promotional and regulatory authorities, the development, reuse or redevelopment of existing urban and commercial fishing ports giving highest priority and preference to water-dependent uses, including but not limited to commercial and recreational fishing and boating uses. CGS Section 22a-92(b) (1) (C)

Compliance: The proposed improvement dredging will facilitate the development and continuation of water-dependent uses and facilities on or adjacent to coastal waters by providing adequate water depth to assure continued safe and economic use of the waterway. The continued and improved access to this channel promotes the economic viability of the region by facilitating overall regional navigation and encourages the development of water-dependent facilities and vicinity support services.

101. To disallow uses which unreasonably congest navigation channels, or unreasonably preclude boating support facilities elsewhere in a port or harbor. CGS Section 22a-92(b) (1) (C)

Compliance: The proposed project will improve navigation conditions in New Haven Harbor for the commercial vessels using the port.

Sewer & Water Lines

102. To locate and phase sewer and water lines, so as to encourage concentrated development in areas which are suitable for development. CGS Section 22a-92(b) (1) (B)

Compliance: Not applicable.

103. To disapprove extension of sewer and water services into developed and undeveloped beaches, barrier beaches and tidal wetlands except that, when necessary to abate existing sources of pollution, sewers that will accommodate existing uses with limited excess capacity may be used. CGS Section 22a-92(b) (1) (B)

Compliance: Not applicable.

Solid Waste

104. Each municipal authority shall make provisions for the safe and sanitary disposal of all solid wastes which are generated within its boundaries, including septic tank pumping,

sludge from water pollution abatement facilities and water supply treatment plants, solid residues and sludge from air pollution control facilities and solid wastes from commercial, industrial, agricultural and mining operations, but excluding wastes which are toxic or hazardous. CGS Section 22a-220

Compliance: Not applicable.

105. The commissioner shall administer and enforce the pluming and implementation requirements of this chapter. He shall examine all existing or proposed solid waste facilities, provide for their planning, design, construction and operation in a manner which conserves, improves and protects the natural resources and environment of the state and shall order their alteration, extension and replacement when necessary to conserve, improve and protect the state's natural resources and environment and to control air, water and land pollution so that the health, safety and welfare of the people of the state may be safeguarded and enhanced. CGS Section 19-524b

Compliance: Not applicable.

Transportation

106. To make use of rehabilitation, upgrading and improvement of existing transportation facilities as the primary means of meeting transportation needs in the coastal area. CGS Section 22a-92(b) (1) (F)

Compliance: This improvement project will widen and deepen the existing New Haven Harbor FNP for the users of the Port of New Haven.

107. To require that new or improved shoreline rail corridors be designed and constructed so as (i) to prevent tidal and circulation restrictions and, when practicable, to eliminate any such existing restrictions, (ii) to improve or have a negligible adverse effect on coastal access and recreation and (iii) to enhance or not unreasonably impair the visual quality of the shoreline. CGS Section 22a-92(c) (1) (F)

Compliance: Not applicable.

108. To require that coastal highways and highway improvements, including bridges, be designed and constructed so as to minimize adverse impacts on coastal resource. CGS Section 22a-92(c) (1) (G)

Compliance: Not applicable.

109. To require that coastal highway and highway improvements give full consideration to mass transportation alternatives. CGS Section 22a-92(c) (1) (G)

Compliance: Not applicable.

110. To require that coastal highways and highway improvements where possible enhance, but in no case decrease coastal access and recreational opportunities. CGS Section 22a-92(c) (1) (G)

Compliance: Not applicable.

111. To disallow the construction of major new airports. CGS Section 22a-92(c) (1) (H)

Compliance: Not applicable.

112. To discourage the substantial expansion of existing airports within the coastal boundary. CGS Section 22a-92(c) (1) (H)

Compliance: Not applicable.

113. To require that any expansion or improvement of existing airports minimize adverse impacts on coastal resources, recreation or access. CGS Section 22a-92(c) (1) (H)

Compliance: Not applicable.

Water Dependent Uses

114. To give high priority and preference to uses and facilities which are dependent upon proximity to the water or the shorelands immediately adjacent to marine and tidal waters. CGS Section 22a-92(a) (3)

Compliance: The proposed improvement dredging will facilitate the development and continuation of water-dependent uses and facilities on or adjacent to coastal waters by providing adequate water depth to assure continued safe and economic use of the waterway. The continued and improved access to this channel promotes the economic viability of the region by facilitating overall regional navigation and encourages the development of water-dependent facilities and vicinity support services.

115. To manage uses in the coastal boundary through existing municipal planning, zoning and other local regulatory authorities and through existing state structures, dredging, wetlands, and other state siting and regulatory authorities, giving highest priority and preference to water-dependent uses and facilities in shorefront areas. CGS Section 22a-92(b) (1) (A)

Compliance: The proposed improvement dredging will facilitate the development and continuation of water-dependent uses and facilities on or adjacent to coastal waters by providing adequate water depth to assure continued safe and economic use of the waterway. The continued and improved access to this channel promotes the economic viability of the region by facilitating overall regional navigation and encourages the development of water-dependent facilities and vicinity support services.

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT
AND ENVIRONMENTAL IMPACT STATEMENT

APPENDIX O
MONITORING AND ADAPTIVE MANAGEMENT PLAN
FOR
SANDY POINT SALT MARSH

Monitoring and Adaptive Management Plan for the Sandy Point Salt Marsh

New Haven Harbor Navigation Improvement Project

NEW HAVEN HARBOR
NEW HAVEN, CONNECTICUT

August 15, 2019

Prepared by:

Planning Division
Environmental Resources Section
U.S. Army Corps of Engineers
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1.0 INTRODUCTION

This Monitoring and Adaptive Management Plan was prepared for the Sandy Point salt marsh creation site associated with the New Haven Harbor Navigation Improvement Project (NHHNIP). The Sandy Point salt marsh is being created with dredged material generated from the NHHNIP. This beneficial use alternative will create approximately 58 acres of salt marsh in the New Haven Harbor ecosystem.

Section 2039 of the Water Resource Development Act (WRDA) 2007 (as amended by Section 1161 of WRDA 2016) directs the Secretary of the Army (Secretary) to ensure, when conducting a feasibility study for a project (or component of a project) under the U.S. Army Corps of Engineers (USACE) ecosystem restoration mission, that the decision document include a monitoring plan to measure the success of the ecosystem restoration and to dictate the direction adaptive management should proceed, if needed.

Section 2039 of WRDA 2007 also directs USACE to develop an adaptive management plan for all ecosystem restoration projects. The adaptive management plan must be appropriately scoped to the scale of the projects. The information generated by the monitoring plan is used by the USACE in consultation with the federal and state resources agencies to guide decisions on adaptive changes that may be needed to ensure ecosystem restoration meets the project success criteria.

An effective monitoring program is necessary to assess the status and trends of ecological health and biota richness and abundance on a per project basis, as well as to report on regional program success within the United States. Assessing status and trends includes both spatial and temporal variation. Gathered information under this monitoring plan will provide insights in the effectiveness of the restoration project and adaptive management strategies, and indicate where goals have been met, if action should continue, and/or whether more aggressive management is warranted.

Created/restored salt marsh can take decades to reach a dynamic equilibrium conditions, therefore the monitoring period of up to 10 years will assess whether the structural template has been established, and if the site is on a trajectory toward success. Tracking environmental changes and distinguishing the changes caused by human actions and natural variations are difficult tasks, which is why a focused monitoring protocol tied directly to the planning objectives is necessary.

This monitoring and adaptive management plan describes the monitoring methods that will be utilized to assess the project. By reporting on environmental changes, this monitoring effort will assess whether measurable results have been achieved and whether the intent of the Sandy Point salt marsh creation beneficial use alternative using material from the NHHNIP is being met. The monitoring plan includes a description of the monitoring activities, the criteria for success, and the estimated cost.

1.1 Guidance

The following documents provide distinct USACE policy and guidance that are pertinent to this monitoring and adaptive management plan:

1. USACE. 2017, Implementation Guidance for Section 1161 of the Water Resources Development Act of 2016 (WRDA 2016), Completion of Ecosystem Restoration Projects.
2. USACE. 2009. Planning Memorandum. Implementation Guidance for Section 2039 of the Water Resources Development Act of 2007 (WRDA 2007) - Monitoring Ecosystem Restoration
3. USACE. 2003. ER 1105-2-404. Planning Civil Work Projects Under the Environmental Operating Principles.
4. USACE. 2000. ER 1105-2-100, as amended, Guidance for Conducting Civil Works Planning Studies.

1.2 Salt Marsh Creation Description

The recommended plan for the project is described in detail in Section 5.2.8 of the Integrated Feasibility Report and Environmental Impact Statement (EIS) for the NHHNIP. The proposed plan would create approximately 58 acres of salt marsh within the New Haven Harbor ecosystem in the vicinity of Sandy Point (West Haven, CT). The goal of the Sandy Point marsh creation is to beneficially use dredged material within the ecosystem that it was generated from to aid in the reduction of dredged material placed in Long Island Sound.

In general, approximately 657,000 cubic yards (CY) of dredged material from the New Haven Harbor main channel would be placed in a containment structure(s) situated over approximately 58 acres of existing sand flat and shallow subtidal areas of the harbor to achieve a target salt marsh surface elevation of 3.6 feet (NAVD88). Several material containment options are under consideration to prevent the erosion of placed material prior to marsh vegetation establishment, including sediment filled geotubes and dikes. The dredged material will be distributed and contoured to create an intertidal salt marsh system with an elevation gradient that transitions from open water to salt marsh. Salt marsh vegetation, primarily saltmeadow cord grass (*Spartina patens*), will occupy the areas of high marsh. Smooth cordgrass (*Spartina alterniflora)* would occupy a slope of increasing elevation in the low marsh and at low tide, mudflat areas will be exposed along the edges of the interface of the salt marsh and open water area. A marsh creek will also be incorporated into the design of the salt marsh to allow for a hydrologic connection with New Haven Harbor as well as Old Field Creek to the south and the salt marsh system to the west of the created salt marsh area.

2.0 MONITORING AND ADAPTIVE MANAGEMENT – OBJECTIVES, STRATEGY, PROCEDURES

This section describes the components of the Monitoring and Adaptive Management program for the Sandy Point Salt Marsh site. Information is based on feasibility level data. During pre-construction engineering and design (PED), the USACE along with the project Non-Federal Sponsor will prepare a detailed monitoring plan in coordination with resources agencies. The detailed monitoring plan will verify the field variables to be evaluated, the most appropriate field measurement methods, the recommended frequency, and duration of each field effort, and confirm reporting requirements.

2.1 Objectives

The purpose of this monitoring and adaptive management program is to assess the progress toward, and the success or failure of, the restoration and the achievement of acceptable standards of salt marsh structure and function. The primary project objective is to reduce open water placement of dredged material in Long Island Sound by creating an intertidal salt marsh that maximizes the salt marsh functions and values of a marsh, yet allows for the maximum amount of dredged material to be contained within the created marsh.

The monitoring and adaptive management plan will focus on tracking the three ecological parameters that are the hallmarks of a functioning tidal marsh as per the *USACE Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Salt marsh Delineation Manual: Northcentral and Northeast Regions* (USACE 2012):

- Hydrophytic Vegetation
- Salt Marsh Soils
- Salt Marsh Hydrology

2.1.1 Monitoring Objective

Evaluating the success of the creation site will be based on the establishment of the targeted habitats within the restoration site and on the ecological functioning of those habitats. Monitoring objectives include:

- Support adaptive management of implemented projects
- Assess and justify adaptive management expenditures
- Determine "ecological success," document and communicate success

2.1.2 Adaptive Management Objective

Adaptive management is a process by which the results of restoration activities are repeatedly monitored and evaluated to make decisions on necessary future restoration actions to achieve desired conditions. These measures are technical response actions to changes that adversely affect how the system was predicted to respond. Adaptive management recognizes that human knowledge regarding biological and physical systems is limited and that these systems may not always respond as expected. When a management or restoration project is implemented and

there is some uncertainty regarding the response of the system to particular actions, adaptive management provides a way to respond to feedback from the system.

2.2 Strategy

The site will be monitored following the completion of salt marsh construction activities to evaluate the success of the project and take corrective actions if necessary to ensure success.

2.2.1 Monitoring Strategy

Post-construction monitoring and management will be performed over a period of up to ten years. An initial monitoring event will immediately follow completion of salt marsh creation. This monitoring plan is based on feasibility level information. All monitoring components of the strategies will continue to be refined as design and construction progresses for the specific habitats restored.

The purpose of the monitoring plan for salt marsh creation is to:

- Assess baseline conditions for water quality, vegetation, invertebrates, and other bio-assessments;
- Evaluate the success for salt marsh creation; and
- Develop a better understanding of salt marsh restoration/creation opportunities and protection needs in the study area.

2.2.2 Adaptive Management Strategy

Adaptive management will be implemented if specific marsh creation standards are not met or if actual conditions diverge sufficiently far from the intended conditions to threaten the achievement of overall project goals. The adaptive management program will consider the following conditions identified by the monitoring reports that may be limiting potential success:

- Review of site hydrology and tidal influence
- Whether appropriate vegetation species are colonizing site or if additional plantings are needed
- Impact of invasive species and herbivory damage to vegetation and identification and evaluation of potential remedies.
- Review of restoration and enhancement designs to identify where design may not be appropriate to address the water resource problems.

2.3 Monitoring and Adaptive Management Procedures

As the site that the Sandy Point marsh creation effort will be located is currently open water and intertidal flat habitat, gathering baseline marsh data is not possible.

The monitoring protocol will assess appropriate colonization as well as coverage of any plantings of target hydrophytes (target hydrophytes are non-invasive saltmarsh native species). The protocol will also document the development of hydric soils and an improved hydrologic regime across the site. Monitoring will conclude with a field salt marsh delineation of the project based on the Federal Manual for Identifying and Delineating Jurisdictional Salt marsh (1989) showing the exact acreage of the created area. This delineation will also assess whether or not the salt marsh has settled to its target elevation and is a functioning tidally-driven system.A discussion of monitoring procedures will follow with information necessary to evaluate the success of the project. Further refinement of these procedures will be completed by the USACE and its sponsors during the PED phase of the project.

2.3.1 Hydrophytic Vegetation Monitoring

Timing and Performance Target:
Vegetation will be monitored biannually in both spring and fall to document progress toward the performance target of at least 85% coverage of planted vegetation of target hydrophytes. Sampling methods will include quadrat plot sampling for emergent vegetation.

Methods:
Quadrat Sampling. One square meter quadrat plots will be used along random transects no more than 15 meters apart. At each transect, one quadrat will be randomly placed within the marsh along the transect line and the existing vegetation of the plot would be monitored. Quadrats will be placed on either side (randomly chosen) within one meter of the measuring tape. The meter mark on the upper and lower edge of the each quadrat will be marked permanently with stakes and recorded on the measuring tape in meters. Plant species, plant height, stem density, flowering density, and percent cover data will be collected within each plot. A narrative description of plant health will also be collected. The exact location and side the quadrat will be placed on will be noted with a GPS unit. The will facilitate monitoring efforts on subsequent visits. Each transect line and 1.0 sq. m. quadrat will be photographed at the time of vegetation monitoring. All photographs must be taken at low tide, in the same location, and at the same height.

Adaptive Management:
If the created salt marsh site is not showing progress to meet the requirements of 85% vegetation cover, additional native vegetation would be planted to meet this goal. If a sustainable ecosystem cannot be established within two years at the site, changes and modifications will be initiated by restoration ecologists. The monitoring plan will be refined by USACE to accommodate these changes to monitor the success of the alteration.

2.3.2 Salt Marsh Soil Monitoring

Timing and Performance Target:

Hydric Soil. Investigations to track the progression of hydric soil formation will occur annually starting in year two. The performance target is for the site to show suitable development of salt marsh characteristics of hydric soils within the ten year monitoring period.
Soil Salinity. Investigation into soil salinity will occur bi-annually starting in year two. The performance target for the restoration area that is at or below mean tide level is to have soil salinity levels of at least 15 parts per thousand (ppt) to assist with saltmarsh development, for the duration of the ten year monitoring period.

Tidal Inundation. The performance target will be 100 % of the low marsh zone to be inundated during high water associated with a spring tide (MHHW). Monitoring will take place annually starting in year two.

***Methods**:*
Hydric Soil. The soil characteristics of texture, color, and structure will be used to help determine the presence or absence of groundwater and/or frequency of surface inundation. Soil texture will be estimated in the field using the U.S. Department of Agriculture (USDA) classification system. Other characteristics such as redoximorphic features, relative moisture content, and structure will also be noted. Color will be described using Munsell color charts. Necessary laboratory analysis will be performed to identify the existing characteristics of the surficial and subsurface soils at the site. Soil samples may be analyzed for the following parameters: standard fertility analysis for soils (P, K, Mg, Ca, Zn, Cu, Mn, Fe, and B), soil pH, and soil organic matter, appropriate details to be developed in PED.

Soil Salinity. Soil salinity will be sampled during low tide at various ground elevations along transects across the site. Sampling timing will be focused on plant growing seasons and location will be focused on critical rooting depths.

Tidal Inundation. Extent of inundation will be observed at spring high tide.

***Adaptive Management**:*
Management of salinity may include modifications to the soil elevation to increase or decrease the duration and/or intensity of tidal inundation. Soil amendments may also be considered as appropriate to improve vegetation growth.

2.3.3 Salt Marsh Hydrology Monitoring

***Timing and Performance Target*:**
Inundation Regime. Monitoring of salt marsh inundation will occur for the first two years after construction, when the greatest change is expected to occur. The performance target for optimal inundation regimes will be measures through degree of inundation in the constructed marsh platform. For a planned marsh with slopes of one percent, the goal for marsh construction is 100% inundation during high tide in the low marsh, and 50 % inundation during high tide in the high marsh.

Methods:
Inundation regime. Visual hydrologic surveys will be used to characterize tidal inundation regimes and evaluate the development of the site through changes in morphology, erosion, and sedimentation. Visual inspection of tidal circulation due to excavation of new channels and intertidal habitat will also be conducted. Depth and duration of tidal inundation will be measured with a tidal staff for selected tidal cycles prior to alteration and following salt marsh construction.

Adaptive Management:
The hydrological regime will be evaluated so that the depth and duration of flooding across the project sites is adequate to maintain salt marsh saturation levels. Changes may include altering tidal creeks to improve water flow velocities, volumes, duration, and inundation.

3.0 MONITORING RESPONSIBILITIES

The responsible parties for the ten year monitoring will be USACE and the Non-Federal Sponsor. Any standards presented above are to be used as guidelines for evaluation. It is anticipated that real-time observations performed by the monitoring team will be used to refine the monitoring plan.

Reporting Results:
A yearly monitoring summary report will be drafted by USACE that briefly summarizes the data collected and determines if adaptive management is needed. A final monitoring report will be drafted that details the outcomes of the constructed restoration project. Included in each report shall be the monitoring data, photographs, a brief summary of the collect data, and a discussion of the data collected.

4.0 ESTIMATED COST AND DURATION

The monitoring and adaptive management program for the Sandy Point Salt Marsh Creation Site is scheduled to begin following the construction of the site. USACE and Non-Federal sponsor will operate this program for ten years following construction of the wetland. The program will include monitoring at the site and implementation of any adjustments that may be needed to support successful salt marsh establishment.

Monitoring and Adaptive Management Cost:
The project estimate includes $250,000 (FY 20 price level) for the monitoring and adaptive management program implementation.

5.0 OPERATION AND MAINTENANCE

A detailed operation and maintenance (O&M) manual containing requirements will be provided to the non-federal sponsor after the construction is closed out. The O&M for the salt marsh project is expected to be minimal due to the self-sustaining nature of the project and design targets for sustainability. The O&M described here is different than the adaptive management described in the previous section.

O&M Costs:
There are no project features requiring operation. Minor maintenance may include some repairs to geotubes as appropriate and possible plant species maintenance (see below). Maintenance is estimated to be about $15,000 per year. Maintenance is 100% non-Federal cost.

Native Plant Community Maintenance. This is required to maintain species richness, abundance, and structure of the restored plant communities within the project area. Aside from minor re-plantings, it will be important to continue to protect plant communities from external changes by human activities, whether those are single incidents or chronic stressors. These can cause native plant communities to experience significant species richness declines event to the point of becoming monotypic stands.

Appendix P
New Haven Harbor, CT
Navigation Improvement Project
Environmental Benefit Evaluation of the
Proposed Sandy Point Salt Marsh
Beneficial Use Project Feature

January 2020
Prepared by:

Planning Division
Environmental Branch
U.S. Army Corps of Engineers
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1.0 BENEFICIAL USE

The US Army Corps of Engineers (USACE) proposed New Haven Harbor Navigation Improvement Project includes dredging about 4.28 Million cubic yards of ordinary improvement material (i.e., silt and sand) and removing 43,500 cy of rock to deepen the channel, turning basin and maneuvering area from -35 feet MLLW to -40 feet MLLW with incidental widening of the channel and channel bend at the breakwaters. As part of the feasibility study, several options were identified for the placement of dredged material. The Federal base plan includes a variety of beneficial use (BU) placements that represent the least costly alternatives and meet the environmental standards. In addition the feasibility study identified a beneficial use alternative for the dredged material that is not a least cost option. This alternative involves using dredged material from the New Haven Harbor improvement project to create salt marsh north of Sandy Point within the New Haven Harbor system. The Connecticut Port Authority, the improvement project Non-Federal Sponsor, supports the proposed placement that is not a least cost option.

The purpose of this appendix is to describe the salt marsh creation resource significance and quantify the environmental benefits to demonstrate that the incremental cost of the beneficial use disposal alternative is reasonable in relation to the environmental benefits to be achieved.

2.0 SALT MARSH RESOURCE SIGNIFICANCE

USACE decisions with respect to the restoration of environmental resources in restoration projects are based on the technical, institutional, and public significance of the affected resources. This section summarizes the significance of salt marsh resources using these criteria.

Institutional Recognition: Institutional recognition is demonstrated through the establishment of laws, restrictions, plans and policy statements by public agencies, tribes or private groups that acknowledge the importance of the environmental resource. The Clean Water Act, Section 404(b)(1) Guidelines institutionally recognize salt marshes as Special Aquatic Sites. Salt marshes provide valuable nesting, spawning, nursery, cover, and foraging habitat for aquatic and semi-aquatic animals, nutrient transformation functions, and aquatic productivity enhancement. The degraded state of this habitat has substantial adverse environmental effects on the value of this site as coastal habitat. Connecticut Coastal Zone Management laws and regulations recognize the importance of salt marsh and estuarine habitats.

Public Recognition: Public significance is demonstrated when some segment of the general public recognizes the importance of an environmental resource. Public recognition of the importance of salt marsh resources is embodied in requests from Federal, State, and local agencies to beneficially use dredged material to create habitat for fish and wildlife resources.

Technical Recognition: Elements of technical significance include habitat scarcity, habitat connectivity, and effects on special status species. Technical significance is demonstrated by scientific or technical knowledge or judgment concluding the importance of a resource.

Habitat Scarcity - Salt marshes have declined significantly due to development, agriculture, and water-control activities. Loss estimates for salt marshes from the mid-1950s to the mid-1970s are

as much as 400,000 acres (Tiner, 1984). The loss of wetlands due to human development is well documented. Deegan and Buchsbaum 2005 state:

Loss of coastal wetlands due to residential and industrial development has been severe in the United States. Recent estimates suggest that about 54% of the nation's original 915,000 km2 of wetlands (freshwater and coastal) have been lost (Tiner, 1984), and over half of the nation's original salt marshes and mangrove forests have been destroyed (Watzin and Gosselink, 1992). A particularly intense period of loss occurred between 1950 and 1970.

The authors also note that degradation in habitat quality is just as harmful as reduction in quantity. Increased siltation, loss of salinity, eutrophication, food web disruption and hydrologic changes have deleterious effects on the quantity and diversity of biota.

Connectivity - Connectivity is a measure of the degree of habitat or population fragmentation; ranging from "connected and sustainable," to "fragmented," to "isolated." There would be a high degree of connectivity between the created marsh habitat and New Haven Harbor and Long Island Sound. This would allow for the marsh area to be used extensively by ecological resources within the system.

Special Status Species – salt marsh habitat can be created and provide important habitat for salt marsh sparrow, which are species of concern.

Biodiversity - Salt marshes are highly productive habitats that contribute to biodiversity. These wetlands serve as spawning habitat and nurseries for many invertebrates and fish as well as nesting and feeding habitat for a variety of birds and mammals. The loss of salt marshes has contributed to the declining populations of many species that rely on a complex mosaic of coastal habitats and can only exist in the narrow estuarine band along the coast.

3.0 ENVIRONMENTAL BENEFITS

3.1 Introduction

The USACE used the Assessment of Wildlife Habitat Value of New England Salt Marsh model (NESMM) to quantify the ecological benefits gained from using the dredged material to create a salt marsh at Sandy Point. The model was used to evaluate the habitat value of salt marsh creation alternatives and the long term value of the marsh creation under different sea level change (SLC) scenarios.

Two different alternative marsh sizes were examined: a 58-acre marsh and a 30-acre marsh. Both sizes included habitat components that were 90% salt marsh habitat and 10% open water/intertidal flat habitat. The 90% marsh habitat component was further evaluated by varying the percentages of high marsh and low marsh sub-habitats within the salt marsh area. For both marsh sizes, the creation of marsh habitats that were 98% high marsh/2% low marsh, 75% high marsh/25% low marsh, and 50% high marsh/50% low marsh were evaluated.

One of the goals of the New Haven Harbor dredging project is to increase beneficial use of dredged material to the maximum extent practicable to avoid open water placement. The

maximum size of the salt marsh creation area (approximately 58 acres) was determined based on outlining a reasonable seaward perimeter which avoided impacting existing infrastructure (e.g., marinas and boat ramp) and locating the created salt marsh within the protected area afforded by the Sandy Point spit. To verify that the maximum size was suitable for an environmental benefits point of view a smaller size creation project (30 acres) was also assessed using the model.

The salt marsh creation project will result in the replacement of subtidal habitat and intertidal mudflat habitat with a combination of high marsh, low marsh, and tidal creek (i.e., open water and mudflat) habitat. The harbor contains an abundance of shallow estuarine subtidal habitat and intertidal mudflat habitat, while the harbor has lost most of its salt marsh habitat due to filling that occurred prior to the 1970s. For the purposes of the benefits evaluation, the loss of the habitat value of the existing condition is considered minimal relative to the environmental benefit to be gained.

3.2 Model Description

The NESMM is a marsh assessment tool that was developed by the US Environmental Protection Agency (USEPA). This model is approved for use by the USACE Ecosystem Restoration PCX.

See: https://cw-environment.erdc.dren.mil/model-library.cfm?CoP=Restore&Option=View&Id=25.

NESMM is a standalone assessment tool based on wildlife habitat values of coastal wetlands. The model quantifies salt marsh health and function through the valuation of marsh characteristics and the presence of habitat types. While other habitat evaluation tools use marsh functions as metrics (e.g., nutrient removal) to assess wetland sites, the NESMM focuses on marsh habitat types, marsh morphology, and landscape setting.

The marsh habitat type was chosen to be used as the framework for the environmental model for a number of reasons. First, providing wildlife habitat is one of the most important functions shared by all marshes. Salt marshes are thought to be amongst the most productive ecosystems in the world, providing substantial biodiversity, supporting numerous species from all of the major groups of organisms, and providing both seasonal and year around habitat for many terrestrial and aquatic species. Of particular importance are wetlands or classes of wetlands that provide habitat for threatened and endangered species. Second, the area of available habitat within a marsh is a metric that is well suited for assessment. Aerial photographic interpretation of the habitat types in the marsh system coupled with ground-truthing can be accomplished easily. Additionally, forecasts of types of habitats in restored and/or created marsh are typically planned out in restoration efforts, so the applicable data is available. Finally, wetland protection or restoration goals based on wildlife habitat targets are generally well received and understood by the public, particularly when the species of interest, such as large birds and mammals, are included in the project goals.

The NESMM quantifies habitat values based on marsh characteristics and the presence of habitat types that contribute to use by terrestrial species. The model's developers identified 79 birds, 20

mammals, and 6 amphibian and reptile species that utilize New England salt marsh habitat at some life stage. Habitat requirements of these species were determined through a search of published literature, unpublished reports, anecdotal information from wetland ecologists and personal observations of the model's creators. From the available information, the developers identified common habitat types associated within salt marshes, or those that were reported as being used by at least 3 bird or mammal species. These habitat types, as well as the habitat requirements of salt marsh fauna, form the basis of the salt marsh assessment model.

The model consists of eight wetland and landscape components that are used to assess and evaluate salt marsh wildlife habitat values (Table 3.1). Several of the components are directly based on the different habitat types found in and around marshes or ecosystems that are linked to salt marshes. Other components reflect the anthropogenic alteration of these habitats. The remaining components take into account the size, morphology, and landscape positions of the marsh, which may be important to territorial species and those that require adjacent upland habitats. The eight components are (1) marsh habitat types, (2) marsh morphology, (3) marsh size, (4) degree of anthropogenic modification, (5) vegetative heterogeneity, (6) surrounding land use, (7) connectivity, and (8) vegetation types. Each component, in turn, consists of several categories. For example, the "Habitat Type" component consists of ten categories including shallow open water, tidal flats, pannes, wooded islands, and low marsh. A complete description of each habitat component and the overall framework of this model are included in McKinney and Wigand (2006).

The model user assigns a rating of low, moderate, high or absent to each model category. The rating is given a numerical score and a weighting factor to reflect faunal habitat requisites, which can be found in Table 3.2. For example, one category of the habitat component involves the presence of shallow water. If open shallow water habitat makes up >20% of the marsh, the category is given a numeric score of "5". If open shallow water habitat is absent from a salt marsh, the category is given a "0". The value of each category is multiplied by a weighting factor. The output produced by the USEPA model is a numerical score, an overall relative wildlife habitat assessment score for the marsh, which is calculated by summing subtotals for each of eight habitat components of the model (McKinney et al. 2009a). The maximum wildlife habitat assessment score possible from the NESMM is 784, with small, impaired marshes receiving values below 100. The values and weighting factors assigned to each model component are shown in the table below (McKinney et al. 2009a).

The scores and weighting factors for each component were developed and tested on a group of 16 salt marshes in Narragansett Bay, Rhode Island. The study and resulting conclusions are described in two peer reviewed papers: "Assessing the wildlife habitat value for New England salt marshes: I. Model and application" and "Assessing the wildlife habitat value of New England salt marshes: II. Model testing and validation."

Table 3.1.

New England Salt Marsh Model wetland assessment components and their associated categories.

Component	Categories	Criteria
I. Salt Marsh Size Class	Very small (under 5 ha) Small (5 – 25 ha) Medium-sized (26 – 125 ha) Large (126 – 200 ha) Very large (over 200 ha)	Marsh area
II. Salt Marsh Morphology	Salt meadow marsh Meadow / fringe marsh Wide fringe marsh Narrow fringe marsh Marine fringe marsh	Marsh morphology
III. Salt Marsh Habitat Types	Shallow open water Tidal flats Low marsh Trees overhanging water High marsh Pools Pannes Wooded islands Marsh-upland border Phragmites	Presence or abundance
IV. Extent of Modification	Little to no ditching Moderate ditching Severe ditching Little to no tidal restriction Moderate tidal restriction Severe tidal restriction	Degree of modification
V. Salt Marsh Vegetation	Aquatic plants Emergents Shrubs Trees Vines	Presence or abundance
VI. Vegetative Heterogeneity	High heterogeneity Moderate heterogeneity Low heterogeneity	Number of habitat edges
VII. Surrounding Land Cover	Open water Natural land Maintained open land Developed land	Presence or area
VIII. Connectivity	Sand or cobble beach Coastal dunes or overwash Other salt marsh wetland Brackish wetland or pond Freshwater wetland or pond Upland meadow Upland forest	Presence or area

Table 3.2.
Values and weighting factors associated with each habitat category in the New England Salt Marsh Model.

a) Pre-classification components

Component	Category	Weighting factor	Criteria (value) High (5)	High/mod. (4)	Moderate (3)	Mod./low (2)	Low (1)
Size class	–	10	> 200 ha	126–200 ha	26–125 ha	5–25 ha	< 5 ha
Morphology	–	10	Salt meadow	Meadow/fringe	Wide or marine fringe	–	Narrow fringe

b) Assessment components

Component	Category	Weighting factor	Criteria (value) High (5)	Moderate (3)	Low (1)	Absent (0)
Habitat type	shallow open water	7	>20% of marsh unit	10–20% of marsh unit	<10% of marsh unit	absent
	tidal flats	8	>30% of marsh unit	5–30% of marsh unit	<5% of marsh unit	absent
	low marsh	8	>15% of marsh unit	5–15% of marsh unit	<5% of marsh unit	absent
	trees overhanging water	5	>15% of marsh unit	5–15% of marsh unit	<5% of marsh unit	absent
	high marsh	8	>40% of marsh unit	5–40% of marsh unit	<5% of marsh unit	absent
	wooded islands	6	>15% of marsh unit	5–15% of marsh unit	<5% of marsh unit	absent
	phragmites	4	>3% of marsh unit	1–3% of marsh unit	<1% of marsh unit	absent
	pools	8	>10 pools/ha	2–10 pools/ha	<2 pools/ha	absent
	pannes	5	>10 pannes/ha	2–10 pannes/ha	<2 pannes/ha	absent
	marsh-upland border[a]	8				
	width		width >8 m	width 2–8 m	width <2 m	–
	length		>65% of perimeter	50–65% of perimeter	<50% of perimeter	–
	composition		>70% shrubs	50–70% shrubs	<50% shrubs	–
Anthropogenic modification	ditching	9	little to no ditching	moderate ditching	severe ditching	–
	tidal restriction	7	little to no restriction	moderate restriction	severe restriction	–
Vegetation	aquatic plants	2	>15% of marsh unit	5–15% of marsh unit	<5% of marsh unit	absent
	emergents	3	>90% of marsh unit	75–90% of marsh unit	<75% of marsh unit	absent
	shrubs	3	>20% of marsh unit	5–20% of marsh unit	<5% of marsh unit	absent
	trees	4	>15% of marsh unit	5–15% of marsh unit	<5% of marsh unit	absent
	vines	1	>15% of marsh unit	5–15% of marsh unit	<5% of marsh unit	absent
Vegetative heterogeneity	–	6	5 edge habitats	3–4 edge habitats	1 or 2 edge habitats	–
Surrounding land use	open water	6	>35% of buffer[b]	25–35% of buffer	<25% of buffer	–
	natural land	9	>25% of buffer	10–25% of buffer	<10% of buffer	–
	maintained open	5	<5% of buffer	5–15% of buffer	>15% of buffer	–
	developed land	9	<5% of buffer	5–35% of buffer	>35% of buffer	–
Connectivity[c]		9				
	habitat types in buffer[d]		>4	3–4	1–2	–
	average size		>3 ha	1–3 ha	<1 ha	–
	proportion of buffer		>30% of buffer	15–30% of buffer	<15% of buffer	–

3.3 Model Requirements

The USEPA designed the model to be an easily accessible tool to be used by field biologists and resource managers to perform office-based assessments that could be run in a relatively short amount of time using readily available data and software. The model designers intended that output produced by the model would be used to make planning and management decisions, such as "(1) prioritizing marshes for protection and restoration, (2) identify ecologically important marshes that could potentially harbor high biodiversity, and (3) monitor changes in habitat value over time, for example during the course of salt marsh restoration" (McKinney et al. 2009a). The input data necessary for the application of the model is "at a minimum, aerial photographs showing each salt marsh to be assessed and the surrounding landscape at least 1km around each site are required to carry out the assessment. Digital land use and land cover in a GIS will aid in determining surrounding land use and associated habitats. Office-based aerial photo delineation to assess habitat type, vegetative structure, and vegetative heterogeneity should, if possible, be supplemented with field assessment" (USEPA, 2008). Software and hardware required to run the EPA model are commonly available in an office setting. An Excel or any simple spread sheet software package can be used to calculate habitat assessment scores. A matrix, including the assessment components, and their associated weighting factors and scores, is available in McKinney et al (2009).

There is no formal training associated with the USEPA model. Since the basis of the model is to assess marsh quality through available habitats, the model user must have an understanding of and the ability to recognize habitat types present in a salt marsh. The user must be able to differentiate, either from aerial photography or through field visits, vegetative structures and habitat types. The user must also be able to estimate the extent of habitat or vegetation types that make up each study site.

3.4 Application of the NESSM Model to the Sandy Point Salt Marsh Creation Area

The NESMM was used to calculate environmental benefits that would be derived from creation efforts at the Sandy Point site within New Haven Harbor (New Haven and West Haven, CT) using a 50-year period of analysis for the created marsh. The model was run for two size alternatives, a 58 acre salt marsh and a 30 acre salt marsh (Figure 3.1), using existing tidal conditions in New Haven Harbor (Table 3.3) and considering SLC (Table 3.4). For all scenarios the design dedicated 90% of the area to salt marsh and 10% of the area to tidal creek/mudflat habitat. The tidal creek/mudflat portion of the area is incorporated into the design to allow for the existing connection between New Haven Harbor and Old Field Creek (which feeds a salt marsh to the west of the site) to remain. One alternative evaluated for both the 30 acre alternative and 58 acre alternative salt marsh areas was creating primarily (98%) high marsh to maximize the marsh's capacity to hold dredged material. Alternatives using salt marsh habitat ratios of 50% high marsh/50% low marsh and 75% high marsh/25% low marsh (assuming the same quantity of placement) were also run to evaluate habitat value under differing marsh configurations.

Figure 3.1: Salt marsh creation alternatives for the New Haven Harbor Navigation Improvement Project.

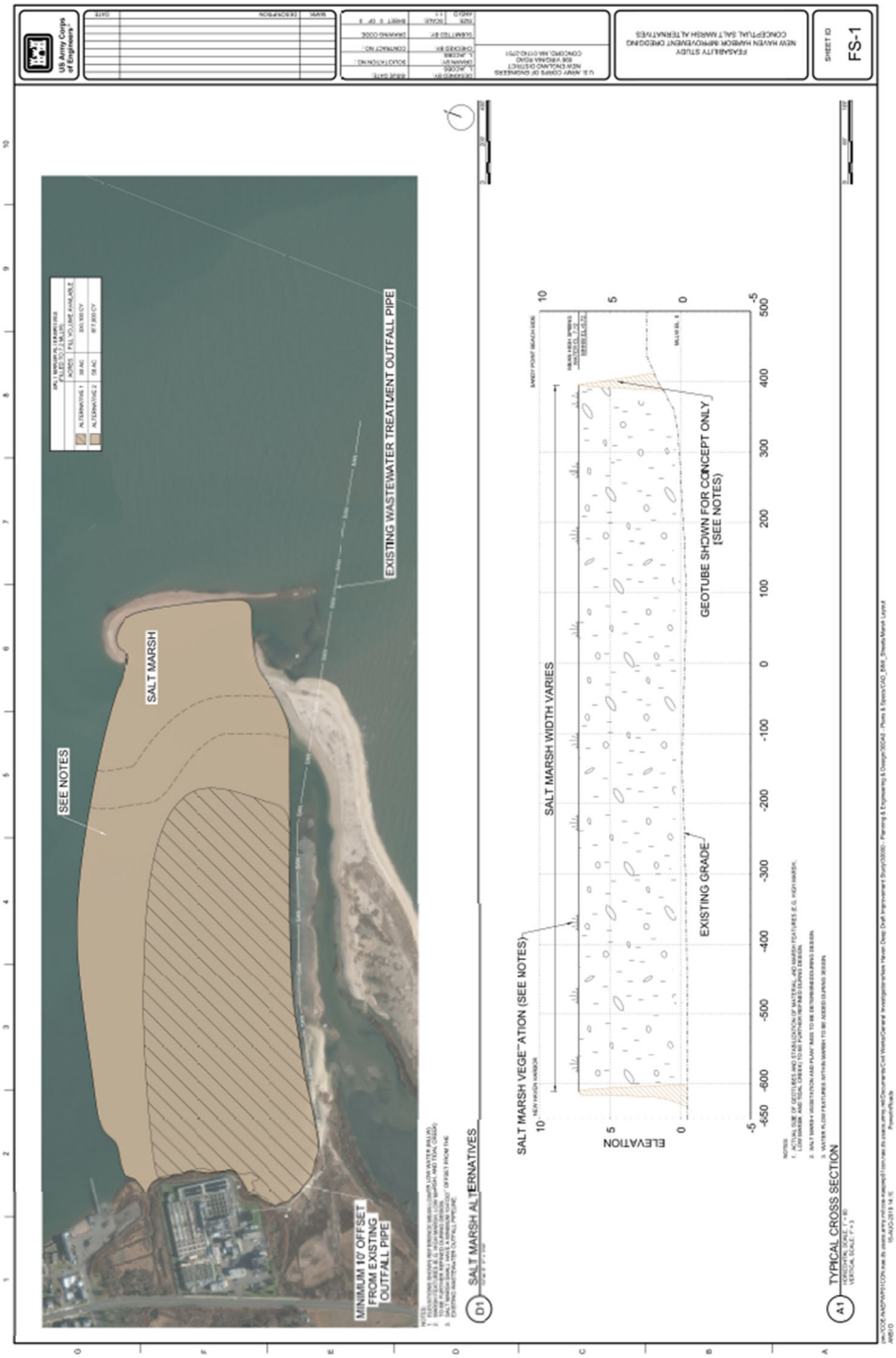

Table 3.3
New Haven Harbor Existing Tide Range – NOAA Station 8465705

Condition	**Elevation (feet, MLLW)**	**Elevation (feet, NAVD88)**
Mean Spring High Water (MSHW)	7.22	3.60
Mean Higher High Water (MHHW)	6.71	3.09
Mean High Water (MHW)	6.39	2.77
NAVD88	3.62	0.00
Mean Sea Level (MSL)	3.32	-0.30
Mean Tide Level (MTL)	3.32	-0.30
Mean Low Water (MLW)	0.24	-3.38
Mean Lower Low Water	0.00	-3.62

Table 3.4
USACE Sea Level Change Rates – Future Scenarios

Estimated Relative Sea Level Change
from 2023 To 2073
8467150, Bridgeport, CT
NOAA's 2006 Published Rate: 0.00840 feet/yr
All values are expressed in feet

Year	USACE Low	USACE Int	USACE High
2023	0.00	0.00	0.00
2025	0.02	0.03	0.06
2030	0.06	0.10	0.24
2035	0.10	0.18	0.43
2040	0.14	0.26	0.64
2045	0.19	0.35	0.87
2050	0.23	0.44	1.12
2055	0.27	0.54	1.38
2060	0.31	0.64	1.67
2065	0.35	0.74	1.97
2070	0.40	0.85	2.29
2073	0.42	0.92	2.50

Marsh Creation and SLC Scenarios

Both the 30-acre and 58-acre alternatives were considered under three sea level change (SLC) scenarios: high, intermediate, and low over the 50-year period of analysis.

30-Acre and 58-acre Marsh Creation, Low and Intermediate SLC Conditions

When comparing the existing (2019) tidal data (Table 3) and the predicted SLC data (Table 4) over a 50-year period, it was determined that under the low and intermediate SLC scenarios, the NESMM values for both alternatives would not change. Both the low and intermediate SLC values were less than a 1 foot change over a 50-year period. This change in water elevation would remain within the range of high marsh conditions and not significantly change marsh species composition. The with project condition represents the future under the low and intermediate SLC conditions. The high SLC scenario, which has a 2.5 foot rise in sea level over 50 years, would impact the marsh species composition and the sensitivity of the results to the high SLC was evaluated with the NESMM and is also presented below.

A discussion of the SLC scenarios and their calculations can be found in Section 5 of the Appendix E - Coastal Engineering. The existing tidal data is shown in Table 3 and predicted SLC data is shown in Table 4. The NESMM was not used to assess current conditions in the project area as the area is currently shallow subtidal habitat and intertidal mudflat habitat. Therefore, the "marsh" habitat value under current conditions was given an overall score of 0.

Data used to quantify the "with project" condition values were based upon projected habitat types that are being considered in the New Haven Harbor Navigation Improvement Project Integrated Feasibility Report and Environmental Impact Statement (IFR/EIS) (USACE 2018). The values were developed using anticipated site conditions once salt marsh creation efforts have been completed and are based upon the best professional judgment of USACE biologists. The inherent weakness of forecasting future conditions is that there is no way to guarantee that optimal conditions will be established at the salt marsh site. This uncertainty can be mitigated with the establishment of monitoring and adaptive management programs, as is required by USACE policy and has been included in the New Haven Harbor IFR/EIS.

30-Acre Marsh Creation, With Project Conditions

<u>Alternative A</u>. 30-acre created salt marsh, consisting primarily (98%) of high marsh, received a NESMM score of 382, which accounts for 49% of the highest possible score an evaluated marsh can achieve (Table 5).

<u>Alternative B</u>. A 30-acre created salt marsh, consisting of a 75% high marsh and 25% low marsh and as a sensitivity check a 30-acre created salt marsh consisting of 50% high marsh and 50% low marsh both received a NESMM score of 414, which accounts for 53% of the highest possible score (Table 5).

Each of the eight NESMM components that comprise the model are discussed below.

Size Class: This component received a score of 20 out of a possible 50 for all 30-acre scenarios. This is due to the marsh being in the "small" sized category (5-25 ha).

Morphology: This component received a score of 50 out of a possible 50 for all 30-acre scenarios. This is due to the marsh being designed as a salt meadow marsh.

Habitat Type: The "Habitat Type" component assesses the presence of 10 distinct microhabitats found within a salt marsh (i.e. shallow open water, tidal flats, pannes, trees over hanging water, high marsh, phragmites, pools, marsh-upland border, wooded islands, and low marsh) by assigning values and weighting factors to the percentage of each microhabitat present at the site. This component received a score of 76 out of a possible 319 for the primarily (98%) high marsh scenario. This value is due to the marsh being primarily high marsh. The scenarios of 75% high marsh/25% low marsh and 50% high marsh/50% low marsh received a score of 108 out of a possible 319. The higher score is a result of the low marsh percentage being greater than 15% and therefore causing the model to rate the marsh higher (the model plateau at which ratings change based upon the percentage of low marsh is at 15% low marsh).

Modification: This component received a score of 80 out of a possible 80 for all scenarios. This is due to the marsh being designed as a salt meadow marsh with no ditching or tidal restrictions.

Surrounding Land: This component received a score of 81 out of a possible 145 for all scenarios. This value is a function of the varying percentages of land use that surround the 30 acre marsh footprint. As the majority of surrounding land use would be open water and natural land, the component scores fairly high compared to the maximum.

Connectivity: This component received a score of 27 out of a possible 45 for all scenarios. This value is a function of the number of habitat types present in the adjacent lands. As with the surrounding land use component, the connectivity component scores fairly high compared to the maximum due to the proximity of open water, beach, and natural land habitat adjacent to the perimeter of the marsh.

Vegetative Heterogeneity: The "Vegetative Heterogeneity" component accounts for the abundance and diversity of vegetative edges. This component received a score of 30 out of a possible 30 for all scenarios. This is due to the marsh being designed as a salt meadow marsh that is adjacent to both open water habitat and natural land habitat.

Vegetation: The model assigns value to the composition of the salt marsh plant community through the "Vegetation" component. The percentage of five plant groups (aquatic plants, emergents, shrubs, trees, and vines) within the marsh unit is captured in this component. This component received a score of 18 out of a possible 65 for all scenarios. The value is due to the footprint being designed as primarily salt marsh as opposed to a mix of salt marsh, islands, upland, and open water.

58-Acre Marsh Creation, With Project Conditions

Alternative A. A 58-acre created salt marsh, consisting primarily (98%) of high marsh, received a NESMM score of 426, which accounts for 54% of the highest possible score an evaluated marsh can achieve (Table 5).

Alternative B. A 58-acre created salt marsh, consisting of 75% high marsh/25% low marsh and as a sensitivity check a 50% high marsh/50% low marsh, both received a NESMM score of 458, which accounts for 58% of the highest possible score an evaluated marsh can achieve (Table 5). The same score achieved by the 2 latter scenarios is a result of both scenarios having low marsh percentages greater than 15% (the model plateau at which ratings change based upon the percentage of low marsh is at 15% low marsh).

Each of the eight NESMM components that comprise the model are discussed below.

Size Class: This component received a score of 30 out of a possible 50 for all three scenarios. This is due to the marsh being in the "medium" sized category.

Morphology: This component received a score of 50 out of a possible 50 for all three scenarios. This is due to the marsh being designed as a salt meadow marsh.

Habitat Type: This component received a score of 92 out of a possible 319 for the predominately (98%) high marsh scenario. The value is due to the marsh being designed as primarily salt marsh as opposed to a mix of upland, marsh, island, and open water habitats. The 75%/25% and the 50%/50% high marsh/low marsh scenarios both obtained scores of 124 for habitat type. The increased score was the result of the greater than 15% low marsh quantity.

Modification: This component received a score of 80 out of a possible 80 for all three scenarios. This is due to the marsh being designed as a salt meadow marsh with no ditching or tidal restrictions.

Surrounding Land: This component received a score of 99 out of a possible 145 for all three scenarios. This value is a function of the varying percentages of land use that surround the 58 acre marsh footprint. As the majority of surrounding land use would be open water and natural land, the component scores fairly high compared to the maximum. All 58-acre marsh alternatives scored 16 points higher in this component than the 30-acre alternatives due to the larger ratio of marsh to open water.

Connectivity: This component received a score of 27 out of a possible 45 for all scenarios. This value is a function of number of habitat types present in the adjacent lands. As with the surrounding land use component, the connectivity component scores fairly high compared to the maximum due to the proximity of open water, beach, and natural land habitat adjacent to the perimeter of the marsh.

Vegetative Heterogeneity: The "Vegetative Heterogeneity" component accounts for the abundance and diversity of vegetative edges. This component received a score of 30 out of a possible 30 for all scenarios. This is due to the marsh being designed as a salt meadow marsh that is adjacent to both open water habitat and natural land habitat.

Vegetation: The model assigns value to the composition of the salt marsh plant community through the "Vegetation" component. The percentage of five plant groups (aquatic plants, emergents, shrubs, trees, and vines) within the marsh unit is captured in this component. This component received a score of 18 out of a possible 65 for all scenarios. The relatively low value is due to the marsh being designed as exclusively salt marsh meadow habitat.

Sensitivity Analysis to High SLC Conditions

30-Acre Marsh Creation, High SLC Conditions

The 30-acre created salt marsh was evaluated under high SLC conditions. In this scenario it was assumed that a sea level rise of 2.5 feet was realized and no natural marsh accretion had occurred. Therefore the site was evaluated as consisting primarily (99%) of low marsh. This scenario received a NESMM score of 374, which accounts for 48% of the highest possible score an evaluated marsh can achieve (Table 5). Each of the eight NESMM components that comprise the model are discussed below.

Size Class: This component received a score of 20 out of a possible 50. This is due to the marsh being in the "small" category (5-25 ha).

Morphology: This component received a score of 50 out of a possible 50. This is due to the marsh being designed as a salt meadow marsh.

Habitat Type: This component received a score of 68 out of a possible 319. The relatively low value is due to the predicted marsh being primarily (~99%) low marsh under high SLC conditions. However, as salt marshes have the ability to adapt to SLC through accretion processes, this scenario of changing from predominately high marsh to predominately low marsh over a lengthy time period (i.e., 50 years) is unlikely.

Modification: This component received a score of 80 out of a possible 80. This is due to the marsh being designed as a salt meadow marsh with no ditching or tidal restrictions.

Surrounding Land: This component received a score of 81 out of a possible 145. This value is a function of the varying percentages of land use that surround the 30 acre marsh footprint. As the majority of surrounding land use would be open water and natural land, the component scores fairly high compared to the maximum. While SLC values predict changes to marsh habitat types on the marsh surface, no changes in surrounding lands are expected.

Connectivity: This component received a score of 27 out of a possible 45. This value is a function of number of habitat types present in the adjacent lands. As with the surrounding land use component, the connectivity component scores fairly high compared to the maximum due to the proximity of open water, beach, and natural land habitat adjacent to the perimeter of the marsh. No changes to surrounding land are expected under the High SLC scenario.

Vegetative Heterogeneity: The "Vegetative Heterogeneity" component accounts for the abundance and diversity of vegetative edges. This component received a score of 30 out of a possible 30. This is due to the marsh being designed as a salt meadow marsh that is adjacent to both open water habitat and natural land habitat. While the high SLC scenario predicts changes

in the salt marsh from high marsh dominant to low marsh dominant, the marsh would still be considered a salt meadow marsh.

Vegetation: This component received a score of 18 out of a possible 65. The relatively low value is due to the marsh being theoretically composed of primarily (99%) low marsh under the High SLC scenario.

58-Acre Marsh Creation, High SLC Conditions

A 58-acre created salt marsh under high SLC conditions, consisting primarily (~99%) of low marsh, received a NESMM score of 418, which accounts for 53% of the highest possible score an evaluated marsh can achieve (Table 5). Each of the eight NESMM components that comprise the model are discussed below.

Size Class: This component received a score of 30 out of a possible 50. This is due to the marsh being in the "medium" category.

Morphology: This component received a score of 50 out of a possible 50. This is due to the marsh being a salt meadow marsh.

Habitat Type: This component received a score of 84 out of a possible 319. The value is due to the predicted marsh being primarily low marsh under high SLC conditions, which (based upon how the NESMM values habitat diversity) is of lesser value than a marsh with a mix of habitat types. However, as salt marshes have the ability to adapt to SLC through accretion processes, this scenario of changing from predominately high marsh to predominately low marsh over a lengthy time period (i.e., 50 years) would depend on the extent to which the marsh is able to keep pace with sea level rise. While some transition to low marsh may occur, the change of the marsh habitat from "salt meadow" to intertidal flat and/or open water is not expected.

Modification: This component received a score of 80 out of a possible 80. This is due to the marsh being designed as a salt meadow marsh with no ditching or tidal restrictions.

Surrounding Land: This component received a score of 99 out of a possible 145. This value is a function of the varying percentages of land use that surround the 30 acre marsh footprint. As the majority of surrounding land use would be open water and natural land, the component scores fairly high compared to the maximum. While SLC values predict changes to marsh habitat types on the marsh surface, no changes in surrounding lands are expected as the 2.50 increase in sea level is below the existing elevations

Connectivity: This component received a score of 27 out of a possible 45. This value is a function of number of habitat types present in the adjacent lands. As with the surrounding land use component, the connectivity component scores fairly high compared to the maximum due to the proximity of open water, beach, and natural land habitat adjacent to the perimeter of the marsh. No changes to surrounding land are expected under the High SLC scenario.

Vegetative Heterogeneity: The "Vegetative Heterogeneity" component accounts for the abundance and diversity of vegetative edges. This component received a score of 30 out of a possible 30. This is due to the marsh being designed as a salt meadow marsh that is adjacent to

both open water habitat and natural land habitat. While the high SLC scenario predicts changes in the salt marsh from high marsh dominant to low marsh dominant, the marsh would still be considered a salt meadow marsh.

Vegetation: This component received a score of 18 out of a possible 65. The relatively low value is due to the marsh being primarily (~99%) low marsh under the High SLC scenario.

4.0 ENVIRONMENTAL BENEFITS SUMMARY

To assess the ecological benefits gained from salt marsh creation, USACE used the NESMM (a marsh assessment tool) to evaluate the habitat value of the salt marsh creation alternative. Results are presented below in Table 4.1. The with project conditions represent the future under the low and intermediate SLC scenarios. A sensitivity analysis is also provided for the high scenario.

Two salt marsh sizes were evaluated one that maximizes placement (beneficial use) of the dredged material and a smaller size. The ratios of high marsh to low marsh habitat within each of the marsh sizes were also varied in an attempt to maximize ecological benefits based on the NESMM. These results show that adjusting the ratios of high to low marsh from 50% to 75% did not change the NESMM score.

The creation of a 58-acre salt marsh with a 75% high marsh 25% low marsh scenario produced the highest NESMM score (458) under the with project conditions, while the creation of a 30-acre salt marsh with the same habitat ratio produced a NESMM score of 414. It should be noted that because of existing conditions surrounding the site, the maximum score of any salt marsh configuration at Sandy Point was calculated to be 633. Therefore, the 58-acre salt marsh with a 75% high marsh 25% low marsh scenario accounts for 72% of the highest score possible.

Applying the high SLC scenario to the salt marsh creation project predicted that the salt marsh would likely change in form from a high-marsh dominated salt marsh meadow to a low-marsh dominated salt marsh meadow, indicating the environmental benefits of the marsh creation would not change significantly over the 50-year period of analysis as NESSM score only decreased by about one percent.

Table 4.1

Scores for each Sandy Point salt marsh creation area scenario under the with project conditions* and the predictive high sea level change (SLC) conditions.

Habitat Component	Max.** NESSM Score Possible	30 acres With Project Conditions (50% high marsh design)	30 acres With Project Conditions (75% high marsh design)	30 acres With Project Conditions (98% high marsh design)	30 acres High SLC Conditions Sensitivity Analysis	58 acres With Project Conditions (50% high marsh design)	58 acres With Project Conditions (75% high marsh design)	58 acres With Project Conditions (98% high marsh design)	58 acres High SLC Conditions Sensitivity Analysis
% salt marsh	-	90	90	90	90	90	90	90	90
% open water - mudflat	-	10	10	10	10	10	10	10	10
% high marsh	-	50	75	98	1	50	75	98	1
% low marsh	-	50	25	2	99	50	25	2	99
Size Class	50.0	20	20	20	20	30	30	30	30
Morphology	50.0	50	50	50	50	50	50	50	50
Habitat Type	319.0	108	108	76	68	124	124	92	84
Modification	80.0	80	80	80	80	80	80	80	80
Surrounding Land	145.0	81	81	81	81	99	99	99	99
Connectivity	45.0	27	27	27	27	27	27	27	27
Vegetative Heterogeneity	30.0	30	30	30	30	30	30	30	30
Vegetation	65.0	18	18	18	18	18	18	18	18
Total	**784****	**414**	**414**	**382**	**374**	**458**	**458**	**426**	**418**
Percent of Maximum	100%	53%	53%	49%	48%	58%	58%	54%	53%

*With project conditions represent both the low and intermediate SLC predictive conditions.
**Due to adjacent land use that cannot be modified, the maximum score for a salt marsh within the footprint under consideration is 633 (81% of the model's maximum score).

5.0 INCREMENTAL COST OF SALT MARSH CREATION AND BENEFIT

The cost to create the salt marsh is not a least cost disposal alternative. Use of the dredged material to create the salt marsh requires mobilizing a hydraulic dredge, placement of geotubes to provide for containment, contouring of the surface of the marsh, and post construction monitoring. Using the dredged material to create the salt marsh helps to limit the material going the Central Long Island Sound Disposal Site (CLDS). Project costs are the additional costs to create the salt marsh alternatives instead of disposing the material at CLDS. Costs are annualized over a 50-planning period (see Table 5.1).

Table 5.1
Project Costs

Sandy Point Salt Marsh Creation Beneficial Use of Dredged Material		
Quantity of Dredged Material	330,100 cy (Plan A & B)	657,000 cy (Plan C &D)
Acres	30	58
Project First Cost* (Cost above disposal at CLDS)	$5,676,000	$7,443,000
IDC (2-years) **	$157,000	$206,000
Total Includes IDC	$5,833,000	$7,649,000
Average Annual Equivalent (AAEQ) Cost	$216,000	$283,000
Average Annual Equivalent (AAEQ) O&M Cost	$15,000	$15,000
Average Annual Equivalent (AAEQ) Total	$231,000	$298,000
* Cost October 2019 price level, ** FY20 Discount Rate 2.75%		

Cost Effectiveness and Incremental-Cost Analysis

Cost effectiveness and incremental-cost analysis is an alternative to benefit-cost analysis used when the primary outputs/benefits of alternative plans are not measured in dollars. Cost effectiveness ensures that the least cost alternative is identified for each possible level of output, or NESMM units in this case. The incremental cost analysis reveals changes in costs as output units increase and allows an assessment of whether the increase in units is worth the additional cost (identifies diminishing returns). This process does not identify a unique optimal solution, rather it informs and supports selecting an alternative.

Five alternatives are considered in the cost effectiveness and incremental-cost analysis (CEICA).

The initial review of the plans shows that five alternatives, are cost-effective plans (economically justifiable). These alternatives are cost effective because there are no other alternatives that provides similar habitat units at less cost (see Table 5.2).

Table 5.2
Cost Effective Plans

Alternative	Description	CY	Output NESMM Score
No Action Alternative			0
Alternative A	30 acre 75% HM	330,100	414
Alternative B	30 acre 98% HM	330,100	382
Alternative C	58 acre 75 % HM	657,000	458
Alternative D	58 acre 98% HM	657,000	426

Best buy plans are a subset of cost effective plans. For each best buy plan there are no other plans that will give the same level of output at a lower incremental cost. There are three best buy plans: No Action, Alternative A, and Alternative C. See Table 5.3 below and Figure 5.1 Best Buy Plans.

Table 5.3
Best Buy Plans

Alternative	Description	Output NESMM Score	AAEQ Cost ($)	Cost Effective
No Action Alternative		0	0	Best Buy
Alternative A	30 acre 75% HM	414	231,000	Best Buy
Alternative B	30 acre 98% HM	382	231,000	Non-Cost Effective
Alternative C	58 acre 75 % HM	458	298,000	Best Buy
Alternative D	58 acre 98% HM	426	298,000	Non-Cost Effective

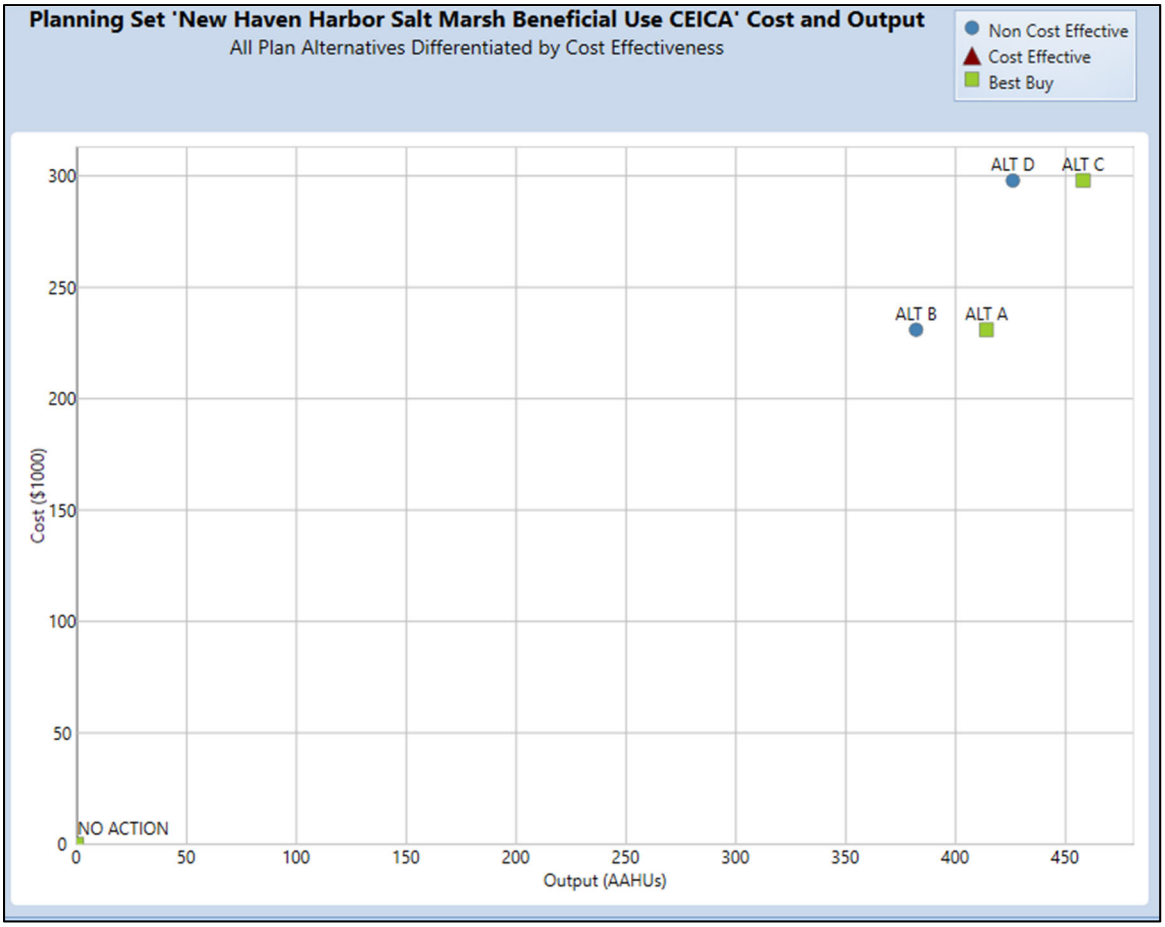

Figure 5.1: Best Buy Plans

The incremental cost per NESMM unit is the change in cost divided by the change in NESMM unit, or incremental output when proceeding to plans with higher levels of output. In this study, the incremental cost curve consists of three points (the three Best Buy Plans). See Figure 5.2. Alterative A would provide an additional 414 NESMM units over the No Action Alternative at an AAEQ cost of $558/unit. Alternative C would provide additional 44 NESMM units over Alternative A at an incremental AAEQ cost of $1,523 per NESMM unit. Although the incremental cost per unit in moving from Plan A to Plan C is higher that the going from the No Action to Plan A, it is worth the increase to obtain the additional environmental benefits provided by the larger 58 acre marsh and take full advantage of the beneficial use of dredged material.

Alternative C is the recommended alternative and provides 58 acres of salt marsh habitat (458 NESMM units) at an AAEQ cost of $650/NESMM unit or an AAEQ of $5,100/acre and significantly decrease the quantity of material going to Central Long Island Sound by 657,000 cy of dredged material.

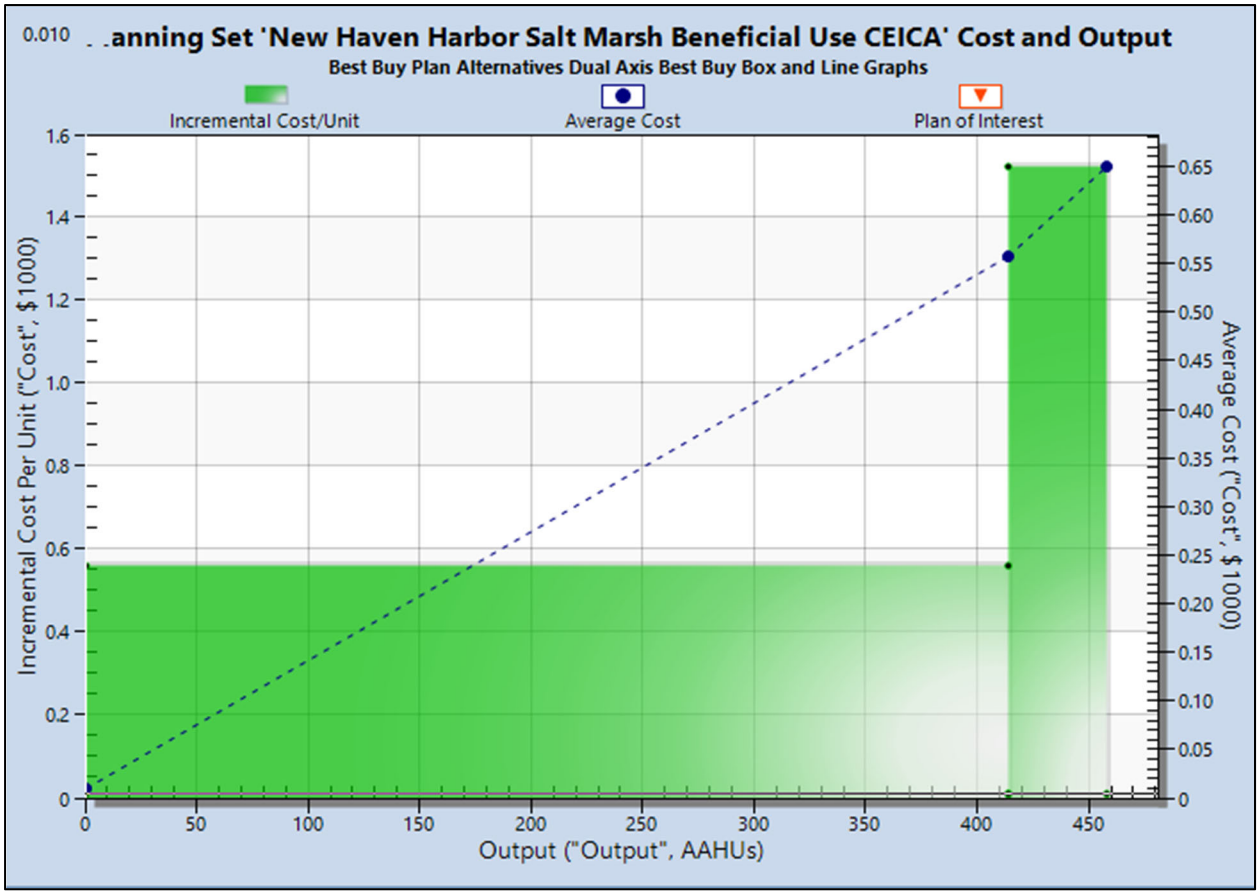

Figure 5.2: Incremental Cost

6.0 REFERENCES

McKinney, R.A., and Wigand, C. 2006. A framework for the assessment of the wildlife habitat value of New England salt marshes. EPA/600/R-06/132. Office of Research and Development. Washington, DC 20460.

McKinney, R.A., Charpentier, M.A., and Wigand, C. 2009a. Assessing the wildlife habitat value of New England salt marshes: I. Model and application. Environmental Monitoring and Assessment. 154:29-40.

McKinney, R.A., Charpentier, M.A., and Wigand, C. 2009b. Assessing the wildlife habitat value of New England salt marshes: II. Model testing and validation. Environmental Monitoring and Assessment. 154:361-371.

Meyerson, L.A., K. Saltonstall, L. Windham, E. Kiviat and S. Findlay. 2000. A comparison of Phragmites australis in freshwater and brackish marsh environments in North America. Wetlands Ecology and Management 8:89-103.

USEPA, Salt Marsh Wildlife Habitat. Link: http://www.epa.gov/aed/html/research/wetland/saltmarsh/index.html Last updated September 22, 2008.

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

CLEAN WATER ACT
404(b)(1) EVALUATION

CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
CONCORD, MA

PROJECT: Improvement Dredging of New Haven Harbor, New Haven, Connecticut

PROJECT MANAGER: Ms. Barbara Blumeris Phone: (978) 318-8737

FORM COMPLETED BY: Mr. Todd Randall Phone: (978) 318-8518

PROJECT DESCRIPTION:

The existing New Haven Harbor Federal Navigation Project (FNP) is shown in Figure 1. Navigation features of the existing Federal Navigation Project include:

- A main ship channel, -35 feet MLLW, extending about 5 miles from deep water in Long Island Sound to the head of the harbor at the mouth of the Quinnipiac River, varying in width from 500 feet (outer-harbor) to 400 feet (inner-harbor), and widened to 800 feet along the upper harbor terminals to provide a maneuvering area;
- A turning basin in the upper harbor west of the channel also at -35 feet MLLW;
- Two anchorages west of the main channel, at -15 and -16 feet MLLW;
- The Quinnipiac River Channel, at -18 feet MLLW (lower channel) and -16 feet MLLW (upper channel), and generally 200 feet wide;
- The Mill River Channel, at -12 feet MLLW, 200 feet wide, including two branches (east branch at 100 ft. wide, and west branch at 125 feet wide);
- The West River channel authorized at -12-feet MLLW, 100 to 150 feet wide, with a -6 foot MLLW anchorage;
- A pile and stone T-dike at Stony Point west of the main channel, 4,200 feet long; and
- Three offshore stone breakwaters, totaling 12,100 feet in length providing a refuge in the outer harbor.

Due to inefficiencies in large vessels transiting the harbor, USACE is considering navigation improvement to the New Haven Harbor FNP. The tentatively selected plan (TSP) for the New Haven Harbor Navigation Improvement project is the -40 feet MLLW Plan. The TSP consists of the following General Navigation Feature Improvements:

<u>TSP - General Navigation Feature Improvements</u>

- Deepen the channel, maneuvering area, and turning basin from - 35 to -40 feet, MLLW
- Widen the turning basin to the north 200 feet
- Widen the inner channel from 400 to 500 feet and the entrance channel from 500 to 600 feet.
- Widen the channel bend at the East Breakwater from 560 to 800 feet

The improvement features are shown in Figure 2. The dredged material quantity estimate

for the improvement dredging is shown in Table 1.

Table 1. TSP Dredged Material Quantity Estimates.

TSP (-40 feet MLLW Plan)	Dredging Quantities (CY)		
	Cut	2-ft. Over depth	Total
Entrance Channel	278,300	240,000	518,300
Bend (Ordinary Material)	475,300	161,300	636,600
Bend (Rock) (Required Cut to El 42)	24,900	18,600	43,500
Interior Channel	1,537,400	776,000	2,313,400
Maneuvering Area	377,700	274,600	652,300
Turning Basin	117,900	40,200	158,100
Total Improvement Dredging	**2,811,500**	**1,510,700**	**4,322,200**

Dredged Material Placement Sites Base Plan

The following sites will be used for the placement of dredged material from the improvement project. These sites are considered the Federal base plan and also represent beneficial use of the dredged material. The sites are:

- Morris Cove and West River Borrow Pits
- Create Oyster Habitat south of east breakwater
- Rock placement at west Breakwater (rock reef)
- Cover historic disposal mounds at CLDS

Salt Marsh Creation Additional Opportunity for Beneficial Use Site

In addition to the above placement sites the opportunity to use some of the dredged material that would go to CLDS to create about 58 acres of salt march was identified. This salt marsh creation site represents an increase in cost over the less expensive option of bringing the material to CLDS. The Non-Federal Sponsors support the salt marsh creation site and are willing to share in the incremental cost above the base plan.

All potential in harbor disposal sites are shown in Figure 2. The CLDS is not shown.

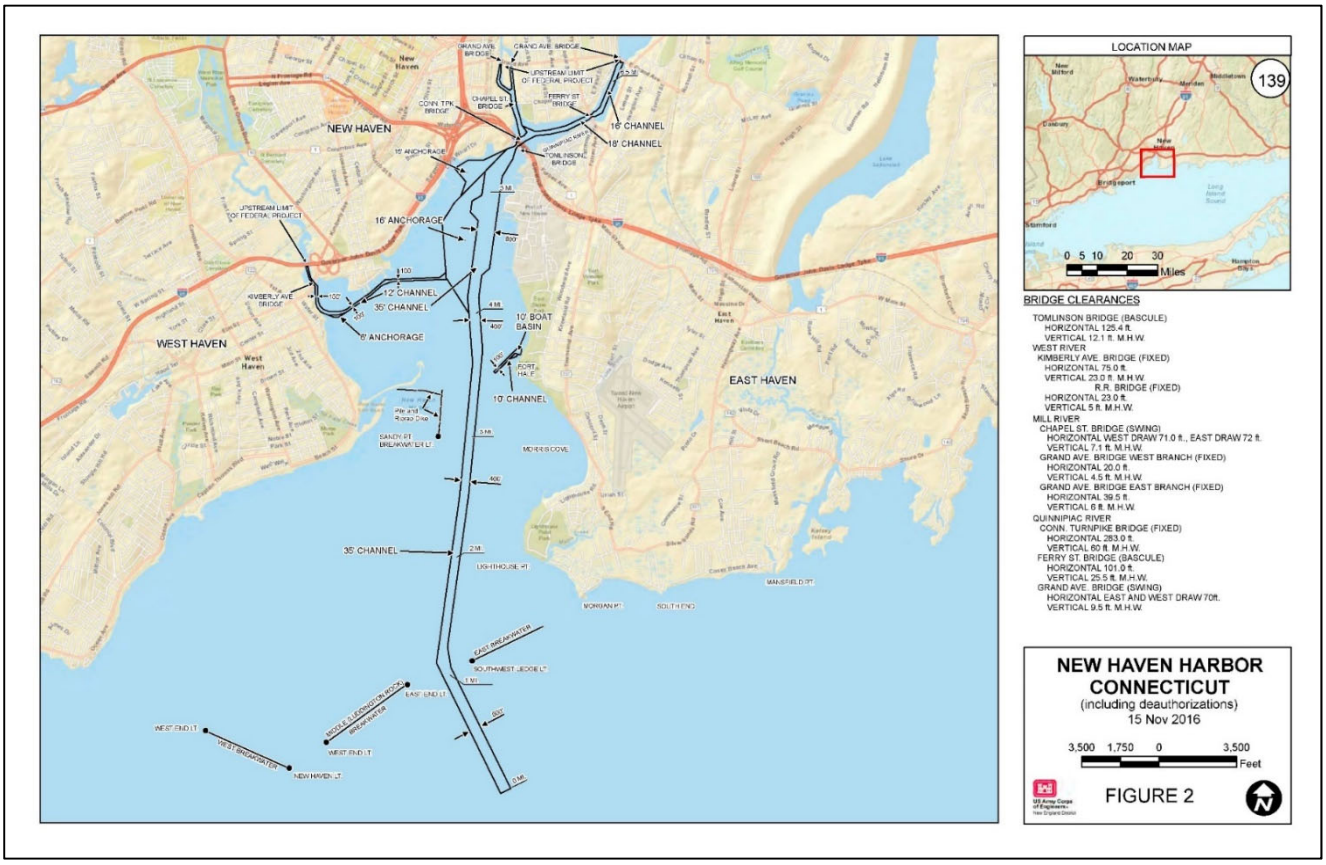

Figure 1. New Haven Harbor Federal Navigation Project

Figure 2. Navigation Improvement Features and Placement Site Locations

NEW ENGLAND DISTRICT
U.S. ARMY CORPS OF ENGINEERS, CONCORD, MA

EVALUATION OF CLEAN WATER ACT SECTION 404(b)(1) GUIDELINES

PROJECT: New Haven Harbor Federal Navigation Improvement Project

1. **Review of Compliance (Section 230.10(a)-(d)).**

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose;	X YES	 NO
b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed threatened and endangered species or their critical habitat; and 3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);	X YES	 NO
c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2);	X YES	 NO
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).	X YES	 NO

2. **Technical Evaluation Factors (Subparts C-F).**	NA	Not Significant	Significant
a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C).			
1) Substrate		X	
2) Suspended particulates/turbidity		X	
3) Water		X	
4) Current patterns and water circulation		X	
5) Normal water fluctuations		X	
6) Salinity gradients		X	
b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D).			
1) Threatened/ endangered species		X	
2) Fish, crustaceans, mollusks and other aquatic organisms in the food web		X	
3) Other wildlife		X	
c. Potential Impacts on Special Aquatic Sites (Subpart E).			
1) Sanctuaries and Refuges		X	
2) Wetlands		X	
3) Mud Flats		X	
4) Vegetated Shallows	X		
5) Coral Reefs	X		
6) Riffle and Pool Complexes	X		
d. Potential Effects on Human Use Characteristics (Subpart F).			
1) Municipal and Private Water Supplies	X		
2) Recreational and Commercial Fisheries		X	
3) Water-Related Recreation		X	
4) Aesthetics		X	
5) Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves		X	

3. Evaluation and Testing (Subpart G).

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

1) Physical Characteristics	X
2) Hydrography in relation to known or anticipated sources of contaminants	X
3) Results from previous testing of the material or similar material in the vicinity of the project	X
4) Known, significant sources of persistent pesticides from land runoff or percolation	-
5) Spill records for petroleum products or designated hazardous substances (Section 311 of CWA)	X
6) Public records of significant introduction of contaminants from industries, municipalities, or other sources	X
7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	-
8) Other sources (specify)	-

List Appropriate References:

Environmental Impact Statement for the Improvement Dredging of New Haven Harbor, New Haven, CT, September 2018

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints. The material meets the testing exclusion criteria.	_____ YES	X NO

4. Disposal Site Delineation (Section 230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

1) Depth of water at disposal site	X
2) Current velocity, direction, and variability at disposal site	X
3) Degree of turbulence	X
4) Water column stratification	X
5) Discharge vessel speed and direction	X
6) Rate of discharge	X
7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	X
8) Number of discharges per unit of time	-
9) Other factors affecting rates and patterns of mixing (specify)	-

List Appropriate References:

Environmental Impact Statement for the Improvement Dredging of New Haven Harbor, New Haven, CT, September 2018

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable.	X YES	 NO

5. Actions To Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken through application of recommendation of Section 230.70-230.77 to ensure minimal adverse effects of the proposed discharge.	X YES	 NO

6. **Factual Determination (Section 230.11).**

A review of appropriate information as identified in items 2 - 5 above indicates that there is minimal potential for short or long term environmental effects of the proposed discharge as related to:

a. Physical substrate (review sections 2a, 3, 4, and 5 above).	X YES	NO
b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5).	X YES	NO
c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5).	X YES	NO
d. Contaminant availability (review sections 2a, 3, and 4).	X YES	NO
e. Aquatic ecosystem structure, function and organisms(review sections 2b and c, 3, and 5)	X YES	NO
f. Proposed disposal site (review sections 2, 4, and 5).	X YES	NO
g. Cumulative effects on the aquatic ecosystem.	X YES	NO
h. Secondary effects on the aquatic ecosystem.	X YES	NO

7. **Findings of Compliance or Noncompliance.**

a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines.	X YES	NO

14 FEB 2020
Date

William M. Conde
Colonel, Corps of Engineers
District Engineer

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

SUPPORTING TECHNICAL DOCUMENT #1
AECOM SEDIMENT EVALUATION

AECOM

Final Report for Dredged Material Suitability Testing and Evaluation in the New Haven Harbor FNP

United States Army Corps of Engineers

Project Number: 60543021

December 19, 2017

Quality information

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Revision History

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Acronyms

ABS	Aquatic BioSystems, Inc.
ARO	Aquatic Resource Organisms
AWQC	Ambient Water Quality Criteria
CLDS	Central Long Island Sound Disposal Site
COC	Chain of Custody
CWA	Clean Water Act
DO	Dissolved Oxygen
DGPS	Differential Global Positioning System
DM	Dredged Material
EC50	Median Effective Concentration
EPA	U.S. Environmental Protection Agency
ESI	EnviroSystems, Inc.
FNP	Federal Navigation Project
FSP	Field Sampling Plan
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatography /Mass Spectrometry
LMW	High Molecular Weight
ICP/MS	Inductively Coupled Plasma Mass Spectrometry
LC50	Median Lethal Concentration
LCS	Laboratory Control Sample
LMW	Low Molecular Weight
MDL	Method Detection Limit
MLLW	Mean Lower Low Water
MPRSA	Marine Protection, Research, and Sanctuaries Act
NAE	U.S. Army Corps of Engineers, New England District
NOAA	National Oceanic and Atmospheric Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RIM	Regional Implementation Manual
RL	Reporting Limit
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
SDS	Sodium Dodecyl Sulfate
SOW	Statement or Scope of Work
SPP	Suspended Particulate Phase
SRM	Standard Reference Material
TOC	Total Organic Carbon
USACE	U.S. Army Corps of Engineers

1. Introduction

The New England District (NAE) of the US Army Corps of Engineers (USACE) is currently preparing a feasibility study for improvements to the New Haven Harbor Federal navigation project (FNP). Aspects of the study include: deepening the main ship channel from 35 feet to a depth up to 42 feet at mean lower low water (MLLW); widening the main ship channel from 400 feet to 500 feet inshore of the breakwaters and to 600 feet on the seaward side; widening the channel bend at Southwest Ledge from 560 feet to a minimum of 780 feet; straightening the channel bend downstream of the existing turning basin; revising the location of the turning basin; and deepening the turning basin from 35 feet to a depth up to 42 feet MLLW. These combined actions would require the mechanical removal of approximately 4,500,000 cubic yards of sediment and 55,100 cubic yards of rock. To the extent practical, suitable material will be beneficially reused for beach nourishment, marsh creation, upland construction projects, and to cover historic dredged material mounds in Long Island Sound. The remainder of the material is expected to be suitable for unconfined placement at the Central Long Island Sound Disposal Site (CLDS).

The purpose of the sampling effort described in this report was to characterize the material that would be produced by the proposed improvement dredging project as well as to aid in the USACE's evaluation of this material for the various placement alternatives. In support of this goal, sediments from 26 core locations within New Haven Harbor were selected to undergo physical, chemical, and biological testing in accordance with the evaluation requirements set forth in the Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters (U.S. Environmental Protection Agency [EPA]/USACE, 2004). A work plan (AECOM, 2017a – Appendix A) was prepared to guide this effort in response to the project requirements identified by NAE in the Statement of Work (SOW) dated 31 May 2017. This report summarizes the methodology used for field sampling and laboratory analysis as well as the results of testing which will be used by NAE to generate a dredged material suitability determination.

1.1 Relevant regulations/standards

Data for the dredged material suitability evaluations under the Marine Protection, Research, and Sanctuaries Act (MPRSA) and Clean Water Act (CWA) have been collected based on quality standards outlined in *QA/QC Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations* (EPA, 1995). Evaluations have followed guidance provided in the Green Book (EPA/USACE, 1991), the *Inland Testing Manual* (EPA/USACE, 1998), and the *Regional Implementation Manual* (RIM) (EPA/USACE, 2004).

2. Methods

Field and laboratory methods are detailed in the project work plan (AECOM, 2017a), comprised of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP). These documents are included in Appendix A. Brief summaries of the methods used are included in the following subsections.

2.1 Field sampling

Sample locations were established by NAE and distributed throughout proposed project area in New Haven Harbor. Final sampling locations are depicted in Figures 1 and 2. Appropriate volumes of dredge area sediment and water were collected at each of 26 harbor stations for the physical, chemical, and biological testing from August 8 – 17, 2017 as described in the sections below. Sediment and water from the CLDS Reference Site (CLDS-Ref) were also collected to facilitate the evaluation of the dredge area material for placement at that location. A full field report (AECOM, 2017b) describing the sampling effort is provided in Appendix B.

Vessel positioning and the determination of actual core sample locations were accomplished utilizing a Differential Global Positioning System (DGPS) with an attempt to collect each core within 3 meters or less of the target location. Local National Oceanic and Atmospheric Administration (NOAA) tide data was obtained from Station 8465705 in real time in order to calculate tidal height in feet above MLLW. Table 2 of the Field Report (AECOM, 2017b) lists the actual coring positions for each coring attempt.

Field observations including penetration depth, material recovery, visual descriptions, and core photographs are also provided in the Field Report (AECOM, 2017b).

Table 1 Sample collection dates for physical and chemical testing

Sample ID	Date	Horizon	Water Depth (MLLW)	Easting, X (CT FT)	Northing, Y (CT FT)	Physical tests	Metals	PAHs, TOC	Pesticides, PCB Congeners
Sediment Samples									
NHH-A-TOP	8/11/2017	0 - 2.2’	-28.7	955707.36	641917.44	x	x	x	x
NHH-A-BOTTOM	8/11/2017	2.2 - 9.9’	-28.7	955707.36	641917.44	x			
NHH-B	8/11/2017	0-4.2’	-39.8	955995.61	642051.34	x	x	x	x
NHH-C-TOP	8/11/2017	0 - 2.8’	-35.3	956248.06	642180.93	x	x	x	x
NHH-C-BOTTOM	8/11/2017	2.8 – 8.0’	-35.3	956248.06	642180.93	x	x	x	x
NHH-D-TOP	8/11/2017	0 – 4.8’	-18.0	954353.17	651157.56	x	x	x	x
NHH-D-BOTTOM	8/11/2017	4.8 – 10.3’	-18.0	954353.17	651157.56	x	x	x	x
NHH-E-TOP	8/14/2017	0 – 6.5’	-35.9	954719.81	651097.16	x	x	x	x
NHH-E-BOTTOM	8/14/2017	6.5 – 8.1’	-35.9	954719.81	651097.16	x	x	x	x
NHH-F-TOP	8/11/2017	0 – 3.2’	-17.7	954918.30	651077.63	x	x	x	x
NHH-F-REF-TOP	8/11/2017	0 – 3.2’	-17.7	954918.30	651077.63	x	x	x	x
NHH-F-BOTTOM	8/11/2017	3.2’ – 10.5’	-17.7	954918.30	651077.63	x	x	x	x
NHH-G-TOP	8/11/2017	0 – 4.3’	-15.9	954957.69	656295.81	x	x	x	x
NHH-G-BOTTOM	8/11/2017	4.3 – 13.7’	-15.9	954957.69	656295.81	x	x	x	x
NHH-H-TOP	8/10/2017	0 – 5.4’	-36.2	955073.00	656256.70	x	x	x	x
NHH-H-REP-TOP	8/10/2017	0 – 5.4’	-36.2	955073.00	656256.70	x	x	x	x
NHH-H-BOTTOM	8/10/2017	5.4 – 7.7’	-36.2	955073.00	656256.70	x	x	x	x
NHH-I-TOP	8/10/2017	0 – 0.7’	-21.3	955525.41	656249.42	x	x	x	x
NHH-I-BOTTOM	8/10/2017	0.7’ – 2.5’	-21.3	955525.41	656249.42	x	x	x	x
NHH-J	8/10/2017	0 – 5.4’	-21.1	955130.54	662186.32	x	x	x	x
NHH-K-TOP	8/10/2017	0 – 5.5’	-35.8	955275.32	662195.02	x	x	x	x
NHH-K-BOTTOM	8/10/2017	5.5 – 8.2’	-35.8	955275.32	662195.02	x			
NHH-L	8/10/2017	0 – 6.7’	-21.7	955734.84	662225.81	x	x	x	x
NHH-M	8/8/2017	0 – 6.8’	-30.4	955479.97	665130.38	x	x	x	x
NHH-N-TOP	8/8/2017	0 – 6.0’	-36.5	955867.55	665076.75	x	x	x	x
NHH-N-BOTTOM	8/8/2017	6.0 – 7.5’	-36.5	955867.55	665076.75	x			
NHH-O-TOP	8/8/2017	0 – 8.3’	-33.1	956251.13	665020.32	x	x	x	x
NHH-O-BOTTOM[1]	8/8/2017	8.7 – 10.9’	-33.1	956251.13	665020.32	x			
NHH-P-TOP	8/9/2017	0 – 5.8’	-15.8	955169.49	667299.54	x	x	x	x

1 - At NHH-O, the horizon 8.3-8.7' was not included in the sample due to the presence of 1-2" gravel.

Table 1 Sample collection dates for physical and chemical testing (cont.)

Sample ID	Date	Horizon	Water Depth (MLLW)	Easting, X (CT FT)	Northing, Y (CT FT)	Physical tests	Metals	PAHs, TOC	Pesticides, PCB Congeners
NHH-P-BOTTOM	8/9/2017	5.8 – 12.3’	-15.8	955169.49	667299.54	x	x	x	x
NHH-Q-TOP	8/9/2017	0 – 5.3’	-12.2	955500.09	667254.47	x	x	x	x
NHH-Q-BOTTOM	8/9/2017	5.3 – 29.4’	-12.2	955500.09	667254.47	x	x	x	x
NHH-R-TOP	8/10/2017	0 – 4.2’	-36.3	956066.76	667161.69	x	x	x	x
NHH-R-BOTTOM	8/10/2017	4.2 – 7.7’	-36.3	956066.76	667161.69	x	x	x	x
NHH-S-TOP	8/10/2017	0 – 6.0’	-37.6	956558.51	667100.36	x	x	x	x
NHH-S-BOTTOM	8/10/2017	6.0 – 6.4’	-37.6	956558.51	667100.36	x			
NHH-T-TOP	8/8/2017	0 – 4.8’	-8.7	955476.02	667998.66	x	x	x	x
NHH-T-BOTTOM	8/8/2017	4.8 – 16.3’	-8.7	955476.02	667998.66	x	x	x	x
NHH-U-TOP	8/9/2017	0 – 5.8’	-11.8	955696.43	667963.55	x	x	x	x
NHH-U-BOTTOM	8/9/2017	5.8 – 30.0’	-11.8	955696.43	667963.55	x	x	x	x
NHH-V-TOP	8/9/2017	0 – 4.8’	-35.4	956178.56	667900.02	x	x	x	x
NHH-V-BOTTOM	8/9/2017	4.8 – 8.6’	-35.4	956178.56	667900.02	x	x	x	x
NHH-W-TOP	8/9/2017	0 – 5.5’	-35.5	956642.29	667836.21	x	x	x	x
NHH-W-BOTTOM	8/9/2017	5.5 – 8.2’	-35.5	956642.29	667836.21	x			
NHH-X-TOP	8/8/2017	0 – 5.2’	-19.0	956695.36	669144.51	x	x	x	x
NHH-X-REP-TOP	8/8/2017	0 – 5.2’	-19.0	956695.36	669144.51	x	x	x	x
NHH-X-BOTTOM	8/8/2017	5.2 – 8.0’	-19.0	956695.36	669144.51	x	x	x	x
NHH-Y-TOP	8/8/2017	0 – 5.9’	-35.5	956935.61	668934.77	x	x	x	x
NHH-Y-BOTTOM	8/8/2017	5.9 – 8.5’	-35.5	956935.61	668934.77	x			
NHH-Z-TOP	8/8/2017	0 – 5.0’	-35.5	957127.56	668767.57	x	x	x	x
NHH-Z-BOTTOM	8/8/2017	5.0 – 8.7’	-35.5	957127.56	668767.57	x	x	x	x

Table 2 Sample collection dates and compositing information for biological testing and elutriate preparation

Sample ID	Date	Horizon	Water Depth (MLLW)	Easting, X (CT FT)	Northing,Y Y (CT FT)	Composite ID	10-day toxicity bioassay	SPP/Elutriate testing	28-day bioassay/tissue
Sediment									
NHH-C	8/17/2017	0 - 2.8'	-35.3	956248.06	642180.93	1	x	x	x
NHH-D	8/16/2017	0-4.8', 4.8–10.3'	-18.0	954353.17	651157.56				
NHH-E	8/16/2017	0-6.5', 6.5-8.1'	-35.9	954719.81	651097.16				
NHH-F	8/16/2017	0-3.2', 3.2-10.5'	-17.7	954918.30	651077.63	2	x	x	x
NHH-G	8/17/2017	0-4.3', 4.3-13.7'	-15.9	954957.69	656295.81				
NHH-H	8/16/2017	0-5.4', 5.4-7.7'	-36.2	955073.00	656256.70				
NHH-I [1]	8/17/2017	0-0.7', 0.7-2.5'	-21.3	955525.41	656249.42	3	x	x	x
NHH-J	8/15/2017	0-5.4'	-21.1	955130.54	662186.32				
NHH-K	8/14/2017	0-5.5'	-35.8	955275.32	662195.02				
NHH-L	8/15/2017	0–6.7'	-21.7	955734.84	662225.81	4	x	x	x
NHH-M	8/13/2017	0-6.8'	-30.4	955479.97	665130.38				
NHH-N	8/13/2017	0-6.0', 6.0-7.5'	-36.5	955867.55	665076.75				
NHH-O	8/14/2017	0-8.3',8.7-10.9'	-33.1	956251.13	665020.32	5	x	x	x
NHH-P	8/12/2017	0-5.8', 5.8-12.3'	-15.8	955169.49	667299.54				
NHH-Q	8/9/2017	0-5.3', 5.3-29.4'	-12.2	955500.09	667254.47				
NHH-R	8/16/2017	0-4.2', 4.2-7.7'	-36.3	956066.76	667161.69				
NHH-S	8/15/2017	0-6.0'	-37.6	956558.51	667100.36	6	x	x	x
NHH-T	8/12/2017	0-4.8', 4.8-16.3'	-8.7	955476.02	667998.66				
NHH-U	8/9/2017	0-5.8', 5.8-30.0'	-11.8	955696.43	667963.55				
NHH-V	8/15/2017	0-4.8', 4.8-8.6'	-35.4	956178.56	667900.02				
NHH-W	8/15/2017	0-5.5', 5.5-8.2'	-35.5	956642.29	667836.21	7	x	x	x
NHH-X	8/12/2017	0-5.2', 5.2-8.0'	-19.0	956695.36	669144.51				
NHH-Y	8/13/2017	0-5.9', 5.9-8.5'	-35.5	956935.61	668934.77				
NHH-Z	8/12/2017	0-5.0, 5.0-8.7'	-35.5	957127.56	668767.57	8	x	x	x
CLDS-Ref [1]	8/17/2017	0-0.5'	-83.0	976671.17	609873.57		x		x
Seawater									
NHC-I [2]	8/17/2017	9.0	-18.0	955550.51	656267.52	3, 4		x	
NHC-V [2]	8/17/2017	10.5'	-21.0	955785.97	667702.21	5, 6, 7, 8		x	
NHC-F [2]	8/17/2017	10'	-20.0	954955.75	651155.34	1, 2		x	
CLDS-Ref	8/17/2017	3', 42', 80'	-83.0	976671.17	609873.57			x	

1 – Sample collected using grab sampler. Other samples collected using vibracoring device.
2 – Seawater samples used to prepare elutriate samples for multiple composites.

Figure 1 Actual Coring and Water Sampling Locations – Inner Harbor

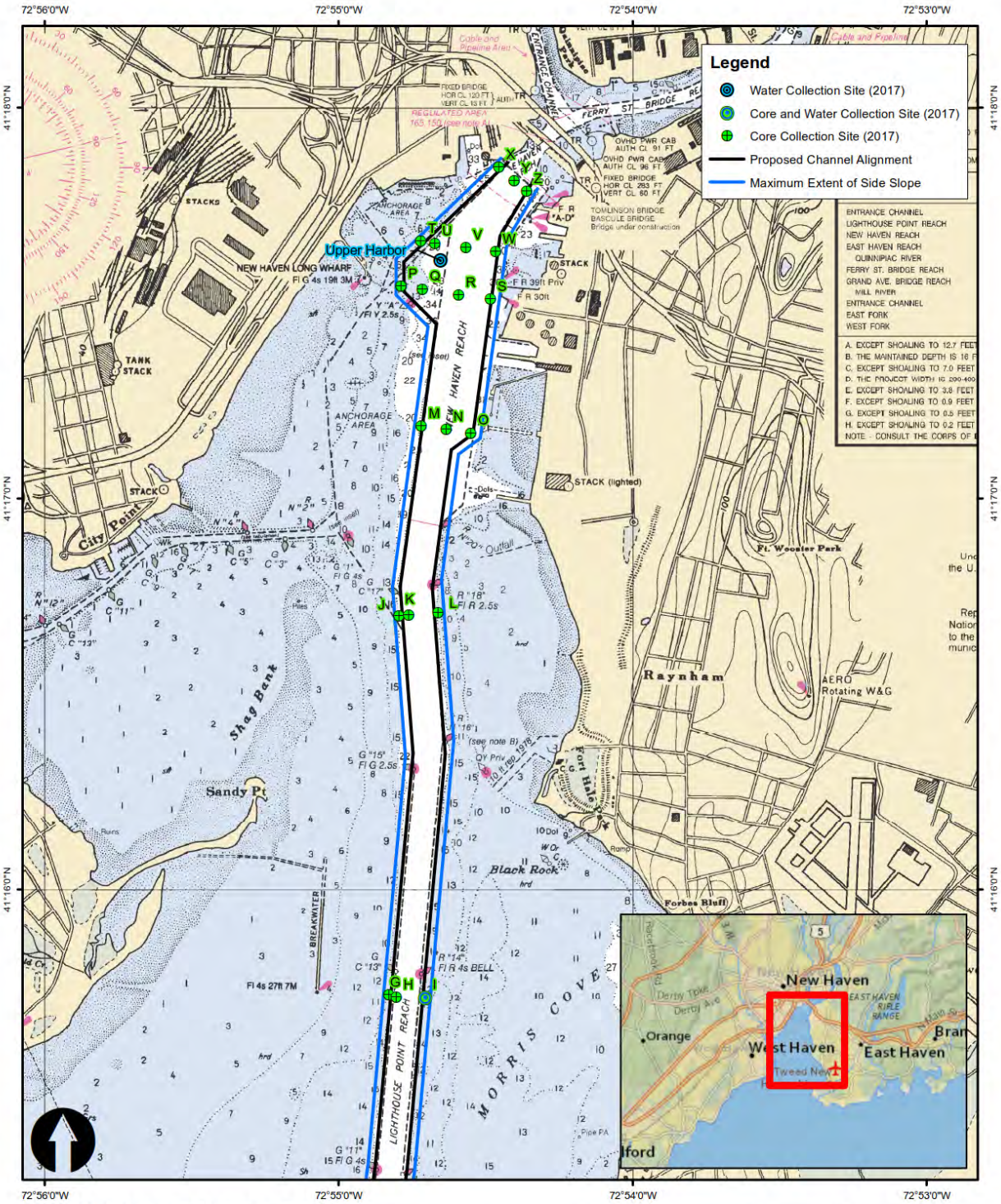

Figure 1: Actual Coring and Water Sampling Stations
Inner Harbor
New Haven Harbor Sediment Characterization Study

0 875 1,750 3,500 5,250 7,000 Feet

0 0.125 0.25 0.5 0.75 1 Miles

Projection: NAD83 CT State Plane Feet *NOAA Chart: 12371*

Figure 2 Actual Coring and Water Sampling Locations – Outer Harbor

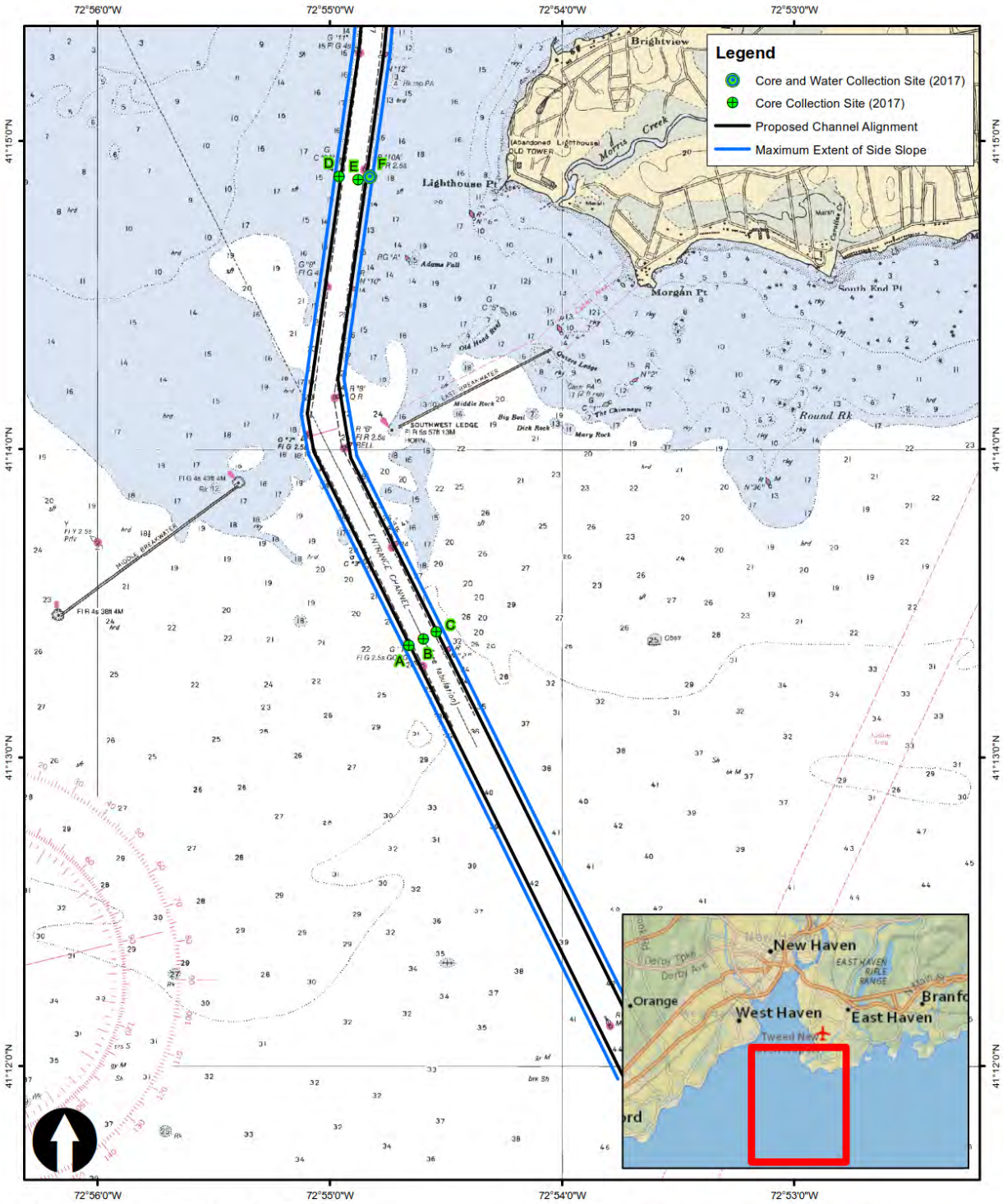

Figure 2: Actual Coring and Water Sampling Stations
Outer Harbor
New Haven Harbor Sediment Characterization Study

0 875 1,750 3,500 5,250 7,000 Feet
0 0.125 0.25 0.5 0.75 1 Miles

Projection: NAD83 CT State Plane Feet *NOAA Chart: 12371*

2.1.1 Sediment collection

An initial core was collected to project depth at each of the 26 harbor stations for grain size and chemistry using a 3.5-inch diameter vibracore (Figures 1 and 2). Field characterization of the sediment cores determined which sediment horizons were selected for analysis (Table 1). Based on the initial grain size results NAE directed the project team to composite sediments from the core locations and depth intervals outlined in Table 2 for toxicological/ biological testing. Additional cores were then collected in order to obtain a sufficient volume of sediment from the sample interval at each location for elutriate preparation, 10-day toxicity, and 28-day bioaccumulation testing.

Reference sediment was collected from CLDS-Ref using a Ted Young modified Van Veen grab sampler and a Ponar grab sampler. All sediment samples were transferred to a refrigerated box truck immediately after returning to the dock. The field report (AECOM, 2017b) provided in Appendix B provides additional detail related to the sampling in the harbor and the reference location.

2.1.2 Surface water collection

Water from the vicinity of the sediment composites in New Haven Harbor (dredge site water) and the CLDS reference area (suspended particulate phase [SPP] dilution water) were collected on August 17, 2017 using a pump and tubing system as outlined in the work plan (Table 2, Figures 1 and 2). The CLDS reference water was collected using a large volume Niskin bottle. Water samples were also transferred to the refrigerated box truck immediately after returning to the dock.

2.1.3 Sampling deviations/difficulties encountered

There are a few notes of interest relative to the New Haven Harbor sediment collection effort:

1. Significant changes to bottom topography were encountered relative to the last bathymetric study of the harbor. At all locations, the planned core length required to attain the target depth (project depth plus a 2-foot allowable over depth) required adjustment in the field using field collected depth soundings and real time tidal correction data from NOAA.

2. According to the SOW, the sediment cores were supposed to be characterized via ASTM 2488. However, they were not. To compensate for this sediment from each sample intervals analyzed for grain size via hydrometer (ASTM 7928) in order to obtain more detailed information on the distribution of fine grained sediments in the project area. Due to the large volume of sediment required from a short interval at station NHH-C during the second week of the program, two individual cores were stacked within a single 5-foot core barrel prior to processing. The stacking process involves advancing the vibracore barrel to the target depth, raising the core barrel out of the sediment, and then advancing the barrel again. The approach greatly reduced the time to collect required sediment volume. Prior to proceeding with the stacked approach, a single 5-foot core was collected for comparison to the stacked core samples to verify that appropriate materials and recovery were retained within the 20 stacked samples.

3. Similarly, sediment volume collection at NHH-I would have required a large number of cores due to the shallow project depth (2.5 feet). In order to meet schedule constraints, the NAE Technical Manager approved collection using a Van Veen/ ponar grab sampler.

2.2 Sample processing and analysis

The project QAPP provides detailed descriptions of all aqueous, sediment, and tissue sample handling and the methods used for chemical, physical and biological testing. Section B.6 of the QAPP (AECOM, 2017a) summarize the chemical and physical testing methods used and Section B.7 summarizes the bioassay and bioaccumulation test methods. Only minor deviations from the QAPP were noted and these are discussed in Section 4.1 for the biological testing and Section 4.2 for the analytical chemistry. These deviations are not expected to have an impact on the usability of the data for decision making.

The analytical project team included two laboratories:

- EnviroSystems Inc. (ESI)(Hampton, NH) provided processing facilities and performed bulk sediment, SPP, and bioaccumulation bioassays, and elutriate chemistry testing; and
- Alpha Analytical Laboratories (Mansfield, MA) provided chemical and physical testing services.

Sediment samples for chemical or physical testing were transferred directly from the field to the associated laboratory. All other samples (bulk sediment or water grab samples) were transferred to the processing facility (ESI) for further processing before subsequent testing commenced. All field to lab and inter-lab transfers were conducted under chain-of-custody (COC) procedures as specified in the project work plan. These records are included in the laboratory backup appendices.

2.2.1 Phased testing

Testing was conducted in two phases. The first phase provided NAE with rapid sediment grain size results to enable NAE to develop a compositing scheme for subsequent testing. The second phase represented full scale testing of the site material including physical and chemical testing performed on individual sediment samples, and elutriate chemistry testing, toxicity bioassays and bioaccumulation bioassays performed on the sample composites identified in Table 2.

2.2.2 Sample handling

As outlined in the work plan, cores representing the depth interval of interest were collected via vibracore (Table 1). After collection, the core was cut into 5.0-foot sections to facilitate handling. The liner of those individual core sections were then split longitudinally, photographed, and described/ logged. At many of the stations, two depth intervals were selected for sampling due to changes in stratigraphy (composition and color). After logging was complete, the requisite core section (surface to project depth) was transferred to storage containers (5-gallon polyethylene buckets) and the entire interval homogenized to obtain depth-integrated samples. Sub-samples were collected for rapid grain size analysis and chemistry. The remaining material was retained for biological testing and kept in labeled, 5-gallon polyethylene buckets prior to compositing. Once the compositing scheme had been determined, a second set of cores was advanced in order to collect the necessary volume for biological testing.

Water samples were collected via Niskin botte and a pump/ tubing assembly, stored in labeled, 5-gallon polyethylene carboys, and kept on ice until returning to the dock. All sediment and water samples were securely stored in a locked, refrigerated box truck (set to 4°C) for the duration of the field effort. At the conclusion of the sampling program, all samples were delivered to ESI's laboratory on August 18, 2017. During the sampling program, there were not any deviations from the sample hold times and preservation conditions outlined in the workplan (Appendix A).

The field report (AECOM, 2017b) provided in Appendix B provides additional detail related to the sampling handling and processing.

2.2.3 Test sample preparation and compositing

Following the sample compositing direction from NAE, eight harbor sediment composites were prepared by combining equal volumes of the material from the various stations collected via vibracore for subsequent testing. Sample composites were prepared by AECOM staff on August 21-22, 2017 at ESI according to the work plan (Appendix A). The sample compositing scheme is depicted in Table 2.

2.2.4 Physical and chemical sample analysis

Physical and chemical analysis methods are fully detailed in the project work plan (Appendix A). In some cases, specialized or modified methods were specified to accommodate unique project objectives. A description of the specialized or modified methods is also provided in this section. All laboratory reports for physical and chemical analyses are provided in Appendices C and D, respectively.

The project team used EPA SW-846 8270D-SIM /680M for the analysis of polychlorinated biphenyl (PCB) congeners. The selected gas chromatography/mass spectrometry (GC/MS) method is generally preferred because it provides

more definitive quantitation and identification of the target PCB congeners and is less prone to interferences or mis-identification than the earlier 8082 (gas chromatography/electron capture detector [GC/ECD]) method. Table 3 summarizes the analytes, analytical methods and method detection limits achieved for the bulk sediment chemistry analyses of the individual core samples.

2.2.5 Elutriate/suspended particulate phase sample preparation and analysis

New Haven Harbor dredge site water was used in the preparation of all chemical elutriates and formed the basis of all elutriate/SPP sample preparations. Water from CLDS was used for all SPP dilutions in the toxicity tests.

Each elutriate/SPP batch was prepared by adding the homogenized sediment to the site water in a 1:4 volumetric ratio, stirring the mixture for 30 minutes, and then allowing the mixture to settle for 1 hour. The supernatant was siphoned off prior to chemical and biological evaluations. Chemical samples were also centrifuged as required by the protocols. All samples were stored at or below 4°C when not in use. Elutriate samples were containerized for chemistry analysis (i.e., filtration of metals samples, analysis of metals and (total) organic compounds). Table 4 provides a summary of the elutriate/ SPP preparation.

Elutriate samples were analyzed for metals, pesticides, pentachlorophenol, and PCB congeners. Most seawater metal measurements were aided with an initial preconcentration step to separate the analytes of interest from the interfering salt matrix. An inductively coupled plasma mass spectrometer (ICP/MS) was then used for the analysis of the extracted metals. Alternate methods (as specified in the work plan) were used to measure chromium 6 (Cr6+), and mercury (Hg) in the elutriate/seawater matrix. Table 5 summarizes the analytes, analytical methods and method detection limits achieved for the elutriate chemistry analyses.

Water column bioassays were conducted in accordance with the RIM (EPA/USACE, 2004), the Inland Testing Manual (EPA/USACE, 1998) and the project work plan (AECOM, 2017a). Test organisms for the water column bioassays included *A. bahia*, *Menidia beryllina*, and *Arbacia punctulata*. Table 6 summarizes the test conditions for these bioassays and Table 7 identifies the dates of the SPP testing. The toxicity tests were completed on a total of eight elutriate samples that were split into two groups of four and analyzed in two separate rounds of assays (referred to as Round 1 and Round 2) with staggered start dates, each with their own respective laboratory control samples and reference samples. All SPP testing was started before the 24-hour holding time for suspended particulate phase solutions. Results and protocol deviations are described in Section 3.2.2.

2.2.5.1 Test species

A. bahia were ≤5 days old and were obtained from cultures maintained by Aquatic Resource Organisms (ARO) of Hampton, New Hampshire. *M. beryllina* were 9-14 days old at the start of the assay and were obtained from Aquatic BioSystems, Inc., (ABS), Fort Collins, Colorado for the Round 1 assay, and from ARO for the Round 2 assay. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. Organisms were transferred to test vessels using a large bore pipet to minimize the amount of water added to test solutions.

Adult *A. punctulata* were from cultures maintained by ESI. Original stock was obtained from a commercial supplier. Adult sea urchins are maintained in the laboratory for as long as they are viable. Male and female urchins are maintained in separate chambers at a temperature of approximately 12±3°C after spawning.

2.2.5.2 Reference toxicant assays

ESI completed acute 96-hour sodium dodecyl sulfate (SDS) reference toxicant assays for *A. bahia* and *M. beryllina*. Results were within two standard deviations of the historic mean of ESI's control charts, indicating that the test organisms were healthy. The *A. punctulata* copper reference toxicant assay was also within two standard deviations of the corresponding control chart mean. Table 8 summarizes the results of the reference toxicant assays conducted in support of the SPP assays.

Although the work plan (AECOM, 2017a) specified that the reference toxicant assays be conducted concurrent with the SPP tests, the reference toxicant assays were conducted approximately a week after the SPP tests terminated. The RIM does not specify that the assays be conducted concurrently and the lack of concurrence between the project assay and the reference toxicant assays does not impact the findings of the project assays.

2.2.6 10-day whole sediment toxicity testing

Bulk sediment bioassays are an important part of the overall suitability testing framework for CLDS consideration and agency guidance specifies that a filter feeder, a deposit feeder, and a burrowing organism be represented in the assay. Ten-day whole sediment bioassays were performed using the crustacean *Americamysis bahia* (mysid shrimp) and the crustacean amphipod *Leptocheirus plumulosus* to represent these feeding strategies in accordance with the RIM (EPA/USACE, 2004), the Inland Testing Manual (EPA/USACE, 1998), and the project work plan (AECOM, 2017a). *A. bahia* is a filter and deposit feeder that spends much of its time in the water above the sediment-water interface. The amphipod *L .plumulosus* builds burrows in the sediment and feeds on particles that are in suspension and on the sediment surface.

Table 9 summarizes the test conditions for the 10-day whole sediment toxicity tests. Assays with both species began on September 1, 2017 and were terminated on September 11, 2017. The control sediment used in the assays was natural sediment collected from the Hampton Estuary, Hampton, New Hampshire. The area is not known to receive any direct industrial inputs and has been used as a laboratory reference sediment in the testing of marine sediments for over 25 years. Overlying seawater was obtained from the Hampton Estuary. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. Seawater is obtained through a filter system located on the bottom of the estuary at a point approximately 1 mile from the open ocean.

Results and protocol deviations are described in Section 3.1.3.

2.2.6.1 Test species

A. bahia were obtained from ARO. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *A. bahia* used in the assay were $\leq$5 days old at the start of the test.

L. plumulosus were obtained from cultures maintained by ARO. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *L. plumulosus* were non-reproductive adults.

2.2.6.2 Reference toxicants

As part of the laboratory quality control program, standard reference toxicant assays were conducted with a sub-sample of the organisms received for testing, for each test species. ESI completed an acute 96-hour SDS reference toxicant assay for *A. bahia* and 96-hour cadmium reference toxicant assay for *L. plumulosus*. Results were within two standard deviations of the historic mean of ESI's control charts, indicating that the test organisms were healthy. Table 10 summarizes the results of the reference toxicant assays conducted in support of the SPP assays.

2.2.7 28-day bioaccumulation bioassay and analysis

The 28-day solid phase/bioaccumulation evaluation was conducted in accordance with the RIM (EPA/USACE, 2004), the Inland Testing Manual (EPA/USACE, 1998) and the project work plan (AECOM, 2017a) using the bivalve *Macoma nasuta* and the burrowing polychaete *Nereis virens*. Table 11 summarizes the test conditions for the 28-day bioaccumulation bioassay.

The *M nasuta* assays were initiated on August 29, 2017 and were completed on September 26, 2017. The *N virens* assays were initiated on August 31, 2017 and came down on September 28, 2017. Results and protocol deviations are described in Section 3.3.1.

At the end of the 28-day bioaccumulation assay exposure period and the 24 hour depuration period, the test organisms were recovered, rinsed/depurated with clean seawater, homogenized, frozen and transferred to the chemistry laboratory for preparation and analysis. Tissue samples were analyzed for metals, PAHs, pesticides, PCB congeners. Table 12 summarizes the analytes, analytical methods and method detection limits achieved for the tissue chemistry analyses.

2.2.7.1 Test species

M. nasuta, 15-40 mm in total length, were obtained from ARO. Organisms were field collected along the Washington coast and shipped to ARO via overnight delivery. At ESI, the clams were placed in clean holding sediment with flowing seawater and monitored for at least 24 hours prior to use. Damaged bivalves and those that would not close when prodded were discarded. The *Macoma* test commenced on August 29, 2017. A total of 30 organisms were added to each replicate in order to obtain sufficient tissue at test termination.

Adult *N. virens* were also obtained from ARO. Worms were collected in the field from the Damariscotta River in Boothbay Harbor, Maine and delivered to ARO. At ESI, the worms were placed in clean holding sediment with flowing seawater and monitored for at least 24 hours prior to use. Damaged and inactive worms were not used in the assay. The *Nereis* test assay commenced on August 31, 2017 with a total of 20 organisms added to each replicate in order to obtain sufficient tissue at test termination.

2.2.7.2 Reference toxicants

ESI completed acute 96-hour copper reference toxicant assays for *M. nasuta* and *N. virens* concurrent with the 28-day bioassays. Results were within two standard deviations of the historic mean of ESI's control charts, indicating that the test organisms were healthy. Table 13 summarizes the results of the reference toxicant assays conducted in support of the 28-day bioassays.

2.3 Data analysis

The array of chemical, physical and biological testing that was performed on the New Haven sediments provides a comprehensive data set from which material quality and its suitability for various alternative placement options, including unconfined placement at the CLDS, can be assessed. These data sets were generally evaluated in the following ways:

- Biological testing data were compared to reference or control values;
- Tissue chemistry results were compared to the reference site tissue chemistry using non-parametric and t-tests.

A description of these evaluation methods is provided below.

2.3.1 Toxicity bioassay statistics

Survival and effects data were analyzed using statistical software (CETIS) to determine significant differences between the project sediments and the laboratory control, and between project sediments or suspended phase solutions and the agency-selected reference site sediments or solutions. Survival data were evaluated to determine homogeneity of sample variances and normality of distribution. Data sets were subsequently evaluated using the appropriate parametric or non-parametric analysis. Pair-wise comparisons were based on the appropriate statistical analysis presented in the EPA decision tree guidelines specified in individual test methods. Statistical difference was evaluated at $\alpha=0.05$. For the SPP testing, acute exposure endpoints, the median lethal concentration (LC50) and the median effective concentration (EC50; in the *Arbacia* testing), were calculated and responses in the undiluted SPP solutions were evaluated against the responses in the reference site diluent.

2.3.2 Bioaccumulative tissue statistics

The statistical analyses of body burden data were completed to determine significant differences between the reference sediment and each site composite sample. The statistical analyses were completed for all compounds of concern identified in the work plan; however the findings of significance discussed in Section 3.3.3 focus only on those compounds detected in the reference sample. Per RIM guidelines, the MDL is used in instances when a compound is not detected for purposes of calculating a mean concentration. MDLs used in statistical computations are adjusted for differences in tissue mass and final extract volumes used in the analysis for each sample.

Data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistics. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Statistical difference was evaluated at $\alpha = 0.05$.

Table 3 Parameters, analytical methods, and achieved method detection limits for sediment

Parameter	Method Reference	Method Number	MDL	MDL Units
Physical Tests				
Total Solids/Water Content	ASTM	D-2216	0.1	%
Percent Moisture	SM	2540	0.1	%
Grain Size Analysis	ASTM	D-6913	N/A	N/A
Hydrometer Analysis	ASTM	D7928	N/A	N/A
TOC	SW-846	9060	0.01	%
Metals				
Arsenic	SW 846	6020A	0.034	mg/kg
Cadmium	SW 846	6020A	0.013	mg/kg
Chromium	SW 846	6020A	0.237	mg/kg
Copper	SW 846	6020A	0.098	mg/kg
Lead	SW 846	6020A	0.074	mg/kg
Mercury	SW 846	7474/7471B	0.005	mg/kg
Nickel	SW 846	6020A	0.135	mg/kg
Zinc	SW 846	6020A	1.32	mg/kg
PAHs				
Acenaphthene	SW-846	8270DSIM	6.98	ug/kg
Acenaphthylene	SW-846	8270DSIM	6.98	ug/kg
Anthracene	SW-846	8270D-SIM	6.98	ug/kg
Benzo(a)anthracene	SW-846	8270DSIM	6.98	ug/kg
Benzo(a)pyrene	SW-846	8270DSIM	6.98	ug/kg
Benzo(b)fluoranthene	SW-846	8270D-SIM	6.98	ug/kg
Benzo(k)fluoranthene	SW-846	8270D-SIM	6.98	ug/kg
Benzo(g,h,i)perylene	SW-846	8270D-SIM	6.98	ug/kg
Chrysene	SW-846	8270D-SIM	6.98	ug/kg
Dibenz(a,h)anthracene	SW-846	8270DSIM	6.98	ug/kg
Fluoranthene	SW-846	8270D-SIM	34[a]	ug/kg
Fluorene	SW-846	8270D-SIM	6.98	ug/kg
Indeno(1,2,3-cd)pyrene	SW-846	8270D-SIM	6.98	ug/kg
Naphthalene	SW-846	8270D-SIM	6.98	ug/kg
Phenanthrene	SW-846	8270D-SIM	6.98	ug/kg
Pyrene	SW-846	8270D-SIM	6.98	ug/kg
Pesticides				
Aldrin	SW-846	8081B	1.4	ug/kg
Chlordane – Alpha	SW-846	8081B	1.4	ug/kg
Chlordane – gamma	SW-846	8081B	1.4	ug/kg
Chlordane – oxy	SW-846	8081B	2.79	ug/kg
4,4' – DDT	SW-846	8081B	1.4	ug/kg
4,4' – DDD	SW-846	8081B	1.4	ug/kg
4,4' – DDE	SW-846	8081B	1.4	ug/kg
Dieldrin	SW-846	8081B	1.4	ug/kg
Endosulfan alpha and beta	SW-846	8081B	1.4	ug/kg
Endrin	SW-846	8081B	1.4	ug/kg
Heptachlor and derivative (epoxide)	SW-846	8081B	2.79	ug/kg
Hexachlorocyclohexane (lindane)	SW-846	8081B	2.79	ug/kg
Methoxychlor	SW-846	8081B	14	ug/kg
Toxaphene	SW-846	8081B	70.1	ug/kg
trans and cis Nonachlor	SW-846	8081B	1.4	ug/kg
Hexachlorobenzene	SW-846	8081B	2.79	ug/kg
PCBs				
C12(8)	SW-846	8082/8270 SIM	0.698	ug/kg
C13(18)	SW-846	8082/8270 SIM	0.698	ug/kg
C13(28)	SW-846	8082/8270 SIM	0.698	ug/kg
C14(44)	SW-846	8082/8270 SIM	0.698	ug/kg
C14(52)	SW-846	8082/8270 SIM	0.698	ug/kg
C14(66)	SW-846	8082/8270 SIM	0.698	ug/kg
C15(101)	SW-846	8082/8270 SIM	0.698	ug/kg
C15(105)	SW-846	8082/8270 SIM	0.698	ug/kg
C15(118)	SW-846	8082/8270 SIM	0.698	ug/kg
C16(128)	SW-846	8082/8270 SIM	0.698	ug/kg

Table 3 Parameters, analytical methods, and achieved method detection limits for sediment (cont.)

Parameter	Method Reference	Method Number	MDL	MDL Units
C16(138)	SW-846	8082/8270 SIM	0.698	ug/kg
C16(153)	SW-846	8082/8270 SIM	0.698	ug/kg
C17(170)	SW-846	8082/8270 SIM	0.698	ug/kg
C17(180)	SW-846	8082/8270 SIM	0.698	ug/kg
C17(187)	SW-846	8082/8270 SIM	0.698	ug/kg
C18(195)	SW-846	8082/8270 SIM	0.698	ug/kg
C19(206)	SW-846	8082/8270 SIM	0.698	ug/kg
C110(209)	SW-846	8082/8270 SIM	0.698	ug/kg

[a] Elevated due to sample re-run with 5x dilution. Absent the re-run, the MDL is 6.98 mg/kg

Table 4 Elutriate solution preparation summary

Water		Sediment		Elutriate Preparation			
Field ID	ESI Code	Composite ID	ESI Code	Elutriate ID	ESI Code	Date	Time
NHC-F	29516-050	Composite 1	29517-001	Elutriate 1 [a]	29521-002	08/22/17	1425
NHC-F	29516-050	Composite 2	29517-002	Elutriate 2 [a]	29521-004	08/22/17	1055
NHC-I	29516-048	Composite 3	29517-003	Elutriate 3 [a]	29521-006	08/22/17	1310
NHC-I	29516-048	Composite 4	29517-004	Elutriate 4 [a]	29521-008	08/22/17	1212
NHC-V	29516-049	Composite 5	29517-005	Elutriate 5	29521-010	08/23/17	1020
NHC-V	29516-049	Composite 6	29517-006	Elutriate 6	29521-012	08/23/17	1100
NHC-V	29516-049	Composite 7	29517-007	Elutriate 7	29521-014	08/23/17	0920
NHC-V	29516-049	Composite 8	29517-008	Elutriate 8	29521-016	08/23/17	1223
NHC-F	29516-050	Composite 1	29517-001	Elutriate 1 [a]	29521-017	08/25/17	0930
NHC-F	29516-050	Composite 2	29517-002	Elutriate 2 [a]	29521-018	08/25/17	1035
NHC-I	29516-048	Composite 3	29517-003	Elutriate 3 [a]	29521-019	08/25/17	1035
NHC-I	29516-048	Composite 4	29517-004	Elutriate 4 [a]	29521-020	08/25/17	1113

[a] Elutriates 1 through 4 prepared on August 22, 2017 were used for the mysid assay only. Elutriates 1 through 4 prepared on August 25, 2017 were used for the *M. beryllina* and *A. punctulata* assays.

Table 5 Parameters, analytical methods, and achieved method detection limits for elutriates

Parameter	Method Reference	Method Number	MDL	MDL Units
Metals[a]				
Arsenic	SW-846	6020	0.00016	mg/L
Cadmium	SW-846	6020	0.00005	mg/L
Chromium	SW-846	6020	0.00017	mg/L
Hexavalent chromium	SW-846	7196	0.003	mg/L
Copper	SW-846	6020	0.00038	mg/L
Lead	SW-846	6020	0.00034	mg/L
Mercury	SW-846	7470A	0.00001	mg/L
Nickel	SW-846	6020	0.00055	mg/L
Selenium	SW-846	6020	0.00023	mg/L
Silver	SW-846	6020	0.0023	mg/L
Zinc	SW-846	6020	0.0034	mg/L
PAHs[b]				
Acenaphthene	SW-846	8270D	5.15	ug/L
Acenaphthylene	SW-846	8270D	5.15	ug/L
Anthracene	SW-846	8270D	5.15	ug/L
Benzo(a)anthracene	SW-846	8270D	5.15	ug/L
Benzo(a)pyrene	SW-846	8270D	5.15	ug/L
Benzo(b)fluoranthene	SW-846	8270D	5.15	ug/L
Benzo(k)fluoranthene	SW-846	8270D	5.15	ug/L
Benzo(g,h,i)perylene	SW-846	8270D	5.15	ug/L
Chrysene	SW-846	8270D	5.15	ug/L
Dibenz(a,h)anthracene	SW-846	8270D	5.15	ug/L
Fluoranthene	SW-846	8270D	5.15	ug/L
Fluorene	SW-846	8270D	5.15	ug/L
Indeno(1,2,3-cd)pyrene	SW-846	8270D	5.15	ug/L
Naphthalene	SW-846	8270D	5.15	ug/L
Phenanthrene	SW-846	8270D	5.15	ug/L
Pyrene	SW-846	8270D	5.15	ug/L
Other Organic compounds				
Pentachlorophenol[c]	SW-846	8270D	0.19	ug/L
Pesticides				
Aldrin	SW-846	8081B	0.001	ug/L
Chlordane (alpha/gamma/oxy)	SW-846	8081B	0.0021	ug/L
Chloropyrifos	SW-846	8081B	0.0014	ug/L
4,4'-DDT	SW-846	8081B	0.0011	ug/L
Dieldrin	SW-846	8081B	0.0005	ug/L
Endosulfan and derivatives (I, II)	SW-846	8081B	0.0005	ug/L
Endrin	SW-846	8081B	0.0011	ug/L
Heptachlor & derivative (epoxide)	SW-846	8081B	0.001	ug/L
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.0022	ug/L
Toxaphene	SW-846	8081B	0.0257	ug/L

Table 5 Parameters, analytical methods, and achieved method detection limits for elutriates (cont.)

Parameter	Method Reference	Method Number	MDL	MDL Units
PCBs				
C12(8)	SW-846	8082	0.515	ug/L
C13(18)	SW-846	8082	0.515	ug/L
C13(28)	SW-846	8082	0.515	ug/L
C14(44)	SW-846	8082	0.515	ug/L
C14(52)	SW-846	8082	0.515	ug/L
C14(66)	SW-846	8082	0.515	ug/L
C15(101)	SW-846	8082	0.515	ug/L
C15(105)	SW-846	8082	0.515	ug/L
C15(118)	SW-846	8082	0.515	ug/L
C16(128)	SW-846	8082	0.515	ug/L
C16(138)	SW-846	8082	0.515	ug/L
C16(153)	SW-846	8082	0.515	ug/L
C17(170)	SW-846	8082	0.515	ug/L
C17(180)	SW-846	8082	0.515	ug/L
C17(187)	SW-846	8082	0.515	ug/L
C18(195)	SW-846	8082	0.515	ug/L
C19(206)	SW-846	8082	0.515	ug/L
C110(209)	SW-846	8082	0.515	ug/L

[a] Metals samples were extracted from seawater matrix and preconcentrated before analysis.
[b] Aqueous PAHs were only analyzed in the equipment blanks.
[c] Pentachlorophenol was not analyzed in the equipment blanks.

Table 6 Suspended particulate phase testing conditions

Parameter	*A. bahia*	*M. beryllina*	*A. punctulata*
Treatments (SPP prepared from sediment composites and harbor water)*	8 Sample Composites and 1 CLDS Reference Site water	8 Sample Composites and 1 CLDS Reference Site water	8 Sample Composites and 1 CLDS Reference Site water
Replicates	5	5	5
Test population	1-5 days old	7-10 day with 24 hours variation	2 hours after fertilization
Temperature	Mean of 20 ± 2°C Maximum Deviation of 3°C	Mean of 20 ± 2°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation	NA
pH	NA	NA	NA
Salinity	30 ‰ ±10%	30 ‰ ±10%	30 ‰ ±10%
Ammonia	NA	NA	NA
Feeding	Daily, <24 hour old Artemia nauplii	Daily, <24 hour old Artemia nauplii	None
Reference Toxicant	SDS	SDS	Copper

Table 7 Period of assay conduct – suspended particulate phase testing

Elutriate			Assay Start		Assay End	
Comp/Elutriate ID	ESI Code	Test Species	Date	Time	Date	Time
Comp 1 Elutriate Comp 2 Elutriate Comp 3 Elutriate Comp 4 Elutriate	29521-002 29521-004 29521-006 29521-008	*A. bahia* Round 1	08/22/17	1540	08/26/17	1440
Comp 5 Elutriate Comp 6 Elutriate Comp 7 Elutriate Comp 8 Elutriate	29521-010 29521-012 29521-014 29521-016	*A. bahia* Round 2	08/23/17	1645	08/27/17	1540
Comp 1 Elutriate Comp 2 Elutriate Comp 3 Elutriate Comp 4 Elutriate	29521-017 29521-018 29521-019 29521-020	*M. beryllina* Round 1 [a]	08/25/17	1620	08/29/17	1500
Comp 5 Elutriate Comp 6 Elutriate Comp 7 Elutriate Comp 8 Elutriate	29521-010 29521-012 29521-014 29521-016	*M. beryllina* Round 2	08/23/17	1545	08/27/17	1345
Comp 1 Elutriate Comp 2 Elutriate Comp 3 Elutriate Comp 4 Elutriate	29521-017 29521-018 29521-019 29521-020	*A. punctulata* Round 1 [a]	08/25/17	1600	08/28/17	1125
Comp 5 Elutriate Comp 6 Elutriate Comp 7 Elutriate Comp 8 Elutriate	29521-010 29521-012 29521-014 29521-016	*A. punctulata* Round 2	08/23/17	1630	08/25/17	1630

[a] Rounds 1 of the *M. beryllina* and *A. punctulata* assay were first initiated on August 22, 2017 but failed to meet test acceptability criteria for survival in the laboratory control. The assays were successfully repeated on the dates and times listed above. The results of the first assays are included in Appendix E-1.

Table 8 Reference toxicant results – suspended particulate phase testing

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
08/31/17	03AbARO083017	96Hr LC-50	20.5	18.0	13.3 - 22.8	SDS (mg/L)
M. beryllina						
08/31/17	07MbABS082617	96Hr LC-50	7.2	6.2	3.6 - 8.8	SDS (mg/L)
A. punctulata						
08/30/17	99ApARO083017	EC-50-Dev	16.1	18.9	10.4 - 27.5	Copper (ug/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

Table 9 10-day whole sediment test conditions

Parameter	*L. plumulosus*	*A. bahia*
Treatments*	8 Sample Composites and 1 CLDS Reference Site Control	8 Sample Composites and 1 CLDS Reference Site Control
Replicates	5	5
Test population	Juvenile -non reproductive adult (2-4mm)	1-5 days old
Temperature	Mean of 20± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation
pH	NA	NA
Salinity	22‰ ±10%	32‰ ±10%
Ammonia	Porewater unionized ammonia <0.8 mg/L	Overlying water unionized ammonia <0.6 mg/L
Feeding	None	Daily, <24 hour old Artemia nauplii
Reference Toxicant	Cadmium	Sodium Dodecyl Sulfate (SDS)

Table 10 Reference toxicant results – 10-day whole sediment evaluation

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
08/31/17	03AbARO083017	96Hr LC-50	20.5	18.0	13.3 - 22.8	SDS (mg/L)
L. plumulosus						
09/02/17	11LpARO083117	96Hr LC-50	0.8	1.1	0.0 - 3.3	Cadmium (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

Table 11 28-day bioaccumulation bioassay test conditions

Parameter	*M. nasuta*	*N. virens*
Treatments*	8 Sample Composites and 1 CLDS Reference Site Control	8 Sample Composites and 1 CLDS Reference Site Control
Replicates	5	5
Test population	Adult clam	Adult Polychaete; 3-15 grams
Temperature	Mean of 12 ±2°C Maximum Deviation of 3°C	Mean of 12 ± 2°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation
pH	NA	NA
Salinity	25 – 30‰ ±10%	25 – 30‰ ±10%
Ammonia	NA	NA
Feeding	None	None
Reference Toxicant	Copper	Copper

Table 12 Parameters, analytical methods, and achieved method detection limits for tissue

Parameter	Method Reference	Method Number	MDL	MDL Units
Physical tests				
Percent Moisture	SM 2540	SM 2540	0.1	%
Total lipids	NOAA 130, 1998	NOAA Tech Memo NOS ORCA 130, 1998	0.1	%
Metals (wet wt.)				
Arsenic	EPA OW	6020	0.034	mg/kg
Cadmium	EPA OW	6020	0.11	mg/kg
Chromium	EPA OW	6020	0.036	mg/kg
Copper	EPA OW	6020	0.033	mg/kg
Lead	EPA OW	6020	0.006	mg/kg
Mercury	SW-846	7474	0.004	mg/kg
Nickel	EPA OW	6020	0.038	mg/kg
Zinc	EPA OW	6020	0.15	mg/kg
PAHs (wet wt.)				
Acenaphthene	SW-846	8270DIM	9.94	ug/kg
Acenaphthylene	SW-846	8270DSIM	9.94	ug/kg
Anthracene	SW-846	8270DSIM	9.94	ug/kg
Benzo(a)anthracene	SW-846	8270DSIM	9.94	ug/kg
Benzo(a)pyrene	SW-846	8270DIM	9.94	ug/kg
Benzo(b)fluoranthene	SW-846	8270D-SIM	9.94	ug/kg
Benzo(k)fluoranthene	SW-846	8270DSIM	9.94	ug/kg
Benzo(g,h,I)perylene	SW-846	8270D-SIM	9.94	ug/kg
Dibenz(a,h)anthracene	SW-846	8270D-SIM	9.94	ug/kg
Chrysene	SW-846	8270DIM	9.94	ug/kg
Fluoranthene	SW-846	8270DSIM	9.94	ug/kg
Fluorene	SW-846	8270DSIM	9.94	ug/kg
Indeno(1,2,3-cd)pyrene	SW-846	8270DSIM	9.94	ug/kg
Naphthalene	SW-846	8270DSIM	9.94	ug/kg
Phenanthrene	SW-846	8270DSIM	9.94	ug/kg
Pyrene	SW-846	8270DSIM	9.94	ug/kg
Pesticides (wet wt.)				
Aldrin	SW-846	8081B	0.05	ug/kg
Chlordane – Alpha	SW-846	8081B	0.5	ug/kg
Chlordane – gamma	SW-846	8081B	0.5	ug/kg
Chlordane – oxy	SW-846	8081B	1.0	ug/kg
4,4' – DDT	SW-846	8081B	0.5	ug/kg
4,4' – DDD	SW-846	8081B	0.5	ug/kg
4,4' – DDE	SW-846	8081B	0.5	ug/kg
Dieldrin	SW-846	8081B	0.5	ug/kg
Endosulfan & derivatives (I, II)	SW-846	8081B	0.5	ug/kg
Endrin	SW-846	8081B	0.5	ug/kg
Cis-Nonachlor	SW-846	8081B	0.5	ug/kg
Heptachlor & derivative (epoxide)	SW-846	8081B	1.0	ug/kg
Trans-Nonachlor	SW-846	8081B	0.5	ug/kg
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.5	ug/kg
Methoxychlor	SW-846	8081B	5.0	ug/kg
Toxaphene	SW-846	8081B	25.1	ug/kg
Hexachlorobenzene	SW-846	8081B	1.0	ug/kg
PCBs (wet wt.)				
C12(8)	SW-846	8082	0.994	ug/kg
C13(18)	SW-846	8082	0.994	ug/kg
C13(28)	SW-846	8082	0.994	ug/kg
C14(44)	SW-846	8082	0.994	ug/kg
C14(52)	SW-846	8082	0.994	ug/kg
C14(66)	SW-846	8082	0.994	ug/kg
C15(101)	SW-846	8082	0.994	ug/kg
C15(105)	SW-846	8082	0.994	ug/kg
C15(118)	SW-846	8082	0.994	ug/kg
C16(128)	SW-846	8082	0.994	ug/kg
C16(138)	SW-846	8082	0.994	ug/kg
C16(153)	SW-846	8082	0.994	ug/kg

Table 12 Parameters, Analytical method, and achieved method detection limits for tissue (cont.)

Parameter	Method Reference	Method Number	MDL	MDL Units
C17(170)	SW-846	8082	0.994	ug/kg
C17(180)	SW-846	8082	0.994	ug/kg
C17(187)	SW-846	8082	0.994	ug/kg
C18(195)	SW-846	8082	0.994	ug/kg
C19(206)	SW-846	8082	0.994	ug/kg
C110(209)	SW-846	8082	0.994	ug/kg

Table 13 Reference toxicant results – 28-day bioaccumulation bioassay

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
M. nasuta						
08/29/17	99MnARO082217	96Hr LC-50	9.2	9.0	1.1 – 16.8	Copper (mg/L)
N. virens						
08/31/17	99NvARO083117	96Hr LC-50	3.2	3.6	1.3 – 5.8	Copper (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

3. Results and discussion

The following sections present results evaluating the following potential exposure pathways that may be applicable to various placement options:

- Direct exposure to the dredged material (DM) following placement (bulk sediment);
- Direct exposure to the water column during/after mixing (elutriate and particulate phase analysis); and
- Bioaccumulation potential resulting from DM exposure over a period of time (bioaccumulation bioassays followed by tissue analysis).

The DM testing program proceeded in two phases. Phase 1 rapid grain size analyses were conducted to support sample pooling decisions and maximize full scale testing efficiency. Physical and chemical analyses were later repeated during Phase 2 of the testing program for chemical, physical, and biological testing data connectivity.

3.1 Sediment physical, chemical and toxicity characteristics

Bulk sediment quality and character are based on physical, chemical and toxicity bioassay tests. A wide range of chemical parameters was examined and toxicity was determined using 10-day exposures to crustaceans and amphipods. Detailed physical and chemical sediment measurements are provided in Table 14 (Phase 1) and Table 15 (Phase 2). The following sections present these findings; full laboratory backup files are provided in Appendices C, D, and E.

3.1.1 Sediment texture

Two primary sediment characteristics are sediment grain size and organic carbon content. Understanding sediment particle sizes and corresponding mineralogy is critical for evaluating sediment chemistry because chemical components vary naturally based on the mineralogy present. For example, chemical affinity to naturally occurring organic compounds, and chemical enrichment within biogenic carbon material are important processes that result in chemical enrichment within sedimentary organic carbon.

Table 14 (Phase 1) and Table 15 (Phase 2) summarize the sediment textures observed at the site. Backup laboratory grain size data for Phase 1 and Phase 2 are included in Appendices C1 and C2, respectively. Grain size data for the New Haven Harbor sediment samples showed that most samples were comprised predominantly of fine-grained materials (silt and clay) with a sub-set of samples containing predominantly sand (Table 15). Grain size correlated fairly well with total organic carbon (i.e., higher TOC values are generally related to samples with higher silt/clay fractions) (Table 5).

3.1.2 Sediment chemistry

After basic sediment properties like grain size and TOC content are understood (Tables 3 through 5), the chemical properties can be evaluated. Tables 16 through 20 summarize the results of the bulk sediment chemistry analyses conducted on 44 of the 51 samples submitted for grain size analysis. Backup laboratory sediment chemistry data are included in Appendix D1. An overview of findings per parameter is presented below.

In cases where values were below the laboratory reporting limit (RL), the result is considered undetected and qualified with a “U” in the data table.

3.1.2.1 Metals

Each of the eight metals analyzed (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn) except mercury were present in all sediment samples at levels greater than the project reporting limits (Table 17). Mercury was reported as non-detect in six of the 44 samples and was reported as an estimated value between the method detection limit (MDL) and RL in three samples.

3.1.2.2 Polycyclic Aromatic Hydrocarbons (PAHs)

PAH compounds were detected in all but six of the 44 samples (Table 18). In all samples with detected PAHs, concentrations of high molecular weight (HMW)[1] PAHs were greater than the concentrations of the low molecular weight (LMW)[2] PAHs. The highest concentration of HMW and LMW PAHs (13,503 and 2,964 ug/kg, respectively) were measured in the field duplicate collected from the top horizon at location NHH-X (sample NHH-X-REP-TOP) with generally similar levels measured in the parent sample.

3.1.2.3 Pesticides

Pesticides were generally undetected or detected at low levels among in the samples (Table 19). Technical chlordane constituents, 4,4' DDE, 4,4' DDD, and 4,4' DDT were the most frequently detected pesticides; gamma-BHC (Lindane) was reported at two locations. Dieldrin and Endosulfan II were reported in several samples but results were qualified for interference and dual column precision that exceeds method criteria; this issue was also noted for several 4,4' DDT results.

3.1.2.4 Polychlorinated Biphenyls (PCBs)

Measurable concentrations of multiple PCB congeners were reported in 33 of the 44 samples (Table 20). Similar to the PAHs, the highest concentration of Total PCBs[3] (1,658 ug/kg) was measured in the field duplicate collected from the top horizon at location NHH-X (sample NHH-X-REP-TOP) with generally similar levels measured in the parent sample.

3.1.2.5 Equipment Rinsate Blanks

Four rinsate blank samples (coring equipment, Niskin Bottle, pump and grab sampler) were analyzed for metals, PAHs, pesticides and PCBs (data are presented in Appendix D). No PCBs or pesticides were detected in any of the rinse blank samples above target reporting limits. Naphthalene was detected in all four rinse blank samples and ten other PAHs were also detected in the grab sampler rinsate. Chromium was detected in all four rinse blank samples and copper, nickel, and zinc were also detected in the grab sampler rinsate. Levels of constituents detected in the rinsate blanks were orders of magnitude lower than concentrations of these metals analyzed in sediment samples.

3.1.3 Whole sediment toxicity

A summary of survival data from the *A. bahia* and *L. plumulosus* assays is included in Table 21. Support data, including copies of bench sheets, are included in Appendix E1. Table 22 summarizes the laboratory control results and other assay acceptability criteria.

Before organisms were added to the test vessels, ammonia levels in the pore water were determined and pore water was found to contain unionized ammonia levels above 0.8 mg/L. Test initiation was delayed and test chambers were renewed daily with one volume addition of overlying water during this pre-assay phase. The sediments were monitored until colorimetric testing showed acceptable ammonia levels. As discussed in Section 3.1.3.1, pore water ammonia samples collected at the start of the *L. plumulosus* assay showed unionized ammonia levels in Composite 6 and Composite 8 were above the 0.8 mg/L threshold. However, ammonia toxicity does not appear to have impacted the results for these samples (see discussion in Section 3.1.3.1).

3.1.3.1 *A. bahia* 10 day solid phase assay

Mean mysid survival in the laboratory control sediment was 92%, and met guideline acceptance criteria (e.g. mean survival >90%; >70% in any replicate). Mean survival in the reference sediment was 98%. Survival of mysid shrimp exposed to New Haven Harbor sediment composites groups ranged from 74 to 96%. Statistical analyses show that there were negative effects on survival for mysids exposed to site Composite samples 1, 5 and 6 as compared to

[1] Calculated as the sum of concentrations for fluoranthene, pyrene, benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(ghi)perylene.
[2] Calculated as the sum of concentrations for naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.
[3] Calculated as the sum of the 18 NOAA congeners multiplied by 2.

mysids exposed to the CLDS reference sediment. The difference in survival from the CLDS reference sediment was <20% for Composite samples 1 and 5, however it was >20% for Composite sample 6.

3.1.3.2 *L. plumulosus* 10 day solid phase assay

Mean amphipod survival in the laboratory control was 94% and met acceptance criteria. Survival among organisms exposed to reference sediment was 95%, with mean survival of amphipods exposed to harbor sediments ranging from 87 to 96%. The statistical analyses show that there were no negative effects on survival for amphipods exposed to any of the site composites, except for Composite 8, as compared to amphipods exposed to the CLDS reference sediment. In Composite 8 however, the difference in survival from the CLDS reference sediment was <20%.

3.1.3.1 Whole sediment protocol deviations

Review of the data collected for these assays documented a few minor deviations from the method protocol and/or ESI's standard procedures.

Protocol requires that the *A. bahia* and *L. plumulosus* assays be conducted at 20±1°C. A temperature spike occurred beginning in the overnight hours at the outset of the assay, and the hourly temperatures exceeded the protocol range for approximately 16 hours reaching a maximum of 29.6°C at 5:37 AM on Saturday morning, September 2, 2017. The technician conducting the study assessed the temperature control unit of the water bath being used and determined that the unit was set to 19.5°C, with a thermostat reading of 19°C, indicating that the unit had malfunctioned. To correct the issue, the unit was disabled and room temperature adjusted to compensate. No further temperature deviations were noted for the remainder of the assay as demonstrated by the mean temperature of 20.8°C, which falls within the protocol range. The maximum temperature recorded also falls within the acceptable range for the species.

Protocol requires that the dissolved oxygen (DO) levels are maintained at or above 6 mg/L, and the assays were aerated from the start to ensure this requirement was met. However, there were sporadic DO measurements that fell below 6 mg/L in both assays (1 measurement in the *L. plumulosus* assay and 4 measurements in the *A. bahia* assay). There were no notations indicating a reason for this, however it is most likely that aeration tubes had fallen out of the test vessels and were replaced on discovery. The mean DO levels were well above the threshold, indicating that overall the desired DO levels were maintained.

To reduce pore water ammonia concentrations prior to the start of the assays, the overlying water was renewed daily for one week prior to the addition of the test organisms. However, upon review of final ammonia data it was determined that the unionized ammonia levels in Composites 6 and 8 of the *L. plumulosus* assay were above the protocol threshold limit of 0.8 mg/L for assay initiation, with calculated unionized ammonia values of 1.64 and 0.86 mg/L, respectively. No significant effects occurred with organisms exposed to Composite 6, which had two times the level of unionized ammonia than the threshold. There was only an 8% difference in mean survival for Composite 8 as compared to the reference site, and the unionized ammonia levels in Composite 8 had reached 0.11 mg/L by test day 3, suggesting that organism exposures above the target threshold were limited. This, coupled with the fact that no significant effect occurred in Composite 6, suggest that effects in Composite 8 do not stem from ammonia toxicity. A colorimetric test is used to determine total ammonia values during the pre-assay monitoring phase of testing. Given that this approach is reliant on analyst interpretation, it likely was unclear that total ammonia values were high enough to result in a protocol excursion.

These lab issues are considered to have had no impact on the outcome of the assays.

3.2 Water column evaluations

Water column evaluations performed in this study incorporated the analysis of chemical elutriate samples and SPP bioassay tests. The full suite of chemicals were measured in the elutriate mixtures to evaluate possible DM effects on water quality at the CLDS. SPP toxicity bioassays included three test species: crustacean, fish, and sea urchin larvae. Acute toxicity as well as very sensitive (larvae) developmental effects have been evaluated.

3.2.1 Elutriate chemistry

Table 23 summarizes elutriate chemistry results obtained after mixing the site materials with reference site seawater to simulate DM mixing at the CLDS. Backup laboratory elutriate chemistry data are included in Appendix D2.

Pentachlorophenol and pesticides were below or only slightly above target reporting limits for all samples analyzed. PCBs were below or slightly above reporting limits in most samples with Composite 6 and Composite 7 having Total PCB levels approximately ten-fold higher than the other samples.

In general, metals results were also below or slightly above reporting limits in most samples, with the exception of As and Zn which were detected in all samples. Chromium, copper, and nickel were also each detected in at least one sample.

3.2.2 SPP bioassay results

The SPP endpoints and adverse effects are presented in Table 24. Laboratory summary reports, including laboratory bench data, are presented in Appendix E2. All SPP laboratory control samples met minimum test acceptability criteria. Survival in laboratory controls was 100% for *A. bahia* in Rounds 1 and 2 and *M. beryllina* in Round 1 and 96% for *M. beryllina* in Round 2. This meets the minimum test acceptability criteria of ≥90% survival in the laboratory control and is an indication that the test organisms were healthy and not stressed by handling. In the *A. punctulata* assays, embryo counts in the laboratory control treatment for Round 1 showed 83% of the embryos survived at the end of the assay and, of the original embryos, 83% were normally developed pluteus larvae. In Round 2, 76% of the laboratory control embryos survived and 72% of the original embryos were normally developed pluteus larvae. These results meet the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control sample.

A notable amount of total ammonia (>10 mg/L) was observed in the elutriates from Composites 2, 3, 4, 5, 6, 7, and 8 at the start of the assays for all three test species. EPA guidance suggests that ammonia, generally in the unionized form, can be a source of toxicity when total ammonia values are >5 mg/L (EPA 2002). EPA Ambient Water Quality Criteria (AWQC) for unionized ammonia in saltwater references LC50 values for two of the species tested: *A. bahia* (1.04 mg/L) and *M. beryllina* (0.88 mg/L) (EPA 1989). AWQC for unionized ammonia in saltwater are not available for *A. punctulata*, however, effects levels are available in the literature for urchin species ranging from 0.06 mg/L for an EC-50 for development (Maguire Group Inc., 2003) to approximately 0.336 mg/L for a 96-hour LC50 (Chang-Hoon Lee et al., 2013). Calculated unionized ammonia values from the start of the assays for these composites and species ranged between 0.5 to 2.1 mg/L (*A. bahia*), 0.4 to 2.1 mg/L (*M. beryllina*) and 0.4 to 1.9 mg/L (*A. punctulata*). Consequently, given the low levels of contaminants detected in the elutriate samples (Table 23; Section 3.2.1) it is possible that any observed toxicity in these composites discussed below is a product of total and unionized ammonia content, rather than sediment-related contaminants of concern.

3.2.2.1 *A. bahia* and *M. beryllina* Acute SPP evaluations

Mysid shrimp were not adversely affected by exposure to SPP solutions prepared from Composites 1, 2, 3, 4, and 5 with LC50 values of >100% for these samples. LC50 values for Composites 6, 7, and 8 were 68%, 65%, and 84% respectively. As described above, elevated ammonia levels in the SPP solutions likely contributed to the observed toxicity for Composites 6, 7, and 8. Total ammonia levels in these three SPP solutions ranged from 40 to 62 mg/L at the start of the assay and from 19 to 36 mg/L at test termination

Minnows were not adversely affected by exposure to SPP solutions prepared from Composites 1, 2, 3, and 4 with LC50 values of >100% for these samples. Minnow LC50 values ranged from 46 to 78% in the remaining four composites. Total ammonia levels in Composites 5, 6, 7 and 8 ranged from 34 to 62 mg/L at the start of the assay and from 12 to 15 mg/L at test termination and these levels likely contributed to the observed minnow toxicity in these tests.

3.2.2.2 *A. punctulata* Acute SPP evaluations

Arbacia punctulata is the most sensitive of the project SPP exposed species. Survival and normal development were quantified when it was determined that the majority of the larvae (>90%) had reached the pluteus larval stage.

Review of the data collected at the end of the assay indicate that all but one composite elutriate solution had significant negative impacts on embryonic survival and/or development, with LC50s ranging from 9 to 35% for survival and with EC50s ranging from 1 to 17% for development. Composite 1 had LC50 and EC50 values of >100%.

As described above, ammonia levels were elevated at the start of the assays and *A. punctulata* appears to be even more sensitive to ammonia than the mysid shrimp or minnows. Composite 1, which showed no toxicity, had a total ammonia level of 1.8 mg/L at both test initiation and termination. The remaining composites had higher total ammonia levels ranging from 12 to 62 mg/L at test initiation. At test termination, total ammonia levels for Composites 2, 3, and 4 had reduced slightly from their start levels and ranged from 10 to 15 mg/L. Ammonia levels were inadvertently not measured at test termination for Composites 5, 6, 7, and 8, but given the elevated levels at test initiation (34 to 62 mg/L), it is expected that the test termination levels would have remained elevated. It is expected that the elevated ammonia levels in these composite samples contributed to the observed survival and development impacts in these tests.

3.2.2.1 SPP protocol deviations

Review of the data collected for these assays documented a few minor deviations from the method protocol and/or ESI's standard procedures.

The protocol requires that the assays be conducted at 20±2°C for the *A. bahia* and *M. beryllina* assays, and 20±1°C for the *A. punctulata* assay. Although the assays were, for the most part, maintained in incubators set at their target temperatures, some temperatures recorded during the assays fell outside of the protocol range due to the ambient laboratory temperature at the time that dilutions were mixed and water quality measurements were taken. These species can tolerate temperatures within the ranges measured, and EPA protocol allows temperatures of 25±2°C for these species. It was noted that the incubator for the Round 1 mysid assays was initially set too high but was corrected and possibly over-compensated the next day.

In addition, the protocol requires that the assays be conducted at a salinity of 30±2‰. It is not uncommon for the salinity to drift upwards during assay conduct due to evaporation and exceed the protocol requirement, but the salinities are adjusted daily as needed to account for this occurrence. In a few instances of the Round 1 mysid assay, the measured salinity was slightly below the acceptable range.

Last, due to technician oversight ammonia samples were not collected for analysis at assay initiation for the laboratory control or CLDS reference samples. Likewise, during Round 2 of the minnow and mysid assays the final ammonia samples were not collected for analysis. Rather, ammonia samples were taken from the 50% test concentration when the assays were terminated at 96 hours. Similarly, ammonia samples were not collected at the end of the Round 2 urchin assays.

These lab issues are considered to have had no impact on the outcome of the assays.

3.3 28-day bioaccumulation bioassay

To evaluate bioaccumulation potential of harbor sediments, the clam *Macoma nasuta* and the worm *Nereis virens* were exposed to material from the eight sediment composite groups. Table 25 provides a summary of the *M. nasuta* and *N. virens* survival data and Table 26 summarizes the laboratory control results and other assay acceptability criteria. Tissue chemistry data and statistical results (relative to reference) are summarized in Table 27 and Table 28. Laboratory bench sheets are included in Appendix E3.

3.3.1 Survival analysis

Mean *M. nasuta* survival was 97% and 99% for clams maintained in the laboratory control and reference (CLDS-Ref) site sediments, respectively. Mean percent survival of the bivalves exposed to harbor sediment composite groups ranged from 96 to 99%. The statistical evaluation of the survival data showed no significant reduction in survival for bivalves maintained in the site composites when compared to the CLDS reference sediment, with the exception of Composite 8; however, the difference in survival was <10% as compared with the CLDS reference sediment.

Polychaete survival was 92% and 98% in the laboratory control and reference (CLDS-Ref), respectively. Mean percent survival among *N. virens* exposed to harbor sediments ranged from 93 to 98%. The statistical evaluation of the data showed no significant reduction in survival for polychaetes maintained in the site composites when compared to the CLDS reference sediment, with the exception of Composite 6; however, the difference in survival was <10% as compared with the CLDS reference sediment.

Survival of clams and worms met established guideline criteria. Surviving organisms for both species tested provided sufficient tissue for preparation and analysis of body burdens.

3.3.1.1 28-day bioaccumulation bioassay protocol deviations

Review of the data collected for these assays documented one minor deviation from the method protocol and/or ESI's standard procedures.

The hourly temperature logger was activated on Day 0 (August 29, 2017) of the *M. nasuta* assay, 2 days earlier than the *N. virens* test was initiated. Due to an oversight, the temperature logger was removed from the temperature controlled room at the end of the *M. nasuta* assay on September 26, 2017, two days prior to the end of the *N. virens* assay. Therefore, hourly temperatures were not measured for the final two days of the *N. virens* assay. There were no abnormalities observed in the daily water quality measurements that were collected during this period. This represents a deviation from ESI's SOP and a data gap, however this deviation is considered to have had no impact on the outcome of the assays.

3.3.2 Tissue chemistry

Test organism tissues were analyzed for the full set of chemical parameters established for the program (AECOM, 2017a) to evaluate the bioaccumulative aspect of the project material. The chemical results provided in Table 27 (*M. nasuta*) and Table 28 (*N. virens*) are presented on a wet weight basis. Backup laboratory tissue chemistry data are included in Appendix D3. Statistical comparisons of tissue body burdens are discussed in Section 3.3.3.

Seven of the eight metals analyzed (As, Cd, Cr, Cu, Pb, Ni, Zn) were detected in all tissue composite samples. Mercury was not detected in clam tissues from Composites 1, 5, and 6. PAHs were detected in all tissue composite samples. For both clams and worms, the highest levels of PAHs were measured in Composite 8. Individual pesticides were detected infrequently in clam tissues and not at all in worm tissues. Endrin was the most frequently detected pesticide in the clam tissues. PCBs were detected in both clam and worm tissues from all composites except clam tissues from the CLDS reference site and Composite 1. Clam tissues from Composite 6 had the highest PCB concentrations.

3.3.3 Tissue body burden analysis

Review of *M. nasuta* tissue data document statistically significant uptake of several chemicals (Table 27). Based on NAE criteria, there were significant increases in body burdens for clams reared in site composites as compared to reference tissue for the following chemicals: cadmium, chromium, copper, lead, five PAHs (benzo[a]anthracene, benzo[b]fluoranthene, fluoranthene, phenanthrene and pyrene) and DDE. Nickel, zinc, and endrin were the only chemicals detected in reference tissue that did not demonstrate significant uptake in site composite tissue. Tissue from Composites 4, 5, 6, 7 and 8 consistently demonstrated significant increases in body burden. There was also significant uptake of pyrene from Composite 2.

Review of *M. nasuta* body burden data showed that the following chemicals were also detected in site composite tissues, but no further analysis was required because the chemical was not detected in reference tissue: four PAHs (benzo[a]pyrene, benzo[k]fluoranthene, chrysene, and indeno[1,2,3-cd]pyrene), nine PCB congeners (8, 44, 52, 66, 101, 105, 118, 138 and 153) and six pesticides (cis-chlordane, trans-nonachlor, DDT, DDD, dieldrin and beta-Endosulfan). These chemicals were primarily present at high concentrations in Composites 4, 5, 6, 7 and 8.

The review of *N. virens* tissue data also found statistically significant uptake of several chemicals in site composites (Table 28). The statistical evaluation found there were significant increases in body burdens for worms maintained in site composites as compared to reference site tissue for the following chemicals: copper, zinc, four PAHs (acenaphthene, acenaphthylene, naphthalene and phenanthrene) and two PCB congeners (138 and 153). It should

be noted that nearly all PAHs and PCBs reflect higher mean tissue concentrations in the site composites as compared with the reference composites, and the majority of these mean concentrations are at or near the MDL suggesting interferences with the tissue matrix, rather than actual detection of these chemicals in worm tissue. This is true for zinc and two of the PAHs (acenaphthene and naphthalene); all were found to be significantly higher in site composite tissue as compared with reference tissue. The same is true for phenanthrene, which was detected at or near the MDL in all composites except Composite 1 where the phenanthrene was detected above the reporting limit. In this instance, however, the only hit above the reporting limit (in replicate A) was identified as an outlier. Tissue from Composite 4 demonstrated significant uptake of copper, and Composites 6, 7, and 8 demonstrated significant increases in body burden for the PCB congeners 138 and 153. The other incidences of significant uptake of chemicals from Composites 2, 3, 4, 5, 6, 7 and 8 appeared to be at or near the MDL.

Review of body burden data for *N. virens* showed that the following chemicals were also detected in site composite tissues, but no further analysis was required because the chemical was not detected in reference tissue: four PAHs (anthracene, fluoranthene, fluorene and pyrene) and four PCB congeners (52, 101, 180 and 187). Most of these chemicals were primarily present at high concentrations in Composites 4, 5, 6, 7 and 8, although many of these chemicals were also present at low concentrations (at or slightly above the MDL) in Composite 1.

Results of body burden data generated from recovered *M. nasuta* and *N. virens* tissue consistently showed significant uptake of chemicals from Composites 4, 5, 6, 7 and 8. There were also sporadic incidences of significant uptake of chemicals from Composites 2 and 3, however these appeared to be at or near the MDL except in a few instances (e.g., fluorene and pyrene uptake in the clam from Composite 2).

Table 14 Rapid turnaround grain size results

	NHH-A-TOP 0 - 2.2′ 0 – 5.4′	NHH-A-BOTTOM 2.2 - 9.9′	NHH-B 0-4.2′	NHH-C-TOP 0 - 2.8′	NHH-C-BOTTOM 2.8 – 8.0′	NHH-D-TOP 0 – 4.8′	NHH-D-BOTTOM 4.8 – 10.3′	NHH-E-TOP 0 – 6.5′	NHH-E-BOTTOM 6.5 – 8.1′	NHH-F-TOP 0 – 3.2′	NHH-F-REF-TOP 0 – 3.2′	NHH-F-BOTTOM 3.2 – 10.5′	NHH-G-TOP 0 – 4.3′	NHH-G-BOTTOM 4.3 – 13.7′	NHH-H-TOP 0 – 5.4′	NHH-H-REP-TOP 0 – 5.4′	NHH-H-BOTTOM 5.4 – 7.7′	NHH-I-TOP 0 – 0.7′	NHH-I-BOTTOM 0.7′ – 2.5′	NHH-J
% Total Fines (<0.125 mm)	9.6	3.3	15.6	27	37.5	79	86.5	96.8	97.6	96.3	96.6	95.4	91.7	92.1	85.4	82.8	78.4	78.7	88.3	73.1
% Fine Sand (0.125 - 0.25 mm)	42.6	68	57	59.2	45.3	10.1	7.9	1	2	2	1.7	1.8	4	4.7	6.8	5.9	19.9	9.8	4.8	7.6
% Medium Sand (0.25 - 0.5 mm)	41.8	26.9	23.2	12.8	11.4	8	4.1	0.4	0.4	1	0.9	1.1	2.8	2.5	4.5	5.9	1.5	8.8	5.1	9.2
% Coarse Sand (0.5 - 2 mm)	4.5	1.8	2.8	0.9	3.8	1.9	1.2	0.8	0	0.3	0.8	1.4	1	0.7	3.3	5	0.2	2.7	1.8	10.1
% Total Gravel (>2 mm)	1.5	0	1.4	0.1	2	1	0.3	1	0	0.4	0	0.3	0.5	0	0	0.4	0	0	0	0

	NHH-K-TOP 0 – 5.5′	NHH-K-BOTTOM 5.5 – 8.2′	NHH-L 0 – 6.7′	NHH-M 0 – 6.8′	NHH-N-TOP 0 – 6.0′	NHH-N-BOTTOM 6.0 – 7.5′	NHH-O-TOP 0 – 8.3′	NHH-O-BOTTOM 8.7 – 10.9′	NHH-P-TOP 0 – 5.8′	NHH-P-BOTTOM 5.8 – 12.3′	NHH-Q-TOP 0 – 5.3′	NHH-Q-BOTTOM 5.3 – 29.4′	NHH-R-TOP 0 – 4.2′	NHH-R-BOTTOM 4.2 – 7.7′	NHH-S-TOP 0 – 6.0′	NHH-S-BOTTOM 6.0 – 6.4′	NHH-T-TOP 0 – 4.8′	NHH-T-BOTTOM 4.8 – 16.3′	NHH-U-TOP 0 – 5.8′	NHH-U-BOTTOM 5.8 – 30.0′
% Total Fines (<0.125 mm)	80.3	1.6	84.3	98.2	71.8	18.6	95.6	22.4	90.4	91.2	96.6	89.5	83.9	88.4	87.6	22	98.6	97.7	94.7	84.3
% Fine Sand (0.125 - 0.25 mm)	0	38.7	6.1	1.5	11.2	78.6	2.9	76.9	4.2	1.7	1.4	2.6	2.9	2.6	8.3	74.3	1.4	1.2	2.5	5.5
% Medium Sand (0.25 - 0.5 mm)	3.7	51.3	5	0.3	12	2.6	1.2	0.7	2.1	3.3	1.3	3.1	5.3	5.4	3.1	3.3	0	1	2.5	5.9
% Coarse Sand (0.5 - 2 mm)	15.2	8.1	4.4	0	2.6	0.2	0.3	0	2.9	3.8	0.7	3.9	7.9	3.6	1	0.4	0	0.1	0.3	4
% Total Gravel (>2 mm)	0.8	0.3	0.2	0	2.4	0	0	0	0.4	0	0	0.9	0	0	0	0	0	0	0	0.3

	NHH-V-TOP 0 – 4.8′	NHH-V-BOTTOM 4.8 – 8.6′	NHH-W-TOP 0 – 5.5′	NHH-W-BOTTOM 5.5 – 8.2′	NHH-X-TOP 0 – 5.2′	NHH-X-REP-TOP 0 – 5.2′	NHH-X-BOTTOM 5.2 – 8.0′	NHH-Y-TOP 0 – 5.9′	NHH-Y-BOTTOM 5.9 – 8.5′	NHH-Z-TOP 0 – 5.0′	NHH-Z-BOTTOM 5.0 – 8.7′
% Total Fines (<0.125 mm)	92.4	88	57.5	36.7	87.8	91.1	29.7	90.3	7.9	94.6	80.2
% Fine Sand (0.125 - 0.25 mm)	2	3.3	36.7	63.2	11	7.9	55	6.3	74.3	4.5	18.6
% Medium Sand (0.25 - 0.5 mm)	2.5	5	5.3	0.1	1.2	1	15.1	2	15.2	0.9	1.1
% Coarse Sand (0.5 - 2 mm)	3.1	3.4	0.5	0	0	0	0.2	0.9	2.6	0	0.1
% Total Gravel (>2 mm)	0	0.3	0	0	0	0	0	0.5	0	0	0

Table 15 Sediment chemistry results - Hydrometer grain size

	NHH-A-TOP 0 - 2.2′	NHH-A-BOTTOM 2.2 - 9.9′	NHH-B 0-4.2′	NHH-C-TOP 0 - 2.8′	NHH-C-BOTTOM 2.8 – 8.0′	NHH-D-TOP 0 – 4.8′	NHH-D-BOTTOM 4.8 – 10.3′	NHH-E-TOP 0 – 6.5′	NHH-E-BOTTOM 6.5 – 8.1′	NHH-F-TOP 0 – 3.2′	NHH-F-REP-TOP 0 – 3.2′	NHH-F-BOTTOM 3.2 – 10.5′	NHH-G-TOP 0 – 4.3′	NHH-G-BOTTOM 4.3 – 13.7′	NHH-H-TOP 0 – 5.4′	NHH-H-REP-TOP 0 – 5.4′	NHH-H-BOTTOM 5.4 – 7.7′	NHH-I-TOP 0 – 0.7′	NHH-I-BOTTOM 0.7′ – 2.5′	NHH-J
0 – 5.4′ % Clay Fine	0.1 U	0.1 U	0.1	1.2	0.3	17.8	0.8	1.4	1.3	1	10	8	10.6	10.5	8.2	0.8	0.5	0.7	53.9	0.9
% Silt Fine	7	2.1	18	22.9	43.8	65.9	82.6	91.7	81.2	66.1	74	84.9	64.9	70.7	67	77.1	69	74.1	31.1	78.2
% Fine Sand	39.4	62.6	54.8	54.2	42.1	8.5	10.5	2.5	6.2	5.7	6.2	2.1	6.7	10.3	8.4	8.6	24.1	9.5	10.3	7.2
% Medium Sand	44.9	32.9	22.3	15.3	10.4	6.7	5.2	2.5	10.7	9	8.8	2.7	9.5	6.8	6.9	8.1	6	11.4	4	4.7
% Coarse Sand	6.8	2.3	2.6	3	2.8	0.9	0.9	1.9	0.6	18.2	1	2.3	8	1.7	9.5	4.9	0.4	4.3	0.7	6.5
% Fine Gravel	1.9	0.1	2.2	3.4	0.6	0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.3	0.1 U	0.1 U	0.5	0.1 U	0.1 U	0.1 U	2.5
% Coarse Gravel	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

	NHH-K-TOP 0 – 5.5′	NHH-K-BOTTOM 5.5 – 8.2′	NHH-L 0 – 6.7′	NHH-M 0 – 6.8′	NHH-N-TOP 0 – 6.0′	NHH-N-BOTTOM 6.0 – 7.5′	NHH-O-TOP 0 – 8.3′	NHH-O-BOTTOM 8.7 – 10.9′	NHH-P-TOP 0 – 5.8′	NHH-P-BOTTOM 5.8 – 12.3′	NHH-Q-TOP 0 – 5.3′	NHH-Q-BOTTOM 5.3 – 29.4′	NHH-R-TOP 0 – 4.2′	NHH-R-BOTTOM 4.2 – 7.7′	NHH-S-TOP 0 – 6.0′	NHH-S-BOTTOM 6.0 – 6.4′	NHH-T-TOP 0 – 4.8′	NHH-T-BOTTOM 4.8 – 16.3′	NHH-U-TOP 0 – 5.8′	NHH-U-BOTTOM 5.8 – 30.0′
% Clay Fine	30.2	0.1 U	5.2	46	2.4	0.1	8.9	0.2	1.2	5.8	16.9	12.1	28.4	23.3	0.7	0.2	17.2	35.5	35.5	19.9
% Silt Fine	51.6	2.1	62.2	52	38.2	15.2	88.8	24.4	96.9	92.7	82	84.7	52.6	68.2	60.9	28.4	81.8	62.4	63	75.4
% Fine Sand	8.1	62.6	9.6	1.5	23.9	82.5	1.7	74.2	1.5	1.3	0.9	1.8	6.1	4.2	9.5	68	1	1.4	1.1	3.2
% Medium Sand	9.4	32.9	20.2	0.5	26	2.2	0.6	1	0.4	0.2	0.2	1.3	6.4	1.7	9.3	3	0.1 U	0.7	0.3	1.4
% Coarse Sand	0.7	2.3	2.8	0.1 U	5.8	0.1 U	0.1 U	0.2	0.1 U	0.1 U	0.1 U	0.1	6.3	2.6	14.7	0.4	0.1 U	0.1 U	0.1	0.1
% Fine Gravel	0.1 U	0.1	0.1 U	0.1 U	3.7	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2	0.1 U	4.9	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
% Coarse Gravel	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

	NHH-V-TOP 0 – 4.8′	NHH-V-BOTTOM 4.8 – 8.6′	NHH-W-TOP 0 – 5.5′	NHH-W-BOTTOM 5.5 – 8.2′	NHH-X-TOP 0 – 5.2′	NHH-X-REP-TOP 0 – 5.2′	NHH-X-BOTTOM 5.2 – 8.0′	NHH-Y-TOP 0 – 5.9′	NHH-Y-BOTTOM 5.9 – 8.5′	NHH-Z-TOP 0 – 5.0′	NHH-Z-BOTTOM 5.0 – 8.7′
% Clay Fine	18.6	23.3	11.3	2.9	8.9	9.6	14.4	1.5	0.1	1.4	1
% Silt Fine	58	65.4	35.3	27.3	83.4	82.6	21.1	93.9	10.4	93.8	79
% Fine Sand	4.4	3.2	48.2	69.7	6.9	7.1	50.8	3.7	66.1	4	19.1
% Medium Sand	5.4	3	3.1	0.1	0.8	0.7	13.5	0.9	12.1	0.8	0.9
% Coarse Sand	8.8	4	2.1	0.1 U	0.1 U	0.1 U	0.2	0.1 U	1.5	0.1 U	0.1 U
% Fine Gravel	4.8	1.1	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	9.8	0.1 U	0.1 U
% Coarse Gravel	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U

U - Not detected at the laboratory RL.

Table 16 Sediment chemistry results - Solids, moisture, and total organic carbon

	NHH-A-TOP 0 - 2.2′	NHH-A-BOTTOM 2.2 - 9.9′	NHH-B 0-4.2′	NHH-C-TOP 0 - 2.8′	NHH-C-BOTTOM 2.8 – 8.0′	NHH-D-TOP 0 – 4.8′	NHH-D-BOTTOM 4.8 – 10.3′	NHH-E-TOP 0 – 6.5′	NHH-E-BOTTOM 6.5 – 8.1′	NHH-F-TOP 0 – 3.2′	NHH-F-REP-TOP 0 – 3.2′	NHH-F-BOTTOM 3.2 – 10.5′	NHH-G-TOP 0 – 4.3′	NHH-G-BOTTOM 4.3 – 13.7′	NHH-H-TOP 0 – 5.4′	NHH-H-REP-TOP 0 – 5.4′	NHH-H-BOTTOM 5.4 – 7.7′	NHH-I-TOP 0 – 0.7′	NHH-I-BOTTOM 0.7′ – 2.5′	NHH-J 0 – 5.4′
Total Solids (%)	60.7	NS	69	70.4	62	60	66	43.9	46.6	40.2	43.1	44.6	41.5	47.4	48.9	46.8	71.1	48.4	48	41.6
Moisture %)	39.3	NS	31	29.6	38	40	34	56.1	53.4	59.8	56.9	55.4	58.5	52.6	51.1	53.2	28.9	51.6	52	58.4
Total Organic Carbon (%)	0.21	NS	1.2	0.42	0.57	1.1	1.2	2.2	2.3	1.9	1.9	2.0	1.7	1.4	1.9	2.1	0.8	1.5	1.3	2.4

	NHH-K-TOP 0 – 5.5′	NHH-K-BOTTOM 5.5 – 8.2′	NHH-L 0 – 6.7′	NHH-M 0 – 6.8′	NHH-N-TOP 0 – 6.0′	NHH-N-BOTTOM 6.0 – 7.5′	NHH-O-TOP 0 – 8.3′	NHH-O-BOTTOM 8.7 – 10.9′	NHH-P-TOP 0 – 5.8′	NHH-P-BOTTOM 5.8 – 12.3′	NHH-Q-TOP 0 – 5.3′	NHH-Q-BOTTOM 5.3 – 29.4′	NHH-R-TOP 0 – 4.2′	NHH-R-BOTTOM 4.2 – 7.7′	NHH-S-TOP 0 – 6.0′	NHH-S-BOTTOM 6.0 – 6.4′	NHH-T-TOP 0 – 4.8′	NHH-T-BOTTOM 4.8 – 16.3′	NHH-U-TOP 0 – 5.8′	NHH-U-BOTTOM 5.8 – 30.0′
Total Solids (%)	47.6	NS	45.6	38.2	64.2	NS	40.4	NS	42.7	42.2	36	42.6	37.3	44.1	40	NS	34.4	41.4	35.6	41.1
Moisture %)	52.4	NS	54.4	61.8	35.8	NS	59.6	NS	57.3	57.8	64	57.4	62.7	55.9	60	NS	65.6	58.6	64.4	58.9
Total Organic Carbon (%)	1.8	NS	2.2	2.4	1.2	NS	2.4	NS	3.1	2.9	2.7	3.8	2.8	2.9	2.6	NS	2.8	3.6	2.9	3.5

	NHH-V-TOP 0 – 4.8′	NHH-V-BOTTOM 4.8 – 8.6′	NHH-W-TOP 0 – 5.5′	NHH-W-BOTTOM 5.5 – 8.2′	NHH-X-TOP 0 – 5.2′	NHH-X-REP-TOP 0 – 5.2′	NHH-X-BOTTOM 5.2 – 8.0′	NHH-Y-TOP 0 – 5.9′	NHH-Y-BOTTOM 5.9 – 8.5′	NHH-Z-TOP 0 – 5.0′	NHH-Z-BOTTOM 5.0 – 8.7′
Total Solids (%)	40.8	41.4	46.1	NS	36	35.2	80.2	36.5	NS	37	44.7
Moisture %)	59.2	58.6	53.9	NS	64	64.8	19.8	63.5	NS	63	55.3
Total Organic Carbon (%)	3.1	3.8	2.7	NS	4.0	4.4	0.3	3.7	NS	3.0	3.8

Table 17 Sediment chemistry results - Metals

Analyte	NHH-A-TOP 0 - 2.2'	NHH-B 0-4.2'	NHH-C-TOP 0 - 2.8'	NHH-C-BOTTOM 2.8 – 8.0'	NHH-D-TOP 0 – 4.8'	NHH-D-BOTTOM 4.8 – 10.3'	NHH-E-TOP 0 – 6.5'	NHH-E-BOTTOM 6.5 – 8.1'	NHH-F-TOP 0 – 3.2'	NHH-F-REP-TOP 0 – 3.2'	NHH-F-BOTTOM 3.2 – 10.5'	NHH-G-TOP 0 – 4.3'	NHH-G-BOTTOM 4.3 – 13.7'	NHH-H-TOP 0 – 5.4'	NHH-H-REP-TOP 0 – 5.4'	NHH-H-BOTTOM 5.4 – 7.7'	NHH-I-TOP 0 – 0.7'	NHH-I-BOTTOM 0.7' – 2.5'	NHH-J 0 – 5.4'	NHH-K-TOP 0 – 5.5'	NHH-L 0 - 6.7'	NHH-M 0 - 6.8'
Total Metals (mg/kg)																						
Arsenic, Total	3.41	3.12	4.1	6.14	3.61	7.01	9.2	9.69	9.49	8.51	11.1	12.1	10.8	10.4	10.7	4.58	8.18	10.3	11.8	8.12	13.8	9.36
Cadmium, Total	0.077	0.069	0.064	0.071	0.064	0.102	0.889	1.44	0.556	0.644	1.12	0.736	0.188	0.86	0.974	0.134	0.143	0.155	1.6	0.402	0.991	0.763
Chromium, Total	10.6	10.3	13	16.1	10.8	20.9	88.1	91.9	69.8	72.2	94.2	67.4	30.2	69.4	80.9	12.4	22.8	30.6	84.8	47.5	52.6	64.2
Copper, Total	10	5.41	8.41	6.45	8.98	7.74	106	140	81.4	96.7	184	118	12.5	80	96.2	6.63	11	12.2	150	57.4	170	92.6
Lead, Total	6.76	3.76	5.77	5.2	5.8	6.83	64.2	58.1	51.2	48.8	63.4	51.3	10.6	47	56.6	6.12	9.33	10.9	71.8	37.6	157	55.8
Mercury, Total	0.028	0.02 U	0.015 J	0.021 U	0.031	0.018 U	0.39	0.499	0.27	0.241	0.49	0.457	0.028 U	0.189	0.331	0.003 J	0.018 J	0.023 U	0.925	0.144	1.12	0.274
Nickel, Total	5.3	6.36	7.4	10.4	5.37	13.5	29	21.4	24.6	27.4	24.5	23.2	19.7	22.7	24.9	7.54	14.7	19.9	25.8	19.4	22.1	23.2
Zinc, Total	29.3	21	31.5	32.8	26.3	42.9	202	223	184	186	246	183	64.2	155	183	24.5	50.7	64.3	223	132	212	170

Analyte	NHH-N-TOP 0 – 6.0'	NHH-O-TOP 0 – 8.3'	NHH-P-TOP 0 – 5.8'	NHH-P-BOTTOM 5.8 – 12.3'	NHH-Q-TOP 0 – 5.3'	NHH-Q-BOTTOM 5.3 – 29.4'	NHH-R-TOP 0 – 4.2'	NHH-R-BOTTOM 4.2 – 7.7'	NHH-S-TOP 0 – 6.0'	NHH-T-TOP 0 – 4.8'	NHH-T-BOTTOM 4.8 – 16.3'	NHH-U-TOP 0 – 5.8'	NHH-U-BOTTOM 5.8 – 30.0'	NHH-V-TOP 0 – 4.8'	NHH-V-BOTTOM 4.8 – 8.6'	NHH-W-TOP 0 – 5.5'	NHH-X-TOP 0 – 5.2'	NHH-X-REP-TOP 0 – 5.2'	NHH-X-BOTTOM 5.2 – 8.0'	NHH-Y-TOP 0 – 5.9'	NHH-Z-TOP 0 – 5.0'	NHH-Z-BOTTOM 5.0 – 8.7'
Total Metals (mg/kg)																						
Arsenic, Total	5.58	9.16	10.4	10.6	9.77	14.5	10.6	10.3	11.5	8.77	11.2	8.98	12.5	11.7	13.5	7.14	9.98	10.9	2.1	9.83	9.9	12.2
Cadmium, Total	1.05	0.691	2.37	2.43	1.05	6.71	0.831	1.14	3.06	0.886	4.51	1.02	6.05	2.68	5.54	1.84	4.42	5.34	0.056	1.7	1.06	7.85
Chromium, Total	50.2	58.8	107	108	70.6	210	67.9	82.8	143	61.9	153	69.8	181	116	178	71	133	140	6.98	69.8	65	195
Copper, Total	74.3	81	215	199	121	376	98.8	135	206	102	266	118	325	198	289	118	234	275	3.47	125	109	320
Lead, Total	35.5	48.5	99.8	102	67.7	151	58.5	76.8	113	62	193	64.8	174	123	188	59.8	175	211	3.15	71.8	63.6	177
Mercury, Total	0.202	0.252	0.608	0.621	0.282	1.29	0.25	0.325	0.543	0.254	0.611	0.28	1.04	0.432	0.805	0.437	0.654	0.704	0.017 U	0.292	0.728	0.826
Nickel, Total	14.3	21.9	30	29.7	26.7	35.6	26.2	28.8	31.6	24	43.6	26.5	41.6	36.3	47.3	19.6	37.1	40.3	4.32	25	23.6	41.9
Zinc, Total	113	159	275	281	211	588	193	221	338	183	358	206	490	288	449	183	330	390	13.9	193	191	534

J - Estimated value.

U - Not detected at the laboratory RL.

Table 18 Sediment chemistry results - PAHs

Analyte	NHH-A-TOP 0 - 2.2′	NHH-B 0-4.2′	NHH-C-TOP 0 - 2.8′	NHH-C-BOTTOM 2.8 – 8.0′	NHH-D-TOP 0 – 4.8′	NHH-D-BOTTOM 4.8 – 10.3′	NHH-E-TOP 0 – 6.5′	NHH-E-BOTTOM 6.5 – 8.1′	NHH-F-TOP 0 – 3.2′	NHH-F-REP-TOP 0 – 3.2′	NHH-F-BOTTOM 3.2 – 10.5′	NHH-G-TOP 0 – 4.3′	NHH-G-BOTTOM 4.3 – 13.7′	NHH-H-TOP 0 – 5.4′	NHH-H-REP-TOP 0 – 5.4′	NHH-H-BOTTOM 5.4 – 7.7′	NHH-I-TOP 0 – 0.7′	NHH-I-BOTTOM 0.7′ – 2.5′	NHH-J 0 – 5.4′	NHH-K-TOP 0 – 5.5′	NHH-L 0 - 6.7'	NHH-M 0 - 6.8'
Polycyclic Aromatic Hydrocarbons (ug/kg)																						
Naphthalene	8.06 U	6.81 U	6.58 U	7.57 U	7.94 U	6.92 U	42.3	113	36.3	41.4	116	83.8	9.93 U	35.7	42.7	6.86 U	9.61 U	10 U	207	26.8	532	76
Acenaphthylene	8.06 U	6.81 U	6.58 U	7.57 U	7.94 U	6.92 U	45.6	78.9	41.7	49.6	60.7	62.3	9.93 U	26.6	36	6.86 U	9.61 U	10 U	81.2	21.3	109	64.7
Acenaphthene	8.06 U	6.81 U	6.58 U	7.57 U	7.94 U	6.92 U	9.42 J	22.2	20.4	6.58 J	24	12.3	9.93 U	9.53 J	9.37 J	6.86 U	9.61 U	10 U	18.2	5.43 J	38.4	22.7
Fluorene	8.06 U	6.81 U	6.58 U	7.57 U	7.94 U	6.92 U	19.1	58.8	27.3	14.1	36.3	24.9	9.93 U	18.6	18.6	6.86 U	9.61 U	10 U	37.5	10.1 J	53.1	23.1
Phenanthrene	5.18 J	6.81 U	6.02 J	7.57 U	7.94 U	6.92 U	125	298	134	95.1	234	194	9.93 U	108	114	6.86 U	5.41 J	10 U	204	63	370	177
Anthracene	8.06 U	6.81 U	6.58 U	7.57 U	7.94 U	6.92 U	36.1	65	44	52.1	67.1	69.6	9.93 U	26.3	31.8	6.86 U	9.61 U	10 U	92.9	20.8	148	68
Fluoranthene	10.7	6.81 U	8.65	7.57 U	7.94 U	6.92 U	276	517	226	259	457	465	9.93 U	227	286	6.86 U	7.31 J	10 U	537	185	900	550
Pyrene	17.6	6.81 U	12.6	7.57 U	7.94 U	6.92 U	254	456	269	297	469	495	5.23 J	215	277	6.86 U	8.25 J	10 U	527	179	929	483
Benz(a)anthracene	6.64 J	6.81 U	5.97 J	7.57 U	7.94 U	6.92 U	135	233	120	127	243	245	9.93 U	124	149	6.86 U	9.61 U	10 U	298	98.1	565	276
Chrysene	7.58 J	6.81 U	7.06	7.57 U	7.94 U	6.92 U	169	290	167	176	263	277	9.93 U	108	142	6.86 U	5.52 J	10 U	321	98.9	589	283
Benzo(b)fluoranthene	8.12	6.81 U	10.9	7.57 U	7.94 U	6.92 U	213	339	217	229	323	338	9.93 U	208	224	6.86 U	6.09 J	10 U	391	171	566	379
Benzo(k)fluoranthene	8.93	6.81 U	6.81	7.57 U	7.94 U	6.92 U	138	183	161	178	184	235	9.93 U	63.4	124	6.86 U	9.61 U	10 U	309	84.3	404	246
Benzo(a)pyrene	8.08	6.81 U	8.58	7.57 U	7.94 U	6.92 U	182	276	181	198	235	278	9.93 U	109	148	6.86 U	9.61 U	10 U	354	107	570	290
Indeno(1,2,3-cd)pyrene	6.56 J	6.81 U	7.17	7.57 U	7.94 U	6.92 U	152	204	146	158	194	215	9.93 U	119	152	6.86 U	9.61 U	10 U	290	97.6	365	226
Dibenz(a,h)anthracene	8.06 U	6.81 U	6.58 U	7.57 U	7.94 U	6.92 U	34.9	47.8	42.5	45	49.3	52.3	9.93 U	22.6	27.6	6.86 U	9.61 U	10 U	64.1	25.8	85.1	53.7
Benzo(ghi)perylene	7.84 J	6.81 U	8.33	7.57 U	7.94 U	6.92 U	172	246	170	183	229	247	9.93 U	119	157	6.86 U	5.01 J	10 U	302	115	446	254
Total LMW PAHs	45.5 J	40.9 U	38.9	45.4 U	47.6 U	41.5 U	278	636	304	259	538	447	59.6 U	225	252	41.2 U	53	60.0 U	641	147	1251	432
Total HMW PAHs	90.1 J	68.1 U	82.7	75.7 U	79.4 U	69.2 U	1726	2792	1700	1850	2646	2847	94.6	1315	1687	68.6 U	80.2	100 U	3393	1162	5419	3041
Total PAHs	136	109 U	122	121 U	127 U	111 U	2003	3428	2003	2109	3184	3294	154	1540	1939	110 U	134	160 U	4034	1309	6670	3472

Analyte	NHH-N-TOP 0 – 6.0′	NHH-O-TOP 0 – 8.3′	NHH-P-TOP 0 – 5.8′	NHH-P-BOTTOM 5.8 – 12.3′	NHH-Q-TOP 0 – 5.3′	NHH-Q-BOTTOM 5.3 – 29.4′	NHH-R-TOP 0 – 4.2′	NHH-R-BOTTOM 4.2 – 7.7′	NHH-S-TOP 0 – 6.0′	NHH-T-TOP 0 – 4.8′	NHH-T-BOTTOM 4.8 – 16.3′	NHH-U-TOP 0 – 5.8′	NHH-U-BOTTOM 5.8 – 30.0′	NHH-V-TOP 0 – 4.8′	NHH-V-BOTTOM 4.8 – 8.6′	NHH-W-TOP 0 – 5.5′	NHH-X-TOP 0 – 5.2′	NHH-X-REP-TOP 0 – 5.2′	NHH-X-BOTTOM 5.2 – 8.0′	NHH-Y-TOP 0 – 5.9′	NHH-Z-TOP 0 – 5.0′	NHH-Z-BOTTOM 5.0 – 8.7′
Polycyclic Aromatic Hydrocarbons (ug/kg)																						
Naphthalene	153	228	253	234	68	1460	52.6	62.8	381	71.4	175	82.5	771	117	1340	354	256	308	5.91 U	69.5	86.1	740
Acenaphthylene	44.7	58.1	142	128	72.9	238	49.4	55.6	79.4	79.9	151	85.7	203	106	199	100	221	275	5.91 U	83.2	81.6	199
Acenaphthene	13.2	26.8	47.4	42.3	15	81.1	15.8	17.3	40.8	27.2	53.1	32.3	86.3	52.8	67.1	37.4	303	327	5.91 U	36.6	27.2	142
Fluorene	17.3	24.7	71.1	63.7	18.7	142	24	28.2	77.9	18.6	75.4	26.4	154	48.9	178	53.6	263	335	5.91 U	30.8	28.8	271
Phenanthrene	122	172	488	480	190	1060	140	146	326	213	498	215	909	349	643	290	924	1270	5.91 U	227	208	1230
Anthracene	37	58	153	156	85.5	255	64.5	76.3	91.6	82.7	147	105	233	121	221	143	364	449	5.91 U	98.7	92.7	246
Fluoranthene	292	479	1290	1320	768	1710	462	468	835	814	1300	982	1600	979	1400	887	3210	3360	5.91 U	1190	935	1810
Pyrene	258	424	1020	952	600	1480	386	413	706	694	1090	724	1290	803	1070	672	2240	2550	5.91 U	948	774	1560
Benz(a)anthracene	141	234	574	526	321	788	200	219	403	373	602	376	690	462	621	376	1140	1400	5.91 U	545	429	833
Chrysene	143	234	706	676	405	943	263	268	363	379	587	491	815	429	730	436	1040	1240	5.91 U	458	416	791
Benzo(b)fluoranthene	168	310	792	721	497	912	287	302	583	527	680	528	828	640	824	489	1130	1490	5.91 U	576	530	1050
Benzo(k)fluoranthene	125	210	471	486	311	663	182	194	234	362	493	400	569	256	456	288	746	736	5.91 U	361	354	578
Benzo(a)pyrene	142	247	628	585	395	774	256	247	310	392	547	440	684	393	635	390	853	1030	5.91 U	410	389	734
Indeno(1,2,3-cd)pyrene	104	187	453	432	304	550	215	195	325	301	395	365	484	320	452	285	592	717	5.91 U	290	290	509
Dibenz(a,h)anthracene	31.8	53.3	133	127	84	159	48.6	47.8	70.4	69.9	113	76.3	143	87	124	80.6	175	207	5.91 U	85.9	67	158
Benzo(ghi)perylene	119	214	513	479	328	594	226	213	319	350	445	372	570	352	499	313	650	773	5.91 U	327	331	609
Total LMW PAHs	387	568	1155	1104	450	3236	346	386	997	493	1100	547	2356	795	2648	978	2331	2964	35 U	546	524	2828
Total HMW PAHs	1524	2592	6580	6304	4013	8573	2526	2567	4148	4262	6252	4754	7673	4721	6811	4217	11776	13503	59 U	5191	4515	8632
Total PAHs	1911	3160	7735	7408	4463	11809	2872	2953	5145	4755	7352	5301	10029	5516	9459	5195	14107	16467	95 U	5737	5039	11460

PAH totals calculated using the reporting limit (RL) for non-detects.

J - Estimated value.

U - Not detected at the laboratory RL.

Table 19 Sediment chemistry results - Pesticides

Analyte	NHH-A-TOP 0 - 2.2′	NHH-B 0-4.2′	NHH-C-TOP 0 - 2.8′	NHH-C-BOTTOM 2.8 – 8.0′	NHH-D-TOP 0 – 4.8′	NHH-D-BOTTOM 4.8 – 10.3′	NHH-E-TOP 0 – 6.5′	NHH-E-BOTTOM 6.5 – 8.1′	NHH-F-TOP 0 – 3.2′	NHH-F-REP-TOP 0 – 3.2′	NHH-F-BOTTOM 3.2 – 10.5′	NHH-G-TOP 0 – 4.3′	NHH-G-BOTTOM 4.3 – 13.7′	NHH-H-TOP 0 – 5.4′	NHH-H-REP-TOP 0 – 5.4′	NHH-H-BOTTOM 5.4 – 7.7′	NHH-I-TOP 0 – 0.7′	NHH-I-BOTTOM 0.7′ – 2.5′	NHH-J 0 – 5.4′	NHH-K-TOP 0 – 5.5′	NHH-L 0 - 6.7′	NHH-M 0 - 6.8′
Organochlorine Pesticides (ug/kg)																						
Aldrin	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
cis-Chlordane	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
cis-Nonachlor	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
Dieldrin	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.643 IP	0.563 IP	0.619 IP	0.594 IP	0.536 IP	0.551 U	0.497 U	0.514 IP	0.582 IP	0.343 U	0.48 U	0.503 U	1.04 IP	0.516 U	0.517 U	1.28 U
Endosulfan I	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
Endosulfan II	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	4.03 P	0.516 U	0.517 U	1.48 IP
Endrin	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
gamma-BHC	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
Heptachlor	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
Heptachlor epoxide	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	1.05 U	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.979 U	0.686 U	0.961 U	1 U	1.2 U	1.03 U	1.03 U	2.57 U
Hexachlorobenzene	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	1.05 U	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.979 U	0.686 U	0.961 U	1 U	1.2 U	1.03 U	1.03 U	2.57 U
Methoxychlor	4.03 U	3.4 U	3.29 U	3.79 U	3.97 U	3.46 U	5.34 U	5.24 U	5.98 U	5.63 U	5.1 U	5.51 U	4.97 U	5.09 U	4.9 U	3.43 U	4.8 U	5.03 U	5.99 U	5.16 U	5.17 U	12.8 U
Oxychlordane	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	1.05 U	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.979 U	0.686 U	0.961 U	1 U	1.2 U	1.03 U	1.03 U	2.57 U
Toxaphene	20.2 U	17.1 U	16.5 U	19 U	19.9 U	17.4 U	26.8 U	26.3 U	30 U	28.3 U	25.6 U	27.6 U	24.9 U	25.6 U	24.6 U	17.2 U	24.1 U	25.2 U	30.1 U	25.9 U	26 U	64.5 U
trans-Chlordane	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	1.92	1.46 IP	0.598 U	0.563 U	0.51 U	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	0.599 U	0.516 U	0.517 U	1.28 U
trans-Nonachlor	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.534 U	0.524 U	0.662	0.563 U	0.701	0.551 U	0.497 U	0.509 U	0.49 U	0.343 U	0.48 U	0.503 U	1.06	0.516 U	0.517 U	1.33
4,4'-DDD	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	0.756	1.68	0.8	0.902	1.56	0.58	0.497 U	0.688	1.05	0.343 U	0.48 U	0.503 U	1.17	0.572	0.517 U	1.28 U
4,4'-DDE	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	2.92	4.75	2.14	2.27	4.1	1.56	0.497 U	2.28	2.97	0.343 U	0.48 U	0.503 U	3.57	1.18	0.517 U	3.17
4,4'-DDT	0.403 U	0.34 U	0.329 U	0.379 U	0.397 U	0.346 U	2.1 P	0.524 U	0.776 IP	0.698 IP	1.46 P	0.551 U	0.497 U	1.73 P	2.34 P	0.343 U	0.48 U	0.503 U	3.84 P	0.743	0.517 U	1.58 IP
Total DDT	1.2 U	1.0 U	0.99 U	1.1 U	1.2 U	1.0 U	5.8	7.0	3.7	3.9	7.1	2.7	1.5 U	4.7	6.4	1.0 U	1.4 U	1.5 U	8.6	2.5	1.6 U	6.0

Analyte	NHH-N-TOP 0 – 6.0′	NHH-O-TOP 0 – 8.3′	NHH-P-TOP 0 – 5.8′	NHH-P-BOTTOM 5.8 – 12.3′	NHH-Q-TOP 0 – 5.3′	NHH-Q-BOTTOM 5.3 – 29.4′	NHH-R-TOP 0 – 4.2′	NHH-R-BOTTOM 4.2 – 7.7′	NHH-S-TOP 0 – 6.0′	NHH-T-TOP 0 – 4.8′	NHH-T-BOTTOM 4.8 – 16.3′	NHH-U-TOP 0 – 5.8′	NHH-U-BOTTOM 5.8 – 30.0′	NHH-V-TOP 0 – 4.8′	NHH-V-BOTTOM 4.8 – 8.6′	NHH-W-TOP 0 – 5.5′	NHH-X-TOP 0 – 5.2′	NHH-X-REP-TOP 0 – 5.2′	NHH-X-BOTTOM 5.2 – 8.0′	NHH-Y-TOP 0 – 5.9′	NHH-Z-TOP 0 – 5.0′	NHH-Z-BOTTOM 5.0 – 8.7′
Organochlorine Pesticides (ug/kg)																						
Aldrin	0.383 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	0.64 U	0.524 U	0.593 U	1.34 U	1.12 U	1.4 U	1.17 U	1.14 U	1.19 U	1.08 U	1.36 U	1.35 U	0.295 U	1.33 U	1.23 U	1.03 U
cis-Chlordane	0.383 U	1.17 U	1.93	1.3	1.8	2.31	0.792	0.855 P	1.3	1.34 U	4.01	1.59	2.41	2.41	4.12	1.6	3.92	6.99	0.295 U	1.33 U	1.23 U	3.96
cis-Nonachlor	0.383 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	0.64 U	0.524 U	0.593 U	1.34 U	1.12 U	1.4 U	1.17 U	1.14 U	1.19 U	1.08 U	1.36 U	1.35 U	0.295 U	1.33 U	1.23 U	1.03 U
Dieldrin	0.552 IP	1.17 U	2.12 IP	2.05 IP	1.38 IP	8.3 IP	0.754 IP	0.752 IP	3.24 IP	1.43 IP	3.52 IP	1.4 U	8.56 IP	1.83 IP	6.02 IP	2.06 IP	3.88 IP	5.52 IP	0.295 U	1.45 IP	1.23 U	7.38 IP
Endosulfan I	0.383 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	0.64 U	0.524 U	0.593 U	1.34 U	1.12 U	1.4 U	1.17 U	1.14 U	1.19 U	1.08 U	1.36 U	1.35 U	0.295 U	1.33 U	1.23 U	1.03 U
Endosulfan II	0.645 IP	1.17 U	3.73 IP	2.77 IP	2.21 I	2.33 IP	2.2 P	3.31 P	11.4 P	1.92 IP	10.3 IP	1.64 IP	11 IP	6.92 IP	25.1 P	3.59 IP	23.3 I	30.5 I	0.295 U	2.08 IP	1.23 U	6.61 IP
Endrin	0.383 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	0.64 U	0.524 U	0.593 U	1.34 U	1.12 U	1.4 U	1.17 U	1.14 U	1.19 U	1.08 U	1.36 U	1.35 U	0.295 U	1.33 U	1.23 U	1.03 U
gamma-BHC	0.383 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	0.64 U	0.524 U	0.593 U	1.34 U	1.12 U	1.4 U	1.17 U	1.14 U	1.19 U	1.08 U	3.66	5.25	0.295 U	1.33 U	1.23 U	1.03 U
Heptachlor	0.383 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	0.64 U	0.524 U	0.593 U	1.34 U	1.12 U	1.4 U	1.17 U	1.14 U	1.19 U	1.08 U	1.36 U	1.35 U	0.295 U	1.33 U	1.23 U	1.03 U
Heptachlor epoxide	0.766 U	2.34 U	2.23 U	2.19 U	2.71 U	2.26 U	1.28 U	1.05 U	1.18 U	2.68 U	2.23 U	2.79 U	2.35 U	2.29 U	2.38 U	2.16 U	2.72 U	2.7 U	0.591 U	2.67 U	2.46 U	2.05 U
Hexachlorobenzene	0.766 U	2.34 U	2.23 U	2.19 U	2.71 U	2.26 U	1.28 U	1.05 U	1.18 U	2.68 U	2.23 U	2.79 U	2.35 U	2.29 U	2.38 U	2.16 U	2.72 U	2.7 U	0.591 U	2.67 U	2.46 U	2.05 U
Methoxychlor	3.83 U	11.7 U	11.1 U	11 U	13.6 U	11.3 U	6.4 U	5.24 U	5.93 U	13.4 U	11.2 U	14 U	11.7 U	11.4 U	11.9 U	10.8 U	13.6 U	13.5 U	2.95 U	13.3 U	12.3 U	10.3 U
Oxychlordane	0.766 U	2.34 U	2.23 U	2.19 U	2.71 U	2.26 U	1.28 U	1.05 U	1.18 U	2.68 U	2.23 U	2.79 U	2.35 U	2.29 U	2.38 U	2.16 U	2.72 U	2.7 U	0.591 U	2.67 U	2.46 U	2.05 U
Toxaphene	19.2 U	58.6 U	55.9 U	55 U	68 U	56.7 U	32.1 U	26.3 U	29.8 U	67.4 U	56 U	70.1 U	58.9 U	57.5 U	59.6 U	54.1 U	68.3 U	67.8 U	14.8 U	67 U	61.8 U	51.5 U
trans-Chlordane	0.383 U	1.17 U	1.11 U	15 P	1.36 U	18.3 P	8.52 P	13.3 P	0.593 U	1.34 U	1.12 U	9.1 P	103 P	77.9 P	114 P	1.08 U	132 P	146 P	0.295 U	1.33 U	1.23 U	108 P
trans-Nonachlor	0.515	1.17 U	2.18	1.98	1.55	5.15 P	1.12	1.36 P	2.55	1.66	6.28 P	1.56	5.8	5.15 P	7.99 P	2.57	10.2 P	12.4 P	0.295 U	1.76	1.23 U	6.07
4,4'-DDD	0.857	1.17 U	1.8	1.74	1.39	9.39 P	1.19	1.18	1.72	1.44	3.32	1.4 U	8.15 P	2.25	5.27	1.64 I	3.22	5.56	0.295 U	1.51	1.23 U	6.62
4,4'-DDE	2.96	2.22	5.62	5.32	3.79	21.5	2.2	2.71	8.16	4.56 P	7.72	5.79 P	18.2	4.8	14.7	5.43	7.83	11.1	0.295 U	3.32	1.88	13.9
4,4'-DDT	1.24 IP	1.19 IP	4.15 IP	2.98 IP	2.03 IP	4.12 IP	1.92	2.57	14.4 P	1.69 IP	11.1	1.8 IP	10.9 IP	9.17 P	14.5	4.65 IP	17.9	20.3	0.295 U	2.54 I	1.57 I	11.5 IP
Total DDT	5.1	4.6	11.6	10.0	7.2	35.0	5.3	6.5	24.3	7.7	22.1	9.0	37.3	16.2	34.5	11.7	29.0	37.0	0.89 U	7.4	4.7	32.0

Total DDT calculated using the reporting limit (RL) for non-detects.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

U - Not detected at the laboratory RL.

Table 20 Sediment chemistry results - PCBs

Analyte	NHH-A-TOP 0 - 2.2′	NHH-B 0-4.2′	NHH-C-TOP 0 - 2.8′	NHH-C-BOTTOM 2.8 – 8.0′	NHH-D-TOP 0 – 4.8′	NHH-D-BOTTOM 4.8 – 10.3′	NHH-E-TOP 0 – 6.5′	NHH-E-BOTTOM 6.5 – 8.1′	NHH-F-TOP 0 – 3.2′	NHH-F-REP-TOP 0 – 3.2′	NHH-F-BOTTOM 3.2 – 10.5′	NHH-G-TOP 0 – 4.3′	NHH-G-BOTTOM 4.3 – 13.7′	NHH-H-TOP 0 – 5.4′	NHH-H-REP-TOP 0 – 5.4′	NHH-H-BOTTOM 5.4 – 7.7′	NHH-I-TOP 0 – 0.7′	NHH-I-BOTTOM 0.7′ – 2.5′	NHH-J 0 – 5.4′	NHH-K-TOP 0 – 5.5′	NHH-L 0 - 6.7′	NHH-M 0 - 6.8′
Polychlorinated Biphenyl Congeners (ug/kg)																						
PCB 8	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	1.05 U	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.553 J	0.686 U	0.961 U	1 U	1.2 U	1.03 U	1.03 U	0.838 J
PCB 18	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	0.955 J	2.27	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.17	0.847 J	0.686 U	0.961 U	1 U	1.41	1.03 U	1.03 U	1.13 J
PCB 28	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.29	1.78	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	0.862 J	0.972 J	0.686 U	0.961 U	1 U	2.04	1.03 U	1.03 U	0.865 J
PCB 44	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	2.6	4.46	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.92	2.1	0.686 U	0.961 U	1 U	3.54	0.675 J	1.03 U	1.95
PCB 49	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	2.31	5.33	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.45	2.15	0.686 U	0.961 U	1 U	2.45	1.03 U	1.03 U	1.57
PCB 52	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	3.16	5.05	1.97	2.89	1.02 U	1.1 U	0.993 U	2.56	3.1	0.686 U	0.961 U	1 U	4.93	0.783 J	1.03 U	2.55
PCB 66	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	2.55	4.15	1.95	2.22	1.02 U	1.1 U	0.993 U	1.47	2.32	0.686 U	0.961 U	1 U	3.31	0.815 J	1.03 U	1.86
PCB 87	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	0.683 J	1.05 U	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.636 J	0.686 U	0.961 U	1 U	2.04	1.03 U	1.03 U	1.28 U
PCB 101	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	3.78	6.87	2.88	3.33	2.06	2.6	0.993 U	2.73	3.45	0.686 U	0.961 U	1 U	5.33	1.03 U	1.03 U	3.05
PCB 105	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	0.878 J	1.57	1.23	1.02 U	1.1 U	0.993 U	1.02 U	0.979 U	0.686 U	0.961 U	1 U	6.57	1.03 U	1.03 U	1.28 U
PCB 118	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	3.8	5.16	3.06	3.44	3.8	1.1 U	0.993 U	2.58	2.65	0.686 U	0.961 U	1 U	5.51	1.4	0.621 J	2.68
PCB 128	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.26	1.08	0.889 J	1.13	1.02 U	1.1 U	0.993 U	1.02 U	0.614 J	0.686 U	0.961 U	1 U	1.26	1.03 U	1.03 U	0.658 J
PCB 138	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	3.72	4.85	4.13	5.06	2.95	3.4	0.993 U	3.14	3.97	0.686 U	0.961 U	1 U	6.85	1.6	1.03 U	3.46
PCB 153	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	3.85	6.28	3.58	3.91	2.87	3.04	0.993 U	3.43	3.97	0.686 U	0.961 U	1 U	5.68	1.52	1.03 U	3.27
PCB 170	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.06 J	1.72	0.979 J	1.33	0.605 J	1.1 U	0.993 U	0.994 J	1.13	0.686 U	0.961 U	1 U	2.07	1.03 U	1.03 U	0.755 J
PCB 180	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.81	2.78	1.74	2.24	2.2	2.73	0.993 U	1.53	2.19	0.686 U	0.961 U	1 U	3.46	0.865 J	1.03 U	1.72
PCB 183	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	0.714 J	1.03 J	1.2 U	0.758 J	0.692 J	0.809 J	0.993 U	0.526 J	0.632 J	0.686 U	0.961 U	1 U	1.09 J	1.03 U	1.03 U	1.28 U
PCB 184	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	1.05 U	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.979 U	0.686 U	0.961 U	1 U	1.2 U	1.03 U	1.03 U	1.28 U
PCB 187	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	2.51	3.36	1.92	2.29	1.78	1.83	0.993 U	2.15	2.57	0.686 U	0.961 U	1 U	3.29	0.648 J	1.03 U	1.43
PCB 195	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.07 U	0.693 J	1.2 U	1.13 U	1.02 U	1.1 U	0.993 U	1.02 U	0.979 U	0.686 U	0.961 U	1 U	1.2 U	1.03 U	1.03 U	1.28 U
PCB 206	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	1.18	1.44	1.2 U	0.988 J	2.28	1.86	0.993 U	0.582 J	0.942 J	0.686 U	0.961 U	1 U	1.78	1.03 U	0.945 J	0.67 J
PCB 209	0.806 U	0.681 U	0.658 U	0.757 U	0.794 U	0.692 U	0.755 J	1.16	1.2 U	0.845 J	3.23	1.7	0.993 U	1.02 U	0.548 J	0.686 U	0.961 U	1 U	1.06 J	1.03 U	0.76 J	0.753 J
Total PCBs	29.0 U	24.5 U	23.7 U	27.3 U	28.6 U	24.9 U	75.0	110	66.1	73.1	61.9	58.5	35.7 U	60.4	67.8	24.7 U	34.6 U	36 U	121	37.2	35.6	60.4

Analyte	NHH-N-TOP 0 – 6.0′	NHH-O-TOP 0 – 8.3′	NHH-P-TOP 0 – 5.8′	NHH-P-BOTTOM 5.8 – 12.3′	NHH-Q-TOP 0 – 5.3′	NHH-Q-BOTTOM 5.3 – 29.4′	NHH-R-TOP 0 – 4.2′	NHH-R-BOTTOM 4.2 – 7.7′	NHH-S-TOP 0 – 6.0′	NHH-T-TOP 0 – 4.8′	NHH-T-BOTTOM 4.8 – 16.3′	NHH-U-TOP 0 – 5.8′	NHH-U-BOTTOM 5.8 – 30.0′	NHH-V-TOP 0 – 4.8′	NHH-V-BOTTOM 4.8 – 8.6′	NHH-W-TOP 0 – 5.5′	NHH-X-TOP 0 – 5.2′	NHH-X-REP-TOP 0 – 5.2′	NHH-X-BOTTOM 5.2 – 8.0′	NHH-Y-TOP 0 – 5.9′	NHH-Z-TOP 0 – 5.0′	NHH-Z-BOTTOM 5.0 – 8.7′
Polychlorinated Biphenyl Congeners (ug/kg)																						
PCB 8	0.555 J	1.17 U	2.06	2.41	1.5	4.83	1.28 U	0.582 J	2.6	0.719 J	4.47	1.4 U	5.07	2.15	4.08	1.68	12	20	0.591 U	1.33 U	0.65 J	3.91
PCB 18	1.49	0.948 J	3.95	2.56	1.18 J	17.8	0.709 J	1.13	7.95	0.816 J	13.4	0.983 J	25.1	3.65	11.2	3.57	42.8	137	0.591 U	1.38	1.44	17.2
PCB 28	1.23	0.905 J	3.98	3.62	1.68	18.3	1.04 J	1.7	5.83	0.884 J	22.2	4.39	11.7	2.94	10.3	5.22	69.5	145	0.591 U	2.97	1.31	32.5
PCB 44	2.59	1.52	7.98	8.39	1.75	36.5	2	3.07	16.4	2.05	15	1.94	43.9	9.29	22	9.29	46.5	90	0.591 U	2.22	2.13	33.6
PCB 49	2.92	1.62	6.53	5.72	1.62	28.3	1.38	2.68	9.02	1.38	13.8	2	33.7	6.66	20.1	7.74	41.8	87.5	0.591 U	1.87	1.73	21
PCB 52	5.17	1.87	10.6	7.28	3.25	40.4	2.98	4.22	13.6	1.86	16.8	3.32	58.4	8.19	28.4	11.3	109	201	0.591 U	3.54	3.03	71.9
PCB 66	2.76	2.12	8.08	7.06	2.43	34.5	2.1	2.68	9.84	2.08	9.82	2.34	41.5	4.86	20.3	7.46	18.4	30.4	0.591 U	2.83	2.71	21.4
PCB 87	0.72 J	1.17 U	3.56	3.49	1.36 U	18.8	0.842 J	1.05 U	7.16	1.09 J	2.87	0.966 J	16.4	1.34	6.8	3.48	4.69	5.81	0.591 U	0.935 J	0.79 J	7.81
PCB 101	4.46	3.75	10.5	11.7	4.12	45.6	3.43	3.96	22.6	3.94	11.6	4.6	48.7	8.01	22.8	11.6	26.2	38.6	0.591 U	3.68	3.69	27.3
PCB 105	0.766 U	1.17 U	2.58	1.1 U	1.36 U	14.8	1.93	5.87	8.13	2.89	16.6	1.83	21	15	21.2	6.9	42.6	45.6	0.591 U	1.33 U	0.86 J	16.7
PCB 118	4.18	3.41	9.22	12.1	4.3	43.1	3	4.28	14.7	3.41	11.3	3.95	37.6	4.96	18.8	9.3	18.5	22.4	0.591 U	4.81	3.41	24.2
PCB 128	0.766	0.594 J	1.96	2.48	1.3 J	10.6	1.28 U	0.862 J	4.02	0.886 J	2.47	1.23 J	9.63	0.994 J	4.59	3.09	2.82	3.92	0.591 U	1.08 J	0.971 J	4.68
PCB 138	4.21	4.03	11.4	11.7	4.49	44.1	4.1	4.53	20.2	4.12	13.5	5.18	39.3	7.34	22.1	12.2	20.2	25.2	0.591 U	4.16	4.72	27.4
PCB 153	4.56	3.7	10.6	10.4	4.26	36.3	3.14	4.49	17.8	3.73	12.2	4.39	32.6	6.1	20.1	10.7	19.6	22.6	0.591 U	3.95	4.24	23.7
PCB 170	0.95	1.02 J	3.35	4.19	1.83	14.3	1.02 J	1.18	6.32	1.08 J	4.17	1.72	13	1.68	7.82	3.78	5.69	6.86	0.591 U	1.41	0.987 J	8.49
PCB 180	2.52	2	7.82	7.06	2.53	25.5	2.09	2.78	11.2	2.12	8.15	2.88	25.3	4.72	13.4	6.83	14.2	19.2	0.591 U	2.69	2.12	20.9
PCB 183	0.737 J	0.649 J	2.22	1.99	0.795 J	6.74	0.667 J	0.684 J	2.54	0.735 J	2.23	0.734 J	6.48	1.38	3.62	1.87	3.3	3.84	0.591 U	0.683 J	0.685 J	4.61
PCB 184	0.766 U	1.17 U	1.11 U	1.1 U	1.36 U	1.13 U	1.28 U	1.05 U	1.18 U	1.34 U	2.93	1.4 U	1.61	1.9	3.89	0.847 J	6.76	7.69	0.591 U	1.33 U	1.23 U	2.4
PCB 187	1.72	1.63	5.2	5.46	2.11	16.2	1.61	2.11	8.9	2.3	7.02	2.06	15.5	2.85	9.36	5.05	10.4	11.4	0.591 U	1.81	1.62	13.1
PCB 195	0.766 U	1.17 U	1.12	1.25	1.36 U	3.05	1.28 U	1.05 U	1.13 J	1.34 U	1.16	1.4 U	2.56	1.14 U	1.29	1.27	1.38	1.49	0.591 U	1.33 U	1.23 U	1.79
PCB 206	0.649 J	0.766 J	3.06	2.89	0.892 J	4.79	0.684 J	0.8 J	2.38	0.866 J	1.81	0.825 J	4.44	1.25	3.25	1.88	3.11	5.18	0.591 U	0.778 J	0.691 J	3.37
PCB 209	0.852	1.17 U	3.06	2.71	0.859 J	2.25	1.28 U	0.627 J	1.24	0.695 J	1.01 J	0.738 J	1.95	0.852 J	1.77	0.922 J	1.31 J	2.96	0.591 U	1.33 U	0.633 J	1.53
Total PCBs	80.4	65.9	213	209	82.4	826	69.9	91.8	350	71.6	345	90.4	875	172	486	224	928	1658	21.3 U	85.3	72.9	707

Total PCBs calculated as the sum of the 18 NOAA congeners multiplied by 2. Reporting limit (RL) used to represent non-detects in total summation..

J - Estimated value.

U - Not detected at the laboratory RL.

Table 21 10 day whole sediment bioassay findings

Americamysis bahia percent survival results

	Replicate Survival at the End of 10 Days Exposure (%)					Mean Survival (%)	Statistically Different from CLDS Reference[1]?
	A	B	C	D	E		
Lab Control	85%	90%	90%	100%	95%	92%	--
CLDS Reference	100%	100%	100%	90%	100%	98%	--
Composite 1	70%	85%	80%	95%	100%	86%	Yes
Composite 2	95%	100%	90%	95%	90%	94%	No
Composite 3	90%	75%	100%	95%	90%	90%	No
Composite 4	85%	95%	100%	100%	90%	94%	No
Composite 5	85%	95%	90%	100%	80%	90%	Yes
Composite 6	85%	75%	70%	50%	90%	74%	Yes [2]
Composite 7	90%	70%	90%	100%	100%	90%	No
Composite 8	100%	90%	90%	100%	100%	96%	No

L. plumulosus percent survival results

	Replicate Survival at the End of 10 Days Exposure (%)					Mean Survival (%)	Statistically Different from CLDS Reference[1]?
	A	B	C	D	E		
Lab Control	90%	95%	95%	95%	95%	94%	--
CLDS Reference	95%	100%	90%	90%	100%	95%	--
Composite 1	95%	100%	85%	100%	95%	95%	No
Composite 2	85%	100%	85%	90%	95%	91%	No
Composite 3	90%	85%	95%	95%	100%	93%	No
Composite 4	100%	100%	95%	95%	90%	96%	No
Composite 5	95%	90%	90%	100%	85%	92%	No
Composite 6	95%	80%	85%	90%	95%	89%	No
Composite 7	90%	100%	100%	90%	100%	96%	No
Composite 8	90%	75%	90%	90%	90%	87%	Yes

1 – Statistically significant difference (α=0.05) from CLDS Reference.

2 – Greater than a 20% difference in survival compared to CLDS Reference.

Table 22 Summary of laboratory control performance and assay acceptability criteria – 10-day whole sediment

Endpoint / Measurement		Protocol Criteria	Unit	*A. bahia*	*L. plumulosus*
Mean Survival			%	92%	94%
		Laboratory Control ≥ 90%	Protocol Met	Yes	Yes
Salinity	Minimum:	*A. bahia* - 28ppt	ppt	29.0	18.8
		L. plumulosus - 18ppt	Protocol Met	Yes	Yes
	Maximum:	*A. bahia* - 32ppt	ppt	31.8	22.3 [a]
		L. plumulosus - 22ppt	Protocol Met	Yes	Yes
Temperature		Mean: 20±1°C	Daily / Hourly °C	20.5 / 20.8	20.6 / 20.8
		Minimum: 17°C	Daily / Hourly °C	19.5 / 19.6	19.7 / 19.6
		Maximum: 23°C	Daily / Hourly °C	22.1 / 29.6 [b]	22.2 / 29.6 [b]
			Protocol Met	Yes / No [b]	Yes / No [b]

[a] The value meets the protocol requirement when rounded to the whole number precision reflected in the method, therefore is not considered a protocol deviation.
[b] Refer to Section 3.1.3.1 for a discussion of the deviation.

Table 23 Elutriate chemistry results

Analyte	CLDS Ref		Composite 1		Composite 2		Composite 3		Composite 4		Composite 5		Composite 6		Composite 7		Composite 8	
Total Metals (mg/L)																		
Arsenic, Total	0.0014		0.0194		0.0304		0.0198		0.0425		0.0441		0.026		0.0125		0.0164	
Cadmium, Total	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Chromium, Total	0.001	U	0.001	U	0.0014		0.001	U	0.0017		0.0014		0.002		0.0013		0.0011	
Copper, Total	0.0008		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0005	U
Hexavalent Chromium	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U	0.005	U
Lead, Total	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Mercury, Total	0.00001	U	0.00001	U	0.00001	U	0.00001	U	0.00001	U	0.00001	U	0.00001	U	0.00001	U	0.00001	U
Nickel, Total	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.001	U	0.0016		0.0013	
Selenium, Total	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Silver, Total	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U	0.0002	U
Zinc, Total	0.0044		0.0039		0.0104		0.0050		0.0091		0.0052		0.006		0.0076		0.0093	
Organochlorine Pesticides (ug/L)																		
Aldrin	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
alpha-BHC	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.0031		0.002	U
alpha-Chlordane	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
beta-BHC	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Chlorpyrifos	0.002	U	0.002	U	0.002	U	0.0034	T	0.002	U	0.0024	T	0.002	U	0.002	U	0.002	U
cis-Nonachlor	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.0030	T	0.002	U
delta-BHC	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Dieldrin	0.004	U	0.004	U	0.004	U	0.0054	T	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Endosulfan I	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Endosulfan Ii	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Endosulfan Sulfate	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Endrin	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Endrin Aldehyde	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.009	T	0.004	U	0.004	U
Endrin Ketone	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.009	T	0.004	U	0.004	U
gamma-BHC (Lindane)	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.0023	T	0.002	U
gamma-Chlordane	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.0038	T	0.002	U
Heptachlor	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Heptachlor Epoxide	0.004	T	0.002	U	0.002	U	0.0024	T	0.002	U	0.002	U	0.002	U	0.0037		0.0036	T
Hexachlorobenzene	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Methoxychlor	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U	0.02	U
Oxychlordane	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
Toxaphene	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U	0.1	U
trans-Nonachlor	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U	0.002	U
4,4-DDD	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
4,4-DDE	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.0058	T	0.004	U
4,4-DDT	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U	0.004	U
Total DDT	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.012	U	0.0138		0.012	U
Pentachlorophenol (ug/L)																		
Pentachlorophenol	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U
Polychlorinated Biphenyl Congeners (ug/L)																		
PCB 8	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0016		0.0101		0.0011	U
PCB 18	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0071		0.0073		0.0010	J
PCB 28	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0143		0.0253		0.0014	
PCB 44	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0010	J	0.014		0.0217		0.00091	J
PCB 49	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0010	J	0.016		0.023		0.0011	
PCB 52	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	J	0.0014		0.024		0.0413		0.0018	
PCB 66	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.015		0.0223		0.0010	J
PCB 77	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0014	J	0.0020		0.0011	U
PCB 87	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0088		0.0101		0.0011	U
PCB 101	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.00104	J	0.0012		0.028		0.0303		0.0016	
PCB 105	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0067		0.0064		0.0011	U
PCB 118	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0010	J	0.0011	U	0.015		0.0193		0.0011	
PCB 126	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U
PCB 128	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0034		0.0033		0.0011	U
PCB 138	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	J	0.0010	J	0.0227		0.0207		0.0011	J
PCB 153	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0012		0.0010	J	0.0227		0.021		0.0012	J
PCB 170	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0072		0.0061		0.0011	U
PCB 180	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0010	J	0.0011	U	0.0126		0.012		0.0010	J
PCB 183	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0045		0.0041		0.0011	U
PCB 184	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U
PCB 187	0.0013		0.0011	U	0.0011	U	0.0011	U	0.0010	J	0.0011	U	0.0094		0.0079		0.0011	U
PCB 195	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0013		0.0010	J	0.0011	U
PCB 206	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0019		0.0016		0.0011	U
PCB 209	0.001	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0011	U	0.0016		0.0013		0.0011	U
Total PCBs	0.042		0.044	U	0.044	U	0.044	U	0.0435	J	0.0442	J	0.4218	J	0.5241	J	0.0463	J

Results presented are the mean of three replicate samples.
Reporting limit (RL) used to represent non-detects in calculation of replicate means and summations for Total DDX and Total PCBs.
Total PCBs calculated as the sum of the 18 NOAA congeners multiplied by 2.
J – Estimated value.
U – Not detected above the laboratory RL.
T – Compound identification is tentative.

Table 24 SPP bioassay findings

	A. bahia	*M. beryllina*	*A. punctulata*	
	LC50 (%)	LC50 (%)	LC50 (%)	EC50 (%)
Composite 1	>100%	>100%	>100%	>100%
Composite 2	>100%	>100%	21%	4%
Composite 3	>100%	>100%	18%	17%
Composite 4	>100%	>100%	18%	15%
Composite 5	>100%	78%	23%	3%
Composite 6	68%	46%	9%	4%
Composite 7	65%	48%	35%	1%
Composite 8	84%	72%	35%	3%

Notes:

Americamysis bahia – survival endpoint

Menidia beryllina – survival endpoint

Arbacia punctulata – survival and development endpoints

Table 25 28 day bioaccumulation bioassay findings

M. nasuta percent survival results

	Replicate Survival at the End of 28 Days Exposure (%)					Mean Survival (%)	Statistically Different from CLDS Reference[1]?
	A	B	C	D	E		
Lab Control	97%	97%	100%	97%	97%	97%	--
CLDS Reference	100%	97%	100%	100%	100%	99%	--
Composite 1	100%	97%	93%	100%	97%	97%	No
Composite 2	97%	97%	100%	97%	100%	98%	No
Composite 3	97%	100%	100%	97%	97%	98%	No
Composite 4	100%	100%	100%	93%	100%	99%	No
Composite 5	97%	100%	100%	100%	93%	98%	No
Composite 6	93%	100%	100%	100%	100%	99%	No
Composite 7	97%	100%	100%	97%	100%	99%	No
Composite 8	100%	93%	97%	97%	93%	96%	Yes

N. virens percent survival results

	Replicate Survival at the End of 28 Days Exposure (%)					Mean Survival (%)	Statistically Different from CLDS Reference[1]?
	A	B	C	D	E		
Lab Control	90%	95%	95%	85%	95%	92%	--
CLDS Reference	95%	95%	100%	95%	100%	97%	--
Composite 1	100%	85%	100%	100%	95%	96%	No
Composite 2	100%	100%	95%	95%	100%	98%	No
Composite 3	95%	100%	95%	100%	100%	98%	No
Composite 4	85%	100%	95%	95%	100%	95%	No
Composite 5	100%	95%	90%	95%	100%	96%	No
Composite 6	95%	95%	90%	90%	95%	93%	Yes
Composite 7	95%	95%	100%	100%	95%	97%	No
Composite 8	95%	100%	100%	95%	95%	97%	No

1 – Statistically significant difference (α=0.05) from CLDS Reference.
No composites showed a greater than 10% difference from the CLDS Reference.

Table 26 Summary of laboratory control performance and assay acceptability criteria – 28-day bioaccumulation bioassay

Endpoint/ Measurement	Protocol Criteria	Unit	*M. nasuta*	*N. virens*
Mean Survival	Laboratory control >90%	%	97%	92%
		Protocol Met	Yes	Yes
Tissue Mass	Sufficient for analysis	Protocol Met	Yes	Yes
Salinity	Minimum: 28ppt	ppt	28.1	28.4
		Protocol Met	Yes	Yes
	Maximum:32ppt	ppt	30.4	30.3
		Protocol Met	Yes	Yes
Temperature	Mean: 12-16°C	Daily/Hourly	12.5 / 12.7	12.4 / 12.7 [a]
	Minimum: 9°C	Daily/Hourly	11.9 / 12.2	11.8 / 12.2 [a]
	Maximum: 15°C	Daily/Hourly	12.8 / 14.1	12.6 / 14.1 [a]
		Protocol Met	Yes	Yes

[a] The *M. nasuta* and *N. virens* assays did not run concurrently, the *M. nasuta* assay started and ended 2 days earlier than the *N. virens* assay. However, the shared hourly temperature logger was removed from the temperature-controlled room at the end of the *M. nasuta* assay, two days before the end of the *N. virens* assay, therefore these measurements were not collected. The values reported for *N. virens* are the same as for *M. nasuta*. See Section 3.3.1.1 for a discussion of the protocol deviation.

Table 27 Mean wet weight chemical concentrations and statistical findings for *M.nasuta* tissue

Analyte	CLDS Ref Site		Composite 1		Composite 2		Composite 3		Composite 4		Composite 5		Composite 6		Composite 7		Composite 8	
Total Metals (mg/kg)																		
Arsenic, total	3.2		2.43	NS	2.07	NS	2.15	NS	2.4	NS	2.18	NS	1.65	NS	2.3	NS	2.33	NS
Cadmium, total	0.028	b	0.02	bNS	0.023	bNS	0.025	bNS	0.045	bS	0.037	bNS	0.063	S	0.045	bS	0.042	bNS
Chromium, total	0.245	b	0.146	bNS	0.228	bNS	0.227	bNS	0.416	bNS	0.263	bNS	0.715	S	0.494	bS	0.534	bS
Copper, total	1.87		1.28	NS	1.66	NS	1.48	NS	2.46	NS	3.87	NS	2.99	S	2.62	NS	2.54	S
Lead, total	0.348		0.192	NS	0.3	NS	0.285	NS	0.589	S	0.389	NS	0.824	S	0.701	S	0.683	S
Mercury, total	0.004	ab	0.004	aNS	0.004	abNS	0.004	abNS	0.005	abNS	0.004	aNS	0.004	aNS	0.004	abNS	0.004	abNS
Nickel, total	0.387		0.227	NS	0.278	NS	0.256	NS	0.352	NS	0.333	NS	0.408	NS	0.365	NS	0.392	NS
Zinc, total	11.19		8.39	NS	7.43	NS	8.22	NS	12.23	NS	10.97	NS	12.74	NS	10.59	NS	11.17	NS
Polycyclic Aromatic Hydrocarbons (ug/kg)																		
Naphthalene	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.5	ac	9.09	ac	8.92	ac	8.97	ac
Acenaphthylene	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.5	ac	9.09	ac	8.92	ac	8.97	ac
Acenaphthene	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.5	ac	9.5	abc	9.56	abc	8.97	ac
Fluorene	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.5	ac	9.09	ac	8.92	ac	8.97	ac
Phenanthrene	9.3	ab	8.99	aNS	9.97	abNS	9.26	aNS	9.99	abNS	10.15	abNS	20.06	bS	16.32	bS	22.18	S
Anthracene	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.5	ac	9.09	ac	8.92	ac	8.97	ac
Fluoranthene	10.14	ab	8.99	aNS	23.5	bNS/S *	11.76	abNS	56.32	S	41.64	S	76.46	S	69.36	S	92.3	S
Pyrene	10.34	ab	8.99	aNS	23.76	S	11.24	abNS	63.24	S	37.5	S	65	S	57.94	S	74	S
Benzo(a)anthracene	11.22	a	8.99	aNS	13.26	abNS	11.24	abNS	36.28	S	24.9	S	39.8	S	36.3	S	38.66	S
Chrysene	9.15	a	8.99	ac	10.8	abc	9.26	ac	28.9	bc	18	bc	34.24	c	28.64	c	28.36	c
Benzo(b)fluoranthene	9.76	ab	8.99	aNS	10.43	abNS	9.26	aNS	24.82	bS	15	bS	25.66	S	23.38	bS	21.76	bS
Benzo(k)fluoranthene	9.15	a	8.99	ac	9.19	abc	9.26	ac	14.82	bc	8.83	abc	12.03	bc	10.34	abc	10.95	bc
Benzo(a)pyrene	9.15	a	8.99	ac	9.28	abc	9.26	ac	16.16	abc	8.91	abc	14.94	bc	12.07	abc	11.22	bc
Indeno(1,2,3-c,d)pyrene	9.15	a	8.99	ac	18.28	bc	15.5	abc	21.88	c	18.9	c	10.38	abc	10.9	ac	15.24	ac
Dibenz(a,h)anthracene	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.5	ac	9.09	ac	8.92	ac	8.97	ac
Benzo(g,h,i)perylene	9.15	a	8.99	ac	9.11	ac	9.26	ac	9.5	abc	8.5	ac	9.54	abc	8.99	abc	8.97	ac
Total LMW PAHs [1]	55.1		53.9		55.5		55.6		54.9		52.7		65.9		61.6		67.0	
Total HMW PAHs [1]	96.4		89.9		136.7		105.3		280.9		190.7		297.1		266.8		310.4	
Total PAHs [1]	151.4		143.8		192.2		160.9		335.9		243.3		363.1		328.4		377.5	
Organochlorine Pesticides (ug/kg																		
Aldrin	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
cis-Chlordane	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.609	ac	0.624	ac	0.475	ac
trans-Chlordane	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
cis-Nonachlor	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
trans-Nonachlor	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.535	ac	0.75	ac	1.082	ac
Oxychlordane	0.915	a	0.899	ac	0.911	ac	0.926	ac	0.899	ac	0.85	ac	0.909	ac	0.892	ac	0.897	ac
Total Chlordanes [1]	2.75		2.7		2.73		2.78		2.7		2.55		2.96		3.16		3.35	
4,4'-DDT	0.458	a	0.449	ac	0.632	ac	0.463	ac	0.449	ac	0.425	ac	0.876	c	0.911	c	0.903	ac
4,4'-DDD	0.458	a	0.449	ac	0.758	ac	0.463	ac	0.449	ac	0.425	ac	0.485	ac	0.459	ac	1.204	ac
4,4'-DDE	0.466	a	0.449	aNS	0.864	aNS	0.519	aNS	0.538	aNS	0.782	S	1.546	S	1.294	S	1.033	S
Total DDT [1]	1.38		1.35		2.25		1.45		1.44		1.63		2.91		2.66		3.14	
Dieldrin	0.458	a	0.449	ac	0.618	ac	0.463	ac	0.449	ac	0.425	ac	0.714	c	0.629	ac	0.503	c
alpha-Endosulfan	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
beta-Endosulfan	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.843	ac	1.28	ac	0.639	ac
Total Endosulfans [1]	0.916		0.898		0.91		0.926		0.898		0.85		1.3		1.73		1.09	
Endrin	2.163		1.963	NS	1.069	NS	5.331	aNS	2.816	aNS	0.708	NS	0.958	NS	3.602	NS	5.722	NS
Heptachlor	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
Heptachlor epoxide	0.915	a	0.899	ac	0.911	ac	0.926	ac	0.899	ac	0.85	ac	0.909	ac	0.892	ac	0.897	ac
Hexachlorobenzene	0.915	a	0.899	ac	0.911	ac	0.926	ac	0.899	ac	0.85	ac	0.909	ac	0.892	ac	0.897	ac
Lindane	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
Methoxychlor	4.576	a	4.494	ac	4.552	ac	4.628	ac	4.494	ac	4.252	ac	4.544	ac	4.46	ac	4.488	ac
Toxaphene	22.96	a	22.54	ac	22.84		23.22	ac	22.54	ac	21.36	ac	22.8	ac	22.4	ac	22.52	ac
Polychlorinated Biphenyl Congeners (ug/kg)																		
PCB 8	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	1.26	ac	0.9	ac
PCB 18	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 28	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 44	0.92	a	0.9	ac	1.26	ac	2.16	c	2.41	ac	2.67	c	2.39	c	2.19	bc	2.02	abc
PCB 52	0.92	a	0.9	ac	0.98	abc	0.93	ac	0.91	abc	1.23	bc	2.69	c	2.95	c	2.61	c
PCB 66	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	abc	0.91	abc	1.44	bc	1.27	bc	0.94	abc
PCB 101	0.92	a	0.9	ac	1.84	abc	1.94	bc	2.68	c	2.75	c	3.22	c	2.3	bc	2.04	ac
PCB 105	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	1.22	abc	0.89	ac	0.9	ac
PCB 118	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.95	abc	0.85	ac	1.26	bc	0.97	abc	0.9	ac
PCB 128	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 138	0.92	a	0.9	ac	0.91	ac	0.93	ac	1.03	abc	1.05	abc	1.76	bc	1.24	bc	1.17	abc
PCB 153	0.92	a	0.9	ac	0.91	ac	0.93	ac	1.04	abc	1.05	abc	1.42	bc	1.21	abc	1.06	abc
PCB 170	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 180	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 187	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 195	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 206	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
PCB 209	0.92	a	0.9	ac	0.91	ac	0.93	ac	0.9	ac	0.85	ac	0.91	ac	0.89	ac	0.9	ac
Total PCBs [1]	33.1		32.4		35.5		38		39.6		39.7		49		44.6		41.3	

Results presented are the mean of five replicate samples.
1 - Totals calculated for informational purposes only. Statistical analysis not conducted on total values and qualifiers not applied.
Statistical qualifiers -
a - Analyte not detected (below MDL) in at least one replicate; mean value was calculated using the project specific MDL for non-detected values.
b - Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c - Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS - Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S - Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05
NS/S indicates that a statistical outlier was detected and the findings of significance were different with and without the statistical outlier included in the analysis.

Table 28 Mean wet weight chemical concentrations and statistical findings for *N. virens* tissue

Analyte	CLDS Ref Site		Composite 1		Composite 2		Composite 3		Composite 4		Composite 5		Composite 6		Composite 7		Composite 8	
Total Metals (mg/kg)																		
Arsenic, total	2.06		2.17	NS	2.3	NS	2.14	NS	2.07	NS	2.23	NS	2.04	NS	2.14	NS	2.32	NS
Cadmium, total	0.034	b	0.039	bNS	0.044	bNS	0.035	bNS	0.04	bNS	0.038	bNS	0.036	bNS	0.038	bNS	0.041	bNS
Chromium, total	0.057	b	0.055	bNS	0.046	abNS	0.047	abNS	0.047	abNS	0.041	abNS	0.08	bNS	0.042	abNS	0.039	abNS
Copper, total	1.02		0.85	NS	1.09	NS	0.96	NS	1.24	S	0.89	NS	1.05	NS	0.94	NS	0.82	NS
Lead, total	0.127		0.098	NS	0.138	NS	0.102	NS	0.124	NS	0.138	NS	0.095	NS	0.116	NS	0.141	NS
Mercury, total	0.01	b	0.011	bNS	0.008	bNS	0.011	bNS	0.012	bNS	0.007	bNS	0.011	bNS	0.012	bNS	0.007	bNS
Nickel, total	0.111	b	0.085	bNS	0.081	bNS	0.093	bNS	0.081	bNS	0.072	bNS	0.115	bNS	0.105	bNS	0.106	bNS
Zinc, total	6.06		6.43	NS	6.68	S	6.64	S	6.72	S	6.25	NS	6.76	S	9.05	S	6.53	NS
Polycyclic Aromatic Hydrocarbons (ug/kg)																		
Naphthalene	4.73	ab	5.06	abNS	9.16	aS	9.39	aS	9.08	aS	9.29	aS	9.47	aS	9.2	aS	8.93	aS
Acenaphthylene	11.94	a	4.84	abNS	9.16	aNS/S	9.39	aNS/S	9.08	aNS/S	9.29	aNS/S	9.47	aNS/S	9.2	aNS/S	8.93	aNS/S a
Acenaphthene	7.26	ab	7.89	abNS	9.16	aNS/S	9.39	aNS/S	9.08	aNS/S	9.29	aNS/S	9.96	abNS/S	11.06	abNS/S	13.32	bS
Fluorene	4.58	a	7.06	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Phenanthrene	5.89	ab	10.5	abNS	9.16	aS	9.39	aS	9.08	aS	9.29	aS	9.47	aS	9.2	aS	8.93	aS
Anthracene	4.58	a	4.77	abc	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Fluoranthene	4.58	a	4.89	abc	9.49	abc	9.39	ac	13	abc	10.74	abc	16.96	bc	21.68	bc	33.5	c
Pyrene	4.58	a	4.73	ac	9.28	abc	9.39	ac	14.18	abc	10.23	abc	13.09	abc	15.62	bc	24.22	bc
Benzo(a)anthracene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Chrysene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Benzo(b)fluoranthene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Benzo(k)fluoranthene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Benzo(a)pyrene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Indeno(1,2,3-c,d)pyrene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Dibenz(a,h)anthracene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Benzo(g,h,i)perylene	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.2	ac	8.93	ac
Total LMW PAHs [1]	39.0		40.1		55.0		56.3		54.5		55.7		57.3		57.1		58.0	
Total HMW PAHs [1]	45.8		47.5		92.1		93.9		99.8		95.3		105.8		110.9		129.2	
Total PAHs [1]	84.8		87.6		147		150.2		154.3		151		163.1		168		187.1	
Organochlorine Pesticides (ug/kg																		
Aldrin	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
cis-Chlordane	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
trans-Chlordane	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
cis-Nonachlor	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
trans-Nonachlor	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
Oxychlordane	0.917	a	0.947	ac	0.916	ac	0.939	ac	0.908	ac	0.929	ac	0.947	ac	0.92	ac	0.893	ac
Total Chlordanes [1]	2.75		2.84		2.75		2.82		2.72		2.79		2.84		2.76		2.68	
4,4'-DDT	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
4,4'-DDD	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
4,4'-DDE	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
Total DDT [1]	1.37		1.42		1.37		1.41		1.36		1.39		1.42		1.38		1.34	
Dieldrin	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
alpha-Endosulfan	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
beta-Endosulfan	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
Total Endosulfans [1]	0.916		0.946		0.916		0.938		0.908		0.928		0.948		0.92		0.894	
Endrin	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
Heptachlor	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
Heptachlor epoxide	0.917	a	0.947	ac	0.916	ac	0.939	ac	0.908	ac	0.929	ac	0.947	ac	0.92	ac	0.893	ac
Hexachlorobenzene	0.917	a	0.947	ac	0.916	ac	0.939	ac	0.908	ac	0.929	ac	0.947	ac	0.92	ac	0.893	ac
Lindane	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.46	ac	0.447	ac
Methoxychlor	4.584	a	4.73	ac	4.58	ac	4.692	ac	4.538	ac	4.644	ac	4.738	ac	4.604	ac	4.468	ac
Toxaphene	23.02	a	23.74	ac	23	ac	23.54	ac	22.78	ac	23.3	ac	23.78	ac	23.12	ac	22.42	ac
Polychlorinated Biphenyl Congeners (ug/kg)																		
PCB 8	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 18	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 28	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 44	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 52	0.46	a	0.47	ac	0.92	abc	0.94	ac	0.91	ac	0.93	ac	2.05	bc	2.18	ac	1.58	ac
PCB 66	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 101	0.46	a	0.54	abc	0.95	abc	0.94	abc	0.91	ac	0.93	ac	1.31	abc	0.92	ac	0.89	ac
PCB 105	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 118	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 128	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 138	0.61	ab	0.76	bNS	0.92	aS	0.95	abS	0.99	abS	0.93	abS	1.38	abS	1.43	bS	1.36	abS
PCB 153	0.87	b	1.16	bNS	0.97	abNS	1.09	abNS	1.18	abNS	1.18	abNS	2.07	bS	2.19	S	1.73	bS
PCB 170	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 180	0.46	a	0.56	abc	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 187	0.46	a	0.53	abc	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 195	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 206	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 209	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
Total PCBs [1]	17.7		19.3		33.3		34.2		33.5		34		40.2		39.2		36	

Results presented are the mean of five replicate samples.
1 - Totals calculated for informational purposes only. Statistical analysis not conducted on total values and qualifiers not applied.
Statistical qualifiers -
a - Analyte not detected (below MDL) in at least one replicate; mean value was calculated using the project specific MDL for non-detected values.
b - Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c - Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS - Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S - Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05
NS/S indicates that a statistical outlier was detected and the findings of significance were different with and without the statistical outlier included in the analysis.

4. Chemical analyses QA/QC

This section provides quality control information and documents the overall quality of the analytical data upon which the project conclusions are drawn. Project QA/QC information (e.g., laboratory control survival, reference toxicant results) for the biological testing program are discussed in Sections 2 and 3.

The chemical data collected during the investigation were of sufficient quality and sensitivity to meet the project objectives. The majority of the QC results associated with the analytical parameters met the measurement objectives presented in Section 5 and 10 of the work plan (AECOM, 2017a). Specific nonconformances with those measurement objectives are presented in the laboratory report narrative, RIM Checklist and validation memo associated with each laboratory report. A full set of QC sample findings (method blanks, duplicate precision results, laboratory control sample results, and matrix spike results) is provided in Appendix D, Chemistry Laboratory Data.

4.1 Analytical sensitivity

The sensitivity of program chemical measurements can sometimes dictate the ultimate usefulness of the final data. Results that are insufficiently sensitive to detect changes can limit the final project conclusions. The New Haven project required RLs were specified in the agency approved work plan (AECOM, 2017a) to detect sedimentary contaminant considerations, ambient seawater and elutriate concentrations, and bioaccumulative tissue concerns.

The work plan prepared by AECOM (AECOM, 2017a) summarized the laboratory RLs and project required RLs. Nondetect chemistry results were reported at laboratory RLs since they provide greater confidence. The majority of the RLs for all sample matrices met the QAPP specifications. Some deviations from work plan-specified (AECOM, 2017a) limits occurred in the sediment matrix but these deviations were very minor. The RL for sedimentary PAH compounds was typically 0.03 milligrams per kilogram (mg/kg) versus the specified 0.01 mg/kg; the RL for pesticides and PCB congeners was typically 0.002 versus 0.001 mg/kg. Overall, these small deviations in the sediment sample set are not considered to affect the project data quality.

4.2 Contamination concerns

Sample contamination can sometimes affect sample results, particularly when measuring chemical parameters at very low concentrations. In this study, potential contamination has been monitored using equipment blank QC samples. In this study, a few target analytes were detected in the equipment blanks associated with the coring equipment and the grab sampler, but at very low levels and are not considered to have an impact on sample results.

4.3 Data precision

Analytical precision was measured at the laboratory level using laboratory control sample (LCS) duplicates or matrix spike duplicates.

Sediment measurement precision

Sediment analysis precision was evaluated using matrix spike duplicates and LCS duplicates. Precision relative percent difference (RPD) objectives for this project ranged from 20 for metal parameters to 30 for trace organic parameters. RPD criteria were not met for individual organic parameters and metals in matrix spike duplicates but this may be attributed to sample homogeneity.

Elutriate and ambient seawater measurement precision

Elutriate and ambient seawater analysis precision was evaluated using matrix duplicates, matrix spike duplicates, and Laboratory Control Sample (LCS) duplicates. RPD objectives for this project were equivalent to the sediment objectives (20 percent for metals, 30 percent for trace organic compounds). The RPD criteria were met for all elutriate parameters with the exception of Aldrin in the Composite 7 elutriate where the RPD was reported as 34%; this deviation should not impact data usability.

Tissue measurement precision

Tissue analysis precision was evaluated using matrix spike and LCS duplicates. The tissue RPD objectives for this project were also 20 percent for metals and 30 percent for trace organic compounds. The RPD criteria were not met for all target analytes but this may be the result of sample homogeneity. These variances are not considered to adversely affect the tissue dataset.

4.4 Data accuracy

Accuracy was evaluated using several QC sample types by calculating the percent recovered for each parameter of interest. A recovery value of 100% corresponds to 100% accuracy in this analysis. LCS and matrix spiked samples were incorporated as accuracy QC samples. Additionally, surrogate spikes were used to evaluate the accuracy of organic measurements and certified reference materials (CRMs) were included where available.

4.4.1 Sediment analysis accuracy

Percent recovery objectives for sediment measurements were met with few exceptions. Results for individual target analytes exceeded control limits in some matrix spikes; this is generally indicative of a sample specific matrix interference. Also, Trans Nonachlor measured in a sediment CRM was outside of the certified range. None of the exceedances are considered to negatively impact data usability.

4.4.2 Elutriate and ambient seawater analysis accuracy

The hexavalent chromium method blank result associated with analytical batch 444W was flagged as high in the QC summary report. However, it appears the result for this blank was a value between the MDL and RL and should not have a significant impact on the usability of data for associated samples. Percent recovery objectives for the aqueous project samples were all within laboratory specified accuracy limits.

4.4.3 Tissue analysis accuracy

LCSs, matrix spikes, and SRMs were used to assess the accuracy of the tissue chemical measurements. The SRMs represent an excellent measure of overall analytical accuracy For pesticides, cis-Chlordane was measured slightly below the certified range in one SRM analysis. For the PCB Congener analysis elevated recoveries were reported for Cl3-BZ#28.

Matrix spike recovery measurements were largely within work plan specified limits. Selected compounds were biased low and within 30 percent of the target QC accuracy range. A detailed discussion of these results can be found in the individual data validation memos.

5. References

AECOM, 2017a. Sampling and Analysis Plan. Laboratory Testing in Support of Environmental Assessment. Sampling and Environmental Testing. New Haven Harbor Federal Navigation Project, New Haven, Connecticut. August 2017.

AECOM. 2017b. Field Report for Dredged Material Suitability Testing and Evaluation in the New Haven Harbor FNP. September 2017.

Chang-Hoon Lee, Chan-Gyoung Sung, Seong-Dae Moon and Jong-Hyeon Lee. 2013. Effects of Ammonia on Fertilization, Development, and Larval Survival in the Northern Pacific Asteroid, *Asterias amurensis* (Sea urchin). Bulletin of Environmental Contamination and Toxicology. 91:102-106.

EPA. 1989. Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989. EPA 440/5-88-004. April 1989.

EPA 2002. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012.

Maguire Group, Inc. 2003. Laboratory Testing in Support of Site Specific Water Quality Criteria Assessment and Hydrographic Data Collection for New Bedford Harbor. Toxicity Identification Evaluation Testing with Mysids and Sea Urchins.

Appendix A Work Plan

USACE CONTRACT NO. W912WJ-17-D-0003
Delivery Order No.:W912WJ17F0036

Laboratory Testing in Support of Environmental Assessment

Sampling and Environmental Testing
New Haven Harbor Federal Navigation Project
New Haven, Connecticut

Prepared for

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

Prepared by
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Laboratory Testing in Support of Environmental Assessment

Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut

COMMITMENT TO IMPLEMENT THE ABOVE SAMPLING AND ANALYSIS PLAN

Ryan McCarthy, AECOM Task Order Manager	Date
Debra Simmons, AECOM QA Officer	Date
Ken Simon, Bioassay Laboratory Manager	Date
Elizabeth Porta Chemistry/Physical Lab Manager	Date
Ken Cadmus Field Services Manager	Date

Sampling and Analysis Plan

Sampling & Environmental Testing – New Haven Harbor FNP
New Haven, Connecticut

Revision: 0
Date: August 2017

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Attachments

Accident Prevention Plan (provided separately)
Coring Log
Daily Activity Logs
COC Form
Sample receipt condition verification forms

Appendices

Field Standard Operating Procedures
- NHH-G-01 Field Records
- NHH-G-02 Navigation
- NHH-G-03 Decontamination Procedures
- NHH-G-04 Custody
- NHH-G-05 Packaging/ Shipping
- NHH-S-01 Grab Sampling
- NHH-S-02 Vibracoring
- NHH-S-03 Sediment Core Processing
- NHH-W-01 Water Quality Data and Water Collection

RIM QC Summary Tables

Acronyms

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
ASTM	American Society for Testing and Materials
AWQC	Ambient Water Quality Criteria
BrCl	Bromium Monochloride
NAE	U.S. Army Corps of Engineers, New England District
CFR	Code of Federal Regulations
CLDS	Central Long Island Sound Disposal Site
COC	Chain of Custody
CWA	Clean Water Act
CVAA	Cold Vapor Atomic Absorption
CVAF	Cold Vapor Atomic Fluorescence
DGPS	Differential Global Positioning System
DIW	Deionized Water
DM	Dredged Material
DQO	Data quality objective
EDD	Electronic Data Deliverable
EM	Engineer Manual
EPA	Environmental Protection Agency
FDA	U.S. Food and Drug Administration
FNP	Federal Navigation Project
GC/ECD	Gas chromatography/electron capture detector
GC/MS	Gas chromatography/mass spectrometry
GPS	Global Positioning System
HASP	Health and Safety Plan
HCl	Hydrochloric Acid
HDPE	High density polyethylene
ICP	Inductively Coupled Plasma
ICP/MS	Inductively Coupled Plasma Mass Spectrometry
ICP/OES	Inductively Coupled Plasma/Optical Emission Spectrometry
ID	Identification
IDW	Investigation-Derived Waste
LIMS	Laboratory information management system
LPC	Limited Permissible Concentration
LQAP	Laboratory Quality Assurance Plan
MDL	Method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MLLW	Mean Lower Low Water
mL	milliliters
mm	millimeter
MPRSA	Marine Protection, Research, and Sanctuaries Act
MQO	Measurement quality objectives
NHH	New Haven Harbor

NMFS	National Marine Fisheries Service (NOAA)
ng/g	nanograms per gram
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
RIM	Regional Implementation Manual
RL	Reporting Limit
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SOW	Statement or Scope of Work
SPP	Suspended Particulate Phase
SSO	Site Safety Officer
TAT	Turnaround Time
TM	Technical Manager
USACE	U.S. Army Corps of Engineers
µm	micrometer
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter

This Sampling and Analysis Plan (SAP) has been prepared by AECOM for the United States Army Corps of Engineers, New England District (NAE) to support NAE's harbor maintenance program at New Haven Harbor, New Haven, Connecticut. This SAP has been prepared in accordance with Engineering Manual 200-1-3 *Requirements for the Preparation of Sampling and Analysis Plans.*

Field Sampling Plan

Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut

A.0 Field Sampling Plan (FSP)

A.1 Project Background

In its mission to provide safe and reliable navigation channels, the U.S. Corps of Engineers (USACE), monitors the water depths in Federal Navigation Projects (FNPs) for safety. The New England District of the Corps of Engineers (NAE) is preparing a feasibility study for improvements to the New Haven Harbor FNP. NAE has developed this Task Order to collect the environmental data necessary to support the impact assessment for dredging and placement of the material at the Central Long Island Sound Disposal Site (CLDS).

The proposal for the improved FNP consists of:

- Deepening the main channel from a 35 foot main channel to 42 feet at mean lower low water (MLLW);
- Widening the main channel from 400 feet to 500 feet in shore of the breakwater and widening to 600 feet outside the breakwater;
- Widening the channel bend at Southwest Ledge from 560 feet to a minimum of 780 feet;
- Straightening the channel bend downstream of the existing turning basin; and,
- Deepening the turning basin from 35 feet to 42 feet MLLW.

NAE is currently proposing to mechanically dredge approximately 4,500,000 cubic yards of sediment and 55,100 cubic yards of rock from the area. To the extent practical, these materials will be reused beneficially to beach nourishment, marsh creation, upland construction projects, and to cover historic dredge material mounds in Long Island Sound. The remainder will be placed, if suitable, at the CLDS.

A.2 Project Organization and Responsibilities

Highly qualified individuals have been selected for each of the tasks to ensure that the project objectives are accomplished accurately and efficiently. The project organization and work breakdown is depicted in **Figure A-1**. Individual responsibilities are detailed below.

NAE Technical Manager (TM)
The NAE Technical Manager, Mr. Ben Loyd, will be consulted during the project planning and performance phases. As the primary point of contact for the Corps and this scope of work, Mr Loyd will be in weekly contact with the AECOM project team during sample preparation, and physical and chemical analysis, and in the event any problems are encountered.

AECOM Program Manager (PM)
Mr. Don Dwight, serving as AECOM's Program Manager (PM), will provide overall leadership in the performance of this task order with regular NAE and AECOM team communications. Mr. Dwight will verify that the right people are committed to contract tasks, that safety and quality systems are in place, regular reviews are undertaken, issues resolved without delay and contractual specifications met or exceeded.

AECOM Deputy Program Manager (DPM)

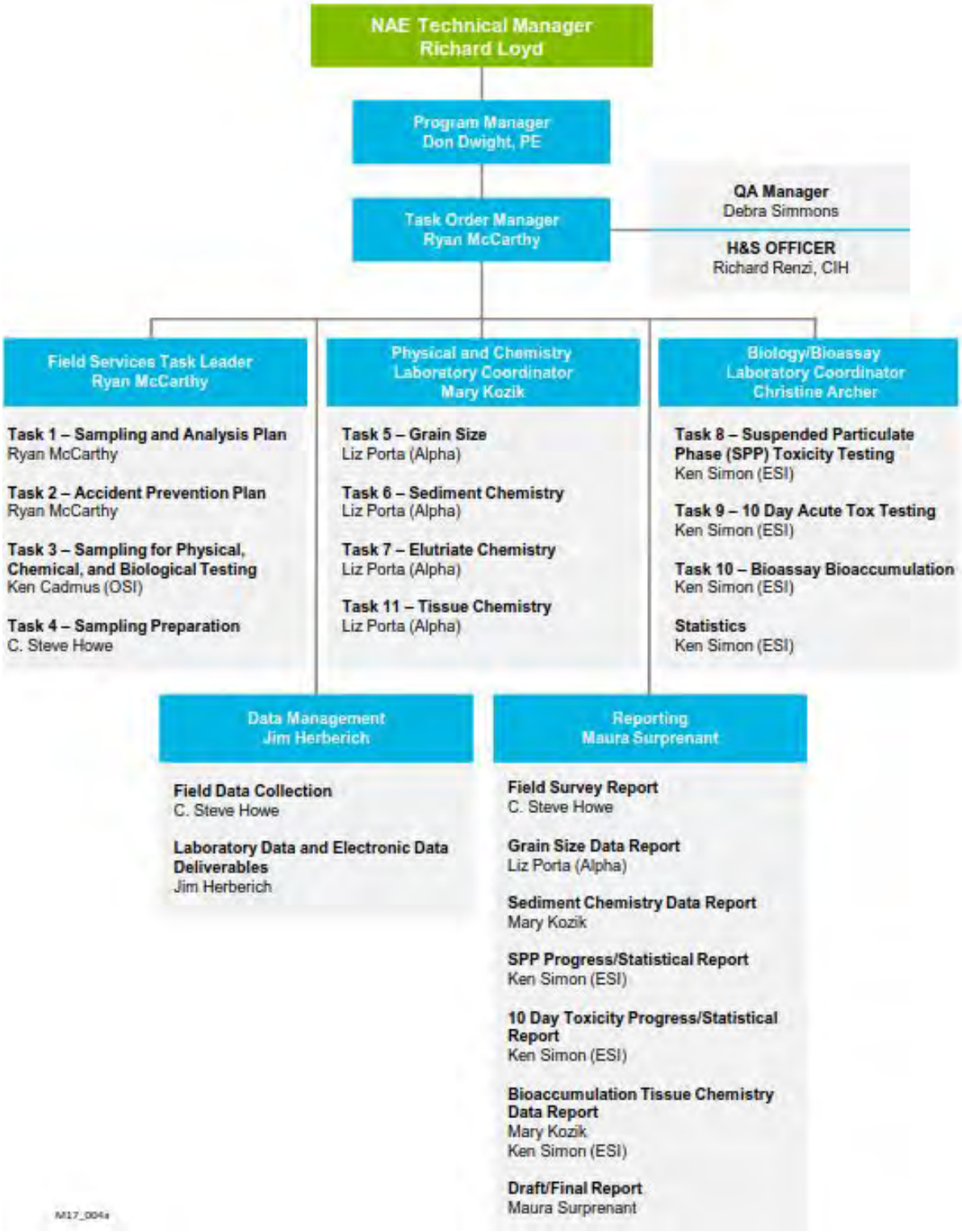
Ms. Maura Surprenant, serving as AECOM's Program Manager (DPM), will provide daily leadership in the performance of this task order with regular NAE and AECOM team communications. Ms. Surprenant will assist Mr. Dwight with daily duties including ensuring that the right people are committed to contract tasks, that safety and quality systems are in place, regular reviews are undertaken, issues resolved without delay and contractual specifications met or exceeded.

AECOM Task Order Manager

Mr. Ryan McCarthy will serve as the AECOM Task Order Manager, with the responsibility for technical, financial, and scheduling matters related to this task. Mr. McCarthy, as the point of contact between task leads, safety and quality managers, and program management, will communicate regularly with the project team to discuss action items, schedule, financial, and technical considerations on a regular basis during the implementation of this SAP and will procure the subcontractor team.

Mr. McCarthy will also oversee the preparation of the task reports to ensure they meet or exceed NAE specifications, particularly as required by NAE's Regional Implementation Manual (RIM; EPA/USACE, 2004). Raw and statistical data will be provided to fully support agency dredged material (DM) suitability decision-making. All reports will be available electronically and all sediment data will be provided in electronic data deliverable (EDD) format meeting RIM requirements. Quality control (QC) summary tables will be included with each data submission.

Figure A-1 Task Order Organization and Work Breakdown



AECOM Health & Safety Officer (SO)
Mr. Richard Renzi, CIH is AECOM's Safety Officer dedicated to this investigation with direct communication to the AECOM Task Order Manager. He will prepare/ review all modifications to the project Accident Prevention Plan (APP), and any applicable Activity Hazard Analyses (AHA). Specific duties include:

- On behalf of AECOM, reviewing and approving the APP and amendments and ensuring that EM-385-1-1 requirements are fully met before delivery to the NAE TM for approval;
- Advising the AECOM Task Order Manager on matters relating to health and safety at the site;
- Conducting accident investigations;
- Maintaining regular contact with the project team to evaluate site conditions and new information that might require modifications to the APP; and
- Overseeing the Site Safety Officer (SSO).

Project Quality Assurance (QA) Officer
Ms. Debra Simmons will serve as the Project QA Officer and has overall responsibility for quality assurance oversight. Ms. Simmons has led quality assurance programs for more than 30 years and in this role will communicate directly to the AECOM Task Order Manager. Specific responsibilities include:

- Implementation of this SAP upon approval;
- Reviewing and approving QA procedures on behalf of AECOM, including any modifications to existing approved procedures;
- Ensuring that QA audits of the various phases of the project are conducted as required; and
- Providing QA technical assistance to project staff.

Field Services Task Leader & Chief Scientist
Mr. C. Steve Howe, serving as the Field Services Task Leader and Chief Scientist will provide leadership in every aspect of the field program, and implement the sediment and water collection program. Mr. Howe will oversee the field services subcontractor (OSI) and all field sample collection activities.

The Field Services Task Leader has overall responsibility for completion of all field activities in accordance with the FSP and Quality Assurance Project Plan (QAPP) and is the communication link between the Task Order Manager and the field team. This individual also acts as the Site Safety Officer (SSO) and will engage the field personnel in daily safety discussions, field safety related documentation (float plans, etc.) and will be the primary point of contact for all field related safety communications. Specific responsibilities of the Field Services Task Leader and Chief Scientist include:

- Coordinating activities in the field, and assigning specific duties to field team members;
- Collecting samples, conducting field measurements, and decontaminating equipment according to documented procedures stated in the FSP and QAPP;
- Mobilizing and demobilizing of the field team and subcontractors;
- Directing the activities of subcontractors in the field;

- Resolving any logistical problems that could potentially hinder field activities, such as equipment malfunctions or availability, personnel conflicts, or weather dependent working conditions;
- Implementing field QC including issuance and tracking of measurement and test equipment; the proper labeling, handling, storage, shipping, and chain of custody (COC) procedures used at the time of sampling; and control and collection of all field documentation;
- Ensuring that field documentation and data are complete and accurate
- Communicating any nonconformance or potential data quality issues to the Task Order Manager.
- Serving as SSO; and
- Preparing the Field Report.

Physical & Chemistry Laboratory Coordinator
Ms. Mary O'Connell-Kozik, as the Physical & Chemistry Laboratory Coordinator, will manage the subcontractor chemistry/physical testing laboratories. Ms. O'Connell-Kozik, a Senior Chemist, will serve as the liaison between field and laboratory personnel; supervise data review activities, and author related progress reports.

Biology/Bioassay Laboratory Coordinator
Ms. Christine Archer, an Eco toxicologist and former bioassay laboratory biologist, will serve as the Biology/Bioassay Laboratory Coordinator. Ms. Archer will coordinate with the biology laboratory to implement sample composite formation, preparation of elutriate samples, and performance and reporting of the 10-day, suspended particulate phase (SPP), and 28-day bioassay results along with all relevant statistics.

Data Manager
Mr. Jim Herberich ensure every aspect of data recording and electronic measurement records are complete and accurate, and that sediment chemistry EDDs are transferred to NAE as defined in the RIM (EPA/USACE, 2004).

Ocean Surveys, Inc. Project Manager
AECOM has selected Ocean Surveys, Inc. (OSI) located in Old Saybrook, CT to provide field services and equipment for the project. OSI will be responsible for providing and maintaining the sampling vessel, vessel and equipment handling staff, appropriate field equipment for positioning the vessel and coring to the project/sample depth.

Mr. Ken Cadmus, the project field survey leader (or designee), will captain the survey vessel and oversee navigational and shipboard operations. Mr. Cadmus (or designee) will implement the field survey requirements specified in this SAP when approved.

Alpha Analytical Laboratory Project Manager
Ms. Elizabeth Porta, Alpha Analytical Laboratory Project Manager will oversee the implementation of this SAP and the specifications detailed in Section B (QAPP). Alpha Analytical will be responsible for the grain size and chemical analyses of the sediments collected as part of this program. Ms. Porta will communicate with the AECOM Task Order Manager to confirm the condition of samples arriving at the laboratory, verify the COC specified sample list and testing requirements, bring any project concerns to the AECOM Physical Laboratory Coordinator without delay, and transmit EDDs and corresponding laboratory reports to the project data manager in the formats specified.

ESI Laboratory Manager
Mr. Ken Simon, ESI Laboratory Manager will oversee the implementation of this SAP and the specifications detailed in Section B (QAPP). ESI will be responsible for all biological and chemical laboratory activities, including elutriate/ SPP sample preparation, toxicological testing and reporting. He will communicate with the appropriate AECOM Laboratory Coordinator (Biology, Chemistry) to confirm the condition of samples arriving at the laboratory, verify the COC specified sample list and testing requirements, oversee the preparation of sample composites, standard chemical elutriate and SPP preparations, and all project bioassays. Mr. Simon will bring any project concerns to the appropriate AECOM Laboratory Coordinator without delay (Biology, Chemistry), and transmit chemistry EDDs and related laboratory reports, and bioassay results with corresponding statistics and reports to the AECOM Laboratory Coordinators according to the established project schedule.

Contact	Phone	Responsibility
Ben Loyd	978.318.8048	NAE Technical Manager
Don Dwight	978.905.2970	AECOM Program Manager
Maura Surprenant	508.833.6960	AECOM Deputy Program Manager
Ryan McCarthy	603.263.2157	AECOM Task Order Manager
Rich Renzi	978.905.3137	AECOM Health & Safety Officer
Debra Simmons	978.589.3358	AECOM QA Officer
C. Steve Howe	603.520.0169	Field Services Task Leader and Chief Scientist
Mary O'Connell-Kozik	978.905.2277	Physical & Chemical Laboratory Coordinator
Christine Archer	603.622.1556	Biology/Bioassay Laboratory Coordinator
Jim Herberich	978.905.2243	Data Manager
Ken Cadmus	860.388.4631	OSI Project Manager
Liz Porta	508.822.9300	Alpha Analytical Laboratory Project Manager
Ken Simon	603.475.7654	ESI Laboratory Manager

A.3 Project Scope and Objectives

The objective of this work is to acquire data for the characterization of sediments proposed to be dredged for New Haven Harbor FNP improvement.

A.3.1 Task Description

This New Haven Harbor FNP Environmental Assessment Project will require the collection of discrete sediment samples from 26 stations throughout the FNP to represent the material to be dredged. Samples (cores) collected from discrete locations within the FNP footprint will be pooled into groups of stations with similar grain size characteristics for full-scale testing. Seawater will also be needed to evaluate potential water column impacts (i.e., the formation of chemical elutriate and suspended particulate phase samples).

The proposed work consists of taking sediment cores to project depth plus 2 feet of over depth (see **Table A-1**) from 26 locations along a stretch within the FNP to be analyzed for parameters as defined in Tasks 5 through 11. Samples from locations where similar material is found may be composited; it is anticipated that the sediment samples will be composited into eight groups for analysis. Reference site sediments should be

collected from the CLDS Reference Site located at latitude 41.134850 and longitude 72.835690. The testing results will be used to characterize the sediment in order to determine the suitable alternatives available for disposal.

Surface water samples will be collected from areas representing the sediment core composite samples and from CLDS for use in preparation of elutriate samples and biological analyses.

General guidance for this work is found in the EPA/ USACE regional protocol "Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters" (April 6, 2004). Sampling, testing, and QA/QC procedures as required and detailed in the RIM are referenced in each task of this scope of work (SOW).

To accomplish the full range of project requirements, NAE has established the following 12 tasks:

Task	Description
1	Sampling and Analysis Plan
2	Accident Prevention Plan
3	Sampling for Physical Analysis, Sediment Chemistry, Elutriate, and Biological Testing
4	Sample Preparation for Physical Analysis, Sediment Chemistry, Elutriate and Biological Testing
5	Sediment Grain Size Analysis
6	Sediment Chemistry
7	Standard Elutriate Testing
8	Suspended Phase Acute Toxicity Testing
9	10-day Whole Sediment Acute Toxicity Testing
10	28-Day Bioassay/Bioaccumulation
11	Tissue Analysis
12	Reporting

A.3.2 Health and Safety

A program specific APP will be developed and submitted to NAE prior to the commencement of any field efforts. The APP will be prepared in accordance with EM-385-1-1. The APP will address any unusual or unique aspects of the proposed scope of work to be executed (e.g., working on water, vibracore operations, etc.). A draft version of the APP will be submitted electronically to the Safety and Occupational Health Office and to the NAE Technical Manager. The final version will be submitted electronically along with one hard copy.

Additionally, the APP will address any AECOM-specific policies and procedures that need to be followed over the course of the field program, and should be considered a "living document" as they can be updated based on changing site conditions. Additionally, task-specific AHA documents will be prepared for use in the field for each major phase of work to be completed. A major phase of work is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform the work. The analysis shall define all activities to be performed,

identify the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Prior to the commencement of any field work, the training records for all staff (AECOM and subcontractors) proposed to be utilized on this program will be reviewed to ensure that they are current.

The SSO for this project is Mr. C. Steve Howe. Mr. Howe will be responsible for general day-to-day field health and safety of AECOM and its subcontractors, ensuring that all field staff participates in daily tailgate/ dockside safety meetings, ensuring correct application/ usage of personal protective equipment (PPE) by field staff, and monitoring field activities for adherence to the APP. Mr. Howe will also responsible for hosting a project Healthy and Safety kickoff meeting for all staff prior to mobilization. In the event of an incident, Mr. Howe is responsible for initial response protocols, incident management, and proper reporting. Mr. Howe and all field staff have “Stop Work Authority” in the event an employee identifies a condition or act that is likely to cause an Imminent Danger situation.

All safety meetings/ briefings will be documented and submitted to the NAE as part of standard reporting procedures. The USACE Contractor Monthly Summary Record of Injuries/ Illness and Work Hour Exposure form will be completed each month and submitted electronically to the NAE Technical Manager no later than close of business on the 10th calendar day of the following month.

A.3.3 Project Mobilization

Upon NAE’s approval of this SAP along with the project APP, the project team will mobilize a field survey to core sediments within the harbor area, collect surface sediment at the CLDS Reference Site, and collect seawater from the harbor and reference site.

Early in the program, NAE will evaluate the sediment texture (rapid 24 hour grain size analysis), chemical composition (bulk sediment chemistry) and determine a discrete sample compositing scheme. Following collection and compositing of bulk sediment samples, elutriate, toxicity, and biological testing will commence.

Table A-1 New Haven Harbor Sampling Positions (NAD 1983), Project Depth, Estimated Penetrations, Quantities, and Anticipated Composite Scheme

Sample ID	Latitude (NAD 83)	Longitude (NAD 83)	Predicted Water Depth (FT MLLW)	Project Depth (FT MLLW) Including Allowable Over Depth	Est Penetration From Water/ Sediment Interface	Estimated Volume (Gallons) Per Location *	Estimated Number of Cores/Grabs Needed
NHH-A#	41.222715	-72.910995	28.6	36.6	10.0	4.2	3
NHH-B	41.223094	-72.909953	39.5	42.0	4.5	1.9	4
NHH-C	41.223443	-72.909040	33.5	42.0	10.5	4.4	2
NHH-D	41.248083	-72.915987	18.6	33.6	17.0	7.1	1
NHH-E	41.247915	-72.915987	36	42.0	8.0	3.3	2
NHH-F#	41.247866	-72.913942	17.8	26.2	10.4	4.3	3
NHH-G#	41.262183	-72.913826	15.4	27.7	14.3	5.9	2
NHH-H	41.262103	-72.913150	39.9	42.0	7.1	3.0	3
NHH-I	41.262042	-72.911773	22.8	31.0	10.2	4.2	2
NHH-J#	41.278348	-72.913132	25.1	24.5	1.4	0.6	15
NHH-K	41.278367	-72.912477	36.8	42.0	7.2	3.0	3
NHH-L	41.278436	-72.911054	23.8	26.6	4.8	2.0	4
NHH-M#	41.286420	-72.912045	24.7	35.0	12.3	5.1	3
NHH-N	41.286272	-72.910575	37.4	42.0	6.6	2.7	3
NHH-O	41.286130	-72.909167	36.6	26.4	8.2	3.4	2
NHH-P#	41.292373	-72.913125	19.2	42.0	24.8	10.3	2
NHH-Q	41.292245	-72.911934	14.8	42.0	29.2	12.1	1
NHH-R	41.292011	-72.909869	36.5	26.0	8.5	3.5	2
NHH-S#	41.281829	-72.908069	38.3	42.0	5.7	2.4	4
NHH-T#	41.294296	-72.912018	8.0	23.0	17.0	7.1	2
NHH-U	41.294206	-72.911217	15.7	42.0	28.3	11.8	1
NHH-V	41.294024	-72.909459	36.7	42.0	7.3	3.0	2

Sample ID	Latitude (NAD 83)	Longitude (NAD 83)	Predicted Water Depth (FT MLLW)	Project Depth (FT MLLW) Including Allowable Over Depth	Est Penetration From Water/ Sediment Interface	Estimated Volume (Gallons) Per Location *	Estimated Number of Cores/Grabs Needed
NHH-W#	41.293841	-72.907753	36.8	42.0	7.2	3.0	3
NHH-X	41.297451	-72.907596	17.8	25.0	9.2	3.8	2
NHH-Y	41.296875	-72.906705	37.3	42.0	6.7	2.8	3
NHH-Z#	41.296409	-72.906006	36.7	42.0	7.3	3.0	4
NHH-CLDS***	41.149165	-72.8825	80	NA	NA	20.9	4

*Volume estimated assuming 3½ -inch diameter core liners for samples and 0.1 m^2 grab for reference location

** Assumes 25 gallons of sediment per composite for testing and archiving

*** CLDS Reference Site.

- Archeological core to be collected at this location

MLLW – Mean Lower Low Water

Sample volumes may be adjusted upon finalization of compositing scheme in consultation with NAE.

Table A-2 Example Composite IDs and Water Sample IDs/ Volumes Used to Prepare the Elutriate and SPP Mixtures

Sample ID*	Water Sample ID* Used for Elutriate/SPP Mixture	Expected Composite ID	Minimum Water Sample Volume Required (gal)
NHH-A	NHC-A	NHC-1	25
NHH-B	NHC-B		
NHH-C	NHC-C		
NHH-D	NHC-D	NHC-2	25
NHH-E	NHC-E		
NHH-F	NHC-F		
NHH-G	NHC-G	NHC-3	25
NHH-H	NHC-H		
NHH-I	NHC-I		
NHH-J	NHC-J	NHC-4	25
NHH-K	NHC-K		
NHH-L	NHC-L		
NHH-M	NHC-M	NHC-5	25
NHH-N	NHC-N		
NHH-O	NHC-O		
NHH-P	NHC-P	NHC-6	25
NHH-Q	NHC-Q		
NHH-R	NHC-R		
NHH-S	NHC-S		
NHH-T	NHC-T	NHC-7	25
NHH-U	NHC-U		
NHH-V	NHC-V		
NHH-W	NHC-W		
NHH-X	NHC-X	NHC-8	25
NHH-Y	NHC-Y		
NHH-Z	NHC-Z		
NHH-CLDS**	NA	NA	22.5

* Actual compositing scheme to be determined based on the results of grain size analysis in consultation with NAE.
** CLDS Reference Site.

Together, these tasks address the potential risks to marine life posed by the material to be dredged:

- **Whole sediment exposure** will be assessed with physical, chemical, and whole-sediment bioassay data [Tasks 5, 6, & 9]. The RIM (EPA/ USACE, 2004) summarizes the wide range of parameters

included in the assessment. The biological testing incorporates a sediment amphipod and mysid shrimp in particular to identify the potential impacts to sediment-associated organisms.

- **Aquatic life exposures** may be assessed with a chemistry screening approach, but are generally modeled using a mixture of seawater and the material to be dredged corresponding to standard chemical elutriates and SPP samples. Chemical elutriate results are used to ensure that Ambient Water Quality Criteria (AWQC) will not be exceeded at the dredged material placement site (CLDS) four hours after discharge, or outside of the site boundary at any time. SPP toxicity testing results are used to develop a Limiting Permissible Concentration (LPC), and, based on regulatory modelling by ADDAMS/ STFATE, are also used to determine Marine Protection, Research, and Sanctuaries Act (MPRSA) §103 water column compliance [Tasks 7 & 8].

- **Bioaccumulation potential** will also be evaluated to address any potential longer-term effects, measured directly using worm and clam organisms over a 28-day period [Tasks 10 & 11]. Findings will be compared to Food and Drug Administration (FDA) levels and used to evaluate ecological health risks.

A.3.4 Applicable Regulations/ Standards

This project has been designed to collect environmental data needed to characterize the sediment to be dredged within the various dredging units, and determine suitability for placement unconfined in the marine environment under MPRSA §103, detailed in the Ocean Dumping Regulations (Title 40, Code of Federal Regulations, [CFR] 220-229). As such, the work will be guided by NAE's *Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters* (RIM, EPA/ USACE, 2004), the *Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual* (Green Book, EPA/ USACE, 1991), and the *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.* (Inland Testing Manual, EPA/ USACE, 1998). These regulations are adhered to within the jurisdictional area of the NAE by the RIM and the laws and regulations of the New England states (where this FNP project is located).

A.3.5 Project Schedule

The sampling schedule is provided in **Table A-3** and **Figure A-2** along with project milestones and deliverables.

The project schedule is an accelerated schedule. As such, elutriate and biological testing shall occur concurrently with the sampling for Tier 2 evaluation.

A.4 Non-measurement Data Acquisition

AECOM anticipates that relevant grain size or other site information reviewed by NAE for planning purposes would be available if needed. However, these historical data are likely too dated to be applicable for the current site characterization effort.

A.5 Field Activities

The approach selected by NAE to meet the project objectives requires the collection of the following sample types:

- Sediment cores (26 stations within New Haven Harbor)

- Surface sediment grab sampling (CLDS Reference Site)
- Single- to multiple-depth seawater collection (composite of surface, mid-depth, and bottom water collection at the harbor stations and at the CLDS Reference Site when overlying water depth > 30 ft MLLW, and mid-depth only for depths < 30 ft MLLW)

Sediments retained from the individual harbor collection stations will be maintained as discrete samples until NAE, based on a rapid grain size reporting, approves continuation of the program and the final pooling/ composite scheme.

A.5.1 Harbor and CLDS Reference Site Sediment

Sediment within the FNP will be cored to the authorized depth (plus allowable over dredge) to fully characterize the sediment prism that requires removal/dredging. At the reference site, only the surface sediment character is relevant for comparison purposes and so a grab sampler is the sampling equipment of choice.

Large sediment volumes will be needed in the event that the full range of testing is required for the program. This section details the locations, composite preparation, field and laboratory measurements, and QC sampling requirements.

A.5.1.1 Coring Collection Locations

NAE has determined that 26 sampling stations are sufficient to characterize the FNP to be dredged. Station positions are detailed on **Table A-1** and depicted in **Figure A-3**.

Table A-3 Schedule of Milestones and Deliverables

Task		Milestone[1]	Schedule
	TASK NOTICE TO PROCEED		21 Jul 17
	PLANNING		
1, 2		SAP & APP preparation; station position & utility verifications	24 -27 Jul 17
		SAP delivered to NAE after 2 day preparation & station positions verification	27 Jul 17
		APP delivered to NAE following 2 day preparation	27 Jul 17
		New Haven Harbor Master & USCG alerted to NAE sampling needs & timing	5 Jun 17
		NAE SAP & APP review, AECOM finalizes, NAE approves SAP & APP	1-4 Aug 17
	SAMPLE COLLECTION, RAPID TAT SEDIMENT GRAIN SIZE, & SAMPLE POOLING		
3		Field Effort: 10 sediment survey days to collect 26 stations	7-17 Aug 17
		Discrete harbor station sediments shipped to laboratory for 24 h grain size analysis	7-9 Aug 17
		Field Effort: 1-day CLDS Ref sediment and water plus all harbor water stations	17 Aug 17
4		Discrete harbor station grain size analysis (24 h TAT)	8-10 Aug 17
5		**Rapid 24 h GS data reported to NAE for review**	9-11 Aug 17
		NAE amends sample pooling scheme as needed	11 Aug 17
		NAE approval to proceed as appropriate based on sediment grain size	11 Aug 17
		Bulk sediment composite preparation	20-21 Aug 17

Task		Milestone[1]	Schedule
		Field Report Delivered to NAE with core logs, photos, and daily activity logs	23 Aug 17
	SEDIMENT CHEMISTRY/GRAIN SIZE (BULK/ COMPOSITE SAMPLES)		
6		Bulk sediment chemistry analysis	20 Aug – 11 Sep 17
		Sediment chemistry data with QC delivered to NAE (RIM format)	25 Sep 17
	ELUTRIATE CHEMISTRY & SUSPENDED PARTICULATE PHASE TESTING		
		Elutriate Preparation	21-22 Aug 17
7		Elutriate Chemistry (plus ambient water)	22 Aug – 13 Sep 17
		Elutriate/Site Water Progress Report Delivered to NAE	13 Sep 17
8		SPP bioassay (begins within 24 hours following Elutriate preparation)	21-25 Aug 17
		SPP progress report delivered to NAE (RIM format)	25 Aug 17
		SPP statistics complete	1 Sep 17
9	10-DAY WHOLE SEDIMENT BIOASSAY		21 Jun - 4 July
		Samples loaded, ammonia equilibration	22-29 Aug 17
		10-day bioassay testing	29 Aug – 8 Sep 17
		10-day whole sediment bioassay progress report delivered to NAE	15 Sep 17
		10-day whole sediment bioassay statistics complete	9 Sep 17
10	28-DAY BIOACCUMULATION BIOASSAY		30 Aug – 28 Sep 17
		28-day bioaccumulation progress report	2 Oct 17
11	TISSUE CHEMISTRY ANALYSIS		
		Tissue analytical chemistry	1-22 Oct 17
		Tissue chemistry statistical analysis	22-28 Oct 17
		Preparation of tissue EDD	28-29 Oct 17
		Tissue progress report	25 Oct 17
	FINAL REPORTS		
12		**Draft Final Report Delivered to NAE**	9 Nov 17
		Final Report Delivered to NAE	21 Nov – 4 Dec 17
[1]NAE Deliverables are bolded			

Figure A-2 Anticipated Schedule Gantt Chart

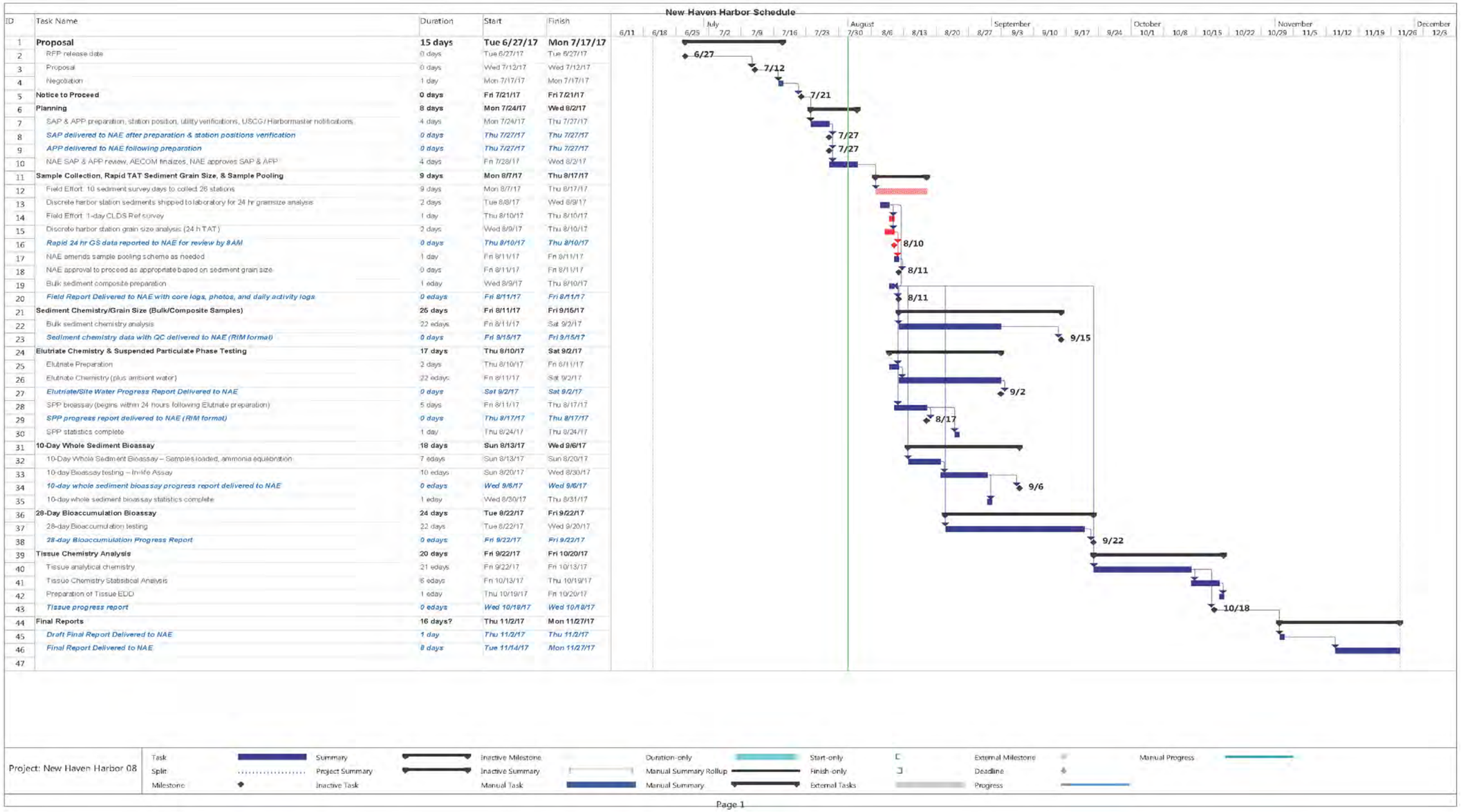


Figure A-3 Sampling Locations: Inner Reach

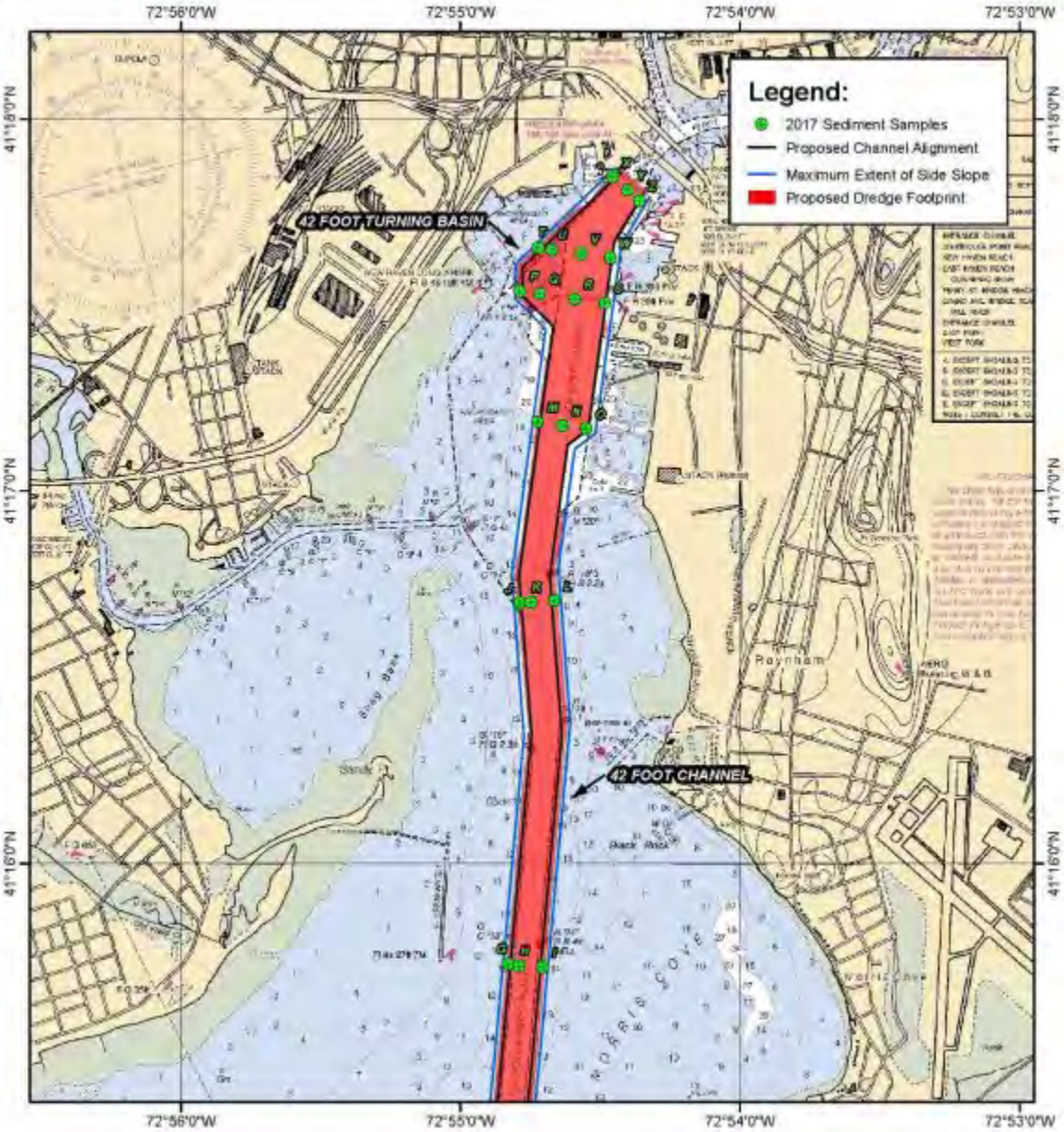
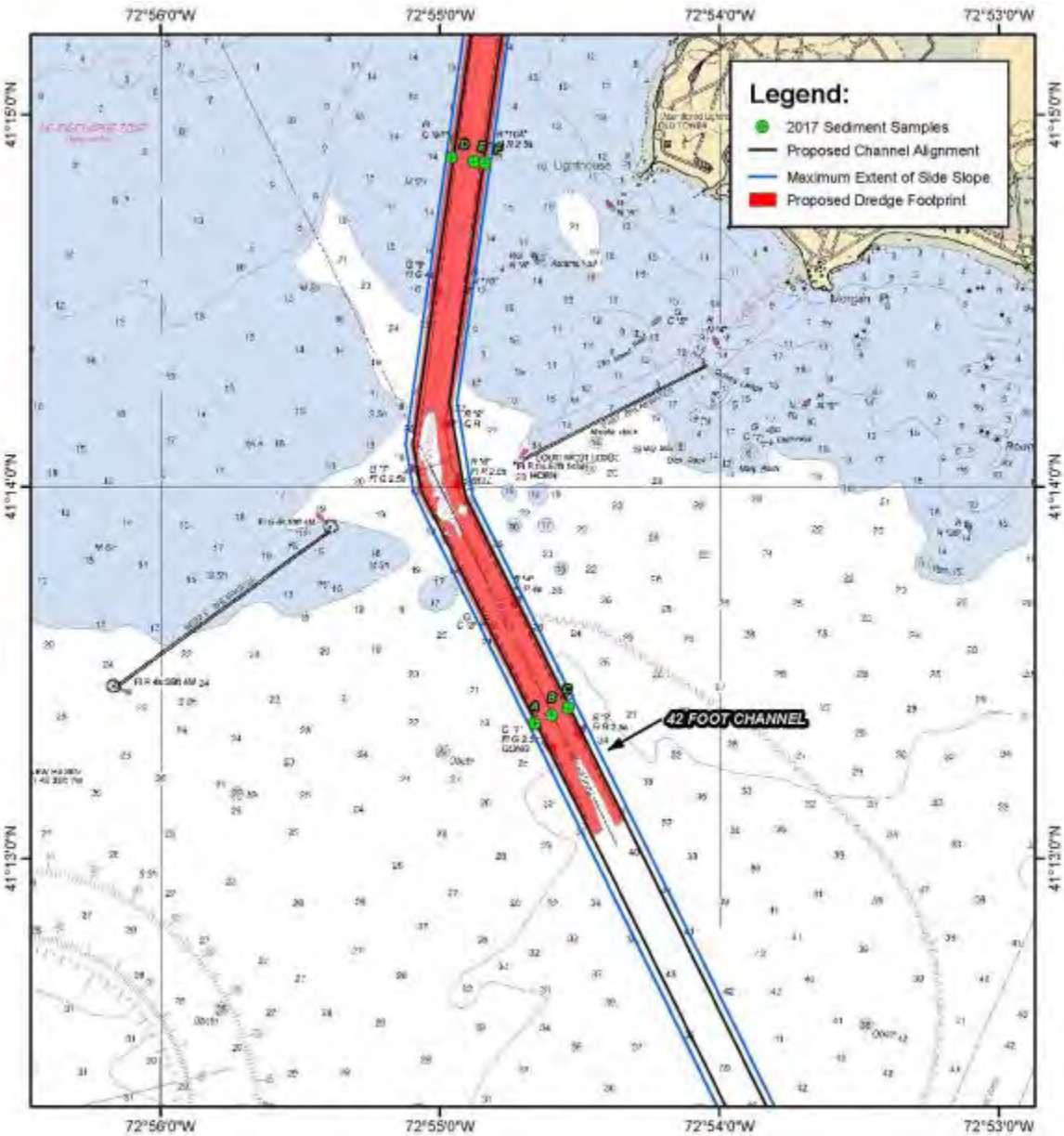


Figure A-4 Sampling Locations: Outer Reach



All plotted/ target sampling positions will be reviewed with the NAE TM as part of the SAP approval process to ensure location accuracy. Channel stations E, H, K, and O are in the vicinity of the Cross Sound Cable. Currently AECOM has generalized mapping information (e.g., NOAA chart/ maps) and communication from the NAE ETL (5/2/17 & 5/11/17 emails from Ben Loyd). OSI is coordinating with the Cross Sound Cable group and has obtained as-built construction information regarding the actual location of the submarine cable prior to the initiation of the coring program. This is to verify target locations are positioned such that damage to the cable will not occur. All utility crossings and outfall locations associated with the sampling areas will also be reviewed with NAE before the field program begins.

A.5.1.2 Discrete/Composite Sediment Sampling Requirements

Initially, the 26 cores will be processed and sub-sampled (up to 2 per core) aboard the sampling vessel and will be maintained as discrete samples. These horizons will be sub-sampled for bulk sediment analytical testing and grain size. The sub-samples will be analyzed for grain size on an expedited schedule. NAE will then review the discrete data and verify the sample composite/ pooling scheme and approve continued testing as appropriate. This sample pooling approach will provide NAE with a smaller set of FNP sample composites to test, thereby reducing the sample collection and testing effort.

The sediment volume needed from each station and station sets that may be pooled together to form composites are detailed on **Table A-1**. As indicted, 25 gallons of sediment will be required for each of the final area composites and an additional 21 gallons (minimum) will be needed from the CLDS Reference Site. Additionally, the sample volumes needed for the array of testing parameters are detailed on **Table A-4** *Sample Mass/ Volume Requirements.*

Sample pooling approved by NAE will be performed at the biological laboratory. Composite preparation procedures are detailed in Section B of this SAP (QAPP).

Table A-4 Sample Mass/ Volume Requirements (minimum)

Parameter	Units	Sediment Volume		Water Volume	
		Per Tested Sample or Composite	CLDS Reference Site	New Haven Harbor	CLDS Reference Site
Sediment Parameters					
Grain Size	L	0.075	0.075	-	-
Metals	L	0.2	0.2		
Organic Compounds	L	0.475	0.475		
Total Organic Carbon	L	3	3	-	-
Aqueous Chemistry (Background Surface Water and Rinsate Blanks)					
PCBs/ Pesticides	L	-	-	12	12
PAHs[1]	L	-	-	6	6
Pentachlorophenol[2]	L	-	-	6	-
Metals	L	-	-	1.5	1.5
Elutriate/ Toxicity Testing Parameters					
10-Day Whole Sediment Bioassay	L	2.4	2.4	-	-

Parameter	Units	Sediment Volume		Water Volume	
		Per Tested Sample or Composite	CLDS Reference Site	New Haven Harbor	CLDS Reference Site
Elutriate Chemistry	L	8	-	360	12
SPP Toxicity Bioassay	L	4	-	100	80
Bioaccumulation Parameters					
Nereis, Macoma Studies	L	60	60	-	-
Bulk Sample Volume (L)	L	78	66	500	102
Bulk Sample Volume (Gal)[3]	Gal	21*	17.5*	110	23

[1]PAHs measured only in (sediment) equipment blank.
[2]Pentachlorophenol measured only in background water.
[3]Minimum sample volume required.
*Per composite

A.5.1.3 Sample Collection and Field & Laboratory Analysis

Navigation. Vessel positioning for all sediment collections will be accomplished utilizing a Differential Global Positioning System (DGPS) Integrated with HYPACK software with an accuracy of 1 meter or less according to AECOM Standard Operating Procedures (SOP) NHH-G-02 (Appendix A). Local tide data will be obtained to calculate tidal height in feet above MLLW. This measurement will facilitate the calculation of the required penetration depth needed to reach the desired project depth. The depths indicated in Table A-1 should be consulted. If the overlying water depth is different from those estimated in Table A-1, the sediment penetration depth will be adjusted accordingly, in consultation with NAE.

Depth to sediment will be measured using a measurement tape/ lead line immediately preceding each coring deployment to identify the exact mudline for coring purposes. Additionally, a precision survey echo sounder with an accuracy of ±0.1feet will provide continuous monitoring of sediment depth/ harbor bottom.

Care will be taken to avoid sample contamination from sampling gear, airborne dust, vessel engine exhaust, cross contamination, etc. If wind/current/ traffic conditions allow, engines will be shut off during sampling; otherwise, sampling will be performed upwind of exhaust and contamination sources. Final sample mixing will be performed in the laboratory for greater contamination control.

Collection & Analysis. The harbor locations will be cored using vibracoring equipment according to AECOM SOP NHH-S-03 (Appendix A), and grab samples of the surface sediment from the CLDS Reference Site will be collected using a Ted Young/ Van Veen grab sampler according to AECOM SOP NHH-S-01 (Appendix A). AECOM is planning on using rigid polycarbonate core liners for this project. **Table A-5** lists the equipment intended for use during project performance and equipment calibration /checking requirements are detailed in **Table A-6**. All sampling will be performed as specified in the project Scope of Work dated 31 May 2017.

Table A-5 Proposed Sampling Gear for the New Haven Harbor FNP Sampling Task

Equipment	Description	Objective
Sampling Vessel	37-foot coring barge[1]	All harbor station sampling
Sampling Vessel	25-foot Parker[1]	Reference station sampling
Refrigerated Storage Vehicle	26-foot Refrigerated Box Truck	Chilled sample storage during the field program
DGPS	AG-132 DGPS with Omnistar and USCG Beacons; Hydrographic Survey Software HYPACK)	Vessel positioning and data collection
Equipment	Description	Objective
Vibracorer	Vibracorer fitted with rigid liners, core cutter, and catcher	The collection of all harbor cores
Grab Sampler	Ted Young/ Van Veen Grab	Reference sediment collection
Water Pump & Tubing	Diaphragm pump and tubing (short length for harbor sampling).	Harbor and CLDS Reference water collections
Niskin Bottle	Messenger activated sampling bottle for specified depths	CLDS Reference water collection
Weight Bearing Line/Cable	Non-contaminating measured lead line	Water depth measurements

[1]Conforms to health and safety measures found in the USACE Safety and Health Requirements Manual EM 385-1-1 (November 30, 2014)

Table A-6 Field Instrument Calibration, Checking, and Corrective Action

Parameter/ Instrument	Calibration Frequency	Calibration Standards	Acceptance Criteria/ Corrective Action
Water Depths JRC Precision echosounder (or equivalent)	Initial: Each time instrument is turned on.	Deployable metal plate and metering line	Within 10% of metering line instrument will be replaced
Station Locations Trimble Pro-XRS DGPS (or equivalent)	Initial: Start of field program	Survey of benchmark	3 meter accuracy minimum or DGPs to be replaced
	Check: Daily	Survey of benchmark	
Temperature/ Refrigerated Storage Truck	Check twice daily	Alternate thermometer	Within 0.5°C of the stationary monitoring thermometer. Re-calibrate stationary thermometer as needed.

Initially, one core will be collected from all locations for rapid turn-around grain size and bulk sediment chemistry analysis (total organic carbon, percent moisture, metals, PCBs, pesticides, and PAHs). From locations A, F, G, J, M, P, S, T, W and Z, an additional core will be collected and kept intact for NAE archive. These cores will be received by an NAE archaeologist at the conclusion of the sampling activities. The archive cores will be retained in an upright position at 4°C±2°C. The penetration depth for each core sample

will be to either the project depth (Table A-1) or refusal, whichever is reached first. Upon sample retrieval, the sampling team will adhere to the following handling sequence:

- Once on deck/ removed from the core barrel, cores will be maintained in an upright position (cores in flexible liners will be hung upright) to allow surface sediment to settle (ca. 15 min) before removing overlying water.
- After overlying water is removed and adhering to contamination control procedures, core liners will be opened longitudinally and cores split (moving from lower clean to upper dirty) for logging purposes using pre-cleaned stainless steel utensils.
- Sediment profiles will be described and recorded on core log forms along with digital photographic references (Attachment 1).
- Photographs of each core will include core number, date, orientation (top, bottom) and scale. Descriptions will include general texture, color, odor, strata, core length, depth of penetration and any other pertinent observations.
- The first core from each location will be visually described/logged and if significant vertical stratification is observed within the sediment column (greater than two feet in thickness), then subsamples will be collected from each horizon for grain size and analytical parameters. If possible, NAE will be contacted to discuss the findings. It is anticipated two subsamples per core will be collected.
- Cores showing significant differences will be retained in the liners.
- The presence of live eelgrass in any sample will be noted and a count of eelgrass stems with roots/ shoots recorded.
- Samples will be chilled while on board, and transferred to a refrigerated box truck daily during field operations with temperature monitored to ensure that the storage temperature is maintained at 4°C ±2.

If less than 80% core recovery is achieved, the core sample recovered will be retained but considered insufficient. At each station where this occurs, another attempt will be made to recover a sufficient sediment core. All sample collections will also be recorded on Daily Activity Logs (Attachment 2). Project documentation requirements are provided in Section A.6.

On a daily basis, the discrete grain size samples/ bulk chemistry samples will be transported via laboratory courier for rapid 24-hour reporting. As the grain size data come in, NAE will have the discrete grain size data and will provide guidance regarding the sample pooling/ composite scheme, and whether the full scope of remaining tests is to proceed on all FNP reaches.

Once the final composite scheme has been approve by NAE, additional sediment cores will be collected from the 26 locations to achieve the volume required to conduct the elutriate and biological testing. These subsequent cores will be collected and the appropriate depth intervals can be transferred directly into the sampling containers (e.g., buckets) without need for additional examination.

All remaining samples will be delivered to the laboratory performing the sample pooling/ composite preparation at the end of the final (water collection) field sampling day. At the laboratory, sub-samples will be collected equally from each horizon required to create a composite sample. By this schedule, the

composite formation may begin without delay, given the short 14 day hold time limitation for the water used in the project bioassays (**Table A-7** and Attachment 5).

After the sample composites are prepared, with NAE's approval, the elutriate chemistry (metals, PCBs, pesticides, and PAHs) and biological tests (SPP, 10-d whole sediment, 28-d bioaccumulation bioassays, and tissue analysis) may proceed. Refer to the task order QAPP (Section B) for a listing of the detailed parameters and species to be tested. The project will follow the schedule/ tiered approach laid out in **Table A-3** and **Figure A-2**.

Table A-7 Sample Container, Preservations, and Holding Time Requirements

Sediment Parameters	Volume/Mass	Container	Preservation	Storage	Holding Time
Physical Parameters	8-oz	Plastic	Chill	4±2 °C	NA
Chemistry	16-oz	Amber glass	Chill or Freeze	4±2 °C	28 days (Hg) 180 days (other metals)
Bulk Chemical/ Biological Testing Material	5-Gal Buckets (see Tables A-1 and A-4 for vol)	Plastic	Fill Completely	4°C dark/airtight	90 days

Aqueous Parameters	Volume/Mass	Container	Preservation	Storage	Holding Time
Metals	1-L	Plastic	HNO_3 to pH<2	4±2 °C	28 d (Hg) 180 d (other metals)
PAHs[1]	1-L	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
Pesticides	1-L	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
PCBs	1-L	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
Pentachlorophenol	1-L x 2	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
Bulk Chemical/ Biological Testing Material	5-Gal Cubitainers (see Tables A-2 and A-4 for vol)	Plastic	Fill Completely	4°C dark/airtight	14 d

[1]PAHs measured only in (sediment) equipment blank
[2]Pentachlorophenol measurement not needed in sediment EB; only pump EB and chemical elutriate.

A.5.1.4 QC Samples & Frequency

Contamination control is one of the important aspects of environmental sample collection efforts. For this reason, equipment blank QC samples will be collected from all equipment that comes in contact with the sediment and surface water samples.

A total of four sediment equipment blanks will be collected during the program:

- One equipment rinse blank will be collected from the NHH coring equipment;
- One equipment rinse blank will be collected from the NHH water sampling equipment;
- One equipment rinse blank will be collected from the CLDS grab sampling equipment; and
- One equipment rinse blank will be collected from the CLDS water sampling equipment.

In each case, high purity deionized water (DIW) will be poured over collection equipment (e.g., surface water sampling bottle, core liners, cutters, catchers, and processing utensils or grab sampler) or run through the pump, and collected in a chemistry container set (**Table A-4**).

A standard set of laboratory QC will be included in the analytical program as defined in the QAPP, but will not require any additional volume collected during field operations beyond those mass/ volumes already specified (**Table A-1** and **Table A-4**).

A.5.1.5 Sample Containers and Preservation Techniques

The sediment storage containers specified for the project are provided on **Table A-7**. Large/ bulk sediment samples will be transferred to UN-Compliant plastic 5 gallon buckets, smaller discrete samples needed for rapid grain size analysis and other purposes will be transferred to smaller plastic and glass containers. Seawater samples will be stored in 5 gallon cubitainers. All samples will be transferred to a refrigerated storage truck on shore.

Subsamples from each station collected for the purposes of station specific grain size analysis and for chemistry will be containerized and preserved/ stored as specified on **Table A-7** and transferred to the analytical laboratory (Alpha). Tissue samples will not be collected during field activities; the storage of tissues obtained from laboratory bioaccumulation bioassays is addressed in Section B.7-3 and **Table B-10**.

A.5.1.6 Decontamination Procedures

Sediment cores will be collected in new core liners that do not require decontamination. The coring equipment that contacts project samples (e.g., core head, catcher, & splitting equipment) will be decontaminated between deployments according to SOP NHH-G-03 (Decon Level 1). The grab sampler will also be cleaned thoroughly to remove any dust/ film before the reference sediment is collected. Level 1 decontamination procedures (SOP NHH-G-03) applied to sediment collection equipment corresponds to the following procedure:

- Non-phosphate soap solution wash/ brush-down;
- Thorough rinse with site water

Re-cleaning between discrete grab samples at the CLDS Reference Site will not be necessary unless the grab sampler is compromised in some way as determined by the field scientist. Stainless steel spoons used to homogenize the sediment will be cleaned in the same manner.

A.5.2 New Haven Harbor and CLDS Reference Site Water

As required by NAE's SOW, seawater from the harbor will be used in the preparation of chemical elutriates and SPP samples and seawater from CLDS Reference Site will be used for preparing dilutions in the SPP toxicity testing dilution series. Given the inherent purity of seawater, collection and handling procedures must follow strict contamination control procedures as discussed in this section. To minimize sample contamination risks, seawater will be collected using a high purity/ pre-cleaned diaphragm pump and tubing system.

A.5.2.1 Water Collection Locations

Water sample collections are planned in the vicinity of each composite group in the proposed dredge area. Water samples will be collected using either a non-contaminating pump with dedicated tubing, or a discrete grab water sampler per AECOM SOP NHH-W-01 (Appendix A). Seawater will also be collected at the CLDS Reference Site for the purposes of SPP dilution series preparations.

Water will be collected from mid-depth when the overlying water depth is less than 30 feet. Where water depth exceeds 30 feet, a composite sample will be created from near surface, mid-depth, and near bottom (3 feet above sediment).

A.5.2.2 Bulk Water Sampling Requirements

As indicated in **Table A-2**, the project team anticipates pooling selected sample groups before full-scale testing commences. To meet the full range of potential testing requirements, a minimum of 123 gallons of seawater will be collected from the harbor and 23 gallons from the CLDS Reference Site (**Table A-2** and **Table A-4**).

A.5.2.3 Sample Collection and Field & Laboratory Analysis

Navigation. The same navigation equipment and protocol used for the sediment collection effort will be used for the water collection effort (AECOM SOP NHH-G-02; Appendix A).

Seawater Collection. Seawater collections at harbor locations will proceed step-wise "up gradient" until the last (inner harbor) water is collected for added cross-contamination control since inner harbor stations are expected to contain higher levels of turbidity and trace chemical constituents relative to outer harbor waters.

Seawater from the harbor area (site water) and the reference area (SPP dilution water) will be collected using a pre-cleaned diaphragm pump and CFLEX™ tubing system at the surface (three feet below the surface), at the mid depth, and near the sediment bottom (three feet above the sediment surface) where water is greater than 30 feet deep. For shallower locations (less than 30 feet of water), water will be collected from mid-depth only. Given the water depth at the reference area, a Niskin bottle may be utilized. **Table A-5** includes the multi-parameter instrument sensors intended for use during water collection portion of the project and instrument calibration requirements are detailed in **Table A-6**.

All water column collections will be performed according to SOP NHH-W-01 (Appendix A). The volume to be collected at each proposed location needed for the project is detailed in **Table A-2** and **Table A-4**. Water collections will be recorded in the field log book and on daily activity logs (Attachment 2).

Pertinent field observations (turbidity, sheen, blooms, etc.) will be recorded on the field collection log and all water collections will also be recorded on daily activity logs (Attachment 2). Project documentation requirements are provided in Section A.6.

In the evening of the final water collection field day, all samples will be transferred to the biological laboratory (ESI) using the refrigerated storage truck. Upon NAE's final approval, sample preparations may begin the following day, to ensure adherence to 14-day hold time for all surface water to be used in the elutriate preparation and the SPP bioassays.

A.5.2.4 QC Samples and Frequency

QC sampling of the water collection program will include collection of a pump blank during the field effort to verify operation cleanliness. To prepare the equipment blank, high purity DIW will be pumped through all (connected) tubing sets and dispensed to a chemistry container set (**Table A-4**). If utilized, a Niskin bottle will also have an equipment blank prepared. It is therefore anticipated that two equipment blanks will be collected for surface water sampling.

A standard set of analytical QC samples will be included in the laboratory program, but additional volume beyond that already specified (**Table A-4**) will not be required.

A.5.2.5 Sample Containers and Preservation Techniques

Bulk water samples collected in the field will be contained in clean/ new five gallon plastic cubitainers and placed on ice for preservation. Discrete seawater samples for rinsate blanks will be contained in smaller plastic (metals) and glass (trace organics) bottles. Water sample containerization and preservation requirements are detailed on **Table A-7**. In addition to icing immediately following collection, the water samples will be transferred to the refrigerated box truck upon returning to the dock.

A.5.2.6 Decontamination Procedures

The tubing used to collect the water will be new/ previously unused and cleaned prior to use in the following manner:

- Deionized water (DIW) rinse
- Dilute Liquinox™ rinse
- DIW rinse
- Seawater flush for two minutes before collection

If tubing is used at the CLDS site, separate tubing sets will be used for harbor water vs. the higher purity CLDS Reference Site water to further minimize any potential cross-contamination. Further cleaning will not be necessary since water collections will proceed step-wise "up gradient" until the last (inner harbor) water is collected. However, each water station sampling will begin with a two minute site water flush.

A.6 Field Operations Documentation

Field documentation will include sediment core and grab sampling logs, with narratives describing relative grain sizes, color, odor, strata, core length and depth of penetration along with other pertinent sediment sampling observations. As indicated, digital photos of each core, including core number, date, top, bottom, and scale will be collected and sampling activities will be recorded on daily activity logs. Seawater collection data (profile information, unique observations) will be recorded in the field logbook.

The full range of information to be included in field records is provided on **Table A-8**. Field documents developed for this task are provided as Attachments 1 and 2.

A.6.1 Field Logbook and Field Sheets

Field logbooks will provide the means of recording the data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that persons reviewing site data can reconstruct a particular situation without reliance on memory.

Field logbooks will be bound field survey books or notebooks, and assigned to the field personnel, but will be stored in the project files when not in use. Each logbook will be identified by the project-specific document number.

The title page of each logbook will contain the following:

- Person to whom the logbook is assigned;
- The logbook number;
- Project name and number;
- Project start date; and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, and the signature of the person making the entry will be entered. The names of any visitors and the purpose of their visit will also be recorded in the field logbook.

Table A-8 Summary of Field Information

General Information	Record Location[1]
Project/task name/general location	All (A,B,C,D, and E)
Personnel on site (AECOM, clients, site contacts, regulators, oversight personnel, subcontractors, general public)	A, B
Results of phone calls, conversations	B
Chronology of activities, including mobilization, investigatory activities, and demobilization	B
Weather conditions (initial and any changes; temperature, barometric pressure, wind conditions, precipitation)	B
Tidal and atmospheric information (if applicable)	B, E
Subcontractors, description of services to be provided, and any issues (equipment problems, corrective action, stand by time)	B
Health and safety (H&S) tailgate meetings, H&S monitoring	Refer to APP
Description of major equipment (survey vessels, sampling platforms, sampling devices) and any problems or conditions that might impact performance or data quality	A, B
Equipment decontamination	D

General Information	Record Location[1]
Any pertinent field observations such as difficulties in sampling or conducting measurements or unusual circumstances that could affect data quality (instrument problems, contamination sources)	B
Deviations from approved plan (schedule, relocation/elimination of locations, change orders), including rationale and approval	A, B
Sample collection and transfer summary, custody information from collection through analysis, to final disposal	C, D
Field measurements	
Description of Instruments (make, model, serial number) and inspection	E
Instrument calibration (date, time, personnel, standard, standards used/expiration date, and results)	E
Measurement date, time, location/station, results (units, any correction factors applied, calculations (if applicable)	D, E
Identity of person performing the measurements	D, E
Sampling information	
Equipment description and inspection	B
Sample selection criteria/rationale (if different from plan)	A, B
Sample location (GPS coordinates, depth, compass/distance from fixed points)	B
Sample manipulations (homogenization, compositing, preservation)	D
Sample ID, (segment/interval), date, time, and sampler identity	B, D
Sample parameters, containers (size/type), preservation	
Field and QC sample ID, storage container and conditions for each (sub)sample/parameter set	C, D

[1] A: Daily Activity Log; B: Field Notebook; C: COC Form; D: Sample Processing Form; E: Water Quality Data Log

Field logbooks will be supplemented by standardized forms, such as coring logs and daily activity logs (Attachment 1 and 2). All measurements made and samples collected will be promptly recorded. All entries will be made in permanent ink, signed, and dated, and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is signed and dated by the sampler. Whenever a sample is collected, or a measurement is made, latitude and longitude information will be recorded. The number of photographs taken of the sampling location will be noted. All equipment used to make measurements will be identified, along with time and date of calibration and checking.

A.6.2 Photographic Records

Each sediment core will be photographed with a scale/ measuring tape for future reference. Each photograph will contain the core ID, the date, orientation (top/ bottom), a scale along the entire core length, and unique features (indicated with a pointer). Photographic records (electronic format) will be maintained in the project files and included in the field report.

A.6.3 Sample Documentation

The data management strategy for this task comprises the following elements:

- Assignment of unique sample codes. This code is used to track the sample from collection, through the analysis, to reporting.
- Data retention. Data will be retained in accordance with the requirements stated in Section A.6.5 of this SAP.

A.6.3.1 Sample Identification/Numbering

For each set of samples collected, the sample containers will be labeled with the following information:

- Project Name (New Haven Harbor DM Suitability Study 2017);
- Unique sample identification number (e.g., NHH-A thru Z, or NHH-CLDS)
- Date and time of sample collection;
- Name or initials of collector;
- Sample preservation/storage condition; and
- Type of analysis (grain size, etc.).

QC samples will be labeled in the following manner:

- Equipment blanks: NHH-EB-XXXX-mm/dd/yy where XXXX corresponds to the equipment type (either pump or grab) and mm/dd/yy corresponds to the collection date.
- Replicates: The sample identification (ID) is to be appended with “-Rep”

Water samples collected for the preparation of SPP/ Elutriate mixtures will be labeled NHC-1 thru NHC-8 as outlined in **Table A-2**.

A.6.3.2 Chain-of Custody Records

Custody is one of several factors necessary to satisfy the two major requirements for data admissibility: relevance and authenticity. Sample custody is addressed in two parts: field sample collection and laboratory analysis. Refer to AECOM SOP NHH-G-04 (Appendix A) for further details.

The field team is personally responsible for the care and custody of the samples until they are transferred or dispatched properly to the laboratories. Field procedures have been designed such that as few people as possible will handle the samples.

All sample containers will be identified by the use of adhesive sample labels. The sample numbering system is presented in Section 6.3.1. Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

Samples will be accompanied by properly completed Chain-of-Custody (COC) forms. The sample codes will be listed on the COC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of

samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location. An example COC form is attached (Attachment 3).

A.6.3.3 Field Instrument Calibration & Documentation

As discussed in Section A.5 *Field Activities*, navigational positioning will be acquired using DGPS instrumentation. Field measurements will include station position information.

Navigation instrumentation will be checked daily each day that seawater is sampled, and checked at the end of each seawater sampling day, as specified on **Table A-6**, following the procedures detailed in SOP NHH-G-02 (Appendix A).

Records of navigational accuracy and checking results will be recorded at the time of calibration or checking in the bound field logbook.

A.6.3.4 Documentation Procedures/ Data Management and Retention

Entries in field logbooks and on standardized forms will be reviewed for outliers and omissions prior to leaving the sampling site. Navigational data will be collected using DGPS integrated with PC-based navigational software. Actual survey positions will be documented at the time of sample collection on the electronic navigation charts and downloaded as survey records.

Photographic records collected of each core/ sample with scale during the course of study will be maintained in the project directory established for the project. If a case arises whereby a unique horizon >2 feet in thickness is encountered, photograph(s) should be transmitted to NAE (if possible) for real-time discussion and decision-making regarding potential segregation of the material.

Any potential deviation from the workplan must be discussed with the Task Order Manager and NAE TM and corrective actions documented as discussed in Section 10. If uncertainties arise, then the Chief Scientist may suspend activities until clarification is obtained from the task leadership (AECOM Task Order Manager, NAE TM).

AECOM's data manager, Mr. Jim Herberich, will establish an environmental database for the project where all measurement data will reside. Field station positions, collection dates/times, field analytical data and field observations will be included. Sample collection times will begin the COC record, based on unique sample IDs for discrete and composite samples, and all physical, chemical or biological laboratory data will be maintained. The database will provide the source data for project progress, draft and final reports. Sediment data will be provided in EDD format matching NAE's preferred format among the RIM specified formats. All EDDs will be checked using the most current EDD Checker available on the RIM website. Only EDDs that pass the Checker without error will be submitted, along with the Checker report.

All field/ project records will be maintained on the project website accessible only to designated AECOM and NAE personnel for a minimum of 5 years. Archived project files will include all field records as specialized log forms and measurement data, station position EDDs, logbook photocopies, photographs, calibration records, corrective action reports, and audit reports. The field report, final maps, progress reports, laboratory reports, and the draft and final Task Order reports will also be placed on the project website, as discussed in the QAPP Section of this SAP (Section B.13 *Reports*).

A.7 Sample Packaging and Shipping

All sample shipments will be accompanied by the COC record identifying the contents. The original record and one copy will accompany the shipment, and one copy will be retained by the sampler and placed in the project files.

Bulk samples will be transported via refrigerated truck; discrete samples will be properly packaged on ice at 4°C for shipment and dispatched to the laboratory for analysis according to AECOM SOP NHH-G-05 (Appendix A). A separate signed COC will be enclosed in and secured to the inside top of each sample box or cooler.

All project samples will be transferred by project couriers; common carriers are not anticipated. If common carriers become necessary for discrete sample shipments, then samples will be placed in plastic coolers for storage and transfer according to procedures detailed in AECOM SOP NHH-G-05. In these cases, custody seals will be attached to the front and back opposite corners of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations and the waybill will be retained in the project file.

A.8 Field Assessment/ Inspection

Sampling and subcontractor equipment will be checked by the Chief Scientist or designee during mobilization, initially before use, and at the end of each day. Furthermore, a field audit may be scheduled at the discretion of the Task Order Manager to verify the inspection process and to review methods and documentation from collection through final packaging and shipment.

Preliminary results of the audit will be reviewed with the Task Order Manager to ensure that deficiencies adversely affecting data quality are immediately corrected.

For this task, critical supplies for field activities will be tracked by the Field Survey Task Leader in the following manner.

Critical Supplies and Consumables	Inspection Requirements and Acceptance Criteria
Sample Containers	Visually inspected upon receipt for cracks/ breakage/ cleanliness. Must be accompanied by certificate of analysis.
Field Equipment & Instrumentation	Functional checks to ensure proper operation and testing (echo sounder, DGPS)
Sampling Equipment	Visually inspected for obvious defects, damage, and contamination

Supplies and consumables not meeting acceptance criteria will initiate the appropriate corrective action. Corrective measures may include repair or replacement of measurement equipment, and/or notification of vendor and subsequent replacement of defective or inappropriate materials. All actions will be documented in the project files.

Field equipment testing activities are listed in **Table A-6** along with non-conformance corrective actions. The laboratory system of inspection and acceptance of supplies and consumable is documented in each project laboratory QA manual.

Field data will be reviewed daily by the Field Survey Task Leader to ensure that the records are complete, accurate, and legible and to verify that the sampling procedures are in accordance with the protocols specified in the FSP and QAPP.

A.9 Nonconformance/Corrective Actions

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or poor performance that can affect data quality. Corrective action proposed and implemented should be documented in QA reports to management. Corrective action should only be implemented after approval by the Task Order Manager or designee.

Field Corrective Action
Corrective action in the field may be needed when the sample network is changed (i.e., more/ less samples, sampling locations other than those specified in the workplan, etc.), or when sampling procedures and/ or field analytical procedures require modification, etc., due to unexpected conditions. The field team may identify the need for corrective action. The Chief Scientist and Task Order Manager will notify the NAE Technical Manager who will approve the corrective measure. The Chief Scientist will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field records (SOP NHH-G-01 in Appendix A). Documentation will include:

- A description of the circumstances that initiated the corrective action;
- The action taken in response;
- The final resolution; and
- Any necessary approvals.

No staff member will initiate corrective action without prior communication of findings through the proper channels. If uncertainties arise in the field, the Chief Scientist may suspend field activities until clarification is obtained from the NAE TM.

Quality Assurance Project Plan

Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut

COMMITMENT TO IMPLEMENT THE ABOVE QUALITY ASSURANCE PROJECT PLAN

Ken Simon Bioassay Laboratory QA Manager	Date
Liz Porta Chemistry/Physical Lab Project Manager	Date

B.0 Quality Assurance Project Plan (QAPP)

B.1 Project Laboratory Organization and Responsibilities

Two laboratories will support the NHH environmental testing task: Alpha Analytical (Alpha), and Envirosystems Inc. (ESI). The laboratory organization and work breakdown is depicted in **Figure A-1** and **Table B-1**.

Table B-1 Laboratory Roles and Responsibilities

Sediment grain size and bulk chemistry			
Task 5 • Rapid 24 h Discrete Grain Size Reporting	Liz Porta. Alpha Analytical Physical Testing Laboratory Supervisor	Laboratory Manager: Christopher Ouellete QA Officer: James Todaro Sample Custodian: Kim Bailey	Alpha Analytical 8 Walkup Drive Westborough, MA 01581 508-898-9220 320 Forbes Boulevard Mansfield, MA 02048 (508) 822-9300
Task 6 Bulk Sediment Chemistry			
Sample processing/composite formation, elutriate and SPP preparation, elutriate, and tissue chemistry, and bioassays			
Task 4 • Sample processing, bulk sediment composite formation • Standard chemical elutriate & suspended phase particulate (SPP) sample preparation	Kirk Cram, ESI Processing Laboratory Supervisor	Laboratory Manager: Ken Simon QA Officer: Catie Sasso Sample Custodian: James Provencher	Envirosystems Inc., 1 Lafayette Rd, Hampton, NH 03842 (603) 926-3345
Task 7 • Elutriate Chemistry	Kirk Cram, ESI Aquatic Bioassay Supervisor		
Task 8 • SPP bioassays	Kirk Cram, ESI Aquatic Bioassay Supervisor		
Task 9 • 10-day whole sediment bioassays	Kirk Cram, ESI Sediment Bioassay Supervisor		
Task 10 • 28-day bioaccumulation bioassays	Kirk Cram, ESI Sediment Bioassay Supervisor		
Task 11 • Tissue Chemistry	Kirk Cram, ESI Laboratory Supervisor		

The Alpha Laboratory Manager is Christopher Ouellette, and the Alpha Project Manager will be Ms. Liz Porta. Ms. Porta will have responsibility for technical, financial, and scheduling matters related to physical and chemistry testing tasks (Task 5 and 6). Ms. Mary O'Connell-Kozik, AECOM's Physical/Chemistry Laboratory Coordinator, in general will be the point of contact for the laboratory task leads and safety and quality managers.

The ESI Laboratory Manager is Mr. Ken Simon, and the ESI Project Manager will be Mr. Kirk Cram, with responsibility for technical, financial, and scheduling matters related to sample processing, chemical analyses, and bioassay testing tasks (Tasks 4, 7, 8, 9, 10, and 11). Ms. Christine Archer, AECOM's Biology/Bioassay Laboratory Coordinator, will be the point of contact for the biology laboratory task leads and safety and quality managers. Ms. Mary O'Connell-Kozik, AECOM's Chemical Laboratory Coordinator, will also interface with the analytical laboratory task leads and safety and quality managers.

The Laboratory Managers in these organizations are ultimately responsible for the data produced by the laboratory. Specific responsibilities include:

- Implementing and adhering to the laboratory QA manual and all corporate policies and procedures within the laboratory,
- Approving the standard operating procedures (SOPs),
- Maintaining adequate staffing documented on organization charts, and
- Implementing internal/external audit findings corrective actions.
- Laboratory QA Coordinator
- The Laboratory QA Coordinator reports to the Laboratory Manager. Specific responsibilities include:
- Approving SOPs;
- Assessing and maintaining the laboratory QA manual implementation within the facility operations;
- Recommending resolutions for ongoing or recurrent non-conformances within the laboratory;
- Performing QA assessments; and

Reviewing and approving corrective action plans for non-conformances, tracking trends of non-conformances to detect systematic problems, and initiating additional corrective actions as needed.

The Laboratory Project Manager in these organizations is the primary point of contact between the laboratory and the appropriate AECOM Laboratory Coordinators. Specific responsibilities of the Laboratory Project Manager include:

- Monitoring analytical and QA project requirements for a specified project,
- Acting as a liaison between the client and the laboratory staff,
- Reviewing project data packages for completeness and compliance to client needs, and
- Monitoring, reviewing, and evaluating the progress and performance of projects.

B.2 Data Assessment and Responsibilities

Organization of the data assessment tasks are detailed in **Table B-2**. Chemical data will be verified by the Alpha QA department to check that the laboratory tasks followed the specified methods and conform to the QAPP including measurement quality objectives (MCOs) and reporting specifications. Chemical laboratory reports and data/EDD submittals will also be validated to check for completeness, evaluate quality control sample results and apply validation qualifiers as needed based on MCO non-compliance (e.g., blank contamination, etc.).

Similarly, the biological data will be verified by the ESI QA department to check that the laboratory tasks followed the specified methods, and conform to the QAPP specifications, including ancillary bioassay test water quality data collection.

B.3 Data Quality Objectives

The data quality objectives (DQOs) for this task have been established by EPA and the Corps of Engineers as documented in the RIM document (EPA/USACE, 2004). The DQO process, that is –problem statement, goal identification and study questions, new data/analysis requirements, study boundaries, analytical approach with corresponding performance/acceptance criteria - have been incorporated into this SAP.

Table B-2 Data Assessments Organization and Responsibilities

Task	Data Verification Responsibility	Data Validation Responsibility
Task 5 • Rapid 24 h Discrete Grain Size Reporting **Task 6** • Bulk Sediment Chemistry •	James Todaro Alpha Analytical, 320 Forbes Boulevard Mansfield, MA 02048 (508) 822-9300	Sharon McKechnie, AECOM 250 Apollo Drive Chelmsford, MA 01824 978-905-2317
Task 4 • Sample processing, bulk sediment composite formation • Standard chemical elutriate & SPP sample preparation	Catie Sasso, ESI QA Officer 1 Lafayette Rd, Hampton, NH 03842 (603) 926-3345	Christine Archer, AECOM 1155 Elm Street Suite 401 Manchester, NH 03101 603-622-1556
Task 7, & Task 11 • Elutriate Chemistry • Tissue Chemistry		Sharon McKechnie, AECOM 250 Apollo Drive Chelmsford, MA 01824 978-905-2317
Task 8, Task 9, & Task 10 • SPP bioassays • 10-day whole sediment bioassays • 28-day bioaccumulation bioassays		Christine Archer, AECOM 1155 Elm Street Suite 401 Manchester, NH 03101 603-622-1556

B.3.1 Data Use Background

The assessment of dredged material typically follows a tiered testing approach. If data collected in earlier tests are insufficient to provide a basis for an environmental conclusion, then additional testing (higher level tiers) is undertaken to collect additional data. For example, if the 24-hour TAT grain size data identified that the accumulated sediment to be dredged was only coarse-grained (i.e. sandy) material, then the exclusionary criteria admitting placement in the marine environment unconfined without further testing may be met. Conversely, fine-grained sediments will require added testing before an impact assessment can be completed and a decision made with respect to the final dredged material placement.

Based on NAE decision-making, physical, chemical, and biological (bioassay) data may be generated during the performance of this Task Order to evaluate potential AWQC and LPC exceedances (Elutriate & SPP bioassays), potential toxicity to sediment-associated organisms (10-d whole sediment bioassay with an amphipod and shrimp), and potential chemical bioaccumulation (28-d bioaccumulation clam and worm bioassays) with corresponding tissue chemistry information.

Overall, the data will be used to evaluate potential environmental impacts associated with the proposed maintenance dredging project in the New Haven Harbor FNP, but each data type will be addressed separately in the following sections.

B.3.2 Measurement Quality Objectives

Measurement quality objectives (MQOs) for sensitivity are well established and published in the RIM document for this task. Required methods and corresponding target reporting limits are provided in the RIM document, summarized in this section, and detailed on **Table B-3** (sediment physical & chemical measurements), **Table B-4** (aqueous chemistry), **Table B-5** (tissue chemistry).

Table B-3 Sediment Methods, Reporting Limits, and Project Required Detection Limits

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Physical Tests					
Total Solids/Water Content	ASTM	D-2216	1.0	1.0	%
Percent Moisture	SM	2540	1.0	1.0	%
Grain Size Analysis	ASTM	D-6913	N/A	N/A	%
Hydrometer Analysis	ASTM	D7928	N/A	N/A	%
Metals					
Arsenic	SW 846	6020A	0.4	0.4	ppm
Cadmium	SW 846	6020A	0.07	0.07	ppm
Chromium	SW 846	6020A	0.5	0.5	ppm
Copper	SW 846	6020A	0.5	0.5	ppm
Lead	SW 846	6020A	0.5	0.5	ppm
Mercury	SW 846	7474/7471B	0.02	0.02	ppm
Nickel	SW 846	6020A	0.5	0.5	ppm
Zinc	SW 846	6020A	1.0	1.0	ppm

Table B-3 Sediment Methods, Reporting Limits, and Project Required Detection Limits

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
PAHs					
Acenaphthene	SW-846	8270DSIM	0.01	0.01	ppm
Acenaphthylene	SW-846	8270DSIM	0.01	0.01	ppm
Anthracene	SW-846	8270D-SIM	0.01	0.01	ppm
Benzo(a)anthracene	SW-846	8270DSIM	0.01	0.01	ppm
Benzo(a)pyrene	SW-846	8270DSIM	0.01	0.01	ppm
Benzo(b)fluoranthene	SW-846	8270D-SIM	0.01	0.01	ppm
Benzo(k)fluoranthene	SW-846	8270D-SIM	0.01	0.01	ppm
Benzo(g,h,i)perylene	SW-846	8270D-SIM	0.01	0.01	ppm
Chrysene	SW-846	8270D-SIM	0.01	0.01	ppm
Dibenz(a,h)anthracene	SW-846	8270DSIM	0.01	0.01	ppm
Fluoranthene	SW-846	8270D-SIM	0.01	0.01	ppm
Fluorene	SW-846	8270D-SIM	0.01	0.01	ppm
Indeno(1,2,3-cd)pyrene	SW-846	8270D-SIM	0.01	0.01	ppm
Naphthalene	SW-846	8270D-SIM	0.01	0.01	ppm
Phenanthrene	SW-846	8270D-SIM	0.01	0.01	ppm
Pyrene	SW-846	8270D-SIM	0.01	0.01	ppm
Pesticides					
Aldrin	SW-846	8081B	0.001	0.001	ppm
Chlordane – Alpha	SW-846	8081B	0.001	0.001	ppm
Chlordane – gamma	SW-846	8081B	0.001	0.001	ppm
Chlordane – oxy	SW-846	8081B	0.001	0.001	ppm
4,4' – DDT	SW-846	8081B	0.001	0.001	ppm
4,4' – DDD	SW-846	8081B	0.001	0.001	ppm
4,4' – DDE	SW-846	8081B	0.001	0.001	ppm
Dieldrin	SW-846	8081B	0.001	0.001	ppm
Endosulfan alpha and beta	SW-846	8081B	0.001	0.001	ppm
Endrin	SW-846	8081B	0.001	0.001	ppm
Heptachlor and derivative (epoxide)	SW-846	8081B	0.001	0.001	ppm
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.001	0.001	ppm
Methoxychlor	SW-846	8081B	0.001	0.001	ppm
Toxaphene	SW-846	8081B	0.025	0.025	ppm
trans and cis Nonachlor	SW-846	8081B	0.001	0.001	ppm
Hexachlorobenzene	SW-846	8081B	0.001	0.001	ppm

Table B-3 Sediment Methods, Reporting Limits, and Project Required Detection Limits

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
PCBs					
Congener analysis	SW-846	8082/8270 SIM	0.001	0.001	ppm
TOC	SW-846	9060	0.01	0.1	%

Table B-4 Aqueous Methods, Reporting Limits, and Project-Required Detection Limits (Surface Water, Elutriates, and Blank Samples)

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Metals[1]					
Arsenic	SW-846	6020	1	1	ppb
Cadmium	SW-846	6020	1	1	ppb
Chromium	SW-846	6020	1	1	ppb
Hexavalent chromium	SW-846	7196	1	1	ppb
Copper	SW-846	6020	0.6	0.6	ppb
Lead	SW-846	6020	1	1	ppb
Mercury	SW-846	7470A	0.4	0.4	ppb
Nickel	SW-846	6020	1	1	ppb
Selenium	SW-846	6020	1	1	ppb
Silver	SW-846	6020	0.05	0.5	ppb
Zinc	SW-846	6020	1	1	ppb
PAHs[2]					
Acenaphthene	SW-846	8270D	10	10	ppb
Acenaphthylene	SW-846	8270D	10	10	ppb
Anthracene	SW-846	8270D	10	10	ppb
Benzo(a)anthracene	SW-846	8270D	10	10	ppb
Benzo(a)pyrene	SW-846	8270D	10	10	ppb
Benzo(b)fluoranthene	SW-846	8270D	10	10	ppb
Benzo(k)fluoranthene	SW-846	8270D	10	10	ppb
Benzo(g,h,i)perylene	SW-846	8270D	10	10	ppb
Chrysene	SW-846	8270D	10	10	ppb
Dibenz(a,h)anthracene	SW-846	8270D	10	10	ppb
Fluoranthene	SW-846	8270D	10	10	ppb
Fluorene	SW-846	8270D	10	10	ppb
Indeno(1,2,3-cd)pyrene	SW-846	8270D	10	10	ppb
Naphthalene	SW-846	8270D	10	10	ppb

Table B-4 Aqueous Methods, Reporting Limits, and Project-Required Detection Limits (Surface Water, Elutriates, and Blank Samples)

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Phenanthrene	SW-846	8270D	10	10	ppb
Pyrene	SW-846	8270D	10	10	ppb
Semi-volatile compounds					
Pentachlorophenol	SW-846	8270D	2	2.60	ppb
Pesticides					
Aldrin	SW-846	8081B	0.26	0.26	ppb
Chlordane (alpha/gamma/oxy)	SW-846	8081B	0.02	0.02	ppb
Chloropyrifos	SW-846	8081B	0.002	0.002	ppb
4,4'-DDT	SW-846	8081B	0.03	0.03	ppb
Dieldrin	SW-846	8081B	0.014	0.14	ppb
Endosulfan and derivatives (I, II)	SW-846	8081B	0.007	0.007	ppb
Endrin	SW-846	8081B	0.0007	0.007	ppb
Heptachlor & derivative (epoxide)	SW-846	8081B	0.01	0.01	ppb
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.26	0.26	ppb
Toxaphene	SW-846	8081B	0.04	0.04	ppb
PCBs					
Congener analysis	SW-846	8082	0.006	0.006	ppb
Pentachlorophenol[3]	SW-846	8270D	2.6	2.6	ppb

[1] Metals samples will be extracted from seawater matrix and preconcentrated before analysis.
[2] Aqueous PAHs will be only be analyzed in the grab sampler equipment blank.
[3] Pentachlorophenol will not be analyzed in the grab sampler equipment blank.

Table B-5 Tissue Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Laboratory RL	Project Required RL	RL Units
Percent Moisture	SM 2540	SM 2540	0.1	0.1	%
Total lipids	NOAA 130, 1998	NOAA Tech Memo NOS ORCA 130, 1998	0.1	0.1	%
PCBs (wet wt.)					
PCB Congeners	SW-846	8082	0.5	0.5	ppb
Metals (wet wt.)					
Arsenic	EPA OW	6020	0.5	0.5	ppm
Cadmium	EPA OW	6020	0.1	0.1	ppm

Table B-5 Tissue Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Laboratory RL	Project Required RL	RL Units
Chromium	EPA OW	6020	1.0	1.0	ppm
Copper	EPA OW	6020	1.0	1.0	ppm
Lead	EPA OW	6020	1.0	1.0	ppm
Mercury	SW-846	7474	0.02	0.02	ppm
Nickel	EPA OW	6020	1.0	1.0	ppm
Zinc	EPA OW	6020	1.0	1.0	ppm
PAHs (wet wt.)					
Acenaphthene	SW-846	8270DIM	0.01	0.02	ppm
Acenaphthylene	SW-846	8270DSIM	0.01	0.02	ppm
Anthracene	SW-846	8270DSIM	0.01	0.02	ppm
Benzo(a)anthracene	SW-846	8270DSIM	0.01	0.02	ppm
Benzo(a)pyrene	SW-846	8270DIM	0.01	0.02	ppm
Benzo(b)fluoranthene	SW-846	8270D-SIM	0.01	0.02	ppm
Benzo(k)fluoranthene	SW-846	8270DSIM	0.01	0.02	ppm
Benzo(g,h,I)perylene	SW-846	8270D-SIM	0.01	0.02	ppm
Dibenz(a,h)anthracene	SW-846	8270D-SIM	0.01	0.02	ppm
Chrysene	SW-846	8270DIM	0.01	0.02	ppm
Fluoranthene	SW-846	8270DSIM	0.01	0.02	ppm
Fluorene	SW-846	8270DSIM	0.01	0.02	ppm
Indeno(1,2,3-cd)pyrene	SW-846	8270DSIM	0.01	0.02	ppm
Naphthalene	SW-846	8270DSIM	0.01	0.02	ppm
Phenanthrene	SW-846	8270DSIM	0.01	0.02	ppm
Pyrene	SW-846	8270DSIM	0.01	0.02	ppm
Pesticides (wet wt.)					
Aldrin	SW-846	8081B	0.001	0.001	ppm
Chlordane – Alpha	SW-846	8081B	0.001	0.001	ppm
Chlordane – gamma	SW-846	8081B	0.001	0.001	ppm
Chlordane – oxy	SW-846	8081B	0.001	0.001	ppm
4,4' – DDT	SW-846	8081B	0.001	0.001	ppm
4,4' – DDD	SW-846	8081B	0.001	0.001	ppm
4,4' – DDE	SW-846	8081B	0.001	0.001	ppm
Dieldrin	SW-846	8081B	0.001	0.001	ppm
Endosulfan & derivatives (I, II)	SW-846	8081B	0.001	0.001	ppm
Endrin	SW-846	8081B	0.001	0.001	ppm
Cis-Nonachlor	SW-846	8081B	0.001	0.001	ppm
Heptachlor & derivative (epoxide)	SW-846	8081B	0.001	0.001	ppm

Table B-5 Tissue Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Laboratory RL	Project Required RL	RL Units
Trans-Nonachlor	SW-846	8081B	0.001	0.001	ppm
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.001	0.001	ppm
Methoxychlor	SW-846	8081B	0.001	0.001	ppm
Toxaphene	SW-846	8081B	0.05	0.05	ppm
Hexachlorobenzene	SW-846	8081B	0.001	0.001	ppm

[1]RL – Reporting limit. Listed laboratory RLs correspond to clam and worm species. RLs for plant tissues will be higher by a factor of five.
LL – Low Level

For this task, systematic checks have been included to ensure data quality. MQOs corresponding to the QC samples are detailed in **Table B-6** (Physical/Chemistry) and **Table B-7** (Bioassays) to ensure that the Data Quality Indicators (DQIs) support the task data usability quality requirements. Quantitative laboratory DQIs for accuracy are supported through the analysis of QC samples as method blanks, matrix spikes, standard reference materials, and in the case of bioassays, through the use of reference toxicants and the monitoring of controls (control survival).

DQIs for precision are supported with the analysis of QC sample spike and/or laboratory duplicates. Field blanks and in some cases field duplicates can also provide important indications of data quality and field blanks have been included in this task (refer to FSP). Completeness of targeted field and laboratory scopes is another important indicator of overall usability/quality.

Qualitative DQIs addressing representativeness and comparability will be assured to some degree through the high number of stations to be sampled, and the subsequent formation of composite samples. The specified use of RIM specified methods will also assure comparability of the dataset to historical data sets generated for similar purposes.

The MQOs established for the quantitative DQIs have been defined below for this task.

Precision
Precision is a measure of the degree to which two or more measurements are in agreement. Laboratory precision will be assessed through the calculation of Relative Percent Difference (RPD) for laboratory duplicate samples, either as matrix spike/ matrix spike duplicates (MS/MSDs) or as laboratory duplicates. Laboratory precision control limits are provided in **Table B-6**. Specific formulas/equations supporting these and other DQIs are provided in Section B.8 *Data Reduction/ Calculation of Data Quality Indicators*.

Accuracy
Accuracy is the degree of agreement between the observed value and an accepted reference or true value. Field accuracy will be assessed through the use of equipment rinsate blanks and through the adherence to all sample handling, preservation, and holding time requirements. Laboratory accuracy will be assessed through the analysis of MS/MSDs, standard reference materials, laboratory control samples (LCSs), and surrogate compounds, and the subsequent determination of percent recoveries (%Rs). Accuracy control limits are provided in **Table B-6**.

Table B-6 Measurement Quality Objectives for Physical and Analytical Measurements

QC Sample	Units	GS	TOC	Pentachlorophenol	Metals	PCBs	Pest	PAHs	Corrective Action
Sediment Material									
Method Blank	Conc	-	< RL	-	<RL	<RL	<RL	<RL	*1*
Surrogate Spikes	% Rec	-	-	-	-	30-150	30-150	30-150	*2*
Matrix Duplicate	% RPD	25	30	-	20	30	30	30	*3*
Matrix Spike	% Rec	-	-	-	75-125	50-120	50-120	50-120	*4*
MSD	% RPD	-	-	-	-	30	30	30	*5*
SRM	% Rec	-	75-125	-	w/in limits	40-140	40-140	40-140	*6*
Aqueous Material									
Method Blank	Conc	-	-	<RL	<RL	<RL	<RL	<RL	*1*
Surrogate Spikes	% Rec	-	-	30-150	-	30-150	30-150	30-150	*2*
Matrix Duplicate	% RPD	-	-	-	-	-	-	-	*3*
Matrix Spike	% Rec	-	-	50-120	80-120	50-120	50-120	50-120	*4*
MSD	% RPD	-	-	30	-	30	30	30	*5*
LCS	% Rec	-	-	50-120	80-120	50-120	50-120	50-120	*6*
Tissue Material									
Method Blank	Conc	-	-	-	<RL	<RL	<RL	<RL	*1*
Surrogate Spikes	% Rec	-	-	-	-	30-150	30-150	30-150	*2*
Matrix Duplicate	% RPD	-	-	-	30	30	30	30	*3*
Matrix Spike	% Rec	-	-	-	75-125	50-120	50-120	50-120	*4*
MSD	% RPD	-	-	-	-	30	30	30	*5*
LCS	% Rec	-	-	-	w/in limits	40-140	40-140	40-140	*6*

[a]QC samples analyzed at a frequency of one per batch of 20 or fewer samples, except surrogates are added to each sample.

Corrective Action Codes:

1 Flag results if <5x blank concentration, re-extract or reanalyze the entire batch.

2 Re-extract sample, re-analyze sample or document and narrate

3 Flag results

4 Flag results

5 Investigate, re-analyze or flag results

6 Re-extract/reanalyze entire batch if all analytes are outside limits; if selected analytes affected, investigate and provide narrative.

Data Qualifiers:

J: Analyte detected < laboratory achieved detection limit (i.e., ssRL for organics and RL for metals) but above MDL.

E: Estimate, result > highest concentration level in the calibration.

B: Analyte concentration is <5x the level found in the procedural blank (the qualifier is only applied to the affected field samples).

U: Not detected above laboratory achieved reporting detection limit

Q: QC value outside the accuracy or precision criteria goal.

Table B-7 Bioassay Measurement Quality Objectives

QC Parameter	Measure or Acceptance Criteria	Corrective Action
SPP Toxicity Testing	*Menidia menidia:* ≥90% control survival *Americamysis bahia*: ≥90% control survival *Arbacia punctulata*: ≥70% control survival	Re-run Test
10-Day Whole Sediment Acute Testing	*Leptocheirus plumulosus*: control ≥90%mean survival in control *Americamysis bahia*: ≥90%mean survival in control	Re-run Test
Bioaccumulation	*Macoma nasuta* and *Nereis virens* bioaccumulation	Re-run Test
Reference Toxicity Tests (10-day and SPP)	≥90% mean survival in control (and within control chart limits)	Repeat entire test series

Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

- Field completeness is a measure of the amount of valid samples obtained during all sampling for the project. The field completeness objective is greater than 95%.
- Laboratory completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. The laboratory completeness objective is greater than 95%.

All analytical data that do not meet the listed MQOs will be submitted to the appropriate AECOM Laboratory Coordinator for review and assessment of the potential impact of the results. Affected samples may be reanalyzed at the discretion of the AECOM Task Order Manager. Data accepted outside these criteria will be flagged with the appropriate data qualifier (**Table B-6** and **Table B-7**), and the rationale for accepting results will be thoroughly documented.

B.4 Sample Receipt, Handling, Custody, and Holding Time Requirements

B.4.1 Sample Receipt Condition Verification/Documentation

Upon sample receipt at the respective laboratories, the condition of samples and associated packaging will be evaluated and documented on a sample receipt form (Attachment 4). As noted on the form, temperature, container condition, unique or unusual sample observations, labeling discrepancies, preservation status, COC completeness, etc. will be documented and a copy sent to the appropriate AECOM Laboratory Coordinator without delay.

When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the COC form (Attachment 3). This record documents the transfer of custody of samples from the sampler to another person, to the permanent laboratory, or to/from a secure storage location.

B.4.2 Corrective Action for Incoming Samples

Corrective actions may in some cases be taken on incoming samples that do not meet storage requirements. All actions are to be discussed with the Task Order Manager, and may include re-containerizing samples when containers are cracked, etc.

Corrective actions will be documented in the project file. Documentation will include:

- A description of the circumstances that initiated the corrective action;
- The action taken in response;
- The final resolution; and
- Any necessary approvals.

No person will initiate corrective action without prior communication of findings through the proper channels.

B.5 Sample Preparation for Physical, Chemical, & Biological Tests (Task 4)

Station homogenates will be prepared initially in the field by mixing the sediment within each bucket with large pre-cleaned stainless steel spoons as additional core material is added. In this way, the discrete subsamples collected for grain size and chemical archive will represent the station samples.

Stations will be re-homogenized at the bioassay laboratory (ESI) before sample pooling commences by mixing the full volume collected from each station in a large 40-L HDPE plastic bin. These same bins will be used to mix the station composites, one bin per composite for storage between subsampling for the Elutriate/SPP samples, the 10-day bioassay, and the 28-day bioassay.

Composites will be prepared by mixing **equal volumes** from each station to form the final composite sample (see **Table A-1** for compositing scheme). Sample container and storage requirements for the range of potential measurements are detailed on **Table A-7** and Attachment 5.

Tools used in sample transfer and mixing will be either stainless steel or Teflon pre-cleaned using the Level III decontamination procedure detailed in SOP NHH-G-03 (Appendix A). Composite labeling will be as specified in **Table A-1** and **Table A-2**. Materials will be retained (refrigerated) until NAE accepts/approves the final project report.

B.6 Analytical Procedures–Physical & Chemical Parameters (Task 5, 6, 7, & 11)

B.6.1 Sediment Procedures (Tasks 5 & 6)

Sediment physical and chemical parameters will be analyzed by two NAE approved laboratories, Alpha and ESI. The laboratory QAPP for Alpha was submitted to and approved by NAE. Periodic updates have been submitted to NAE, most recently in April 2017. The laboratory QAPP for ESI was submitted to and approved by NAE. Periodic updates have been submitted to NAE, most recently in April 2016.

Initially, discrete samples collected from the 26 individual sampling stations will be wet sieved by Alpha to determine gravel, sand, silt and clay (#4, 10, 40 and 200 sieves) on a fast (24-hour) turnaround time.

Following NAE's data review/approval and composite preparation, bulk sediment samples will be analyzed by sieve-hydrometer (Task 5; Alpha) and sediment chemical methods (Task 6; Alpha). **Table B-3** details the methods and Reporting Limits (RLs) established as DQOs (equivalent to RIM requirements) to meet project objectives.

Grain size analysis (with hydrometer) of the harbor composites and reference site sample shall be conducted according to the methods described in ASTM D422 and Alpha SOP 2183 (Revision8, June 2017) Particle Size Analysis of Soils-With/Without Hydrometer and reported as percentages retained by weight in the following size classes at a minimum:

Cobble (3" sieve)
Gravel (no. 4 sieve)
Coarse Sand (no. 10 sieve)
Medium Sand (no. 40 sieve)
Fine Sand (no. 200 sieve)
Fine Grained Material (passing the no. 200 sieve)

Results will be reported on a dry-weight basis, and will include distribution curves. QC results will be reported on NAE's QC Summary Tables (Appendix B).

Total Organic Carbon (TOC) will be analyzed as detailed in Alpha SOP 17452 Total Organic Carbon and Soot in Soil, Sediment (Revision 1, July 2015). All samples will be analyzed in duplicate. Results will be reported on a dry-weight basis.

Trace Organic Parameters as PAHs, PCB Congeners and pesticides will be analyzed following Alpha SOPs 2157, Analysis of Polynuclear Aromatic Hydrocarbons and PCB Congeners by Gas Chromatography/Mass Spectrometry with Selected Ion Monitoring (Revision 13, May 2016) and 2158, Determination of Organochlorine Pesticides By Gas Chromatography/Electron Capture Detection (GC/ECD) (Revision 13, June 2017). Samples are extracted three times using appropriate solvent. Extracts are combined, dried over sodium sulfate, and evaporatively concentrated. Concentrated extracts may require cleanup before analysis. Cleanup procedures may include copper, silica gel, florisil, sulfuric acid or other appropriate cleanup techniques.
Target compound identification will be based on dual- column analysis for GC analyses or reference mass spectral identification for GC-MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using external standards for GC analyses and internal standards for GC-MS analyses.

All results will be reported in microgram per kilogram (µg/kg) dry weight.

Metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc) will be analyzed following procedures in Alpha SOP 2137, Inductively Coupled Plasma-Mass Spectrometry (Revision 13, April 2016). Sample preparation will be conducted according to the SOP An aliquot of digestate will be nebulized into a spray chamber where a stream of argon carries the sample aerosol through a quartz torch and injects it into the radio frequency inductively coupled plasma. The ions produced in the plasma are introduced to the mass spectrometer for quantification against a single point initial calibration. All results are reported in milligrams per kilogram (mg/kg) dry weight.

Mercury will be analyzed following procedures in Alpha SOP2143, Mercury Determination in Tissue and Soil/Sediment Samples by Cold Vapor Atomic Fluorescence Technique (CVAF) (Revision 8, July 2015) Sediment samples (approximately 1 g) will be digested by hot plate in an aqua regia acid solution. An aliquot of the digest will then be prepared with HCL/BrCl and hydroxylamine hydrochloride solution. Mercury in the digested sample is reduced to elemental mercury, aerated from solution and introduced into the spectrophotometer. The emission is measured and compared to a multi-level initial calibration for quantification. All results will be reported in mg/kg dry weight.

B.6.2 Elutriate/ SPP Preparation & Aqueous Analytical Procedures (Task 7)

The preparation of elutriate and SPP samples will utilize the sediment composites prepared under Task 4 detailed above. Elutriate and other (i.e., equipment blanks, CLDS Reference Site water) aqueous samples will be analyzed for trace metals, PAHs (equipment blank only), PCBs/pesticides and pentachlorophenol (not in CLDS water equipment blank). The samples will be prepared in glass containers. The elutriate/ SPP preparation must commence no later than 14 days after seawater collection. Elutriate and SPP samples will be prepared concurrently and used within 24 hours of preparation.

The elutriate/SPP samples are prepared by placing one volume of test sediment and four volumes of dredging site water (i.e. harbor water) from the appropriate site in an eight-gallon glass container and mixing vigorously with a magnetic stir bar. Additionally, the sediment/water mixture will be hand stirred at approximately 10 minute intervals during the mixing period. At the end of the 30-minute period, the sediment/water mixture will be allowed to settle for one hour and the supernatant (elutriate/SPP) siphoned off for testing. Sufficient sediment and seawater volumes are used to prepare samples for chemical analysis of the elutriate and SPP bioassays. If required, the SPP portion may be centrifuged (only enough to clear the water so organisms can be seen) to facilitate biological observations.

The elutriate samples will be prepared in **triplicate** for the analyses of PCBs/pesticides, pentachlorophenol, and trace metals. Elutriate samples will be centrifuged at ESI, split for metals and organic analysis, and then containerized per **Table A-7** and Attachment 5 requirements. Elutriate blanks are defined for this project as the site water (used to prepare elutriates) that are run through the entire elutriate preparation process for background correction purposes.

Table B-4 details the list of target elutriate analytes, corresponding analytical method references, and target detection limits for the aqueous project samples.

Trace Organic Parameter elutriate and elutriate blank samples will be centrifuged at ESI and analyzed at ESI. Rinsate blank samples will be transferred to ESI directly from the field. PAH (sediment equipment blank), pentachlorophenol, PCB Congeners and pesticides will be analyzed following the ESI SOPs 1345 (Revision 3, March 2012) Analysis of ABN Compounds by GC/MS, 1351 (Revision 9,March 2016) Analysis of Pesticides and PCBs in Extracts of Soil, Tissue and Water and 1391 (Revision 1, May 2013) Analysis of Selected PCB Congeners by GC/MS. Water samples will be extracted according to ESI SOPs 1367 (Revision 3, March 2013) Extraction of Pentachlorophenol and Other ABN Compounds in Aqueous Samples and 1344 (Revision 9, April 2014) Extraction of Pesticides and PCBs in Aqueous Samples.

Samples are extracted three times using appropriate solvent. Extracts are combined, dried over sodium sulfate, and evaporatively concentrated. Concentrated extracts may require cleanup before analysis. Cleanup procedures may include copper, silica gel, florisil, sulfuric acid or other appropriate cleanup techniques.

Target compound identification will be based on dual- column analysis for GC analyses or reference mass spectral identification for GC-MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using external standards for GC analyses and internal standards for GC-MS analyses.

All results will be reported in microgram per liter (µg/L) units.

Metals elutriate and elutriate blank samples will be prepared and analyzed at ESI. The reference site water samples will be transferred to ESI directly from the field. Elutriate and elutriate blank samples will be analyzed for ten metals: arsenic, cadmium, hexavalent chromium, copper, nickel, lead, silver, selenium, zinc, and mercury.

Mercury will be analyzed following procedures in ESI SOP 1365 (Revision 5, June 2012), Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry. Water samples will be digested with a BrCl solution followed by reduction with a hydroxylamine hydrochloride solution. Mercury in the digested sample will be reduced to elemental mercury, aerated from solution and introduced into the fluorescence detector. The emission will be measured and compared to a multi level initial calibration for quantification.

Arsenic, cadmium, copper, nickel, lead, selenium, silver, and zinc will be extracted from seawater according to ESI SOP1323 (Revision 8, January 2015) Sample Preparation; Trace Metals Digestion and analyzed according to ESI SOP1369 (Revision 9, June 2016) Determination of Trace Metals by ICP-MS Analysis.

Hexavalent chromium will be analyzed according to ESI SOP 1353 (Revision 12, July 2015) Hexavalent Chromium.

All metals results will be reported in mg/L units.

B.6.3 Tissue Analytical Procedures (Task 11)

Although the 28-day bioaccumulation testing will be performed on all composite group sediment samples, chemical analyses will only be performed on tissue samples for those sediments that pass the 10-day whole sediment acute toxicity test. **Table B-5** lists the potential parameters that may be analyzed in the bioaccumulative tissue samples. If selected parameters are not detected in selected sediment composites, then those parameters may be omitted from tissue testing with NAE approval.

Trace organic tissue parameters as PAHs, PCB Congeners and Pesticides will be analyzed after preparation following Alpha SOPs 2157 (Revision13, May 2016) Analysis of Polynuclear Aromatic Hydrocarbons and PCB Congeners by Gas Chromatography/Mass Spectrometry with Selected Ion Monitoring and 2158, Determination of Organochlorine Pesticides By Gas Chromatography/Electron Capture Detection (GC/ECD) (Revision 13, June 2017). Samples are extracted three times using appropriate solvent. Extracts are combined, dried over sodium sulfate, and evaporatively concentrated. Concentrated extracts may require cleanup before analysis. Cleanup procedures may include copper, silica gel, florisil, sulfuric acid or other appropriate cleanup techniques.

Target compound identification will be based on dual- column analysis for GC analyses or reference mass spectral identification for GC-MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using external standards for GC analyses and internal standards for GC-MS analyses.

All tissue results will be reported in nanograms per gram (ng/g) on a wet weight basis.

Lipid Content in tissue samples will be determined according to NOAA Tech Memo 130, 1998. An aliquot of tissue is weighed in a tared glass vial and the lipid content of the sample is extracted using a specific ratio of solvent to water. The sample is serially extracted three times. The organic layer is removed and dried over sodium sulfate. The extract is evaporated to dryness, leaving the lipid content. Amount of residue is determined gravimetrically.

The results will be reported in % wet tissue.

Metals tissue samples will be processed according to Alpha SOP 2137 (Revision 13, April 2016) Inductively Coupled Plasma-Mass Spectrometry.

For metals other than mercury, an aliquot of the digestate will be analyzed following procedures in Alpha SOP 2137. By this procedure, the digestion solution is nebulized into a spray chamber where a stream of argon carries the sample aerosol through a quartz torch and injects it into the radio frequency inductively coupled plasma. The ions produced in the plasma will be introduced to the mass spectrometer for quantification against a single point initial calibration.

Mercury will be analyzed following procedures in Alpha SOP 2143 (Revision 8, July 2015) Mercury Determination in Tissue and Soil/Sediment Samples by Cold Vapor Atomic Fluorescence Technique. An aliquot of the digest is prepared with HCL/BrCl and hydroxylamine hydrochloride solution. Mercury in the digested sample will be reduced to elemental mercury, aerated from solution and introduced into the fluorescence detector. The fluorescence will be measured and compared to a multi-level initial calibration for quantification.

All metals results will be reported in micrograms per gram (µg/g) on a wet weight basis.

B.6.4 Preventive Maintenance

Routine testing and preventive maintenance is performed by the laboratory as part of their QA program. Details on the type of checks, frequencies, and corrective actions associated with the physical and chemical project measurements are included in the corresponding laboratory QA manuals.

B.6.5 Calibration Procedures & Frequency

Specific laboratory method calibration procedures and frequency requirements are detailed in NAE QC summary tables, referenced in the RIM (EPA/ USACE, 2004) and included in Appendix B.

Calibration procedures for laboratory instruments will consist of initial calibrations, initial calibration verifications, and continuing calibration verification. The SOP for each analysis performed in the laboratory describes the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. This information is summarized in the laboratory QA Manuals.

The laboratory maintains documentation for each instrument which includes the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions, and the samples associated with these calibrations.

Inspection/ Acceptance of Supplies and Consumables
The laboratory system of inspection and acceptance of supplies and consumable is documented in the laboratory QA Manuals.

Supplies and consumables not meeting acceptance criteria will initiate the appropriate corrective action. Corrective measures may include repair or replacement of measurement equipment, and/or notification of vendor and subsequent replacement of defective or inappropriate materials. All actions will be documented in the project files.

B.6.6 Laboratory QC Procedures

Each batch of sediment samples analyzed for TOC, organics and metals will be prepared with a routine set of QC samples. For TOC, all samples will be analyzed in duplicate and QC samples will also include one method blank and one standard reference material. For organics, QC samples will include one matrix spike, one matrix spike duplicate, one sample duplicate, and one sediment standard reference material sample. Metals will include one matrix spike, one sample duplicate, and one standard reference material sample.

Each batch of twenty aqueous samples analyzed for organic contaminants and metals will be prepared with a set of QC samples as specified in the RIM. For organic contaminant analysis, QC samples will include one method blank, one laboratory control sample, one matrix spike, and one matrix spike duplicate. For metals analyses, QC samples will include one method blank, one laboratory control sample, one matrix spike and one matrix spike duplicate.

Each batch of twenty or fewer tissue samples analyzed for organic contaminants (PCB/ pesticides and PAHs) and metals will be prepared with a routine set of QC samples, including one method blank, one laboratory control sample, one matrix spike, one matrix spike duplicate, one sample duplicate, and one tissue standard reference material sample. For lipid content analysis, one sample duplicate will be prepared with each batch of tissue samples.

Physical and chemical measurement quality objectives (MQOs) for sediment, elutriate, and tissue sample types are provided in **Table B-6**.

B.6.7 Performance and System Audits

Sediment and tissue analytical programs include SRMs, providing an excellent way to audit the performance of laboratory procedures for sample preparation and analysis. Field and/or laboratory system audits may be performed at the discretion of the NAE TM to ensure project personnel are performing project related tasks according to the project specific SAP and associated field and laboratory SOPs.

Field Audit
As detailed in Section A.9 of the FSP, the AECOM Field Services Task Leader will be responsible for ensuring that the approved procedures documented in the SAP and QAPP are being followed. The Task Leader will review field sampling records, field measurement results, and field instrument operating and calibration records. The Field Services Task Leader will also be responsible for monitoring procedures for sample collection, handling, and packaging procedures, QA procedures, chain-of-custody, and sample documentation, etc.

If significant deficiencies are noted, corrective action will be implemented as discussed in Section B.6.8.

Laboratory Audit
Laboratory audits are conducted periodically by AECOM as part of their analytical subcontractor monitoring program. A typical systems audit includes review of the following areas:

- QA organization and procedures,

- Personnel training and qualifications,
- Sample log-in procedures,
- Sample storage facilities,
- Analyst technique
- Adherence to laboratory SOPs and project SAP,
- Compliance with QA/QC objectives,
- Instrument calibration and maintenance,
- Data recording, reduction, review, and reporting, and
- Cleanliness and housekeeping.

Preliminary results of the audit are discussed with the Laboratory Manager, Laboratory Project Manager, and Laboratory QA Coordinator. A written report that summarizes audit findings and recommends corrective actions is prepared and submitted to the Laboratory Manager for response, and to the AECOM Project Manager.

Data Package Audits
Audits of analytical data packages will be conducted for 100% of the packages received as part of the data validation process (Section B.11). The review will include an evaluation of the package to ensure that (1) all required deliverables are provided, (2) the package contains the information necessary to reproduce the reported results, and (3) the QC acceptance criteria specified in the SAP were met. Any deficiencies will be communicated to the laboratory and documented in the project files.

Audit Samples
Audit samples will be incorporated into the program as discussed in the Laboratory QC Procedures section above. Results for the audit/SRM samples will be reviewed by the Physical & Chemistry Laboratory Coordinator and compared to the acceptable limits provided by the vendor. Failure to meet the acceptance criteria will result in the review of the results and supporting data by the laboratory to identify the cause of the failure. Depending on the outcome of this review, subsequent corrective actions may include the following:

- Qualification/flagging of affected data,
- Discarding affected data and re-analysis, or
- Discarding affected data, re-sampling, and re-analysis.

B.6.8 Nonconformance & Corrective Actions

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter SAP specification nonconformance, unacceptable procedures, or out-of-limit QC performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. All corrective action proposed and implemented will be documented as detailed in Section 13 Reports.

Corrective action should only be implemented after approval by the AECOM Task Order Manager, or her designee. Field related corrective action is discussed in Section A.10 of the FSP.

Laboratory Corrective Action
Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, multiple phases, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or analysis. Following consultation with laboratory analysts and supervisory personnel, it may be necessary for the Laboratory QA Coordinator to approve the implementation of corrective action. If the nonconformance causes project objectives not to be achieved, the AECOM Task Order Manager will be notified.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and in the narrative data report sent from the laboratory to the AECOM (Chemical or Biological) Laboratory Coordinator and the AECOM Task Order Manager. If the corrective action does not rectify the situation, the laboratory will contact the AECOM Task Order Manager who, in concert with the AECOM (Chemical or Biological) Laboratory Coordinator and NAE's TM, will determine the action to be taken and inform the appropriate personnel.

Physical & Chemical Measurements
The need for corrective action may be identified during either data validation or data assessment. Potential types of corrective action may include resampling by the field team or reinjection/reanalysis of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team and whether the data to be collected is necessary to meet the required QA objectives. If the AECOM Laboratory identifies a corrective action situation, the AECOM Task Order Manager will be responsible for informing the appropriate personnel.

B.6.9 Corrective Action Reports to Management

QA reports will be submitted to the AECOM Task Order Manager to ensure that any problems identified during the sampling and analysis programs are investigated and the proper corrective measures taken in response. The QA reports will include:

- All results of field and laboratory audits,
- Problems noted during data validation and assessment, and
- Significant QA/QC problems, recommended corrective actions, and the outcome of corrective actions.

QA reports will be prepared by the AECOM Project QA Officer and submitted on an as-needed basis.

B.7 Analytical Procedures – Bioassays (Tasks 8, 9, & 10)

All toxicity testing will be conducted following protocol guidance presented in NAE's RIM (EPA/USACE, 2004) and in the Inland Testing Manual (EPA/USACE, 1998).

B.7.1 SPP Bioassays (Task 8)

SPP toxicity tests will commence no later than 24 hours after the SPP is prepared. SPP from each of the six composites will be tested at 100%, 50%, 10%, and 0% concentrations, using the CLDS Reference Site water as the dilution water. Three species, *M. menidia*, *A. bahia*, and *A. punctulata*, will be exposed to the

SPP dilution series, reference site water, as well as a clean seawater control (i.e., laboratory control). All SPP tests will be conducted static, with aeration provided if dissolved oxygen falls below 40% saturation (~4 mg/L at 20ºC and 30 parts-per-thousand). The *M. menidia* and *A. bahia* tests are 96-hour duration; the *A. punctulata* larval development test is 48-72-hour duration. A reference toxicant test of the same duration, using potassium chloride or copper in clean seawater, will be performed concurrently with each SPP test. Specific test conditions for the SPP tests are provided in **Table B-8**.

Table B-8 Suspended Particulate Phase Testing Conditions

Parameter	Americamysis bahia	Menidia menidia	Arabacia punctulata
Treatments (SPP prepared from sediment composites and harbor water)*	8 Sample Composites and 1 CLDS Reference Site water	8 Sample Composites and 1 CLDS Reference Site water	8 Sample Composites and 1 CLDS Reference Site water
Replicates	5	5	5
Test population	1-5 days old	7-10 day with 24 hours variation	2 hours after fertilization
Temperature	Mean of 20 ± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation	NA
pH	NA	NA	NA
Salinity	25 – 30 ‰ ±10%	25 – 30 ‰ ±10%	30-32‰
Ammonia	NA	NA	NA
Feeding	Daily, <24 hour old Artemia nauplii	Daily, <24 hour old Artemia nauplii	None
Reference Toxicant	KCL	KCL	Copper

*Study design also includes laboratory control.

B.7.2 10-day Whole Sediment Bioassay (Task 9)

The 10-day whole sediment toxicity test is proposed to commence less than two weeks after the sediment collection data (tests must commence no later than six weeks post collection). The decision to proceed with this testing will be at the direction of the NAE. Protocol for the whole sediment toxicity assays will be based on guidance established in the RIM (EPA/USACE, 2004).

Whole sediment acute toxicity testing will be performed using the marine invertebrates *Leptocheirus plumulosus* and *A. bahia*. *L. plumulosus* and *A. bahia* will be exposed to all eight sample composites plus the CLDS Reference Site sediment. A laboratory control will also be run with each test. Tests with each species will be 10-day static renewal exposures with mortality as the endpoint. Depending on the concentrations of ammonia in bulk sediment and/or overlying water, the test chambers may require purging to reduce ammonia below toxic levels.

The acceptable porewater ammonia concentration for *L. plumulosus* at test initiation is 60 mg/L total ammonia (EPA, 2001). For *L. plumulosus*, ammonia purging and monitoring will follow the guidance in Method for Assessing the Chronic Toxicity of Marine and Estuarine Sediment-associated Contaminants with the Amphipod *Leptocheirus plumulosus* (EPA, 2001), which calls for aerating the sample and replacing two volumes of overlying water per day until thresholds are met. Overlying and porewater ammonia will be monitored each day during the purging period.

The acceptable overlying water ammonia concentration for *A. bahia* is 0.6 mg/L as unionized ammonia. For *A. bahia*, ammonia purging and monitoring will follow the guidance in the 1994 memo from Elizabeth Sunderland to Mario Del Vicario (EPA/USACE 2002) which calls for replacing two volumes of overlying water per day until the unionized ammonia thresholds is met. Overlying ammonia will be monitored each day during the flushing period.

For both test species, organisms (20 per chamber) will be introduced to the test chambers once ammonia levels are within acceptable levels. Overlying water will be monitored on Days 0, 3, and 10 of the test, per the guidance in Appendix F of the Inland Testing Manual (Day 0, 10 monitoring) and NAE (intermediate Day 3 monitoring).

The static-renewal test conditions of one exchange per day should ensure that ammonia remains within acceptable range. However, if the Day 3 monitoring results show that ammonia was above the acceptable range, the static-renewal frequency will be increased to two exchanges per day. Other water quality parameters (temperature, pH, dissolved oxygen, and salinity) will be measured in all replicates at test initiation, in one replicate per day during the test, and again in all replicates at test termination.

The bioassay tests will also include a concurrent 96-h, water-only, reference toxicant test using cadmium (for *L. plumulosus*) or copper/ sodium dodecyl sulfate (for *A. bahia*) to assess the sensitivity of each test population. Specific test conditions for the whole sediment toxicity tests are provided in **Table B-9**.

Table B-9 10-day Whole Sediment Test Conditions

Parameter	Leptocheirus plumulosus	Americamysis bahia
Treatments*	8 Sample Composites and 1 CLDS Reference Site Control	8 Sample Composites and 1 CLDS Reference Site Control
Replicates	5	5
Test population	Juvenile -non reproductive adult (2-4mm)	1-5 days old
Temperature	Mean of 25± 2ºC Maximum Deviation of 3ºC	Mean of 20 ± 1ºC Maximum Deviation of 3ºC
Dissolved Oxygen	40% Saturation	40% Saturation
pH	NA	NA
Salinity	20 – 30‰ ±10%	25 – 30‰ ±10%
Ammonia	Porewater unionized ammonia <0.8 mg/L	Overlying water unionized ammonia <0.6 mg/L
Feeding	None	Daily, <24 hour old Artemia nauplii
Reference Toxicant	Cadmium	Copper / Sodium Dodecyl Sulfate

*Study design also includes laboratory control.

B.7.3 28-day Bioaccumulation Bioassay (Task 10)

Project bioaccumulation tests will commence within six weeks of sample collection. Chemical analyses will only be performed on tissue samples for sediments that pass the 10-day whole sediment acute toxicity test. Bioaccumulation tests will be performed by ESI according to the NAE Regional Guidance (EPA/USACE 1998, 2004).

Macoma nasuta and *Nereis virens* will be exposed to the eight sample composites, plus the CLDS Reference Site sediment, and native control sediments (i.e., negative laboratory control), for 28 days under flow-through conditions. *M. nasuta* and *N. virens* will be tested in separate 10-gallon aquaria, with five replicate aquaria per treatment. Twenty organisms will be introduced into each replicate aquaria.

Water quality parameters (temperature, dissolved oxygen, pH, and salinity) will be measured in all replicates at test initiation, in at least one replicate per treatment daily, and in all replicates at test termination. Flow rates into individual aquaria are measured daily and adjusted as necessary from Days 0 through 27 of the bioaccumulation test. If necessary, aeration will be provided to all test chambers to maintain dissolved oxygen >40% saturation.

At the end of the 28-day testing period, *M. nasuta* and *N. virens* will depurate in clean seawater for 24 hours. Following depuration, organism tissues will be homogenized, transferred into the appropriate chemistry jars for tissue chemistry analyses and stored frozen (<20°C) until analysis. Tissue sample container and storage requirements are detailed in **Table B-10** and Attachment 5.

Table B-10 Sample Container, Preservation, and Holding Time Requirements for Tissue Samples

Tissue Parameters	Mass (g)	Container	Preservation	Storage	Holding Time
Lipids	0	N/A – lipid content obtained from organic analysis			
Moisture	2-10	Glass	Freeze	-20°C	14 d
Organic Chemistry (PAHs/PCBs/ Pesticides)	40	Glass	Freeze	-20°C	14 d (extract)/ 40 d (analyze) when thawed
Metals Chemistry	10	Glass	Freeze	-20°C	28 d (Hg), 180 d (other metals) when thawed

Specific test conditions for the 28-day bioaccumulation test are provided in **Table B-11**.

Table B-11 28-Day Bioaccumulation Bioassay Test Conditions

Parameter	Macoma nasuta	Nereis virens
Treatments*	8 Sample Composites and 1 CLDS Reference Site Control	8 Sample Composites and 1 CLDS Reference Site Control
Replicates	5	5
Test population	Adult clam	Adult Polychaete; 3-15 grams
Temperature	Mean of 12 ±2°C Maximum Deviation of 3°C	Mean of 12 ± 2°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation
pH	NA	NA
Salinity	25 – 30‰ ±10%	25 – 30‰ ±10%
Ammonia	NA	NA
Feeding	None	None
Reference Toxicant	NA	NA

*Study design also includes laboratory control.

B.7.4 Preventive Maintenance

Routine testing and preventive maintenance of instrumentation needed to carry out bioassay test chamber monitoring is performed by the laboratory as part of their QA program. Details on the type of checks, frequencies, and corrective actions associated with the physical and chemical project measurements are included in the corresponding laboratory QA manuals.

B.7.5 Calibration Procedures & Frequency

Calibration of bioassay monitoring instrumentation will be guided by the procedures detailed in the laboratory QA manual.

Ammonia and pH measurement probes will be calibrated immediately before (daily) use and at the finish of (daily) monitoring activities. Thermometers and temperature recording devices will be checked daily against a standard thermometer. Dissolved oxygen probes will also be checked before (daily) use and at the finish of (daily) monitoring activities.

B.7.6 Laboratory QC Procedures

All bioassays will include a negative control, and a concurrent 96-hour, water-only, reference toxicant test to assess the sensitivity of each test population.

Additionally, the biological QC elements detailed in the NAE QC summary tables, referenced in the RIM (EPA/USACE, 2004) and included in Appendix B will be adhered to, including test species age/health, control abnormality and mortality acceptance criteria and test-specific acceptability requirements.

B.7.7 Performance and System Audits

Bioassay programs include the use of reference toxicants to audit the performance of bioassay laboratory procedures. Laboratory system audits may be performed at the discretion of the NAE TM to ensure project personnel are performing project related tasks according to the project specific SAP and associated field and laboratory SOPs.

Laboratory Audit
ESI laboratory audits are conducted periodically by AECOM as part of their analytical subcontractor monitoring program. A typical systems audit includes review of the following areas:

- QA organization and procedures,
- Personnel training and qualifications,
- Sample log-in procedures,
- Sample storage facilities,
- Analyst technique
- Adherence to laboratory SOPs and project SAP,
- Compliance with QA/QC objectives,
- Equipment calibration and maintenance,
- Data recording, reduction, review, and reporting, and
- Cleanliness and housekeeping.

Preliminary results of the audit are discussed with the Laboratory Manager, Laboratory Project Manager, and Laboratory QA Coordinator. A written report that summarizes audit findings and recommends corrective actions is prepared and submitted to the Laboratory Manager for response, and to the AECOM Project Manager.

Data Package Audits
Audits of bioassay reports will be conducted for 100% of the packages received as part of the data review process. The review will include an evaluation of the package to ensure that (1) all required deliverables are provided, (2) the package contains the information necessary to reproduce the reported results, and (3) the QC acceptance criteria specified in the SAP were met. Any deficiencies will be communicated to the laboratory and documented in the project files.

Audit Samples
Audit samples will be incorporated into the program as discussed in the Laboratory QC Procedures section above. Reference toxicant results will be reviewed by the Biology/Bioassay Laboratory Coordinator and compared to the acceptable limits provided by the vendor. Failure to meet the acceptance criteria will result

in the review of the results and supporting data by the laboratory to identify the cause of the failure. Depending on the outcome of this review, subsequent corrective actions may include the following:

- Qualification/flagging of affected data,
- Discarding affected data and re-analysis, or
- Discarding affected data, re-sampling, and re-analysis.

B.7.8 Nonconformance & Corrective Actions

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter SAP specification nonconformance, unacceptable procedures, or out-of-limit QC performance that can affect data quality. All corrective action proposed and implemented will be documented as detailed in Section 13 Reports.

Corrective action should only be implemented after approval by the AECOM Task Order Manager, or her designee.

Biological Laboratory Corrective Action
Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as low/high water quality readings may be identified. Following consultation with laboratory personnel, it may be necessary for the Laboratory QA Coordinator to approve the implementation of corrective action. If the nonconformance causes project objectives not to be achieved, the AECOM Task Order Manager will be notified.

These corrective actions are performed prior to release of the reports from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and in the narrative report sent from the laboratory to the AECOM Biology/Bioassay Laboratory Coordinator and the AECOM Task Order Manager. If the corrective action does not rectify the situation, the laboratory will contact the AECOM Task Order manager who, in concert with the AECOM Biology/Bioassay Laboratory Coordinator and NAE's TM, will determine the action to be taken and inform the appropriate personnel.

B.8 Data Reduction/ Calculation of Data Quality Indicators

In addition to measurement sensitivity discussed previously, data usability will depend on the measurement accuracy and precision, as indicated by the corresponding accuracy and precision QC samples (i.e., method & equipment blanks, matrix spike samples, laboratory control samples (LCSs), certified/standard reference materials (CRMs/SRMs), and replicates). The field and laboratory data collected during this investigation will be used to achieve the objectives identified in Section A.7 of this QAPP. The QC results associated with each analytical parameter for each matrix will be compared to the measurement objectives presented in Section A.7.2 of this QAPP.

This section details the calculation of these DQIs.

B.8.1 Accuracy Assessment

One measure of accuracy will be percent recovery (%Rs), which is calculated for matrix spikes, surrogates, LCSs, and CRMs/SRMs. Percent recoveries for matrix spike results will be determined according to the following equation:

$$\%R = \frac{(Amount\ in\ Spiked\ Sample - Amount\ in\ Sample)}{Known\ \text{Amount}\ \text{Added}} x100$$

Percent recoveries for LCS, CRM/SRM, and surrogate compound results will be determined according to the following equation:

$$\%R = \frac{Experimental\ Concentration}{Known\ Amount\ \text{Added}} x100$$

An additional measure of accuracy is blank contamination. The blanks associated with this project include laboratory method blanks and equipment rinsate blanks. The results of the laboratory and field blanks will be compared to the objectives in stated Section B.3.2 of the QAPP. Failure to meet these objectives may indicate a systematic laboratory or field problem that should be investigated and resolved immediately. Associated data may have limitations placed on its use, depending on the magnitude of the problem.

B.8.2 Precision Assessment

The RPD between sample replicates is calculated to compare to precision objectives (Section 3). The RPD will be calculated according to the following formula.

$$RPD = \frac{(Amount\ in\ Sample\,1 - Amount\ in\ Sample\ 2)}{0.5\,(Amount\ in\ Sample\,1 + Amount\ in\ Sample\ 2)} x100$$

Failure to achieve precision objectives may result in the associated data having limitations placed upon its use.

Completeness Assessment
Completeness is the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$Completeness = \frac{(number\ of\ valid\ measurements)}{(number\ of\ measurements\ planned)} x100$$

Failure to meet the completeness objective will require an assessment to determine if the missing or invalid data are critical to achieving the project objectives. Corrective actions may include re-sampling or re-analysis, depending on the type of problem, logistical constraints, etc.

B.8.3 Comparison to Project Objectives

In addition, the data obtained will be both qualitatively and quantitatively assessed on a project-wide, matrix-specific, and parameter-specific basis. Factors to be considered in this assessment of field and laboratory data will include, but not necessarily be limited to, the following:

- Conformance to the field methodologies proposed in the FSP and QAPP,
- Conformance to the analytical methodologies provided in the QAPP,
- Adherence to proposed sampling strategy,
- Presence of elevated detection limits due to matrix interferences or contaminants present at high concentrations,
- Unusable data sets based on the data review results,
- Data sets identified as usable for limited purposes based on the data review results,
- Status of all issues requiring corrective action, as presented in the QA reports to management,
- Effect of nonconformance (procedures or requirements) on project objectives,
- Adequacy of the data as a whole in meeting the project objectives, and
- Identification of any remaining data gaps and need to reevaluate project decision rules.

This assessment will be performed by the technical team, in conjunction with the Project QA Officer, and the results presented in the final report.

B.9 Laboratory Operations Documentation

Laboratory data reduction procedures will be performed according to the following protocol. All information related to analysis will be documented in controlled laboratory logbooks, instrument printouts, or other approved forms. All entries that are not generated by an automated data system will be made neatly and legibly in permanent, waterproof ink.

Information will not be erased or obliterated. Corrections will be made by drawing a single line through the error and entering the correct information adjacent to the cross-out. All changes will be initialed, dated, and, if appropriate, accompanied by a brief explanation. Unused pages or portions of pages will be crossed out to prevent future data entry. Analytical laboratory records will be reviewed by the supervisory personnel on a regular basis, and by the Laboratory QA Coordinator periodically, to verify adherence to documentation requirements.

Sediment data will be reported on a dry weight basis. All data will be reported down to method detection limits (MDLs). Data between the MDL and the reporting limit (RL) will be flagged as estimated by the laboratory. Non-detected results (i.e., values below the MDL) will be reported as non-detect at the MDL. The detection limits associated with all non-detected results will be corrected for sample-specific factors such as analytical dilutions, percent moisture, sample volume, etc.

Data and report deliverables will be provided within the turnaround time specified in **Table A-3** and **Figure A-2** of the FSP. The chemistry laboratory will provide at least one report in a printed document format (PDF) and one EDD to the Physical and Chemistry Laboratory Coordinator. Upon approval of this SAP, the required format of the EDD will be provided (per the RIM). The hard copy data package will include the information summarized below:

- Case narrative (see description below);

- Cross reference of field sample IDs and laboratory IDs;
- Method summary;
- COC documentation;
- Dates of sample extraction and analysis;
- Description of any data qualifiers used;
- Sample results, including units;
- Sample preparation information;
- Results for MS/MSDs, method or preparation/calibration blanks, LCSs, surrogate spikes, and laboratory duplicates; and
- Matrix-specific MDLs and RLs.

The case narrative will include the client name, project name and number, date of issuance, and a discussion of any deviations from analytical strategy, technical problems, and QC failures or non-conformances. The report will be signed by the Laboratory Project Manager.

Physical testing results will be provided as a hard copy report with grain size curves and as a simple spreadsheet of results (as percent passing each sieve plus hydrometer). The report will include a summary of results, method citations, and QC summary.

All laboratory reports will be maintained on the project website (along with all project related/generated information) with access only to designated AECOM and NAE personnel for a minimum period of five years.

B.10 Data Assessment Procedures

All data generated through field activities or through the analytical program will be reviewed prior to reporting. No data will be disseminated by AECOM until it has been subjected to the procedures summarized below.

B.10.1 Internal Laboratory Review

Prior to the release of any data from the laboratories, the data will be reviewed and approved by laboratory personnel. The review will consist of a tiered approach that will include reviews by the person performing the work, by a qualified peer, and by supervisory and/or QA personnel.

B.10.2 Validation of Analytical Data

Validation of the laboratory deliverables will be performed by AECOM. The laboratory data will be reviewed for the following, as appropriate to the method:

- Completeness of deliverable;
- Technical holding times;

- Laboratory and field blank contamination;
- Surrogate spike recoveries;
- MS/MSD recoveries and relative percent differences (RPDs);
- Laboratory duplicate RPDs;
- LCS recoveries; and
- Field duplicate.

The evaluation will consist of a review of the data package narrative and QC result. If data are considered usable, no data qualification will occur. In the event that serious deficiencies in data quality are noted, the data may be rejected and considered unusable.

B.11 Verification and Validation Methods

B.11.1 Field Data Verification

Field records will be reviewed by the Field Services Task Leader to ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good recordkeeping practices, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the FSP and QAPP, and that any deviations were documented and approved by the appropriate personnel.

B.11.2 Laboratory Data Verification

Prior to being released as final, laboratory data will proceed through a tiered review process. Data verification starts with the analyst who performs a 100% review of the data to ensure the work was done correctly the first time. The data reduction and initial verification process must ensure that:

- Sample preparation and analysis information is correct and complete,
- Analytical results are correct and complete,
- The appropriate SOPs have been followed and are identified in the project records,
- Proper documentation procedures have been followed, and
- All non-conformances have been documented.

Following the completion of the initial verification by the analyst performing the data reduction, a systematic check of the data will be performed by an experienced peer or supervisor. This check will be performed to ensure that initial review has been completed correctly and thoroughly and will include a review of

- Adherence to the requested analytical method SOP;
- Correct interpretation of chromatograms, mass spectra, etc.;
- Correctness of numerical input when computer programs are used (checked randomly);
- Correct identification and quantitation of constituents with appropriate qualifiers;
- Numerical correctness of calculations and formulas (checked randomly);
- Acceptability of QC data;
- Documentation that instruments were operating according to method specifications (calibrations, performance checks, etc.);
- Documentation of dilution factors, standard concentrations, etc.; and
- Sample holding time assessment.

A third-level review will be performed by the Laboratory Project Manager before results are submitted to clients. This review serves to verify the completeness of the data report and to ensure that project requirements are met for the analyses performed. A narrative to accompany the final report will be prepared by the Laboratory Project Manager.

B.11.3 Validation of Laboratory Deliverables

If requested by the PM, data will be reviewed as described in Sections D.1.3 of the QAPP. Upon completion of the validation, a brief report will be prepared discussing the acceptability of the data.

B.11.4 Verification during Data Management

All manually entered data (e.g., field data) will be proofed 100% against the original. Electronic data will be checked 100% after loading against laboratory data sheets for completeness and spot checked for accuracy.

B.12 Reconciliation with User Requirements

The field and laboratory data collected during this investigation will be used to achieve the objectives identified in Section A.7 of this QAPP. The QC results associated with each analytical parameter for each matrix will be compared to the measurement objectives presented in Section A.7.2 of this QAPP.

B.13 Reports

In addition to any potential audit and/or corrective action reports, several progress reports are scheduled to be delivered prior to submission of the project draft and final reports. The scheduled reports are as follows:

Sediment Chemistry Progress Report
Two copies of a written progress report will be provided within fifteen business days of the start of chemical analysis. The data will also be available by the completion of the 28-day bioaccumulation test to properly inform the decision-making process. Chemistry data will also be reported in the prescribed EDD format (to be finalized after the approval of the SAP). A completeness checklist and Quality Control Summary sheets as prescribed in the RIM will be filled out and submitted with the progress report for all data reported.

Elutriate Chemistry Progress Report
Two copies of the written progress report will be provided within fifteen business days from completion of elutriate preparation to properly inform the decision-making process. Chemistry data will be approved EDD spreadsheet formats (once the SAP is approved). A completeness checklist and Quality Control Summary sheets as prescribed in the RIM will be filled out and submitted with the progress report for all data reported.

Tissue Progress Report
A written progress report, without statistical analysis, will be provided five weeks after the initiation of the tissue analysis. The report will present tabulated data for each test series and organism analyzed. Statistical analysis will be performed upon approval from NAE of the written progress report. Statistical analyses will be performed using wet weight contaminant data following Appendix D3 of the Inland Testing Manual (Fisher's Least Significant Difference multiple comparisons procedure; EPA/USACE, 1998). Two copies of the written progress report, updated to include results from the statistical analyses, will be provided within two weeks of authorization to proceed with the statistical analyses. An electronic copy of the tissue contaminant data will also be reported according to the "bioaccumulation results spreadsheet" required by the RIM (EPA/ USACE, 2004).

SPP Toxicity Test Progress Report
A progress report, without statistical analysis, will be provided within two weeks from start of SPP test. The report will include summaries of all procedures and present tabulated data for each test series and organism analyzed. Statistical analysis will be performed upon approval from NAE of the written progress report.

Statistical analyses will be performed following Appendix D2 of the Inland Testing Manual (EPA/USACE, 1998). In addition to the written report all data will be submitted in electronic transmittable spreadsheets.

Whole Sediment Acute Toxicity Test Progress Report
Two copies of the written progress report for toxicity and bioassay testing, without statistical analysis, will be provided within four weeks from test initiation. The report will include summaries of all procedures and present tabulated data for each test series and organism analyzed. Statistical analysis will be performed upon approval from NAE of the written progress report. Statistical analyses will be performed following Appendix D2 of the Inland Testing Manual. In addition to the written report all data will be submitted in electronic transmittable spreadsheets.

Draft and Final Reports
A draft report will be prepared to allow NAE an opportunity to review and comment on the document before finalizing. In each case, the draft and final reports will be transmitted to NAE within the established schedule (FSP **Figure A-2** and **Table A-3**) containing the following elements:

- Cover sheet, which includes contract number, statement of data authenticity, and official signature of release.
- Table of contents.
- Case narrative which shall include analytical methods used, field sample and laboratory number correlations, data qualifier definitions, and deviations from established QA/QC procedures with associated corrective action.
- Site Map(s) with sample locations with sufficient scale to show channel lines, shore landmarks such as building and docks.

- Summary tables of chemical analyses and biological tests.
- Complete field report, which includes sampling procedures and any problems or deviations from the SAP encountered.
- Physical testing results (composite data).
- Sediment chemistry results (dry weight basis) for each analyte, which include project name, field sample ID number, batch numbers, collection/extraction/analysis dates, detection limits, and dilution factors.
- Biological testing results (toxicity).
- Sample documentation which includes original Chain of Custody record, shipping documents, and cooler receipt forms.
- QA/QC information which shall include method detection limits for each analyte, spike recoveries including surrogate recoveries, measures of precision, and all control limits for accuracy and precision. The QA/QC samples analyzed for each batch of samples (maximum of 20 samples to a batch) consist of:
  - Method blank.
  - Laboratory Control Sample (LCS).
  - Matrix Duplicate (using sample from project).
  - Matrix Spike/Matrix Spike Duplicate (using sample from project).
  - Standard Reference Material (SRM) (if available with analyte concentrations comparable to the project).
- The sediment chemistry data will also be presented in an EDD according to http://www.nae.usace.army.mil/reg/rim.htm under Data Reporting Requirements/Sediment Evaluation/EDD.
- Completion of the Completeness Checklist Table II-1 located under Appendix II of the RIM (Appendix B).

Delivery dates for all reports are provided on **Table A-3** and **Figure A-2**. Project reports, along with all relevant project records will also be maintained on AECOMs project website with access only to designated AECOM and NAE personnel for a minimum period of five years.

B.14 References

ASTM. Annual Book of ASTM Standards. American Society for Testing and Materials, Philadelphia, Pennsylvania.

United States Army Corps of Engineers. 2001. Requirements for the Preparation of sampling and Analysis Plans. Department of the Army Engineering and Design, Engineer manual 200-1-3. February, 2001.

United States Army Corps of Engineers. 2014. Safety and health Requirements. Department of the Army, U.S. Army Corps of Engineers Washington, D.C. 20314-1000. Engineering Manual (EM) 385-1-1. November 2014.

United States Environmental Protection Agency/ United States Army Corps of Engineers. 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters. April, 2004.

United States Environmental Protection Agency. 1997. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846. Third Edition. May 1986, revised June 1997.

United States Environmental Protection Agency. 1995. QC/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations – Chemical Evaluations. EPA 823-B-95-001. Office of Water, Office of Science and Technology, Standards and Applied Science Division, Washington, DC.

United States Environmental Protection Agency/ United States Army Corps of Engineers. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual. Inland Testing Manual. EPA-823-B-98-004. February 1998.

United States Environmental Protection Agency/ United States Army Corps of Engineers. 1991. Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual. EPA-503/8-91/001.

Attachments

Sample Delivery Group Summary

Alpha Job Number : L17XXXX

Received :Month,Day, 2017
Reviewer :Sample Custodian

Account Name : AECOM
Project Number :
Project Name :

Delivery Information

Samples Delivered By : Alpha Courier

Chain of Custody : Present

Cooler Information

Cooler	Seal/Seal#	Preservation	Temperature(°C)	Additional Information
A	Absent/	Ice	2.0	
B	Absent/	Ice	2.0	

Condition Information

All samples on COC received?	**YES**
Extra samples received?	**NO**
Are there any sample container discrepancies?	**NO**
Are there any discrepancies between sample labels & COC?	**NO**
Are samples in appropriate containers for requested analysis?	**YES**
Are samples properly preserved for requested analysis?	**YES**
Are samples within holding time for requested analysis?	**YES**
All sampling equipment returned?	**NA**

Volatile Organics/VPH

Reagent Water Vials Frozen by Client?	**NA**

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	27413		
SDG No:			
Project:			
Delivered via:	Client		
Date and Time Received:	04/28/16 1340	Date and TIme Logged into Lab:	04/28/16 1610
Received By:	JTP	Logged into Lab by:	JTP
Air bill / Way bill:	No	Air bill included in folder if received?	N/A
Cooler on ice/packs:	N/A	Custody Seals present?	N/A
Cooler Blank Temp (C) at arrival:	N/A	Custody Seals intact?	N/A
Number of COC Pages:	1		
COC Serial Number(s):	N/A		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	N/A
Client notification/authorization:	Not required	pH Test strip ID number:	N/A

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
RAD-004	27413-100	S	Hold: Composite	8 x 3.5 gallo	4C	Yes
RAD-005	27413-101	S	Hold: Composite	3 x 3.5 gallo	4C	Yes
RAD-006	27413-102	S	Hold: Composite	3 x 3.5 gallo	4C	Yes
RAD-007	27413-103	S	Hold: Composite	3 x 3.5 gallo	4C	Yes
RAD-008	27413-104	S	Hold: Composite	4 x 3.5 gallo	4C	Yes
RAD-009	27413-105	S	Hold: Composite	4 x 3.5 gallo	4C	Yes
RAD-010	27413-106	S	Hold: Composite	3 x 3.5 gallo	4C	Yes
RAD-011	27413-107	S	Hold: Composite	3 x 3.5 gallo	4C	Yes
RAD-001	27413-108	S	Subsample: 10-Day Solid Phase Assay, 28-day Bioaccum	8 x 3.5 gallo	4C	Yes
RAD-002	27413-109	S	Subsample: 10-Day Solid Phase Assay, 28-day Bioaccum	8 x 3.5 gallo	4C	Yes
RAD-003	27413-110	W	Subsample: SPP Assays;	5 x 5 gallon	4C	Yes
RAD-013	27413-111	W	Subsample: Elutriate Prep;	5 x 5 gallon	4C	Yes
RAD-014	27413-112	W	Subsample: Elutriate Prep;	5 x 5 gallon	4C	Yes
RAD-015	27413-113	W	Subsample: Elutriate Prep;	5 x 5 gallon	4C	Yes
RAD-016	27413-114	W	Subsample: Elutriate Prep;	5 x 5 gallon	4C	Yes
RAD-012	27413-115	S	Hold: Composite	3 x 3.5 gallo	4C	Yes

Notes and qualifications:

Samples arrived in a refrigerated truck the day they were sampled. JTP

Location: New Haven, CT	Logged By:	Date/Time:	Core/Sample ID
Project: New Haven FNP	Vessel: CanDu		
Equipment (Circle One) Vibracore/Grab Sampler			
Coordinates:	X:	Y:	
Project Depth (ft):	Penetration:	Recovery:	No. Attempts:

Depth (ft)	Sketch	Description	
1			
2			
3			
4			
5			
6			
7			
8			

Comments/Photographic References:

AECOM

Daily Activity Log New Haven FNP Sediment Evaluation	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. W912WJ17F0036
Date: _____	
Vessel/Sampling Platform:	
Personnel (Name/Affiliation/Role):	
Sampling Performed/Equipment Used:	
Stations Sampled:	
Health and Safety Issues:	
Deviations from Approved Plan:	
Dock Departure Time:	
Dock Return Time:	
Recorded by:	

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name:	Project Location:	
Project Number:	Field Logbook No.:	
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape Nos.:	
Signature:	Send Results/Report to:	TAT:

Analysis Requested

Container Type
P – Plastic
A – Amber Glass
G – Clear Glass
V – VOA Vial
O – Other
E – Encore

Preservation
1 – HCl, 4°
2 – H2SO4, 4°
3 – HNO3, 4°
4 – NaOH, 4°
5 – NaOH/ZnAc, 4°
6 – Na2S2O3, 4°
7 – 4°

Matrix Codes:
DW – Drinking Water
WW – Wastewater
GW – Groundwater
SW – Surface Water
ST – Storm Water
W – Water
S – Soil
SL – Sludge
SD – Sediment
SO – Solid
A – Air
L – Liquid
P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered											Lab I.D.	Remarks

Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via:
UPS FedEx Courier Other

Temp blank
Yes No

Serial No._____

APPENDIX II

QUALITY CONTROL SUMMARY TABLES

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	
9. Were the samples properly labeled?	
10. Were all the requested data included?	
11. Were the reporting limits met?	
12. Were the chain-of-custody forms properly processed?	
13. Were the method blanks run and were the concentration below the acceptance criteria?	
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	
15. Were the SRM/CRM analyses within acceptance criteria?	

Table II-1 (continued): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	
19. Were surrogate recoveries within the required acceptance criteria?	
20. Were corrective action forms provided for all non-conforming data?	
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-2 (continued): Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for Analyses of Pesticides in Sediment, Tissue and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (< 20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-3 (continued): Quality Control Summary for Analyses of Pesticides in Sediment, Tissue and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychorinated Biphenyls (PCB congeners) in Sediment, Tissue and Water Matrices

Method Reference Number: 8082A

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration. (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-4 (continued): Quality Control Summary for Analyses of Polychorinated Biphenyls (PCB congeners) in Sediment, Tissue and Water Matrices

Method Reference Number: 8082A

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package

Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package

Table II-5 (continued): Quality Control Summary for Analyses of Metals in Sediments, Tissue and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample.(<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-6 (continued): Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; ≤ 40% clam larvae, ≤ 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Appendices

AECOM

Standard Operating Procedure

Field Records

Procedure Number: NHH-G-01

Revision No.: 0

Revision Date: August 2017

Prepared by

Rachel MacPhee

_____ Date: _____

Ryan McCarthy
AECOM Task Order Manager

_____ Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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Attachment 1 Example of Daily Activity Log

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Standard Operating Procedure
Field Records

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for documentation of field activities conducted on the New Haven Harbor Federal navigation project (FNP), including sample collection events, field measurements, and site visits. This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). Appropriate documentation of field activities provides an accurate and comprehensive record of the work performed, sufficient for a technical peer to reconstruct the day's activities and determine that necessary requirements were met. Field records also provide evidence and support technical interpretations and judgments. The procedures and systems defined in this SOP help ensure that the records are identifiable (reference the project task/activity), legible, retrievable, and protected from loss or damage.

1.2 Field data may be recorded electronically or in field logbooks, standardized forms, annotated maps, or photos. This SOP provides general guidance on field recordkeeping; additional details for specific procedures (for example, chain of custody, sample collection) are provided in the SOPs for the individual task.

1.3 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 Although record keeping itself does not generally pose significant health and safety risks, the tasks being implemented in the vicinity of individuals keeping records may require attention to safety practices. Project related physical, chemical and biological hazards are addressed in the site specific Accident Prevention Plan (APP) (AECOM 2017a).

2.2 Daily safety briefings will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

Not Applicable

4.0 Equipment and Materials

The following equipment list contains materials that may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Bound field logbook
- Standardized field data sheets (refer to Section 5.3)
- Black ballpoint pen, Rite-in-Rain® pen, or black Sharpie® (or equivalent)
- Site maps
- Clipboard
- Three-ring binder or equivalent
- Camera (optional)
- Time piece

5.0 Procedures

5.1 General Requirements

5.1.1 The field records will contain sufficient detail so that the collection effort can be reconstructed without reliance on the collector's memory.

5.1.2 Pertinent field information will be recorded legibly in a logbook and/or an appropriate standardized form (as described herein), or directly onto a portable electronic device, such as a laptop computer. It is recommended that entries made by hand be made in black ballpoint pen.

5.1.3 Entries will be signed and dated. No erasures or obliterations will be made. A single line will be drawn through incorrect entries and the corrected entry written next to the original strikeout. Strikeouts are to be initialed and dated by the originator.

5.1.4 If a ballpoint pen cannot be used because of adverse weather conditions (rain or freezing temperatures), fine-point Sharpie® or Rite-in-Rain® pens are acceptable substitutes. If conditions are such that only pencil can be used, an explanation will be included in the logbook and the affected data will be photocopied, signed as verified copy, and maintained in the project files as documentation that the information has not been changed.

5.1.5 Entries will be factual and observational (i.e., no speculation or opinion), and will not contain any personal information or non-project-related entries. Abbreviations and acronyms will be defined.

5.1.6 Field information will be recorded without delay – information recorded significantly after the fact will be dated as such.

5.1.7 Field activities and other events pertinent to the field activities will be documented in chronological order. Times will be recorded using Eastern Standard Time (EST) or Eastern Daylight Savings Time (EDT) notation for each entry.

5.2 Field logbooks

5.2.1 Field logbooks will be bound waterproof field books. Logbooks will be dedicated to the project and will not be used for any other project or purpose. Separate and dedicated logbooks will be kept for different operations running concurrently (e.g., sample collection on board the vessel, core processing, surface water collection on-board a vessel, surface water collection from the shore); individual tasks making up each operation will be maintained in the same logbook, if possible.

5.2.2 The cover and binding of each logbook will be labeled to identify the operation and dates included with the logbook; each page in the logbook will be consecutively numbered. Pages will not be removed or torn out of the logbook.

5.2.3 The title page of each logbook will contain the following:

- AECOM contact, AECOM office location, and phone number;
- The logbook number (assigned at the time the logbook is signed out)
- Project name and AECOM project number; and
- Start and end dates of work covered by the logbook.

5.2.4 To assist in the return of a field logbook in the event it is lost, the following will also be included on the title page: "$25 Reward if found and returned to AECOM, 250 Apollo Drive, Chelmsford, Massachusetts 01824".

5.2.5 At the front of each logbook will be a page cross-referencing each author's printed name, signature, and initials.

5.2.6 A page header will appear on the first page of each day's notes in the logbook, and activities for each day will be recorded on a new page. The page header will include:

- Name of author and other personnel on site (and affiliated organization if applicable);
- Date;
- Time of arrival (military time);
- Proposed activity (task); and
- Current weather and tidal conditions, and weather forecast for the day.

5.2.7 An abbreviated header, containing at least the date, will appear at the top of each additional page for the active date. Field forms require similar header information.

5.2.8 The field logbook will provide a chronology of events. At a minimum, documentation in a logbook will include the following (unless documented on a standard form):

- Names of visitor(s), including time of arrival and departure, the visitor's affiliation, and reason for visit;
- Summary of project-related communications, including names of people involved and time;
- Time daily work commences and ceases;
- Start and stop times of new tasks;
- Start and stop times of significant stand-by time (work interruptions);
- Safety or other monitoring data, including units with each measurement;
- Deviations from approved scope of work, including the necessary approvals;
- Progress updates;
- Problems/delays encountered;

- Unusual events; and
- Signature or initials of author on every page.

Additional detail on the contents of the field logbook is provided in Table 1.

5.2.9 The logbook will cross-reference the field forms if necessary; however, whenever possible, details recorded on the standardized forms will not be replicated in the logbook.

5.2.10 If there are additional lines on the page at the end of the day's activities, a line will be drawn through the empty space, and initialed and dated, leaving no room for additional entries.

5.3 Standardized forms

5.3.1 Standard forms for field data are provided with each SOP. The Daily Activity Log is attached to this SOP (Attachment 1). This form will be completed each day of active work and transmitted to the Task Manager or his/her designee. Refer to the appropriate SOP (e.g., core processing) for the forms specific to that task.

5.3.2 The information collected on any field form may alternately be collected electronically by PC/handheld as appropriate.

5.3.3 The following rules apply to the standardized forms:

- Each form will be signed and dated by the person completing the form.
- There will be no blank spaces on the form – unused spaces will have "not applicable" or "not available" explanations.

5.4 Maps and drawings

5.4.1 Pre-existing maps and drawings that include notations made in the field (for example, relocating of sample locations) will be referenced in the logbook and, like all field records, include the project/task name and number, site identification, and be signed/dated by the person that prepared them.

5.4.2 Maps and drawings will include compass orientation and scale. Sketches will include points of reference and distances to the reference points.

5.5 Photographs and other photo documentation

Photographs or videos may be taken by the field team to help document site conditions, sample locations, or sample characteristics. Photographs and videos will be identified in the logbook or on the standard form by a unique numbering system. If photographs are collected by a digital camera, the file number as well as the photograph number will accompany the description of the photograph in the logbook. At a minimum, the date/time the photograph was taken, the general location, a brief description, and the photographer's name will be recorded. Additional information may include Differential Global Positioning System (DGPS) coordinates, direction the photographer was facing, and/or weather conditions. If necessary, an object will be included to indicate the scale of the object in the photograph.

5.6 Electronic files

5.6.1 Electronically recording devices may include data logging systems, laptops, or tablet computers.

5.6.2 Sufficient backup systems will be in place to protect against electronic data loss. Information will be saved to a disk or backed up immediately upon completion. The backup disk or other media (CD, flash drive) will then be stored in a secure location separate from the laptop or tablet.

5.6.3 Files will be uniquely identified and will be stored in the project files on the network in accordance with the workplan (AECOM 2017b). An unedited version of the file will be maintained and all subsequent manipulations tracked.

6.0 Quality Assurance/Quality Control

6.1 Entries in the field forms will be double-checked by the field team members to verify the information is correct.

6.2 Completed field forms will be reviewed by the Field Task Manager and/or his/her designee to verify that the requirements are being met. At a minimum, this should occur at the end of each day. When the review is complete, the reviewer will append his/her initials and date to the pages reviewed for documentation purposes.

6.3 If information recorded in the field is transcribed to another format, the original record will be retained for comparison purposes.

7.0 Data and Records Management

7.1 Deviations to the procedures detailed in the SOP or approved plans will be noted in the field logbook or other appropriate field form at the time of occurrence and summarized on the Daily Activity Log (Attachment 1). A formal field correction action form will be completed (Attachment 2) and distributed as specified in the workplan (AECOM 2017b).

7.2 Proposed modifications to the SOPs or approved plans will be documented on a field correction action form. An example field correction action form is presented as Attachment 2.

7.3 Logbooks that are taken offsite from the field will be photocopied or scanned and filed at the end of each day to mitigate against the loss of historical entries should the logbook be lost in the field.

7.4 Field data forms and chain of custody will be filed in the office facility once they have been completed and distributed (if necessary), or at the end of each field day. These documents will be maintained in labeled three-ring binders or contained in some other organized manner that prevents loss.

7.5 Distribution of daily forms will be performed according to the needs of the project team and at the direction of the Field Task Manager or designee.

8.0 Personnel Qualifications and Training

8.1 Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP [AECOM 2017a], workplan [AECOM 2017b]). No specialized training is required. Nonetheless, these activities should be reviewed by the Field Task Manager, as described below.

8.2 The Field Task Manager is responsible for reviewing and approving the field records for accuracy, completeness, and conformance to the procedures in this SOP. The Field Task Manager is also responsible for ensuring that the field records are distributed to the appropriate personnel during field activities, ensuring that records are maintained properly on site, and for archiving the records upon completion of field activities.

9.0 References

AECOM 2017a. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision History

Revision	Date	Changes
0	August 2017	NA

Table 1 Summary of Typical Field Information

General Information	Applicable Record[1]
Project/task name/general location	All
Personnel on site (AECOM, clients, site contacts, regulators, oversight personnel, subcontractors, general public)	A, B
Results of phone calls, conversations (See workplan (AECOM 2017b) for project contact information)	B
Chronology of activities, including mobilization, investigatory activities, and demobilization	B
Weather conditions (initial and any changes; temperature, barometric pressure, wind conditions, precipitation)	B
Tidal and atmospheric information (if applicable)	B
Subcontractors, description of services to be provided, and any issues (equipment problems, corrective action, stand by time)	A, B
Health and safety (H&S) tailgate meetings, H&S monitoring	Refer to APP
Description of major equipment (survey vessels, sampling platforms, sampling devices) and any problems or conditions that might impact performance or data quality	A, B, F
Equipment decontamination	B
Any pertinent field observations such as difficulties in sampling or conducting measurements or unusual circumstances that could affect data quality (instrument problems, contamination sources)	B, D, F
Deviations from approved plan (schedule, relocation/elimination of locations, change orders), including rationale and approval	A, B, F
Sample collection and transfer summary, custody information from collection through analysis	C
Field measurements	
Description of Instruments (make, model, serial number) and inspection	B
Measurement date, time, location/station, results (units, any correction factors applied, calculations (if applicable)	D, E
Identity of person performing the measurements	D, E
Sampling information	
Equipment description and inspection	B, D, E
Sample selection criteria/rationale (if different from plan)	A, B, D, E
Sample location (GPS coordinates, depth, compass/distance from fixed points)	D, E
Sample description (recovery, moisture, color, odor, texture, general sediment profile/stratigraphy, artifacts)	D, E
Sample manipulations (homogenization, compositing, filtering, preservation)	D, E
Sample ID, segment/interval, date, time, and sampler identity	B, D, E
Sample parameters, containers (size/type), preservation	
Field and QC sample ID, storage container and conditions for each (sub)sample/parameter set	B, C, D, E

[1] Locations for this information may include but are not limited to: A: Daily Activity Log; B: Field Notebook; C: COC Form; D: Field Coring Log; E: Grab Collection Form; F: Field Corrective Action Form

Attachment 1 Example of Daily Activity Log

Daily Activity Log New Haven FNP Sediment Evaluation	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. W912WJ17F0036
Date: _____	
Vessel/Sampling Platform:	
Personnel (Name/Affiliation/Role):	
Sampling Performed/Equipment Used:	
Stations Sampled:	
Health and Safety Issues:	
Deviations from Approved Plan:	
Dock Departure Time:	
Dock Return Time:	
Recorded by:	

Attachment 2 Example of Field Corrective Action Form

Field Corrective Action Form New Haven FNP Sediment Evaluation	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. W912WJ17F0036
Date: _____	
Document (plan or SOP title):	
Activity:	
Proposed Modification:	
Effective Date:	
Rationale:	
Submitted by:	Date:
Chief Scientist Approval:	Date:
Task Order Manager Approval:	Date:
NAE Technical Manager Approval:	Date:

AECOM

Standard Operating Procedure

Navigation/Positioning

Procedure Number: NHH-G-02

Revision No.: 0

Revision Date: August 2017

Prepared by

Rachel MacPhee

Date: _____

Ryan McCarthy
AECOM Task Order Manager

Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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Standard Operating Procedure Navigation/Positioning

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for positioning vessels in the New Haven Harbor Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). Positioning will be conducted to locate the vessel(s) with sufficient accuracy and precision to meet project objectives during sampling or measurement activities.

1.2 This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to position vessels. Specific information regarding proposed sampling and/or measurement locations is provided in the workplan (AECOM 2017a)

1.3 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 The health and safety (H&S) considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the site specific Accident Prevention Plan (APP) (AECOM 2017b). The major health and safety considerations for the work associated with navigating/positioning the vessel are the marine safety aspects of the program.

2.2 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

Differential global positioning system (DGPS) signal interferences/blockage can occur from time to time by bridges or other structures. These interferences can prevent system function until satellite signals are re-established. If insufficient satellite coverage occurs for proper function, the user will be alerted by the HYPACK system. In these cases the vessel will be repositioned to obtain better satellite coverage.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP;
- Sampling vessel(s) adequately sized and equipped for the task and expected conditions, including high frequency (VHF) radio, ground tackle, and required U.S. Coast Guard safety gear;
- Navigation charts and sampling/measurement locations figure;
- Electronic navigation charts with pre-loaded waypoints for all sampling and measurement locations - refer to the workplan (AECOM 2017a);
- DGPS Receiver with an accuracy of $\pm$1 foot;
- DGPS External Antennas;
- Field laptop computer with HYPACK survey software;
- Fixed water level measurement and recording gauges (approximately one per river mile);
- Equipment user manuals;
- Table of target sampling/measurement location coordinates;
- Assorted nautical equipment (e.g., anchors, lines, personal flotation devices);
- Logbook and ballpoint pen;
- Sample collection forms; and
- Real time kinematic (RTK) DGPS positioning system (optional).

5.0 Procedures

Sampling and measurement activities will be conducted from a vessel. In accordance with procedures outlined below, these vessels must be properly positioned and their position recorded before each activity can begin. The following describes the procedures that will be performed to accurately position sampling vessels at a designated sampling location, and the pertinent observations that will be recorded in the appropriate field notebook and/or data sheet.

Positioning will be achieved by using a DGPS integrated with HYPACK survey software in order to obtain the real time position of the vessel, in relation to planned sampling stations, displayed on an electronic nautical chart. Survey personnel will follow the appropriate sections of equipment user's manuals to ensure proper equipment operation and system performance.

5.1 Positioning the vessel

This section gives the step-by-step procedures for vessel positioning. Observations made during vessel positioning will be recorded on the sample collection forms, other standardized forms, and/or logbook, as appropriate.

A DGPS will be used to establish locations during implementation of activities specified in the workplan (AECOM 2017a). While this SOP provides general guidance and procedural steps, personnel performing positioning activities also will follow the appropriate sections of equipment user's manuals and have the manuals available for reference while operating the equipment.

The following procedures describe the steps to establish position at a location, as well as the steps to adjust the positioning for collection of additional samples.

5.1.1 Obtain the appropriate form(s). Initiate the Daily Activity Log provided in SOP NHH-G-01 (Field Records).

5.1.2 Obtain the target sampling/measurement locations. These locations will have been selected prior to commencement of field activities, as described in the workplan (AECOM 2017a). The location of each target sampling location will be established in the local State Plane Coordinate System with respect to the North American Datum of 1983 (NAD83).

5.1.3 Enter the coordinates for each sampling location as a waypoint into the HYPACK software package. Confirm accuracy of each entry against the coordinates established in the corresponding workplan (AECOM 2017a).

5.1.4 Configure the HYPACK system for the survey, including setting the survey grid to the local State Plane Coordinate System with respect to the North American Datum of 1983 (NAD83 - feet), and setting the "target ring" or maximum allowable offset based on task specific requirements listed in the corresponding workplan (AECOM 2017a).

5.1.5 If less than sub-meter accuracy is required, a DGPS base station will be established over a shore-based marker prior to sampling or measurement operations. The operation and horizontal/vertical accuracy of the vessel mounted DGPS will be verified at another shore-based marker by recording observed horizontal and vertical (XYZ) data and comparing these data to the published XYZ data for a given point. After initial DGPS system verification, a temporary benchmark may be established at a location convenient to the vessel to facilitate daily DGPS system performance verification. DGPS system performance verification will be conducted twice per day and documented in the logbook and vessel data logger. The horizontal and vertical accuracy will be compared to shore-based markers to verify performance. Elevations will be recorded in North American Vertical Datum of 1988 (NAVD88) with an accuracy of +/- one foot.

5.1.6 Install the DGPS antennae in a safe location which accurately represents the actual sample or measurement collection point; (e.g., immediately adjacent to a coring well, or mounted to the A-frame).

5.1.7 Identify and approach actual sampling/measurement locations by using data from the DGPS/HYPACK system in the navigation mode. The navigation mode provides information on heading, distance remaining, and time remaining. This information is based on the selected waypoint location and the present location of the vessel.

5.1.8 For sediment sampling, the vessel will be secured by lowering spud poles once in position within the station "target radius". In water depths that preclude the use of spud poles, maneuver the vessel approximately 60 feet up-current (or up-wind in slack conditions) of the target, drop the anchor, and pay out anchor line until the vessel drifts within the "target radius". A second anchor set may be required to increase lateral stability under certain conditions.

5.1.9 For water column sampling, the vessel will be positioned over each sampling/measurement location with no contact with the bottom. The operator will utilize the onboard navigation system to attempt to maintain positioning of the vessel within 10 feet of the sampling/measurement location.

5.1.10 Once the vessel is on location (and secured, for sediment sampling), note the coordinates from the DGPS unit and check the coordinates to verify that the vessel is within the pre-determined range of the target location as defined in workplan (AECOM 2017a). If not acceptable, adjust the vessel's location, and recheck the position. Repeat this process until the vessel's position is within acceptable range of the target. Record the final coordinates on the appropriate form. Record the actual sampling coordinates electronically (using HYPACK).

5.1.11 Once the coordinates are acceptable, perform the sampling or measurement activity at the location. Record final location coordinates on the appropriate form. For sediment sampling, final location coordinates will be recorded once the sampling device has penetrated the sediment to the target depth or refusal and prior to retrieval. Plot locations onto a master chart or use computer-based, real-time software to verify location.

5.1.12 To adjust the vessel's position to repeat an attempt at sediment sampling, the vessel will be moved by allowing it to rotate around the spud pole or by adjusting an anchor line until the new position for the sampling device has been established. Record the new position.

5.1.13 At the end of the sampling day, check the data loaded onto the DGPS units to verify the existence of locations where data were collected. Download HYPACK navigation files to a portable data storage device and transfer data to an applicable secure project directory.

5.2 Elevation measurements

5.2.1 In order to establish the elevation of the sediment surface at locations within the harbor, a system will be established whereby the water level of the harbor is continuously monitored and recorded for use as a local reference (e.g., local NOAA station).

5.3 Calibration, maintenance, and use of field instruments

5.3.1 Poor DGPS Reception or System Failure

If insufficient satellite coverage occurs for proper function, the user will be alerted by the HYPACK® system. In these cases the Field Task Manager will be notified that verification of the field position of the vessel at the target location cannot be performed. The Field Task Manager will review the situation with respect to available reference resources and may provide the field team with alternate locations, as required by the workplan (AECOM 2017a). The selection of alternate sampling locations will be made jointly through discussions with the Field Task Manager and the boat personnel.

When satellite reception is insufficient to meet system accuracy requirements, system error codes will appear on the output screen. Nonetheless, proper operation of the DGPS / HYPACK navigation system can be verified by checking the displayed vessel position on the electronic base map against surrounding geographic features. This activity will be undertaken at the start of each day after start-up as a quick check to verify proper system function. Note: system function errors will be obvious and rigorous checking of the system is not necessary.

5.3.2 Maintenance

Prior to use, the DGPS units will be inspected for functionality. Maintenance and use of DGPS units will follow the appropriate sections of the equipment user's manual. Field personnel will have the manual available for reference. Equipment maintenance will be recorded in the field logbook, including the reason for the maintenance (routine or because of a problem), actions taken, and final resolution (e.g., correction of the problem, replacement of the instrument).

6.0 Quality Assurance/Quality Control

6.1 Actual sampling/measurement locations will be verified as being within the workplan-specified radius/tolerance surrounding the target coordinates specified in the workplan (AECOM 2017a). Using a HYPACK navigation system allows the user to see the real time position of the sampling vessel in relation to the designated position of the sampling/measurement station and the user defined “target radius” surrounding each station. This visual confirmation on the electronic chart is also complimented by a HYPACK data display that indicates the actual distance to target. Using these two features ensures proper vessel positioning.

6.2 DGPS system performance will be verified by confirming the accuracy of the initial HYPACK configuration (i.e., geographic reference) and by regular system checks during the course of the day.

6.3 The quality of the data provided by the DGPS unit is monitored by HYPACK as another control feature built into the system. In the event there is degradation in DGPS signal quality, either by a reduced number of available satellites or satellite geometry, the HYPACK system will alert the operator of the reduced quality of horizontal and vertical precision levels.

6.4 Data recorded manually and electronically (see Section 7.2) will be cross-checked for accuracy

7.0 Data and Records Management

7.1 Field records will be generated as outlined in SOP NHH-G-01 (Field Records). This document provides specifics on recording data for field activities. At a minimum, sample position information (x, y, and z), verification of DGPS system performance, and any positioning-related problems encountered will be recorded. Additional information may be required for sample collection or measurement activities and are outlined in the relevant SOPs.

7.2 Position data will be saved electronically at the time of sampling within HYPACK and recorded manually on the sample collection/measurement forms. Although the electronic record represents the primary record, the sample collection/measurement form information will serve as a backup to the electronic file.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and summarized on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A field correction action form will be completed (refer to SOP NHH-G-01 – Field Records) and distributed as specified in the workplan (2017a).

7.4 All records (electronic and hard copy) associated with the activities described in this SOP will be maintained in accordance with the workplan (AECOM 2017a).

8.0 Personnel Qualifications and Training

Individuals executing these procedures will have read, and be familiar with, the requirements of this SOP. Vessel navigation and positioning will only be performed by experienced DGPS / HYPACK operators.

9.0 References

AECOM 2017a. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision History

Revision	Date	Changes
0	August 2017	NA

AECOM

Standard Operating Procedure

Equipment Decontamination

Procedure Number: NHH-G-03

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Prepared by

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Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
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Standard Operating Procedure
Equipment Decontamination

1.0 Scope and Applicability

The purpose of this document is to define the standard operating procedure (SOP) for decontamination of equipment, instruments, and other materials used during implementation of field tasks on the New Haven Harbor Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). Decontamination is the process of neutralizing, washing, and rinsing exposed surfaces of equipment to minimize the potential for contaminant migration and/or cross-contamination. This procedure does not apply to personnel decontamination which is described in the site-specific Accident Prevention Plan (APP) (AECOM 2017a).

It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and communicated to the clientr. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical and biological hazards, are addressed in the APP (AECOM 2017a).

2.2 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. As detailed in the APP (AECOM 2017a), everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

3.1 Equipment decontamination should be performed in an area that does not interfere with sampling activities, but sufficiently close to maintain an efficient working environment. Whenever possible, decontamination activities will be performed in a location that is not subject to potential sources of contamination (for example, generators and other combustion engines). Where decontamination is required on a boat, the vessel's engines must be turned off during decontamination. Ideally, boat engines and/or generators should be shut off during

collection of equipment blanks, consistent with collection of sediment/ water samples. If this is not possible, then the sampling platform should be positioned upwind from any running combustion engines.

3.2 Equipment that is improperly or inadequately decontaminated may result in biased sample results. To avoid sample contamination, the procedures and equipment specified in this SOP are to be followed. Specifically:

- The decontamination materials, including detergent, water, etc., will meet the specifications of the SOP;
- Buckets and other containers holding decontamination solutions will be labeled to segregate containers holding “dirty” from “clean” solutions, and brushes will be dedicated to a particular step in the decontamination process; and
- Decontaminated equipment that is not immediately reused will be covered/wrapped in plastic or aluminum foil (shiny side out) and marked to indicate it is clean.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP (AECOM 2017a);
- Bristle brushes;
- Plastic wash/rinse buckets or tubs;
- Phosphate-free biodegradable detergent (e.g. Liquinox®, Alconox®);
- Deionized "analyte-free" water (DIW);
- Stainless steel bowls or pans (labeled as needed);
- Aluminum foil;
- Plastic sheeting;
- Zipper-lock bags;
- Tap water (from any treated municipal water supply);
- Sample container(s) for equipment rinsate blank, if collected; and
- Field logbook and standardized forms as needed.

5.0 Procedures

Sampling equipment (excluding newly purchased disposable equipment) that comes into contact with the media to be sampled will be decontaminated prior to use in the field to eliminate or minimize cross-contamination. The frequency of decontamination is provided in the task-specific SOPs (for example, surface water sampling, grab sampling, sediment collection via vibracore, core processing). Sufficient decontaminated equipment will be available to be dedicated to the sampling locations planned for each day, where feasible. Equipment will be decontaminated in the area designated for decontamination.

Surface water and sediment samples may be submitted for chemical, biological, and geotechnical analyses as described in the workplan. Sampling equipment will be decontaminated as described in Section 5.0 below. Decontamination of the sampling equipment will be commensurate with the analyses to be performed.

5.1 General preparation

Inspect equipment needed for sample collection to ensure that it is in good working order and establish an equipment decontamination area that includes a collection basin that can be placed beneath the equipment to collect decontamination fluids, brushes, and a series of wash bottles for each of the solutions specified in the following section. Personnel will dress in suitable PPE to reduce exposure to contaminants (refer to the APP [AECOM 2017a]).

5.1.1 Residual sediment will be scraped off and the equipment rinsed with site water (on the sampling vessel while on site).

5.1.2 Equipment may be rinsed with potable water if needed to further remove gross contamination.

5.1.3 Equipment will be placed in a wash tub or bucket (if size allows) containing Alconox® (or other phosphate-free detergent) along with potable water, and scrubbed with a bristle brush or similar utensil.

5.1.4 Equipment will be rinsed twice with potable water over a bucket using a squeeze bottle or pump sprayer.

5.1.5 Following decontamination, equipment will be placed in a dedicated clean area or will be protected from re-contamination by covering with plastic or wrapping in foil.

5.1.6 Rinse water and detergent water will be replaced frequently.

5.2 Field instrumentation should be cleaned according to the manufacturer's instructions. Care will be taken to prevent damage to equipment. When possible, instruments which are

difficult to decontaminate, such as cameras and data logging instruments, may be protectively wrapped to reduce or eliminate the need for decontamination.

5.3 Pumps used for surface water sampling will be rinsed with potable water prior to and following each day of use. Decontamination of the pump between stations or between depths is not required.

5.4 Other sampling equipment that might be used and that has had direct contact with sediments or wastes will be decontaminated at a designated area prior to leaving the Site. If the above decontamination procedures are not applicable or feasible, the decontamination procedure will be as follows:

5.4.1 Equipment will be wrapped or draped in plastic or placed in the plastic-lined cargo area of a truck for transport to the area designated for decontamination.

5.4.2 Equipment will then be rinsed, by hose or high pressure spray, with potable water.

5.5 Equipment rinsate blanks will be collected to assess the adequacy of equipment decontamination procedures. Equipment rinsate blanks will be submitted for testing at the frequency specified in the workplan. The equipment rinsate blank collection procedures are included in the SOPs for the individual tasks (surface water sampling, sediment sampling, core processing, etc.) and in the workplan (AECOM 2017b).

6.0 Quality Assurance/Quality Control

6.1 Decontamination QA/QC procedures described in Section 5.0 will be performed to assess the adequacy of equipment decontamination procedures. Equipment rinsate blanks will be collected at the frequency specified in the workplan.

6.2 It is the responsibility of the Field Task Manager to periodically check/ensure that the equipment decontamination procedures are in conformance with those stated in this SOP.

7.0 Data and Records Management

7.1 Documentation of decontamination procedures will be contained in the field logbook or recorded on the appropriate task-specific standardized form and should include:

- A list of equipment being decontaminated along with the date and time;
- The names of the project staff performing the decontamination;
- Documentation of equipment rinsate blanks including sample ID, date and time, the equipment rinsed, collector, and parameters; and

7.2 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and summarized on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A field corrective action form will be completed (refer to SOP NHH-G-01 – Field Records) and distributed as specified in the workplan (AECOM 2017b).

8.0 Personnel Qualifications and Training

Individuals executing these procedures will have read, and be familiar with, the requirements of this SOP and the corresponding plans (e.g., APP [AECOM 2017a], workplan [AECOM 2017b]). Decontamination of field equipment is a relatively simple procedure; no specialized training is needed. However, execution of these activities will initially be supervised by more experienced personnel.

9.0 References

AECOM 2017a. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision History

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0	August 2017	NA

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Standard Operating Procedure

Sample Custody

Procedure Number: NHH-G-04

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Prepared by

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Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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Attachment 1 Example Chain-of-Custody Form

Standard Operating Procedure
Sample Custody

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for the chain-of-custody (COC) procedures associated with samples collected in the New Haven Harbor Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). The objective of COC procedures is to provide sufficient evidence of sample integrity to satisfy data defensibility requirements. Samples may include sediment or water collected or generated for chemical, biological, and/or physical analyses, and associated quality assurance (QA) analysis. This SOP is intended to be complete enough so that: 1) the steps which could affect tracking, documentation, or integrity of samples are explained in sufficient detail and 2) different sampling personnel following these procedures will deliver samples to the laboratory which are equally reliable and consistent.

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 Although COC activities do not generally pose significant health and safety risks, sample exposure via external container residues may occur and much of the work going on in the vicinity of sample custodians requires attention to safety practices. Project-related physical, chemical and biological hazards are addressed in the site specific Accident Prevention Plan (APP) (AECOM 2017a).

2.2 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

Not applicable.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP (AECOM 2017a);
- Sample containers as specified in the workplan (AECOM 2017b)
- Sample labels;
- Chain of custody forms;
- Custody tape or seals;
- Field logbook;
- Ballpoint pen or fine-tipped marked (e.g., Sharpie®); and
- Clear plastic sealing tape.

5.0 Procedures

5.1 General requirements

5.1.1 As few people as possible should handle the samples.

5.1.2 Sampling personnel should be able to testify that tampering of the samples could not occur without their knowledge.

5.2 Sample identification

Each sample, including field samples and quality control (QC) samples (e.g., equipment rinsate blanks, field duplicates) will be assigned a unique identification. Refer to the workplan (AECOM 2017b) for the sample identification protocol.

5.3 Sample labeling

5.3.1 A label will be attached to each bottle used for sampling. Waterproof, adhesive labels are preferred. Labels will be applied to the container, not the lid, whenever possible.

5.3.2 When practical, the project identification, sample matrix, laboratory designation/analyses requested, field sample identification code, and preservation will be typed or printed onto the label before sampling. The label will be protected from water and solvents with clear packing tape, except in cases where not appropriate.

5.3.3 Completion of the sample labels (including the sampler's initials and the date and time of sample collection) will occur at the time of sample collection. Labels will be completed in waterproof, indelible ink.

5.4 Sample tracking

5.4.1 From the time of collection through transportation, the handling of samples will follow COC procedures. A representative from each sampling team (e.g., from each vessel) will be assigned as the field sample custodian. This individual will be responsible for the custody of the samples from collection until release for processing or shipment to the laboratories. The field sample custodian will provide a sample transfer/custody form and the completed and electronic versions of the sample collection forms (refer to SOPs NHH-S-01 – Grab Sampling, NHH-S-02 – Sediment Sampling Using a Vibracorer, and NHH-S-03 – Core Processing) when relinquishing the collected samples for sample processing or shipment. The samples will be verified against the sample transfer/custody form. An example standard chain of custody (COC) form is provided in Attachment 1.

5.4.2 A sample is considered under a person's custody if one or more of the criteria are met:

- Sample is in the person's possession;
- Sample is in the person's view after being in person's possession;
- Sample was in the person's possession and then was locked up to prevent tampering; or
- Sample is in a designated secure area.

5.4.3 Samples collected for analysis will be continuously tracked and while in transit to the laboratory by use of the following procedures below.

5.4.4 Individual sample bottles will be properly labeled and securely sealed before being placed in the container for shipment to the laboratory.

5.4.5 Pertinent information will be entered on the COC form (Attachment 1) and will include:

- Project identification
- Signatures of samplers;
- Sample identification code. This code should be unique to the sampling event and to the program and must agree exactly with the field sample identification code recorded on the bottle label;
- Date and time of sample collection,

- Sample matrix (sediment, water, etc.);
- Analyses requested;
- Number of sample containers;
- Preservative;
- Grab or composite sample designation (if applicable);
- Sampler's remarks (optional). These comments may serve to alert the laboratory to highly contaminated samples or identify QC sample requirements.
- Signatures of individuals involved in sample transfer;
- destination (e.g., laboratory name and location);
- Page number (for example: 1 of 2, 2 of 2);
- If applicable, COC tape numbers; and
- If applicable, the air bill or other shipping number.

This information is consistent with guidance in SW 846, Test Methods for Evaluating Solid Waste (USEPA, 1993).

5.4.6 The COC will be manually filled out completely and legibly in indelible ink. COCs may be pre-printed with known information (project identification, parameters to be analyzed, etc.). Corrections will be made, if necessary, by drawing a single line through and initialing and dating the error. The correct information will then be recorded with indelible ink. There should be no unexplained blank spaces. Blank lines will be lined out and initialed and dated.

5.4.7 Each COC will be cooler-specific (i.e., list only the samples packed in the cooler). Information on the COC must agree exactly with that recorded on the sample containers. Discrepancies may result in the samples being incorrectly logged into the laboratory or delays in initiating sample analysis.

5.4.8 The completed COC form will be signed, dated, enclosed in a sealable plastic bag, and placed in the container prior to shipment/ transfer to a courier. A copy of the COC will be retained by field personnel and stored in a dedicated binder or file. Additional copies will be distributed via email or fax as follows:

- Project Chemist or his/her designee;
- Data Management Task Manager or his/her designee; and
- Laboratory project manager at each laboratory being used.

5.4.9 If samples are to be shipped by commercial overnight carrier, COC seals must be used and the COC seal numbers recorded on the COC form. Refer to SOP NHH-G-05 –

Packaging and Shipment of Environmental Samples for specific packaging procedures. Representatives of commercial carriers are not required to sign the COC form.

5.4.10 If samples are hand carried to a laboratory, custody will be maintained and documented on the COC form through the process (e.g., from the person packing the cooler to the person transporting the samples to the laboratory).

5.4.11 If samples are transmitted to the laboratory by courier, the procedures described in either Section 5.4.10 or 5.4.11 will be followed, depending on whether the courier is a commercial courier or laboratory representative, and whether the cooler has been secured by COC seals prior to pick up by a laboratory courier.

5.4.12 Upon receipt at the laboratory, the designated laboratory sample custodian will sign the COC form indicating receipt of the incoming field samples. The samples will be checked against the COC form upon arrival at the laboratory. The receiving personnel will enter all arriving samples into the laboratory system. Any discrepancies between the samples and the COC form(s), or any evidence of tampering with the shipping container or the custody seal will be immediately reported to the Project Chemist. The laboratory sample custodian will check the temperature of the cooler upon arrival at the laboratory and record the measured temperature on the COC and/or appropriate sample/cooler receipt forms. The Project Chemist will be immediately notified of any sample preservation issues, including temperature exceedances.

5.4.13 A completed copy of the COC form will be distributed via email or fax to the Project Chemist within 24 hours of sample receipt at the laboratory. The original will be retained by the laboratory.

6.0 Quality Assurance/Quality Control

6.1 Completed COCs will be reviewed by the individuals preparing the samples for shipment for completeness, accuracy, and legibility. Specifically, the samples and COC record will be compared to ensure agreement between the sample labels and the COC, and to verify the number of sample containers.

6.2 These records are subjected to periodic review by the Field Task Manager to verify adherence to the procedures outlined in this SOP.

7.0 Data and Records Management

7.1 The records associated with the custody process (transfer forms, COC records, airbills, etc.) will be maintained in an organized and contained manner.

7.2 COC records will be distributed to the appropriate personnel as described in the SAP.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and summarized on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A field corrective action form will be completed (refer to SOP NHH-G-01 – Field Records) and distributed as specified in the workplan (AECOM 2017b).

8.0 Personnel Qualifications and Training

Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP [AECOM 2017a], workplan [AECOM 2017b]). No specialized training is required; however, execution of these activities will initially be supervised by more experienced personnel.

9.0 References

AECOM 2017a. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision History

Revision	Date	Changes
0	August 2017	NA

Attachment 1 Example Chain-of-Custody Form

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name:	Project Location:	Analysis Requested
Project Number:	Field Logbook No.:	
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape Nos.:	
Signature:	Send Results/Report to:	TAT:

Container Type
P – Plastic
A – Amber Glass
G – Clear Glass
V – VOA Vial
O – Other
E – Encore

Preservation
1 – HCl, 4°
2 – H2SO4, 4°
3 – HNO3, 4°
4 – NaOH, 4°
5 – NaOH/ZnAc, 4°
6 – Na2S2O3, 4°
7 – 4°

Matrix Codes:
DW – Drinking Water
WW – Wastewater
GW – Groundwater
SW – Surface Water
ST – Storm Water
W – Water
S – Soil
SL – Sludge
SD – Sediment
SO – Solid
A – Air
L – Liquid
P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered											Lab I.D.	Remarks

Relinquished by: (Print Name)(Affiliation) Signature:	Date: Time:	Received by: (Print Name)(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)(Affiliation) Signature:	Date: Time:	Received by: (Print Name)(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)(Affiliation) Signature:	Date: Time:	Received by: (Print Name)(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

Standard Operating Procedure

Sample Packaging and Shipping

Procedure Number: NHH-G-05

Revision No.: 0

Revision Date: August 2017

Prepared by

Rachel MacPhee

_____ Date: _____

Ryan McCarthy
AECOM Task Order Manager

_____ Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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Standard Operating Procedure
Sample Packaging and Shipping

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for packaging and shipping samples collected on the New Haven Harbor Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). Sample packaging and shipment generally involves the placement of individual sample containers into a cooler or other similar shipping container and placement of packing materials and coolant in such a manner as to isolate the samples, maintain the required temperature, and to limit the potential for damage to sample containers when the cooler is transported.

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 Although packaging activities do not generally pose significant health and safety risks, sample exposure via external container residues may occur and much of the work going on in the vicinity of sample custodians/shippers require attention to safety practices. Project related physical, chemical, and biological hazards are addressed in the site specific Accident Prevention Plan (APP) (AECOM 2017a).

2.2 Sample packaging and shipping involves potential physical hazards primarily associated with handling of occasional broken sample containers and lifting of heavy objects. Adequate precautions will be taken, including minimizing the weight of individual coolers, using hand carts to transport coolers, and using the buddy system to lift coolers into and out of vehicles.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. As detailed in the APP (AECOM 2017a), everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

Improper sample storage or inadequate protection against breakage and cross-contamination could potentially affect sample results. The field team will follow the details of this SOP to minimize these effects.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP (AECOM 2017a);
- Inert packing material (e.g., foam peanuts, vermiculite, cardboard, bubblewrap, etc.);
- Sample containers as specified in the workplan (AECOM 2017b);
- Sample labels;
- Chain of custody (COC) forms;
- Insulated coolers;
- Custody tape or seals;
- Indelible marking pens;
- Shipping tape;
- Sealable plastic bags;
- Temperature blanks (provided by the laboratory);
- Field logbook;
- Ice or similar chilling source;
- Ballpoint pen or fine-tipped marked (e.g., Sharpie®); and
- Clear plastic sealing tape.

5.0 Procedures

5.1 General requirements

5.1.1 Vehicular sample transport will adhere to normal/applicable Department of Transportation (DOT) regulations. DOT regulations/guidelines related to sample shipments can be viewed on AECOM's SH&E intranet web page.

5.1.2 An area for storing unused sample containers/coolers and a clean area for sample handling, packaging, and shipment will be identified.

5.1.3 Laboratories will often re-use coolers. The interior and exterior of each cooler received at a project location should be inspected for cleanliness before using it. Any coolers that have cracked interior or exterior linings/panels or hinges should be discarded. Any coolers missing one or both handles should also be discarded if replacement handles (i.e., knotted rope handles) cannot be fashioned in the field.

5.1.4 Excess strapping tape and old shipping labels should be removed. If the cooler interior exhibits visible contamination or odors it should be decontaminated in accordance with NHH-G-03 – Equipment Decontamination prior to use.

5.1.5 The Field Task Manager or designee will notify the laboratory(ies) of the number, type and approximate collection and shipment dates for the samples in advance of any sample transfers and communicate any delays. The laboratory(ies) will provide courier service for all sample shipments.

5.2 Sample packaging and shipping will be done in accordance with applicable regulations, as described below:

5.2.1 After filling a sample container, affix cap. For sediment/solids containers, secure the cap with clear tape; the use of plastic tape to secure the cap is not required for aqueous containers. Complete the sample label. Apply the label to the sample container and cover with clear tape.

5.2.2 Clean the outside of each sample container by wiping it off with a clean paper towel. Verify that residual sediment has been removed from the outside of the container, and from the area under and around the cap.

5.2.3 Place each glass sample bottle into an individual bubble bag sleeve provided by the lab or wrap each glass bottle/jar individually using bubble wrap secured with tape or rubber bands

5.2.4 Seal each sample container inside a sealable plastic bag.

5.2.5 For those samples that require thermal preservation, place on ice or similar chilling source immediately after collection.

5.2.6 Place plastic bubble wrap matting in the bottom of each cooler or shipping container as needed.

5.2.7 Transfer the samples to the plastic-lined cooler. Place bottles upright into the cooler. If a combination of plastic and glass sample containers are to be packed, alternate them within the cooler to further protect the glass. Use inert packaging material (e.g., cardboard, etc.) to cushion the samples and minimize the potential for breakage by placing additional packing material throughout the voids between sample containers and between any layers within each cooler to a level which meets the approximate top of the sample containers. Packing material may require tamping by hand to reduce the potential for settling. Seal the drains on the ice chest (if present) with shipping tape or plug the drains with silicone sealant or a similar inert substance.

5.2.8 Conduct an inventory of sample numbers, fractions and containers when placing samples into the coolers, and check the inventory against the corresponding COC form before sealing the cooler (SOP NHH-G-04 – Sample Custody).

5.2.9 For those samples requiring thermal preservation, ice or similar chilling sources sufficient to maintain a temperature of 4° ± 2° Celsius (°C) will be placed inside the cooler during transport. Double bag cubed ice in heavy duty Ziploc type plastic bags to prevent leakage, close the bags, and distribute the packages in a layer over the top of the samples. If sample bottles are bubble wrapped, it is also permissible to insert double bagged ice packages between the sample bottles. Never place un-bagged loose ice directly into a cooler. Use sufficient ice to accommodate reasonable delays in shipment. A temperature blank provided by the analytical laboratory with each cooler will be included in the shipment.

5.2.10 Obtain two custody seals and enter the seal numbers on the COC form. Complete sample tracking documentation as described in SOP NHH-G-04 (Sample Custody), and place the documents in a sealable plastic bag inside the ice chest, taped to the inside of the lid.

5.2.11 Secure chest lid with shipping tape by covering the entire seal with tape. Sign and date the two custody seals, affix the custody seals on opposing corners of the cooler lid and cover the seals with clear plastic tape.

5.2.12 Repeat the above steps for each cooler or shipping container. If more than one cooler is being delivered to a laboratory, mark each cooler as “1 of 2”, “2 of 2”, etc.

5.2.13 Transport the shipping container directly to the laboratory or the laboratory courier. Samples will be shipped by close of the same day, whenever possible.

6.0 Quality Assurance/Quality Control

6.1 Completed COCs will be reviewed by the individuals preparing the samples for shipment for completeness, accuracy, and legibility. Specifically, the samples and COC record will be

compared to ensure agreement between the sample labels and the COC, and to verify the number of sample containers.

6.2 The laboratory will notify the Project Chemist within 24 hours of receipt in the event that samples are received broken, that there are sample preservation concerns or holding time exceedances, or there are discrepancies between the custody paperwork and the sample containers.

6.3 The procedures and records associated with sample packaging and shipping are subjected to periodic inspection and review by the Field Task Manager to verify adherence to the procedures outlined in this SOP.

7.0 Data and Records Management

7.1 The records associated with the shipment process (COC records, etc.) will be maintained in an organized and contained manner.

7.2 COC records will be distributed to the appropriate personnel as described in the Work plan (AECOM 2017b).

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and summarized on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A formal nonconformance report (NCR) will be completed (refer to SOP NHH-G-01 – Field Records) and distributed as specified in the workplan (AECOM 2017b).

8.0 Personnel qualifications and training

Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP [AECOM 2017a], workplan [AECOM 2017b]). No specialized training is required; however, execution of these activities will initially be supervised by more experienced personnel.

9.0 References

AECOM 2017a. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven,

Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision History

Revision	Date	Changes
0	August 2017	NA

AECOM

Standard Operating Procedure

Sediment Grab Sampling

Procedure Number: NHH-S-01

Revision No.: 0

Revision Date: August 2017

Originally Prepared by

Rachel MacPhee

Date: _____

Ryan McCarthy
AECOM Task Order Manager

Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
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Attachment 1 Example of Grab Collection Form

Attachment 2 Equipment Rinsate Blank Collection Procedure

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for collecting sediment grab samples using a grab sampler deployed from a boat or other sampling platform as part of the New Haven Harbor Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). Surface sediment samples will be collected for a variety of chemical, physical, and biological parameters. Grab samplers intended for use on the FNP project include Van Veen grab samplers (including Ted Young modified), power grab samplers and a box corer. This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to collect grab samples. Specific information regarding grab sampling can be found in the associated workplan (AECOM 2017a). This SOP is based on United States Environmental Protection Agency (USEPA) guidance document Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual (USEPA, 2001).

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted based on field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by Project Quality Assurance (QA) Manager and the Task Manager. Deviations from this SOP will be documented in the field records and on a field corrective action form (SOP NHH-G-01 – Field Records) including the reason for the deviation(s). The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the site specific Accident Prevention Plan (APP) (AECOM 2017b),

2.2 The health and safety considerations for the work associated with grab sampling include:

- The physical hazards of handling heavy equipment,
- Pinch hazards associated with the grab or box core sampler,
- Overhead lifting hazards using boat based winches and A-frames,
- Marine safety aspects of the program, and

- The specific chemical hazards related to the sediments.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP (AECOM 2017b, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

Grab sampler collection issues generally include mechanical failures, over penetration, or surface sediment loss. Each of these will affect the quality/representativeness of the resulting data. Any sampler that did not trigger properly, or did not completely close will be rejected. Samplers that are either over-filled or appear to have lost surface fines will also be rejected. These details are further discussed in Section 5 (Procedures).

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Coring/sampling vessel, including the necessary navigational, communication, and grab deployment equipment;
- Marine VHF radio;
- Van Veen (or Ted Young modified Van Veen) grab sampler;
- Stainless-steel power grab sampler with pneumatic ram and stainless steel guide;
- Box corer;
- Stand (cradle) on which to place the grab or box core while not in deployment;
- Siphon tubing and bucket or pipette;
- Source of running water (optional);
- Water pump and hoses (optional);
- First aid kit and personal protective equipment (PPE) (refer to APP [AECOM 2017b]);

- Approved plans, including target sampling locations;
- Sample containers (refer to workplan [AECOM 2017a]);
- Stainless steel bowls/trays and spoons/spatulas (or equivalent);
- Insulated coolers with wet ice;
- Sample labels;
- Waterproof paper and pen;
- Field notebook, Grab Collection Form, and other standardized forms (as needed);
- Ruler and tape measure;
- Digital camera (optional);
- Chain-of-custody forms and seals;
- Decontamination supplies (refer to SOP NHH-G-03 – Equipment Decontamination).

5.0 Procedures

This section gives the step-by-step procedures for collecting grab samples using a grab sampler (Van Veen, Ted Young modified Van Veen, or power grab) or box corer. Observations made during sediment grab sample collection will be recorded on the Grab Collection Form (Attachment 1), and/or a logbook (SOP NHH-G-01 - Field Records).

5.1 Equipment decontamination

The grab sampler or box corer, stainless steel bowls/containers, and stainless steel spoons/spatulas will be cleaned prior to initial use and between each station following the procedures in SOP NHH-G-03 and documented in the field notebook. A sufficient supply of pre-decontaminated small equipment will be mobilized to the sampling locations to minimize the need for performing field decontamination. Larger equipment, such as grab or box core, will however require field decontamination on the vessel between sampling stations. Note: grabs or box corers will not require decontamination between deployments at the same station; only between sampling stations, unless sticky or tar-like materials are encountered.

5.2 Equipment rinsate blanks

Equipment rinsate blanks will be collected at the frequency specified in the workplan (AECOM 2017a) after the sampling gear is decontaminated. The procedure for collecting equipment rinsate blanks and related sample containerization requirements are detailed in Attachment 2.

5.3 Positioning

5.3.1 The sediment sampling schedule for the day will be established prior to vessel departure, and sufficient equipment to complete the work will be on-board the sampling/coring vessel. Grab samples are anticipated to be collected adjacent to core collection locations.

5.3.2 The sampling/coring vessel will move to a grab/coring location in accordance with SOP NHH-G-02 (Navigation Positioning).

5.4 Sampling preparation

The associated workplan summarize the parameters that require collection at each station, and list the sample mass, container type, preservatives, and storage conditions required for each sample.

5.5 Sampler Deployment and Retrieval

5.5.1 Don PPE as required by the APP (AECOM 2017b).

5.5.2 Attach the sampler (grab sampler or box corer) to the end of the winch cable with a shackle and tighten the pin.

5.5.3 Attach any needed weights to achieve the needed penetration or pads (boards) for stabilization. Arm the grab/box corer.

5.5.4 Lower the sampler through the water column until the cable slackens. Nearing the bottom travel time will not exceed 1 m/sec to minimize bow wave disturbance. Record the station location (HYPACK system) and water depth (echo sounder or weighted line) on the Grab Collection Form (Attachment 1).

5.5.5 Retrieve the sampler and place it on the stand.

5.5.6 Open the sampler and examine it for acceptability:

- The sediment surface should be basically level and intact over the surface area of the grab, with no sign of channeling or sample washout
- Penetration depth should be sufficient (as measured from the center of the grab) to meet the project requirements
- The jaws of the sampler should be tightly closed and water should not be substantially leaking from the sampler

- The surface appears intact (shell hash or coarse material visible on the surface is acceptable as long as the first two criteria are met and the jaws of the grab are tightly closed and not leaking).

- Grabs that are only partially filled, or obviously slumped or pitched due to the sampler hitting at an angle are not considered acceptable. In addition, sediments should not be in contact with the underside of the sampler access doors. Drain overlying water from the sampler (by siphoning, not decanting) until only a thin film remains.

5.5.7 Describe the sample surface (color, texture, odor, etc.) on the Grab Collection Form (Attachment 1); continue to describe the sample during sample processing.

5.5.8 Collect the sample as described below. Future deployments will be adjusted for local sediment conditions by either adding/removing weight or pads to the grab frame to control the penetration depth.

5.5.9 Repeat steps 5.5.4 through 5.5.9 until sufficient grab samples are collected to meet the sample volume requirements for the full set of parameters as specified in the workplan. Care will be taken to ensure that the precise collection interval/horizon specified in the corresponding workplan is collected. Slight adjustments/relocation of the vessel on-station between sampler deployments will be performed according to SOP NHH-G-02.

5.6 Shipboard sample collection

5.6.1 Siphon off the overlying water (or remove via pipette) to the sediment/water interface without substantially disturbing the soft surface sediment. This will be performed by gently allowing the water to drain to one corner of the sampler for siphoning-off.

5.6.2 Sediment to be homogenized (for non-discrete sample parameters) will be placed in a covered plastic bucket (e.g., 3 ½ gallon bucket) provided by the laboratory.

5.6.3 Store the sample containers in an insulated cooler containing wet ice to keep samples cold while on the vessel until they can be transported to shore for further processing or shipment to the corresponding analytical laboratory as described in SOP NHH-G-05 (Sample Packaging and Shipping).

5.6.4 Clean the grab sampler or box corer in accordance with the procedures in SOP NHH-G-03 between stations.

6.0 Quality Assurance/Quality Control

6.1 Completing the Grab Collection Form (Attachment 1) will document that the process is being followed and that pertinent information is being collected and recorded in accordance with the procedures outlined in this SOP.

6.2 Entries on the forms and in the field logbook will be double-checked by the samplers to verify the information is correct. Completed forms and field logbook will be reviewed periodically by the Field Task Manager to verify that the requirements are being met.

6.3 The workplan (AECOM 2017a) has been prepared to collect representative samples within the NHH per the SOW (NAE 2017). High sediment moisture content, which can impact the achievable reporting/detection limits and sample representativeness, will be evaluated. Samples collected with a high water content will be discussed with the Field Task Manager to evaluate the need to collect added sample or to take added action that would reduce the water content (e.g., allowing the sediment slurry to settle in a bucket followed by siphoning the overlying water).

6.4 Data quality evaluations will be based on quality control (QC) sample results. QC samples may include field duplicates and equipment rinsate blanks; collection requirements are tabulated in the associated workplan (AECOM 2017a).

6.5 The workplan (AECOM 2017a) lists the proper sediment sample containerization, preservation, and storage conditions required to maintain sample integrity.

7.0 Data and Records Management

7.1 Field notes will be kept during sampling activities in accordance with SOP NHH-G-01 - Field Records.

7.2 Field data will be distributed to the appropriate personnel as described in the workplan (AECOM 2017a).

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A field corrective action form, including reason and impact on the program, will be submitted to the Task Manager and Project QA Manager for approval.

8.0 Personnel Qualifications and Training

8.1 Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP [AECOM 2017b], workplan [AECOM

2017a]). Inexperienced personnel performing these activities will be initially supervised by the Field Task Manager or his/her designee.

9.0 References

AECOM 2017a. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

USEPA 2001. Methods for Collection, Storage and Chemical Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. United States Environmental Protection Agency, Office of Water. EPA-823-B-01-002. October 2001.

10.0 Revision History

Revision	Date	Changes
0	August 2017	NA

Attachment 1

Example of Grab Collection Form

Sediment Grab Collection Record AECOM

Location ID | Date | Project #

Sampler | Contractor | Vessel

Weather

Sampling Equipment: Ted Young Box Core | Diameter *in*

Target Northing | Easting | NJ NAD83 Stateplane Feet

Grab Number | Time *24hr* | Water Depth *ft* | # Attempts

Actual Northing | Easting | Distance from target *ft*

Target Penetration Depth *ft*
Actual Penetration Depth *ft*
Recovered Length *ft*
Recovery %

Remarks

RPD *cm* | Texture *all*: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID *ppm* | H2S *ppm* | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No | Oil sheen: Yes No | Visible biology: Yes No

Grab Number | Time *24hr* | Water Depth *ft* | # Attempts

Actual Northing | Easting | Distance from target *ft*

Target Penetration Depth *ft*
Actual Penetration Depth *ft*
Recovered Length *ft*
Recovery %

Remarks

RPD *cm* | Texture *all*: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID *ppm* | H2S *ppm* | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No | Oil sheen: Yes No | Visible biology: Yes No

Grab Number | Time *24hr* | Water Depth *ft* | # Attempts

Actual Northing | Easting | Distance from target *ft*

Target Penetration Depth *ft*
Actual Penetration Depth *ft*
Recovered Length *ft*
Recovery %

Remarks

RPD *cm* | Texture *all*: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID *ppm* | H2S *ppm* | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No | Oil sheen: Yes No | Visible biology: Yes No

1.2 2009/07/02 Page ___ of ___

Attachment 2

Equipment Rinsate Blank Collection Procedure

1. Decontaminate the sample handling equipment (e.g., grab, box corer, utensils and basins/bowls) according to the procedures detailed in SOP NHH-G-03 – Equipment Decontamination.

2. Rinse the utensils with de-ionized water (DIW), collect the rinse water in the decontaminated basin/bowl, and pour it into laboratory-provided containers. Note that equipment rinsate blanks for dioxins/furans will substitute hexane for the DIW. Sample volume, container type, preservatives, and storage details are provided in the workplan (AECOM 2017a). QC sample blank containers will be pre-preserved by the laboratory that provides them. Note: equipment blanks may not be appropriate for each parameter

3. Label each container with the sample ID, date and time of collection, and the analytical parameters, cover the label with clear packing tape and fill out the custody form (refer to SOP NHH-G-04 – Sample Custody).

4. Store the samples in a cooler on ice until they are transported to the field facility, under the Field Custody and Transfer Form (refer to SOP NHH-G-04 – Sample Custody), for shipment to the corresponding analytical laboratory following SOP NHH-G-05 – Sample Packaging and Shipping.

AECOM

Standard Operating Procedure

Sediment Coring Using a Vibracorer

Procedure Number: NHH-S-02

Revision No.: 0

Revision Date: August 2017

Originally Prepared by

Rachel MacPhee

_____ Date: _____

Ryan McCarthy,
AECOM Task Order Manager

_____ Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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Attachment 1 Example of Sediment Core Collection Record

Standard Operating Procedure
Sediment Coring Using a Vibracorer

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for collecting cores using a vibracoring device as part of the New Haven Harber Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to collect cores using a vibracore. Specific information regarding coring can be found in the associated workplan (AECOM 2017a).

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and will be communicated to the NAE Project Manager. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the sampling event or the field activity.

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the site specific Accident Prevention Plan (APP) (AECOM 2017b).

2.2 The health and safety considerations for the work associated with vibracoring include:

- The physical hazards of handling heavy equipment;
- Overhead lifting hazards using boat based winches and A-frames;
- Marine safety aspects of the program;
- The specific chemical hazards related to the sediments; and
- Sharp edges of cut polycarbonate vibracore liners.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP (AECOM 2017b), everyone on the field team has the authority to stop

work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

3.1 In some cases, the addition of a piston to the corer may be appropriate and in all cases field personnel should continually monitor the core progression and ensure that the core sample is not vibrated excessively if the downward progression has ceased.

3.2 Common interferences encountered during core driving are listed below:

Interference	Possible Effect	Action Taken to Minimize Effect
Vibratory action	Consolidate/compact sediment during driving	Vibrate only as needed to advance the tube; use of a piston to improve recovery; establish minimum acceptance criteria
Loss of material out bottom	Less drive length achieved; gaps in retained sediment	Use core catcher
Blocking	Material doesn't enter core tube or lessens recovery	Move off station and re-drive; establish minimum acceptance criteria
Angled entry	Drive length less than expected and fore-shortened	Make sure that wire line is vertical during core driving
GPS satellite accuracy is low	Less confidence in station location	Wait until DGPS accuracy returns to acceptable limits and resume or use a buoy marker or land-survey techniques to confirm sample location. See SOP NHH-G-02 – Navigation/Positioning.

4.0 Equipment and materials

The following equipment list contains materials which may be needed in carrying out the procedures outlined in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP (AECOM 2017b);
- First aid kit;
- Navigation charts and Core Locations figure;
- Sampling vessel adequate for task at hand and river conditions;

- Marine VHF radio;
- Positioning equipment;
- Vibracoring device;
- Deployment equipment (e.g., A-frames, winches, generator);
- Decontaminated polycarbonate vibracore liners;
- Stainless steel core cutter/catcher;
- Hacksaw;
- Tubing cutter;
- Decontaminated hacksaw blades;
- Decontaminated drill bits and/or Unibits;
- Drill;
- Daily Activity Log (provided in SOP NHH-G-01 – Field Records);
- Sediment Core Collection Record (example provided in Attachment 1);
- Core storage racks to hold cores vertical and cold during temporary storage on-board coring vessel;
- Assorted nautical equipment (e.g., anchors, lines, personal flotation devices [PFDs]);
- Waterproof logbooks, pens, and labels;
- Permanent marker or grease pencil;
- Echo sounder with a resolution of 0.1 foot;
- Weighted line or survey rod, with graduations of 0.1 foot;
- Depth measuring plate;
- Tape measure and ruler;
- Submersible pump and hose;
- Decontaminated core tube caps;
- Electrical tape, duct tape, PVC pipe tape, or “Gorilla” brand tape;
- Camera;
- Stainless steel spoon/ utensils;
- Five gallon buckets; and
- Decontamination equipment/supplies (refer to SOP NHH-G-03 – Equipment Decontamination).

5.0 Procedures

Cores will be collected using a vibracoring device. Following collection, cores will be processed using on-board core processing station. Core processing procedures are described in SOP NHH-S-04 – Sediment Core Processing.

5.1 Sampling procedures

This section gives the step-by-step procedures for collecting cores using a vibracore. Observations made during sediment core collection should be recorded on the Sediment Core Collection Record (Attachment 1).

5.1.1 Decontamination of equipment

Decontamination of the polycarbonate core liners, core caps, stainless steel core cutter/catcher, hacksaw blades, drill bits, and assemblies will be performed prior to vessel departure in accordance with procedures outlined in SOP NHH-G-03 – Equipment Decontamination. A sufficient amount of decontamination equipment and supplies will be brought on the coring vessel to accommodate the need for miscellaneous, unforeseen decontamination. The hacksaw blade used to cut the core will be decontaminated between each segment following the Level III decontamination protocol as detailed in SOP NHH-G-03 – Equipment Decontamination.

5.1.2 Locating coring position

1. The coring schedule for the day will be established prior to vessel departure, and sufficient equipment to complete the work will be on board the sampling vessel. The coring crew will be informed prior to departure of the coring locations and the number of cores required at each location. The number of cores to be recovered at each location will be determined by the sample volume requirements of the project analytical program.

2. The vibracoring vessel will be positioned at a coring location in accordance with SOP NHH-G-02 - Navigation / Positioning. Upon collection of a sample, the actual sampling site will be documented by a DGPS unit or by a physical measurement from a fixed feature if satellite reception cannot be acquired.

5.1.3 Collection of core samples (boat based)

1. Initiate the Sediment Core Collection Record (Attachment 1).

2. Don PPE as required by the APP (AECOM 2017b).

3. Activate the submersible pump in preparation for cleaning the vibracore and coring tube, upon retrieval.

4. Slowly winch the vibracore into its deployment orientation.

6. Obtain water depth (to nearest 0.1 foot) from the echo sounder or via deployment of a weighted line or survey rod with graduations of 0.1 foot. Record on the Sediment Core Collection Record (Attachment 1).

7. Confirm the water depth with the depth in the work plan (AECOM 2017a). If the overlying water depth differs, the project depth and core depth may need to be adjusted. Upon consultation with NAE and the Task Order Manager, adjust depth if necessary and record in the log book and using a field corrective action form (NHH-G-01 – Field Records).

8. Slowly lower the vibracore into the water using the winch or other deployment equipment. Slowly lower the vibracore through the water column to the sediment surface using the water depth reading.

9. Record the "zero" mark on the winch cable.

10. Turn motor of vibracorer on. Slowly lower vibracore into sediment to penetrate the sediment to the workplan-specified target depth (AECOM 2017a), adjusted target depth (see step 7) or refusal. Record the start time on the Sediment Core Collection Record (Attachment 1).

11. Lower vibracore approximately 1 foot more to obtain a "plug" at the bottom of the core (i.e., to minimize loss of sediment from core). Record the end time on the Sediment Core Collection Record (Attachment 1).

12. On completion of the required penetration, or upon vibracore refusal, de-energize the vibracore and allow the core to stabilize for a period of 15 minutes. Record the vibracore penetration depth on the Sediment Core Collection Record (Attachment 1).

13. Record the final core location coordinates on the Sediment Core Collection Record (Attachment 1).

14. Slowly raise the vibracore, while maintaining the core in a vertical position, as field conditions allow.

15. Bring vibracore to sampling vessel deck while maintaining the core in a vertical position. Remove core cutter and core catcher, replace with cap, and secure cap with electrical tape (or equivalent).

16. Clean the vibracore barrel and coring assembly by hosing down the equipment with site water as described in SOP NHH-G-03 – Equipment Decontamination.

17. Remove the core tube from the vibracore barrel and place a cap on bottom of the coring tube, keeping the core tube in an upright position, as field conditions allow.

18. Return the vibracore device to its onboard, deck storage location.

19. Clean the core tube by hosing it down with river water. Care should be taken not to direct water into the open end of the core tube.

20. Evaluate whether core penetration and recovery are acceptable using the procedures outlined in Sections 5.1.5 and 5.1.6, respectively.

21. Keeping the core tube upright, as field conditions allow, use a hacksaw with a decontaminated blade or drill with a decontaminated drill bit to make a cut/hole in the core tube approximately 1 to 2 inches above the sediment/ water interface and allow the excess water to drain out.

22. Cap the cut end of the tube with decontaminated core cap, secure cap with electrical tape (or equivalent), and draw an arrow toward the cap. Draw an arrow on the coring tube with permanent marker and label "top" to indicate the top of the core. Label the core with the location ID, date, and time, and record this information on the Sediment Core Collection Record (Attachment 1).

23. Mark the side of the core to indicate the sediment-water interface. Measure the recovered length of the sediment in the core tube (to the nearest 0.1 foot to the extent possible) and record it on the Sediment Core Collection Record (Attachment 1). The distance between the top of the sediment in the coring tube and the bottom of the coring tube corresponds to the recovered length. Apparent gaps should be noted on the Sediment Core Collection Record (Attachment 1) and the length and location(s) of the gap(s) should be noted. The total gap length will be subtracted from the total recovery length.

24. Store the core vertically in a core storage rack (capable of keeping cores cold) while on the vessel, until it can be processed. Longer cores (e.g., archeology) will be segmented on the vessel to allow for storage and transportation. Cut these cores at the location of a planned sample segmentation using a hacksaw with a decontaminated blade and recap the exposed ends. Add appropriate markings to indicate the location and unique identification of each segment. (Segments will be identified as AB, BC, CD, etc., with the first letter marked just below the upper cut, and the second letter marked just above the lower cut).

5.1.4 Procedures for determining acceptable core penetration

1. Calculate penetration percentage using the following equation:

$$\text{Penetration}(\%) = \frac{\text{actual penetration (feet)}}{\text{target penetration (feet)}} \times 100$$

2. Actual penetration is the depth advanced into the sediment not including the depth advanced to form a plug.

3. Record penetration percentage or penetration start and end depths in the field logbook.

4. If penetration is ≥80%, then penetration is acceptable. Proceed to Section 5.1.6, Procedures for Determining Acceptable Core Recovery.

5. If penetration is <80%, then (a) retain core and (b) record on the Sediment Core Collection Record (Attachment 1) if due to refusal or to encountering the red-brown sand or clay. Record additional penetration notes at the Remarks section of the Sediment Core Collection Record (Attachment 1). Adjust the vessel location slightly prior to next sampling attempt in accordance with SOP NHH-G-02 – Navigation/Positioning and project-specific location acceptance criteria in the workplan (AECOM 2017a). Upon three unsuccessful attempts to obtain >80% penetration, contact the Field Task Manager to determine if additional cores should be attempted (Section 5.1.6.4, below). Proceed to Section 5.1.6, Procedures for determining acceptable core recovery, below.

5.1.5 Procedures for determining acceptable core recovery

1. Calculate recovery percentage by the following equation:

$$\text{Recovery}(\%) = \frac{\text{recovery (feet)} - \text{gaps (feet)}}{\text{actual penetration (feet)}} \times 100$$

2. Record recovery percentage or recovery length on the in the field logbook.

3. If recovery is ≥80%, then recovery is acceptable, provided that the core reached refusal or the workplan-specified target depth (AECOM 2017a). Continue processing the core, then move to a new core location in accordance with SOP NHH-G-02 – Navigation/Positioning and project specific target location acceptance criteria. Proceed to Step 2 of Sections 5.1.3 and 5.1.4 for collection of second core. If the recovery <80%, proceed to Step 4.

4. If recovery is <80%, then (a) retain core and clearly mark on core cap that recovery is <80%, and (b) adjust vessel location in accordance with SOP NHH-G-02 – Navigation/Positioning. Upon three unsuccessful attempts to obtain >80% recovery, contact the Field Task Manager to determine if additional cores should be attempted and consult with the NAE Project Manager. The vessel will proceed to the next station. Record all attempts on

the Sediment Core Collection Record (Attachment 1). Communications with the Field Task Manager will be documented in the field logbook. Failure to collect a core at a specified location will be recorded on the Daily Activity Log (provided in SOP NHH-G-01 – Field Records).

5. Upon collection of acceptable core(s) proceed to Section 5.1.7, Management of cores, below.

5.1.6 Management of cores

1. Containerize excess sediment on the vessel. The field crew will make reasonable attempts to containerize "gross" sediment material produced from coring. Sediment residuals generated from rinsing operations will not be included in such containerization.

2. Verify that the lengths of the core tubes, water depth, and positioning data have been recorded on the Sediment Core Collection Record (Attachment 1).

3. Prior to transit to the next coring location or return to the marina, decontaminate the coring equipment and sampling vessel as described in SOP NHH-G-02 – Equipment Decontamination.

4. Upon completion at a location or transect, the containerized excess sediment may be disposed of overboard prior to moving station.

5. Proceed to next core location specified for that day and repeat above procedures.

6.0 Quality assurance / quality control

6.1 Completing the Sediment Core Collection Record (Attachment 1) will document that the process is being followed and that pertinent information is being collected and recorded in accordance with the procedures outlined in this SOP.

6.2 Entries on the forms and in the field logbook will be double-checked by the samplers to verify the information is correct. Completed forms will be reviewed periodically by the Field Task Manager his/her designee to verify that the requirements are being met.

7.0 Data and records management

7.1 Field notes will be kept during coring activities in accordance with SOP NHH-G-01 – Field Records. The information pertinent to coring activities includes chronology of events, sample

locations (x,y,z), time/date, sampler name, methods (including type of core liner/barrel, if applicable), sampler penetration and acceptability, sample observations, and the times and type of equipment decontamination. This information will be recorded in the field logbook or Sediment Core Collection Record (Attachment 1), as appropriate.

7.2 Field data will be distributed to the appropriate personnel as described in the workplan (AECOM 2017a).

7.3 Deviations to the procedures detailed in the SOP should be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A formal nonconformance record, including reason and impact on the program, will be submitted to the Task Manager and Project QA Manager for approval.

7.4 All records associated with the activities described in this SOP will be ultimately maintained in accordance with the workplan (AECOM 2017a).

8.0 Personnel qualifications and training

8.1 The individuals executing these procedures will have read, and be familiar with, the requirements of this SOP and the corresponding workplan (AECOM 2017a). Actual vibracoring operations will be conducted only by personnel experienced with the equipment, but subsequent manipulations, measurements, cutting and labeling procedures are relatively simple and can be implemented by personnel without specialized training. It is recommended that initial core manipulations and handling activities be supervised by more experienced personnel.

8.2 Sampling personnel will also be health and safety trained and certified as specified in the APP (AECOM 2017b).

9.0 References

AECOM 2017a. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision history

Revision	Date	Changes
0	August 2017	NA

Attachment 1 Example of Sediment Core Collection Record

Sediment Core Collection Record

AECOM

Location ID _____ Date _____ Project # 12182-004-

Sampler _____ Contractor _____ Vessel _____

Weather _____

Sampling Equipment _____ Diameter *in* _____

Target Northing _____ Easting _____ *NJ NAD83 Stateplane Feet*

Core Number _____ Time *24hr* _____ Water Depth *ft* _____

Actual Northing _____ Easting _____ Distance from target *ft* _____

Target Penetration Depth *ft* _____
Actual Penetration Depth *ft* _____
Recovered Length *ft* _____
Recovery % _____

Remark _____

Segment	Length *in*	Description
A – B		
B – C		
C – D		
D – E		
E – F		
F – G		
G – H		

Core Number _____ Time *24hr* _____ Water Depth *ft* _____

Actual Northing _____ Easting _____ Distance from target *ft* _____

Target Penetration Depth *ft* _____
Actual Penetration Depth *ft* _____
Recovered Length *ft* _____
Recovery % _____

Remark _____

Segment	Length *in*	Description
A – B		
B – C		
C – D		
D – E		
E – F		
F – G		
G – H		

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AECOM

Standard Operating Procedure

Core Processing

Procedure Number: NHH-S-03

Revision No.: 0

Revision Date: August 2017

Originally Prepared by

Rachel MacPhee

Date: _____

Ryan McCarthy
AECOM Task Order Manager

Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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Attachment 1 Equipment Rinsate Blank Collection Procedure

Attachment 2 Example of Field Coring Log

Standard Operating Procedure
Core Processing

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for processing of sediment cores collected as part of the New Haven Harber Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). This processing procedure applies to sediment cores collected using a variety of samplers, including vibracore, push or gravity cores. Core processing includes logging of cores, and the collection of samples for geotechnical, chemical, or other analyses. Core processing will be conducted to meet the sample collection and analysis objectives defined in the associated workplan (AECOM 2017a).

1.2 It is fully expected that the procedures outlined in this SOP will be followed by the field team. Procedural modifications may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project Quality Assurance (QA) Manager and the Task Manager and will be communicated to the NAE Project Manager. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the sampling event or the field activity.

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the site specific Accidnet Prevention Plan (APP) (AECOM 2017b).

2.2 Daily safety briefs should be conducted at the start of each working day before any work commences. These daily briefs should be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. As detailed in the APP (AECOM 2017b), everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

3.1 Potential bias/interference related to sediment core processing may be introduced if the sediment/water interface is not properly maintained (i.e., keeping sediment cores vertical and

decanting overlying water to avoid surface sediment mixing). Interference may be introduced if sediment has fallen out of the bottom creating spatial gaps in the core stratigraphy. If the core was not advanced vertically, angled contacts may be observed in the core tube.

3.2 High sediment moisture content, which can impact the achievable reporting/detection limits and sample representativeness, should be evaluated. Samples collected with very high water content should be discussed with the Field Task Manager to evaluate the need to collect added cores, allow cores to settle, or prioritize the subsampling effort.

3.3 Inadequate or improper homogenization of the sediment material may result in samples that are non-representative and/or biased.

Interference	Possible Effect	Action Taken to Minimize Effect
Mixing of sediment/water interface	Inaccurate depth reading and chemical mixing	Stand core tube vertically and let suspended material settle then siphon or drain overlying water
Poor homogenization	Biased physical and chemical results	Mix material in bowl until uniform texture and color
Core not driven vertically or on slope	Angled stratigraphy and contacts	Note visual observations and sample along contacts

3.4 Cross contamination of samples may result if sample handling equipment is inadequately or improperly decontaminated. Refer to SOP NHH-G-03 – Equipment Decontamination for decontamination procedures.

3.5 Contamination of samples may also result if samples are exposed to certain environmental conditions. Core processing will be conducted in a dedicated area on the vessel. Exposure to potential sources of contamination (e.g., exhaust fumes) will be minimized.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Core cutting table;
- Vertical core stand and containment basin;

- Fine-gauge stainless steel wire;
- Hacksaw with spare decontaminated blades and case knives;
- Core cutting tool (electric sheet metal shears, router, circular saw, or similar tool, with spares);
- Lithology and Sample Collection Records (data may be collected via hardcopy or electronically; hardcopy examples are provided as Attachment 3);
- Grease pencil/pens;
- Decontamination supplies (refer to SOP NHH-G-03 – Equipment Decontamination);
- Stainless steel bowls/pans and utensils;
- Electric drill;
- Stainless steel dividing blades/knives;
- Aluminum foil, plasticized bench sheeting (white) and marker pens;
- Ruler and tape measure;
- Stadia rod;
- First aid kit and personal protective equipment (PPE) (refer to the APP [AECOM 2017b]);
- Pre-labeled sample bottles for the analyses specified in the workplan (AECOM 2017a);
- Pre-labeled and pre-preserved sample bottles for equipment rinsate samples (see Equipment Rinsate Blank Collection Procedure in Attachment 1);
- Sample processing table (ventilated area);
- Custody forms (refer to SOP NHH-G-04 – Sample Custody);
- Refrigerator and freezer;
- Digital cameras;
- Unified Soil Classification System (USCS) Charts; and
- Core storage rack to hold cores vertical and keep cold prior to either processing or placement in a refrigerator.

5.0 Procedures

The core processing procedure presented in this SOP is a multi-step process. Field samples will be collected in rigid plastic liners and stored vertically to allow fine grained materials to settle out of the overlying water.

Cores will be inspected visually, logged and photographed, and samples will be collected and submitted for geotechnical, chemical, and physical analyses, as required by the workplan (AECOM 2017a).

5.1 Equipment decontamination

5.1.1 Decontamination of equipment prior to contact with sediment will be performed in a designated decontamination area. The decontamination will be performed in accordance with procedures outlined in SOP NHH-G-03 – Equipment Decontamination. The sample handling equipment (i.e., stainless steel bowls/containers, spoons/spatulas) will be decontaminated between segments following the procedures in SOP NHH-G-03 and documented in the field records. Core cutting equipment (hacksaw, cutting blades, stainless steel spatulas) will be decontaminated. Equipment decontamination will be conducted sufficiently ahead of the processing activities to allow for the implementation of proper procedures (including drying of decontaminated equipment).

5.1.2 Equipment rinsate blanks will be collected at the frequency specified in the workplan (AECOM 2017a). Procedures for collecting equipment rinsate blanks are included in Attachment 1.

5.2 Preliminary activities prior to core processing

5.2.1 Acquire the necessary sampling equipment (decontaminated stainless steel bowls, utensils), pre-labeled sampling containers, and hardcopy or electronic Sediment Core Collection Records prepared during the coring operations.

5.2.2 At the sample processing area on the boat, cores will be stored vertically prior to processing.

5.2.3 Dry the surface of the core tube with clean paper towels and measure the length of sediment in the core tube.

5.3 Core processing

5.3.1 Don PPE per the APP (AECOM 2017b) (including hearing and eye protection).

5.3.2 Transfer the core to the processing table and make two longitudinal cuts along the core tube using the core cutting table designed for that purpose. Cut the length of the core in two cuts at 180° from each other. Cutting will be performed using a small circular saw, router, electric sheet metal shears, or other appropriate tool. Complete the cut (as needed) using a heavy duty box cutter. Transfer the core intact onto the plasticized bench sheeting. Split the core into longitudinal halves using decontaminated stainless steel spatulas or other (e.g., wire). Open the tube lengthwise

and carefully separate the core half-sections and place them on the plasticized bench sheeting.

5.3.3 Visually describe the core in the Field Coring Log (Attachment 2). Using the Unified Soil Classification System (USCS) Charts, record the description of the sediment type in the appropriate section of the form and include the total core length, the presence of observable biota or organic matter, odor, and color.

5.3.4 Photograph the exposed section of the core in approximately one foot increments. Include a stadia rod for scale, and mark the top and bottom and ends of the core. If foreign objects or gaps are present, or unusual observations are made, photograph the object or subject of the observations. Make sure an adequate amount of light is available to photograph core and include a photograph ID label in the photograph. If core features are photographed, a scale should be provided, along with a label that indicates the core segment/depth in the sediment column. Maintain photographic records as specified in SOP NHH-G-01 – Field Records.

5.3.5 Determine sub-sample intervals for subsampling. Subsample each core (approximately two per core) for grainsize and chemical analysis per the workplan (AECOM 2017a).

5.3.6 Homogenize the sediment using the pre-cleaned utensils until there is uniformity in the color and texture. Sediment subsamples should be collected as indicated on the core processing form.

5.3.7 Transfer homogenized sediments to pre-labeled sample jars for grainsize and chemical analysis.

5.3.8 Place the samples in a secure refrigerated area (4°C) until the samples are transferred to the laboratory courier at the end of the day. Transfer the samples to the laboratory(ies) as described in SOPs NHH-G-05 – Sample Custody and NHH-G-06 – Packaging and Shipping.

5.3.9 The remaining material from each sub-section of core will be containerized (i.e., 5-gallon bucket), labeled, and stored cold (4°C) under chain of custody.

5.4 Core Collection

5.4.1 Once a composting scheme has been approved by NAE, additional sediment cores will be collected to obtain necessary sediment volume. These cores will not be processed but will be containerized directly into buckets per the compositing scheme.

5.4.2 Additional cores for archaeological archive will be collected per the workplan (AECOM 2017a). These cores will be labeled, and maintained vertical, and stored cold (4°C) under chain of custody for transfer to NAE.

6.0 Quality Assurance/Quality Control

6.1 Completing the the Field Coring Log (Attachment 2) will document that the process is being followed and that pertinent information is being collected and recorded in accordance with the procedures outlined in this SOP.

6.2 Entries on the forms and in the field logbook will be double-checked by the samplers and sample processing personnel to verify the information is correct. Completed forms and field logbook will be reviewed periodically by the Field Task Manager or his/her designee to verify that the requirements are being met.

6.3 Data quality evaluations will be based on QC sample results. QC samples may include field duplicates and equipment rinsate blanks; collection requirements are tabulated in the associated workplan (AECOM 2017a).

6.4 The workplan (AECOM 2017a) lists the proper sediment sample containerization, preservation, and storage conditions.

7.0 Data and Records Management

7.1 Field notes (including photologging, if conducted) will be kept during sampling activities in accordance with SOP NHH-G-01 – Field Records. The form associated with this SOP (Attachment 2) will be filled out completely and accurately.

7.2 Deviations to the procedures detailed in the SOP should be recorded in the field logbook at the time of occurrence and included on the Daily Activity Log (refer to SOP NHH-G-01 – Field Records). A field corrective action form, including reason and impact on the program, will be submitted to the Task Manager and Projct QA Manager for approval.

8.0 Personnel Qualifications and Training

Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP [AECOM 2017b], workplan [AECOM

2017a]). No specialized training is required; however, inexperienced personnel performing the tasks described in this SOP should be initially supervised by the Field Task Manager or his/her designee.

9.0 References

AECOM 2017a. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision History

Revision	Date	Changes
0	August 2017	NA

Attachment 1

Equipment Rinsate Blank Collection Procedure

1. Decontaminate the sample handling utensils and basins/bowls according to the procedures detailed in SOP NHH-G-03 – Equipment Decontamination.

2. Rinse the utensils with de-ionized water (DIW), collect the rinsewater in the decontaminated basin/bowl, and pour it into laboratory-provided containers. Sample volume, container type, preservatives, and storage details are provided in the workplan (AECOM 2017a). QC sample blank containers should be pre-preserved by the laboratory that provides them. Note: equipment blanks may not be appropriate for each parameter. Refer to the workplan (AECOM 2017a) for the parameters for which equipment rinsate blanks will be collected.

3. Label each container with the sample ID (refer to the corresponding workplan (AECOM 2017a) for the identification nomenclature), date and time of collection, and the analytical parameters, cover the label with clear packing tape and fill out the custody form (refer to SOP NHH-G-05 – Sample Custody).

4. Store the samples in a cooler on ice until they are packed for shipment to the corresponding analytical laboratory following SOP NHH-G-06 – Sample Packaging and Shipping.

Attachment 2

Example of Field Coring Log

Location: New Haven FNP	Logged By:	Date/Time:	Core/Sample ID
Delivery Order No.:W912WJ17F0036		Vessel:	
Equipment (Circle One) Vibracore/Grab Sampler			
Coordinates:	X:	Y:	
Project Depth (ft):	Penetration:	Recovery:	No. Attempts:

Depth	Sketch	Description	

AECOM

Standard Operating Procedure

Surface Water Sampling

Procedure Number: NHH-W-01

Revision No.: 0

Revision Date: August 2017

Prepared by

Rachel MacPhee

Reviewed by:

_____ Date: _____

Ryan McCarthy
AECOM Task Order Manager

_____ Date: _____

Debra L. Simmons
Project QA Manager

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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1.0 Scope and applicability

1.1 This project Standard Operating Procedure (SOP) defines the operating procedures for the collection of bulk and discrete water samples associated with New Haven Harbor Federal navigation project (FNP). This SOP has been developed in accordance with requirements in the United States Army Corps of Engineers New England District (NAE) Statement of Work (SOW) for the project (NAE, 2017). Water samples are collected either using a bottle-type sampler, or with the aid of a peristaltic (or other equivalent) water pump.

1.2 Samples will be collected using a pre-cleaned diaphragm pump and CFLEX™ (or equivalent) tubing system at the surface (three feet below the surface), at the mid depth, and near the sediment bottom (three feet above the sediment surface). If needed, a Niskin bottle may be utilized. Samples will be analyzed for chemical, biological and physical analyses. Water will also be collected for creation of elutriate samples at the laboratory per the workplan (AECOM 2017a). Analytes for a particular program are specified in the workplan (AECOM 2017a).

1.3 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the Project QA Manager and the Task Manager and communicated to the client. Deviations from this SOP will be documented in the field records.

2.0 Health and safety considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the site specific Accident Prevention Plan (APP; AECOM, 2017b). The major health and safety considerations for the work associated WQ data collections are the near and on-water safety aspects of the program.

2.2 Daily safety briefs are to be conducted at the start of each working day before any work commences. These daily briefs are to be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

3.1 Cross-contaminations of samples may result if sample handling equipment is inadequately or improperly decontaminated.

3.2 Contamination of samples may result if samples are exposed to certain environmental conditions. Exposure to potential sources of contamination (e.g., exhaust fumes) will be minimized.

3.3 Care must be taken to avoid disturbing the bed sediment during sampling. Re-suspended bed sediments may contaminate/ artificially bias the surface water samples.

3.4 Inappropriate sampling equipment, such as that manufactured from non-inert plastics, may contaminate samples. Using Teflon, polymer, or stainless steel sampling equipment will minimize contamination during sample collection activities.

4.0 Equipment and materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, depending on the field conditions encountered:

- Diaphragm or equivalent water pump, variable speed
- 12-volt battery (as needed)
- CFLEX or equivalent polymer tubing (typical configuration requires 1.2 in. OD)
- Niskin or equivalent sampling bottle
- Sample containers as specified in the workplan (AECOM 2017a)
- Connective (serial) cabling
- Weight bearing line/cable
- Field computer (if applicable)
- Project specific field log book
- Chemical-free wipes
- Disinfectant wipes
- Approved plans, including target sampling locations
- Insulated coolers with wet ice
- Field notebook, pen, standardized forms (as needed)
- Chain-of-custody forms and seals
- Replacement batteries
- GPS

- Safety gear (work vests, APP specified PPE)
- Nitrile gloves
- Gauntlet gloves
- Storage bags
- Boat with all applicable safety equipment (anchor, etc.)
- Dry storage cooler

5.0 Procedures

5.1 Water Pump/Tubing Set-up

Connect the pump to a 6-volt battery or other power source. The water pumps and associated tubing used on this investigation should be rinsed with potable water before and after each (daily) use. Project tubing should be new at the project start, and rinsed thoroughly with deionized water. The tubing should be sealed in a bag when not in use; open tube ends should also be covered and protected when not in use, including between stations. Between-station rinsing is not generally required but flushing the system with site water at each sampling location is to be performed. The number of minutes required to purge the pump and tubing will be calculated as follows:

$(((\pi r^2 \times l)/10)/f) \times 3$ = minutes to purge the pump

Where:
π = pi
r = half the inner diameter of the tubing (centimeters)
l = length of tubing used on station (meters)
f = flow rate of the pump (liters/minute)

5.2 Field Data and Sample Collections

5.2.1 Navigate to sampling stations outlined in the project sampling plan using the GPS unit.

5.2.2 Estimate and record the depth of the water. Water depth may be recorded using a weighted line with 0.1 ft increments marked.

5.2.3 Samples will be collected from mid-depth when overlying water is less than 30 feet. For locations with greater than 30 feet depth, samples will be composite samples from near top, mid-depth and near bottom (3 feet from sediment) samples per the SOW (NAE 2017) and workplan (AECOM 2017a).

5.2.4 In areas that require pumped collections, flush the tubing with water collected at the depth of interest. Given the small (typically ¼ in) tube diameter, flushing will be complete for a 25-foot tube well within 10 seconds with a flow rate of ~5 L/min or better (Section 5.2).

When the purge is complete, wearing nitrile gloves, fill each sample container while avoiding contact between the sampling tube and the bottle.

If collecting from multiple depths, no additional purging is required between depths of the same location.

5.2.5 In areas and for parameters that allow grab sampling, the Niskin or equivalent sampler is lowered to the desired depth. The trigger mechanism is activated to close the sampler and the sampler is retrieved to the boat. Water from the sampler may be poured directly in the sample containers. Place the capped container on ice in a cooler.

5.2.6 Samples will be placed in coolers and stored on ice (refer to the SAP for containerization and storage specifications) until shipment or transfer to the laboratory.

5.2.7 All discrete water samples should be collected and stored/transferred to laboratories according to the procedures described in FGDs for Packaging and Shipping.

6.0 Quality assurance / quality control

It is the responsibility of the Field Team Leader (FTL) to check the calibration information, to spot check instrument operations, and to check the documentation accuracy of all field staff.

Quality control (QC) samples may include equipment blanks, field and laboratory duplicates.

6.1 Equipment blanks

Equipment blanks will be collected at the frequency specified in the SAP, and from each set of sampling gear (e.g., tubing, tubing outfitted with a filter, and bottle sampler with tubing, etc.), after the sampling gear is decontaminated.

Equipment blanks may be collected if required by the SAP for pumped samples by flushing the collection tube with deionized water and filling a set of containers with deionized water that has been pumped through the system.

If required, bottle blanks may be used to evaluate potential contamination associated with the direct grab sampling technique. In this case, bottles may be filled directly with deionized, capped, bagged, and stored on ice for transfer to the laboratory.

7.0 Data and records management

Calibration records will be recorded in the field log. Field records will be generated and maintained as outlined in the workplan (AECOM 2017a). The workplan addresses all aspects of collection including data and sample types, station locations, and chronology of events.

Deviations to the procedures detailed in the SOP must be recorded in the field logbook and communicated to the Task Manager and the QA Officer at the end of the day.

8.0 Personnel qualifications and training

The individuals executing these procedures must have read, and be familiar with, the requirements of this SOP and the workplan (AECOM 2017a). Water sample collections are relatively simple procedures requiring minimal training. However, initial instrument calibrations and sample/data collections should be supervised by the FTL.

9.0 References

AECOM 2017a. Laboratory Testing in Support of Environmental Assessment, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

AECOM 2017b. Accident Prevention Plan, Sampling and Environmental Testing – New Haven Harbor Federal Navigation Project, New Haven, Connecticut. USACE Contract No. W912WS-17-D-0003. Delivery Number W912WJ17F0036. August 2017.

NAE 2017. Statement Of Work, Sampling and Testing in Support of Dredged Material Suitability Determination, New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. May 31, 2017.

10.0 Revision history

Revision	Date	Changes
0	August 2017	NA

Appendix B Field Report

AECOM

Field Report for Dredged Material Suitability Testing and Evaluation in the New Haven Harbor FNP

United States Army Corps of Engineers

Project Number: 60543021

December 12, 2017

Quality information

Prepared by	Checked by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
0	9/13/17	Original			
1.0	12/12/17	Attachments 3 and 4 replaced by finalized core logs	Yes	Ryan McCarthy	Project Manager

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Acronyms

CENAE	U.S. Army Corps of Engineers, New England District
CLDS	Central Long Island Sound Disposal Site
COC	Chain of Custody
DGPS	Differential Global Positioning System
MLLW	Mean Lower Low Water
NOAA	National Oceanographic and Atmospheric Administration
OSI	Ocean Surveys Incorporated
SAP	Sampling and Analysis Plan
SPP	Suspended Particulate Phase

1. New Haven Harbor 2017 Field Summary

The project field effort commenced August 8th 2017 and was completed on August 17th, 2017. The program was divided into three tasks that were scheduled to occur over a two-week period. The first task was the initial collection of sediment cores at twenty-six (26) stations that were grouped into eight (8) separate transects across the project area. Those cores were analyzed for grain size to determine stations, sampling depths and volume to be collected during the second task for biological and toxicological testing. The initial 26 locations also had samples submitted for chemical analyses. The third task involved sediment and water collection at the Central Long Island Sound Disposal Site (CLDS) reference site.

Ocean Surveys Inc. (OSI), provided field services for the collection of core, grab, and water samples at each of the selected stations. Table 1 summarizes the activities accomplished each day during the survey. Detailed Daily Activity Logs are provided in Attachment 1. All harbor coring activities were conducted aboard the vessel R/V CanDu. CLDS reference site samples (sediment/ water), selected harbor water site samples, and sediment volume samples at station NHH-I were collected from the vessel R/V Ready II.

2. Health and Safety

New Haven Harbor sampling activities were completed without incident. Each participant took an active part during the weekly safety briefings as well as daily safety briefings which are documented on the Daily and Weekly Activity Logs (Attachment 1). The Task Order Manager was de-briefed at the end of each day during field activities. Float Plans covering the days boating activities and safety protocols are compiled as Attachment 2.

3. Sediment collection

Sediments were collected using a 3.5-inch diameter vibracore at most harbor stations as outlined in the project Sampling and Analysis Plan (SAP). An initial core was collected at each of the 26 stations for grain size and chemistry. At station NHH-I, with a project depth of just 2.5 feet, approval was obtained from the U.S. Army Corps of Engineers, New England District (CENAE) Technical Manager to use a Van Veen grab sampler to obtain the volume needed to augment sediment collected from the station during the first week of vibracoring.

The sediment collection process was also modified with approval at station NHH-C during the volume collection week. Due to the large volume needed at the station (23 gallons) and the short target core depth (within the uppermost 2.8 feet), two cores were stacked (i.e., core barrel advanced, withdrawn, and advanced again without removing sediment) within a 5-foot core barrel. The approach greatly reduced the time to collect required sediment volume.

3.1 Vessel Positioning

Vessel positioning and the determination of actual core sample locations was accomplished utilizing a Differential Global Positioning System (DGPS). The coring vessel was held on station with a multi-point anchor spread. The local National Oceanic and Atmospheric Administration (NOAA) tide data were obtained from Station 8465705 to calculate tidal height in feet above mean lower low water (MLLW). Table 2 lists the actual coring positions for each coring attempt.

3.2 Core sample handling

All cores targeted/ specified in the project SAP were successfully collected during the ten-day field effort. Figure 1 depicts the proposed sampling stations targeted for this effort. Multiple cores were required at most stations to collect the full project volume. Given the very soft nature of the harbor sediment, target core penetrations generally went beyond the target project depth in an attempt to reach clay rich material that would aid in core retention in the barrel. Excess material retained in the split core barrels was discarded/ returned to the harbor. Excess material included sediment below project depth as well as sediment collected within the project depth that was subsequently determined to not be of interest due to composition and stratigraphy.

Table 2 lists the exact locations occupied for each station collection, along with core penetration and recovery information. As indicated in Table 2, recovery in cores was typically in excess of 80% (with very few exceptions).

After collection, the core was cut into 5.0-foot sections to facilitate handling. The liner of those individual core sections were then split longitudinally, photographed, and described/ logged. New Haven Core Logs are provided in Attachment 3. At many of the stations, two depth intervals were selected for sampling due to changes in stratigraphy (composition and color). All sub-sampling determinations were made by the USACE field representative. At some of the stations where an upper (or top) and lower (or bottom) interval was delineated, the bottom interval was sandy and determined to not be of interest from a chemical/ toxicological standpoint. Samples from many of those sandy bottom intervals were collected for grain-size analysis only.

After logging was complete, the requisite core section (surface to project depth) was transferred to storage containers (polyethylene plastic buckets). Homogenized material from the bucket containers were subsampled for rapid grain-size analysis and chemistry. Excess materials were retained for later compositing with material collected during the second sampling week. At each transect, one to two cores were collected for archeological review by the USACE archeologist. Those archeological cores were cut into individually labeled, 5-foot sections, and stored horizontally in cold storage until delivery at the USACE Fort Devens facility. All samples retained for analysis (grain size, chemistry, archeology, and toxicology) were stored on the sampling vessel in coolers. At the end of each day, samples were off-loaded from the vessel and transferred into a locked refrigerated box truck set to 2.2 °C. Samples for grain size and chemistry were handed off to the laboratory courier.

Based upon grain-size analyses on cores collected during the first week of the program, additional sediment volume was collected from each transect to attain an approximate 25-gallon total volume for toxicological/ biological testing. At the A-B-C transect (located outside the breakwater), only the uppermost 2.8-feet of sediment from station NHH-C were determined to be of interest, requiring a large number of short cores (NHH-A and NHH-B were excluded due to sand). The NHH-C cores were collected by “stacking” two nearby cores together in a single 5-foot core barrel to limit down time between core attempts and processing time on the boat. A total of twenty three (23 cores) were collected from station NHH-C during the 10-day program.

After the requisite sediment volume was collected at each station, the coring gear and sub-sampling gear was decontaminated as outlined in the SAP.

3.3 Grab sample handling

Grab sampling was accomplished as outlined in the SAP using a Van Veen grab sampler and a Ponar grab sampler. Multiple deployments of the Van Veen and Ponar grab samplers were required to obtain the needed 25-gallons of sediment for testing. For each grab, the sample was examined for disturbance, then transferred to a polyethylene bucket. The sediments collected by grab sampler at the reference site were transferred to the refrigerated box truck upon return to the dock.

3.4 Water collections

Water samples from the harbor area (site water) were collected using a pump and tubing system as outlined in the SAP. All three harbor water samples were collected from mid-depth in the water column. The water sample from the reference area (suspended particulate phase [SPP] dilution water) was collected using a large Niskin bottle. Given the site depth at the CLDS reference area, water was collected from three separate depths in the water column (approximately 3-feet below the surface, mid-depth, and approximately 3-feet off the bottom). Table 3 summarizes the volumes collected at each station. Water samples were also transferred to the refrigerated box truck immediately after returning to the dock.

4. Field QA/QC procedures

Equipment blanks were collected from the coring equipment on August 9th during coring activities. Additional equipment blanks were collected from the Niskin bottle, sediment grab samplers, and pump/ tubing system on August 17th.

All equipment blanks were placed in the locked refrigerated box truck after collection and later iced for courier transport.

All samples were held under chain of custody (COC), and signed for during ownership transfer (Attachment 4).

5. SAP deviations/difficulties encountered

There are a few notes of interest relative to the New Having Haven sediment collection effort:

1. Significant changes to bottom topography were encountered relative to the last bathymetric study of the harbor. At all locations, the planned core depth (project depth plus a 2-foot allowable over depth) required adjustment in the field using real time tidal data from NOAA (which occasionally resulted in a core barrel changeover).
2. Archeological cores were moved from two stations. The core proposed for NHH-Z was moved to NHH-X and the core proposed for NHH-A was moved to NHH-C.
3. Due to the large volume of sediment required from a short interval at station NHH-C during the second week of the program, two individual cores were stacked within a single 5-foot core barrel prior to processing. This approach was approved beforehand by the CENAE Technical Manager, Richard B. Loyd. Prior to proceeding with the stacked approach, a single 5-foot core was collected for comparison to the stacked core samples to verify that appropriate materials and recovery were retained within the 20 stacked samples.
4. Similarly, volume collection at NHH-I would have required a large number of cores due to the shallow sample depth. In order to meet schedule constraints, CENAE Technical Manager, Richard B. Loyd, approved collection using a Van Veen grab sampler from the R/V Ready II.

All project logbook entries are included as Attachment 5.

Table 1 New Haven Survey Field Survey Activity Summary

Date	Survey Activities	Equipment	Platform
7 August 17	Mobilization and refrigerated truck pick up	-	-
8 August 17	Sediment coring at stations - NHH-X, Y, Z, M, N, O, T	Vibracore	R/V CanDu
9 August 17	Sediment coring at stations - NHH - P, Q, U, V, W; Archaeological core collected from NHH - P. Rinseate Blank collected for coring equipment.	Vibracore	R/V CanDu
10 August 17	Sediment coring at stations - NHH - R, S, J, L, K, H (field dup), I	Vibracore	R/V CanDu
11 August 17	Sediment coring at stations - NHH - G, C, B, A, D, F	Vibracore	R/V CanDu
12 August 17	Sediment coring at stations - NHH - X, Z, P, T	Vibracore	R/V CanDu
13 August 17	Sediment coring at stations - NHH - Y, M, N; Archaeological core collected from NHH - M	Vibracore	R/V CanDu
14 August 17	Sediment coring at stations - NHH - E, J, K, O; Archaeological core collected from NHH - M	Vibracore	R/V CanDu
15 August 17	Sediment coring at stations - NHH - W, S, L, V	Vibracore	R/V CanDu
16 August 17	Sediment coring at stations - NHH - R, H, E, D, F	Vibracore	R/V CanDu
17 August 17	Sediment coring at stations - NHH - G and C; Archaeological core collected from NHH-G and C. CLDS - REF water and sediment grab sampling. NHH water and sediment grab sampling. Rinseate blank collected for Niskin Bottle, Pump/Tubing, and Grab Samplers.	Vibracore/ Niskin Bottle/ Pump and tubing System/ Ponar/ Van Veen	R/V CanDu/ R/VReady II

Table 2 New Haven Sediment Sampling Detail

Station	Station ID/Attempt No.	Date	Time[1]		Latitude	Longitude	Water Level (Ft, MLLW)	Water Depth (Ft)	Sediment Elevation	Penetration	Recovery	Volume Collected (Gallons)[2]
A	A	8/11/2017	13:10	A	41.2227	72.9110	6.00	34.7	-28.7	13.0	11.0	Excluded
B	B	8/11/2017	11:43	B	41.2231	72.9100	4.04	43.8	-39.8	9.0	8.8	Excluded
C	C	8/11/2017	10:13	C	41.2234	72.9090	1.80	37.1	-35.3	15.0	15.5	22
	C-2	8/17/2017	11:28	C_2	41.2235	72.9090	2.85	36.6	-33.8	5.0	4.7	
	C-3	8/17/2017	12:01	C_3	41.2235	72.9090	2.12	35.8	-33.7	5.0	4.6	
	C-4/5	8/17/2017	12:31	C_4/5	41.2234	72.9090	1.61	35.4	-33.8	2.5 - 5.0	4.6	
	C-6/7	8/17/2017	13:22	C_6/7	41.2234	72.9090	0.87	35.1	-34.2	2.5 - 5.0	n/a	
	C-8/9	8/17/2017	13:48	C_8/9	41.2234	72.9090	0.74	35.6	-34.9	2.5 - 5.0	n/a	
	C-10/11	8/17/2017	14:08	C_10/11	41.2234	72.9090	0.70	35.8	-35.1	2.5 - 5.0	n/a	
	C-12/13	8/17/2017	14:41	C_12/13	41.2234	72.9090	Gauge down	36.4	Gauge down	2.5 - 5.0	n/a	
	C-14/15	8/17/2017	15:01	C_14/15	41.2234	72.9091	Gauge down	38.8	Gauge down	2.5 - 5.0	n/a	
	C-16/17	8/17/2017	15:45	C_16/17	41.2234	72.9091	Gauge down	40.4	Gauge down	2.5 - 5.0	n/a	
	C-18/19	8/17/2017	16:04	C_18/19	41.2235	72.9091	Gauge down	39.4	Gauge down	2.5 - 5.0	n/a	
	C-20/21	8/17/2017	16:44	C_20/21	41.2235	72.9091	Gauge down	38.3	Gauge down	2.5 - 5.0	n/a	
	C-22/23	8/17/2017	17:03	C_22/23	41.2235	72.9090	Gauge down	38.2	Gauge down	2.5 - 5.0	n/a	
D	D	8/11/2017	14:51	D	41.2481	72.9160	7.22	25.2	-18.0	19.5	19.5	26
	D-2	8/16/2017	14:24	D_2	41.2481	72.9160	1.89	20.5	-18.6	15.5	15.8	
E	E	8/14/2017	8:14	E	41.2479	72.9147	2.75	38.6	-35.9	10.0	9.8	
	E-2	8/16/2017	12:15	E_2	41.2479	72.9147	1.06	37.0	-35.9	10.0	9.9	
	E-3	8/16/2017	12:44	E_3	41.2479	72.9146	0.84	37.0	-36.2	10.0	9.8	
F	F	8/11/2017	16:25	F	41.2479	72.9139	5.70	23.4	-17.7	17.0	16.5	
	F-2	8/16/2017	15:52	F_2	41.2479	72.9139	4.02	21.9	-17.9	15.0	14.2	
	F-3	8/16/2017	16:40	F_3	41.2478	72.9139	5.31	23.5	-18.2	15.0	15.2	
G	G	8/11/2017	8:17	G	41.2622	72.9138	0.10	16.0	-15.9	20.0	19.6	31**
	G-2	8/17/2017	8:30	G_2	41.2622	72.9139	6.35	21.7	-15.4	19.5	19.6	
	G-3	8/17/2017	9:19	G_3	41.2622	72.9138	5.66	21.0	-15.3	16.0	16.0	
H	H	8/10/2017	15:35	H	41.2621	72.9134	5.80	42.0	-36.2	10.0	9.3	
	H-2	8/16/2017	10:09	H_2	41.2621	72.9133	3.16	39.2	-36.0	10.0	9.7	
	H-3	8/16/2017	10:43	H_3	41.2621	72.9133	2.43	38.4	-36.0	9.0	8.7	
I	I	8/10/2017	17:33	I	41.2621	72.9118	2.87	24.2	-21.3	18.0	17.5	

Table 2 (continued) New Haven Sediment Sampling Detail

Station	Station ID/Attempt No.	Date	Time[1]		Latitude	Longitude	Water Level (Ft, MLLW)	Water Depth (Ft)	Sediment Elevation	Penetration	Recovery	Volume Collected (Gallons)[2]
J	J	8/10/2017	11:09	J	41.2783	72.9132	4.40	25.5	-21.1	10.0	9.7	23
	J-2	8/14/2017	10:08	J_2	41.2783	72.9133	0.76	20.8	-20.0	10.0	9.4	
	J-3	8/14/2017	10:41	J_3	41.2783	72.9133	0.64	20.3	-19.7	10.0	9.5	
	J-4	8/14/2017	11:06	J_4	41.2783	72.9133	0.60	20.4	-19.8	10.0	9.5	
K	K	8/10/2017	13:58	K	41.2784	72.9127	6.98	42.8	-35.8	10.0	9.1	
	K-2	8/14/2017	12:21	K_2	41.2784	72.9125	1.65	38.1	-36.5	10.0	8.9	
	K-3	8/14/2017	13:13	K_3	41.2784	72.9125	2.87	39.8	-36.9	9.0	8.0	
	K-4	8/14/2017	13:40	K_4	41.2784	72.9125	3.60	40.6	-37.0	10.0	9.1	
L	L	8/10/2017	12:50	L	41.2785	72.9110	6.20	27.9	-21.7	10.0	9.8	
	L-2	8/15/2017	13:32	L_2	41.2784	72.9111	2.17	25.9	-23.7	10.0	9.1	
	L-3	8/15/2017	14:14	L_3	41.2784	72.9110	3.20	25.9	-22.7	10.0	9.2	
	L-4	8/15/2017	15:15	L_4	41.2784	72.9110	4.66	25.5	-20.8	10.0	9.9	
M	M	8/8/2017	15:56	M	41.2864	72.9120	3.25	33.6	-30.4	10.0	9.7	29
	M-2	8/13/2017	11:24	M_2	41.2864	72.9120	1.47	29.4	-27.9	10.0	9.6	
	M-3	8/13/2017	12:02	M_3	41.2864	72.9120	2.44	32.2	-29.8	10.0	9.5	
	M-4	8/13/2017	12:34	M_4	41.2864	72.9120	3.33	34.9	-31.6	10.0	9.3	
N	N	8/8/2017	12:55	N	41.2863	72.9106	6.92	43.4	-36.5	10.0	9.3	
	N-2	8/13/2017	14:43	N_2	41.2863	72.9105	6.33	42.3	-36.0	10.0	9.5	
	N-3	8/13/2017	15:29	N_3	41.2863	72.9105	6.79	42.7	-35.9	10.0	9.3	
	N-4	8/13/2017	16:32	N_4	41.2863	72.9105	6.84	43.0	-36.2	10.0	9.3	
O	O	8/8/2017	14:30	O	41.2861	72.9092	5.48	38.6	-33.1	13.0	13.4	
	O-2	8/14/2017	15:54	O_2	41.2861	72.9092	6.44	40.7	-34.3	10.0	9.3	
	O-3	8/14/2017	16:51	O_3	41.2861	72.9092	7.24	41.1	-33.9	10.0	9.6	
P	P	8/9/2017	10:48	P_1	41.2924	72.9131	4.57	20.4	-15.8	30.0	29.6	28
	P-2	8/9/2017	12:00	P_2	41.2924	72.9131	6.08	22.1	-16.0	30.0	29.3	
	P-3	8/12/2017	8:26	P_3	41.2924	72.9132	0.66	16.3	-15.6	16.0	15.8	
Q	Q	8/9/2017	14:04	Q	41.2923	72.9119	6.64	18.8	-12.2	30.0	29.4	
R	R	8/10/2017	8:10	R	41.2920	72.9099	0.12	36.2	-36.3	9.5	9.2	
	R-2	8/16/2017	8:16	R_2	41.2920	72.9099	5.58	41.8	-36.2	10.0	9.8	
S	S	8/10/2017	9:39	S	41.2918	72.9081	1.70	39.3	-37.6	10.0	9.5	
	S-2	8/15/2017	10:58	S_2	41.2919	72.9081	1.08	38.5	-37.4	10.0	9.8	
	S-3	8/15/2017	11:33	S_3	41.2919	72.9081	0.88	38.3	-37.4	10.0	9.7	
	S-4	8/15/2017	12:01	S_4	41.2919	72.9081	0.72	38.4	-37.7	10.0	9.8	

Table 2 (continued) New Haven Sediment Sampling Detail

Station	Station ID/Attempt No.	Date	Time[1]		Latitude	Longitude	Water Level (Ft, MLLW)	Water Depth (Ft)	Sediment Elevation	Penetration	Recovery	Volume Collected (Gallons)[2]
T	T	8/8/2017	17:19	T	41.2943	72.9120	1.39	10.1	-8.7	20.0	19.7	31
	T-2	8/12/2017	10:39	T_2	41.2943	72.9120	0.41	10.5	-10.1	19.5	19.3	
	T-3	8/12/2017	11:13	T_3	41.2943	72.9120	1.06	11.5	-10.4	19.5	18.9	
U	U	8/9/2017	8:37	U	41.2942	72.9112	1.25	13.0	-11.8	30.0	29.9	
V	V	8/9/2017	17:25	V	41.2940	72.9095	2.00	37.4	-35.4	10.0	9.7	
	V-2	8/15/2017	16:31	V_2	41.2940	72.9095	6.37	41.8	-35.4	9.8	8.9	
W	W	8/9/2017	16:12	W	41.2939	72.9078	3.49	39.0	-35.5	10.0	9.8	
	W-2	8/15/2017	8:24	W_2	41.2938	72.9078	4.08	40.2	-36.1	10.0	9.2	
	W-3	8/15/2017	9:05	W_3	41.2938	72.9078	2.98	38.8	-35.8	10.0	9.7	
	W-4	8/15/2017	9:44	W_4	41.2938	72.9078	2.40	37.3	-34.9	10.0	9.4	
X	X	8/8/2017	8:43	X	41.2974	72.9076	2.96	22.0	-19.0	10.0	9.7	26
	X-2	8/12/2017	15:16	X_2	41.2975	72.9076	6.90	24.9	-18.0	10.0	9.5	
	X-3	8/12/2017	15:54	X_3	41.2975	72.9076	6.74	24.7	-18.0	10.0	9.0	
	X-4	8/12/2017	16:56	X_4	41.2975	72.9076	5.60	22.7	-17.1	10.0	9.4	
Y	Y	8/8/2017	10:34	Y	41.2969	72.9067	4.96	40.5	-35.5	10.0	9.4	
	Y-2	8/13/2017	8:05	Y_2	41.2969	72.9067	1.23	37.3	-36.1	10.0	7.1	
	Y-3	8/13/2017	9:35	Y_3	41.2969	72.9067	0.26	35.8	-35.5	10.0	9.3	
	Y-4	8/13/2017	10:01	Y_4	41.2969	72.9067	0.25	36.0	-35.8	10.0	9.1	
Z	Z	8/8/2017	11:43	Z	41.2964	72.9060	6.35	41.6	-35.3	10.0	9.7	
	Z-2	8/12/2017	13:09	Z_2	41.2964	72.9060	4.19	41.0	-36.8	10.0	9.7	
	Z-3	8/12/2017	13:51	Z_3	41.2964	72.9061	5.24	42.7	-37.5	10.0	9.5	

[1]As recorded on OSI log.
[2]Transect sediment volume after sieving to remove large orgainic debris (shells, wood, etc.) and rocks. Transect volumes contributed from each selected coring station were generally similar prior to sieving.
** Additional volume was collected from Station I for transect G-H-I composite on 8/17/17 using grab sampler to capture shallow interval samples (<2.5 feet).

Table 3 New Haven Harbor Water Sampling Detail

Station	Date	Time	End Time	Latitude	Longitude	Gallons Collected
CLDS REF BOTTOM	8/17/2017	1015	1030	41.1348	72.8347	10
CLDS REF MID	8/17/2017	1045	1100	41.1348	72.8347	10
CLDS REF TOP	8/17/2017	1115	1130	41.1348	72.8347	10
NHH-F	8/17/2017	1300	1325	41.2478	72.9139	30
NHH-I	8/17/2017	1425	1500	41.2621	72.9118	35
NHH-V	8/17/2017	1528	1555	41.2940	72.9095	65

Figure 1 Target Coring and Water Sampling Locations - New Haven Harbor Sediment Characterization Study

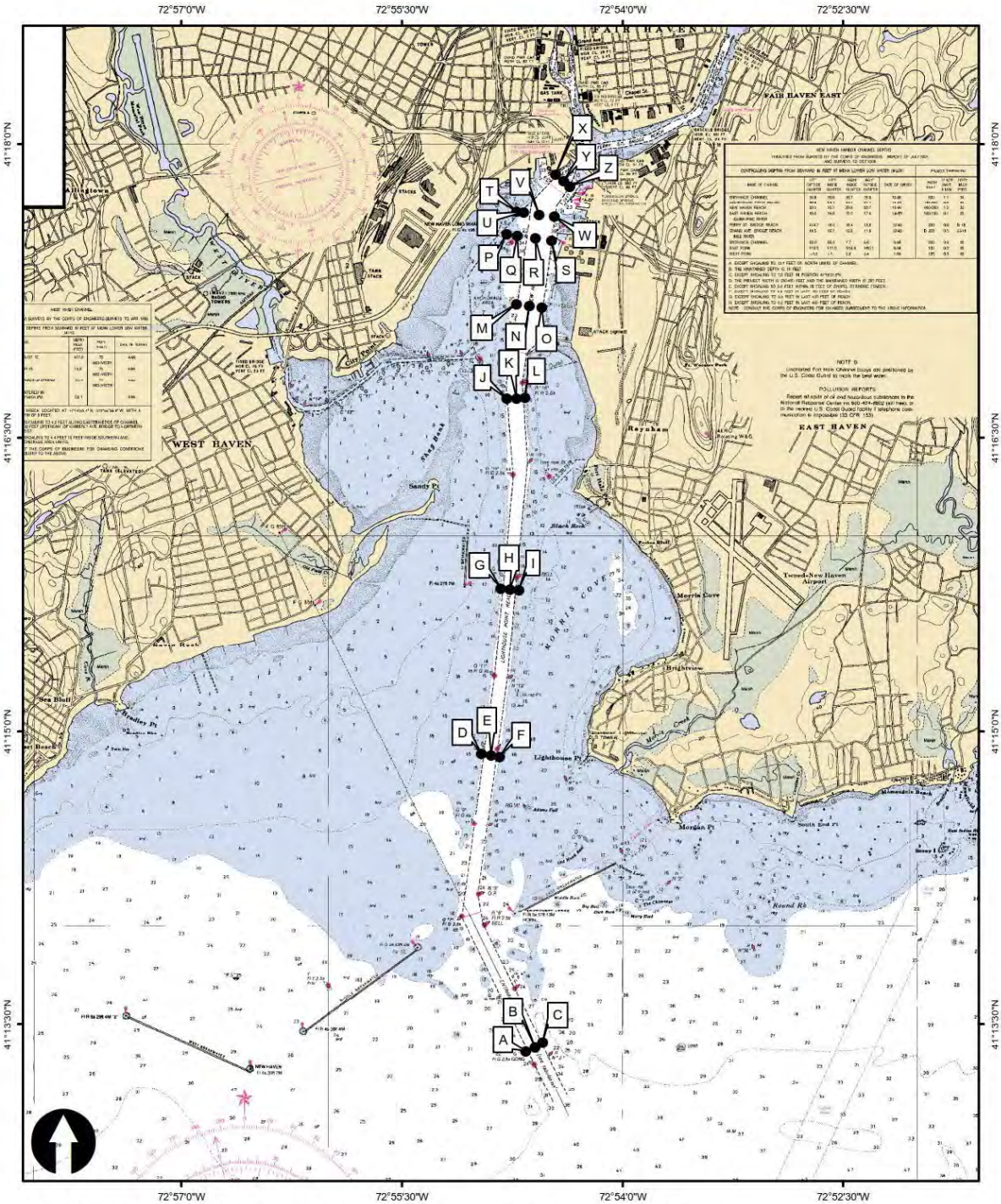

Figure 1: Target Coring and Water Sampling Stations - New Haven Harbor Sediment Characterization Study

● Target Sampling Locations

0 0.25 0.5 1 Nautical Miles

Projection: NAD83 CT State Plane Feet *NOAA Chart: 12371*

Figure 2 Actual Coring and Water Sampling Locations - New Haven Harbor Sediment Characterization Study

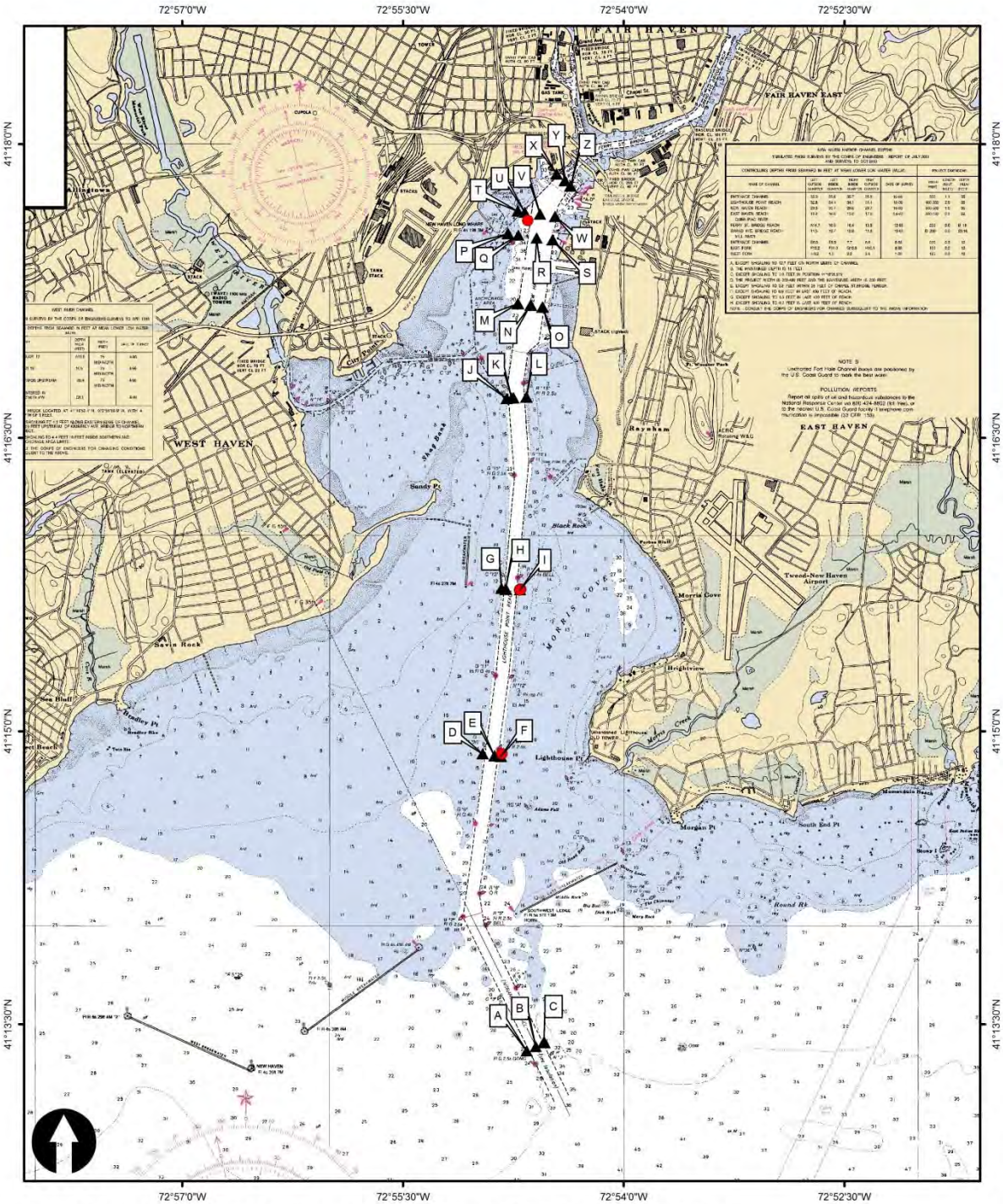

Figure 2: Actual Coring and Water Sampling Stations - New Haven Harbor Sediment Characterization Study

● Core and Water Collection Site ▲ Core Collection Site

0 0.25 0.5 1 Nautical Miles

Projection: NAD83 CT State Plane Feet *NOAA Chart: 12371*

Attachment 1 New Haven Harbor 2017 Daily and Weekly Activity Logs

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/8/17

Vessel/Sampling Platform: R/V CANDU

Personnel (Name/Affiliation/Role):

RYAN MCCARTHY - AECOM - TOM
C. STEVE HOWE - AECOM - FTL
KEN CADMUS - OSI - FIELD LEAD
JEFF PYDESKI - OSI - VESSEL OPERATOR
MORGAN BARRETT - OSI - OPERATOR
TODD RANDALL - NAE

Sampling Performed/Equipment Used:

VIBRACORE SAMPLING IN NEW HAVEN HARBOR

Stations Sampled:

NHH-
X, Y, Z, M, N, O, T

Health and Safety Issues: N/A

HAD DETAILED PROJECT KICKOFF (SHE) BEFORE COMMENCING PROGRAM

Deviations from Approved Plan:

N/A

Dock Departure Time: 0800
Dock Return Time: 1850
Recorded by: RYAN MCCARTHY

AECOM

Daily Activity Log New Haven FNP Sediment Evaluation	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. W912WJ17F0036

Date: 08/09/17

Vessel/Sampling Platform: R/V CanDu

Personnel (Name/Affiliation/Role):

Ryan McCarthy - TOM - AECOM
C. Steven Howe - FTL - AECOM
Todd Randall - USACE
Jeff Pydeski - Vessel Operator - OSI
Morgan Barrett - Equipment Operator - OSI

Sampling Performed/Equipment Used:

Vibracore sampling in New Haven Harbor
Equipment blank

Stations Sampled:

P, Q, U - 30' stations. Archaeological core collected from NHH-P
V, W

Health and Safety Issues: N/A

Deviations from Approved Plan: N/A

Dock Departure Time: 0745
Dock Return Time: 1845
Recorded by: Ryan McCarthy

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/10/17

Vessel/Sampling Platform: RV Can Du

Personnel (Name/Affiliation/Role):
C. Steve Howe - FTL - AECOM
Clare Murphy-Hagan - AECOM Todd Randall - USACE
Jeff Pydes'ki - Vessel Operator - OSI
Morgan Barrett - Equipment Operator - OSI

Sampling Performed/Equipment Used:
Vibracore sampling in New Haven Harbor

Stations Sampled:
R, S, J, L, K, H, I, Field duplicate at H

Health and Safety Issues: N/A

Deviations from Approved Plan: N/A

Dock Departure Time: 0745
Dock Return Time: 1845
Recorded by: C Steve Howe

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/11/17

Vessel/Sampling Platform: RV Carlin

Personnel (Name/Affiliation/Role):
C. Steve Howe - FTL - AECOM Todd Randall - USACE
Clare Murphy-Hagan AECOM
Jeff Rydeski - vessel operator - OSI
Morgan Barrett - Equipment Operator - OSI

Sampling Performed/Equipment Used:
Vibracore sampling in New Haven Harbor

Stations Sampled:
G, C, B, A, D, F

Health and Safety Issues: The wind and waves picked up in the evening making the core barrel swing excessively. The team did not proceed to the last station (NHH-E)

Deviations from Approved Plan:

Dock Departure Time: 0745
Dock Return Time: 1805
Recorded by: C. Steve Howe

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 08/12/17

Vessel/Sampling Platform: RV Candu

Personnel (Name/Affiliation/Role):
R. MacPhee - FTL - AECOM
Marc Smith - AECOM
Jeff Pydeski - Vessel operator - OSI
Morgan Barrett - Equipment operator - OSI

Sampling Performed/Equipment Used:
Vibracore Sampling in New Haven Harbor

Stations Sampled:

X, Z, P, T

Health and Safety Issues:

Deviations from Approved Plan:

Dock Departure Time: 0805
Dock Return Time: 1815
Recorded by: R. MacPhee

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 08/13/17

Vessel/Sampling Platform:
RV Candu

Personnel (Name/Affiliation/Role):
R. MacPhee - FTL - AECOM
Marc Smith - AECOM
Jeff Rydeski - Vessel operator - OSI
Morgan Barrett - Equipment operator - OSI

Sampling Performed/Equipment Used:
Vibracore sampling in New Haven Harbor

Stations Sampled:
Y, M, N

Health and Safety Issues:

Deviations from Approved Plan:

Dock Departure Time: 0745
Dock Return Time: ~~1830~~ 1800
Recorded by: R. MacPhee

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/14/17

Vessel/Sampling Platform: Can Du

Personnel (Name/Affiliation/Role):
C. Steve Howe - FTL AECOM Marc Smith AECOM
Jeff Rydeski - boat captain - OSI
Morgan Barrett - equipment operator - OSI
Kevin Murphy - OSI - equipment operator

Sampling Performed/Equipment Used:
Vibracore sampling in New Haven Harbor

Stations Sampled:
E - grain size and chemistry
J - archeological core and volume collection
K + O - volume collection

Health and Safety Issues: Morgan (OSI equipment operator) was experiencing discomfort with an existing knee issue so left boat. Replaced by Kevin Murphy

Deviations from Approved Plan:
None

Dock Departure Time: 0730
Dock Return Time: 1803
Recorded by: C. Steve Howe

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/15/17

Vessel/Sampling Platform: Can Do

Personnel (Name/Affiliation/Role):
C. Stace Howe - FTL AECOM
Clare Murphy - Hagan AECOM
Kevin Murphy - OSI - equipment operator
Jeff Pydeski - boat captain - OSI

Sampling Performed/Equipment Used:
Vibracore sampling in New Haven Harbor

Stations Sampled:
W, S, L, V

Health and Safety Issues: None

Deviations from Approved Plan: None

Dock Departure Time: 0745
Dock Return Time: 1735
Recorded by: C. Stace Howe

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/16/17

Vessel/Sampling Platform:
RV Carter

Personnel (Name/Affiliation/Role):
Jeff Pyjeski - Captain - OSI
Kevin Murphy - Egypt Operator - OSI
Clare Murphy - Engineer
C. Steve Hone

Sampling Performed/Equipment Used:
Vibracore sampling in New Haven Harbor

Stations Sampled:
L, H, E, D, F

Health and Safety Issues: None

Deviations from Approved Plan: None

Dock Departure Time: 0745
Dock Return Time:
Recorded by: C. Steve Hone

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/17/17

Vessel/Sampling Platform:

RV CanDu

Personnel (Name/Affiliation/Role):

Jeff Pydeski, Captain, OSI
Kevin Murphy, OSI
C. Steve Howe, FTL, AECOM
Clare Murphy-Hagan, AECOM

Sampling Performed/Equipment Used:

Vibracore sampling in New Haven Harbor

Stations Sampled:

G, C

Health and Safety Issues: None

Deviations from Approved Plan: None

Dock Departure Time: 0745
Dock Return Time: 1811
Recorded by: C. Steve Howe

AECOM

Daily Activity Log
New Haven FNP Sediment Evaluation

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ17F0036

Date: 8/17/17

Vessel/Sampling Platform: R/V READY II

Personnel (Name/Affiliation/Role):

RYAN MCCARTHY - AECOM
KEN CADMUS - OSI
MIKE LINCOLN - OSI

Sampling Performed/Equipment Used:

CLDS REF - SEDIMENT/WATER SAMPLING
NHH - HARBOR WATER COLLECTION
NHH - NHH-1 - GRAB SAMPLING

Stations Sampled:

CLDS-REF
NHH-1

Health and Safety Issues: N/A

Deviations from Approved Plan: GRAB SAMPLING INSTEAD OF CORING AT STATION NHH-1 (PER CONVERSATION WITH NAE STAFF)

Dock Departure Time: 0730
Dock Return Time: 1830
Recorded by: RYAN MCCARTHY

WEEKLY SAFETY MEETING

Date Held: 8/8/17
Time: 0730

CONTRACTOR: AECOM Contract No. DACW33- W912WJ-17-D-003
PERSONNEL PRESENT (check): Contractor X Sub. X Government X

SUBJECTS DISCUSSED (check items that were discussed during meeting):

USACE EM385-1-1 ✓ (Specific sections: _____)
On-site Accident Prevention Plan (or Site Safety and Health Plan) ✓
Individual protective equipment (steel-toed boots, safety glasses, etc..) ✓
Prevention of slips/falls ✓
Back injury/safe lifting techniques ____
Fire prevention ✓
First aid ✓
Tripping hazards ✓
Equipment inspection and maintenance ✓
Hoisting equipment, winch and crane safety ✓
Ropes, hooks, chains, and slings ✓
Water safety ✓
Boat safety ✓
HAZMAT, Toxic hazards, contaminated sediments, MSDS, respiratory, ventilation ____
Biological hazards (poison ivy, ticks, wasps, mosquitoes etc) ____
Staging, ladders, concrete forms, safety nets, handrails ✓
Hand tools, power tools, machinery, chain saws ✓
Vehicle operation safety ____
Electrical grounding, temporary wiring, GFCI ____
Lockouts/safe clearance procedures ____
Welding, cutting ____
Excavation hazards/rescue ____
Loose rock/steep slopes ____
Explosives ____
Sanitation and waste disposal ✓
Clean-up, trash ✓

Other safety issues of concern specific to contract that was discussed during meeting:

- WEATHER
- VESSEL TRAFFIC

All persons attending meeting the meeting must sign below or on the back of the form.

Contractor Representative Signature _____ Date: 8/8/17
CE Inspector/QA (if present at meeting) _____ Date: 8/8/17

WEEKLY SAFETY MEETING

Date Held: 8/17/17
Time: 0730

CONTRACTOR: AECOM Contract No. DACW33-
PERSONNEL PRESENT (check): Contractor X Sub. X Government ___

SUBJECTS DISCUSSED (check items that were discussed during meeting):

USACE EM385-1-1 ✓ (Specific sections: _____)
On-site Accident Prevention Plan (or Site Safety and Health Plan) ✓
Individual protective equipment (steel-toed boots, safety glasses, etc..) ✓
Prevention of slips/falls ✓
Back injury/safe lifting techniques ✓
Fire prevention ✓
First aid ✓
Tripping hazards ✓
Equipment inspection and maintenance ✓
Hoisting equipment, winch and crane safety ✓
Ropes, hooks, chains, and slings ✓
Water safety ✓
Boat safety ✓
HAZMAT, Toxic hazards, contaminated sediments, MSDS, respiratory, ventilation ___
Biological hazards (poison ivy, ticks, wasps, mosquitoes etc) ___
Staging, ladders, concrete forms, safety nets, handrails ✓
Hand tools, power tools, machinery, chain saws ✓
Vehicle operation safety ___
Electrical grounding, temporary wiring, GFCI ___
Lockouts/safe clearance procedures ___
Welding, cutting ___
Excavation hazards/rescue ___
Loose rock/steep slopes ___
Explosives ___
Sanitation and waste disposal ✓
Clean-up, trash ✓

Other safety issues of concern specific to contract that was discussed during meeting:

weather
vessel traffic

All persons attending meeting the meeting must sign below or on the back of the form.

Contractor Representative Signature [signature] Date: 8/17/17
CE Inspector/QA (if present at meeting) _____ Date: _____

Attachment 2 New Haven Harbor 2017 Project SH&E Documentation

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	RYAN MCCARTHY	**Date Performed:**	8/8/17
Topics Discussed:	1. PROJECT KICKOFF		
	2. WEATHER		
	3. SLIP TRIP FALL		
	4. VIBRATORY OPS		

Printed Name	Signature	Representing
RYAN MCCARTHY		AECOM
Tina Merritt		AECOM
Ken Cadmus		OSI
TODD RANDALL		USACE
C. Steve Howe		AECOM
MORGAN BARRETT		OSI
Jeff Pydeski		OSI

AECOM

Daily Float Plan

Name of vessel's operator:	JEFF PYDESKI
Telephone Number:	908 642 4670
Name of Vessel:	R/V CANDU
Registration No.:	CT 6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	37' PONTOON BOAT TOWER

Rafts/Dinghies: Number: Size: Color: N/A

Radio: Type: VHF Frequencies Monitored: 13/16

Number of persons onboard: 6

Name:	Age:	Address & Telephone:
RYAN MCCARTHY / TODD RANDALL		603 770 4945
C. STEVE HOWE		
KEN CADMUS		
MORGAN BARRETT		
JEFF PYDESKI		

Engine Type: OUTBOARD H.P.: 150 X2 Normal Fuel Supply (days): 2X

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: NEW HAVEN HARBOR

Date & Time of Departure: 8/8/17 0800

Departure From: LONG WHARF PIER Departure To: NEW HAVEN HARBOR

Expected to arrive by: 1900 In no case later than: 2000

Date & Time of Arrival: Boat Lead Signature at Arrival:

Boat Safety Checklist

Keep this page with your boat, ready for inspection. By using this checklist, or one fine-tuned by yourself, you'll be sure that everything is on board and in good working order. Your passengers will appreciate knowing you're concerned about boating safety.

- [x] Float plan--let a friend or relative know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- [x] Registration certificate or documentation
- [x] Personal Flotation Devices (wearable and throw able)--USCG approved, good condition, readily accessible, assigned and fitted
- [x] Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- [x] Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- [x] Anchors and Line--adequate anchor for bottom, adequate line for water depth
- [x] Bilge device --bilge pump operable, alternative bailing device available
- [x] Watch or clock--operable
- [ ] Bright flashlight or searchlight
- [x] Navigation lights --tested and operable, spare bulbs
- [x] Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- [x] Sound-producing device--horn, whistle appropriate for boat
- [ ] Alternate propulsion--paddle or oar
- [x] First Aid Kit
- [x] Tools, spare outboard prop and lock nut
- [x] Compass
- [x] Sunscreen
- [x] Weather Radio

Boat: R/V CANDU Captain's Signature: J. Pyleski

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	C Steve Hone	**Date Performed:**	8/9/17
Topics Discussed:	1. Heat		
	2. slips trips falls		
	3. eyes on water - busy harbor		
	4.		

Printed Name	Signature	Representing
TODD RANDALL	Todd Randall	USACE
Jeff Pydeski	[illegible]	OSI
Morgan Barnett	MDB	OSI
RYAN MCCARTHY	[illegible]	AECOM
C. Steve Hone	[illegible]	AECOM

AECOM

Daily Float Plan

Name of vessel's operator:	JEFF PYDESKI
Telephone Number:	908 642 4670
Name of Vessel:	RV CANDU
Registration No.:	CT 6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	37' PONTOON TOWER

Rafts/Dinghies: Number: Size: Color: N/A

Radio: Type: VHF Frequencies Monitored: 13/16

Number of persons onboard:

Name:	Age:	Address & Telephone:
RYAN MCCARTHY		603 770 4945
C STEVE HOWE		
TODD RANDALL		
JEFF PYDESKI		
MORGAN BARRETT		

Engine Type: OUTBOARD x2 H.P.: 150 x2 Normal Fuel Supply (days): 2x

Survival equipment on board: (check as appropriate)

- ☑ Life Jackets
- ☑ Flares
- ☐ Smoke Signals
- ☑ Medical Kit
- ☐ EPIRB
- ☑ Paddles
- ☑ Anchor
- ☑ Loran/GPS
- ☑ Life Ring

Trip: NEW HAVEN HARBOR

Date & Time of Departure: 8/9/17 0745

Departure From: LONG WHARF PIER

Departure To: NEW HAVEN HARBOR

Expected to arrive by: 1900 In no case later than: _____

Date & Time of Arrival:

Boat Lead Signature at Arrival:

Boat Safety Checklist

Keep this page with your boat, ready for inspection. By using this checklist, or one fine-tuned by yourself, you'll be sure that everything is on board and in good working order. Your passengers will appreciate knowing you're concerned about boating safety.

- [x] Float plan--let a friend or relative know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- [x] Registration certificate or documentation
- [x] Personal Flotation Devices (wearable and throw able)--USCG approved, good condition, readily accessible, assigned and fitted
- [x] Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- [x] Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- [x] Anchors and Line--adequate anchor for bottom, adequate line for water depth
- [x] Bilge device --bilge pump operable, alternative bailing device available
- [x] Watch or clock--operable
- [x] Bright flashlight or searchlight
- [x] Navigation lights --tested and operable, spare bulbs
- [x] Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- [x] Sound-producing device--horn, whistle appropriate for boat
- [ ] Alternate propulsion--paddle or oar
- [x] First Aid Kit
- [x] Tools, spare outboard prop and lock nut
- [x] Compass
- [x] Sunscreen
- [x] Weather Radio

8/9/17

Boat: Yu (ANDY Captain's Signature: [illegible]

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	C Steve Howe Jeff Pydeski	**Date Performed:**	8/10/17
Topics Discussed:	1. Vessel safety refresher - new crew member		
	2. lifting		
	3.		
	4.		

Printed Name	Signature	Representing
C Steve Howe		AECOM
MORGAN BARRETT		OSI
C. Murphy-Hagan		AECOM
TODD RALDAM		USACE
Jeff Pydeski		OSI

AECOM

Daily Float Plan

Name of vessel's operator:	Jeff Pydesk.
Telephone Number:	908 642 4670
Name of Vessel:	RV Candu
Registration No.:	CT 6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	37' Pontoon Tower

Rafts/Dinghies: Number: Size: Color: N/A

Radio: Type: Frequencies Monitored: 13/16

Number of persons onboard:

Name:	Age:	Address & Telephone:
C. Steve Howe		603 520-0169
Clare Murphy-Hagan		
Todd Randall		
Jeff Pydesk.		
Morgan Barrett		

Engine Type: Outboard x2 H.P.: 150 x2 Normal Fuel Supply (days): 2X

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New Haven Harbor

Date & Time of Departure: 8/9/17 0740

Departure From: Long Wharf Pier

Departure To: New Haven Harbor

Expected to arrive by: 1900 In no case later than: _____

Date & Time of Arrival:

Boat Lead Signature at Arrival:

Boat Safety Checklist

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- ✓ Float plan--let a friend or relative know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- ✓ Registration certificate or documentation
- ✓ Personal Flotation Devices (wearable and throw able)--USCG approved, good condition, readily accessible, assigned and fitted
- ✓ Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- ✓ Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- ✓ Anchors and Line--adequate anchor for bottom, adequate line for water depth
- ✓ Bilge device --bilge pump operable, alternative bailing device available
- ✓ Watch or clock--operable
- ✓ Bright flashlight or searchlight
- ✓ Navigation lights --tested and operable, spare bulbs
- ✓ Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- ✓ Sound-producing device--horn, whistle appropriate for boat
- ✓ Alternate propulsion--paddle or oar
- ✓ First Aid Kit
- ✓ Tools, spare outboard prop and lock nut
- ✓ Compass
- ✓ Sunscreen
- ✓ Weather Radio

Boat: M/V Candy Captain's Signature: _____

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	Steve Hone Jeff Pydeski	**Date Performed:**	8/11/17
Topics Discussed:	1. Co-Work: coring & processing		
	2. Recreational Boating		
	3.		
	4.		

Printed Name	Signature	Representing
Clare Murphy-Hagan		AECOM
TODD RANDALL		USACE
MORGAN BARRETT		OST
Jeff Pydeski		OST
C. Steve Hone		AECOM

AECOM

Daily Float Plan

Name of vessel's operator:	Jeff Rydeski
Telephone Number:	908 642 4670
Name of Vessel:	R/V Candu
Registration No.:	CT 6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	37' Pontoon Boat Tower

Rafts/Dinghies: Number: Size: Color: NA

Radio: Type: VHF Frequencies Monitored: 13/16

Number of persons onboard: 5

Name:	Age:	Address & Telephone:
C. Steve Howe AECOM		603 520 0169
Clare Murphy Hogan AECOM		
Morgan Barrett OSI		
Jeff Rydeski OSI		
Todd Randall USACE		

Engine Type: outboard H.P.: 150 x2 Normal Fuel Supply (days): 2x

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New Haven Harbor

Date & Time of Departure: 8/11/17

Departure From: Long Wharf Pier Departure To: New Haven Harbor

Expected to arrive by: 1900 In no case later than: 2000

Date & Time of Arrival: 8/11/17 Boat Lead Signature at Arrival:

Boat Safety Checklist

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- ☑ Float plan--let a friend or relative know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- ☑ Registration certificate or documentation
- ☑ Personal Flotation Devices (wearable and throw able)--USCG approved, good condition, readily accessible, assigned and fitted
- ☑ Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- ☑ Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- ☑ Anchors and Line--adequate anchor for bottom, adequate line for water depth
- ☑ Bilge device --bilge pump operable, alternative bailing device available
- ☑ Watch or clock--operable
- ☑ Bright flashlight or searchlight
- ☑ Navigation lights --tested and operable, spare bulbs
- ☑ Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- ☑ Sound-producing device--horn, whistle appropriate for boat
- ☑ Alternate propulsion--paddle or oar
- ☑ First Aid Kit
- ☑ Tools, spare outboard prop and lock nut
- ☑ Compass
- ☑ Sunscreen
- ☑ Weather Radio

Boat: Can Do Captain's Signature: _____

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	Rachel MacPhee Jeff Pydeski	**Date Performed:**	08/12/17
Topics Discussed:	1. Vessel safety		
	2. lifting		
	3.		
	4.		

Printed Name	Signature	Representing
Rachel MacPhee		AECOM
Mark R. Smith		AECOM
Jeff Pydeski		OSI
MORGAN BARRETT		OSI

AECOM

Daily Float Plan

Name of vessel's operator:	Jeff Rydeski
Telephone Number:	908 642 4670
Name of Vessel:	RV Condu
Registration No.:	CT 6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	37' Pontoon tower

Rafts/Dinghies: Number: Size: Color: N/A

Radio: Type: Frequencies Monitored: 13/16

Number of persons onboard:

Name:	Age:	Address & Telephone:
Rachel MacPhee		978-877-9436
Jeff Rydeski		
Morgan Barrett		
Mark Smith		

Engine Type: Outboard x2 H.P.: 150 x2 Normal Fuel Supply (days): 28

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New haven harbor

Date & Time of Departure: 8/12/17 0805

Departure From: Long wharf Pier

Departure To: New haven harbor

Expected to arrive by: 1900 In no case later than: _____

Date & Time of Arrival: 8/12/17

Boat Lead Signature at Arrival:

Boat Safety Checklist

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- [x] Float plan--let a friend or relative know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- [x] Registration certificate or documentation
- [x] Personal Flotation Devices (wearable and throw able)--USCG approved, good condition, readily accessible, assigned and fitted
- [x] Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- [x] Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- [x] Anchors and Line--adequate anchor for bottom, adequate line for water depth
- [x] Bilge device --bilge pump operable, alternative bailing device available
- [x] Watch or clock--operable
- [x] Bright flashlight or searchlight
- [x] Navigation lights --tested and operable, spare bulbs
- [x] Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- [x] Sound-producing device--horn, whistle appropriate for boat
- [x] Alternate propulsion--paddle or oar
- [x] First Aid Kit
- [x] Tools, spare outboard prop and lock nut
- [x] Compass
- [x] Sunscreen
- [x] Weather Radio

Boat: PV Candu Captain's Signature: [illegible]

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	R. MacPhee	**Date Performed:**	08/13/17
Topics Discussed:	1. Boat safety		
	2. Heat Stress		
	3. fatigue		
	4.		

Printed Name	Signature	Representing
Jeff Pydosh		OSI
MORGAN BARRETT		OSI
Marc R. Smith		AECOM
Rachel MacPhee		AECOM

AECOM

Daily Float Plan

Name of vessel's operator: Jeff Rydeski

Telephone Number: 908 642 4670

Name of Vessel: RV Condu

Registration No.: CT 6433 AR

Description of Vessel:
Type:
Make:
Color of Hull/Trim: 37' Pontoon tower

Most distinguishing identifiable feature:

Rafts/Dinghies: Number: Size: Color: N/A

Radio: Type: Frequencies Monitored: 13/16

Number of persons onboard:

Name:	Age:	Address & Telephone:
Rachel MacPhee		978-877-9436
Jeff Rydeski		
Morgan Barrett		
Marc Smith		

Engine Type: Outboard x2 H.P.: 150 x2 Normal Fuel Supply (days): 2X

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New haven harbor

Date & Time of Departure: 08/12/17 0805

Departure From: Long Wharf Pier Departure To: New haven harbor

Expected to arrive by: 1900 In no case later than: 2100

Date & Time of Arrival: 08/13/17 Boat Lead Signature at Arrival:

Boat Safety Checklist

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- [x] Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- [x] Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- [x] Anchors and Line--adequate anchor for bottom, adequate line for water depth
- [x] Bilge device --bilge pump operable, alternative bailing device available
- [x] Watch or clock--operable
- [x] Bright flashlight or searchlight
- [x] Navigation lights --tested and operable, spare bulbs
- [x] Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- [x] Sound-producing device--horn, whistle appropriate for boat
- [x] Alternate propulsion--paddle or oar
- [x] First Aid Kit
- [x] Tools, spare outboard prop and lock nut
- [x] Compass
- [x] Sunscreen
- [x] Weather Radio

Boat: RV Candu Captain's Signature: _____

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	Jeff Pydeski C. Steve Howe	**Date Performed:**	8/14/17
Topics Discussed:	1. Pace		
	2. Complacency		
	3.		
	4.		

Printed Name	Signature	Representing
C. Steve Howe	[signature]	AECOM
Marc R. Smith	[signature]	AECOM
MORGAN BARKETT	[signature]	OSR
Jeff Pydeski	[signature]	OSI

AECOM

Daily Float Plan

Name of vessel's operator:	Jeff Rydeski
Telephone Number:	908 642 4670
Name of Vessel:	RV Candu
Registration No.:	CT 6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim	37' Pontoon
Most distinguishing identifiable feature:	Tower

Rafts/Dinghies: Number: Size: Color: NA

Radio: Type: Frequencies Monitored: 13/16

Number of persons onboard:

Name:	Age:	Address & Telephone:
C. Steve Hone		603-520-0169
Jeff Rydeski		
Morgan Barrett		
Marc Smith		

Engine Type: Outboard x2 H.P.: 150 x2 Normal Fuel Supply (days): 2x

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New Haven Harbor

Date & Time of Departure: 8/14/17 0730

Departure From: Long Wharf Pier Departure To: New Haven Harbor

Expected to arrive by: 1900 In no case later than: 2000

Date & Time of Arrival: Boat Lead Signature at Arrival:

Boat Safety Checklist

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- ☑ Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- ☑ Sound-producing device--horn, whistle appropriate for boat
- ☑ Alternate propulsion--paddle or oar
- ☑ First Aid Kit
- ☑ Tools, spare outboard prop and lock nut
- ☑ Compass
- ☑ Sunscreen
- ☑ Weather Radio

Boat: Can Du Captain's Signature: _____

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	Jeff Pydeski C Steve Hone	**Date Performed:**	8/15/17
Topics Discussed:	1. Walking - pick up feet		
	2. Heat - stay cool & hydrated		
	3.		
	4.		

Printed Name	Signature	Representing
C Steve Hone		AECOM
Kevin O Murphy		OSE
Jeff Pydeski		OSI
Chase Murphy-Hogan		AECOM

AECOM

Daily Float Plan

Name of vessel's operator: Jeff Rydeski

Telephone Number: 908 642 4670

Name of Vessel: RV Candu

Registration No.: CT 6433 AR

Description of Vessel: 37' Pontoon

Type:

Make: Tower

Color of Hull/Trim

Most distinguishing identifiable feature:

Rafts/Dinghies: Number: Size: Color:

Radio: Type: Frequencies Monitored: 13/16

Number of persons onboard: 4

Name:	Age:	Address & Telephone:
C. Steve Hare		603 520 0169
Jeff Rydeski		
Kevin Murphy		
Clare Murphy Hogan		

Engine Type: Outboard H.P.: 2x 150 Normal Fuel Supply (days): 2x

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [x] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New Haven Harbor

Date & Time of Departure: 8/12/17 0745

Departure From: Long Wharf Pier

Departure To:

Expected to arrive by: 1900 In no case later than: 2000

Date & Time of Arrival: 8/15/17

Boat Lead Signature at Arrival:

Boat Safety Checklist

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- ✓ First Aid Kit
- ✓ Tools, spare outboard prop and lock nut
- ✓ Compass
- ✓ Sunscreen
- ✓ Weather Radio

Boat Can Du Captain's Signature: [signature]

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	Jeff Pydeski C. Steve Howe	**Date Performed:**	8/16/17
Topics Discussed:	1. Heat Stress		
	2. General boat deck safety		
	3.		
	4.		

Printed Name	Signature	Representing
C. Steve Howe	[illegible]	AECOM
Clare Murphy-Hagan	[illegible]	AECOM
Kevin O Murphy	[illegible]	OST
Jeff Pydeski	[illegible]	OSI

AECOM

Daily Float Plan

Name of vessel's operator:	Jeff Rydeski
Telephone Number:	908 642 4670
Name of Vessel:	R/V Can Du
Registration No.:	CT .6433 AR
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	37' Pontoon Boat Tower

Rafts/Dinghies: Number: Size: Color: NA

Radio: Type: VHF Frequencies Monitored: 13/16

Number of persons onboard: 4

Name:	Age:	Address & Telephone:
C. Steve Howe		603-520-0169
Clare Murphy-Hagan		
Jeff Rydeski		
Kevin Murphy		

Engine Type: outboard H.P.: 150 2x Normal Fuel Supply (days): 2x

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [ ] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New Haven Harbor

Date & Time of Departure: 8/16/17 0745

Departure From: Long Wharf Pier Departure To:

Expected to arrive by: 19:00 In no case later than: 2000

Date & Time of Arrival: 8/16/17 1820 Boat Lead Signature at Arrival: [signature]

Boat Safety Checklist

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- ☑ Sound-producing device--horn, whistle appropriate for boat
- ☑ Alternate propulsion--paddle or oar
- ☑ First Aid Kit
- ☑ Tools, spare outboard prop and lock nut
- ☑ Compass
- ☑ Sunscreen
- ☑ Weather Radio

Boat: Can Do Captain's Signature: _____

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	RYAN MCCARTHY	**Date Performed:**	8/17/17
Topics Discussed:	1. WEATHER		
	2. OFFSHORE OPS		
	3. HOUSEKEEPING		
	4. SLIP TRIP FALL		

Printed Name	Signature	Representing
RYAN MCCARTHY	[signature]	AECOM
KEN CADMUS	[signature]	OSI
MIKE LINCOLN	[signature]	OSI

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Harbor FNP
Sediment/ Water Sampling/ New Haven, CT

Conducted by:	**C. Stephen Howe**	**Date Performed:**	**08/17/17 0745** See project log-book
Topics Discussed:	1. Multiple vessels		
	2. New sampling techniques		
	3.		
	4.		

Note: Dockside SH&E briefing was held however, original field signature form was destroyed.

Printed Name	Signature	Representing
C. Stephen Howe		AECOM
Clare Murphy-Hagan		AECOM
Jeff Pydeski		OSI
Kevin Murphy		OSI

AECOM

Daily Float Plan

Name of vessel's operator:	KEN CADMUS
Telephone Number:	860 395 8112
Name of Vessel:	R/V READY II
Registration No.:	CT 8934 AX
Description of Vessel: Type: Make: Color of Hull/Trim Most distinguishing identifiable feature:	25' PARKER FORWARD CABIN

Rafts/Dinghies: Number: Size: Color: N/A

Radio: Type: VHF Frequencies Monitored: 13/16

Number of persons onboard: 3

Name:	Age:	Address & Telephone:
RYAN MCARTHY		603 770 4945
KEN CADMUS		
MIKE LINCOLN		

Engine Type YAMAHA H.P.: 150 X2 Normal Fuel Supply (days): 3X

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [ ] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: CLOS / NEW HAVEN HARBOR

Date & Time of Departure: 8/17/17 0730

Departure From: BRANFORD RAMP

Departure To: CLOS / NHH

Expected to arrive by: 1900 In no case later than: 2000

Date & Time of Arrival:

Boat Lead Signature at Arrival:

AECOM

Daily Float Plan

Name of vessel's operator:	Jeff Rydeski
Telephone Number:	908 642-4670
Name of Vessel:	Can Du
Registration No.:	CT6133 AR
Description of Vessel: Type: Make: Color of Hull/Trim	31' Pontoon
Most distinguishing identifiable feature:	Tower

Rafts/Dinghies: Number: Size: Color: NA

Radio: Type: VHF Frequencies Monitored: 13/16

Number of persons onboard:

Name:	Age:	Address & Telephone:
C. Steve Hone		603-520-0169
Clare Murphy-Hagan		
Jeff Rydeski		
Kevin Murphy		

Engine Type: outboard H.P.: 2x150 Normal Fuel Supply (days): 2X

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [ ] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [ ] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: New Haven Harbor

Date & Time of Departure: 8/17/17 0745

Departure From: Long Warf Pier Departure To: New Haven Harbor

Expected to arrive by: 1900 In no case later than: 2000

Date & Time of Arrival: 1811 Boat Lead Signature at Arrival: [signature]

Boat Safety Checklist

page with your boat, ready for inspection. By using this checklist, or one fine-tuned by yourself, ure that everything is on board and in good working order. Your passengers will appreciate ou're concerned about boating safety.

lan--let a friend or relative know when you're leaving, where you're going, when you expect to at to do if you don't, and a description of your boat

ration certificate or documentation

al Flotation Devices (wearable and throw able)--USCG approved, good condition, readily assigned and fitted

xtinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, readily accessible

l Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB

ors and Line--adequate anchor for bottom, adequate line for water depth

device --bilge pump operable, alternative bailing device available

ch or clock--operable

ht flashlight or searchlight

igation lights --tested and operable, spare bulbs

teries--fully charged, encased in plastic boxes or terminals covered, securely fastened down

nd-producing device--horn, whistle appropriate for boat

ernate propulsion--paddle or oar

st Aid Kit

ols, spare outboard prop and lock nut

ompass

unscreen

Weather Radio

Boat: Canda Captain's Signature:

Boat Safety Checklist

Keep this page with your boat, ready for inspection. By using this checklist, or one fine-tuned by yourself, you'll be sure that everything is on board and in good working order. Your passengers will appreciate knowing you're concerned about boating safety.

- [x] Float plan--let a friend or relative know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- [x] Registration certificate or documentation
- [x] Personal Flotation Devices (wearable and throw able)--USCG approved, good condition, readily accessible, assigned and fitted
- [x] Fire Extinguishers--right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- [x] Visual Distress Signals--current dates on flares, proper number, batteries good if lights or EPIRB
- [x] Anchors and Line--adequate anchor for bottom, adequate line for water depth
- [x] Bilge device --bilge pump operable, alternative bailing device available
- [x] Watch or clock--operable
- [x] Bright flashlight or searchlight
- [x] Navigation lights --tested and operable, spare bulbs
- [x] Batteries--fully charged, encased in plastic boxes or terminals covered, securely fastened down
- [x] Sound-producing device--horn, whistle appropriate for boat
- [ ] Alternate propulsion--paddle or oar
- [x] First Aid Kit
- [x] Tools, spare outboard prop and lock nut
- [x] Compass
- [x] Sunscreen
- [x] Weather Radio

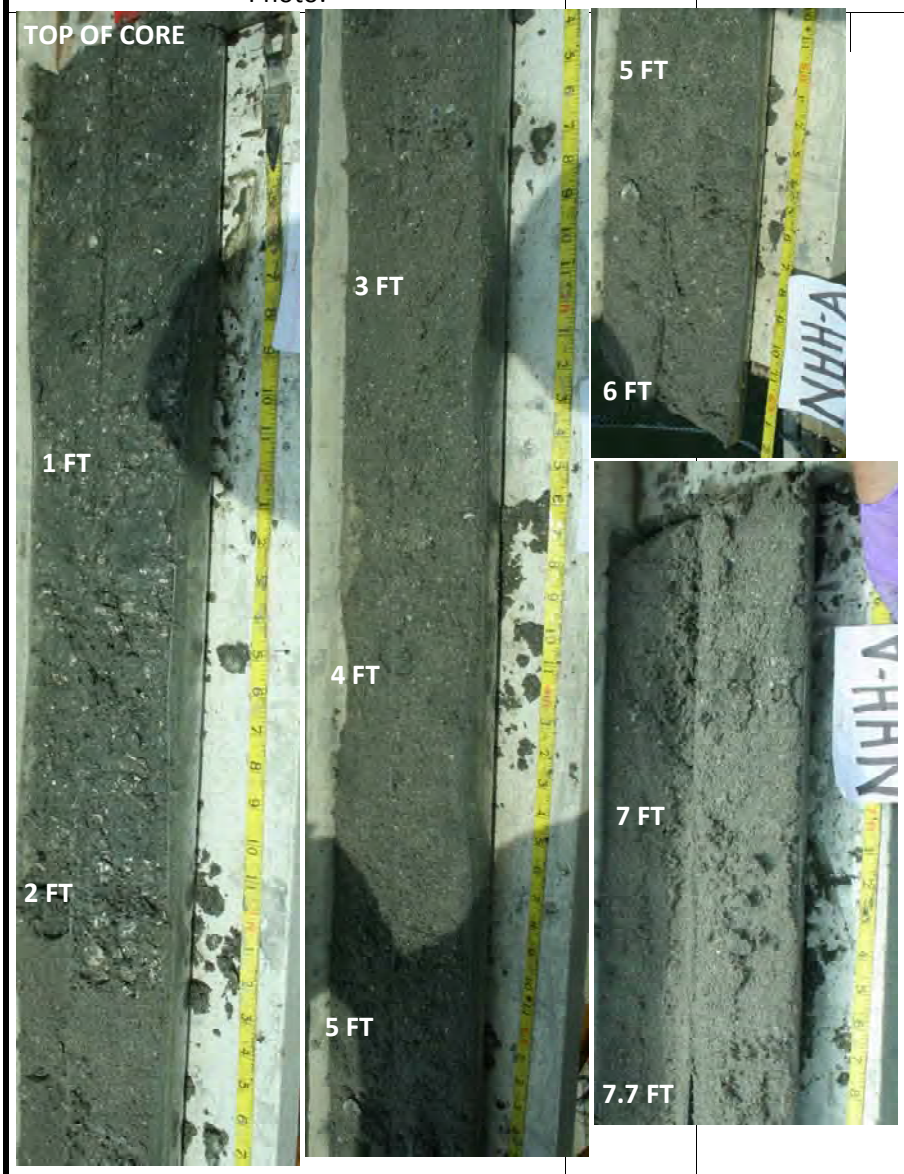
Boat: RV Ready II Captain's Signature: [illegible]

Attachment 3 New Haven Harbor 2017 Core Logs

Includes Core Logs from Archeological Cores

Core ID: NHH-A					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/7/2017
Client:	USACE	X:	955707.36	Time:	13:10
Subcontractor:	Ocean Surveys Inc.	Y:	641917.44	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	13
Weather:	Partly Cloudy, 75°F			Recovery (ft):	11
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-28.7

Photo:



Notes:

0 - 2.2' - Dark grey fine/ medium sand with trace silt and shells. SW-SM

2.2' - 6.2' - Tan fine/ medium sand with shells. SP

6.2' - 7.7' - Tan fine/ medium sand. SP

Comments: Samples collected at 0-2.2' (chemistry / GS) and 2.2-9.9' (GS only)

Core ID: NHH-A					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/7/2017
Client:	USACE	X:	955707.36	Time:	13:10
Subcontractor:	Ocean Surveys Inc.	Y:	641917.44	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	13
Weather:	Partly Cloudy, 75°F			Recovery (ft):	11
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-28.7

Photo:

Notes:

7.7' - 11.0' - Tan fine/ medium sand. SP

Comments:

Core ID: NHH-B

Project:	New Haven Harbor FNP	Coordinates (CT FT)		Date:	8/11/2017
Client:	USACE	X:	955995.61	Time:	11:43
Subcontractor:	Ocean Surveys Inc.	Y:	642051.34	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	9
Weather:	Sunny, 77°F			Recovery (ft):	8.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-39.8

Photo:

Notes:

0-0.3' - Black silty fine sand with shell hash. SM

0.3-3.2' - Dark grey silty fine sand with some shell hash. SM

3.2-6.4' - Dark grey silty fine to medium sand with shell hash. SM

Comments: Samples collected at 0-4.2' (chemistry / GS).

Core ID: NHH-B					
Project:	New Haven Harbor FNP	Coordinates (CT FT)		Date:	8/11/2017
Client:	USACE	X:	955995.61	Time:	11:43
Subcontractor:	Ocean Surveys Inc.	Y:	642051.34	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	9
Weather:	Sunny, 77°F			Recovery (ft):	8.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-39.8

Photo:

Notes:

6.0-6.4' - Dark grey silty fine to medium sand with shell hash. SM

6.4-7.9' - Dark grey sandy silt. SM

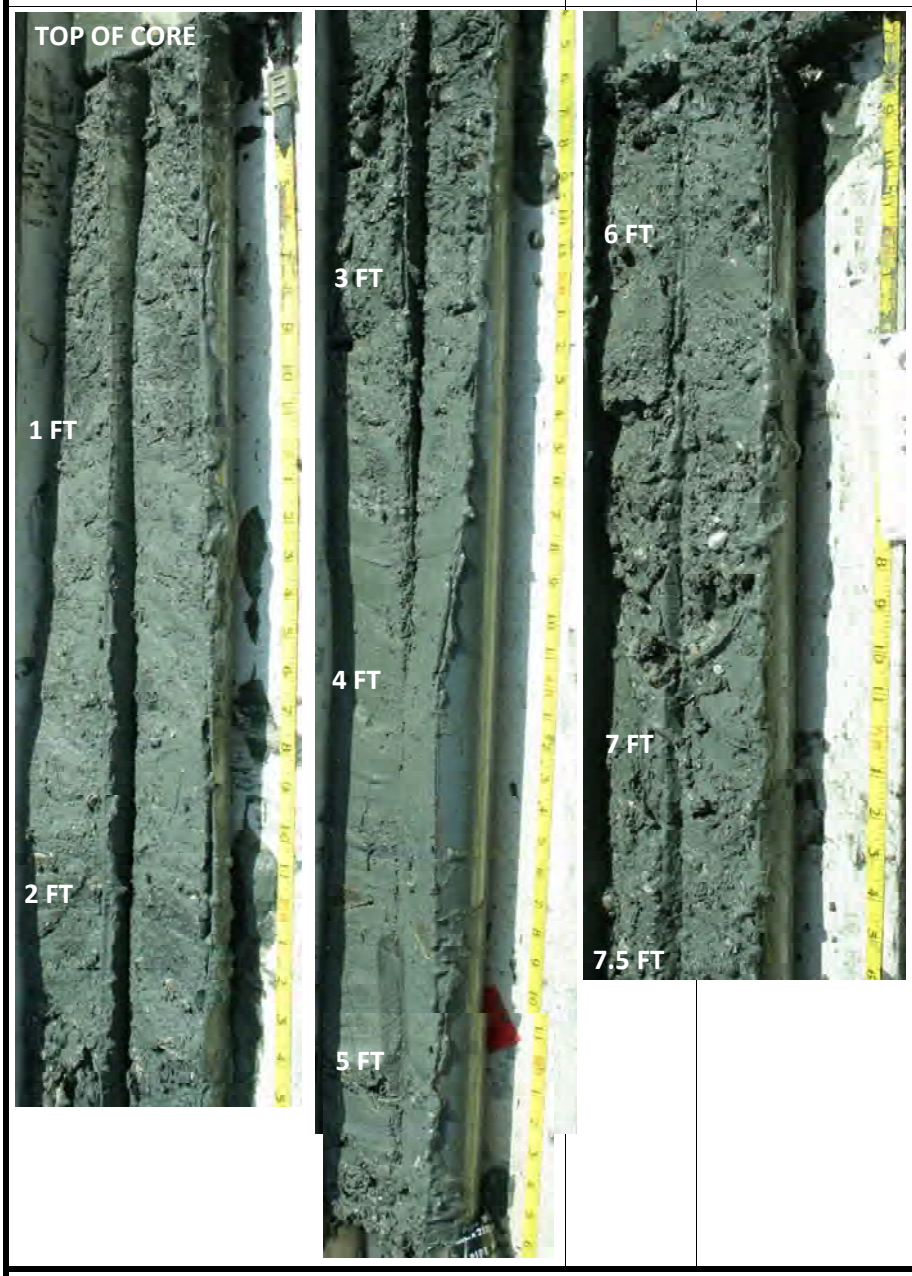
7.9-8.6' - Dark brown fine to medium sand with silt. SW-SM

8.6-8.8' - Dark brown medium to coarse sand with shells. SW

Comments:

Core ID: NHH-C					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	956248.06	Time:	10:13
Subcontractor:	Ocean Surveys Inc.	Y:	642180.93	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	15
Weather:	Sunny, 77°F			Recovery (ft):	15.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.3

Photo:



Notes:

0-0.8' - Dark grey silty sand with shell hash. SM

0.8-2.2' - Dark grey silty fine to medium sand. SM

2.2-2.8' - Dark grey silty fine to medium sand with many shells. SM

2.8-5.4' - Dark grey fine to medium sandy silt with bands of shells. ML

5.4-7.5' - Dark grey fine to medium sandy silt with shells. ML

Comments: Samples collected at 0-2.8' (chemistry / GS) and 2.8-8.0' (chemistry /GS)

Core ID: NHH-C					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	956248.06	Time:	10:13
Subcontractor:	Ocean Surveys Inc.	Y:	642180.93	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	15
Weather:	Sunny, 77°F			Recovery (ft):	15.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.3

Photo:

Notes:

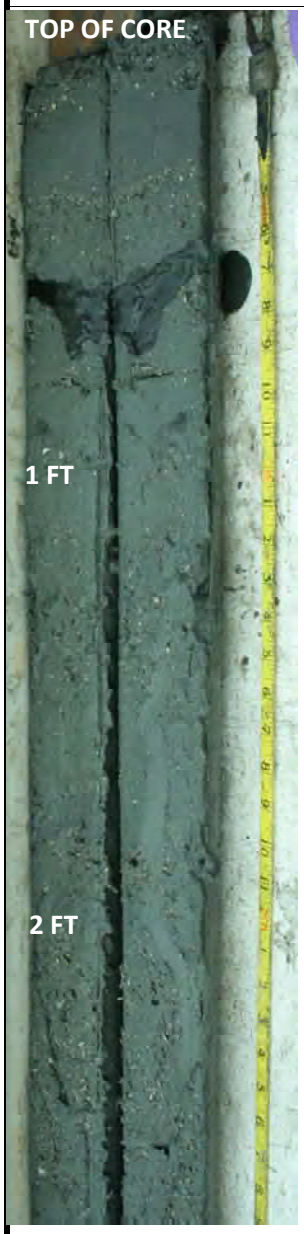
7.5-8.0' - Dark grey fine to medium sandy silt with shells. ML

8.0-10.4'- Dark grey silt with lots of shell hash and some sand. ML

Comments:

Core ID: NHH-D					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954353.17	Time:	14:51
Subcontractor:	Ocean Surveys Inc.	Y:	651157.56	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	19.5
Weather:	Sunny, 77°F			Recovery (ft):	19.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-18

Photo:



Notes:

0-4.8' - Dark grey silty clay with intermittent shell hash. CL

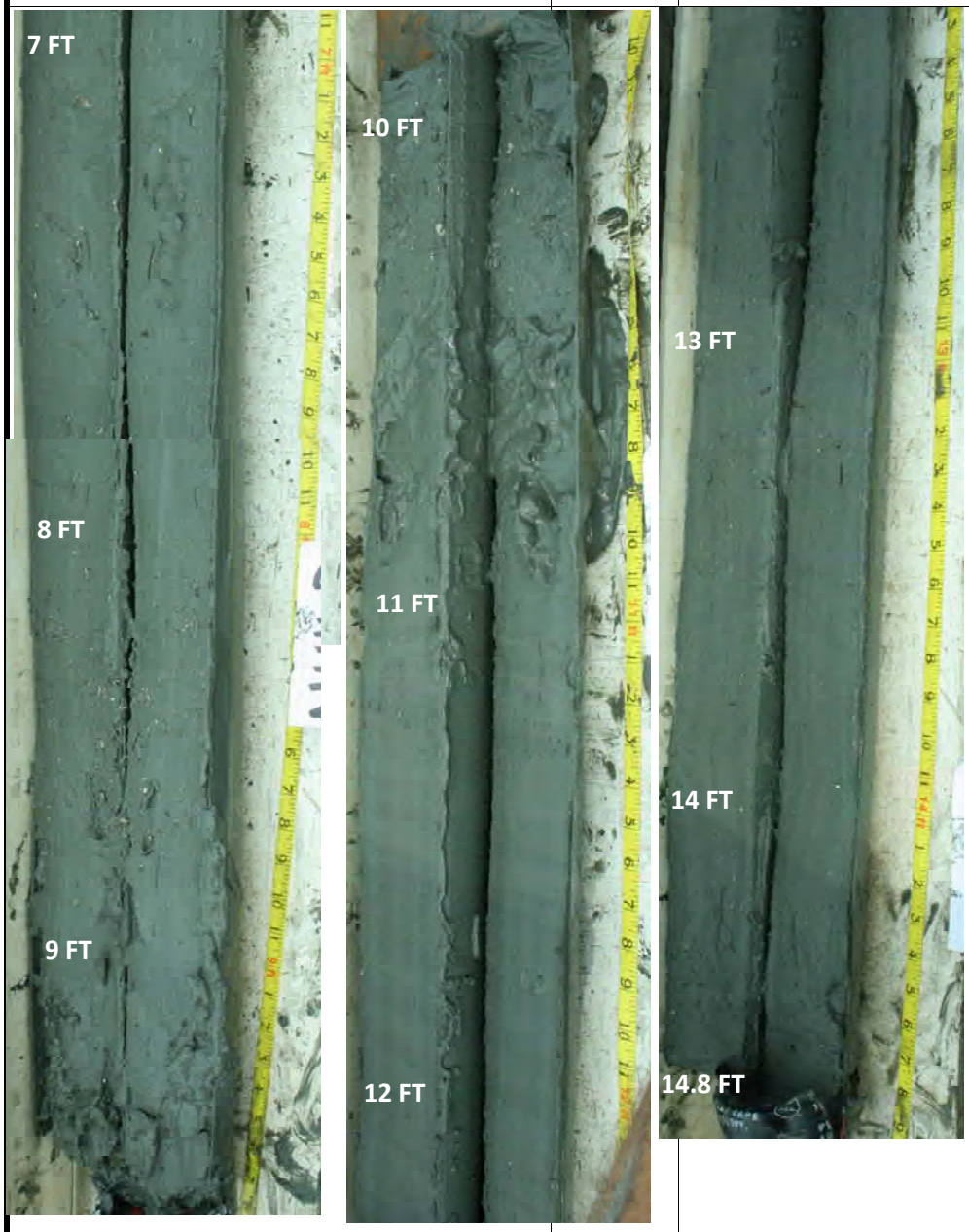
4.8-5.4' - Medium grey clay with shell hash. CL.

5.4-7.0 - Dark grey silt with some fine to medium sand. ML.

Comments: Samples collected at 0-4.8' (chemistry / GS) and 4.8-10.3' (chemistry/ GS)

Core ID: NHH-D					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954353.17	Time:	14:51
Subcontractor:	Ocean Surveys Inc.	Y:	651157.56	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	19.5
Weather:	Sunny, 77°F			Recovery (ft):	19.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-18

Photo:



Notes:

7.0-14.8' - Dark grey silt with some fine to medium sand. ML.

Comments:

Core ID: NHH-D

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954353.17	Time:	14:51
Subcontractor:	Ocean Surveys Inc.	Y:	651157.56	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	19.5
Weather:	Sunny, 77°F			Recovery (ft):	19.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-18

Photo:

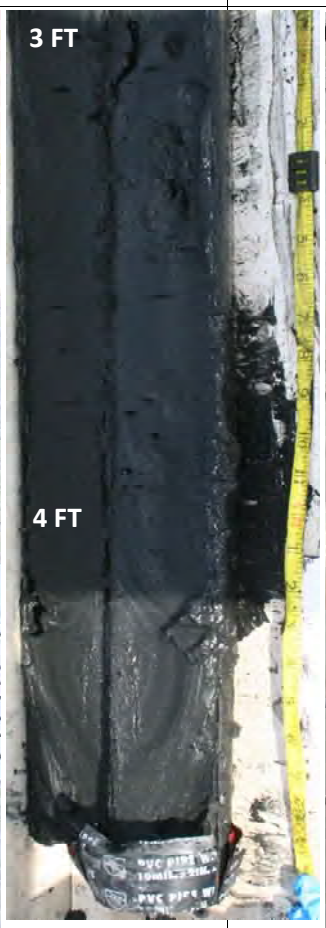
Notes:

14.8-19.5' - Dark grey silt with some fine to medium sand. ML

Comments:

Core ID: NHH-E					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/14/2017
Client:	USACE	X:	954719.81	Time:	8:14
Subcontractor:	Ocean Surveys Inc.	Y:	651097.16	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Cloudy, 79°F			Recovery (ft):	9.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.9

Photo:



Notes:

0-4.8' - Dark black fine silt. ML

4.8-5.8' - Dark grey silt. ML

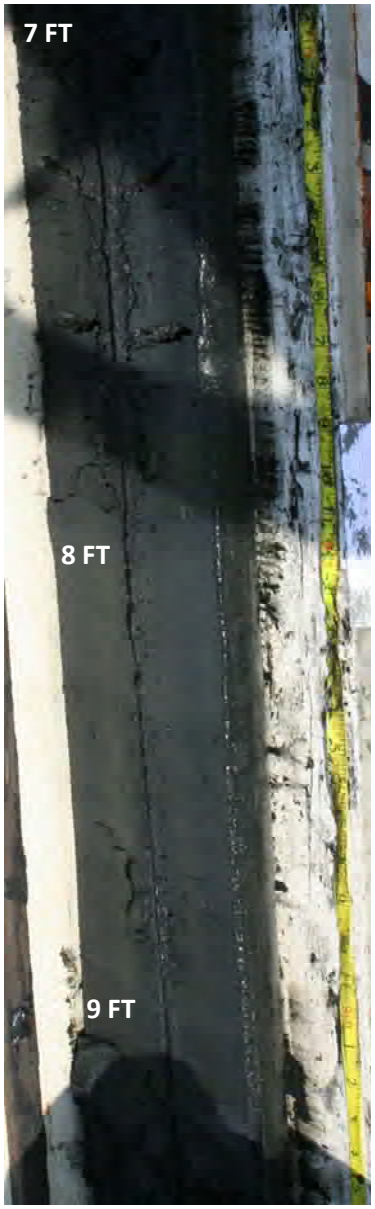
5.8-6.5' - Darker grey silt. ML

6.5-7.1' - Black fine silt. ML

Comments: Top horizon (0-0.8') photo did not save on camera. Samples collected at 0-6.5' (chemistry / GS) and 6.5-8.1' (chemistry/ GS)

Core ID: NHH-E					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/14/2017
Client:	USACE	X:	954719.81	Time:	8:14
Subcontractor:	Ocean Surveys Inc.	Y:	651097.16	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Cloudy, 79°F			Recovery (ft):	9.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.9

Photo:



Notes:

7.0-9.8' - Dark grey fine silt. ML

Comments: Top horizon (0-0.8') photo did not save on camera.

Core ID: NHH-F					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954918.3	Time:	16:25
Subcontractor:	Ocean Surveys Inc.	Y:	651077.63	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	17
Weather:	Sunny, 77°F			Recovery (ft):	16.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-17.7

Photo:

Notes:

0-6.6' - Dark black to dark grey fine silt with some sand (fine to coarse). Very soft to soft, wet to moist. ML

Comments: Samples collected at 0-3.2' (chemistry / GS [dup]) and 3.2-10.5' (chemistry/ GS)

Core ID: NHH-F

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954918.3	Time:	16:25
Subcontractor:	Ocean Surveys Inc.	Y:	651077.63	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	17
Weather:	Sunny, 77°F			Recovery (ft):	16.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-17.7

Photo:

Notes:

6.6-11.5' - Dark black to dark grey fine silt with some sand (fine to coarse). Very soft to soft, wet to moist. ML

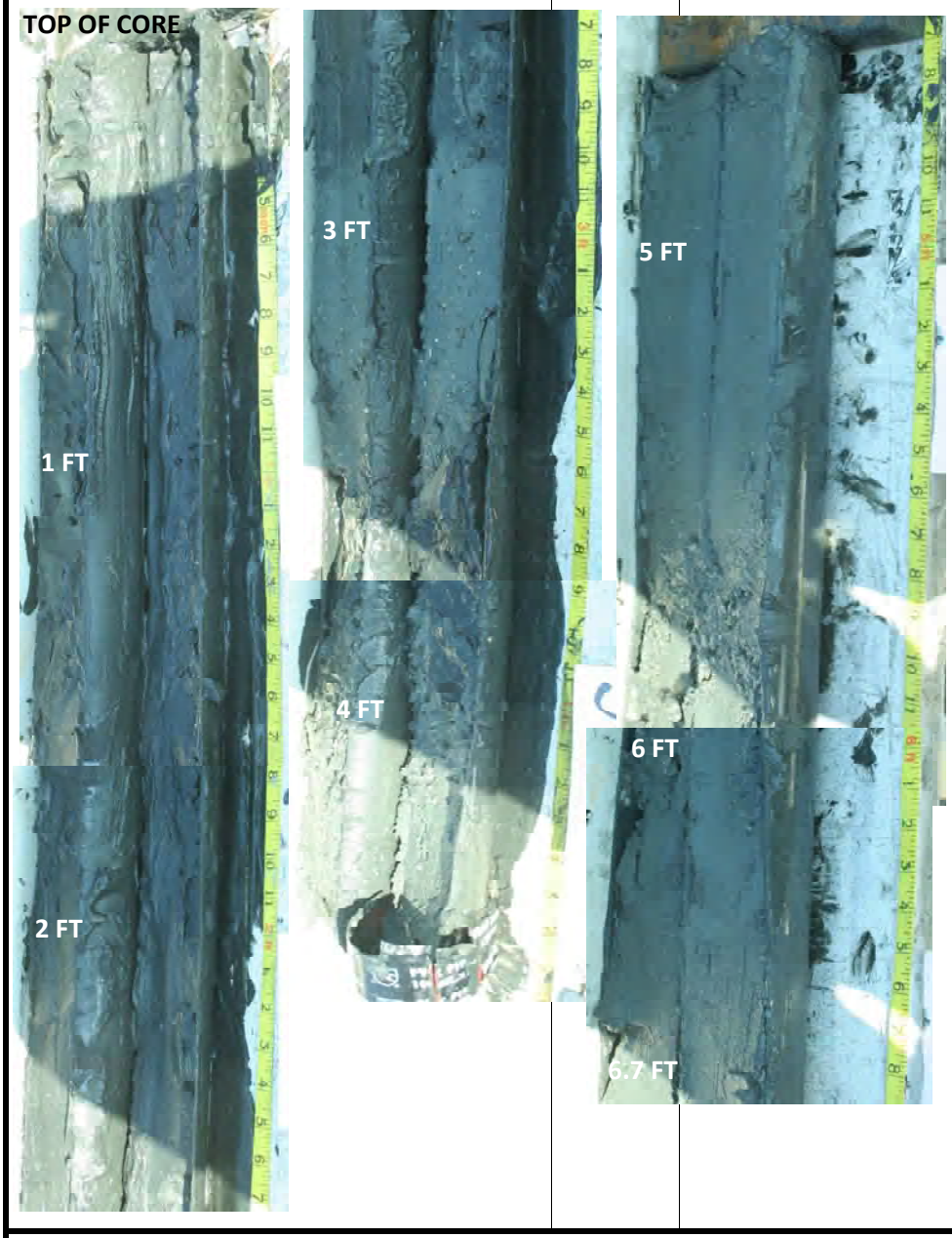
Lense of grey clay at 10.5'. CL

No plasticity to low plasticity with depth.

Comments:

Core ID: NHH-G					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954957.69	Time:	8:17
Subcontractor:	Ocean Surveys Inc.	Y:	656295.81	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	20
Weather:	Sunny, 77°F			Recovery (ft):	19.6
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-15.9

Photo:



Notes:

0-2.8' - Black to dark grey sandy silt. ML

2.8-3.7' - Dark grey sandy silt. ML

3.7-4.3' - Darker grey sandy silt with intermittent shell hash. ML

Not plastic.

4.3-5.7' - Dark grey silt with some sand. ML

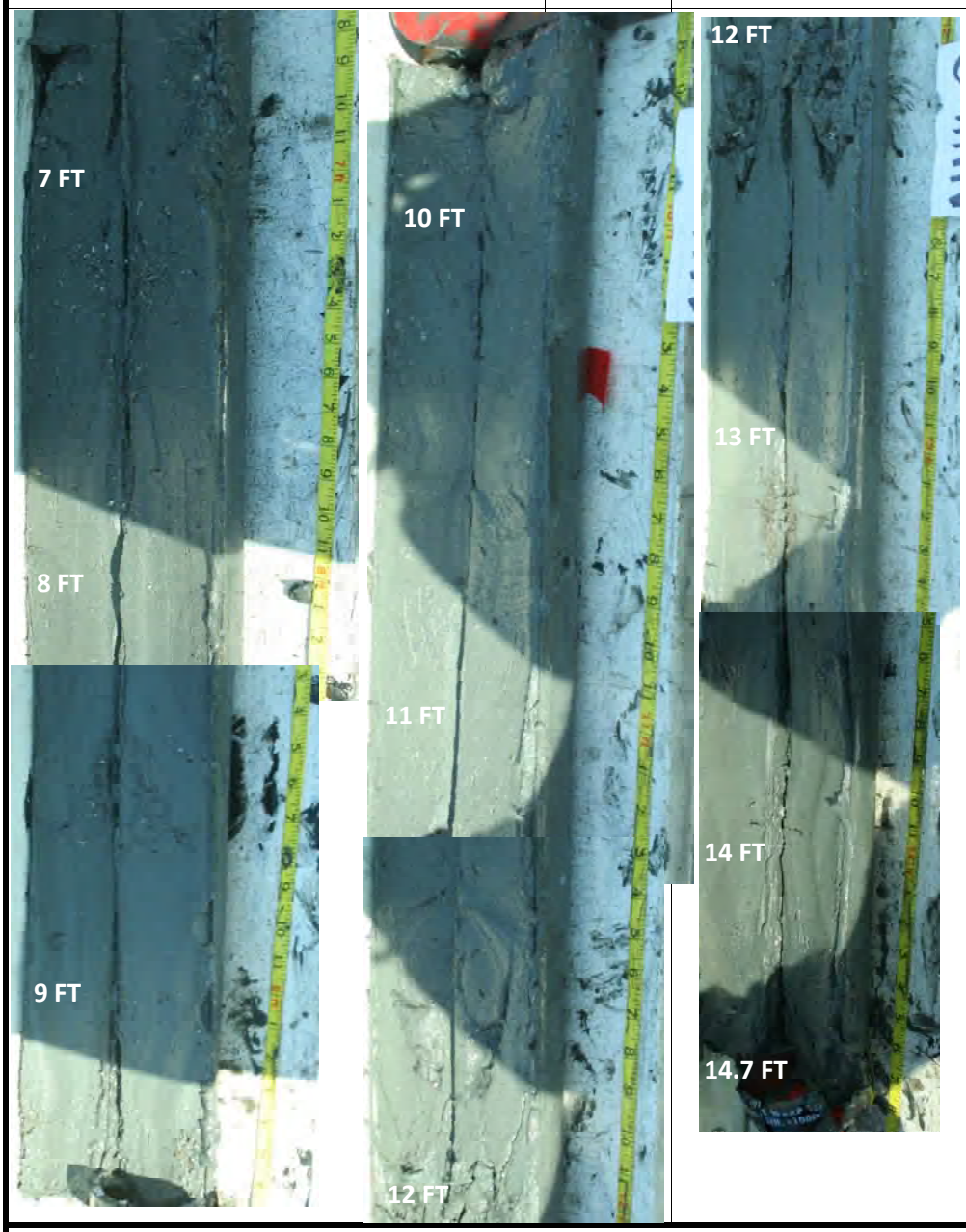
5.7-6.2' - Grey sandy silt with shell hash. ML

6.2-6.7' - Dark grey silt with some sand and trace clay. ML

Comments: Samples collected at 0-4.3' (chemistry / GS) and 4.3-13.7' (chemistry/ GS)

Core ID: NHH-G					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/11/2017
Client:	USACE	X:	954957.69	Time:	8:17
Subcontractor:	Ocean Surveys Inc.	Y:	656295.81	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	20
Weather:	Sunny, 77°F			Recovery (ft):	19.6
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-15.9

Photo:



Notes:

6.7-9.6' - Dark grey silt with some sand and trace clay and shell hash. ML

9.6-14.7' - Dark grey compact silt with occasional shell hash. ML

Not plastic to low plasticity.

Comments:

Core ID: NHH-H					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955073	Time:	15:35
Subcontractor:	Ocean Surveys Inc.	Y:	656256.7	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-36.2

Photo:

Notes:

0-1.6' - Black soft silt.. ML

1.6-1.7' - Lense of dark grey clay. CL

1.7-2.7' - Dark black silt with some sand. ML

2.7-4.1' - Dark black silt with some sand. ML

4.1-5.7' - Soft grey silt. ML

5.3-5.6' - Oyster shells

5.7-6.7'- Compact brown silt with some sand. ML

6.7-7.0' - Transition between brown silt and grey clay. ML/CL

Comments: Samples collected at 0-5.4' (chemistry / GS [dup]) and 5.4-7.7' (chemistry/ GS)

Core ID: NHH-H

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955073	Time:	15:35
Subcontractor:	Ocean Surveys Inc.	Y:	656256.7	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-36.2

Photo:

Notes:

7.0-7.8' - Dark grey clay streaked with light brown silt. ML/CL

7.8-8.2' - Brown silt with fine sand. ML

8.2-9.3 Reddish fine to medium sand. SW

Comments:

Core ID: NHH-I					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955525.41	Time:	17:33
Subcontractor:	Ocean Surveys Inc.	Y:	656249.42	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	18
Weather:	Sunny, 79°F			Recovery (ft):	17.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-21.3

Photo:

Notes:

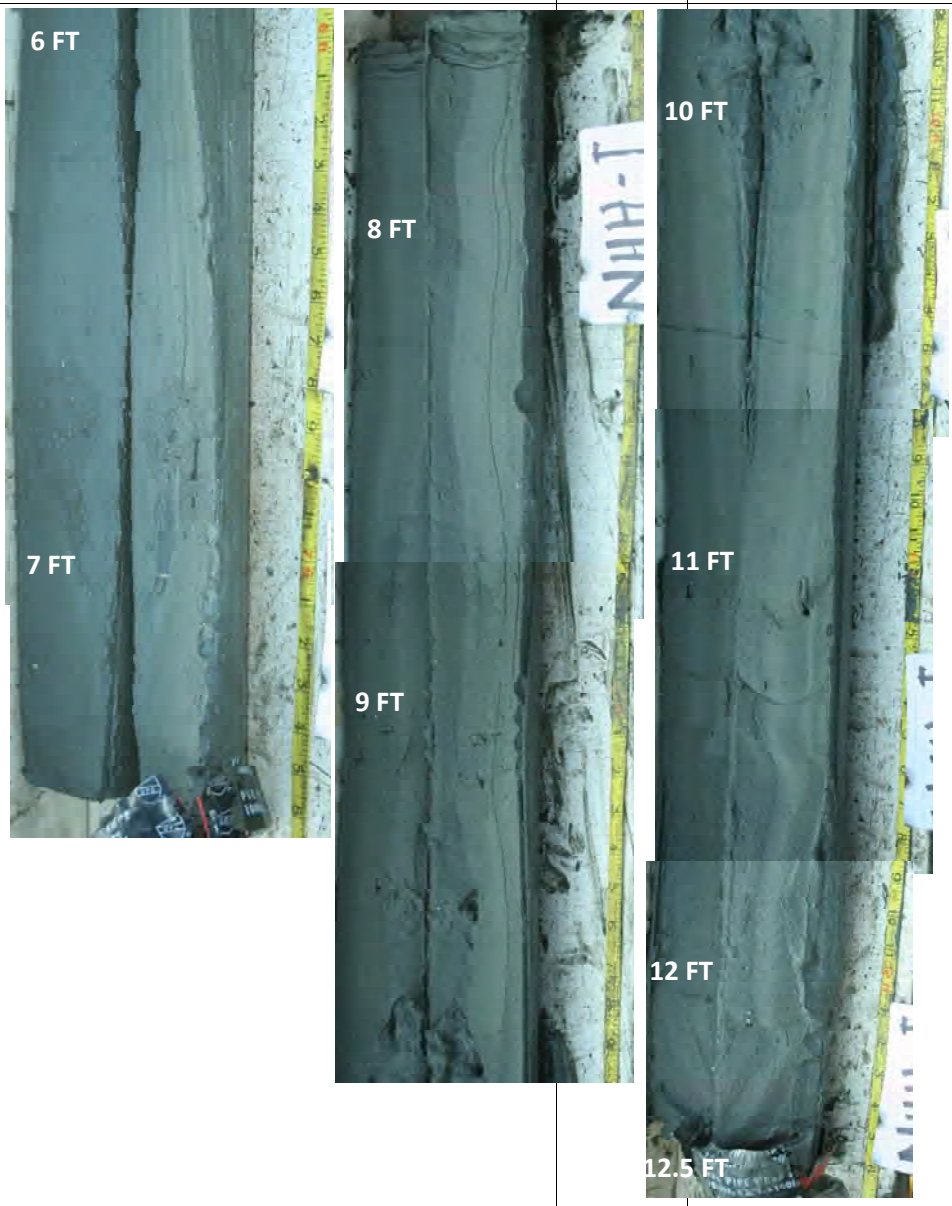
0-0.7' - Grey soft silt with some sand. ML

0.7-6.0' - Dark grey silty clay. CL

Comments: Samples collected at 0-0.7' (chemistry / GS) and 0.7-2.5' (chemistry/ GS)

Core ID: NHH-I					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955525.41	Time:	17:33
Subcontractor:	Ocean Surveys Inc.	Y:	656249.42	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	18
Weather:	Sunny, 79°F			Recovery (ft):	17.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-21.3

Photo:



Notes:

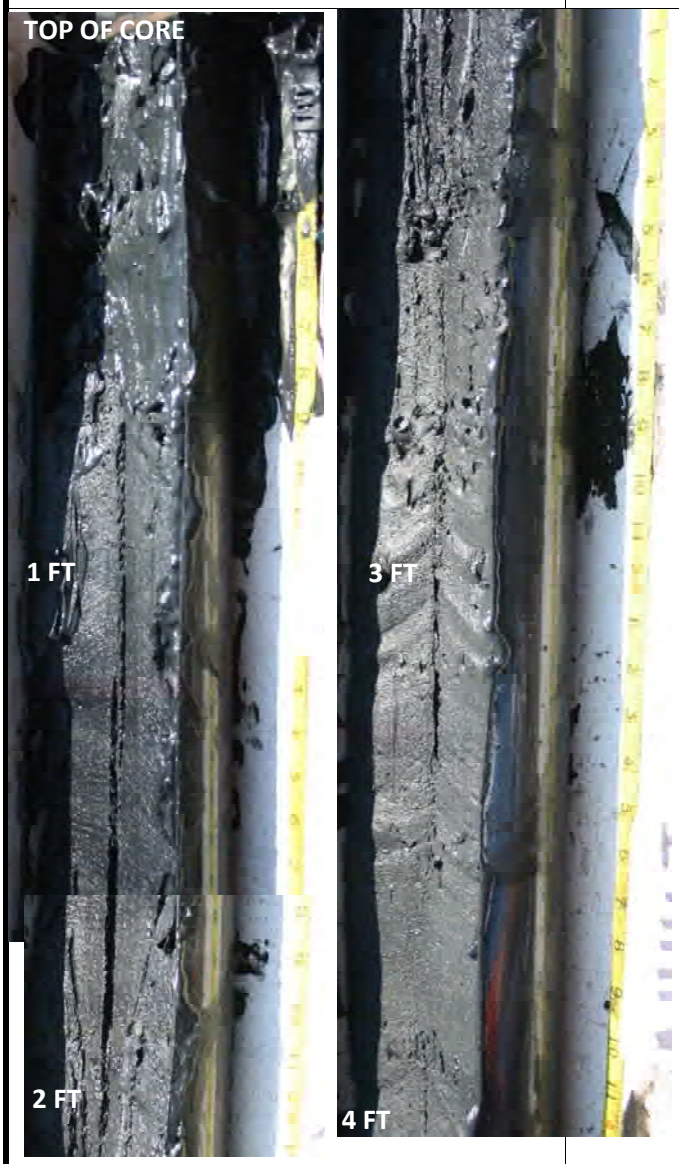
6.0-12.5' - Dark grey silty clay. CL

Comments:

Core ID: NHH-J

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955130.54	Time:	11:09
Subcontractor:	Ocean Surveys Inc.	Y:	662186.32	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	21.3

Photo:



Notes:

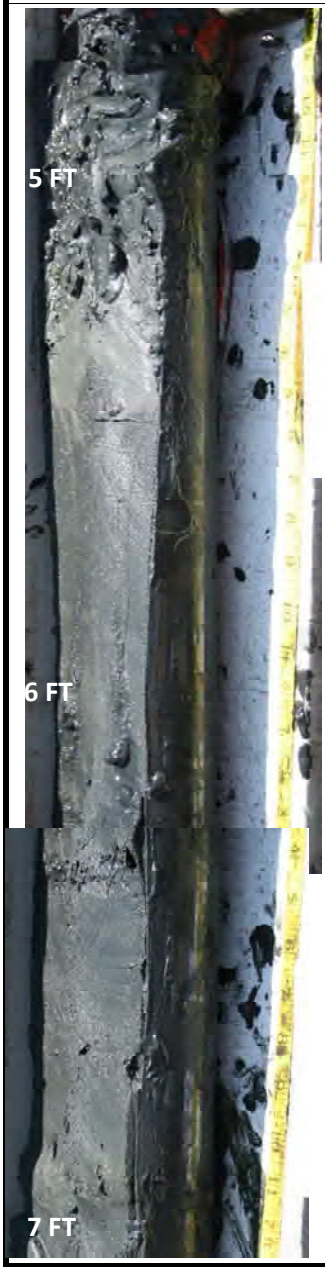
0-4.7' - Dark grey to black soft silt with some sand. Very soft, wet. ML

Not plastic.

Comments: Samples collected at 0-5.4' (chemistry / GS)

Core ID: NHH-J					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955130.54	Time:	11:09
Subcontractor:	Ocean Surveys Inc.	Y:	662186.32	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	21.3

Photo:



Notes:

4.7-9.7' - Dark grey to black soft silt with some sand. ML

Low plasticity.

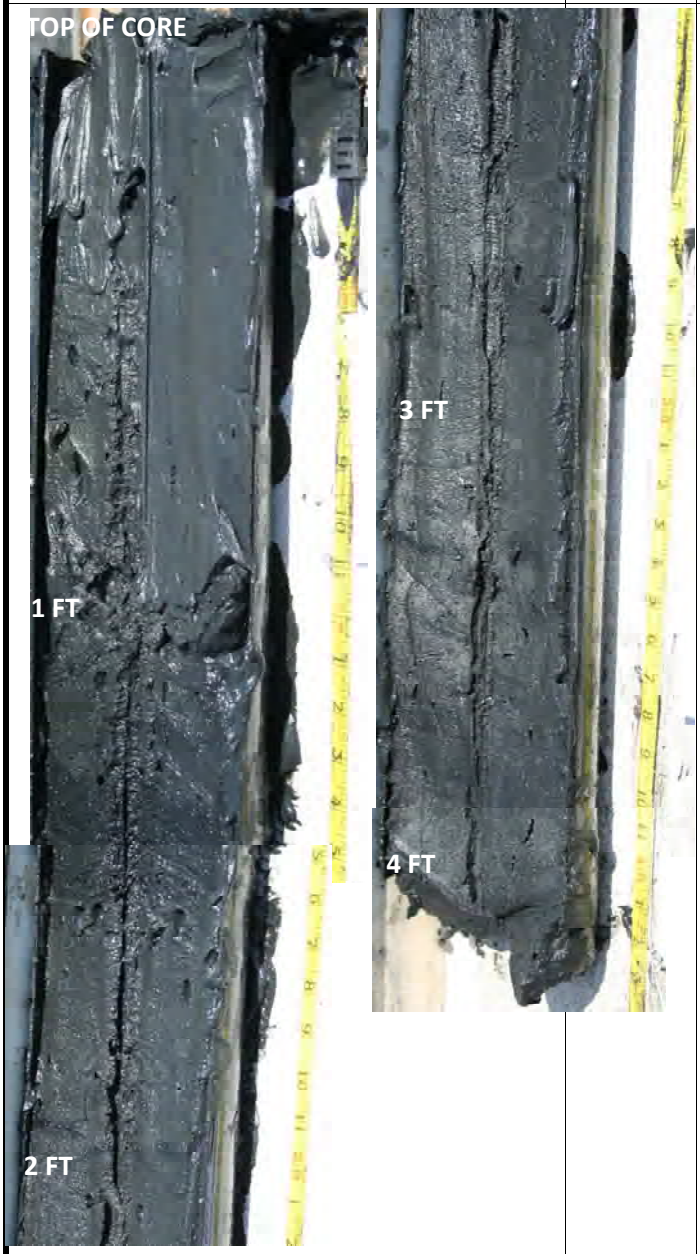
7.4' - Chunk of wood

Comments:

Core ID: NHH-K

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955275.32	Time:	13:58
Subcontractor:	Ocean Surveys Inc.	Y:	662195.02	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.1
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.8

Photo:



Notes:

0-4.8' - Black soft silt. ML

4.8-5.8' - Grey clay intertwined with reddish brown silt. CL/ML

Comments: Samples collected at 0-5.5' (chemistry / GS) and 5.5-8.2' (GS only)

Core ID: NHH-K					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955275.32	Time:	13:58
Subcontractor:	Ocean Surveys Inc.	Y:	662195.02	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.1
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.8

Photo:

Notes:

5.8-6.1' - Reddish brown fine to medium sand. SW

6.1-7.3' - Reddish brown medium to coarse sand. SW

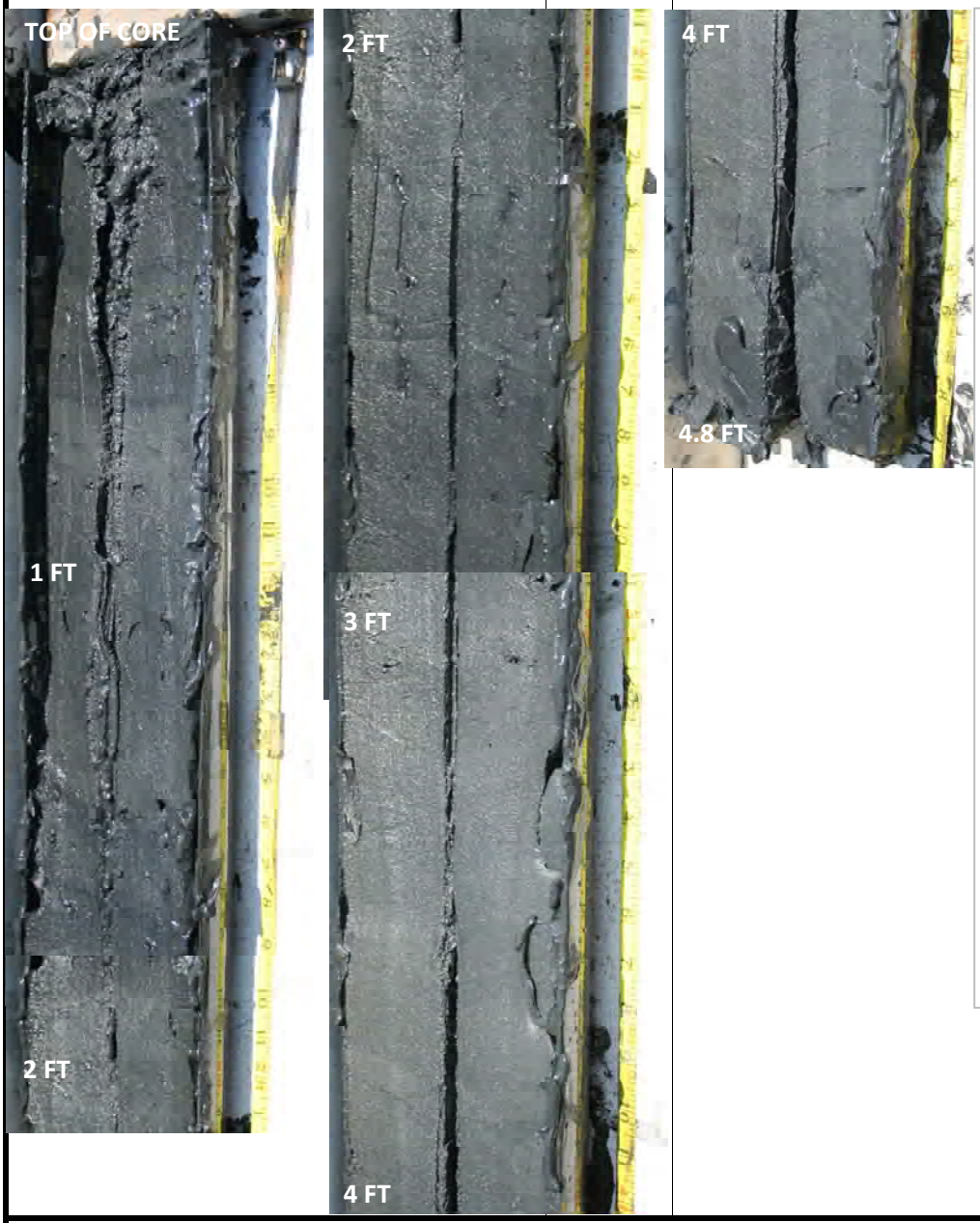
7.3-8.3' - Reddish brown fine to medium sand. SW

8.3-9.1' - Reddish brown fine sand. SP

Comments:

Core ID: NHH-L					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955734.84	Time:	12:50
Subcontractor:	Ocean Surveys Inc.	Y:	662225.81	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-21.7

Photo:



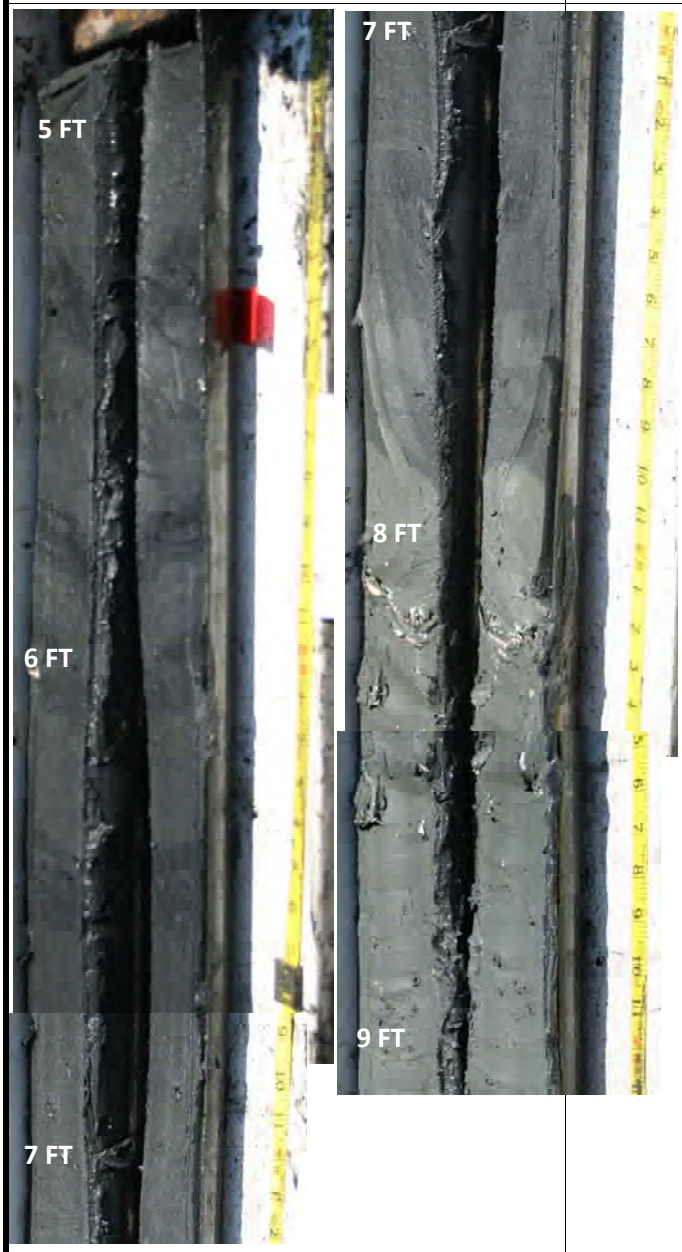
Notes:

0-4.8' - Black soft silt with some fine to medium sand. ML

Comments: Samples collected at 0-6.7' (chemistry / GS)

Core ID: NHH-L					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	955734.84	Time:	12:50
Subcontractor:	Ocean Surveys Inc.	Y:	662225.81	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-21.7

Photo:



Notes:

4.8-7.8' - Black soft silt with some fine to medium sand. ML

7.8-9.8' - Dark grey clay. CL

Comments:

Core ID: NHH-M					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955479.97	Time:	15:56
Subcontractor:	Ocean Surveys Inc.	Y:	665130.38	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-30.4

Photo:

Notes:

0.0-4.8' - Dark black silt. Very soft, wet, not plastic. ML

Not plastic.

Comments: Samples collected at 0-6.8' (chemistry / GS)

Core ID: NHH-M					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955479.97	Time:	15:56
Subcontractor:	Ocean Surveys Inc.	Y:	665130.38	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-30.4

Photo:

Notes:

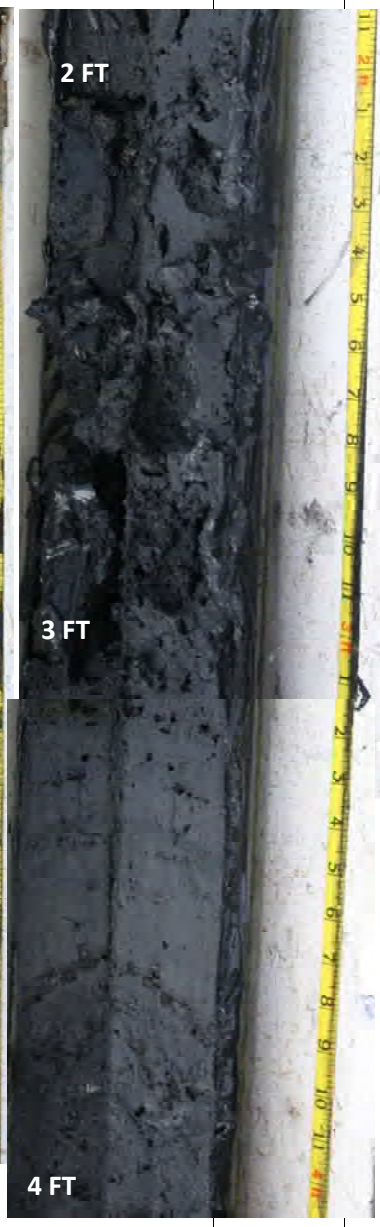
4.8-8.8' - Dark black silt. Very soft/ wet. Not plastic. ML

8.8-9.7' - Reddish fine to medium sand. SW Low plasticity

Comments:

Core ID: NHH-N					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955867.55	Time:	12:55
Subcontractor:	Ocean Surveys Inc.	Y:	665076.75	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-36.5

Photo:



Notes:

0.0-4.3' - Dark black silt. ML

Comments: Samples collected at 0-6.0' (chemistry / GS) and 6.0-7.5' (GS only)

Core ID: NHH-N					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955867.55	Time:	12:55
Subcontractor:	Ocean Surveys Inc.	Y:	665076.75	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-36.5

Photo:

Notes:

4.3-5.5' - Dark black silt. ML

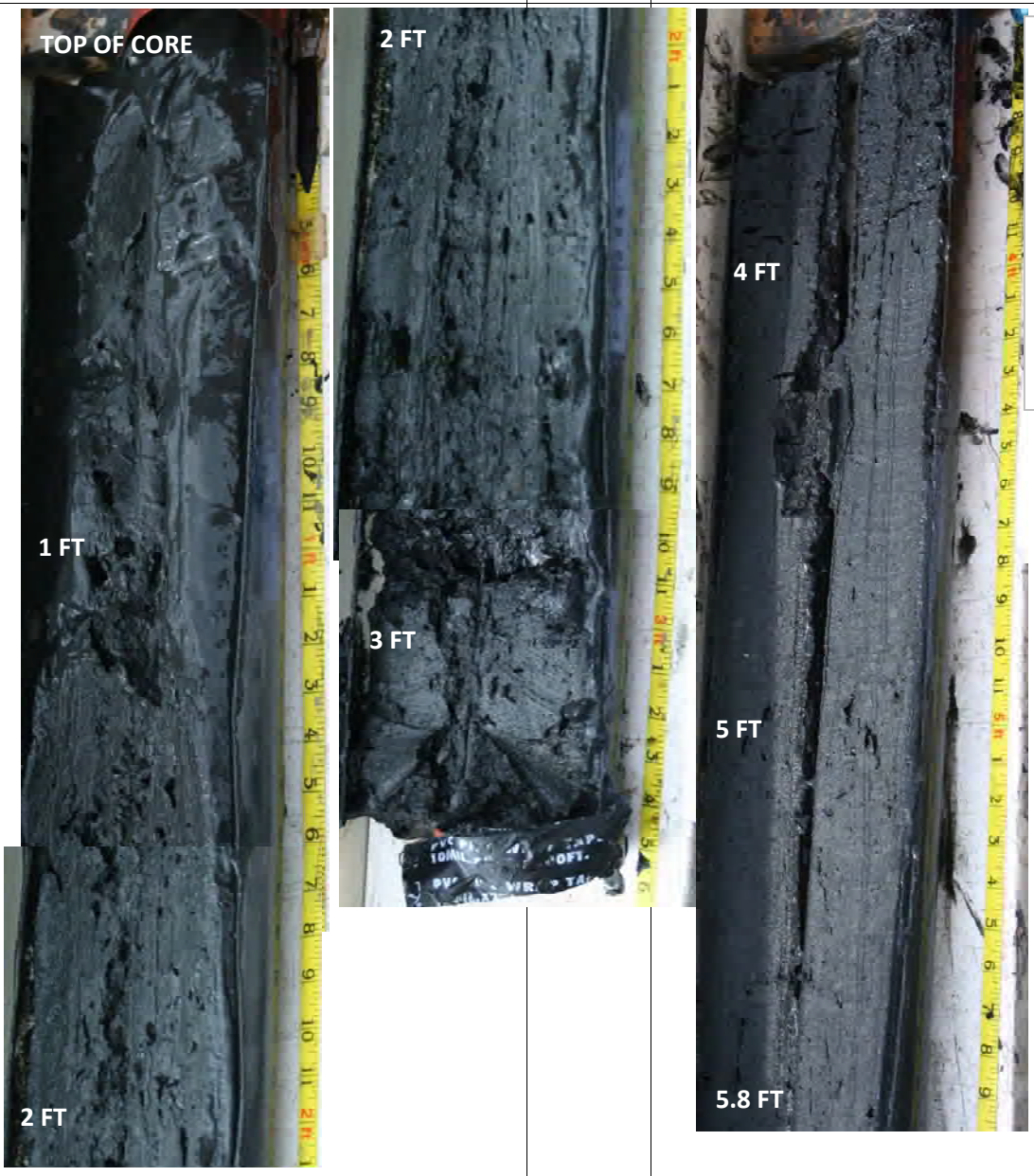
5.5-6.0' - Black soft silt with shell hash. Medium to coarse sand at transition zone, with slight petroleum-like odor. ML

6.0-9.3' - Tan/ reddish fine/ medium sand. Sand color transitions from darker to lighter deeper in the core. SW

Comments:

Core ID: NHH-O					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	956251.13	Time:	14:30
Subcontractor:	Ocean Surveys Inc.	Y:	665020.32	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	13
Weather:	Partly Sunny, 72°F			Recovery (ft):	13.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-33.1

Photo:



Notes:

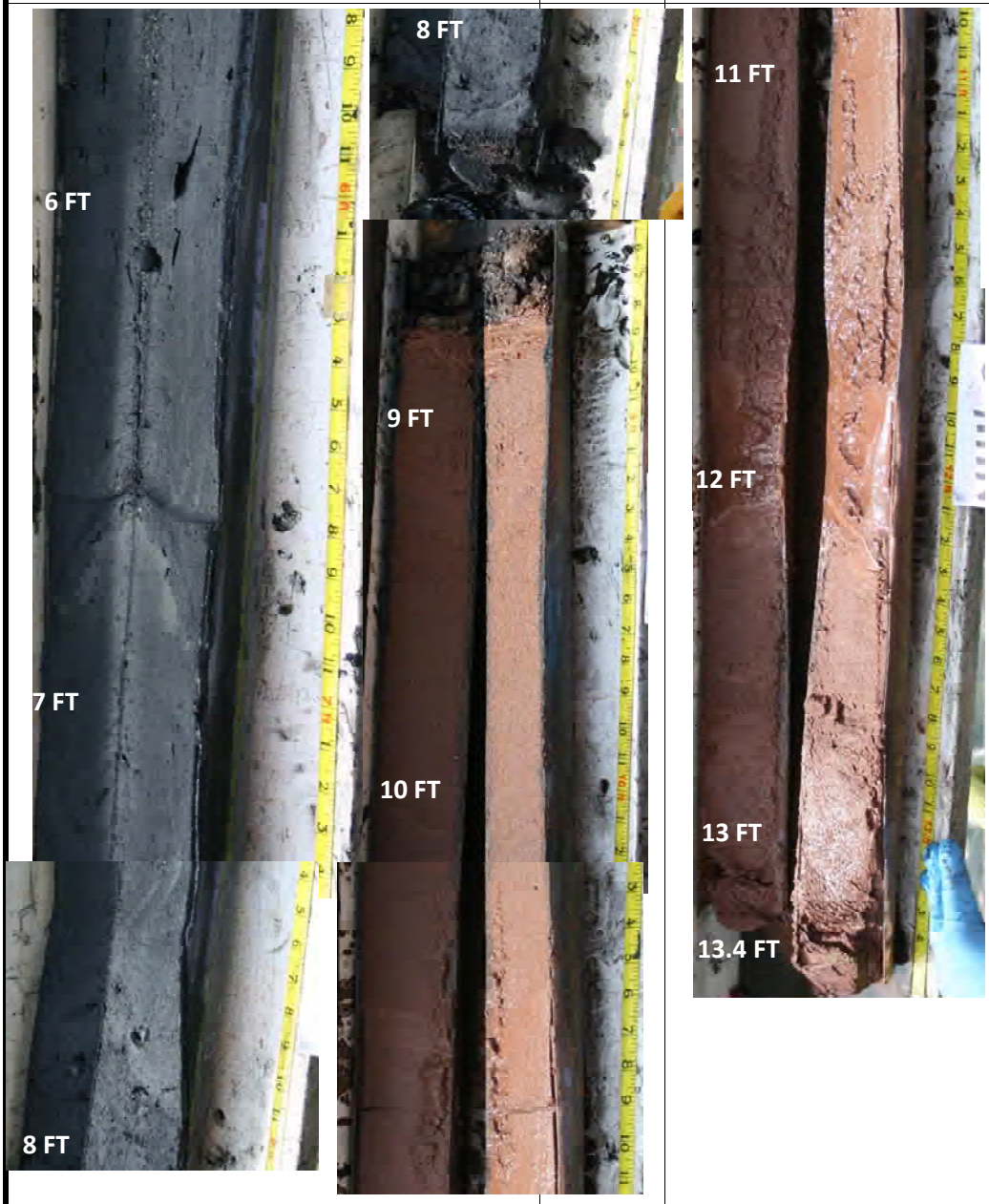
0.0-5.8' - Dark black silt. ML

Comments: Samples collected at 0-8.3' (chemistry / GS) and 8.7-10.9' (GS only)

Core ID: NHH-O

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	956251.13	Time:	14:30
Subcontractor:	Ocean Surveys Inc.	Y:	665020.32	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	13
Weather:	Partly Sunny, 72°F			Recovery (ft):	13.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-33.1

Photo:



Notes:

5.8-8.3' - Dark black silt. ML

8.3-8.7' - Dark (black) coarse sand and gravel. SP

8.7-13.0' - Reddish brown fine sand. SP

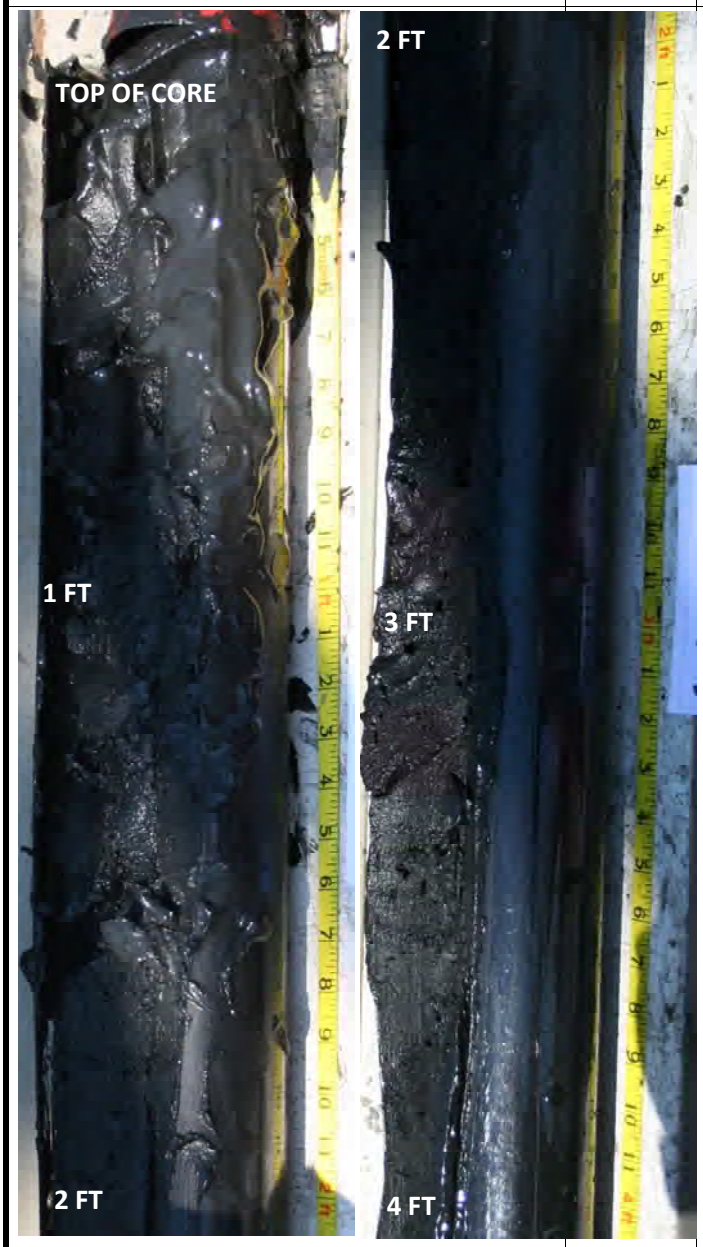
13.0-13.3' - Transition zone reddish brown fine sand/ reddish brown clay. SP/CL

13.3 - 13.4' - Reddish brown clay. CL

Comments:

Core ID: NHH-P					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955176.17	Time:	12:00
Subcontractor:	Ocean Surveys Inc.	Y:	667304.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-16

Photo:



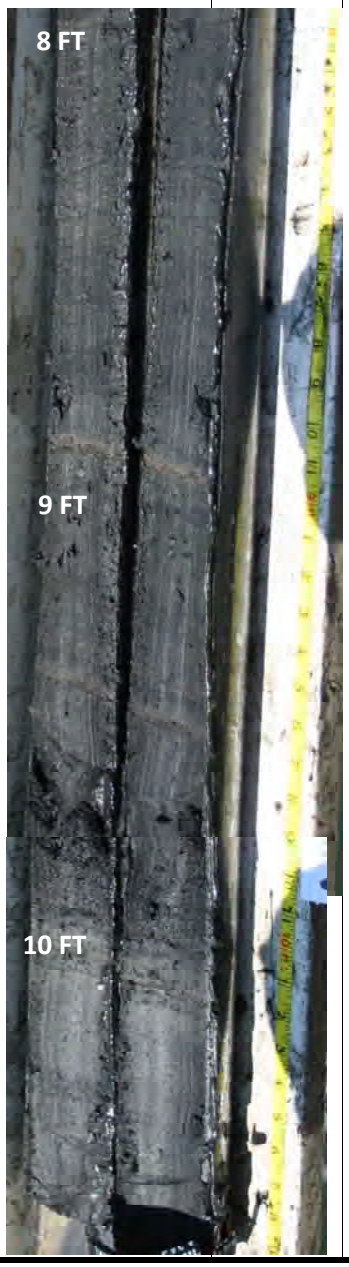
Notes:

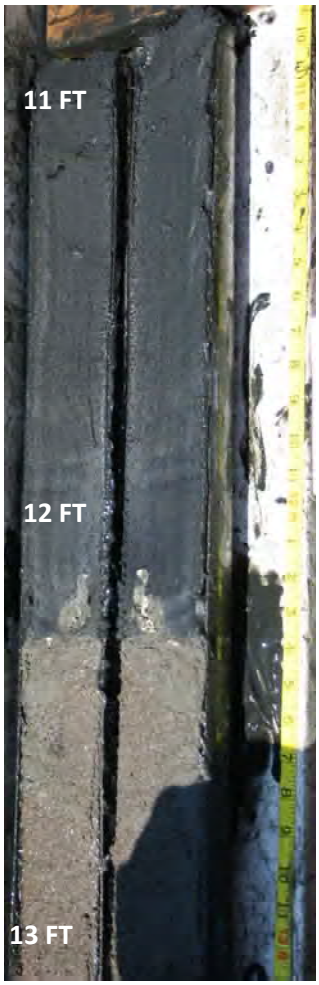
0.0-5.8' - Black silt, very soft to soft. Wet, not plastic. ML

Comments: Samples collected at 0-5.8' (chemistry / GS) and 5.8-12.3' (chemistry/ GS)

Core ID: NHH-P					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955176.17	Time:	12:00
Subcontractor:	Ocean Surveys Inc.	Y:	667304.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-16

Photo:





Notes:

5.8-8.9' - Black silt, very soft to soft. Wet, not plastic. ML

8.9-9.0' - Band of brown/ tan fine/ medium sand. SW

9.0-9.5' - Black silt. ML

9.5-9.6' - Band of brown/ tan fine/ medium sand. SW

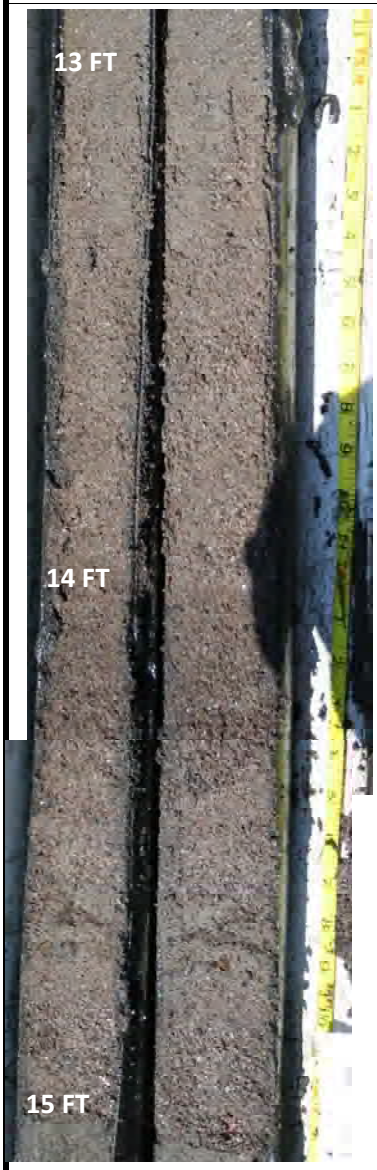
9.6-12.3' - Black silt w/ shell hash at transition. ML

12.3-13.2' - Tan/ brown fine/ medium sand with some grey silt. SM/SW

Comments:

Core ID: NHH-P					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955176.17	Time:	12:00
Subcontractor:	Ocean Surveys Inc.	Y:	667304.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-16

Photo:



Notes:

13.2-15.2' - Brown medium sand. SP

15.2-15.8' - Brownish to grey silty fine sand. SM

15.8-18.3' - Brown silty fine sand with dark grey band at transition. Dense, moist. SM

18.3-19.5' - Reddish brown silt, trace very fine sand and clay. Medium stiffness, moist, low plasticity. ML

Comments:

Core ID: NHH-P					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955176.17	Time:	12:00
Subcontractor:	Ocean Surveys Inc.	Y:	667304.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-16

Photo:

Notes:

19.5-21.9' - Reddish clayey silt ML/CL

21.9-22.1' - Tan to brown fine sand. SP

22.1-22.3 - Tannish brown clayey silt. ML/CL

22.3-22.7' - Tannish brown fine to medium sand. SW

22.7-23.8' - Tannish brown medium to coarse sand. SW

23.8-23.9' - Dark grey band in medium to coarse sand. SW

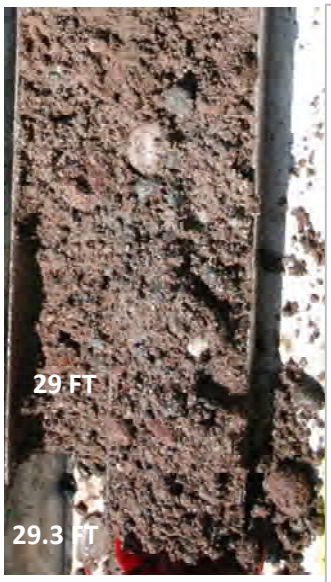
23.9-24.3' - Tannish brown medium to coarse sand. SW

Comments:

Core ID: NHH-P

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955176.17	Time:	12:00
Subcontractor:	Ocean Surveys Inc.	Y:	667304.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.3
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-16

Photo:



Notes:

24.3-25.4' - Tannish brown medium to coarse sand. SW

25.4-26.1' - Tannish brown silty fine sand. SM

26.1-27.1' - Brownish coarse sand with some silt and gravel. SM

27.1-27.8' - Brownish medium to coarse sand. SW

27.8-28.3' - Brownish red fine sand with clay. CL

28.3-29.3'- Brownish coarse sand with silt and gravel. SM

Comments:

Core ID: NHH-Q					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955500.09	Time:	14:04
Subcontractor:	Ocean Surveys Inc.	Y:	667254.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-12.2

Photo:

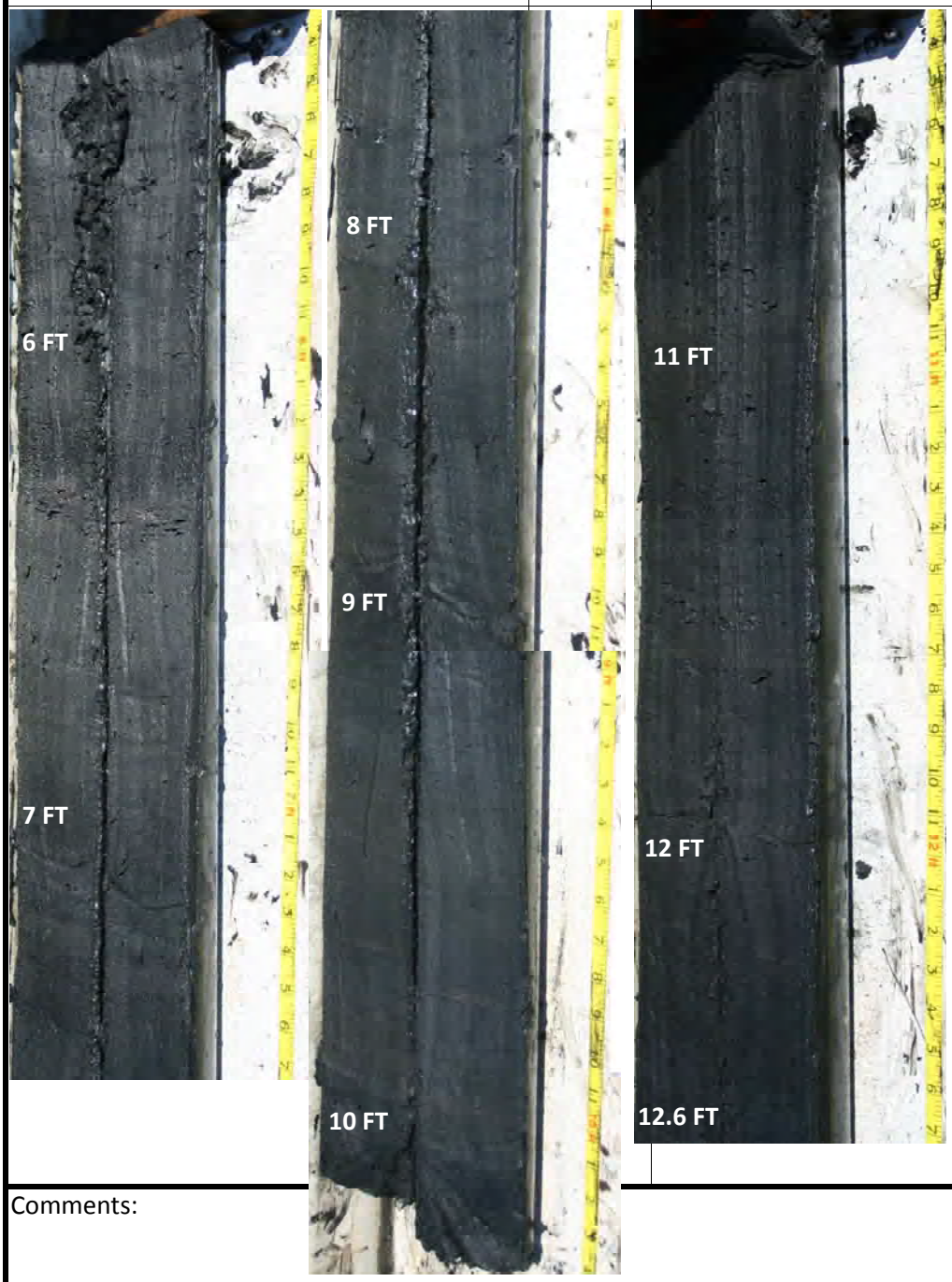
Notes:

0.0-5.2' - Black fine silt. Moist to 2.0'. ML

Comments: Samples collected at 0-5.3' (chemistry / GS) and 5.3-29.4' (chemistry/ GS)

Core ID: NHH-Q					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955500.09	Time:	14:04
Subcontractor:	Ocean Surveys Inc.	Y:	667254.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-12.2

Photo:



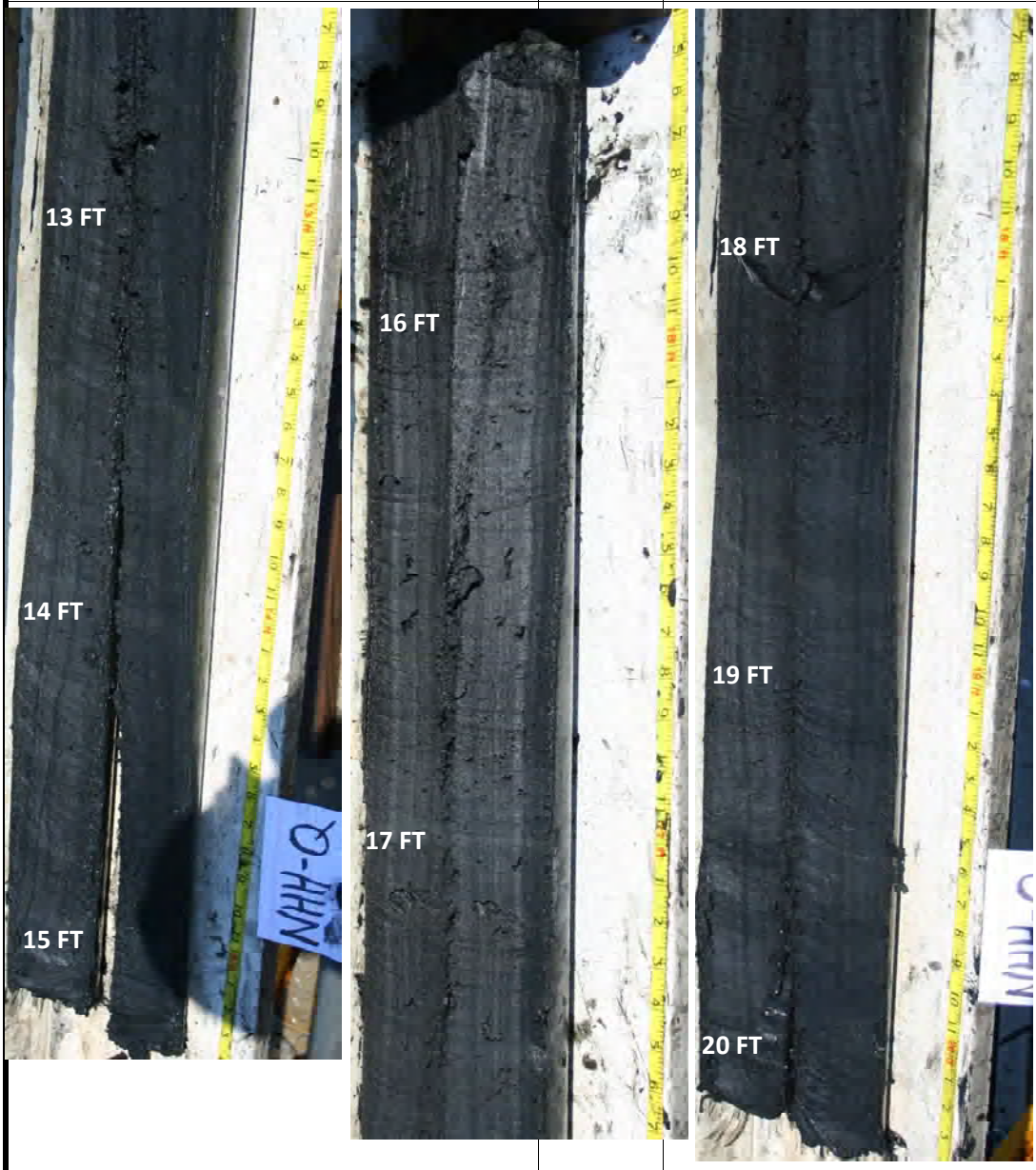
Notes:

5.2-12.5' - Black silt. ML

Comments:

Core ID: NHH-Q					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955500.09	Time:	14:04
Subcontractor:	Ocean Surveys Inc.	Y:	667254.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-12.2

Photo:



Notes:

12.5-20.3' - Black silt. ML

Comments:

Core ID: NHH-Q					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955500.09	Time:	14:04
Subcontractor:	Ocean Surveys Inc.	Y:	667254.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-12.2

Photo:

Notes:

20.3-26.2' - Black silt. ML

26.2-Grey fine to medium sand. SW

26.2-26.8'- Black fine silt. SP

Comments:

Core ID: NHH-Q

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955500.09	Time:	14:04
Subcontractor:	Ocean Surveys Inc.	Y:	667254.47	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-12.2

Photo:

Notes:

26.8' - Sand seam Grey fine to medium sand. SW

26.8-27.6' - Black silt. ML

27.6' - Sand seam Grey fine to medium sand. SW

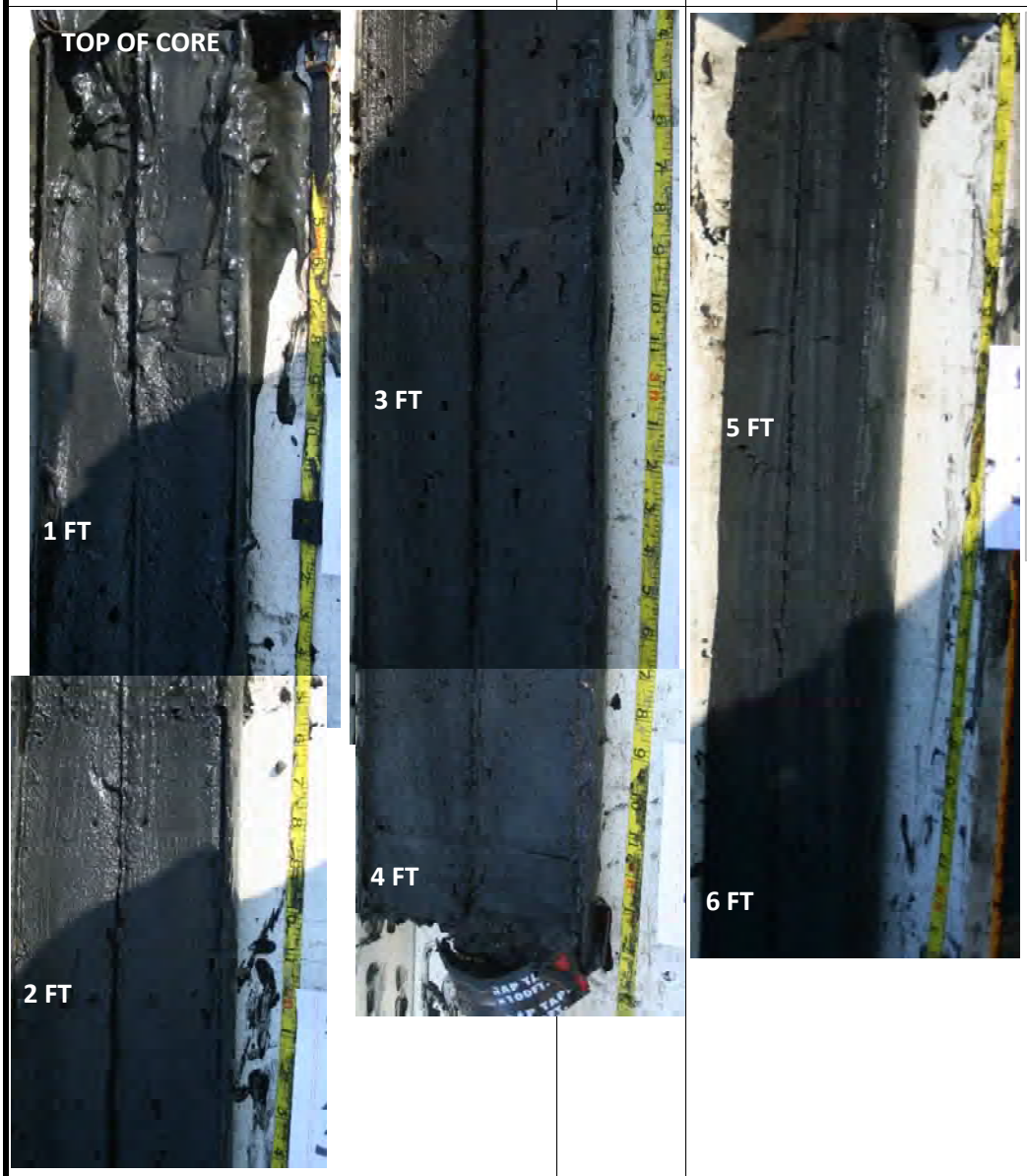
27.6-29.3' - Black silt. ML

29.3-29.4' - Brownish black silt. ML

Comments:

Core ID: NHH-R					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	956066.76	Time:	8:10
Subcontractor:	Ocean Surveys Inc.	Y:	667161.69	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	9.5
Weather:	Sunny, 79°F			Recovery (ft):	9.2
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-36.3

Photo:



Notes:

0.0-6.0' - Black soft silt with some clay. ML/CL

Comments: Samples collected at 0-4.2' (chemistry / GS) and 4.2-7.7' (chemistry/ GS)

Core ID: NHH-R					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	956066.76	Time:	8:10
Subcontractor:	Ocean Surveys Inc.	Y:	667161.69	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	9.5
Weather:	Sunny, 79°F			Recovery (ft):	9.2
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-36.3

Photo:

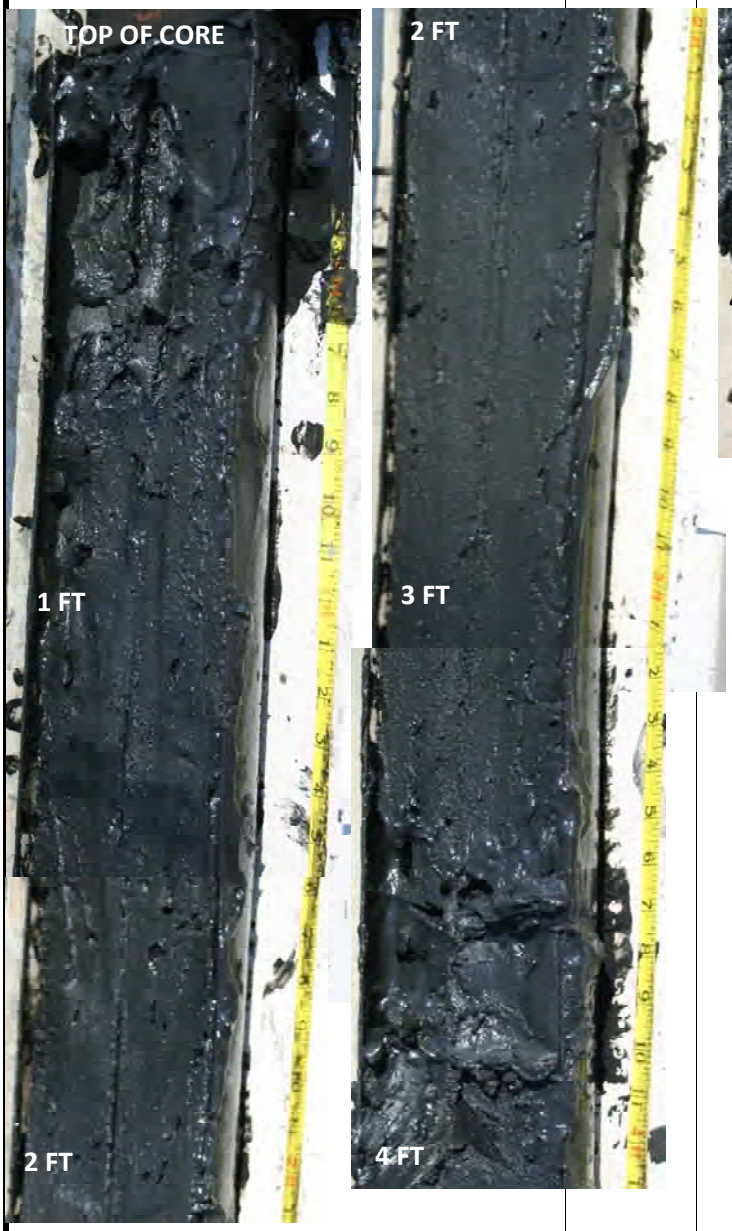
Notes:

6.0-9.2' - Black soft silt with some clay. ML/CL

Comments:

Core ID: NHH-S					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	956558.51	Time:	9:39
Subcontractor:	Ocean Surveys Inc.	Y:	667100.36	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-37.6

Photo:



Notes:

0.0-4.5' - Black soft silt with some fine to coarse sand. Very soft, wet. ML

Not plastic.

Comments: Samples collected at 0-6.0' (chemistry / GS) and 6.0-6.4' (chemistry/ GS)

Core ID: NHH-S					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/10/2017
Client:	USACE	X:	956558.51	Time:	9:39
Subcontractor:	Ocean Surveys Inc.	Y:	667100.36	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 79°F			Recovery (ft):	9.5
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-37.6

Photo:

Notes:

4.5-6.0' - Black soft silt with some fine to coarse sand. Soft, wet. ML

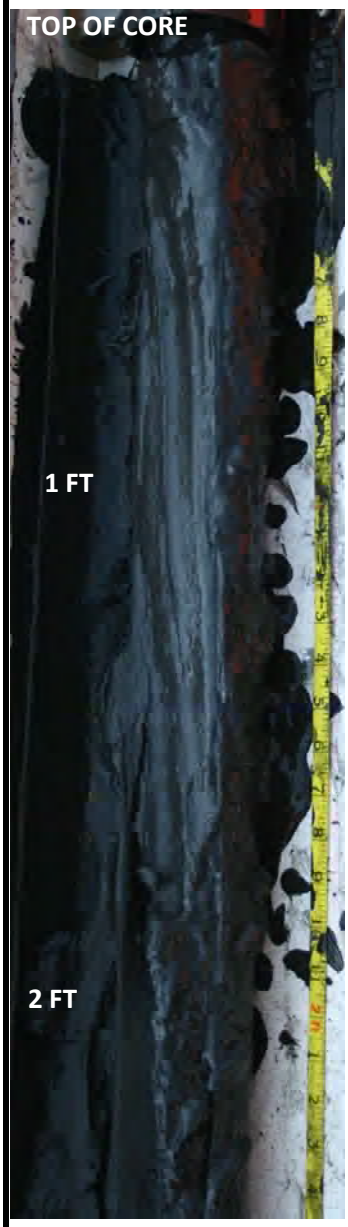
Not plastic

6.0-9.5' - Reddish fine sand. Very hard, moist. SP

Comments:

Core ID: NHH-T					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955476.02	Time:	17:19
Subcontractor:	Ocean Surveys Inc.	Y:	667998.66	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	20
Weather:	Partly Sunny, 72°F			Recovery (ft):	19.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-8.7

Photo:



Notes:

0.0-4.8' - Black silt.
Very soft, wet. ML

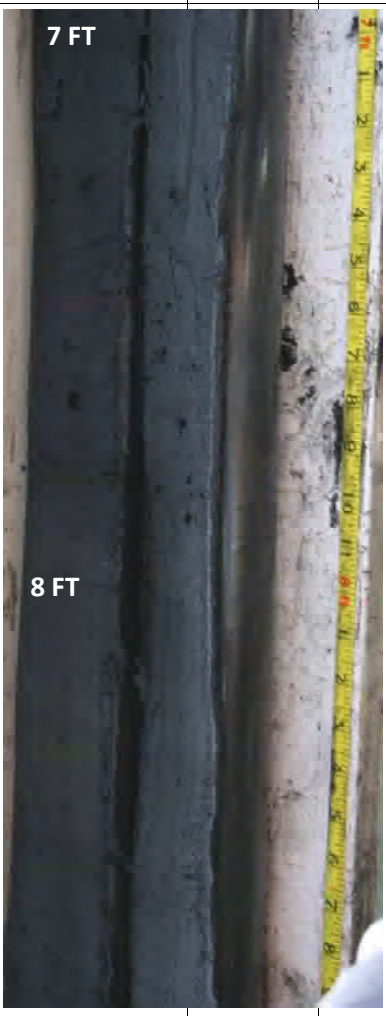
Not plastic.

Comments: Samples collected at 0-4.8' (chemistry / GS) and 4.8-16.3' (chemistry/ GS)

Core ID: NHH-T

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955476.02	Time:	17:19
Subcontractor:	Ocean Surveys Inc.	Y:	667998.66	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	20
Weather:	Partly Sunny, 72°F			Recovery (ft):	19.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-8.7

Photo:



Notes:

4.8-9.8' - Black silt. Very soft to soft. Wet to moist. ML

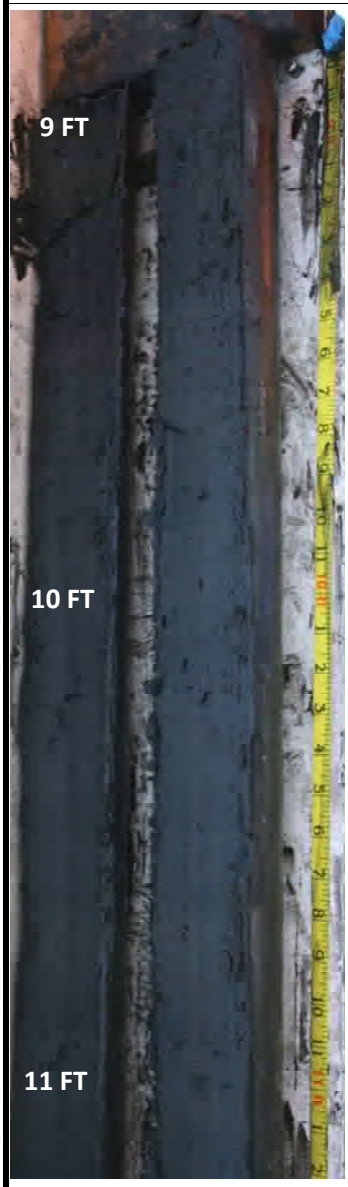
Not plastic to low plasticity.

Comments:

Core ID: NHH-T

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955476.02	Time:	17:19
Subcontractor:	Ocean Surveys Inc.	Y:	667998.66	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	20
Weather:	Partly Sunny, 72°F			Recovery (ft):	19.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-8.7

Photo:



Notes:

9.0-13.8' - Black silt.
Very soft to soft.
Wet to moist. ML

Not plastic to low plasticity.

Comments:

Core ID: NHH-T					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	955476.02	Time:	17:19
Subcontractor:	Ocean Surveys Inc.	Y:	667998.66	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	20
Weather:	Partly Sunny, 72°F			Recovery (ft):	19.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-8.7

Photo:

Notes:

15.0-19.7' - Black silt. Very soft to soft. Wet to moist. ML

Not plastic to low plasticity.

Comments: Photo for horizon 13.8-15.0 did not save.

Core ID: NHH-U					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	8:37
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.9
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:

Notes:

0.0-5.8' - Black silt. Moist to 1.5'. ML

Comments: Samples collected at 0-5.8' (chemistry / GS) and 5.8-30.0' (chemistry/ GS)

Core ID: NHH-U					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	8:37
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.9
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:

Notes:

5.8-13.0' - Black silt. ML

Comments:

Core ID: NHH-U					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	8:37
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.9
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:

Notes:

13.0-18.0' - Black silt. ML

Comments:

Core ID: NHH-U					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	8:37
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.9
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:

Notes:

18.0-24.9' - Black silt. ML

Comments: Photo for horizon 20.0-21.0' did not save.

Core ID: NHH-U					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	8:37
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	30
Weather:	Sunny, 75°F			Recovery (ft):	29.9
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:

Notes:

24.9-29.9' - Black silt. ML

Comments:

Core ID: NHH-V					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	17:25
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 75°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:

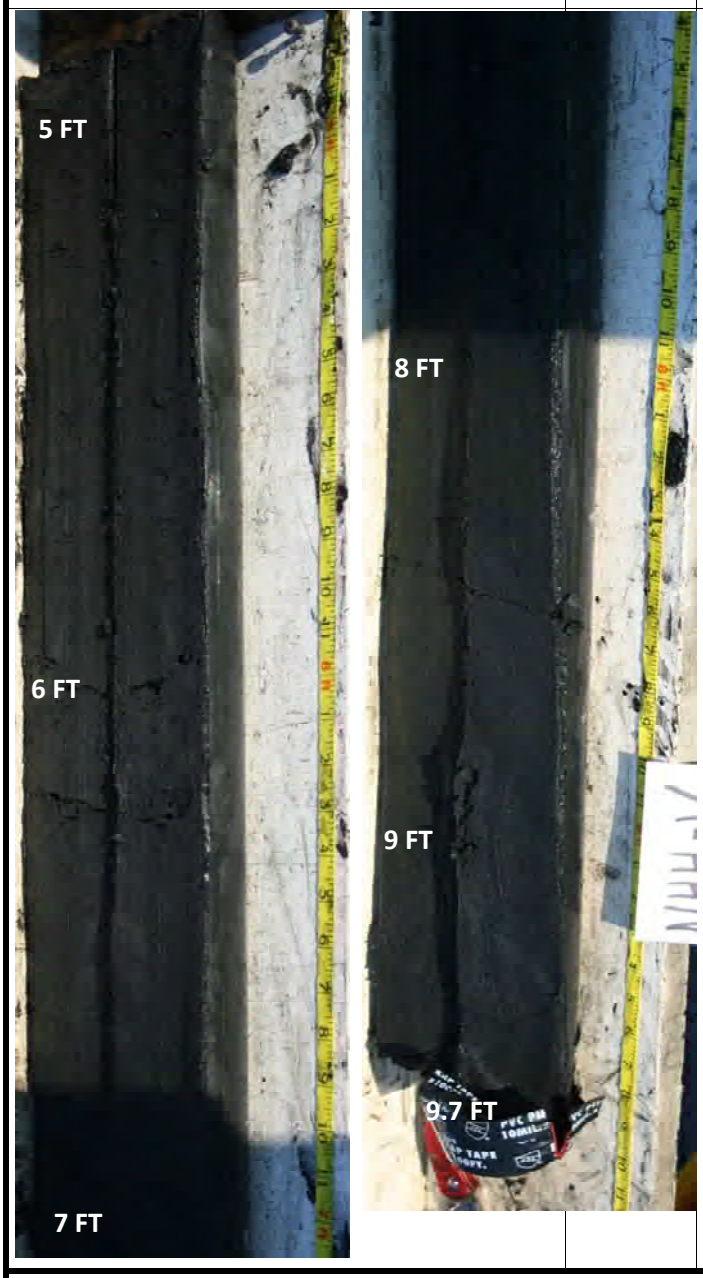
Notes:

0.0-3.5' - Black silt. Moist to 0.8'. ML

Comments: Photo for horizon 4.0-5.0' did not save. Samples collected at 0-4.8' (chemistry / GS) and 4.8-8.6' (chemistry/ GS)

Core ID: NHH-V					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	955696.43	Time:	17:25
Subcontractor:	Ocean Surveys Inc.	Y:	667963.55	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 75°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-11.8

Photo:



Notes:

5.0-9.7' - Black silt. ML

Comments:

Core ID: NHH-W					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	956642.29	Time:	16:12
Subcontractor:	Ocean Surveys Inc.	Y:	667836.21	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 75°F			Recovery (ft):	9.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.5

Photo:

Notes:

0.0-4.8' - Black silt. Very soft, wet. ML

Not plastic

Comments: Samples collected at 0-5.5' (chemistry / GS) and 5.5-8.2' (GS only)

Core ID: NHH-W					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/9/2017
Client:	USACE	X:	956642.29	Time:	16:12
Subcontractor:	Ocean Surveys Inc.	Y:	667836.21	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Sunny, 75°F			Recovery (ft):	9.8
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.5

Photo:

Notes:

4.8-5.5' - Black silt. ML

5.5-6.8' - Reddish fine sand with some silt. Very hars, moist. Poorly graded. SM

6.8-8.2' - Reddish fine sand. Very hard, moist, poorly graded. SP

8.2-9.3' - Reddish clayey silt. ML/CL

9.3-9.8' - Reddish fine sand. SP

Comments:

Core ID: NHH-X					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	956695.36	Time:	8:43
Subcontractor:	Ocean Surveys Inc.	Y:	669144.51	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-19

Photo:

Notes:

0.0-4.7' - Black silt. Very soft. Wet, not plastic. Faint petroleum-like odor. ML

Comments: Samples collected at 0-5.2' (chemistry / GS [dup]) and 5.2-8.0' (chemistry/ GS)

Core ID: NHH-X					
Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	956695.36	Time:	8:43
Subcontractor:	Ocean Surveys Inc.	Y:	669144.51	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-19

Photo:

Notes:

4.7-5.2' - Black silt. ML

5.2-8.0' - Dark tan/ brown fine sand. Very hard/ moist. SP

8.0-9.7' - Tannish brown coarse sand. SP

Comments:

Core ID: NHH-Y			
Project: New Haven Harbor FNP	Coordinates (CT ft)	Date:	8/8/2017
Client: USACE	X: 956935.61	Time:	10:34
Subcontractor: Ocean Surveys Inc.	Y: 668934.77	Core Diameter (in):	3.5
Sampling Personnel: (AECOM)		No. of Attempts:	1
Logged by: Steve Howe		Penetration (ft):	10
Weather: Partly Sunny, 72°F		Recovery (ft):	9.4
Sampling Equipment: Vibracore		Water Depth (ft, MLLW):	-35.5

Photo:

Notes:

0.0-5.9' - Black silt. ML

5.9-6.7' - Reddish brown coarse sand with cobbles. SP

Comments: Samples collected at 0-5.9' (chemistry / GS) and 5.9-8.5' (GS only)

Core ID: NHH-Y

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	956935.61	Time:	10:34
Subcontractor:	Ocean Surveys Inc.	Y:	668934.77	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.4
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.5

Photo:

Notes:

6.7-6.8' - Reddish brown coarse sand. SP

6.8-9.5' - Reddish fine to medium sand with occasional cobbles. SW

Comments:

Core ID: NHH-Z

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	957127.56	Time:	11:43
Subcontractor:	Ocean Surveys Inc.	Y:	668767.57	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.3

Photo:

Notes:

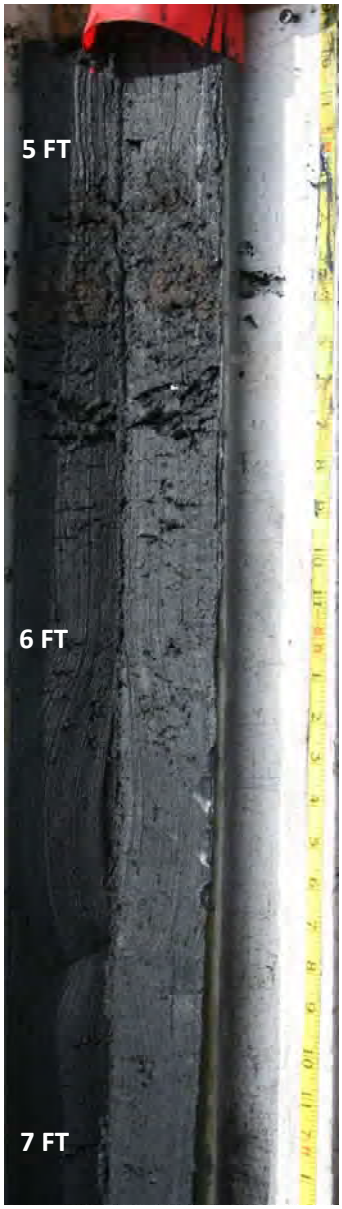
0.0-4.8' - Black silt. ML

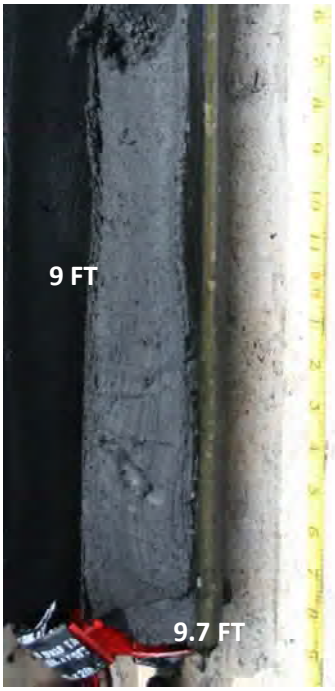
Comments: Samples collected at 0-5.0' (chemistry / GS) and 5.0-8.7' (chemistry/ GS)

Core ID: NHH-Z

Project:	New Haven Harbor FNP	Coordinates (CT ft)		Date:	8/8/2017
Client:	USACE	X:	957127.56	Time:	11:43
Subcontractor:	Ocean Surveys Inc.	Y:	668767.57	Core Diameter (in):	3.5
Sampling Personnel:	(AECOM)			No. of Attempts:	1
Logged by:	Steve Howe			Penetration (ft):	10
Weather:	Partly Sunny, 72°F			Recovery (ft):	9.7
Sampling Equipment:	Vibracore			Water Depth (ft, MLLW):	-35.3

Photo:





Notes:

4.8-5.3' - Black silt. ML

5.3-5.5' - Reddish brown fine to medium sand. SW

5.5-7.6' - Firm/ compact black silt. ML

7.6-9.8' - Firm/ compact black silt. Trace medium to fine sand. ML

Comments:

AECOM
250 Apollo Drive, Chelmsford, MA 01824
(978) 905-2100 - office, (978) 905-2101 - fax

Core ID: C

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 2.85 ft MLLW
Station Location: NHH-C	Survey Vessel: Cardu	Core Diameter (in): 3.5
GPS Coordinates: E 956256.40 N 642185.04	Weather: sunny 70-80°	No. Attempts: 1
Date: 8/30/17 (collected 8/17/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Recovery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0 – 5' Dk brown (f) sandy SILT, some shell hash, trace organics, very soft, wet 10YR 3/1
						very small gastropods @ 0.8', 4.2'

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

AECOM
250 Apollo Drive, Chelmsford, MA 01824
(978) 905-2100 - office, (978) 905-2101 - fax

Core ID: F

Client:	USACE	Contractor:	OSI	Water Depth:	
Project Number:	60543021	Sampling Equipment:	Vibracore	MLW:	4.02 ft, MLLW
Station Location:	NHH-F	Survey Vessel:	Candu	Core Diameter (in):	3.5
GPS Coordinates:	E954916.7 N651081.9	Weather:	Sunny 70-80°F	No. Attempts:	1
Date:	8/30/17 (collected 8/16/17)	Seas:	Calm	Logged by:	H. Jones
Time:		Survey Personnel:			

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-14.4' Black SILT, very soft to soft wet to moist GLEY 1 2.5/N to trace clay 9.3'-14.4' GLEY 1 2.5/10Y
						trace v. small bivalve shells @ 1.8', 2.7', 4.3' 9.4'-9.9' 14.4'
						Mottling black / brown 9.3-11.2' GLEY 1 2.5/N 2.5Y 4/1
						No plasticity to less plasticity w/ depth

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

AECOM
250 Apollo Drive, Chelmsford, MA 01824
(978) 905-2100 - office, (978) 905-2101 - fax

Core ID: G2

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 6.35 ft. MLLW
Station Location: NHH-G	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E954958.5 N656298.4	Weather: Sunny 70-80°F	No. Attempts: 1
Date: 8/30/17 (collected 8/17/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-4.3' Dk grey SILT, very soft, wet Not plastic GLEY 1 3/N trace shell hash throughout
						Some shell hash / very small bivalves 0.9'-1.1'
						4.3'-20' Grey SILT, very soft to soft, Not plastic to low plasticity GLEY 1 4/10Y trace clay to some clay
						little shell hash throughout small / very small bivalves @ 7.2', 8.1'

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

AECOM
250 Apollo Drive, Chelmsford, MA 01824
(978) 905-2100 - office, (978) 905-2101 - fax

Core ID: J

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 0.76 ft MLLW
Station Location: NHH-J	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E955160.4 N662188.0	Weather: sunny 70-80°F	No. Attempts: 1
Date: 8/30/17 (collected 8/14/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Recovery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
0-9.4						0-8.7' Dk grey SILT, very soft, wet not plastic trace f. sand GLEY 1 ~~4/5GY~~ 3/N 4.4
						shell hash / small bivalves (some) 2.6'-3.2', 3.9'-4.2'
						6.1'-6.8', 7.3'-7.8' some f-m. sand some shell hash / bivalves, coal slag @ 6.2'
						8.7'-9.4' Grey SILT, some shell hash, trace f. sand + clay, very soft, wet, low plasticity
						GLEY 1 4/5GY

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

AECOM
250 Apollo Drive, Chelmsford, MA 01824
(978) 905-2100 - office, (978) 905-2101 - fax

Core ID: M1

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 1.47 ft, MLLW
Station Location: NHH-M	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E955464.7 N665128.6	Weather: 70-80°F Sunny	No. Attempts: 1
Date: 8/30/17 (collected 8/13/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Recovery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-4.6' Black SILT, very soft, saturated to wet Non plastic GLEY 1 2.5/N
						4.6'-8' Mottled Black + brown SILT, very soft, wet GLEY1 3/N + 10YR 3/2 Non plastic
						8'-9.7' Black SILT, trace + little clay, soft, wet, low plasticity GLEY 1 3/N

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

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Core ID: P

Client:	USACE	Contractor:	OSI	Water Depth:	
Project Number:	60543021	Sampling Equipment:	vibracore	MLW:	4.57 ft MLLW
Station Location:	NHH - P	Survey Vessel:	Candu	Core Diameter (in):	3.5
GPS Coordinates:	E955172.0 N667298.2	Weather:	Sunny 70-80°F	No. Attempts:	1
Date:	8/30/17	Seas:	Calm	Logged by:	H. Jones
Time:		Survey Personnel:			

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-12.9' Black SILT, very soft to soft, wet not plastic GLEY 1 2.5/N
						10YR 2/2 GLEY 1 2.5/N Brown / black mottling (mostly black) 5.7'-11.3'
						lense of silty f. sand (dk red-brown) 10.3'-10.4' (7.5YR 2.5/2)
						12.9'-16.1' Dk brown silty f. SAND grading to f-m SAND, very hard, moist 10YR 3/1
						16.1'-18.2' Dk brown silty f. SAND, dense, moist 10YR 3/1
						18.2'-20.4' Red-brown SILT, trace v.f. sand, + clay med stiff, moist 7.5YR 5/2 low plasticity
						20.4'-21.7' Red-brown silty f. SAND, very hard, poorly graded, moist 5YR 5/2
						21.7'-27.6' Red-brown f-m SAND, med dense to loose, moist lense of brown silt @ 23.5' 5YR 5/1
						27.6'-30' Red-brown f-c SAND, some f-c gravel subrounded-rounded, loose, moist 5YR 4/2

Estimated Penetration Range:	**Comments:**
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

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Core ID: S

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 1.08 ft. MLLW
Station Location: NHH - S	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E956561.0 N667097.4	Weather: Sunny, 70-80°F	No. Attempts: 1
Date: 8/30/17 (collected 8/15/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-4.9' Black SILT, very soft, wet Not plastic GLEY 1 2.5/N 4.8
						4.2'-4' Brown f. sand loose (10YR 3/1)
						4.9'-5.8' Black SILT, some f. sand, soft, wet GLEY 1 2.5/N Not plastic
						5.8'-9.7' Red-brown f. SAND, very hard, moist 7.5YR 4/2 poorly graded

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

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Core ID: T

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 1.06 ft, MLLW
Station Location: NHH-T	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E955477.5 N667998.3	Weather: Sunny, 70-80°F	No. Attempts: 1
Date: 8/30/17 (collected 8/12/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Recovery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-4.1' Black SILT, very soft, wet, not plastic GLEY 1 2.5/N
						4.1'-9' Mottled black + brown SILT, very soft to soft, wet to moist, trace f. sand + clay + organics, not plastic to slightly plasticity
						Mottling decreases w/ depth - mostly black silt
						brown = 10YR 3/2 black = GLEY 1 2.5/N

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

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Core ID: W

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 4.08 ft, MLLW
Station Location: NHH-W	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E956649.2 N667830.3	Weather: Sunny, 70-80°F	No. Attempts: 1
Date: 8/30/17 (collected 8/15/17)	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 inch	Recovery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0-3.8' Black SILT, very soft, wet, not plastic GLEY 2.5/N
						3.8'-5.3' Intermittent banding of Black SILT, med soft, moist w/ red-brown f. SAND, very hard, moist GLEY 2.5/N + 7.5YR 2.5/2
						5.3'-9.1' Red-brown f. SAND, very hard, moist poorly graded
						trace m. subangular/subrounded gravel @ 5.3' 7.5YR 4/4

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

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Core ID: X

Client: USACE	Contractor: OSI	Water Depth:
Project Number: 60543021	Sampling Equipment: vibracore	MLW: 5.60 ft, MLLW
Station Location: NHH-X	Survey Vessel: Candu	Core Diameter (in): 3.5
GPS Coordinates: E956694.8 N669145.6	Weather: Sunny 70-80°F	No. Attempts: 1
Date: 8/30/17	Seas: Calm	Logged by: H. Jones
Time:	Survey Personnel:	

(Note: bgs = below ground surface)

Depth Range	Blow per 6 Inch	Re-covery ft/ft	PID	Lab Sample ID	USCS	Geologic Description Method:
						0 – 6.4' Black SILT, very soft, wet Not plastic CLEY 2 2.5/5BG
						6.4'-9.4' Dk brown f. SAND, trace silt, very hard, moist 10YR 3/1
						Some shell hash 6.9'-7.2', 8'-8.5'

Estimated Penetration Range:	Comments:
Project Depth:	
Actual Penetration:	
Recovery:	
% Recovery:	

Attachment 4 New Haven Harbor 2017 Chain of Custody Forms

AECOM

CHAIN OF CUSTODY RECORD

Page 1 of ___

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: 5-24 hr CHEM - SD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6020 + 7471-7470B	PCBs - 8082 / 8270 SIM	PESTICIDES - 8081B	PAHs - 8270 D SIM	TOC - 9060	Lab I.D.	Remarks
NHH-X-TOP	8/8/17	0922	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X		0-4'9"
NHH-X-REP-TOP	8/8/17	0922	X			SD			X	X	X	X	X	X		REPLICATE - 0.49"
NHH-X-BOTTOM	8/8/17	0922	X			SD			X	X	X	X	X	X		4'9" - 8.0'
NHH-Y-TOP	8/8/17	1037	X			SD			X	X	X	X	X	X		0-5'11"
NHH-Y-BOTTOM	8/8/17	1037	X		8oz	SD			X							5'11" - 8'6"
NHH-Z-TOP	8/8/17	1153	X		8oz/16oz	SD			X	X	X	X	X	X		0-5.0'
NHH-Z-BOTTOM	8/8/17	1153	X			SD			X	X	X	X	X	X		5.0' - 8'8"
NHH-N-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X		0-6.0'
NHH-N-MS-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X		0-6.0' MS
NHH-N-MSD-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X		0-6.0' MSD
NHH-N-BOTTOM	8/8/17	1305	X		8oz	SD			X							6.0' - 7'6"
NHH-O-TOP	8/8/17	1445	X		8oz/16oz	SD			X	X	X	X	X	X		0-8' 4"
NHH-O-BOTTOM	8/8/17	1445	X		8oz	SD			X							8'8" - 10'1"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY - AECOM Signature:	Date: 8/8/17 Time: 1847	Signature:	Date: 8/8/17 Time: 1847
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Serial No. № 0154

White: Original (to Lab) Yellow: Lab Pink: Sampler

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

AECOM

CHAIN OF CUSTODY RECORD

Page 2 of ___

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIC

TAT: 65-24TAT CHEM - STD

Analysis Requested

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6020A / 7474-7470	PCBS - 8082 / 8270 SIM	PESTICIDES - 8081B	PAHS - 8270 DSIM	TOC - 9060					Lab I.D.	Remarks
NHH - M	8/8/17	1610	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X						0-6'9"
NHH - T - TOP	8/8/17	1734	X		8oz/16oz	SD	⊥	⊥	X	X	X	X	X	X						0-4'10"
NHH - T - BOTTOM	8/8/17	1734	X		⊥	SD	⊥	⊥	X	X	X	X	X	X						4'10" - 16'4"

Container Type: P - Plastic; A - Amber Glass; G - Clear Glass; V - VOA Vial; O - Other; E - Encore

Preservation: 1 - HCl, 4°; 2 - H2SO4, 4°; 3 - HNO3, 4°; 4 - NaOH, 4°; 5 - NaOH/ZnAc, 4°; 6 - Na2S2O3, 4°; 7 - 4°

Matrix Codes: DW - Drinking Water; WW - Wastewater; GW - Groundwater; SW - Surface Water; ST - Storm Water; W - Water; S - Soil; SL - Sludge; SD - Sediment; SO - Solid; A - Air; L - Liquid; P - Product

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/8/17 Time: 1847	Signature:	Date: 8/8/17 Time: 1847
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WEST BOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Serial No. № 0180

AECOM

CHAIN OF CUSTODY RECORD

L1727787

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GRAINSIZE - 24hr CHEMISTRY - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAINSIZE - SIEVE	METALS - 6020A/7471A-7473	PCBS - 8082/8270 SIM	PESTICIDES - 8081B	PAHS - 8270D SIM	TOC - 9060					Lab I.D.	Remarks
01	NHH - U - TOP	8/9/17	0705	X		807/1607	SD	4°C	N/A	X	X	X	X	X	X						0 - 5'10"
02	NHH - U - BOTTOM		0705	X		↓				X	X	X	X	X	X						5'10" - 30"
03	NHH - P - TOP		1219							X	X	X	X	X	X						0 - 5'9"
04	NHH - P - BOTTOM		1219							X	X	X	X	X	X						5'9" - 12'4"
05	NHH - Q - TOP		1427							X	X	X	X	X	X						0 - 5'3"
06	NHH - Q - BOTTOM		1427							X	X	X	X	X	X						5'3" - 29.5"
07	NHH - W - TOP		1634							X	X	X	X	X	X						0 - 5'6"
08	NHH - W - BOTTOM		1634			807				X											5'6" - 8'2"
09	NHH - V - TOP		1745			807/1607				X	X	X	X	X	X						0 - 4'9"
10	NHH - V - BOTTOM		1745			↓				X	X	X	X	X	X						4'9" - 8'7"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1558
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Serial No. № 0155

AECOM

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE - NHH FNP	Project Location: NEW HAVEN, CT
Project Number: 60543021	Field Logbook No.:
Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM	Chain of Custody Tape Nos.:
Signature:	Send Results/Report to: MARY O'DONNELL KOZIK — TAT: STD

Analysis Requested

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs / PCB	PESTICIDES	CLP	Lab I.D.	Remarks
NHH-EB-CORE-080917	8/9/17			X		W	4°C-3	N/A	X	X	X	X		4x1L AMBER 1x250 mL 1x250mL w/ HNO3

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1858
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GRAINSIZE - 24hr CHEMISTRY - STD

Analysis Requested

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAINSIZE - SIEVE	METALS - 6020A/7471A-7473B	PCBS - 8082/8270 SIM	PESTICIDES - 8081B	PAHS - 8270D SIM	TOC - 9060						Lab ID	Remarks
NHH - U - TOP	8/9/17	0105	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X							0 - 5'10"
NHH - U - BOTTOM		0105	X						X	X	X	X	X	X							5'10" - 30'
NHH - P - TOP		1219							X	X	X	X	X	X							0 - 5'9"
NHH - P - BOTTOM		1219							X	X	X	X	X	X							5'9" - 12'4"
NHH - Q - TOP		1427							X	X	X	X	X	X							0 - 5'3"
NHH - Q - BOTTOM		1427							X	X	X	X	X	X							5'3" - 29.5"
NHH - W - TOP		1634							X	X	X	X	X	X							0 - 5'6"
NHH - W - BOTTOM		1634			8oz				X												5'6" - 8'2"
NHH - V - TOP		1745			8oz/16oz				X	X	X	X	X	X							0 - 4'9"
NHH - V - BOTTOM		1745							X	X	X	X	X	X							4'9" - 8'7"

Container Type: P - Plastic; A - Amber Glass; G - Clear Glass; V - VOA Vial; O - Other; E - Encore

Preservation: 1 - HCL 4°; 2 - H2SO4 4°; 3 - HNO3 4°; 4 - NaOH 4°; 5 - NaOH/ZnAc 4°; 6 - Na2S2O3 4°; 7 - 4°

Matrix Codes: DW - Drinking Water; WW - Wastewater; GW - Groundwater; SW - Surface Water; ST - Storm Water; W - Water; S - Soil; SL - Sludge; SD - Sediment; SG - Solid; A - Air; L - Liquid; P - Product

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1858
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0155

AECOM

CHAIN OF CUSTODY RECORD

4727788

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GRAINSIZE - 24hr CHEMISTRY - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAINSIZE - SIEVE	METALS - 6020A/7471-7473	PCBS - 8082/8270 SIM	PESTICIDES - 8081B	PAHS - 8270D SIM	TOC - 9060					Lab I.D.	Remarks
-01	NHH - U - TOP	8/9/17	0705	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X						0 - 5'10"
-02	NHH - U - BOTTOM		0705	X						X	X	X	X	X	X						5'10" - 30"
-03	NHH - P - TOP		1219							X	X	X	X	X	X						0 - 5'9"
-04	NHH - P - BOTTOM		1219							X	X	X	X	X	X						5'9" - 12'4"
-05	NHH - Q - TOP		1427							X	X	X	X	X	X						0 - 5'3"
-06	NHH - Q - BOTTOM		1427							X	X	X	X	X	X						5'3" - 29.5"
-07	NHH - W - TOP		1634							X	X	X	X	X	X						0 - 5'6"
-08	NHH - W - BOTTOM		1634			8oz				X											5'6" - 8'2"
-08	NHH - V - TOP		1745			8oz/16oz				X	X	X	X	X	X						0 - 4'9"
-09	NHH - V - BOTTOM		1745							X	X	X	X	X	X						4'9" - 8'7"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1858
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2109	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0155

AECOM

CHAIN OF CUSTODY RECORD

L1727788

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60548021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'DONNELL KOZIK

TAT: STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs / PCB	PESTICIDES	CRL						Lab I.D.	Remarks
-10 NHH-EB-CORE-080917	8/9/17			X		W	4°C-3	N/A	X	X	X	X							4x 1L AMBER 1x 250 mL 1x 250mL w/ HNO3

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1858
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 21 29	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0179

AECOM

CHAIN OF CUSTODY RECORD

L1728049

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A / 7471B	PCBs - 8082 / 8270 SIM	Pesticides - 8081B	PAHs - 8270D-SIM	TOC - 9060					Lab I.D.	Remarks
-01	NHH-R-Top	8/10/17	0832	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						0-4'2"
-02	NHH-R-Bottom		0832	X		"	SD	4°C		X	X	X	X	X	X						4'2"-7'8"
-03	NHH-S-Top		0955	X		"	SD	4°C		X	X	X	X	X	X						0-6'0"
--	NHH-S-Bottom		0955	X		8oz	SD	4°C		X											6'0"-6'5"
-04	NHH-J		1141	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'5"
-05	NHH-L		1300	X		"	SD	4°C		X	X	X	X	X	X						0-6'9"
-06	NHH-K-Top		1409	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'6"
--	NHH-K-Bottom		1409	X		8oz	SD	4°C		X											5'6"-8'2"
-07	NHH-H-Top		1458	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'5"
-08	NHH-H-Rep-Top		1458	X		"	SD	4°C		X	X	X	X	X	X						0-5'5"
-09	NHH-H-Bottom		1458	X		"	SD	4°C		X	X	X	X	X	X						5'5"-7'8"
-10	NHH-I-Top		1548	X		"	SD	4°C		X	X	X	X	X	X						0-8"
-11	NHH-I-Bottom		1548	X		"	SD	4°C		X	X	X	X	X	X						8"-2'6"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C Steve Hone AECOM Signature:	Date: 8/10/17 Time: 1922	Signature:	Date: 8/10/17 Time: 1928
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/10/17 Time: 2000	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

L1728049

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature: C Steve

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7471A/7471B	PCBs - 8082	8270 - SIM	Pesticides - 8081B	PAHs - 8270D - SIM	TOC - 9060					Lab I.D.	Remarks
NHH-G-Top	8/11/17	0837	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X							0-4'3"
NHH-G-Bottom	8/11/17	0837	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							4'3"-13'8"
NHH-C-Top		1033	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							0-2'10"
NHH-C-Bottom		1033	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							2'10"-8'0"
NHH-B		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X							0-4.2'
NHH-B-MS		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X							0-4.2'
NHH-B-MSD		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X							0-4.2'
NHH-A-Top		1340	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							0-2'2"
NHH-A-Bottom		1340	X		8oz	SD	4°C		X												2'2"-9.9'
NHH-D-Top		1507	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							0-4'9"
NHH-D-Bottom		1507	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							4'9"-10'4"
NHH-F-Top		1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							0-3'2"
NHH-F-Rep-Top		1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X							0-3'2"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/11/17 Time: 1925	Signature:	Date: 8/11/17 Time: 1925
Signature:	Date: 8/11/17 Time: 2237	Signature: Bethany Beo	Date: 8/11/17 Time: 2237
Signature:	Date: Time:	Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

L1728049

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7471A	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270D-SIM	TOC - 9060					Lab I.D.	Remarks
NHH-F-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						3'2" - 10'6"
NHH-F-MS-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						3'2" - 10'6"
NHH-F-MSD-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						3'2" - 10'6"

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/11/17 Time: 1925	Signature:	8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) Bethany Bodard Signature:	8/11/17 Time: 22:37
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

LA28340

Page ____ of ____

Client/Project Name: USACE - NHH - FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals 6020A/7471A/7471B	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270D	TOC - 9060					Lab I.D.	Remarks
.01	NHH-E-Top	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X						0-6'6"
.02	NHH-E-Bottom	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X						6'6"-8.1'

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/14/17 Time: 1509	Signature:	8/14/17 Time: 1509
Relinquished by: (Print Name)/(Affiliation) Signature:	8/14/17 Time: 1710	Received by: (Print Name)/(Affiliation) MARC A MUIR Signature:	8/14/17 Time: 1712
Relinquished by: (Print Name)/(Affiliation) MARC A MUIR Signature:	8/14/17 Time: 1815	Received by: (Print Name)/(Affiliation) Signature:	8/14/17 Time: 1815

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0168

AECOM

CHAIN OF CUSTODY RECORD

L1728343

Page ____ of ____

Client/Project Name: USACE - NHH - FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals 6020A/7471/7471B	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270D	TPC - 9060	Lab I.D.	Remarks
.01	NHH-E-Top	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X		0-6'6"
.02	NHH-E-Bottom	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X		6'6"-8.1'

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hone AECOM Signature:	Date: 8/14/17 Time: 1509	Signature:	Date: 8/14/17 Time: 1509
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/14/17 Time: 1712	Received by: (Print Name)/(Affiliation) MARC A MUIR Signature:	Date: 8/14/17 Time: 1712
Relinquished by: (Print Name)/(Affiliation) MARC A MUIR Signature:	Date: 8/14/17 Time: 1815	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/14/17 Time: 1815

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0168

AECOM

CHAIN OF CUSTODY RECORD

21728961

Page 1 of 1

Client/Project Name: USACE- NHH FUP	Project Location: NEW HAVEN, CT
Project Number: 60543021	Field Logbook No.:
Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM	Chain of Custody Tape Nos.:
Signature:	Send Results/Report to: MARY O'CONNELL KOZIK — TAT: STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs/PCB	PESTICIDES	CR6	Lab I.D.	Remarks
NHH-EB-NISIL-081717	8/17/17	1135		X		W	4°C-3	N/A	X	X	X	X		

Relinquished by: (Print Name)/(Affiliation) RYAN MCCARTHY Signature:	Date: 8/17/17 Time: 1840	Received by: (Print Name)/(Affiliation) AAL Signature:	Date: 8/17/17 Time: 1840	Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA — ATTN: HZ PORTA
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/17/17 Time: 2055	Received by: (Print Name)/(Affiliation) AAL Signature:	Date: 8/17/17 Time: 2055	
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other — Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

4728962

Page 1 of 1

Client/Project Name: USACE - NHH FNP	Project Location: NEW HAVEN, CT
Project Number: 605 43021	Field Logbook No.:
Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM	Chain of Custody Tape Nos.:
Signature:	Send Results/Report to: MARY OYONIECK KOZIK — TAT: STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs/PCBs	PESTICIDES	CR6							Lab I.D.	Remarks
NHH-EB-GRAB-081717	8/17/17	1155		X					X	X	X	X								
NHH-EB-PUMP-081717	8/17/17	1600		X					X	X	X	X								

Relinquished by: (Print Name)/(Affiliation) RYAN MCCARTHY Signature:	Date: 8/17/17 Time: 1840	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/17/17 Time: 1840
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/17/17 Time: 2055	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/17/17 Time: 2055
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Attachment 5 New Haven Harbor 2017 Field Log Books

CONTENTS

PAGE	REFERENCE	DATE

Location NHH - NEW HAVEN HARBOR Date 8/8/17

Project / Client NHH FNP - USACE

0650 ARRIVE LONG WHARF PIER

RYAN MCCARTHY
TODD RANDALL
JEFF PYDESKI
TINA MERRITT
C. SIENE HOWE
KEN CROMWS
MORGAN BARRETT

0700 LOAD VESSEL

0715 PROJECT SHAE TAILGATE/ KICKOFF W/ TINA MERRITT

0820 DEPART DOCK FOR X,Y,Z TRANSECT

0830 BEGIN ANCHOR SET AT X

0844 ON STATION DECON EQUIPMENT

STRONG PETROLEUM ODOR NEAR TERMINAL

Location NHH Date 8/8/17

Project / Client FNP - USACE

NHH-X

E 956695.4

N 669144.5

LOW TIDE 0623

HIGH TIDE 1234

MOON POOL DEPTH - 22.0

GRAB CORE IN THE WATER

0922 CORE ON DECK

PEN - 10.0'

0936 Opening core NHH-X

NHH-X 0-4'9" black silt

NHH-X 4'9" -

4'9" - 5'2"

dark organic silt

5'2" - 8'0 fine sand, darkton

8'0" - 9'9 coarse sand, end

0-5'2" sample - Top

5'2" - 8 sample - Bottom

Location NHH Date 8/8/17

Project / Client FNP - USACE

1015 moving to next location

NHH-Y

40.5' WATER

BARGE COMING THROUGH CHANNEL

MAY HAVE TO MOVE

NHH-Y

1037 Core on deck E 956935.61

10' penetration

9'4" recovery N 668934.77

1054 opening core

1122 moving to NHH-Z

1142 on NHH-Z

Tug approaching to

move nearby tanker.

Positioning to move tanker

1150 begining core E 957127.6

1153 Core on deck N 668767.6

10'0" penetration

9.7' recovery

Location NEW HAVEN, CT Date 8/8/17
Project / Client NHH FNP / USACE

1235 En Route to next core
STATION NHH-N E 955867.6
N 665076.8

1305 ~~HA~~ NHH-N on deck
10.0 penetration
9.3 recovery

1343 MOVING TO NHH-O

1402 On NHH-O
Core target is 10.7 ft
switching from 10-foot
core barrel to 20-foot

E 956251.1
N 665020.3

1438 begin core NHH-O

1444 core on deck

PEN 13.0'
13.4 recovery

1534
MOVING TO NHH-M

Location NEW HAVEN CT Date 8/8/17
Project / Client NHH FNP / USACE

1555 On NHH-M

DIFFICULTY ANCHORING ON SOFT BOTTOM
ANCHORS WERE PULLING, CONSENSUS
WITH TODD RANDALL TO TAKE CORE
AT CURRENT LOCATION (WITHIN 14.0'
OF TARGET) AND WITHIN CHANNEL,
NEAR SLOPE

1610 core on deck

PEN 10.0'

E 955479.97
N 665130.38

1645

MOVING TO STATION T

A 1707 At NHH-T
1734 core on deck

E 955476.0
N 667998.7

Location NHH Date 8/8/17

Project / Client NHH-FNP / USGS

1840 CORING OPS COMPLETE FOR DAY

COLLECTED STATIONS

X, Y, Z, M, N, O, T

1850 BACK AT DOCK / UNLOAD

1915 PACK UP BOAT / HEAD OFFSHORE

8/8/17

Location NEW HAVEN CT Date 8/9/17

Project / Client NHH-FNP / USGS

0650 ARRIVE LONG WHARF

R. MCCARTHY
C. STEVE HOWE
TODD RANDALL
J. PYDESKI
M. BARRETT

0715 LOAD BOAT / SHORE BRIEFING

0730 CHANGE TO 30' BARREL FOR LONG CORE STATIONS

0810 LEAVING DOCK FOR NHH-U

0844 Setting up for NHH-U
revised target length - 32+ ft
longest core barrel = 30 feet

0905 Core on deck FULL PEN / RECOVERY

1020 PROCESSING COMPLETE

E 955696.4
N 667963.6

MOVING TO STATION NHH-P
WILL COLLECT ARCHEOLOGICAL CORE

Location NEW HAVEN, CT Date 8/9/17

Project / Client NHH - FNP / USACE

TARGET
E 955172.0
N 667298.2

1050 NHHP location
archeological core

1102 start NHH-P archeological

1113 NHH-P "a" on deck

Pg	0 - 2.8 ft
Pf	2.8 - 5.8 ft
Pe	5.8 - 10.8 ft
Pd	10.8 - 15.8 ft
Pc	15.8 - 20.8
Pb	20.8 - 24.6
Pa	24.6 - 29.6

30 penetration
29.6 recovery

TARGET
E 955172.0
N 667298.2

1210 begin NHH-P

1219 core on deck

NHH-P - APPROX 5 GALLONS
RETAINED (TOP + BOTTOM)

Location NEW HAVEN CT Date 8/9/17

Project / Client NHH - FNP / USACE

1409 ON STATION NHH-Q

TARGET
E 955500.1
N 667254.5

TARGET PEN IS 31.8'. TAKING
30' CORE

14:15 Problem with core head

14:19 Driving core

1427 Core on deck

1615 ON STATION NHH-W

1634 core on deck

1725 ON STATION NHH-V

1745 EQUIPMENT BLANK
NHH-EB-CORE-080917

1745 CORE ON DECK E-956178.56
N-667900.02

Location NEW HAVEN, CT Date 8/9/17

Project / Client NHH FNP - USACE

1820 CORING OPS COMPLETED FOR DAY HAULING ANCHORS / RETURNING TO COL WHARF

COLLECT 5 STATIONS

U, P, Q, W, V

AND EQUIPMENT BLANK

1840 BACK AT DOCK

Location New Haven, CT Date 8/10/17

Project / Client NHH - FNP - USACE

0715 - Loading for day
- HAS
Clare Murphy - Hagan AECOM
C. Steve Howe AECOM
Todd Randall USACE
Jeff Rydeski OSI
Morgan Barret OSI

0745 On Way to NHH-R

0832 core on deck

0913 moving to NHH-5

0946 begin core NHH-5
0955 core on deck

956558.51
667100.36

1100 Setting up on NHH-J
955157.82
~~666~~ 662159.41

Location New Haven, CT Date 8/10/17

Project / Client NHH-FNP-USACE

water depth 35.0
tide -(+4.0)
31.0

Project depth 24.5 + 2 over
26.5

no core needed here

Todd verified
Can-Do exploring channel
in vicinity of NHH-J to
find appropriate core location

1127 Reset location NHH-J to
955130.54
662186.32

adjusted depth 21.1
project depth 24.5
3.4
+2 over
5.4 core

1141 Core on deck

Location New Haven, CT Date 8/10/17

Project / Client NHH-FNP-USACE

1225 Amistad coming into harbor, moving to NHH-L

1254 begin NHH-L
955734.84 662225.81

1300 Core on deck

1409 Core NHH-K on deck
955275.32 662195.02

1450 Heading to NHH-H
955073.00
656256.70

1540 On location
had to wait for Tug to pass

1543 begin core

1548 NHH-H on deck

1709 At NHH-I
Swapping to 20 foot barrel
955525.41 656249.42

1746 core on deck
heavy recreational
and commercial boat
traffic

Location New Haven Harbor Date 8/10/17

Project / Client NHH FNP USACE

Processed core in transit to dock

18:47 At Dock

1928 Samples to Alpha

1946 Leaving site

CSH

Location New Haven Harbor Date 8/11/17

Project / Client NHH FNP USACE

0745 Can Du departing Long Wharf Pier

Claire Murphy Hogan AECOM

Jeff Pydeski OSI

Morgan Barnett OSI

Todd Randall US ACE

C Steve Howe AECOM

NHH-G 954957.69 656295.81

0831 Set up on ~~NHH I~~ NHH-G CSH

~~955525.41 656249.42~~ CSH

0837 Core on Deck

0929 Picking up to move offshore

1000 Setting up at NHH-C

956248.06 672180.93

1033 Core on deck

1145 Set up on NHH-B

1157 core on deck

collected MS/MSD at "B"

1249 Prepping for travel to "A"

Location New haven harbor Date 08/12/17

Project / Client

10.5

1020 complete volume requirements from station P, transit to station T

1040 on station at T N 667994.28 E 955470.86

water depth 10.5
tide (+0.41)

Core T2
target depth 16.3

19.3 rec | 19.5 pen

No sand layer observed
contact

1115 start arc. core at station T E 955480.71 N 668007.12
water depth 11.5
tide 1.06

19.5 pen 18.9 rec

Location New haven harbor Date 08/12/17

Project / Client

Arc core T3

Td ~~Tad~~ @ 0-3.9
Tc ~~Tbee~~ 3.9-8.9
Tb ~~Tc~~ 8.9-13.9
Ta ~~Tdd~~ 13.9-18.9

1220 complete volume requirements at station T. transit to station Z.

1235 Tug boat around station Z. waiting for him to leave before we get on station.

water level 38.2

1250 swap out 20ft core barrel for 10ft

1300 on station at Z

Location New haven harbor Date 08/12/17

Project / Client

1315 Station Z (core #1) E 957123.41 N 668771.32
water depth 41.0
tide -(+4.19)

pen 10.0 / Rec 9.7

1350 Station Z (core #2) E 957111.38 N 668772.82
water depth 42.7
tide -(+5.24)

Pen 10.0 | Rec 9.5

1500 complete volume requirement at Station Z (2 buckets)
mobilize to Station X.

1515 on Station X

Core #1 WL: 24.9 1545 E 956688.44 N 669149.64
-(+6.9)

Pen 10.0 | 9.5 rec
@ Sand @ 5' 8"

Location New Haven harbor Date 08/12/17

Project / Client

1600 Station X E 956688.65 N 669150.55
Core #2
Water level: 24.7
tide: 6.49

- Sand @ at 5' ~~8"~~ 3"

Pen 10 / rec 9.0

1700 collect archeological core for Station X

water level: 22.7
tide: -(+5.6)

10.0 pen | 9.4 rec

1710 Arc. Core X4 E 956686.56 N 669156.44
Xb 0-4.4
Xa 4.4-9.4

1745 complete volume at Station X
transit back to dock to unload @ dendbe.

@1830 offsite to hotel

Location New Haven Harbor Date 08/13/17

Project / Client

0745 Candy departs long wharf pier.
- Rachel MacRae (AECOM)
- Marc Smith (AECOM)
- Jeff Rydesk (OSI)
- Morgan Barrett (OSI)

- Hot Meeting
- 0750 Mobilize to station Y

0820 Station Y core #1 N 668944.73 E 956945.53
water level 37.3
tide -(+1.23)
pen 10.0 / rec 7.1

Station Y core #2 N 668936.98 E 956949.45
water level @ ~~36.5~~ 35.8
pen 10.0 / rec 9.3 tide - ~~(+0.78)~~ @ 0.26

* Sand @ 6' 4" on core #1 collected to 6' 4" for composite sample.

Location New Haven Harbor Date 08/13/17

Project / Client

0915 hydraulic head malfunctioning. OSI crew swapping out spare head.

Station Y core #3 N 668932.79 E 956950.64
water level: 36.0
tide: 0.25
pen 10.0 / rec 9.1

* Sand at 4' 9" on core #2 collected to 4' 9" for core #2

* Sand at 5' 2" on core #3 collected to 5' 2" for core #3

1100 Volume requirements complete for station Y, decontaminate and transit to station M

Location New Haven Harbor Date 08/13/17

Project / Client

32.2 2.44

1130 Core #1 Station M N 665135.21 E 955472.89
water level: 29.4
tide -(+1.47) 10.0 per / 9.6 rec

1155 Core #1 at station M
Archedogical Core:
Mb 0-4.6
Ma 4.6-9.6

1220 Core #2 at Station M
water level 32.2 N 665121.53 E 955479.04
tide: -(+2.44)
10.0 per | 9.5 rec

1245 Core #3 at station M
water level: 34.9 N 665121.11 E 955480.98
tide: 3.33
10.0 per | 9.3 rec

1400 head to dock to fuel up Boat

Location New Haven Harbor Date 08/13/17

Project / Client

1430 Complete fuel-up. Head to next station, NH-N

1515 Core #1 at Station-N N 665079.31 E 955883.16
water level: 42.3
tide: +(+6.33)
10.0 per | 9.5 rec.

1550 Core #2 at Station-N N 665076.57 E 955885.20
water level: 42.7
tide: -(+6.79)
10.0 per | 9.3 rec

☆ Core #1 Send @ 5' 9" Sample for composite taken from 0-5' 9"

☆ Core #2 Send @ 4' 3" Sample for composite taken from 0-4' 3"

Location New Haven Harbor Date 08/13/17

Project / Client

1710 Core #3 at Station N
water level: 40.0
@ ~~water depth~~ tide (6.84)
10.0 pen / 9.3 rec
N 465073.56
E 955888.76

☆ Core #3 Send at 5'
composite sample taken
from 0-5' from this
core.

Location New Haven Harbor Date 8/14/17

Project / Client NHH- FNP-USACE

0730 Gain On departing Long
Wharf Pier for core
NHH-E c. Steve Howe, Marc
Smith, Jeff Rydesk, Morgan Barrett
0805 Setting up at NHH-E
0832 Core on deck
954719.81 651097.16
0-4'9" black silty
clay, no real change
in color, composition,
or cohesiveness

1003 Setting up at NHH-J
for volume and Archeological

1016 Start NHH-J "a"
10.0 pen 9.4 rec
Jb ~~fb~~ 0-4.4'
Ja ~~fa~~ 4.4-9.4'

1019 NHH-J "a" on deck
"J2" in OSI
955126.43 662180.87
1048 NHH-J3 on deck

Location _____ Date 8/14/17

Project / Client _____

10.0 pen 9.5 rec
1113 NHH-J4 on deck
10.0 pen 9.5 rec
955122.23 662182.68 coords
5.5 gallons w/2 cores at J
955121.04 662186.48
1159 Pulling anchor for NHH-K
1223 At NHH-K2
38.1' depth, +1.65 tide
955337.20' 662203.78
1232 NHH-K2 on deck
10.0 pen 8.9 rec
3.5' organic silt
over 1 ft grey clay and
red sands to bottom
collected 0-3.5'
1316 NHH-K3
39.8', 2.87 tide
1328 core on deck
9.0 pen 8.0 rec

955327.41 662203.30

Location _____ Date 8/14/17

Project / Client _____

1344 prepping for NHH-K4
40.6 to water, 3.57 tide
1353 core on deck
10.0 9.1
6.5' black organic silt
over sand
955325.72 662195.65
1427 Picking up anchor
for Long Wharf Pier
1455 At Pier
1520 Morgan Barrett off boat
Kevin Murphy on boat
Leaving Pier for "O"
1614 NHH-O2 on deck
956239.02 665017.20

1656 Set up at NHH-O3
@ 956246.99 n 665012.24
1755 heading back to Pier
1803 On Pier

CSH

Location New Haven Harbor Date 8/15/17

Project / Client NHH-FNP-USACE

0745 Can Do departing to "W"
Kevin Murphy
Jeff Pyjeski
Clare Murphy-Hyan
C. Steve Howe

0840 NHH-W "a" on board
NHH-W2 on OSI records
10.0 pen 9.2 rec
NHH-W B 0-4.2
956641.18 667825.42 A 4.2-9.2

0923 NHH-W3 on deck
10 pen 9.7 rec
956640.71 667830.90

0955 NHH-W4 on deck
956635.09 667828.03
10.0 pen 9.4 rec

1105 NHH-S - 2 vol cores
1 arch core

1114 NHH-S "a" on deck
NHH-S2 in OSI log
10.0 pen 9.8 rec
956559.67 667111.26

Location New Haven Harbor Date 8/15/17

Project / Client NHH-FNP-USACE

NHH-S B 0-4.8
A 4.8-9.8

NHH-S3 on deck at 1140
10.0 pen 9.7 rec
956560.08 667106.98

1216 NHH-S4 on deck
10.0 pen 9.8 rec
956566.16 667108.06

1301 Heading to L
Heavy tug/cargo traffic
in northern portion of
harbor

1347 core NHH-L2 on deck
10.0 pen 9.1 rec
955727.81 662220.69

1425 core NHH-L3 on deck
10.0 pen 9.2 rec
955733.02 662219.97

1526 core NHH-L4 on deck
955744.24 662223.11

Location New Haven Harbor Date 8/15/17

Project / Client NHH-FNP-USACE

60543021

per 10.0 rec 9.9

1619 Setting up on V

1646 NHH-V-2 on deck

Pen 9.8 Rec 8.9

956170.32 667900.95

1735 Can Pu on pier

Location New Haven Harbor Date 8/16/17

Project / Client NHH-FNP-USACE

Weather: Sunny 80's 60543021

0700 At Long Wharf Pier
Prepping for day

0730 H&S Meeting
- Discuss heat stress

0745 Depart Dock

0829 NHH-~~12~~ (SH) on deck R2
10.0 pen 9.8 rec
black organic silt 0-9.8
956066.14 667161.51

0942 At NHH-H
waiting for tug to pass
before finalizing location
near power line

1027 NHH-H2 on deck
10.0 pen 9.7 rec
955092.89 656254.49
large freighter coming into
harbor, tugs

Location _____ Date 8/16/17

Project / Client _____

60543021

10:44 NHH-H-3 setting up
38.4 td, 2.43 tide
36.0 corrected
955099.48 656261.60

10:52 core on deck

NHH-H2 5.5' black organic silt & clay over mottled plastic grey silty clay with some shells, wood horizon at 9.5-9.8

original sampling horizon included some grey clays
returned 0-6.5 ft for volume sample

NHHH3 black organic ~~silt&cl~~ silty clay to 8', 0.1' grey clay over brown silt
collected 0-7.7

Location _____ Date 8/16/17

Project / Client _____

11:46 heading to NHH-E
12:16 At NHH-E
12:30 Core on deck
10.0 pen 9.9 rec

12:56 NHHE2 on deck
954721.12 651092.30

12:21 NHH-E3 on deck
10.0 pen 9.8 rec
954726.90 651096.85

~~12:2~~

NHH-E2 0-9.7 black-dark grey silt and clay, grey clay on bottom
NHH-E3 0-7.5 dark silt & clay over gray v. plastic clay

13:33 Snapping to 20' barrel
Choppy seas, will try
D & E. If unsafe will
move back into bay

Location

Date 8/16/17

Project / Client

14:43 NHH-D2 on deck
15.5 pen 15.8 rec
954356.69 651164.47
1 ft shell rich dark
grey silty clay
dark grey silty clay
moderately plastic to ~~10.3~~
9.3. Highly plastic from
9.3 to bottom of section
at 11.8 feet

1607 NHH-Fa on deck
NHH-F2 in OSI records
954927.28 ~~656~~ 651078.18
NHH-F c 0-4.2
NHH-F b 4.2-9.2
NHH-F a 9.2-14.2

1658 NHH-F3 on deck
954923.40 651073.35

1745 Pulling anchor at F

1820 At Pier, offloading

CSH

Location

Date 8/16/17

Project / Client

Location New Haven Harbor Date 8/17/17

Project / Client NHH-FNP-USACE

0700 At Long Wharf Pier prepping for day

0745 H&S Meeting
- new techniques
- multiple OSI RVs

0750 Heading to "G"

0835 At NHH-G
archeological & Volume
2 cores

0854 NHH-G "a" on deck
- NHH-G2 in OSI Records
19.5 19.6

NHH-G2d 0-4.6 csH
c 4.6 ~~19.6~~ 9.6
b 9.6 - 14.6
a 14.6 - 19.6

Location Date 8/17/17

Project / Client

0934 NHHG3 on deck
16.0 16.0
0-2 black org silty clay (soft loose)
2-5 moderately firm black org silt & clay
5-6 dk gray firm/stiff clay
~~8~~ clay "
~~8~~ to 11
11 - 13 "
13 - 16 stiff, dark gray clay, some shelly horizons

Increasing stiffness

1010 Swapping from 20' to 5' barrel

1030 Heading to C
need 23 gallons from top 2.8 ft + archeological

1110 At NHH-C

1143 C2 on deck
archeological

Location _____ Date 8/17/17

Project / Client _____

5.0 pen 4.7 rec

NHH-C " "
C2A 0-4.7

1213 C3 on deck
5.0 pen 4.6 rec

1220 RV Ready II - OSI
Ken Cadmus
Ryan McCarthy
dropped off small grab sampler

1240 C4/C5 on deck
2.5' pen
move a few feet
2.5' pen
5.0 ft total pen
4.6 recovery

Location _____ Date 8/17/17

Project / Client _____

C3 ~2' dark grey silty clay, with shells and some sand over 3.7' less dark, similar materials

C4/C5 ~2' dark grey over ~4 foot lighter material. Below ~3 feet, darker material returns

Double core (C4/C5) has about 1 foot of lower material from first hit at C4. C3 has about half foot in upper 2.5 of sampling depth. Similar overall comp in a double core (5') vs two single cores (2 × 2.5')

1334 C6/7 on deck

Location _____ Date 8/17/17

Project / Client _____

1 single (C3) plus 2
doubles (C4/5, C6/7) filled
5 gallons

1355 begin coring C8/C9
1403 C8/9 in bucket
2 gallons
AECOM & OSI names
may not match
look at sequence

1415 begin coring C10/11
1420 Core on deck

1440 begin coring C12/13

1450 Freighter exiting harbor
waiting for it to pass
before continuing w/coring

1536 Isolar Blue freighter passed
2nd freighter outbound

Location _____ Date 8/17/17

Project / Project _____

1531 begin C14/15

1537 core on deck

1555 C16/17 on deck
12 gallons

~~1617 C18/19 5~~ CSH

1617 C18/19 on deck
CSH ~~21 gallons~~ 19 + gallons

NOAA page issues for
tide corrections

1653 C20/21 on deck

1712 C22/23 on deck

1735 Pulling anchor

1759 Heading to Pier
1811 At Long Wharf Pier

CONTENTS

PAGE	REFERENCE	DATE

Location NEW HAVEN, CT Date 8/17/17

Project / Client NHH-FNP

0650 R MCCARTHY ARRIVE
BRANFORD STATE RAMP

R. MCCARTHY - AECOM
K. CADMUS - OSI
M. LINCOLN - OSI

WX
SUNNY ~
75°F

0700 LAUNCH BOAT

HIGH TIDE ~
0745

0715 DOCKSIDE SH&E BRIEFING

0730 DEPART FOR CLDS

SOW FOR TODAY IS TO SAMPLE
CLDS REF SITE FOR SEDIMENT
AND WATER, THEN SAMPLE NEW
HAVEN HARBOR FOR WATER
AT 3 LOCATIONS (INNER, MID, OUTER)
INNER - NEAR ANCHORAGE
MID - NEAR GHI TRANSECT
OUTER - CLOSE TO BREAKWATER

Location NEW HAVEN, CT Date 8/17/17

Project / Client NHH - FMP

0755 AT CLDS REF TO BEGIN SEDIMENT GRAB SAMPLING

E 976671.17 CT STPL
N 609872.57 FT
83' DEEP

FIRST GRAB IN VAN VEEN YIELDS APPROX 5 GALLONS

OF GREY BROWN SOFT SILT MOIST NO SAND CONTENT / CONSISTENT THROUGH. SEVERAL JELLYFISH OBSERVED (2-3") IN GRAB AND EXCLUDED FROM SAMPLE

0820 E 976669.43 84' DEEP
N 609902.18

BAD GRAB x4

0835 SUCCESSFUL FULL PEN GRAB (#6) CONSISTENT MATERIAL W/ NOTE

Location NEW HAVEN CT Date 08/17/17

Project / Client NHH - FMP

BAD GRABS ||||

0900 GOOD GRAB (#10)

MATERIAL IS SOFTER / HIGHER MOISTURE CONTENT THAN PREVIOUS 2 SUCCESSFUL GRAB APPROX 4.5 GAL

BAD GRABS ~~||||~~

0930 SWITCHING TO SMALLER DONAR BECAUSE VAN VEEN

0940 GOOD GRAB - ~2+/GAL

0945 GOOD GRAB - ~2+/GAL

0950 GOOD GRAB ~2+ GAL

0955 GOOD GRAB ~2+/GAL

SAMPLING FOR SEDIMENT COMPLETE

MOVING TO WATER SAMPLING USING NISKIN BOTTLE

Location NEW HAVEN, CT Date 8/17/17

Project / Client NHH-FNP

WATER DEPTH APPROX 85'
TARGETING ~80' (TO ACCOUNT FOR MUSHROOM ANCHOR BELOW BOTTLE) FOR "BOTTOM" SAMPLE

1015 FIRST SAMPLE - BOTTOM.

1030 SECOND SAMPLE - BOTTOM 10 Gal collected

1045 COLLECTED FIRST MID SAMPLE AT APPROX 40'

1100 COLLECTED SECOND MID SAMPLE
10 GALLONS COLLECTED

1110 FIRST TOP SAMPLE COLLECTED AT APPROX 3-5'

1115 SECOND TOP SAMPLE COLLECTED
10 GAL COLLECTED
30 GALLONS COLLECTED

Location NEW HAVEN, CT Date 8/17/17

Project / Client NHH-FNP

1135 - EQUIPMENT - NISKIN BOTTLE
OCEANTEST EQUIPMENT RINSE BLANK
3L LITER CAPACITY
NHH-EB-NISK-081717

NISKIN BOTTLE AND C-FLEX TUBING

1155 VAN VEEN / PONAR / SPOON
RINSE BLANK

NHH-EB-GRAB-081717

HEADED TOWARDS NEW HAVEN HARBOR

1215
HAND OFF GRAB SAMPLER TO R/V CANDU

1230 ANCHOR BETWEEN NHH-E AND NHH-F FOR WATER SAMPLE NHC-E.

1300 BEGIN SAMPLING NHC-E
APPROX 20' WATER DEPTH SAMPLE

Location NEW HAVEN, CT Date 8/17/17

Project / Client NHH - FNP

TAKEN AT APPROX 10'

1325 SAMPLE COMPLETE

HEAD TO DOCK TO OFFLOAD SAMPLES INTO REFER

1335 BACK AT LONG WHARF TO OFFLOAD

1410 BOAT UNLOADED HEADED BACK OUT TO GH1 TRANSECT

1425 SETTING UP ON SIDE ON CHANNEL NEAR NHH-1

5 MIN SITE WATER PURGE

1430 SAMPLING NHC-F SAMPLE AT 9' WATER DEPTH 18'

1506 SAMPLE COMPLETE 35 GALLONS COLLECTED

Location NEW HAVEN, CT Date 8/17/17

Project / Client NHH - FNP

MOVING TO ANCHORAGE "UPPER" AREA NHC-V

SAMPLE IN AREA BETWEEN U + Q ON SIDE OF CHANNEL

WATER DEPTH 21'

SAMPLE AT 10.5'

1523 5 MINUTE PURGE WITH SITE WATER

1528 BEGIN SAMPLE

1555 COMPLETE SAMPLE

1600 COLLECT RINSE BLANK ON PUMP/TUBING

NHH-EB-PUMP-08171 7

Location _____ Date _____

Project / Client _____

1627 GRAB SAMPLING NHH-1

3 PONAR SAMPLES

3 VAN VEEN SAMPLES
10 GALLONS COLLECTED

1700 RETURN TO LONG WHARF

1715 UNLOAD

1600 STEAM FOR BRANFORD

1635 BACK AT BRANFORD DOCK

Location _____ Date _____

Project / Client _____

Appendix C Grain Size Data

Rapid Grain Size Results (ASTM D6913)

ANALYTICAL REPORT

Lab Number:	L1727561
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	12/13/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1727561-01	NHH-X-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1727561-02	NHH-X-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1727561-03	NHH-X-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1727561-04	NHH-Y-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 10:37	08/08/17
L1727561-05	NHH-Y-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 10:37	08/08/17
L1727561-06	NHH-Z-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 11:53	08/08/17
L1727561-07	NHH-Z-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 11:53	08/08/17
L1727561-08	NHH-N-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 13:05	08/08/17
L1727561-09	NHH-N-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 13:05	08/08/17
L1727561-10	NHH-O-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 14:45	08/08/17
L1727561-11	NHH-O-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 14:45	08/08/17
L1727561-12	NHH-M	SEDIMENT	NEW HAVEN, CT	08/08/17 16:10	08/08/17
L1727561-13	NHH-T-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 17:34	08/08/17
L1727561-14	NHH-T-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 17:34	08/08/17

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727561
Report Date: 12/13/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1727561
Project Number: 60543021 **Report Date:** 12/13/17

Case Narrative (continued)

Report Reissue

This report replaces the report issued on August 9, 2017. The RIM QC Summary Form is included as an addendum.

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1030340-1 Laboratory Duplicate RPD for % Coarse sand (35%), performed on L1727561-08, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 12/13/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-01
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	1.20		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	11.0		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	87.8		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-02
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	1.00		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	7.90		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	91.1		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-03
Client ID: NHH-X-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	0.200		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	15.1		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	55.0		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	29.7		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-04
Client ID: NHH-Y-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.500		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	0.900		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	2.00		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	6.30		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	90.3		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-05
Client ID: NHH-Y-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	2.60		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	15.2		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	74.3		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	7.90		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-06
Client ID: NHH-Z-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	0.900		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	4.50		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	94.6		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-07
Client ID: NHH-Z-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	0.100		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	1.10		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	18.6		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	80.2		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-08
Client ID: NHH-N-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.40		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	2.60		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	12.0		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	11.2		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	71.8		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-09
Client ID: NHH-N-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	0.200		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	2.60		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	78.6		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	18.6		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-10
Client ID: NHH-O-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	0.300		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	1.20		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	2.90		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	95.6		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-11
Client ID: NHH-O-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	0.700		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	76.9		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	22.4		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-12
Client ID: NHH-M
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 16:10
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	0.300		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	1.50		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	98.2		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-13
Client ID: NHH-T-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	1.40		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	98.6		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

SAMPLE RESULTS

Lab ID: L1727561-14
Client ID: NHH-T-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Coarse Sand	0.100		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Medium Sand	1.00		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Fine Sand	1.20		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP
% Total Fines	97.7		%	0.100	NA	1	-	08/09/17 11:36	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1030340-1 QC Sample: L1727561-08 Client ID: NHH-N-TOP						
% Total Gravel	2.40	ND	%	NC		25
% Coarse Sand	2.60	3.70	%	**35**	Q	25
% Medium Sand	12.0	14.7	%	20		25
% Fine Sand	11.2	14.3	%	24		25
% Total Fines	71.8	67.3	%	6		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727561-01A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-02A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-03A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-04A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-05A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-06A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-07A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-08A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-08A1	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727561
Report Date: 12/13/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727561-08A2	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-09A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-10A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-11A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-12A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-13A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727561-14A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1727561
Project Number:	60543021	**Report Date:**	12/13/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1727561
Project Number:	60543021	**Report Date:**	12/13/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

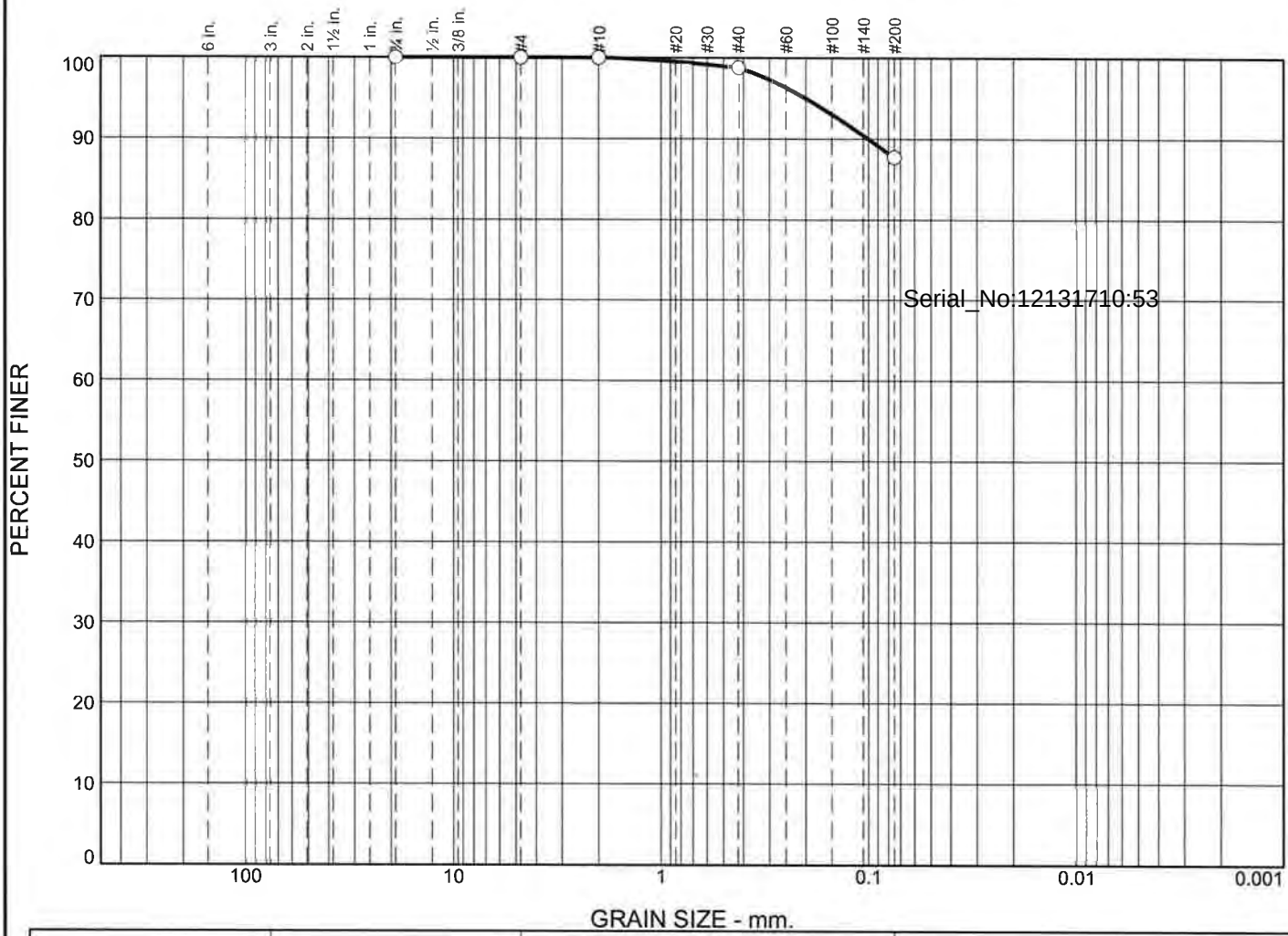
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.2	11.0	87.8	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-X-TOP **Sample Number:** L1727561-01

Date:

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-X-TOP

Sample Number: L1727561-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.88
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.88	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.22	0.00	98.8
		#200	1.97	0.00	87.8

Serial_No:12131710:53

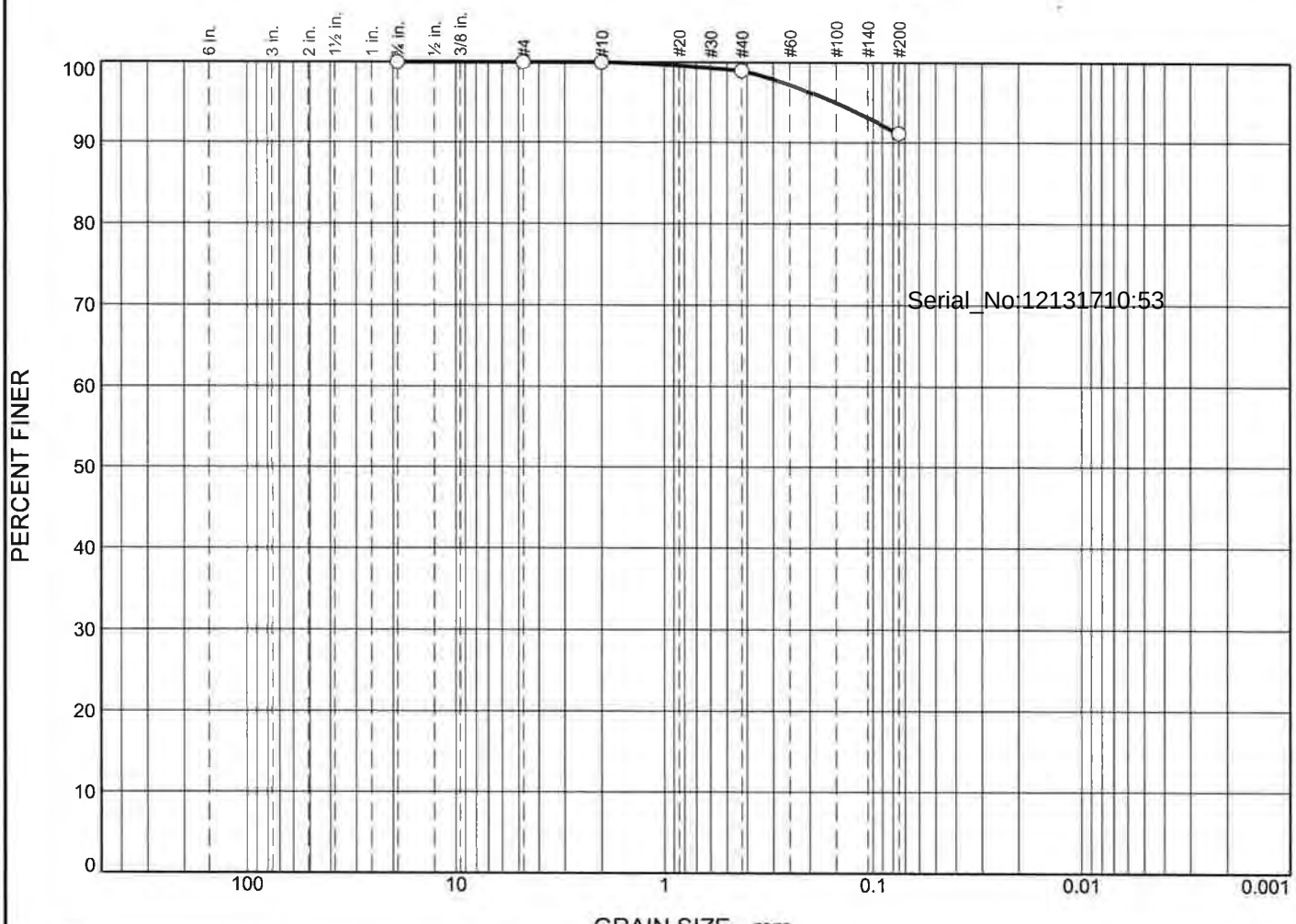
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.2	11.0	12.2			87.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1000	0.2002

Fineness Modulus
0.11

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	1.0	7.9	91.1	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-X-REP-TOP **Sample Number:** L1727561-02

Date:

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-X-REP-TOP

Sample Number: L1727561-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 15.41
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
15.41	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.16	0.00	99.0
		#200	1.21	0.00	91.1

Serial_No:12131710:53

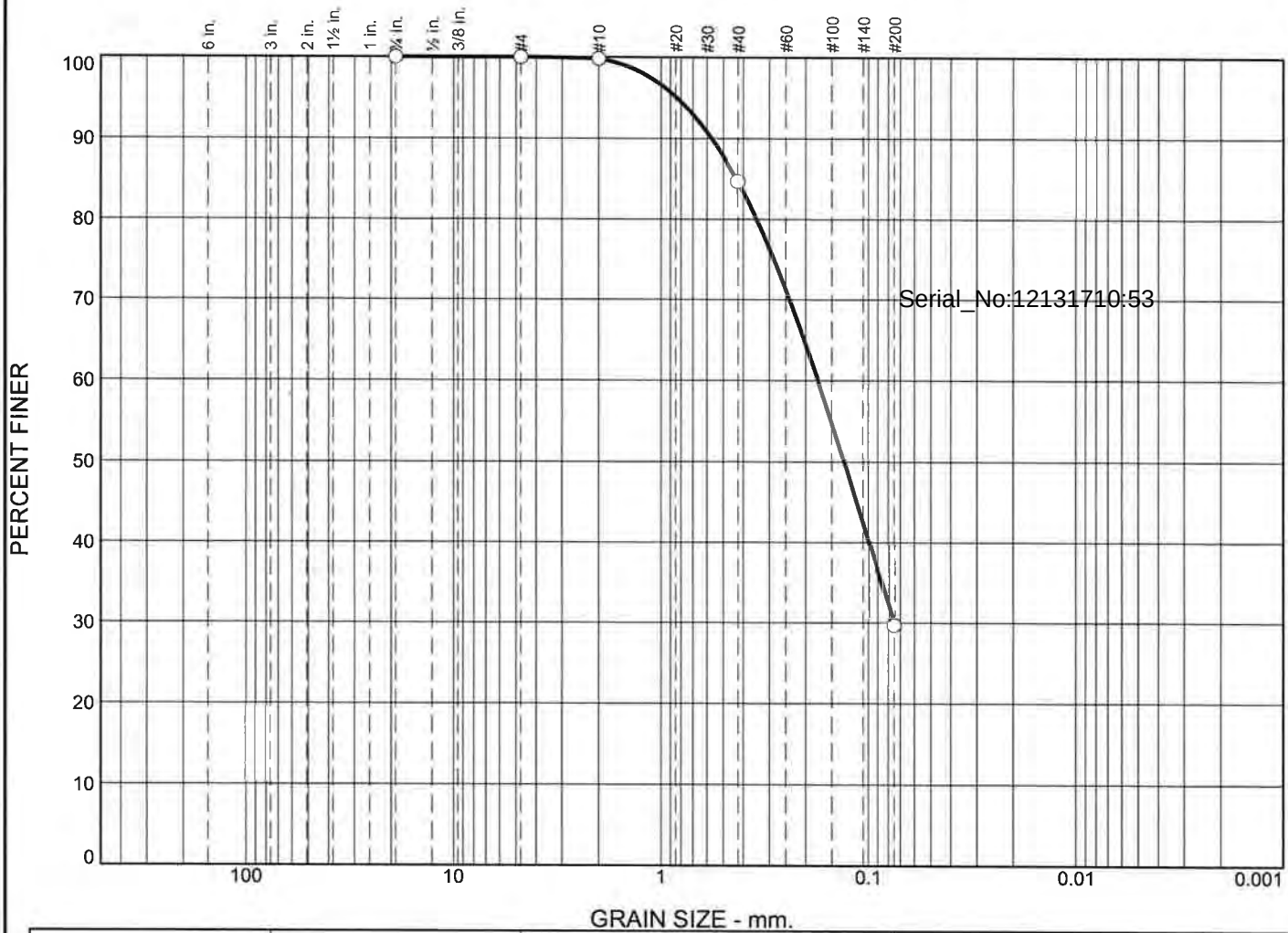
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.0	7.9	8.9			91.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.1544

Fineness Modulus
0.08

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	15.1	55.0	29.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.4316	0.1749	0.1307	0.0756				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-X-BOTTOM **Sample Number:** L1727561-03

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-X-BOTTOM

Sample Number: L1727561-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 34.46
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
34.46	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.06	0.00	99.8
		#40	5.22	0.00	84.7
		#200	18.94	0.00	29.7

Serial_No:12131710:53

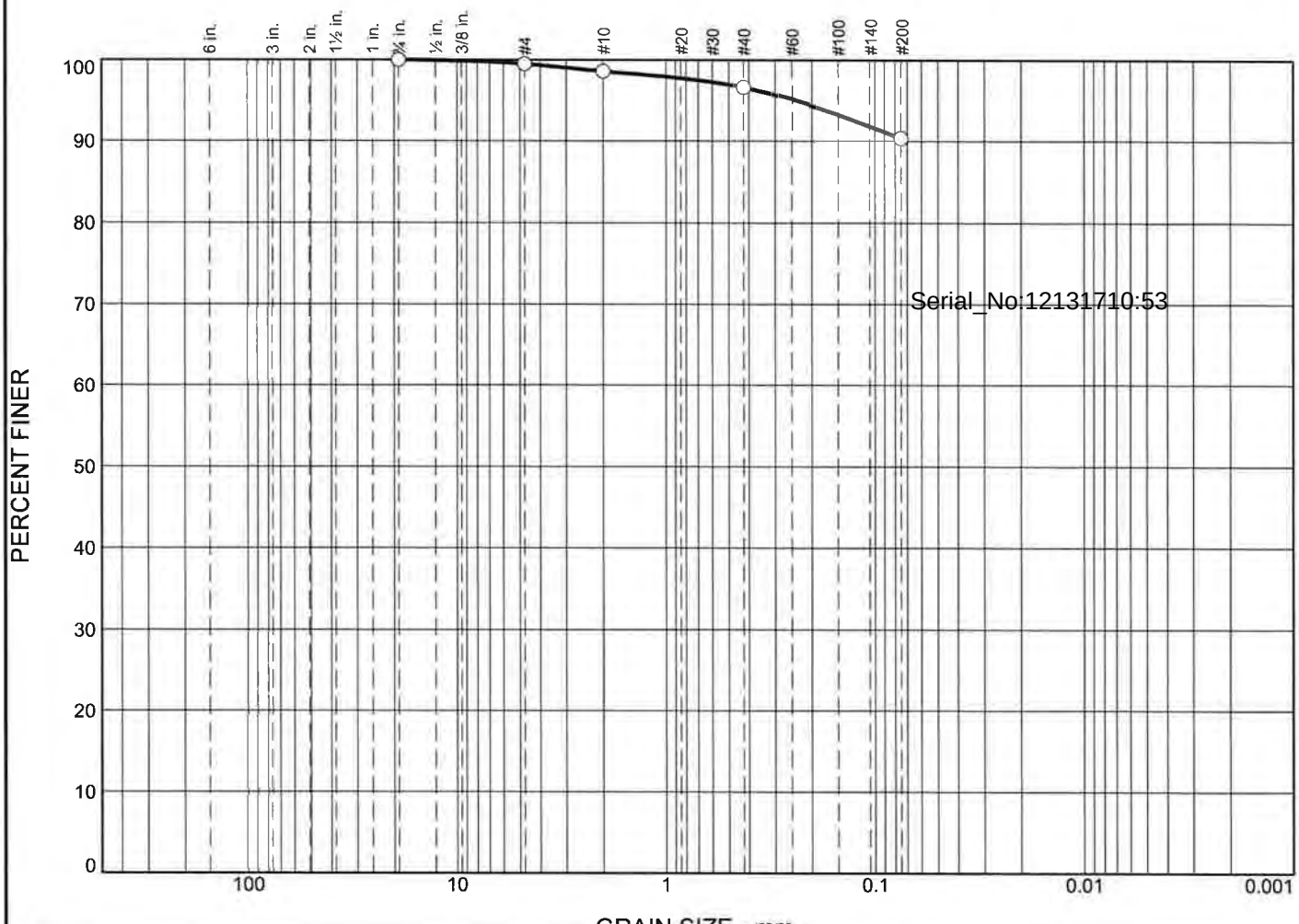
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	15.1	55.0	70.3			29.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0756	0.1307	0.1749	0.3461	0.4316	0.5678	0.8349

Fineness Modulus
0.80

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.5	0.9	2.0	6.3	90.3	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Y-TOP **Sample Number:** L1727561-04

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-Y-TOP

Sample Number: L1727561-04

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 15.59
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
15.59	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.5
		#10	0.14	0.00	98.6
		#40	0.31	0.00	96.6
		#200	0.98	0.00	90.3

Serial_No:12131710:53

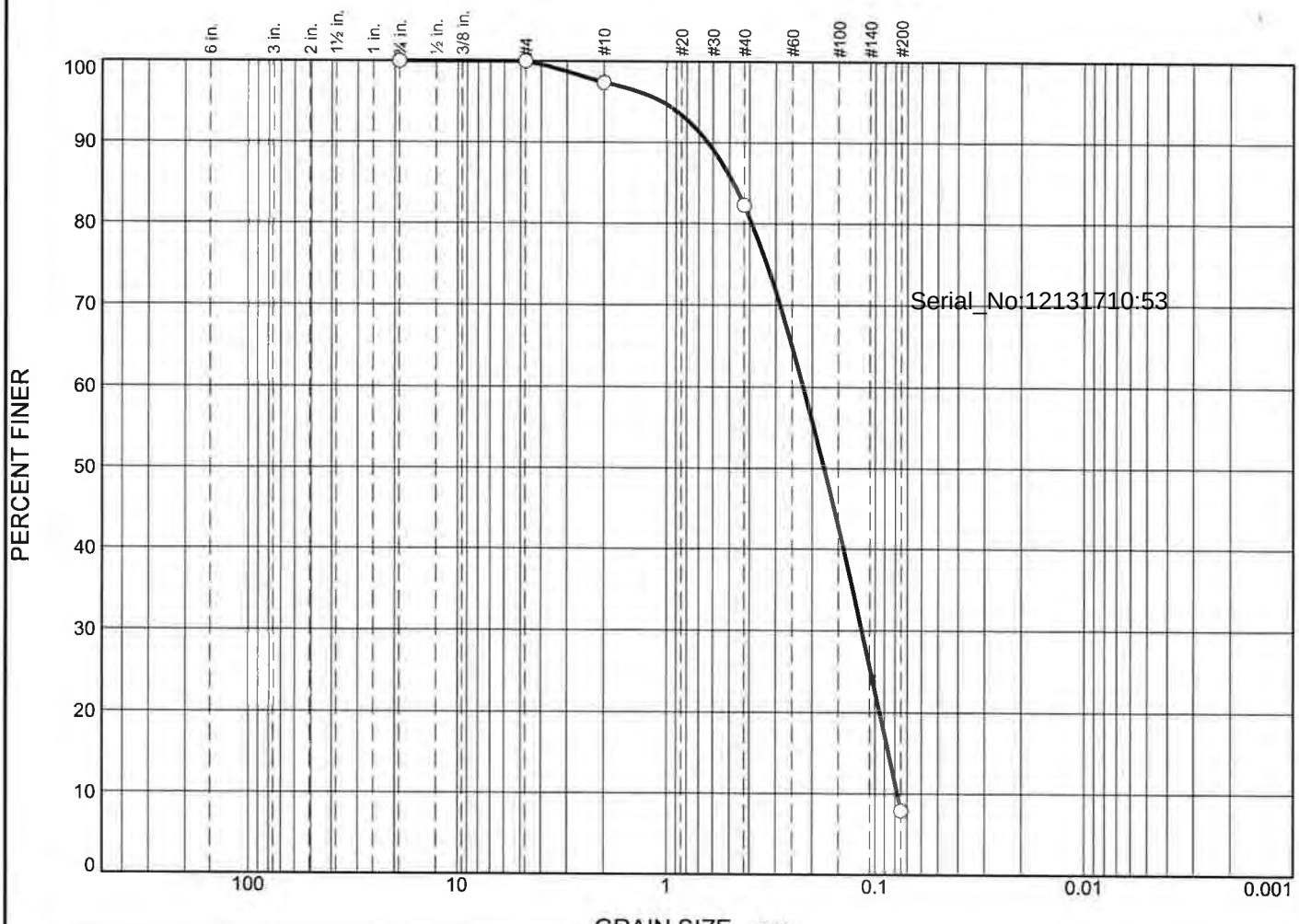
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	0.9	2.0	6.3	9.2			90.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.2435

Fineness Modulus
0.18

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	2.6	15.2	74.3	7.9	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.4791	0.2206	0.1753	0.1155	0.0860	0.0781	0.77	2.83

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Y-BOTTOM **Sample Number:** L1727561-05

Date: ○

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-Y-BOTTOM

Sample Number: L1727561-05

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 36.48
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.48	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.95	0.00	97.4
		#40	5.54	0.00	82.2
		#200	27.10	0.00	7.9

Serial_No:12131710:53

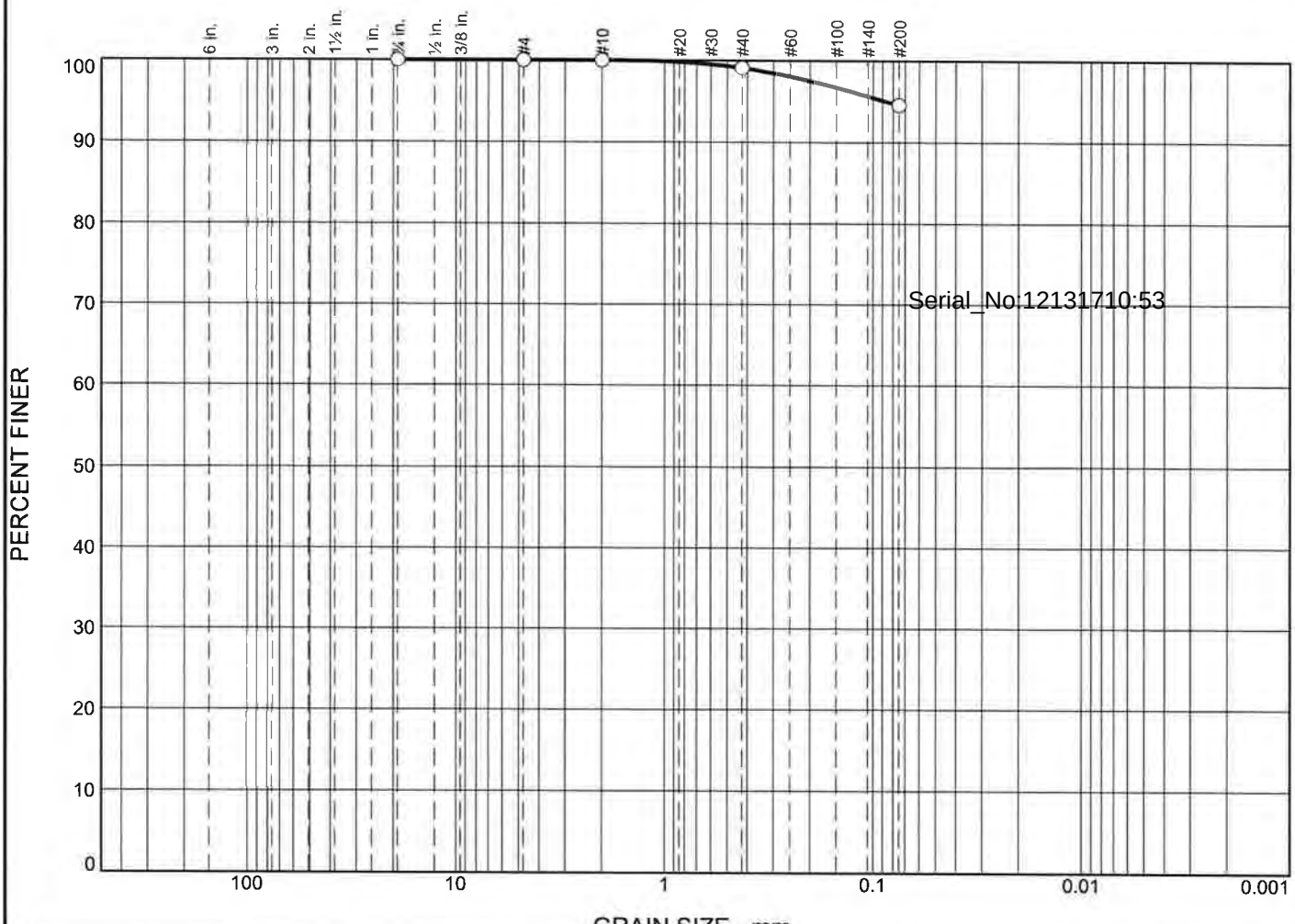
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.6	15.2	74.3	92.1			7.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0781	0.0860	0.0948	0.1155	0.1753	0.2206	0.3908	0.4791	0.6334	1.0568

Fineness Modulus	C_u	C_c
1.03	2.83	0.77

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.9	4.5	94.6	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-Z-TOP **Sample Number:** L1727561-06

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-Z-TOP

Sample Number: L1727561-06

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 15.43
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
15.43	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.14	0.00	99.1
		#200	0.70	0.00	94.6

Serial_No:12131710:53

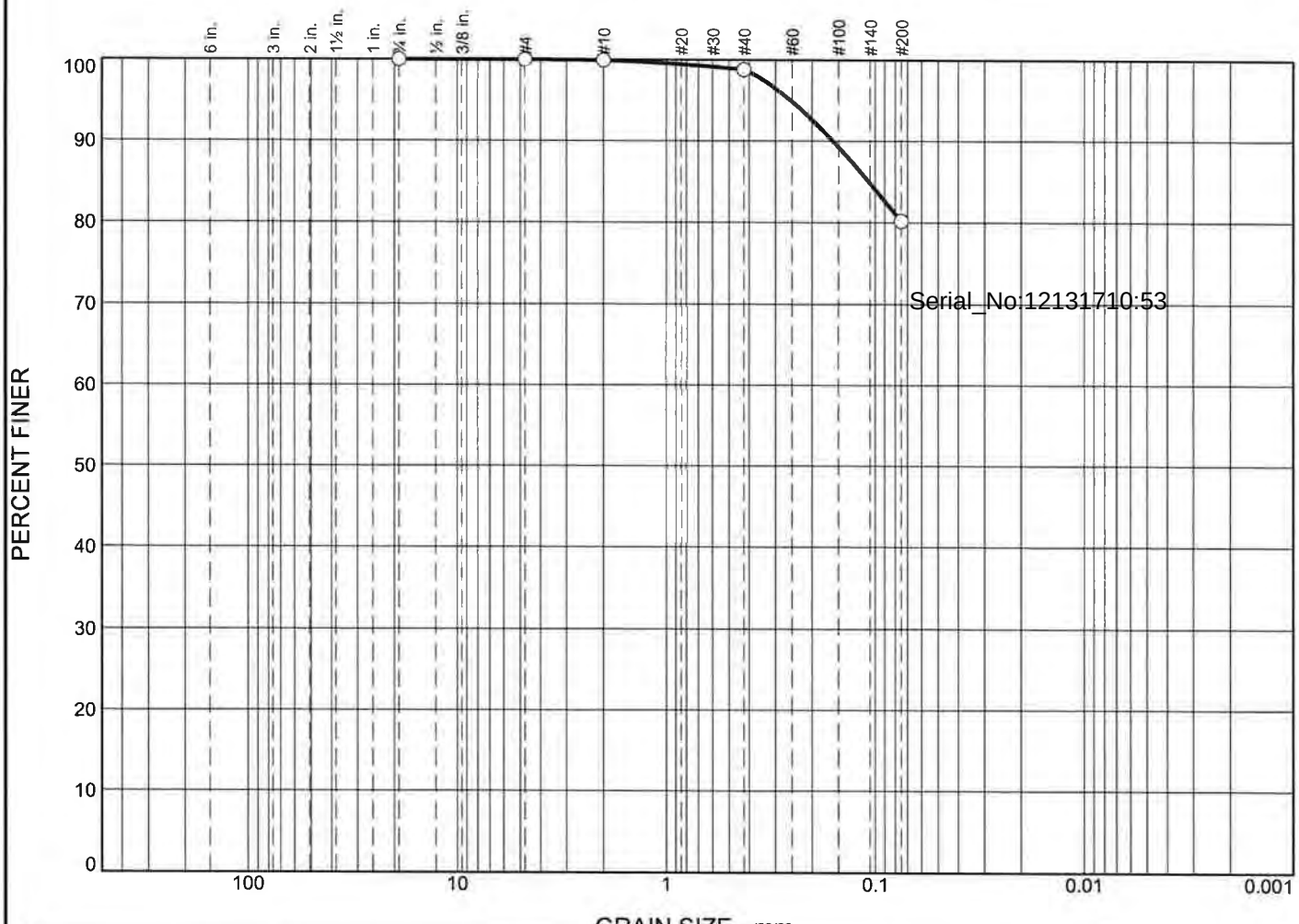
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	4.5	5.4			94.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.0864

Fineness Modulus
0.05

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	1.1	18.6	80.2	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1074							

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Z-BOTTOM **Sample Number:** L1727561-07

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Sample Number: L1727561-07

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.03
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.03	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.02	0.00	99.9
		#40	0.23	0.00	98.8
		#200	3.92	0.00	80.2

Serial_No:12131710:53

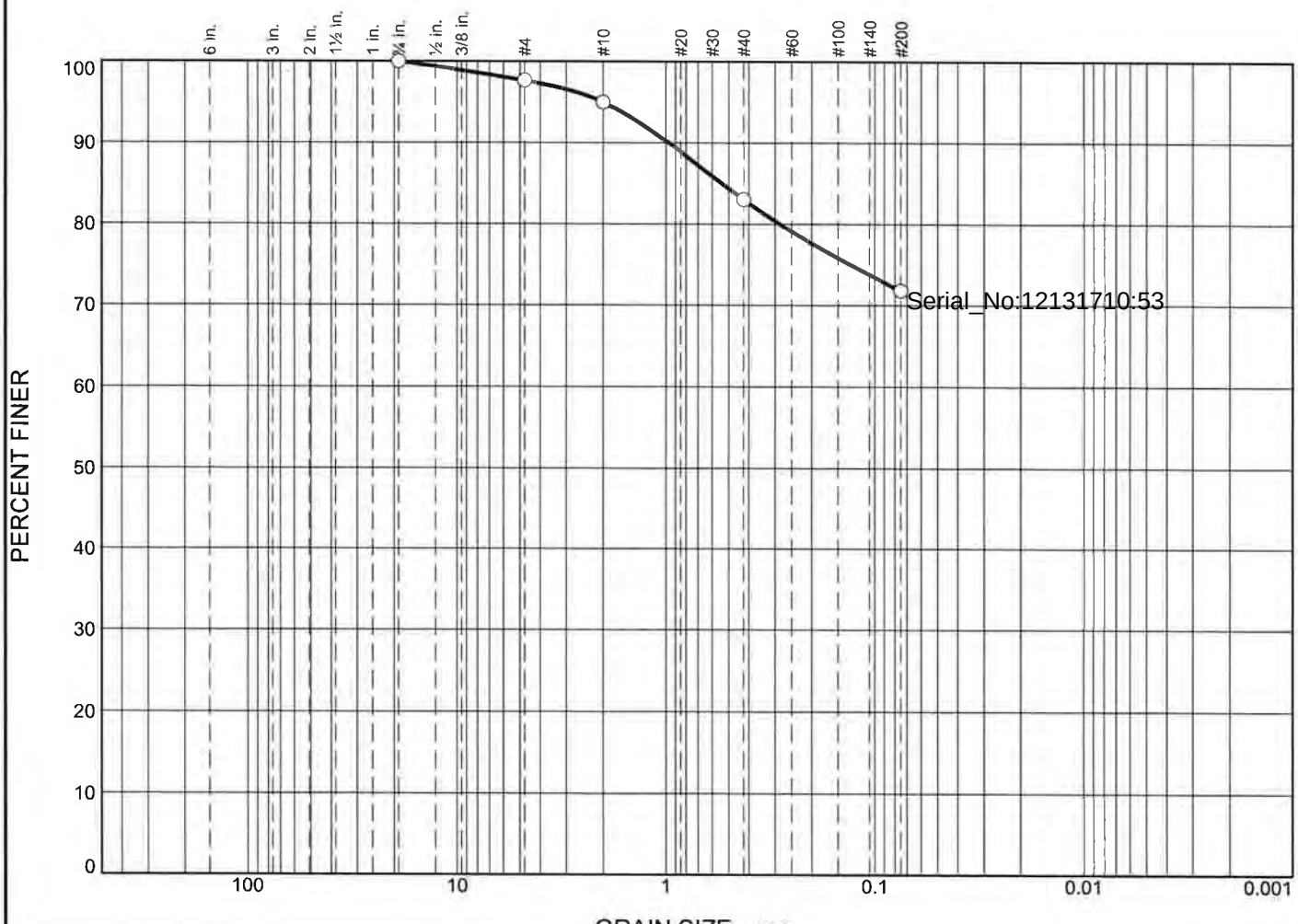
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.1	18.6	19.8			80.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1074	0.1594	0.2535

Fineness Modulus
0.16

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.4	2.6	12.0	11.2	71.8	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.5398							

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-N-TOP **Sample Number:** L1727561-08

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-N-TOP

Sample Number: L1727561-08

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.78
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.78	0.00	0.75	0.00	0.00	100.0
		#4	0.47	0.00	97.6
		#10	0.52	0.00	95.0
		#40	2.37	0.00	83.0
		#200	2.22	0.00	71.8

Serial_No:12131710:53

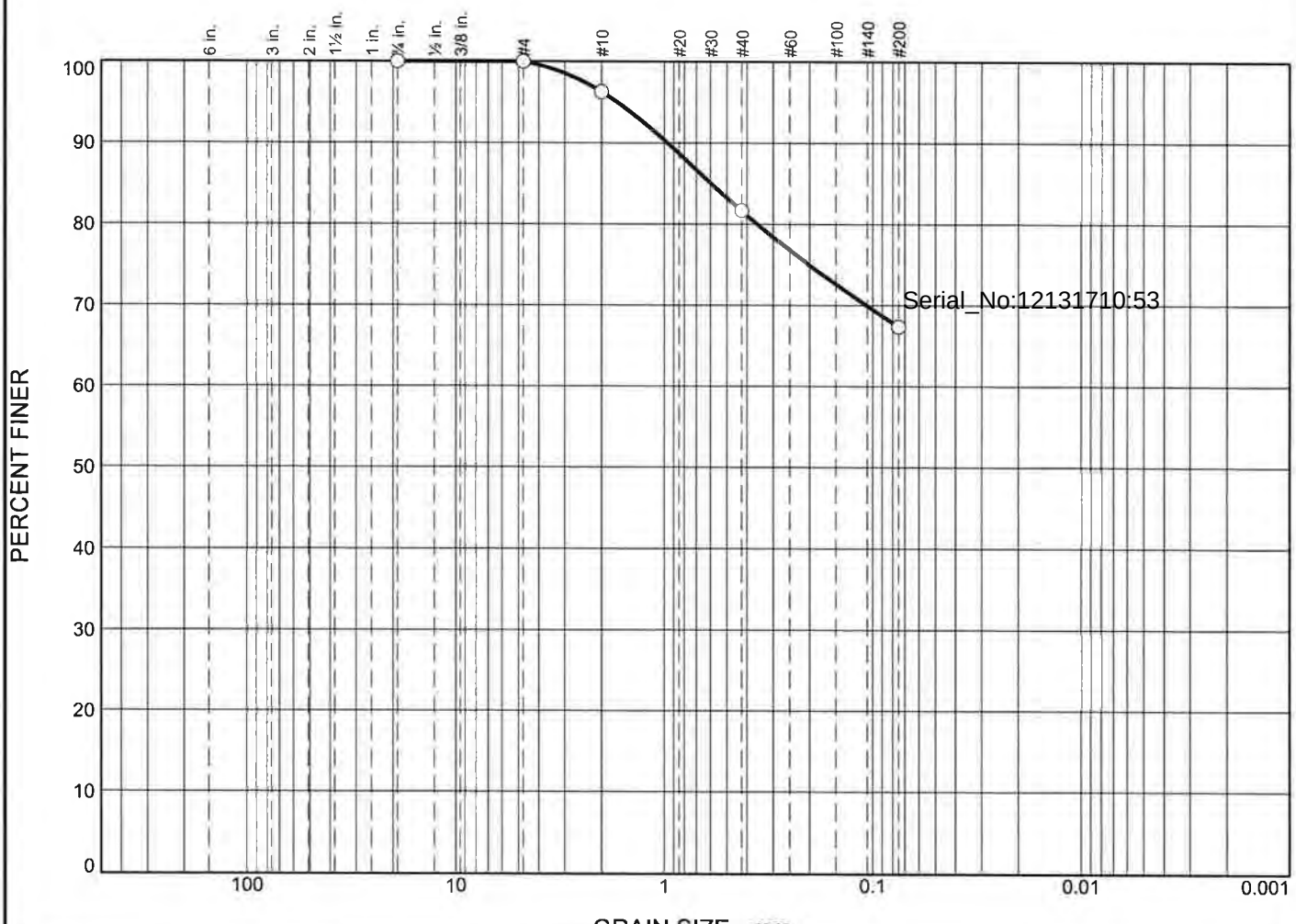
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.4	2.4	2.6	12.0	11.2	25.8			71.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.2850	0.5398	0.9688	2.0020

Fineness Modulus
0.74

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	3.7	14.7	14.3	67.3	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.5930							

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-N-TOP **Sample Number:** WG1030340-1

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-N-TOP

Sample Number: WG1030340-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.91
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Serial_No:12131710:53

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.91	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.89	0.00	96.3
		#40	3.50	0.00	81.6
		#200	3.42	0.00	67.3

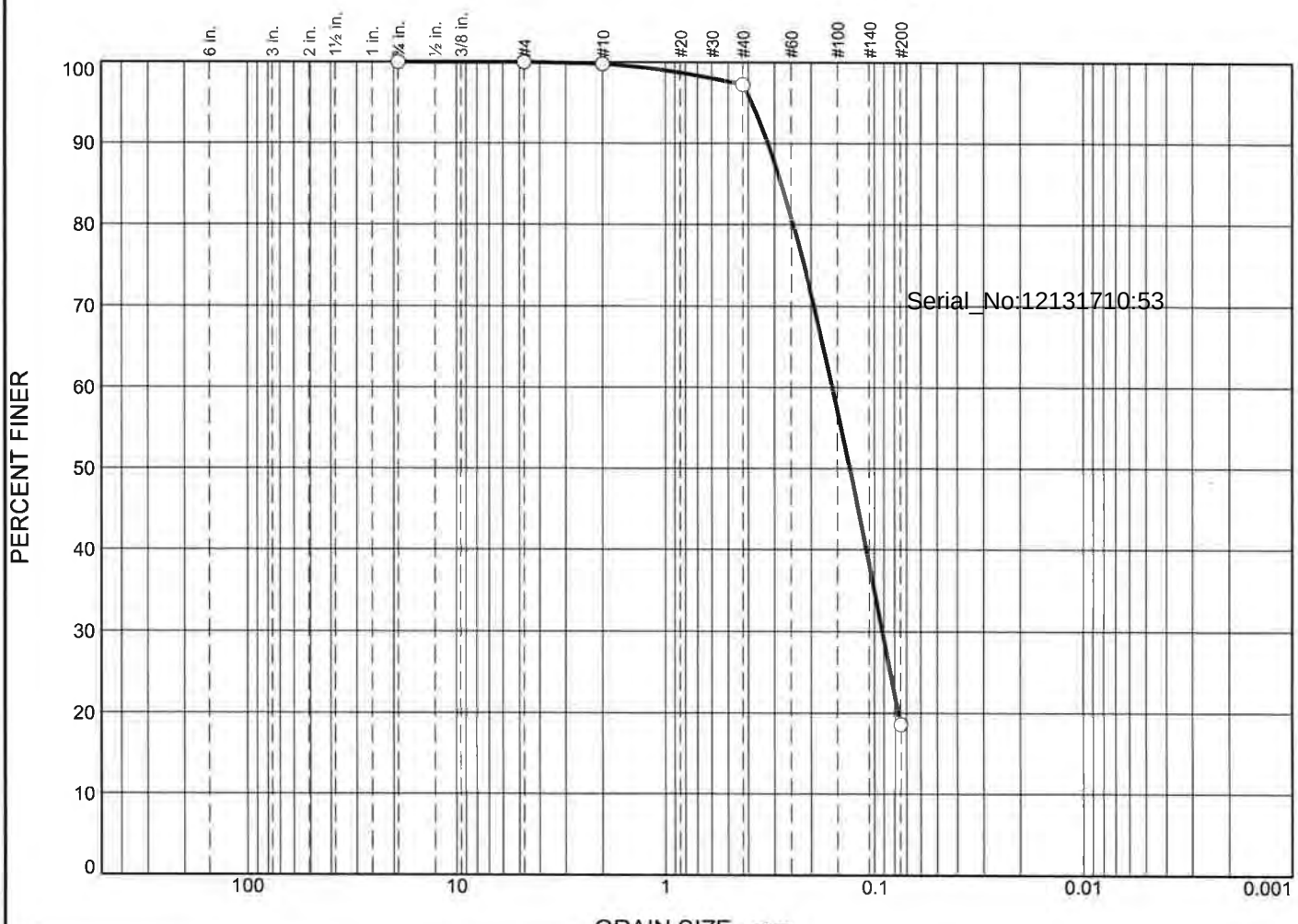
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.7	14.7	14.3	32.7			67.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.3579	0.5930	0.9663	1.6803

Fineness Modulus
0.75

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	2.6	78.6	18.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2784	0.1583	0.1308	0.0915				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-N-BOTTOM **Sample Number:** L1727561-09

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-N-BOTTOM

Sample Number: L1727561-09

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 36.32
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.32	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.08	0.00	99.8
		#40	0.93	0.00	97.2
		#200	28.56	0.00	18.6

Serial_No:12131710:53

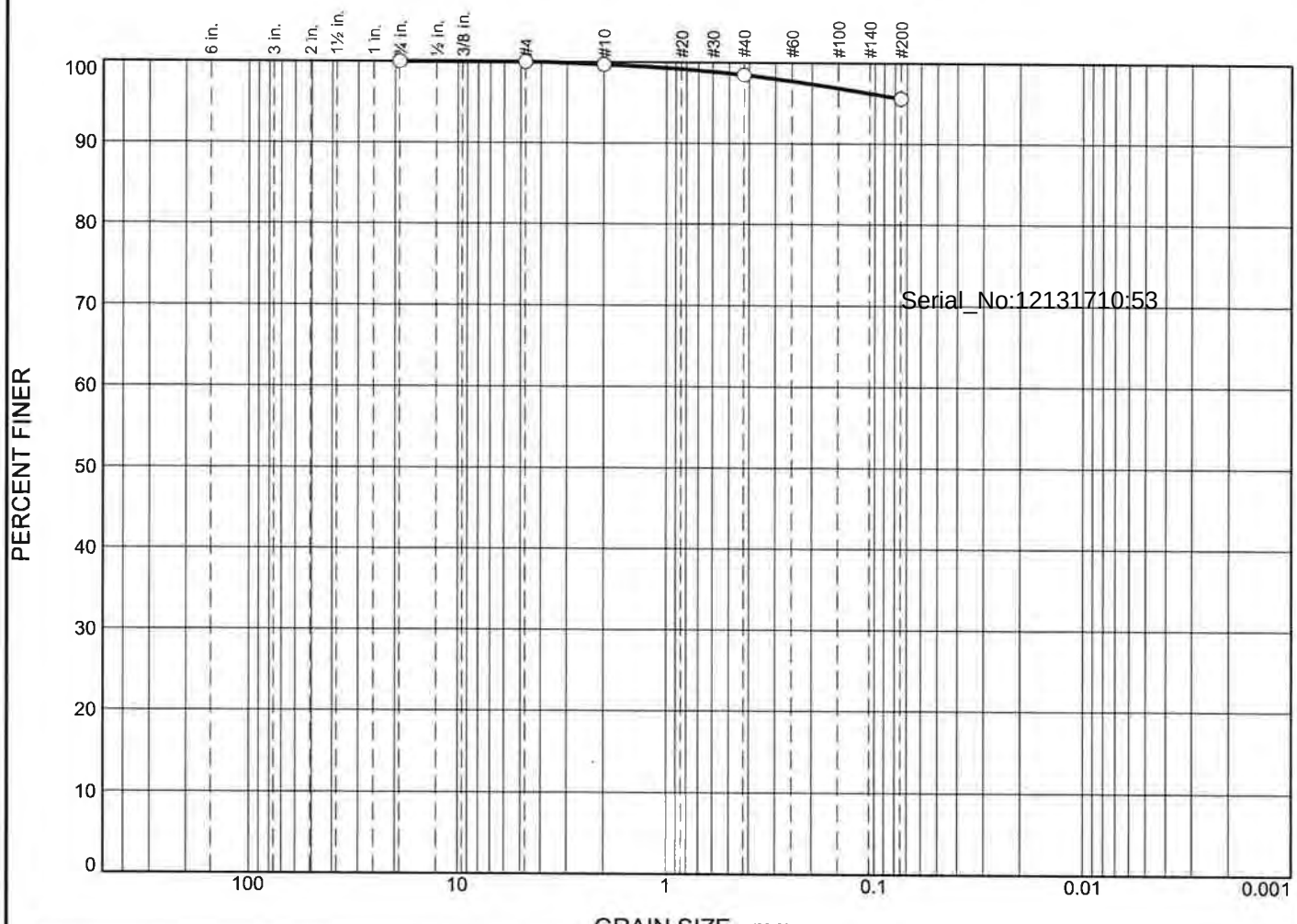
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	2.6	78.6	81.4			18.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0769	0.0915	0.1308	0.1583	0.2445	0.2784	0.3225	0.3853

Fineness Modulus
0.58

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	1.2	2.9	95.6	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-O-TOP **Sample Number:** L1727561-10

Date:

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-O-TOP

Sample Number: L1727561-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.14
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.05	0.00	99.7
		#40	0.21	0.00	98.5
		#200	0.49	0.00	95.6

Serial_No:12131710:53

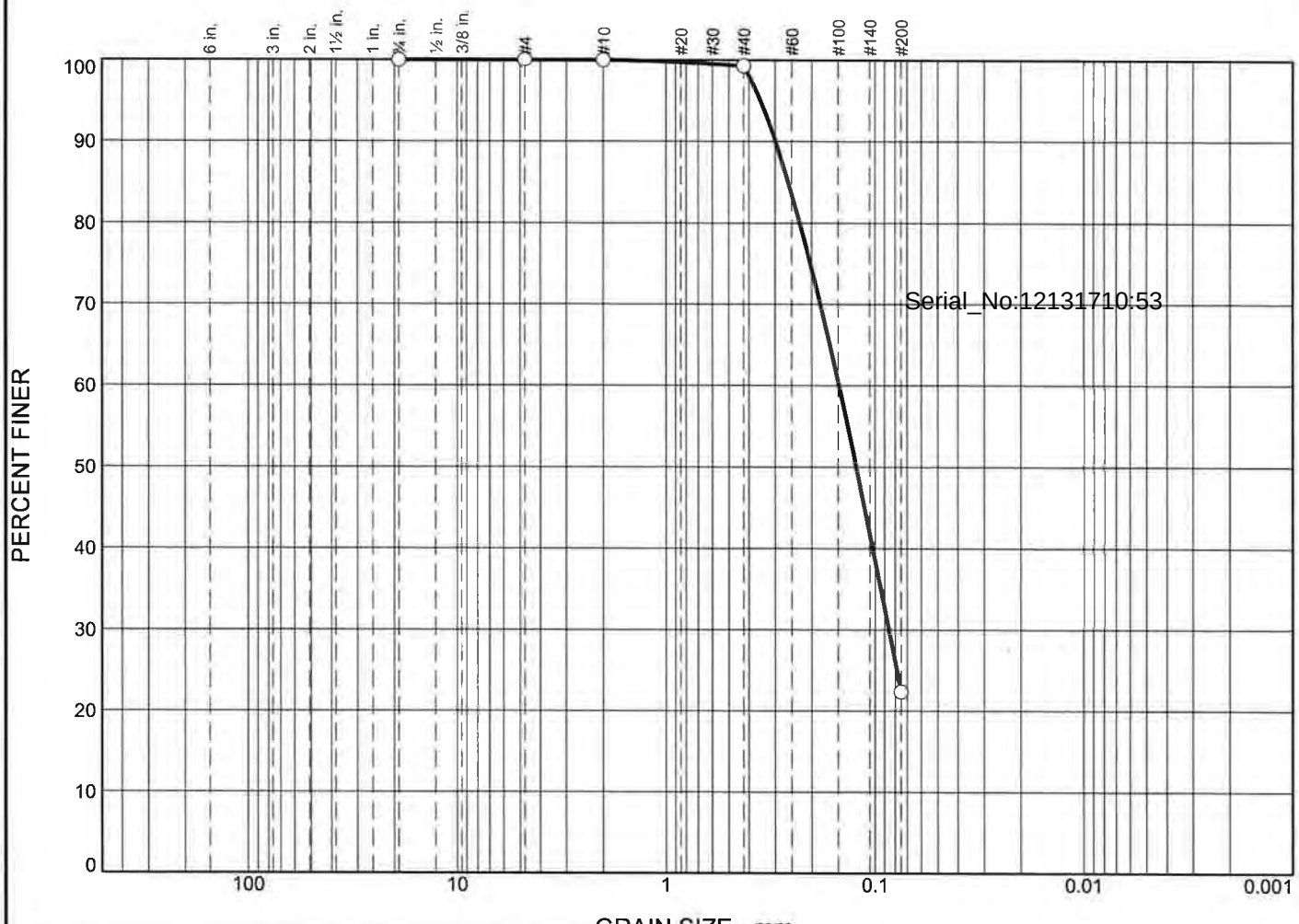
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.3	1.2	2.9	4.4			95.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.07

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.7	76.9	22.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2594	0.1487	0.1229	0.0857				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-O-BOTTOM **Sample Number:** L1727561-11

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-O-BOTTOM
Sample Number: L1727561-11

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 36.67
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.67	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.26	0.00	99.3
		#200	28.19	0.00	22.4

Serial_No:12131710:53

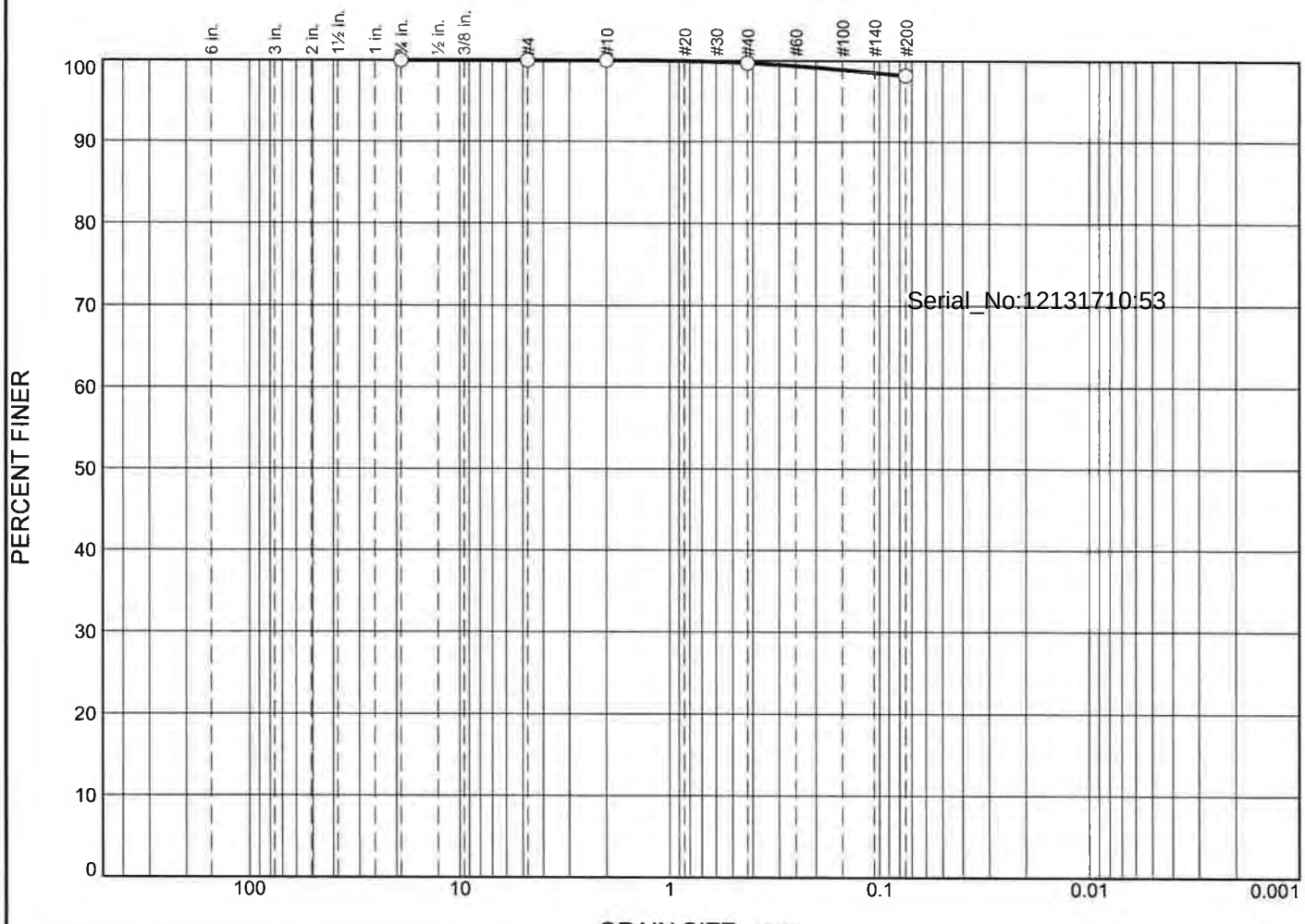
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.7	76.9	77.6			22.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0857	0.1229	0.1487	0.2286	0.2594	0.2988	0.3531

Fineness Modulus
0.50

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.3	1.5	98.2	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-M **Sample Number:** L1727561-12

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-M

Sample Number: L1727561-12

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.58
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.58	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.05	0.00	99.7
		#200	0.27	0.00	98.2

Serial_No:12131710:53

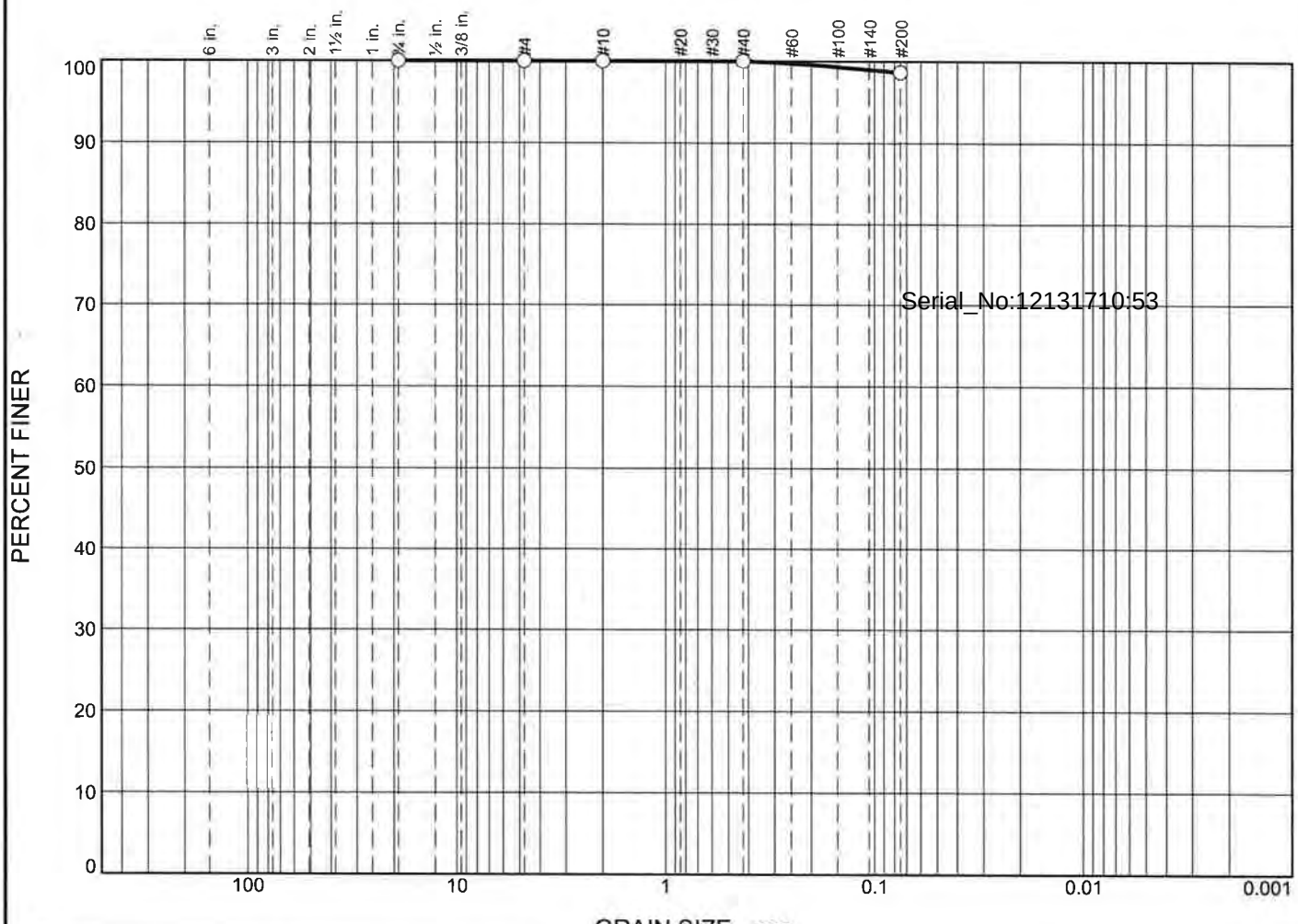
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.3	1.5	1.8			98.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.02

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.0	1.4	98.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-T-TOP **Sample Number:** L1727561-13

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-T-TOP

Sample Number: L1727561-13

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 16.97
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
16.97	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.00	0.00	100.0
		#200	0.23	0.00	98.6

Serial_No:12131710:53

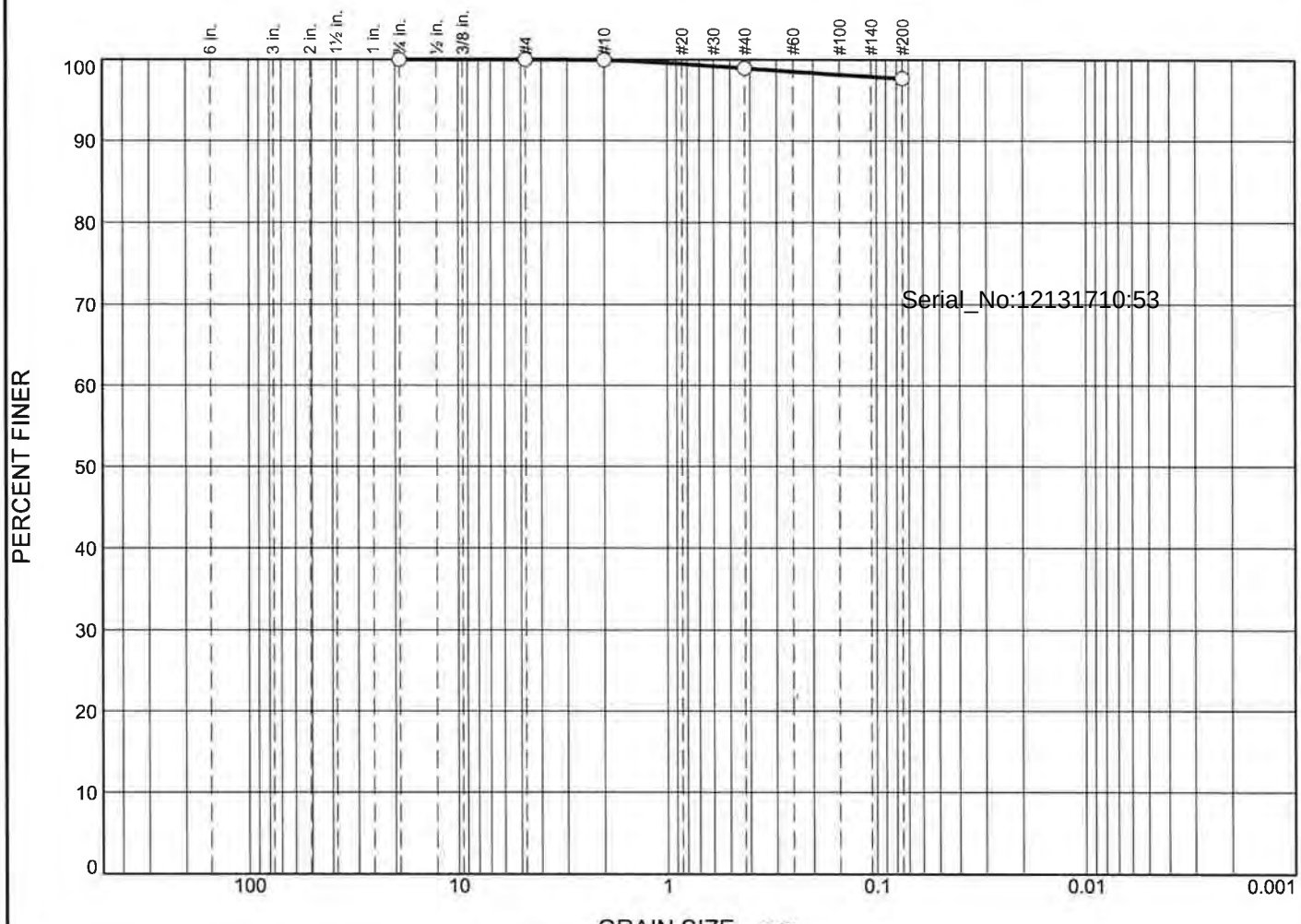
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4			98.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.01

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	1.0	1.2	97.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-T-BOTTOM **Sample Number:** L1727561-14

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/9/2017

Location: NHH-T-BOTTOM

Sample Number: L1727561-14

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 16.91
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
16.91	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	99.9
		#40	0.17	0.00	98.9
		#200	0.21	0.00	97.7

Serial_No:12131710:53

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.0	1.2	2.3			97.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.04

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	NA
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	NA
22. Were the test-specific age requirements met for each test species?	NA
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	NA
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	NA
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	NA

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% Coarse sand (35%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

L1727561

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GS-24TAT CHEM-SID

Analysis Requested

Container Type	Preservation
P – Plastic	1 – HCl, 4°
A – Amber Glass	2 – H2SO4, 4°
G – Clear Glass	3 – HNO3, 4°
V – VOA Vial	4 – NaOH, 4°
O – Other	5 – NaOH/ZnAc, 4°
E – Encore	6 – Na2S2O3, 4°
	7 – 4°

Matrix Codes:

DW – Drinking Water	S – Soil
WW – Wastewater	SL – Sludge
GW – Groundwater	SD – Sediment
SW – Surface Water	SO – Solid
ST – Storm Water	A – Air
W – Water	L – Liquid
	P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6020A / 7474-7471B	PCBs - 8082 / 8270 SIM	PESTICIDES - 8081B	PAHs - 8270D SIM	TOC - 9060					Lab I.D.	Remarks
01	NHH-X-TOP	8/8/17	0922	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X						0-4'9"
02	NHH-X-REP-TOP	8/8/17	0922	X			SD			X	X	X	X	X	X						REPLICATE - 0-4'9"
03	NHH-X-BOTTOM	8/8/17	0922	X			SD			X	X	X	X	X	X						4'9" - 8.0'
04	NHH-Y-TOP	8/8/17	1037	X			SD			X	X	X	X	X	X						0-5'11"
05	NHH-Y-BOTTOM	8/8/17	1037	X		8oz	SD			X											5'11" - 8'6"
06	NHH-Z-TOP	8/8/17	1153	X		8oz/16oz	SD			X	X	X	X	X	X						0-5.0'
07	NHH-Z-BOTTOM	8/8/17	1153	X			SD			X	X	X	X	X	X						5.0' - 8'8"
08	NHH-N-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X						0-6.0'
08	NHH-N-MS-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X						0-6.0' MS
08	NHH-N-MSD-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X						0-6.0' MSD
09	NHH-N-BOTTOM	8/8/17	1305	X		8oz	SD			X											6.0' - 7'6"
10	NHH-O-TOP	8/8/17	1445	X		8oz/16oz	SD			X	X	X	X	X	X						0-8'4"
11	NHH-O-BOTTOM	8/8/17	1445	X		8oz	SD			X											8'8" - 10'1"

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
RYAN MCCARTHY - AECOM Signature:	8/8/17 Time: 1847	Signature:	8/8/17 Time: 1847
Relinquished by: (Print Name)/(Affiliation) Signature:	8/8/17 Time: 2138	Received by: (Print Name)/(Affiliation) Signature:	8/8/17 Time: 2138
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Serial No. № 0154

White: Original (to Lab) Yellow: Lab Pink: Sampler

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: 48-24 TAT

CHEM - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6020A / 7474-7471B	PCBS - 8082	PESTICIDES - 8081B	PAHS - 8270 DSIM	TPC - 5060					Lab I.D.	Remarks
12	NHH - M	8/8/17	1610	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						0 - 6'9"
13	NHH - T - TOP	8/8/17	1734	X		8oz/16oz	SD	⊥	⊥	X	X	X	X	X	X						0 - 4'10"
14	NHH - T - BOTTOM	8/8/17	1734	X		⊥	SD	⊥	⊥	X	X	X	X	X	X						4'10" - 16'4"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/8/17 Time: 1847	Signature:	Date: 8/8/17 Time: 1847
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/8/17 Time: 2138	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/8/17 Time: 2138
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WEST BOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0180

ANALYTICAL REPORT

Lab Number:	L1727787
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE-NHH FNP
Project Number:	60543021
Report Date:	08/10/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1727787-01	NHH-U-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 09:05	08/09/17
L1727787-02	NHH-U-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 09:05	08/09/17
L1727787-03	NHH-P-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 12:19	08/09/17
L1727787-04	NHH-P-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 12:19	08/09/17
L1727787-05	NHH-Q-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 14:27	08/09/17
L1727787-06	NHH-Q-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 14:27	08/09/17
L1727787-07	NHH-W-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 16:34	08/09/17
L1727787-08	NHH-W-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 16:34	08/09/17
L1727787-09	NHH-V-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 17:45	08/09/17
L1727787-10	NHH-V-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 17:45	08/09/17

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE-NHH FNP **Lab Number:** L1727787
Project Number: 60543021 **Report Date:** 08/10/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1030761-1 Laboratory Duplicate RPD for % Coarse sand (172%), % Medium sand (67%), performed on L1727787-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 08/10/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-01
Client ID: NHH-U-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	0.300		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	2.50		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	2.50		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	94.7		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-02
Client ID: NHH-U-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.300		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	4.00		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	5.90		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	5.50		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	84.3		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-03
Client ID: NHH-P-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.400		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	2.90		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	2.10		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	4.20		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	90.4		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-04
Client ID: NHH-P-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	3.80		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	3.30		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	1.70		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	91.2		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-05
Client ID: NHH-Q-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	0.700		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	1.30		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	1.40		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	96.6		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-06
Client ID: NHH-Q-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.900		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	3.90		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	3.10		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	2.60		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	89.5		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-07
Client ID: NHH-W-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	0.500		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	5.30		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	36.7		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	57.5		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-08
Client ID: NHH-W-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	0.100		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	63.2		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	36.7		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-09
Client ID: NHH-V-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	3.10		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	2.50		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	2.00		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	92.4		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

SAMPLE RESULTS

Lab ID: L1727787-10
Client ID: NHH-V-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.300		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Coarse Sand	3.40		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Medium Sand	5.00		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Fine Sand	3.30		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP
% Total Fines	88.0		%	0.100	NA	1	-	08/10/17 12:51	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG1030761-1 QC Sample: L1727787-01 Client ID: NHH-U-TOP						
% Total Gravel	ND	ND	%	NC		25
% Coarse Sand	0.300	4.00	%	**172**	Q	25
% Medium Sand	2.50	5.00	%	**67**	Q	25
% Fine Sand	2.50	2.60	%	4		25
% Total Fines	94.7	88.4	%	7		25

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727787-01A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-02A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-03A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-04A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-05A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-06A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-07A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-08A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1727787-09A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727787
Report Date: 08/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727787-10A	Plastic 8oz unpreserved for Grain Size	A	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name:	USACE-NHH FNP	**Lab Number:**	L1727787
Project Number:	60543021	**Report Date:**	08/10/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE-NHH FNP	**Lab Number:**	L1727787
Project Number:	60543021	**Report Date:**	08/10/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

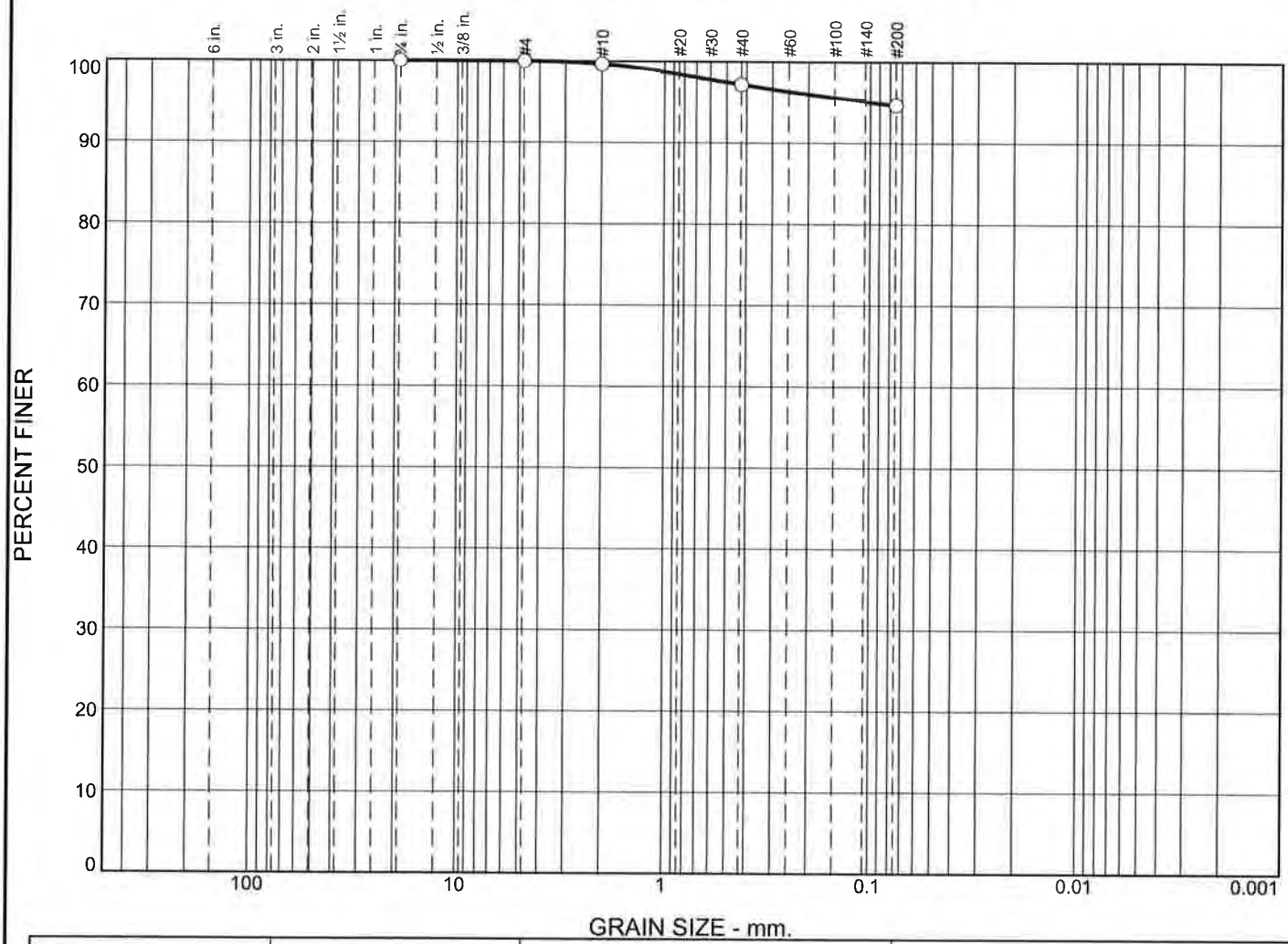
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.3	2.5	2.5	94.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-U-TOP **Sample Number:** L1727787-01

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-U-TOP

Sample Number: L1727787-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.39
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.39	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.06	0.00	99.7
		#40	0.43	0.00	97.2
		#200	0.44	0.00	94.7

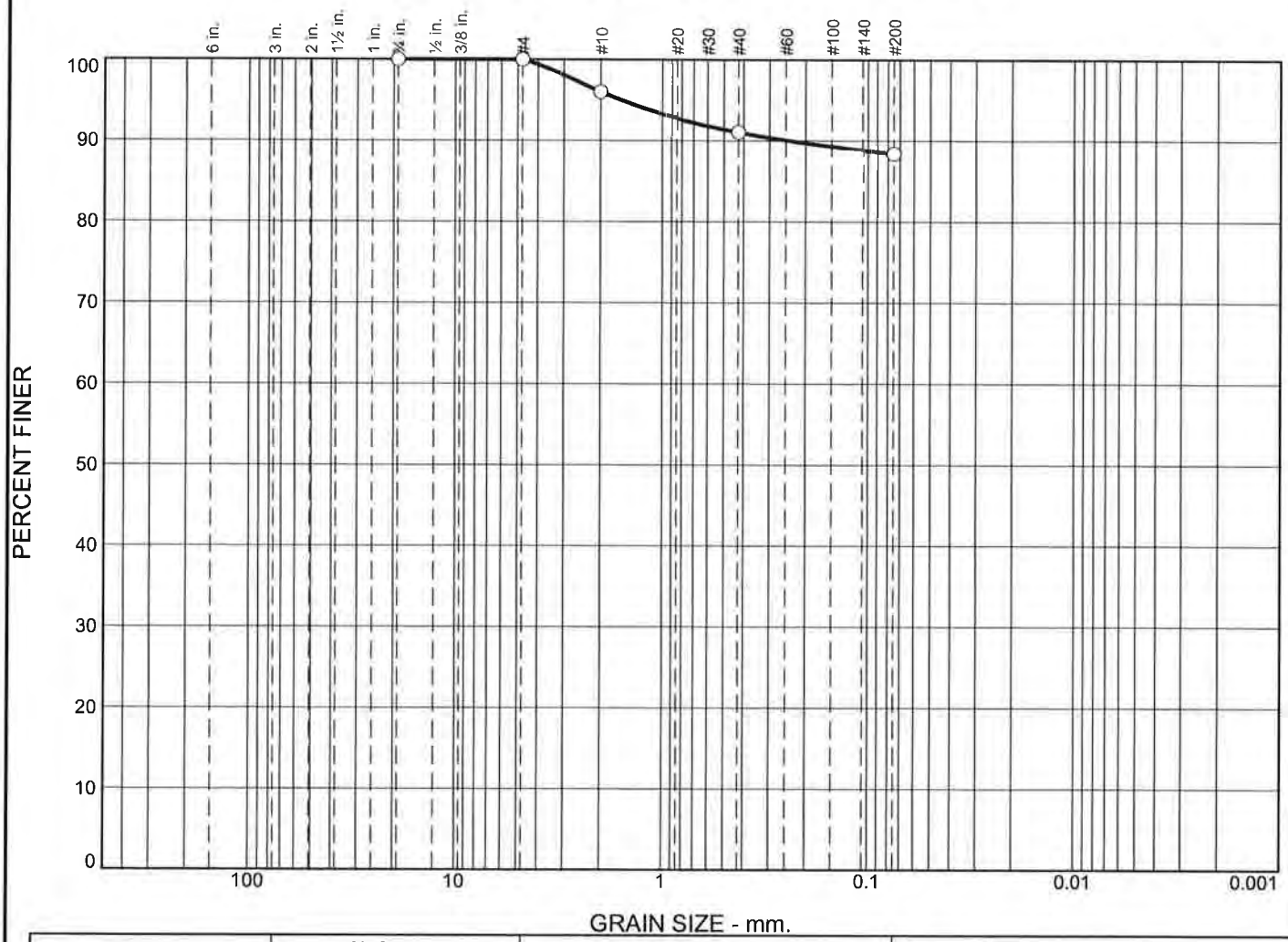
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.3	2.5	2.5	5.3			94.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.0977

Fineness Modulus
0.11

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	4.0	5.0	2.6	88.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-U-TOP **Sample Number:** WG1030761-1

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-U-TOP

Sample Number: WG1030761-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.06
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.06	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.68	0.00	96.0
		#40	0.85	0.00	91.0
		#200	0.45	0.00	88.4

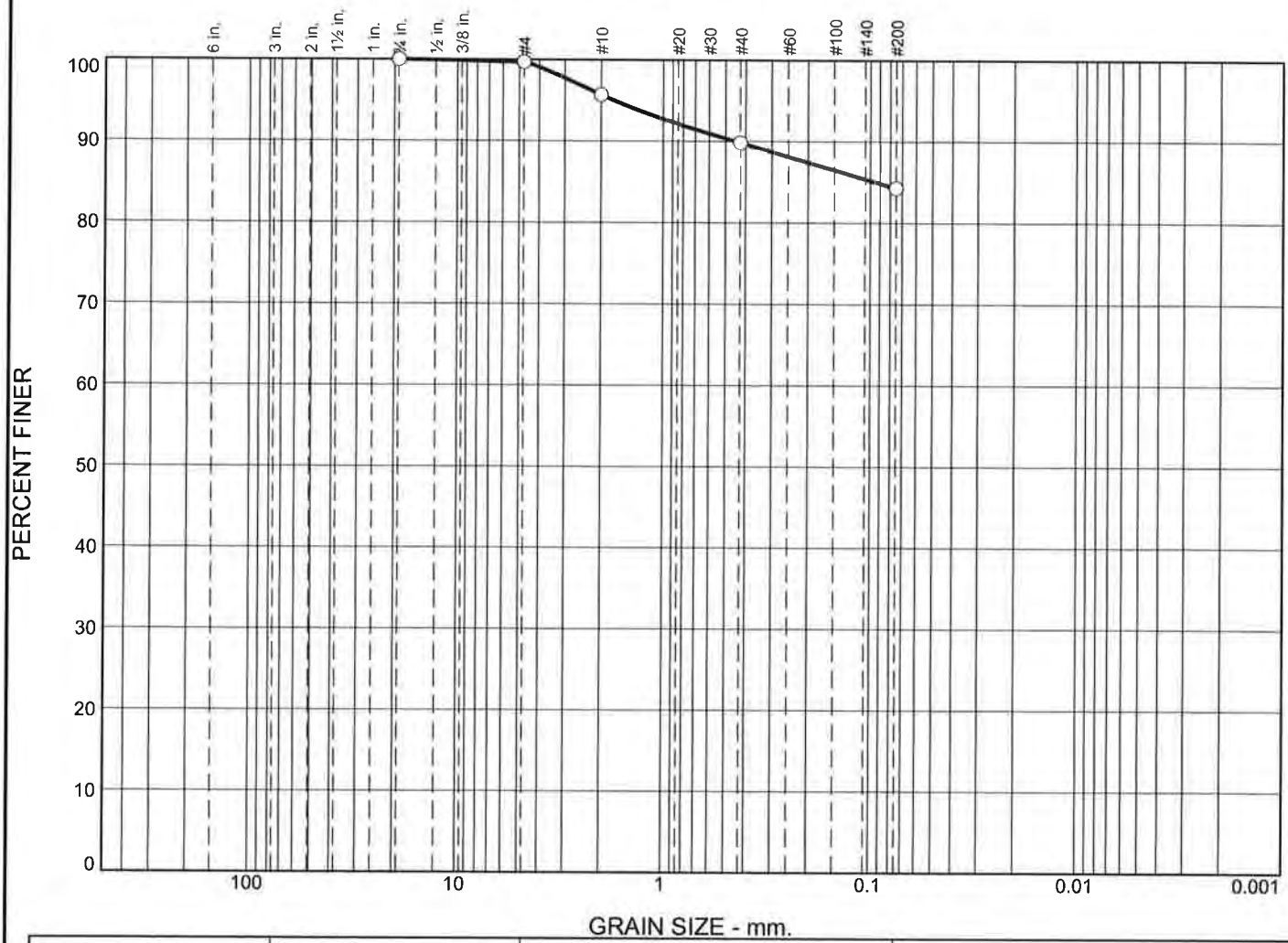
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	4.0	5.0	2.6	11.6			88.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.2415	1.5985

Fineness Modulus
0.38

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	4.0	5.9	5.5	84.3	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0947							

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-U-BOTTOM **Sample Number:** L1727787-02

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-U-BOTTOM
Sample Number: L1727787-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.94
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.94	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.80	0.00	95.7
		#40	1.17	0.00	89.8
		#200	1.11	0.00	84.3

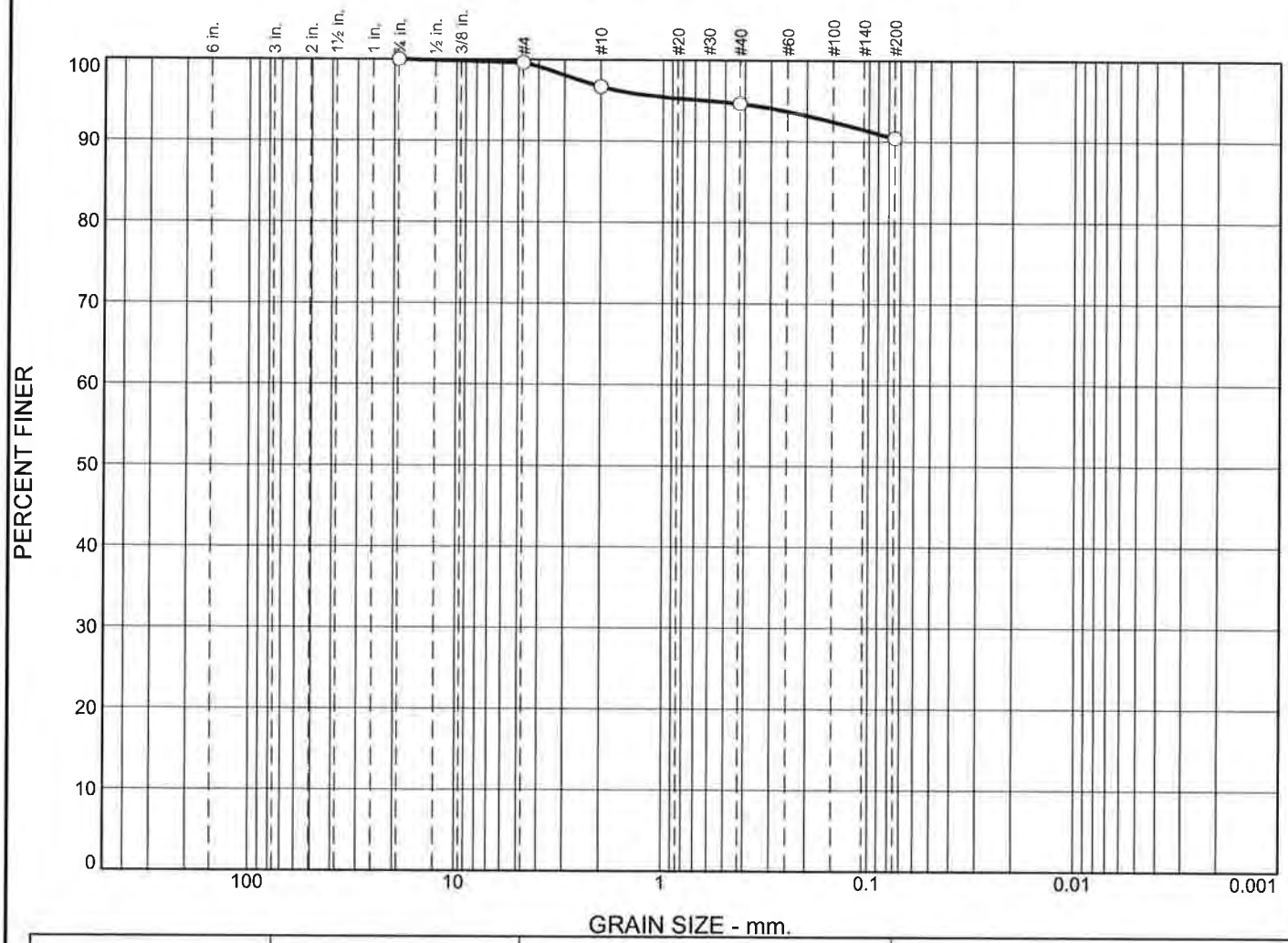
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	4.0	5.9	5.5	15.4			84.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.0947	0.4495	1.7315

Fineness Modulus
0.44

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.4	2.9	2.1	4.2	90.4	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-P-TOP **Sample Number:** L1727787-03

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-P-TOP

Sample Number: L1727787-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.42
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.42	0.00	0.75	0.00	0.00	100.0
		#4	0.07	0.00	99.6
		#10	0.57	0.00	96.7
		#40	0.40	0.00	94.6
		#200	0.82	0.00	90.4

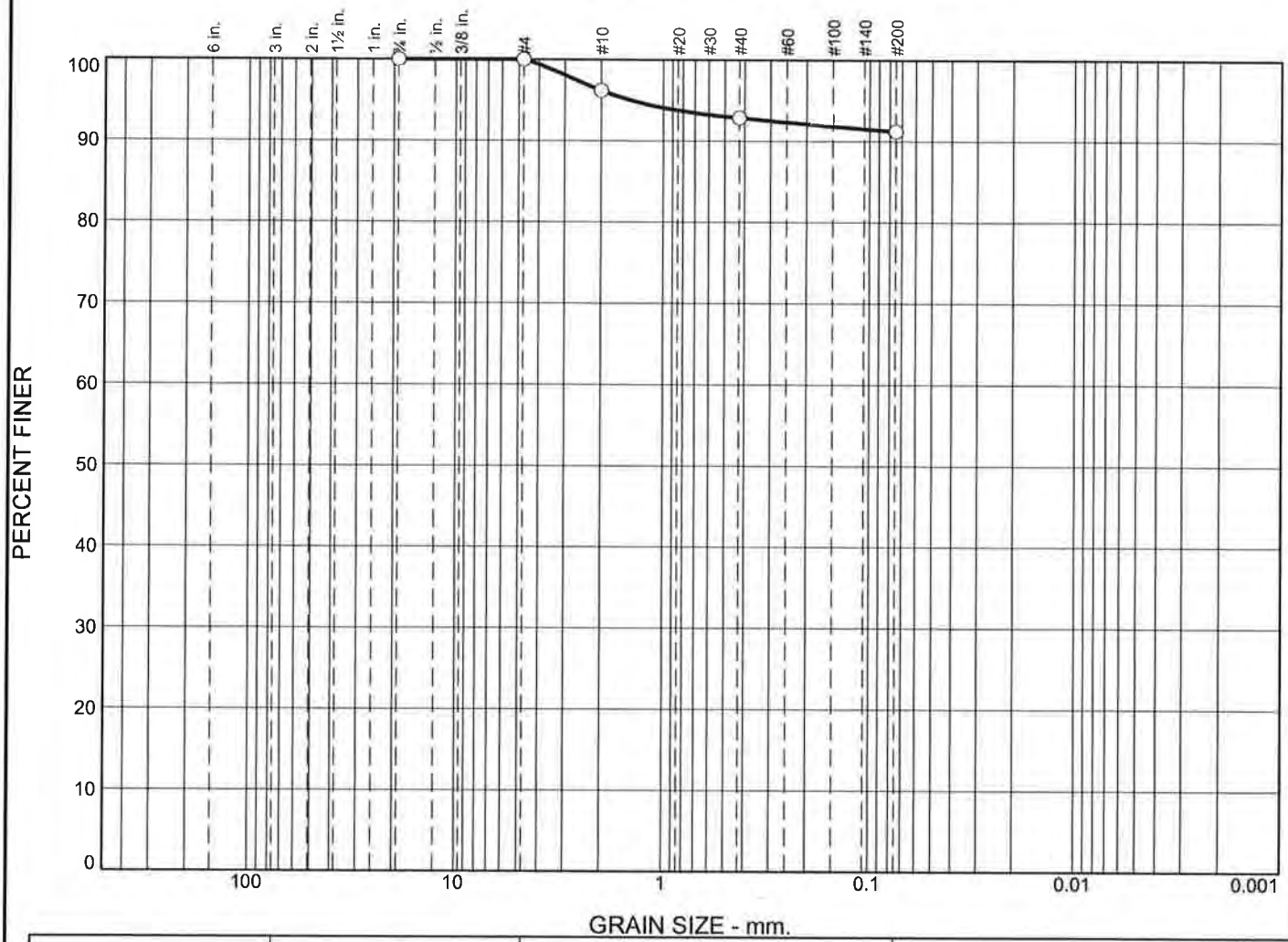
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	2.9	2.1	4.2	9.2			90.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.5998

Fineness Modulus
0.26

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	3.8	3.3	1.7	91.2	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-P-BOTTOM **Sample Number:** L1727787-04

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-P-BOTTOM

Sample Number: L1727787-04

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.65
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.65	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.67	0.00	96.2
		#40	0.59	0.00	92.9
		#200	0.29	0.00	91.2

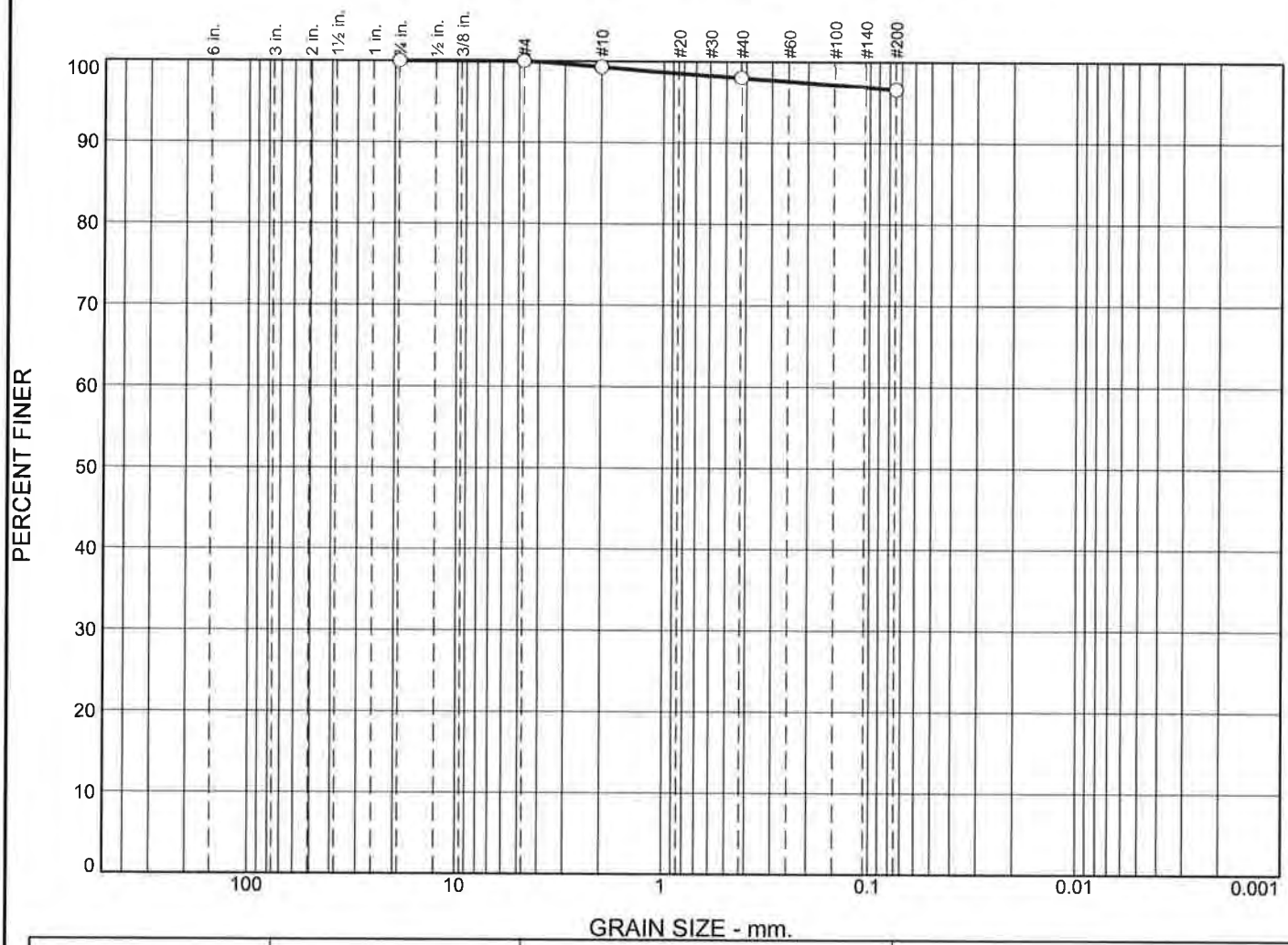
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.8	3.3	1.7	8.8			91.2

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									1.4330

Fineness Modulus
0.31

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.7	1.3	1.4	96.6	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-Q-TOP **Sample Number:** L1727787-05

Date:

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-Q-TOP

Sample Number: L1727787-05

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 16.96
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
16.96	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.12	0.00	99.3
		#40	0.22	0.00	98.0
		#200	0.23	0.00	96.6

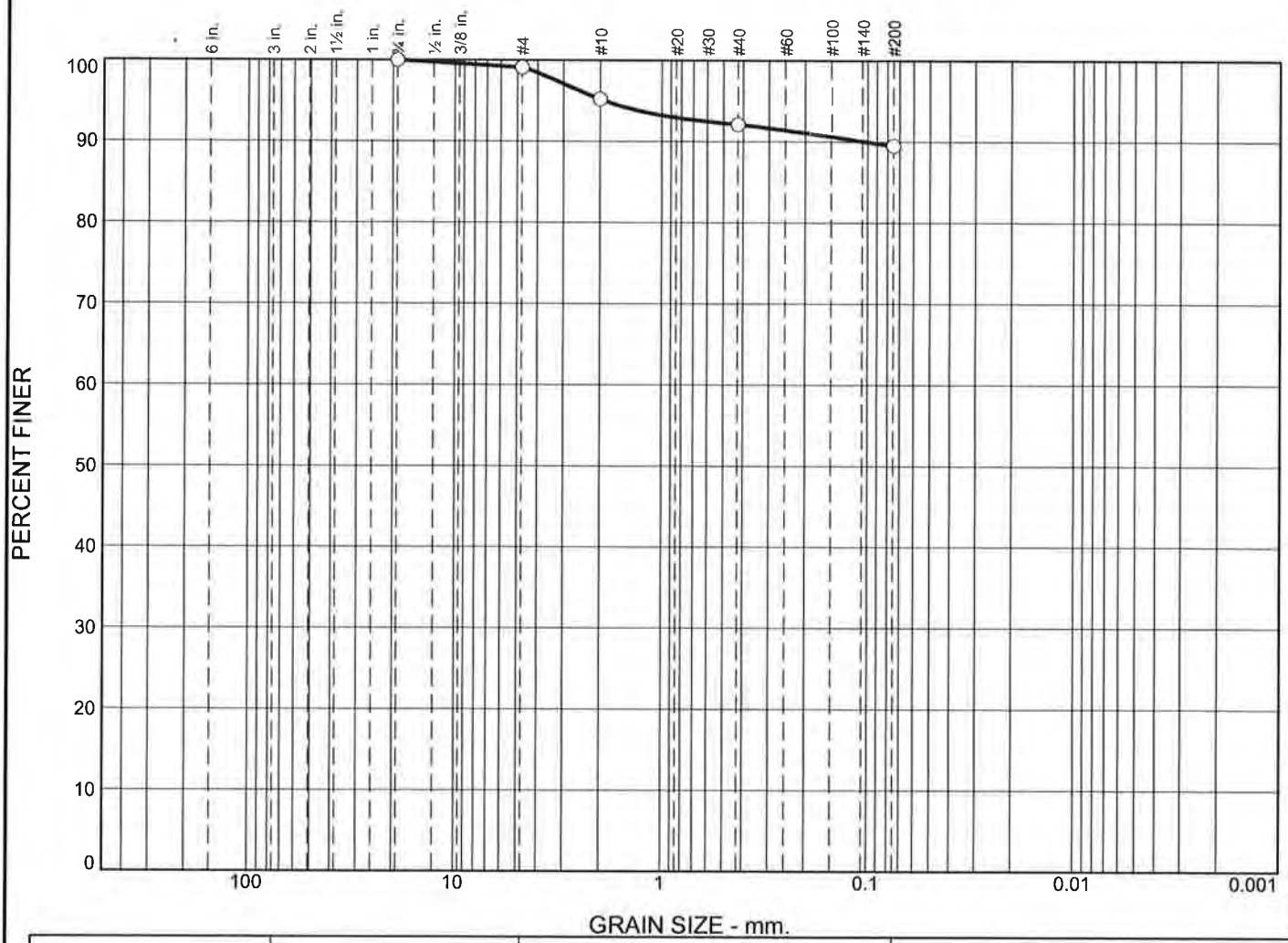
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	1.3	1.4	3.4			96.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.09

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.9	3.9	3.1	2.6	89.5	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Q-BOTTOM **Sample Number:** L1727787-06

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-Q-BOTTOM

Sample Number: L1727787-06

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.98
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.98	0.00	0.75	0.00	0.00	100.0
		#4	0.18	0.00	99.1
		#10	0.78	0.00	95.2
		#40	0.62	0.00	92.1
		#200	0.52	0.00	89.5

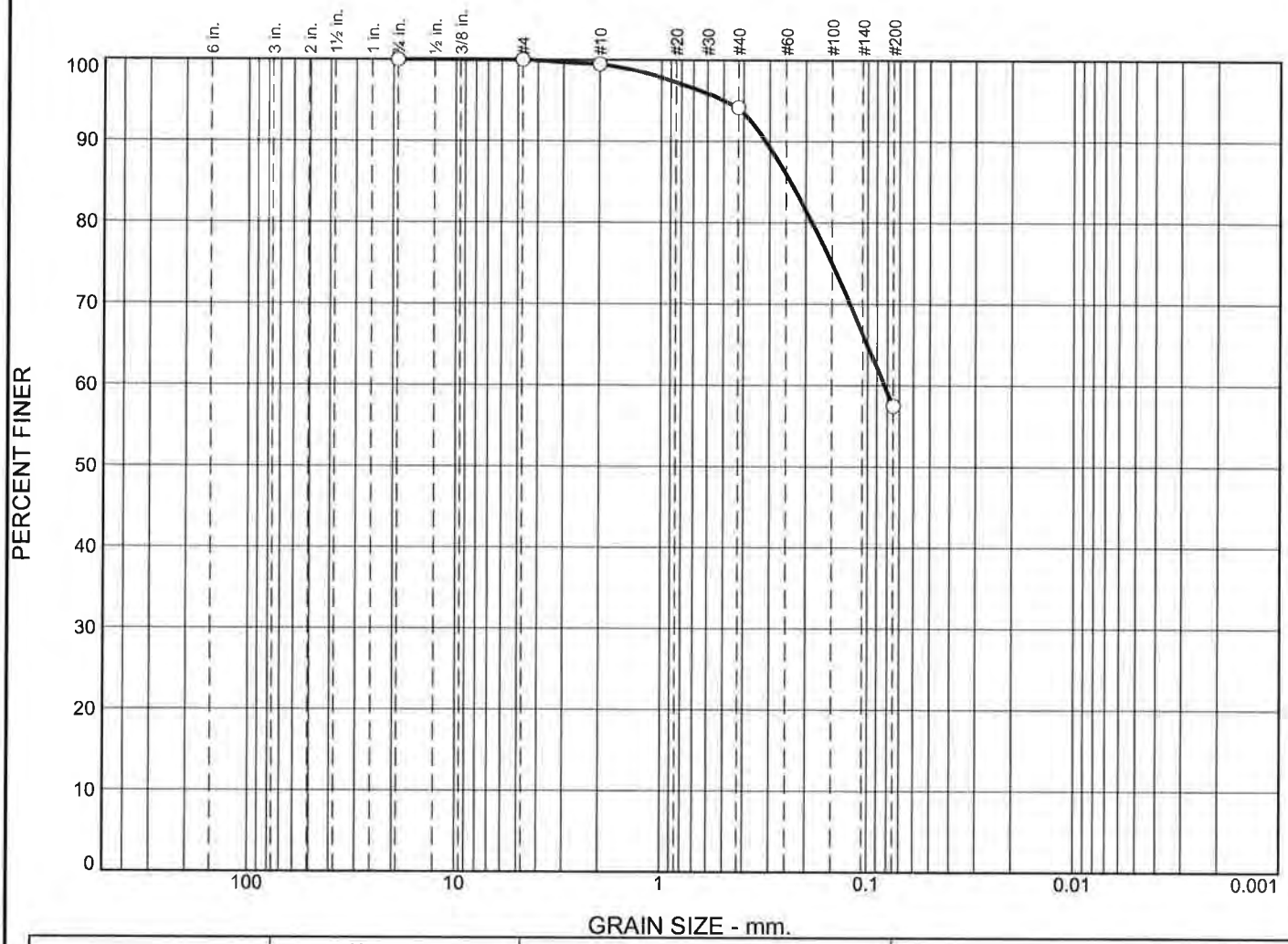
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.9	0.9	3.9	3.1	2.6	9.6			89.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1020	1.9050

Fineness Modulus
0.37

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.5	5.3	36.7	57.5	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2378	0.0827						

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-W-TOP **Sample Number:** L1727787-07

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-W-TOP

Sample Number: L1727787-07

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.74
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.74	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.12	0.00	99.5
		#40	1.26	0.00	94.2
		#200	8.72	0.00	57.5

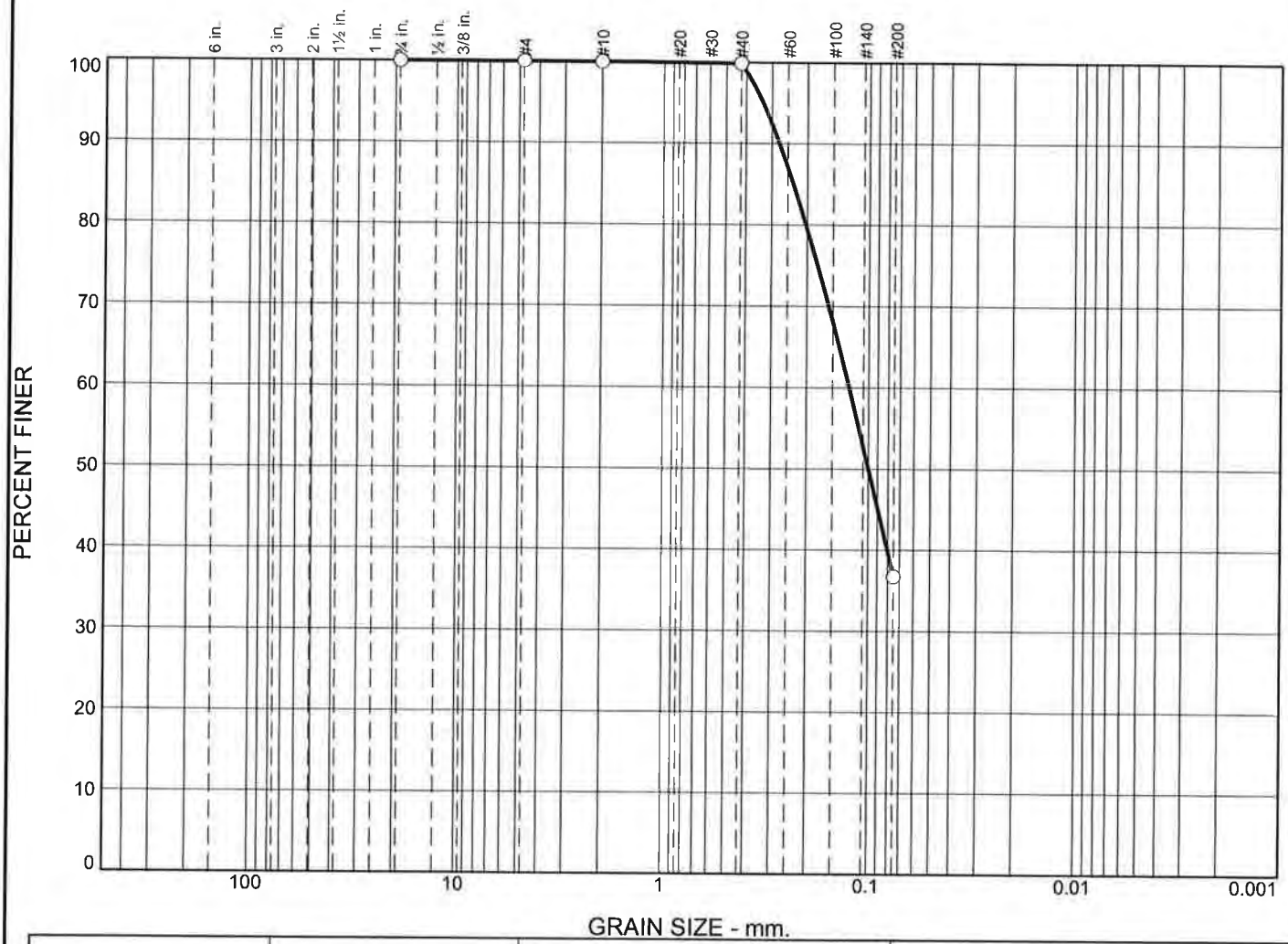
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.5	5.3	36.7	42.5			57.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
					0.0827	0.1871	0.2378	0.3144	0.4991

Fineness Modulus
0.42

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	63.2	36.7	

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.2348	0.1245	0.0998					

Material Description	USCS	AASHTO

Project No. **Client:**
Project:
Source of Sample: NHH-W-BOTTOM **Sample Number:** L1727787-08

Date:

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-W-BOTTOM

Sample Number: L1727787-08

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 38.45
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
38.45	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.05	0.00	99.9
		#200	24.28	0.00	36.7

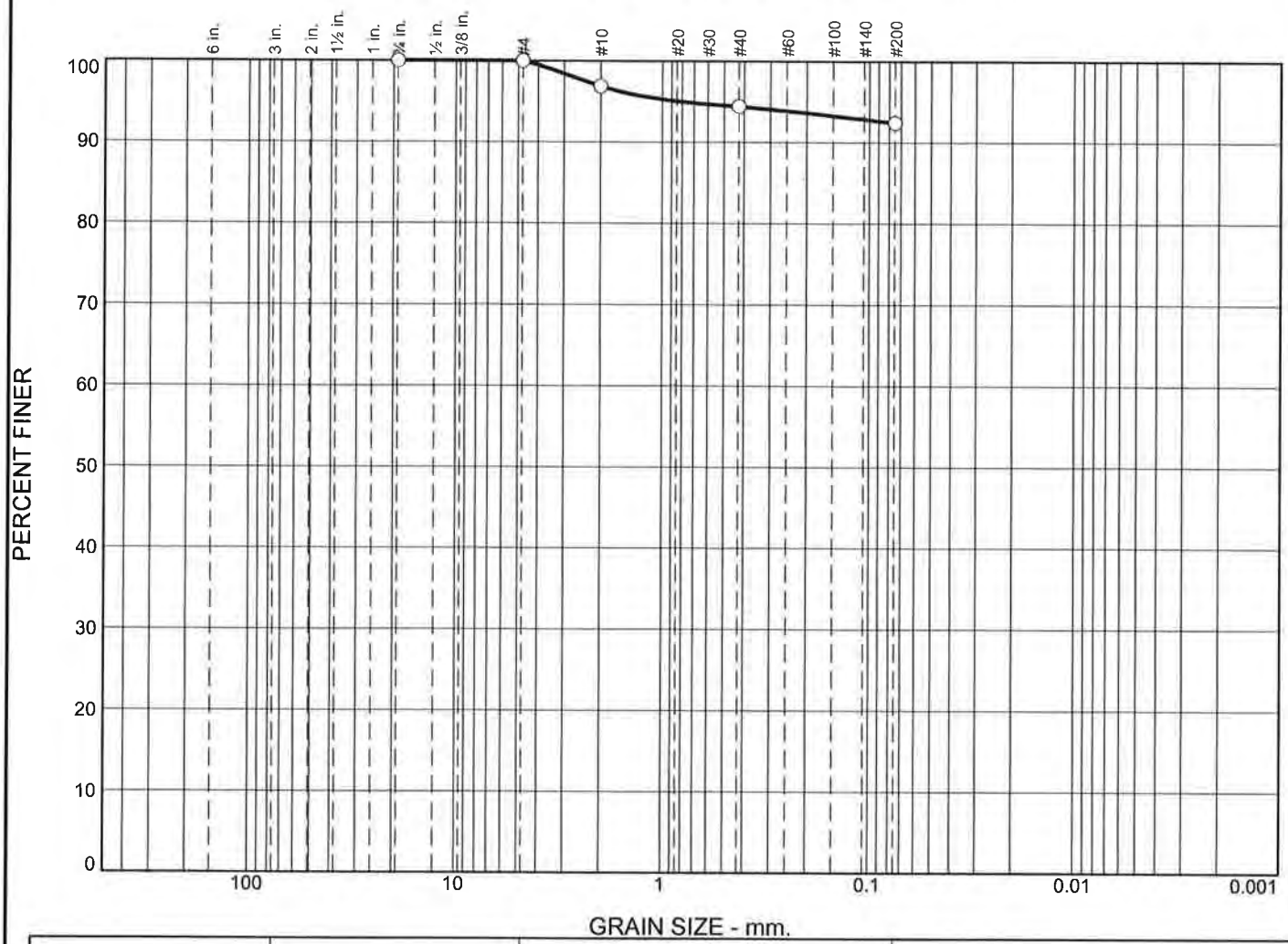
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	63.2	63.3			36.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0998	0.1245	0.2035	0.2348	0.2754	0.3324

Fineness Modulus
0.40

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	3.1	2.5	2.0	92.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-V-TOP **Sample Number:** L1727787-09

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-V-TOP

Sample Number: L1727787-09

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.30
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.30	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.60	0.00	96.9
		#40	0.48	0.00	94.4
		#200	0.38	0.00	92.4

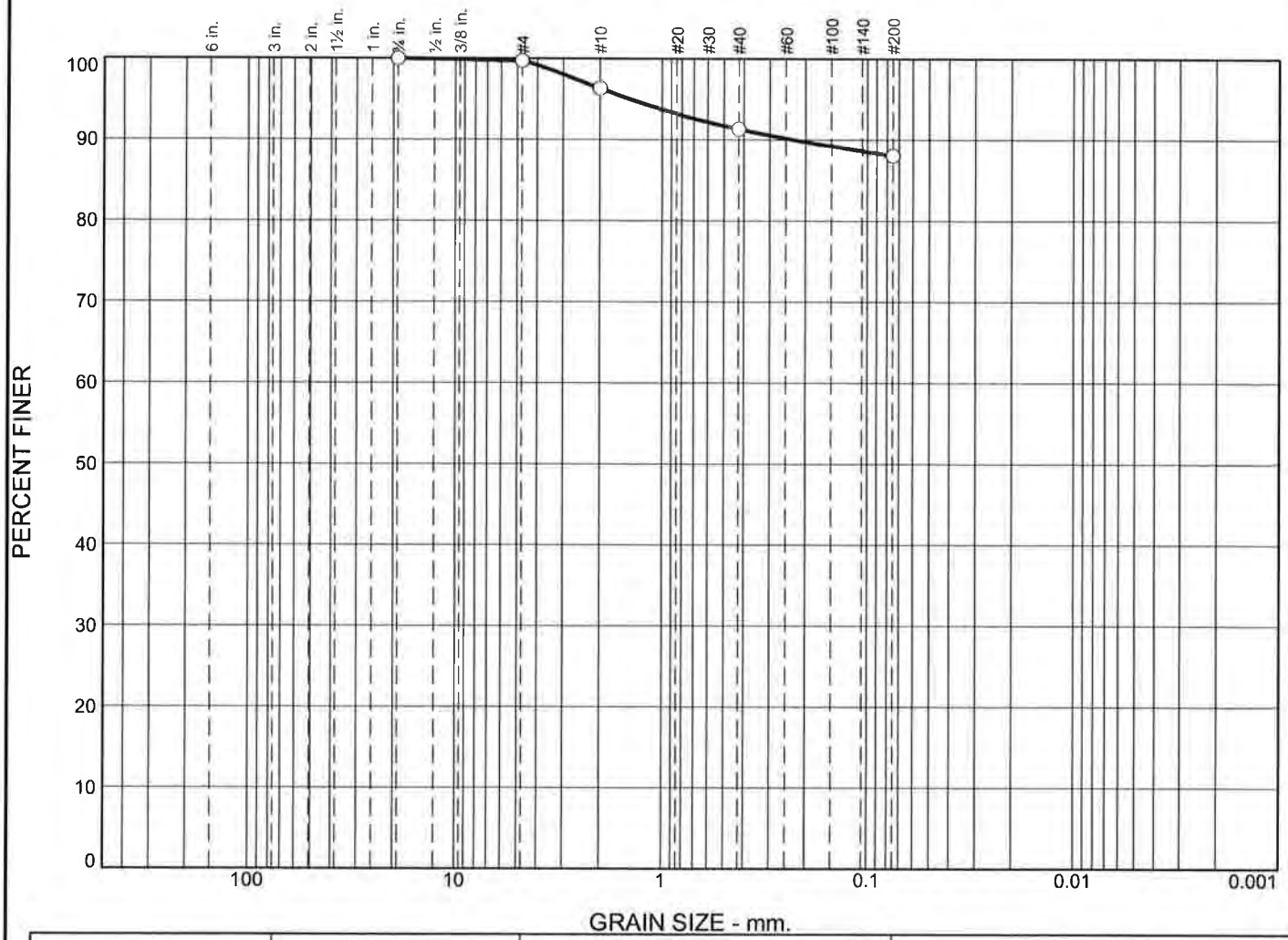
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.1	2.5	2.0	7.6			92.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.8028

Fineness Modulus
0.25

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	3.4	5.0	3.3	88.0	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-V-BOTTOM **Sample Number:** L1727787-10

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/10/2017

Location: NHH-V-BOTTOM

Sample Number: L1727787-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.91
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.91	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.68	0.00	96.3
		#40	0.99	0.00	91.3
		#200	0.65	0.00	88.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	3.4	5.0	3.3	11.7			88.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.2303	1.4514

Fineness Modulus
0.37

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% coarse sand (172%), % medium sand (67%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

L1727787

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GRAINSIZE - 24hr CHEMISTRY - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAINSIZE - SIEVE	METALS - 6020A/7471A-7473	PCBS - 8082/8270 SIM	PESTICIDES - 8081B	PAHS - 8270D SIM	TOC - 9060					Lab I.D.	Remarks
01	NHH - U - TOP	8/9/17	0705	X		807/1607	SD	4°C	N/A	X	X	X	X	X	X						0 - 5'10"
02	NHH - U - BOTTOM		0705	X		↓				X	X	X	X	X	X						5'10" - 30"
03	NHH - P - TOP		1219							X	X	X	X	X	X						0 - 5'9"
04	NHH - P - BOTTOM		1219							X	X	X	X	X	X						5'9" - 12'4"
05	NHH - Q - TOP		1427							X	X	X	X	X	X						0 - 5'3"
06	NHH - Q - BOTTOM		1427							X	X	X	X	X	X						5'3" - 29.5"
07	NHH - W - TOP		1634							X	X	X	X	X	X						0 - 5'6"
08	NHH - W - BOTTOM		1634			807				X											5'6" - 8'2"
09	NHH - V - TOP		1745			807/1607				X	X	X	X	X	X						0 - 4'9"
10	NHH - V - BOTTOM		1745			↓				X	X	X	X	X	X						4'9" - 8'7"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1558
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0155

ANALYTICAL REPORT

Lab Number:	L1728048
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	08/11/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728048-01	NHH-R-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 08:32	08/10/17
L1728048-02	NHH-R-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 08:32	08/10/17
L1728048-03	NHH-S-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 09:55	08/10/17
L1728048-04	NHH-S-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 09:55	08/10/17
L1728048-05	NHH-J	SEDIMENT	NEW HAVEN, CT	08/10/17 11:41	08/10/17
L1728048-06	NHH-L	SEDIMENT	NEW HAVEN, CT	08/10/17 13:00	08/10/17
L1728048-07	NHH-K-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:09	08/10/17
L1728048-08	NHH-K-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 14:09	08/10/17
L1728048-09	NHH-H-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1728048-10	NHH-H-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1728048-11	NHH-H-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1728048-12	NHH-I-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 15:48	08/10/17
L1728048-13	NHH-I-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 15:48	08/10/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1728048
Project Number: 60543021 **Report Date:** 08/11/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1031205-1 Laboratory Duplicate RPD for % Coarse sand (129%), % Medium sand (137%), % Fine sand (64%), performed on L1728048-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 08/11/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-01
Client ID: NHH-R-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	7.90		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	5.30		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	2.90		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	83.9		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-02
Client ID: NHH-R-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	3.60		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	5.40		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	2.60		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	88.4		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-03
Client ID: NHH-S-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	1.00		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	3.10		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	8.30		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	87.6		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-04
Client ID: NHH-S-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	0.400		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	3.30		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	74.3		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	22.0		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-05
Client ID: NHH-J
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 11:41
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	10.1		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	9.20		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	7.60		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	73.1		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-06
Client ID: NHH-L
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 13:00
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.200		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	4.40		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	5.00		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	6.10		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	84.3		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-07
Client ID: NHH-K-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.800		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	15.2		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	3.70		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	80.3		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-08
Client ID: NHH-K-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.300		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	8.10		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	51.3		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	38.7		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	1.60		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-09
Client ID: NHH-H-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	3.30		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	4.50		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	6.80		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	85.4		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-10
Client ID: NHH-H-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.400		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	5.00		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	5.90		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	5.90		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	82.8		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-11
Client ID: NHH-H-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	0.200		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	1.50		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	19.9		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	78.4		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-12
Client ID: NHH-I-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	2.70		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	8.80		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	9.80		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	78.7		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

SAMPLE RESULTS

Lab ID: L1728048-13
Client ID: NHH-I-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Coarse Sand	1.80		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Medium Sand	5.10		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Fine Sand	4.80		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP
% Total Fines	88.3		%	0.100	NA	1	-	08/11/17 14:12	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-13 QC Batch ID: WG1031205-1 QC Sample: L1728048-01 Client ID: NHH-R-TOP						
% Total Gravel	ND	ND	%	NC		25
% Coarse Sand	7.90	1.70	%	**129**	Q	25
% Medium Sand	5.30	1.00	%	**137**	Q	25
% Fine Sand	2.90	1.50	%	**64**	Q	25
% Total Fines	83.9	95.8	%	13		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728048-01A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-02A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-03A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-04A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-05A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-06A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-07A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-08A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-09A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728048
Report Date: 08/11/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728048-10A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-11A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-12A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728048-13A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728048
Project Number:	60543021	**Report Date:**	08/11/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728048
Project Number:	60543021	**Report Date:**	08/11/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

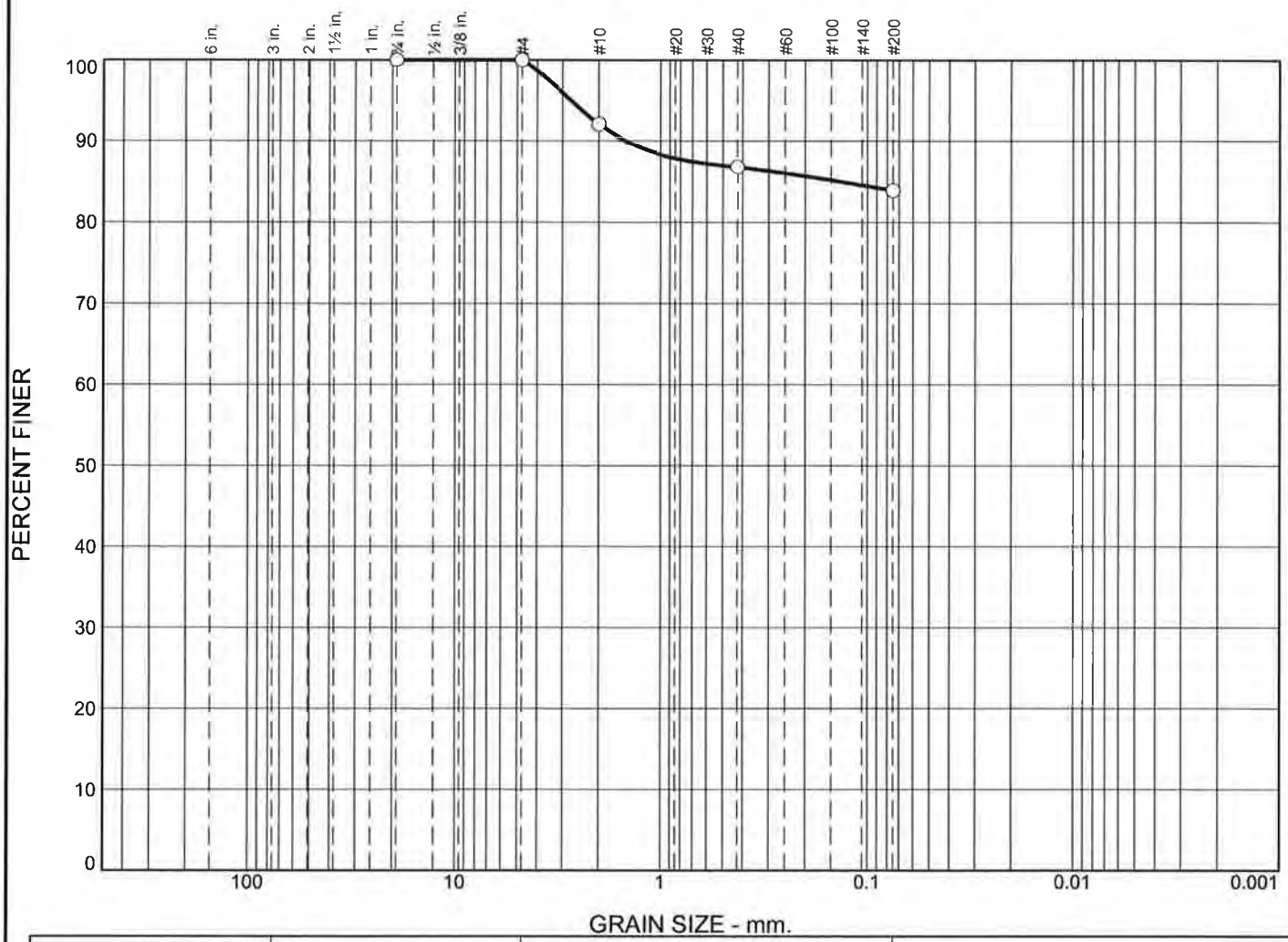
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	7.9	5.3	2.9	83.9	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1353							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-R-TOP **Sample Number:** L1728048-01

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-R-TOP

Sample Number: L1728048-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.78
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.78	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	1.41	0.00	92.1
		#40	0.94	0.00	86.8
		#200	0.51	0.00	83.9

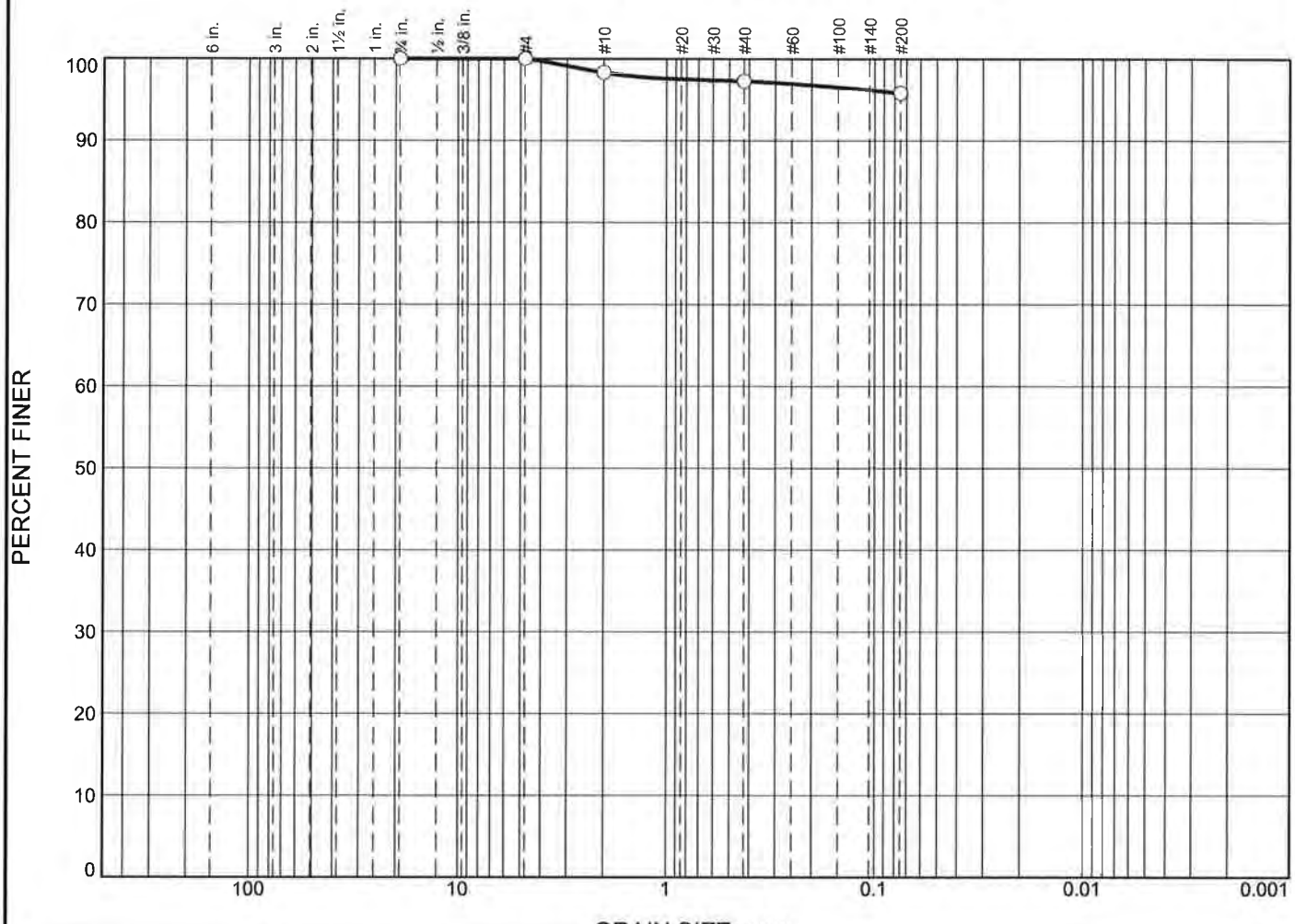
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	7.9	5.3	2.9	16.1			83.9

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1353	1.4863	2.7283

Fineness Modulus
0.59

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.7	1.0	1.5	95.8	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-R-TOP **Sample Number:** WG1031205-1

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-R-TOP

Sample Number: WG1031205-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 17.23
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
17.23	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.29	0.00	98.3
		#40	0.18	0.00	97.3
		#200	0.25	0.00	95.8

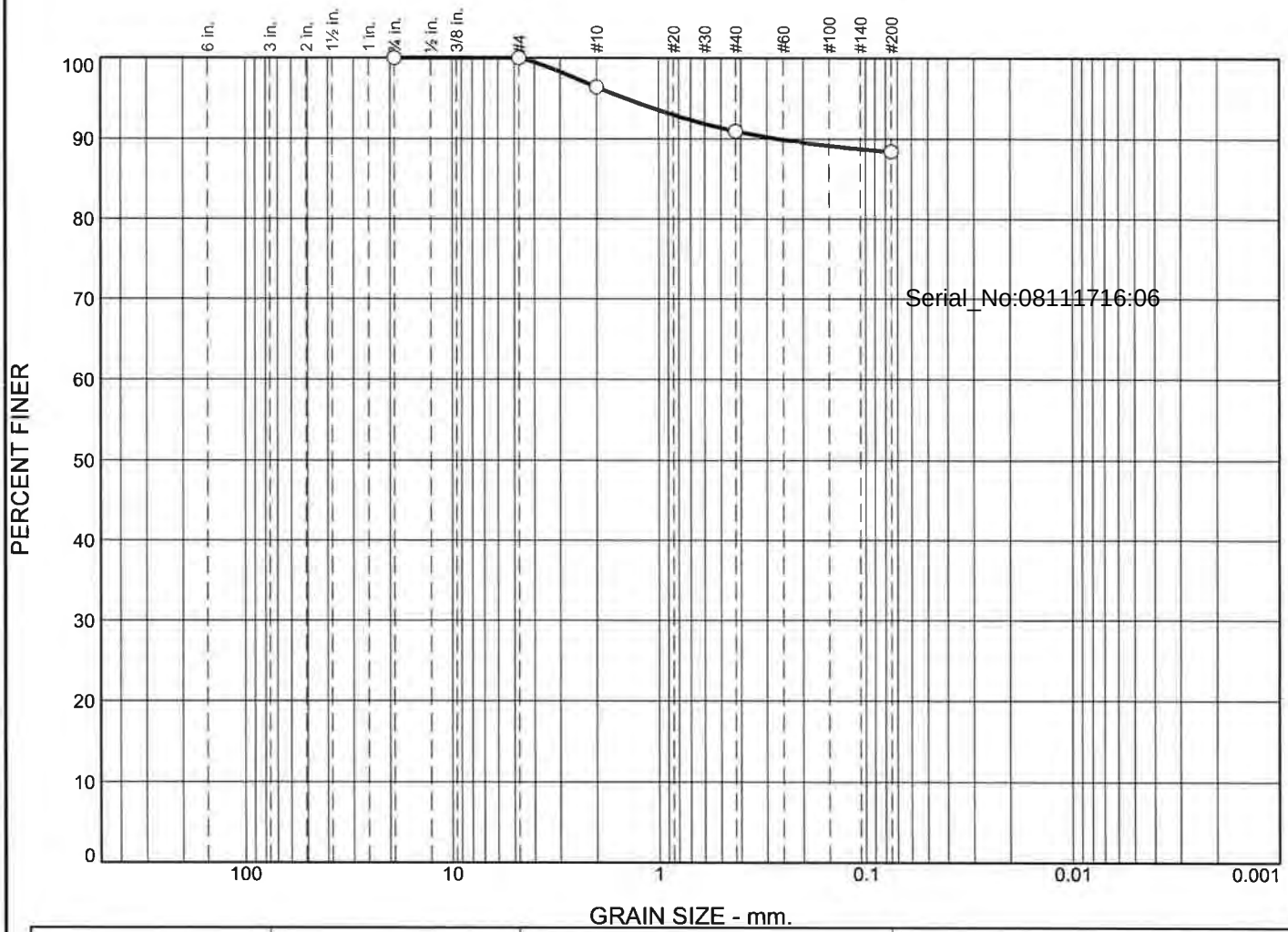
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.7	1.0	1.5	4.2			95.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	3.6	5.4	2.6	88.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-R-BOTTOM **Sample Number:** L1728048-02

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-R-BOTTOM

Sample Number: L1728048-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.45
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.45	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.70	0.00	96.4
		#40	1.06	0.00	91.0
		#200	0.49	0.00	88.4

Serial_No:08111716:06

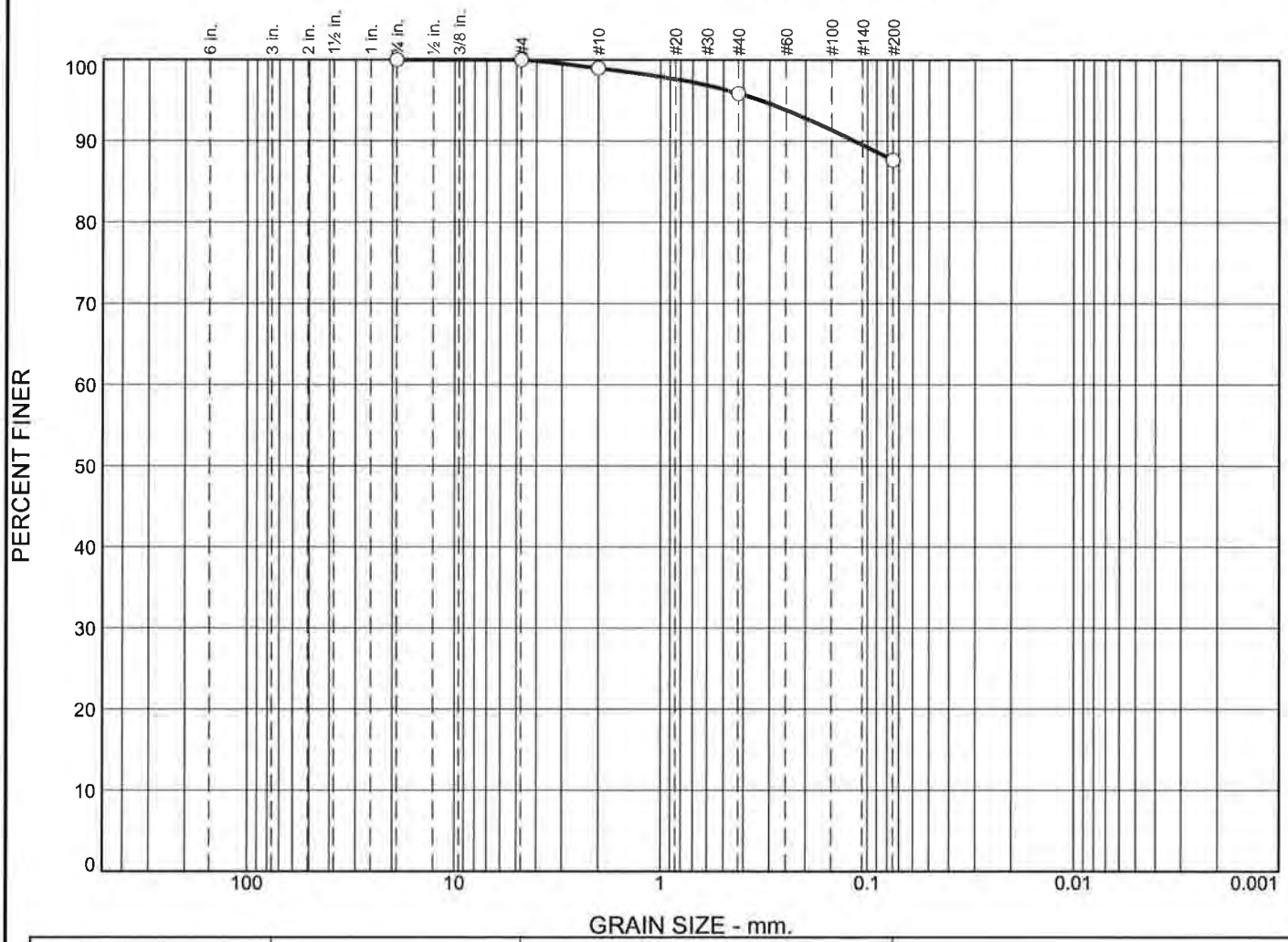
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.6	5.4	2.6	11.6			88.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.2658	1.4543

Fineness Modulus
0.37

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.0	3.1	8.3	87.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-S-TOP **Sample Number:** L1728048-03

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-S-TOP

Sample Number: L1728048-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 18.46
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
18.46	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.19	0.00	99.0
		#40	0.57	0.00	95.9
		#200	1.52	0.00	87.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.0	3.1	8.3	12.4			87.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1156	0.3320

Fineness Modulus
0.20

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.4	3.3	74.3	22.0	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2810	0.1550	0.1268	0.0869				

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-S-BOTTOM **Sample Number:** L1728048-04

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-S-BOTTOM

Sample Number: L1728048-04

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 37.37
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.37	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.15	0.00	99.6
		#40	1.22	0.00	96.3
		#200	27.79	0.00	22.0

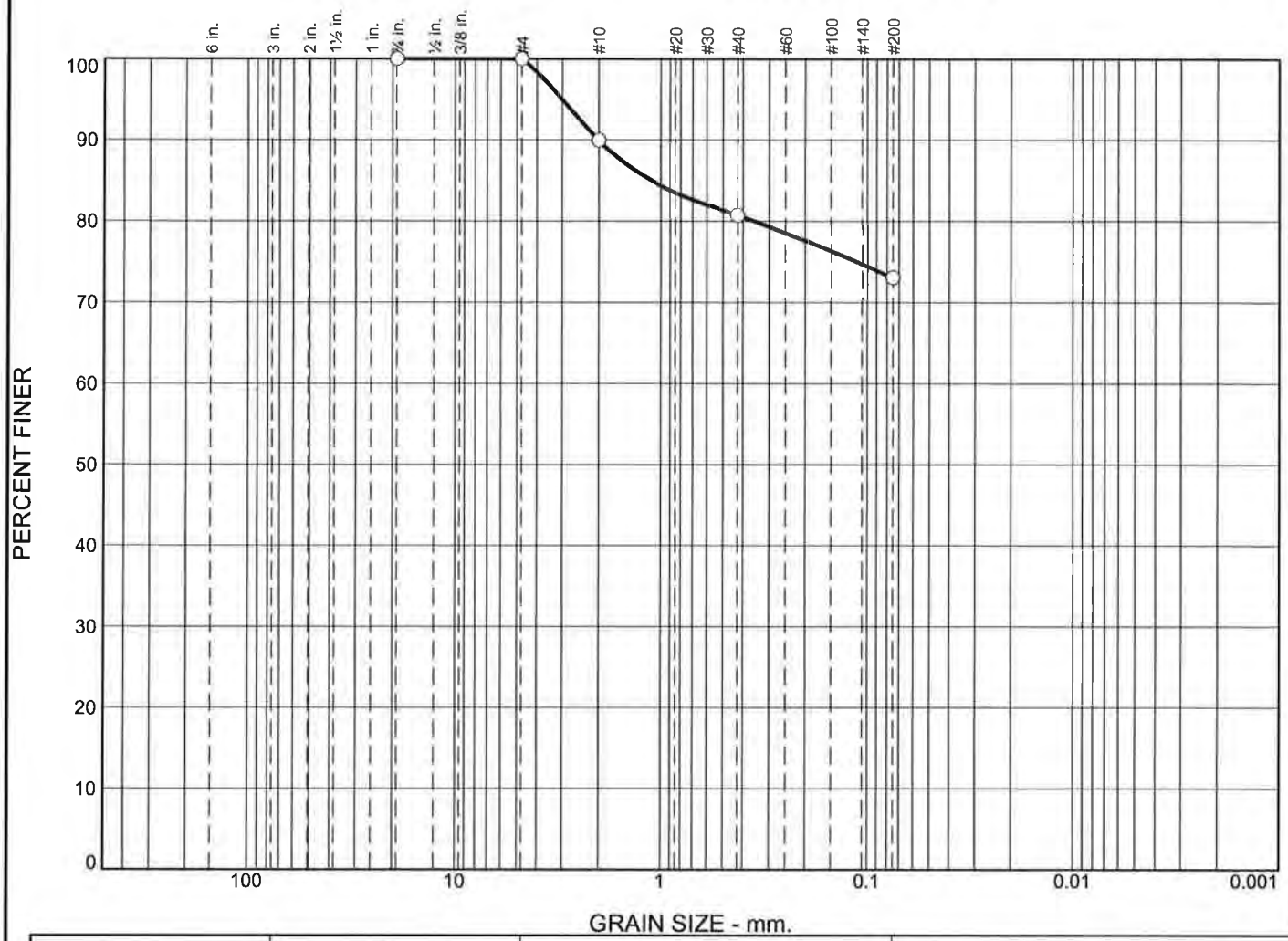
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.4	3.3	74.3	78.0			22.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0869	0.1268	0.1550	0.2449	0.2810	0.3288	0.3989

Fineness Modulus
0.59

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	10.1	9.2	7.6	73.1	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				1.1161							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-J **Sample Number:** L1728048-05

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-J

Sample Number: L1728048-05

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.49
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.49	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	1.96	0.00	89.9
		#40	1.80	0.00	80.7
		#200	1.49	0.00	73.1

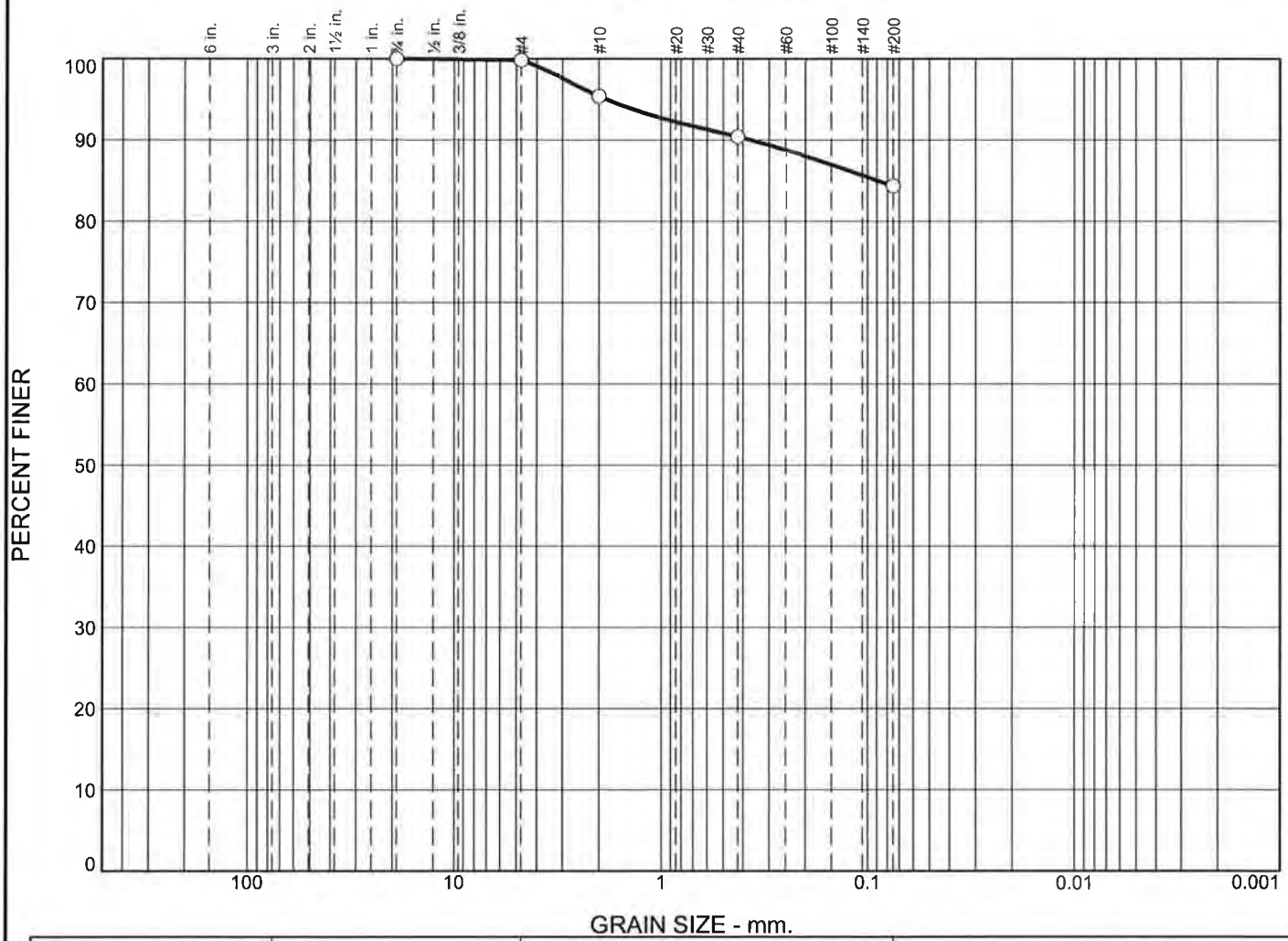
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	10.1	9.2	7.6	26.9			73.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.3543	1.1161	2.0102	3.0105

Fineness Modulus
0.85

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	4.4	5.0	6.1	84.3	

╳	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0894							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-L **Sample Number:** L1728048-06

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-L

Sample Number: L1728048-06

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.56
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.56	0.00	0.75	0.00	0.00	100.0
		#4	0.04	0.00	99.8
		#10	0.96	0.00	95.4
		#40	1.07	0.00	90.4
		#200	1.31	0.00	84.3

Fractional Components

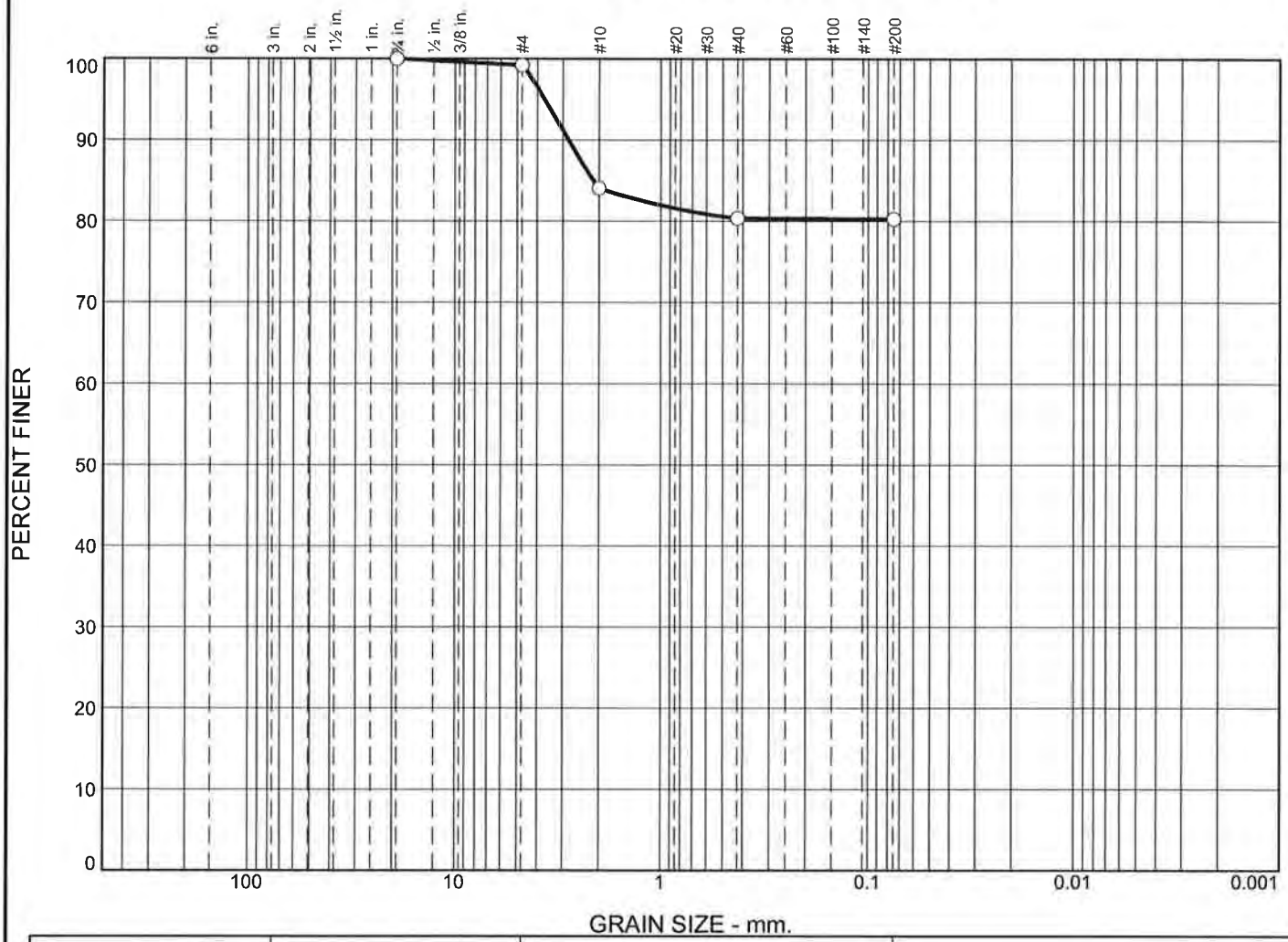
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	4.4	5.0	6.1	15.5			84.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.0894	0.3697	1.8570

Fineness Modulus
0.43

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.8	15.2	3.7		80.3	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				2.1307							

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-K-TOP **Sample Number:** L1728048-07

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-K-TOP

Sample Number: L1728048-07

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.76
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.76	0.00	0.75	0.00	0.00	100.0
		#4	0.19	0.00	99.2
		#10	3.60	0.00	84.0
		#40	0.88	0.00	80.3
		#200	0.02	0.00	80.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.8	0.8	15.2	3.7		18.9			80.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							2.1307	2.8177	3.6595

Fineness Modulus
0.91

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	8.1	51.3	38.7	1.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				1.5260	0.7362	0.5625	0.3012	0.1575	0.1211	1.02	6.08

	Material Description	USCS	AASHTO
○		SW	

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-K-BOTTOM **Sample Number:** L1728048-08

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-K-BOTTOM
Sample Number: L1728048-08
USCS Classification: SW

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 39.15
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
39.15	0.00	0.75	0.00	0.00	100.0
		#4	0.13	0.00	99.7
		#10	3.17	0.00	91.6
		#40	20.09	0.00	40.3
		#200	15.12	0.00	1.6

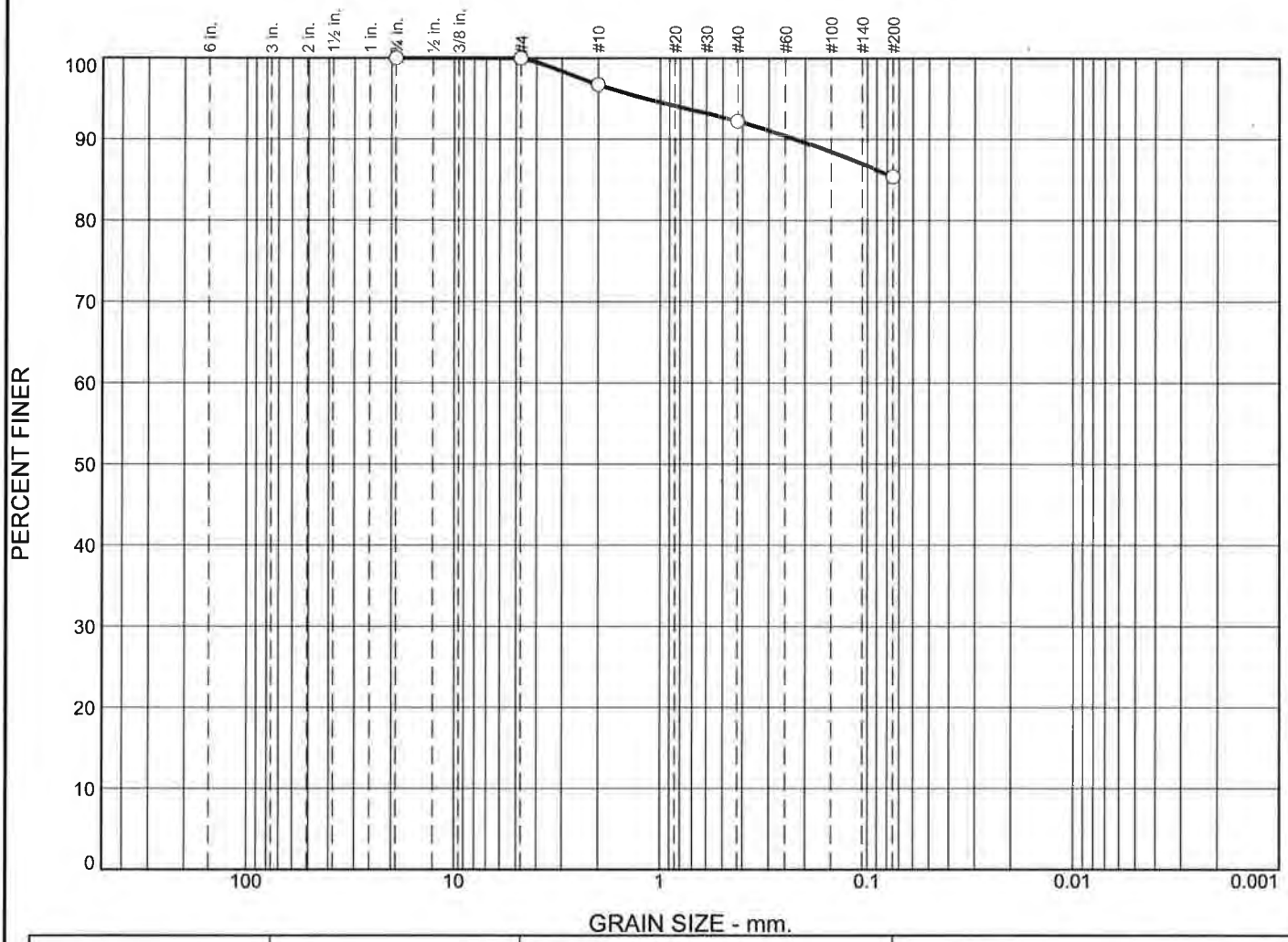
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	8.1	51.3	38.7	98.1			1.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1211	0.1575	0.2000	0.3012	0.5625	0.7362	1.2921	1.5260	1.8578	2.4533

Fineness Modulus	C_u	C_c
2.33	6.08	1.02

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	3.3	4.5	6.8	85.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-H-TOP **Sample Number:** L1728048-09

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-H-TOP

Sample Number: L1728048-09

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.50
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.50	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.77	0.00	96.7
		#40	1.06	0.00	92.2
		#200	1.60	0.00	85.4

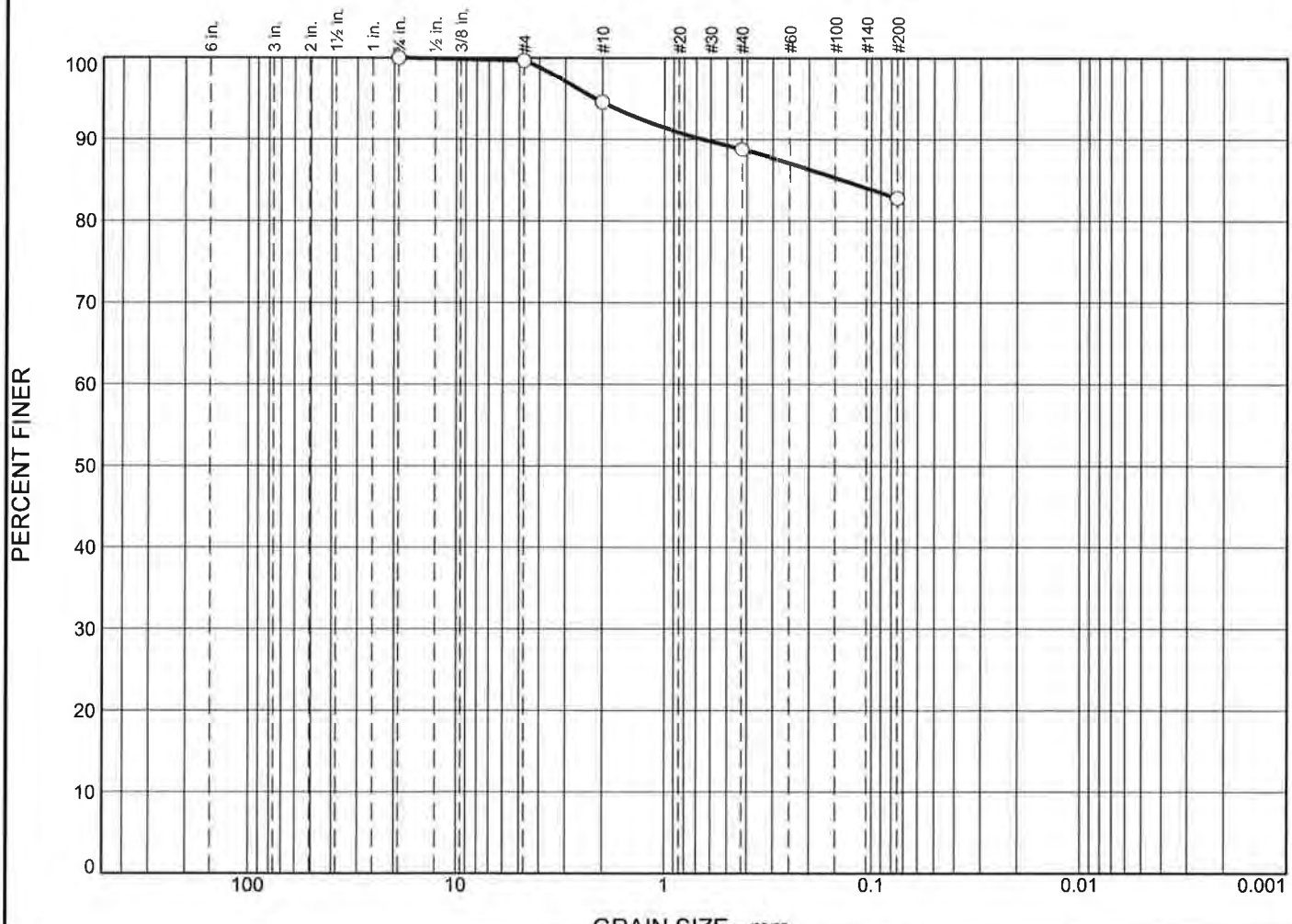
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	3.3	4.5	6.8	14.6			85.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.2245	1.1850

Fineness Modulus
0.35

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.4	5.0	5.9	5.9	82.8	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1381							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-H-REP-TOP **Sample Number:** L1728048-10

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-H-REP-TOP

Sample Number: L1728048-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.85
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.85	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.6
		#10	1.11	0.00	94.6
		#40	1.27	0.00	88.7
		#200	1.30	0.00	82.8

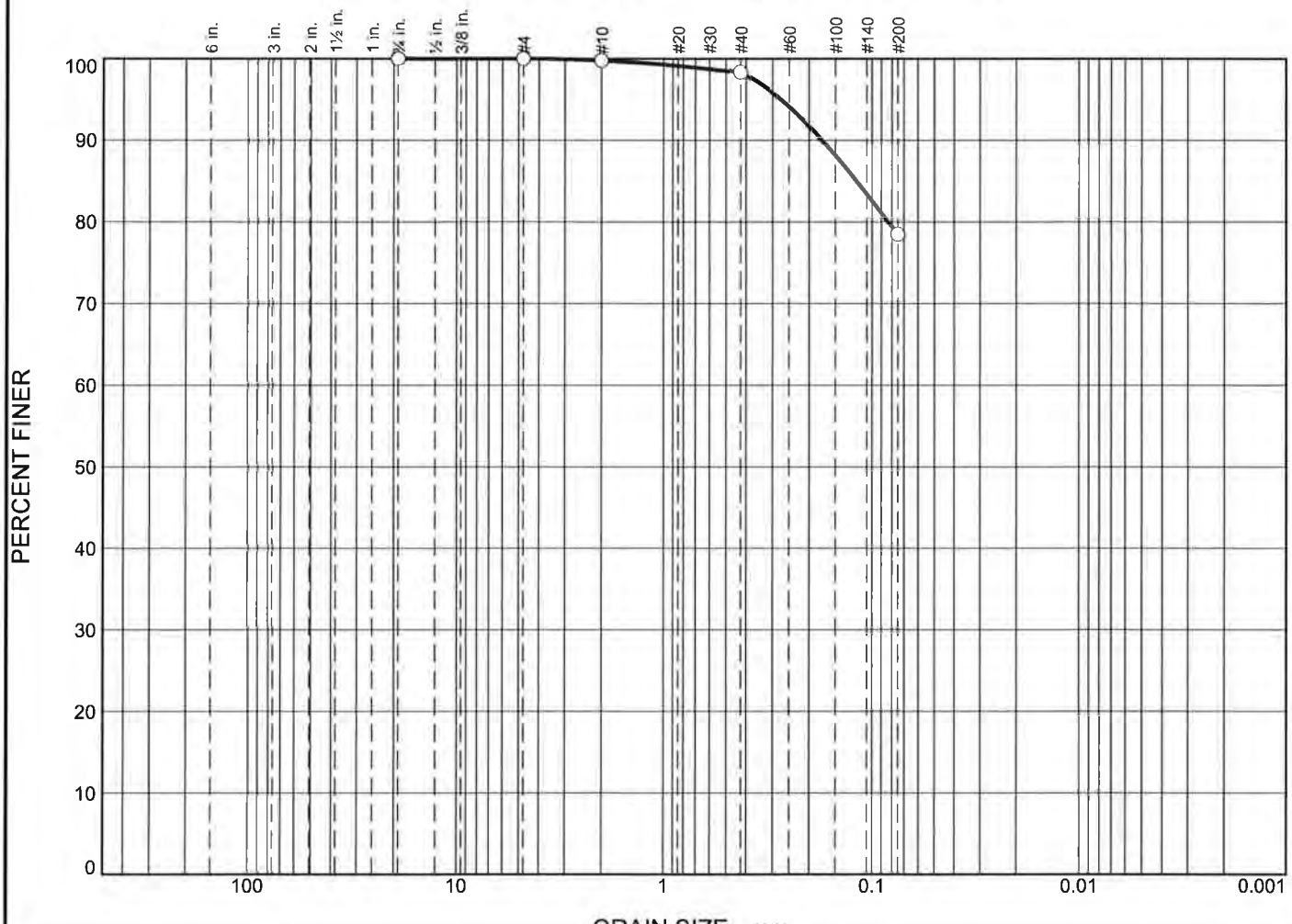
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	5.0	5.9	5.9	16.8			82.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.1381	0.6512	2.1554

Fineness Modulus
0.50

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	1.5	19.9	78.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1192							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-H-BOTTOM **Sample Number:** L1728048-11

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-H-BOTTOM

Sample Number: L1728048-11

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 30.31
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
30.31	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.07	0.00	99.8
		#40	0.45	0.00	98.3
		#200	6.02	0.00	78.4

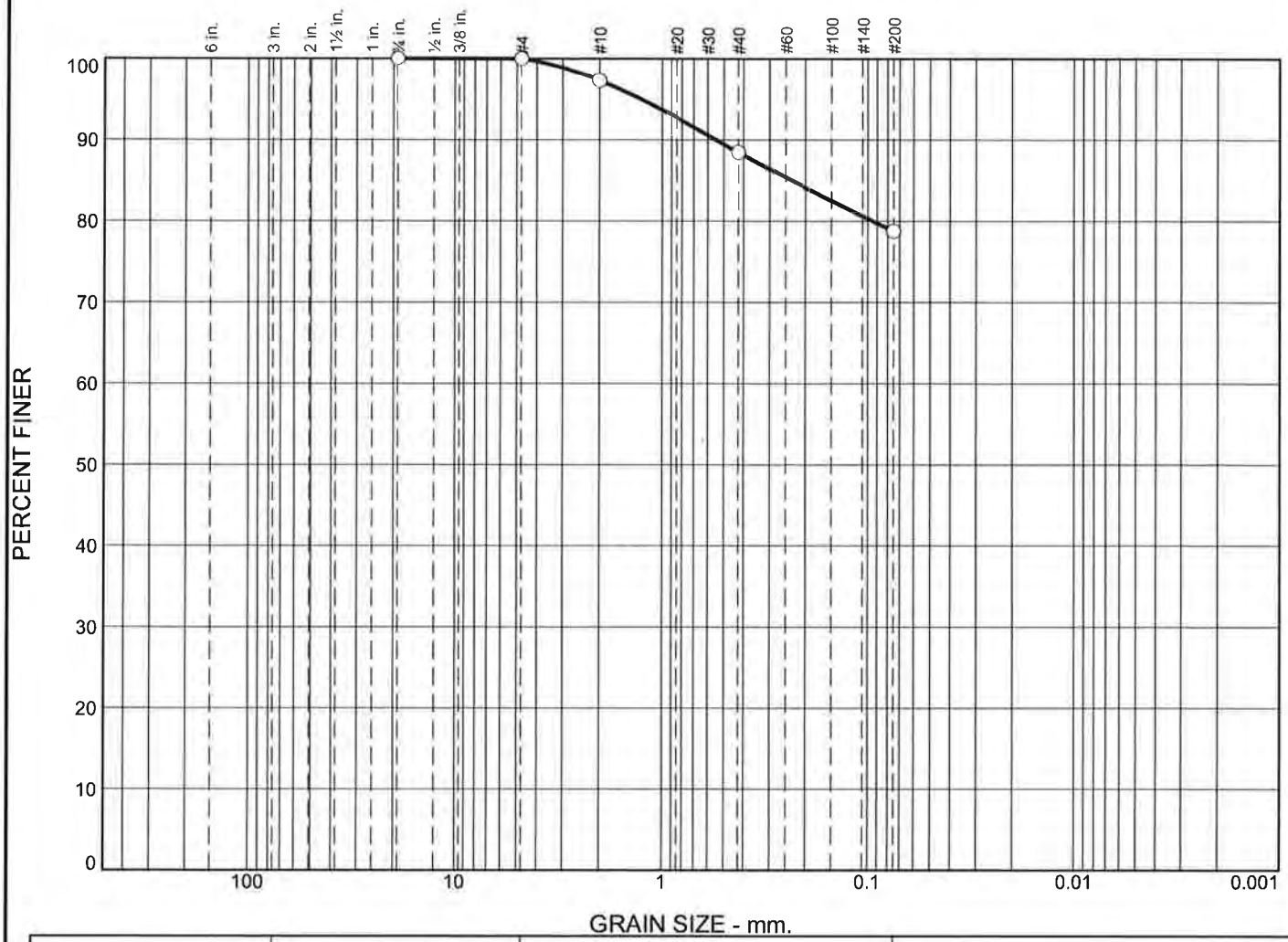
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	1.5	19.9	21.6			78.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.0837	0.1192	0.1746	0.2756

Fineness Modulus
0.18

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	2.7	8.8	9.8	78.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2352							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-I-TOP **Sample Number:** L1728048-12

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-I-TOP

Sample Number: L1728048-12

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.05
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.05	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.62	0.00	97.3
		#40	2.04	0.00	88.5
		#200	2.24	0.00	78.7

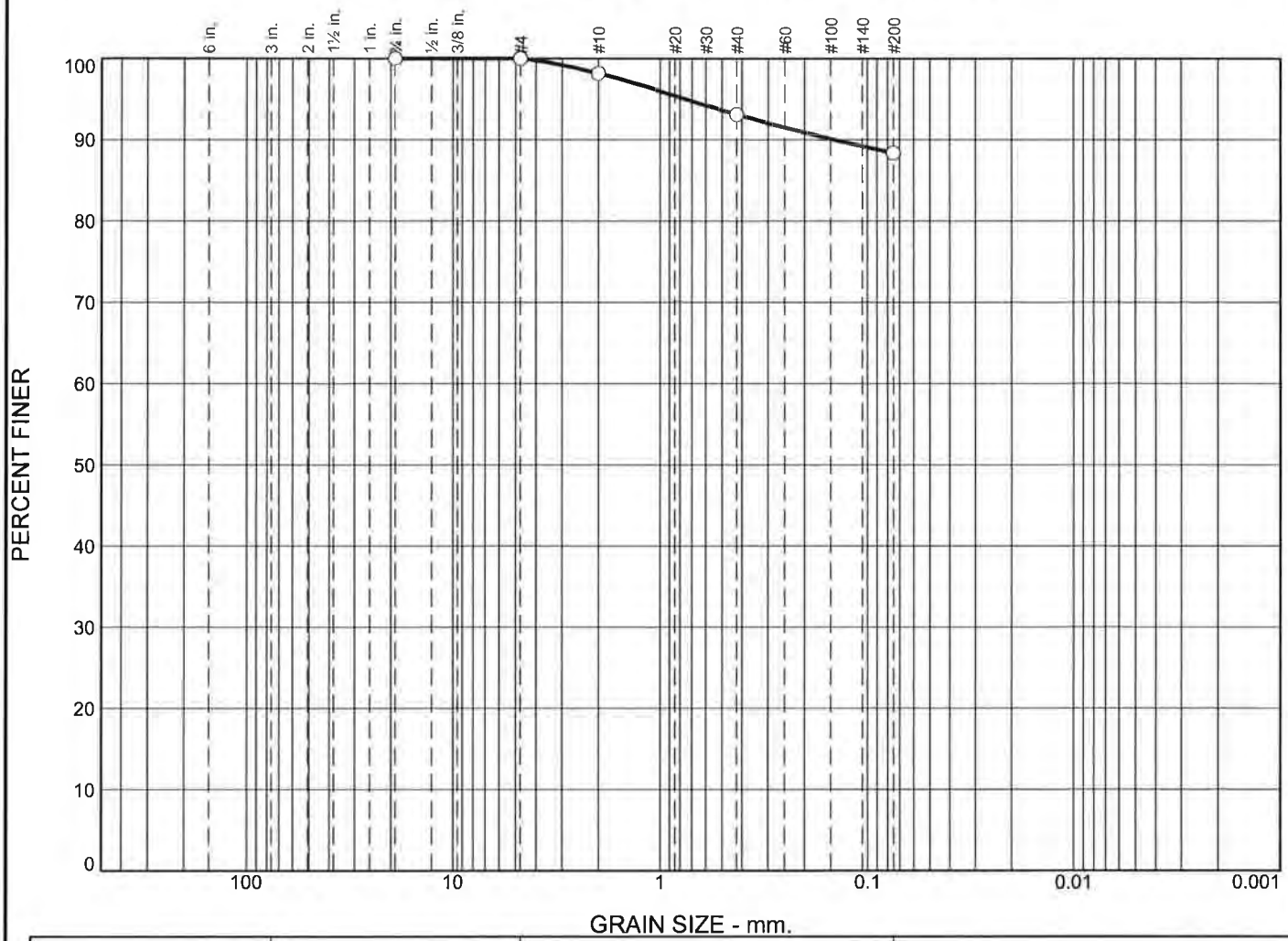
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.7	8.8	9.8	21.3			78.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.0947	0.2352	0.5466	1.2621

Fineness Modulus
0.48

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.8	5.1	4.8	88.3	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-I-BOTTOM **Sample Number:** L1728048-13

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/11/2017

Location: NHH-I-BOTTOM

Sample Number: L1728048-13

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.11
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.11	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.39	0.00	98.2
		#40	1.07	0.00	93.1
		#200	1.00	0.00	88.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.8	5.1	4.8	11.7			88.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1439	0.7552

Fineness Modulus
0.29

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% coarse sand (129%), % medium sand (137%), % fine sand (64%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

Serial_No:08111716:06

L1728048

~~L1728049~~ BB

AECOM

CHAIN OF CUSTODY RECORD

Page 1 of 2

Client/Project Name: USACE-NHH-FMP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A / 7471B	PCBs - 8082	Pesticides - 8081B	PAHs - 8270D-SIM	TOC - 9060					Lab I.D.	Remarks
-01	NHH-R-Top	8/10/17	0832	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						0-4'2"
-02	NHH-R-Bottom		0832	X		"	SD	4°C		X	X	X	X	X	X						4'2"-7'8"
-03	NHH-S-Top		0955	X		"	SD	4°C		X	X	X	X	X	X						0-6'0"
-04	NHH-S-Bottom		0955	X		8oz	SD	4°C		X											6'0"-6'5"
-05	NHH-J		1141	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'5"
-06	NHH-L		1300	X		"	SD	4°C		X	X	X	X	X	X						0-6'9"
-07	NHH-K-Top		1409	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'6"
-08	NHH-K-Bottom		1409	X		8oz	SD	4°C		X											5'6"-8'2"
-09	NHH-H-Top		1458	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'5"
-10	NHH-H-Rep-Top		1458	X		"	SD	4°C		X	X	X	X	X	X						0-5'5"
-11	NHH-H-Bottom		1458	X		"	SD	4°C		X	X	X	X	X	X						5'5"-7'8"
-12	NHH-I-Top		1548	X		"	SD	4°C		X	X	X	X	X	X						0-8"
-13	NHH-I-Bottom		1548	X		"	SD	4°C		X	X	X	X	X	X						8"-2'6"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C Steve Howe AECOM Signature:	Date: 8/10/17 Time: 1922	Signature:	Date: 8/14/17 Time: 1928
Signature:	Date: 8/14/17 Time: 2000	Signature:	Date: Time:
Signature:	Date: Time:	Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0156

ANALYTICAL REPORT

Lab Number:	L1728229
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE-NHH-FNP
Project Number:	60543021
Report Date:	08/14/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728229-01	NHH-G-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 08:37	08/11/17
L1728229-02	NHH-G-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 08:37	08/11/17
L1728229-03	NHH-C-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 10:33	08/11/17
L1728229-04	NHH-C-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 10:33	08/11/17
L1728229-05	NHH-B	SEDIMENT	NEW HAVEN, CT	08/11/17 11:57	08/11/17
L1728229-06	NHH-A-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 13:40	08/11/17
L1728229-07	NHH-A-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 13:40	08/11/17
L1728229-08	NHH-D-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 15:07	08/11/17
L1728229-09	NHH-D-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 15:07	08/11/17
L1728229-10	NHH-F-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1728229-11	NHH-F-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1728229-12	NHH-F-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	USACE-NHH-FNP	**Lab Number:**	L1728229
Project Number:	60543021	**Report Date:**	08/14/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1031751-1 Laboratory Duplicate RPD for % Fine gravel (53%), performed on L1728229-05, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative

Date: 08/14/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-01
Client ID: NHH-G-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.500		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	1.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	2.80		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	4.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	91.7		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-02
Client ID: NHH-G-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	0.700		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	2.50		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	4.70		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	92.1		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-03
Client ID: NHH-C-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.100		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	0.900		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	12.8		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	59.2		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	27.0		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-04
Client ID: NHH-C-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	2.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	3.80		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	11.4		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	45.3		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	37.5		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-05
Client ID: NHH-B
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 11:57
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.40		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	2.80		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	23.2		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	57.0		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	15.6		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-06
Client ID: NHH-A-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.50		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	4.50		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	41.8		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	42.6		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	9.60		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-07
Client ID: NHH-A-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	1.80		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	26.9		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	68.0		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	3.30		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-08
Client ID: NHH-D-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	1.90		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	8.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	10.1		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	79.0		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-09
Client ID: NHH-D-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.300		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	1.20		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	4.10		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	7.90		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	86.5		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-10
Client ID: NHH-F-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.400		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	0.300		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	1.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	2.00		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	96.3		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-11
Client ID: NHH-F-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	0.800		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	0.900		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	1.70		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	96.6		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

SAMPLE RESULTS

Lab ID: L1728229-12
Client ID: NHH-F-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	0.300		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Coarse Sand	1.40		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Medium Sand	1.10		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Fine Sand	1.80		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP
% Total Fines	95.4		%	0.100	NA	1	-	08/14/17 12:31	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1031751-1 QC Sample: L1728229-05 Client ID: NHH-B						
% Total Gravel	1.40	2.40	%	**53**	Q	25
% Coarse Sand	2.80	2.30	%	20		25
% Medium Sand	23.2	23.2	%	0		25
% Fine Sand	57.0	52.4	%	8		25
% Total Fines	15.6	19.7	%	23		25
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1031751-2 QC Sample: L1728229-12 Client ID: NHH-F-BOTTOM						
% Total Gravel	0.300	ND	%	NC		25
% Coarse Sand	1.40	ND	%	NC		25
% Medium Sand	1.10	0.900	%	20		25
% Fine Sand	1.80	1.40	%	25		25
% Total Fines	95.4	97.7	%	2		25

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
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Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728229-01A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-02A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-03A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-04A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-05A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-05A1	Bag	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-05A2	Bag	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-06A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-07A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name: USACE-NHH-FNP
Project Number: 60543021

Lab Number: L1728229
Report Date: 08/14/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728229-08A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-09A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-10A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-11A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-12A	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-12A1	Bag	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728229-12A2	Plastic 8oz unpreserved for Grain Size	A	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name:	USACE-NHH-FNP	**Lab Number:**	L1728229
Project Number:	60543021	**Report Date:**	08/14/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

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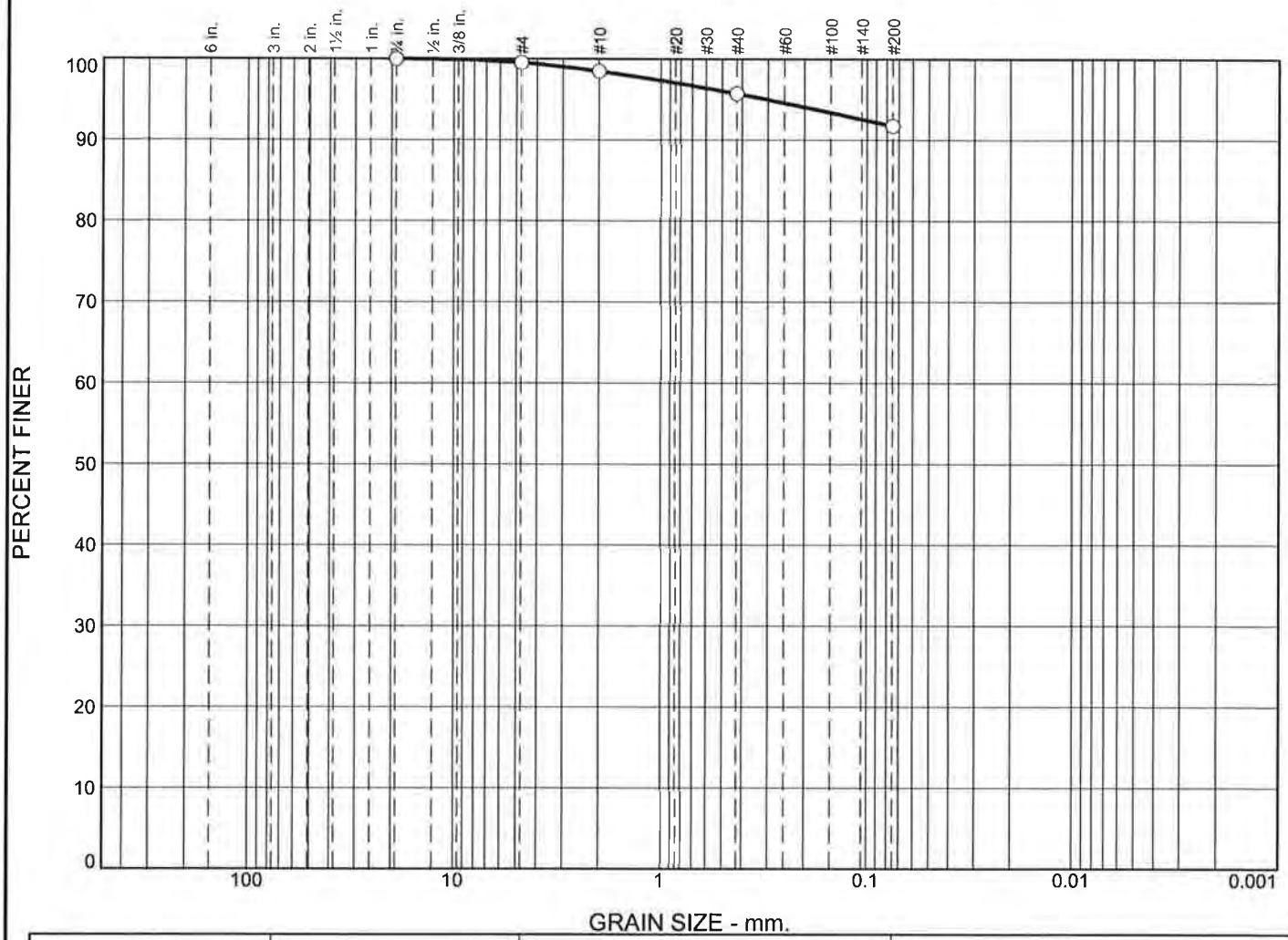
We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.5	1.0	2.8	4.0	91.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-G-TOP **Sample Number:** L1728229-01

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-G-TOP

Sample Number: L1728229-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.81
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.81	0.00	0.75	0.00	0.00	100.0
		#4	0.10	0.00	99.5
		#10	0.22	0.00	98.5
		#40	0.57	0.00	95.7
		#200	0.83	0.00	91.7

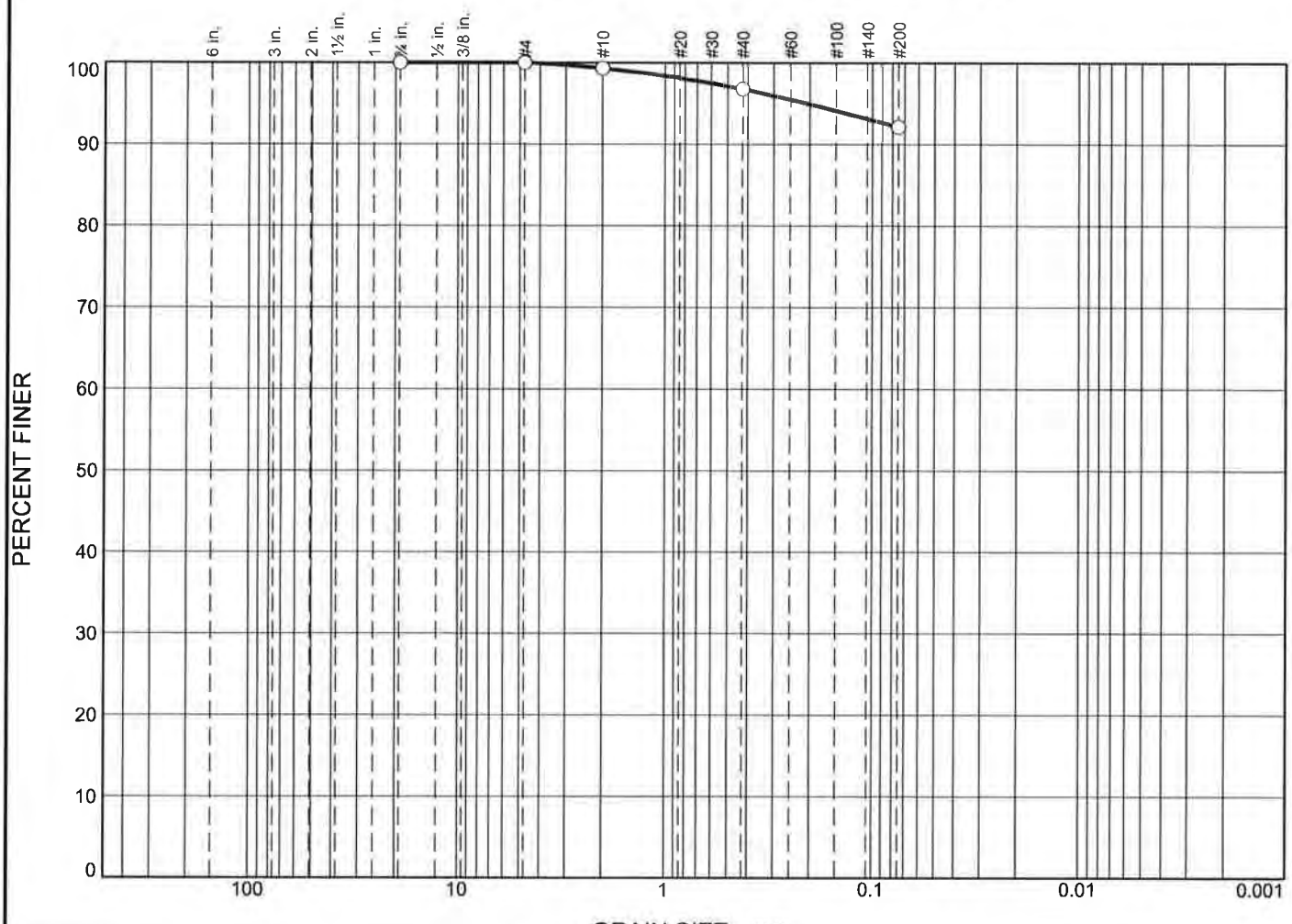
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	1.0	2.8	4.0	7.8			91.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.3027

Fineness Modulus
0.19

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.7	2.5	4.7	92.1	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-G-BOTTOM **Sample Number:** L1728229-02

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-G-BOTTOM
Sample Number: L1728229-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.20
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.20	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.16	0.00	99.3
		#40	0.59	0.00	96.8
		#200	1.08	0.00	92.1

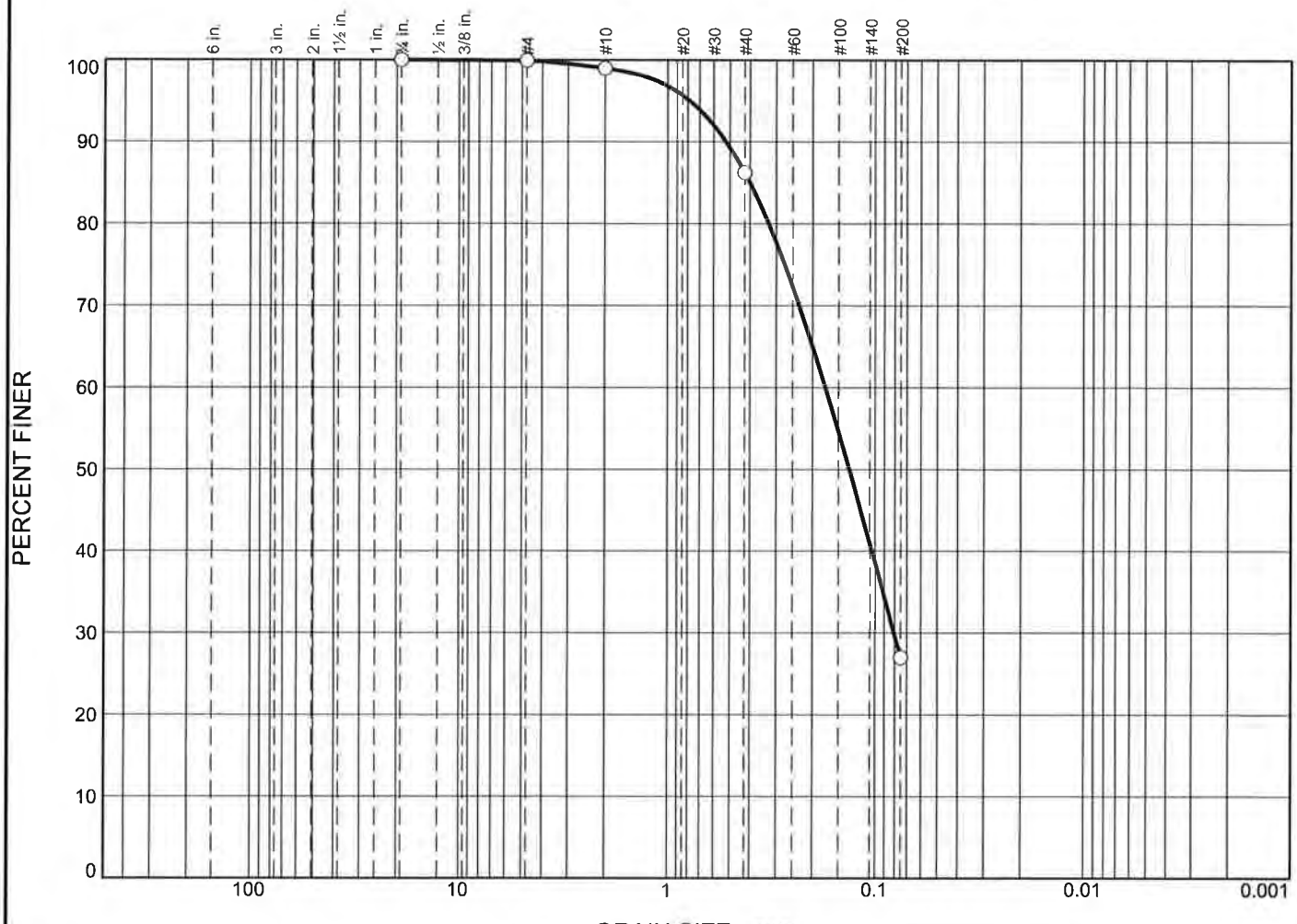
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	2.5	4.7	7.9			92.1

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.2076

Fineness Modulus
0.14

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	0.9	12.8	59.2	27.0	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.4012	0.1736	0.1330	0.0807				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-C-TOP **Sample Number:** L1728229-03

Date: ○

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-C-TOP

Sample Number: L1728229-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 32.53
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
32.53	0.00	0.75	0.00	0.00	100.0
		#4	0.03	0.00	99.9
		#10	0.30	0.00	99.0
		#40	4.15	0.00	86.2
		#200	19.27	0.00	27.0

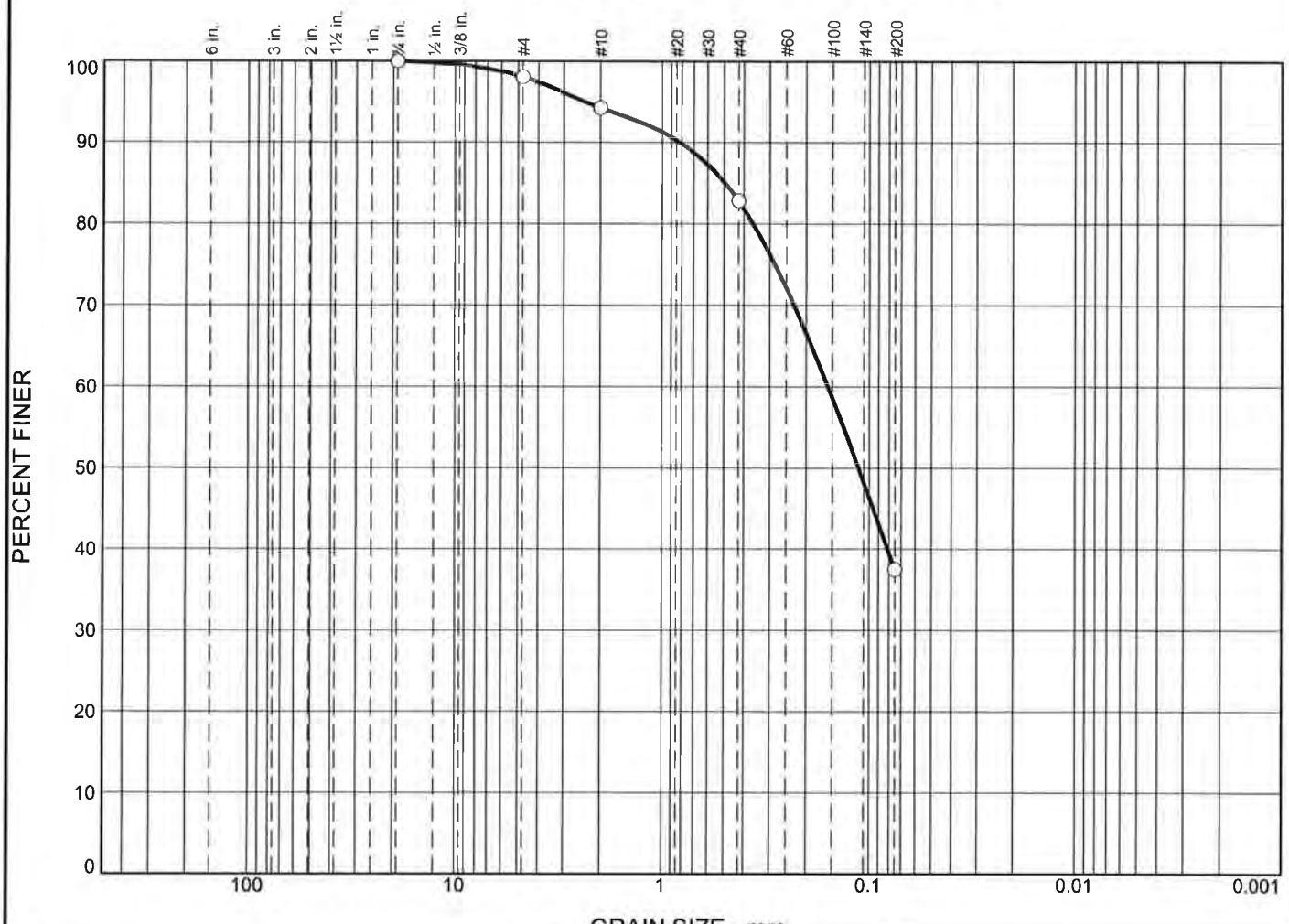
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	0.9	12.8	59.2	72.9			27.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0807	0.1330	0.1736	0.3263	0.4012	0.5222	0.7822

Fineness Modulus
0.79

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.0	3.8	11.4	45.3	37.5	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.4952	0.1576	0.1123					

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-C-BOTTOM **Sample Number:** L1728229-04

Date: ○

Remarks:

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-C-BOTTOM

Sample Number: L1728229-04

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 29.67
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
29.67	0.00	0.75	0.00	0.00	100.0
		#4	0.59	0.00	98.0
		#10	1.12	0.00	94.2
		#40	3.40	0.00	82.8
		#200	13.43	0.00	37.5

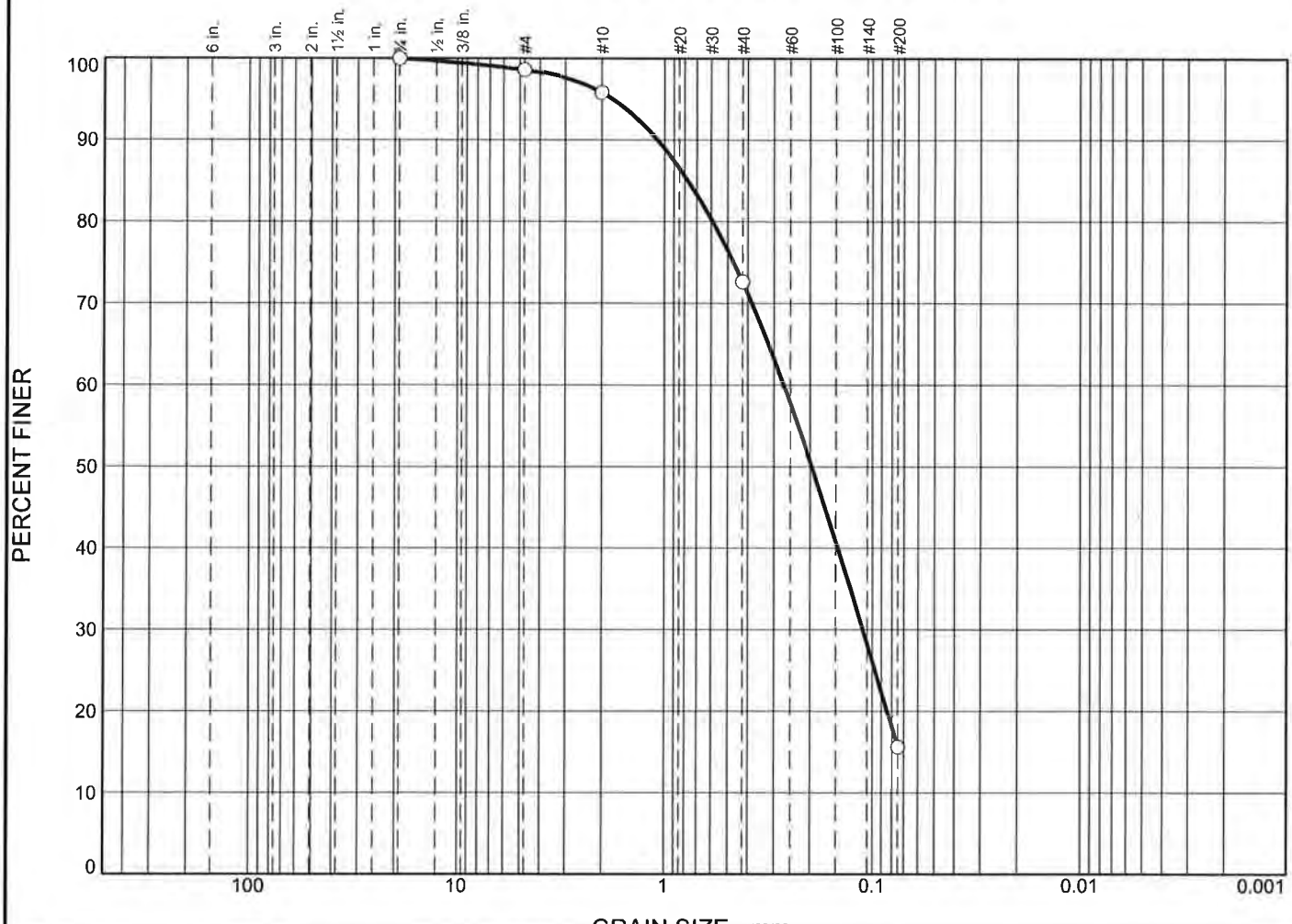
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.0	2.0	3.8	11.4	45.3	60.5			37.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.1123	0.1576	0.3617	0.4952	0.8211	2.3776

Fineness Modulus
0.93

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.4	2.8	23.2	57.0	15.6	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.7721	0.2693	0.1966	0.1110				

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-B **Sample Number:** L1728229-05

Date: ○

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-B

Sample Number: L1728229-05

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 37.01
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.01	0.00	0.75	0.00	0.00	100.0
		#4	0.53	0.00	98.6
		#10	1.03	0.00	95.8
		#40	8.57	0.00	72.6
		#200	21.10	0.00	15.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.4	1.4	2.8	23.2	57.0	83.0			15.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0845	0.1110	0.1966	0.2693	0.5897	0.7721	1.0825	1.7818

Fineness Modulus
1.30

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.4	2.3	23.2	52.4	19.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.8034	0.2673	0.1905	0.1022				

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-B **Sample Number:** WG1031751-1

Date: ○

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-B

Sample Number: WG1031751-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 36.31
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
36.31	0.00	0.75	0.00	0.00	100.0
		#4	0.86	0.00	97.6
		#10	0.84	0.00	95.3
		#40	8.42	0.00	72.1
		#200	19.05	0.00	19.7

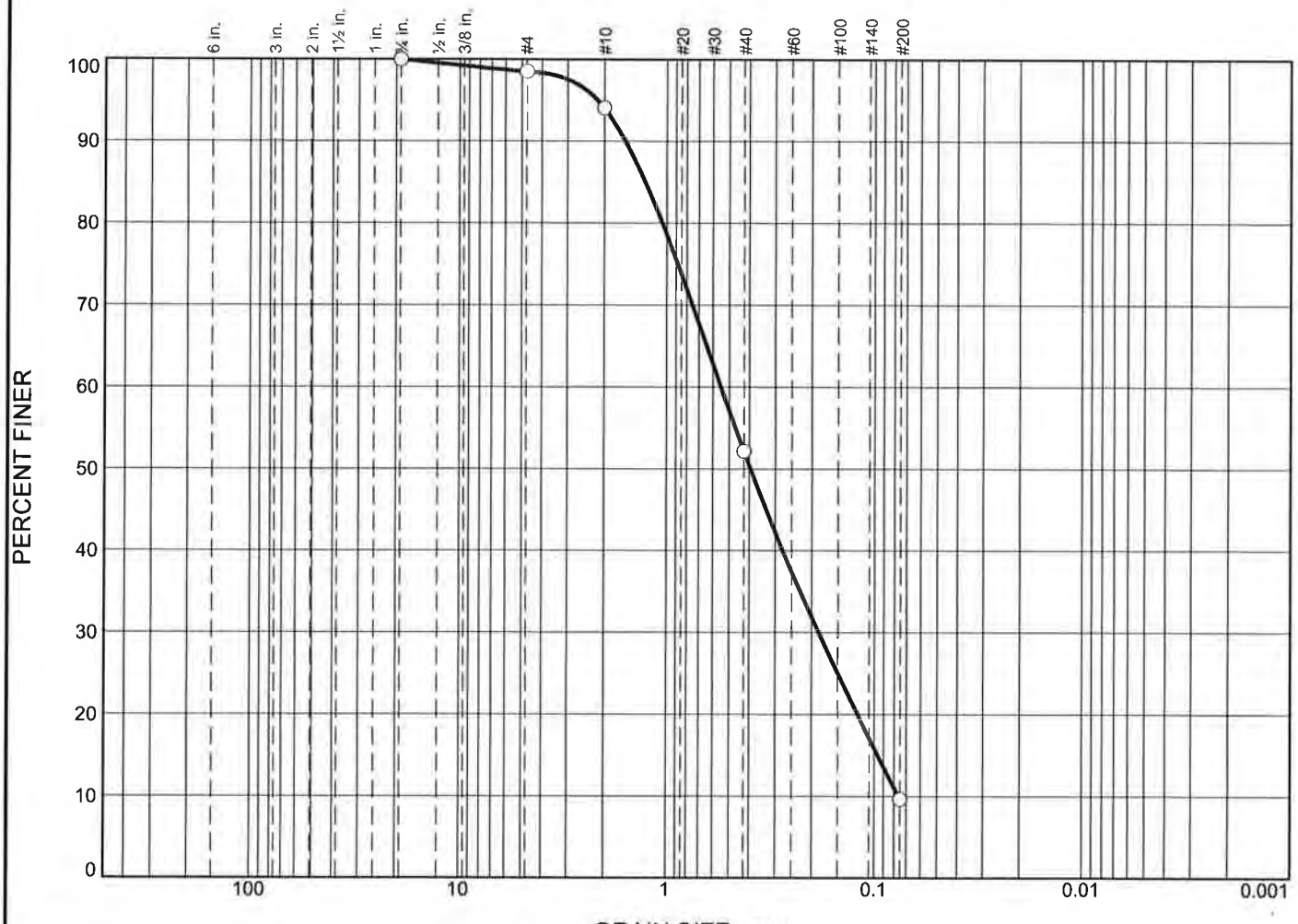
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.4	2.4	2.3	23.2	52.4	77.9			19.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0758	0.1022	0.1905	0.2673	0.6101	0.8034	1.1305	1.9009

Fineness Modulus
1.32

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.5	4.5	41.8	42.6	9.6	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				1.2684	0.5477	0.3951	0.1852	0.0959	0.0762	0.82	7.18

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-A-TOP **Sample Number:** L1728229-06

Date: ○

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-A-TOP

Sample Number: L1728229-06

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 37.23
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.23	0.00	0.75	0.00	0.00	100.0
		#4	0.56	0.00	98.5
		#10	1.66	0.00	94.0
		#40	15.59	0.00	52.2
		#200	15.83	0.00	9.6

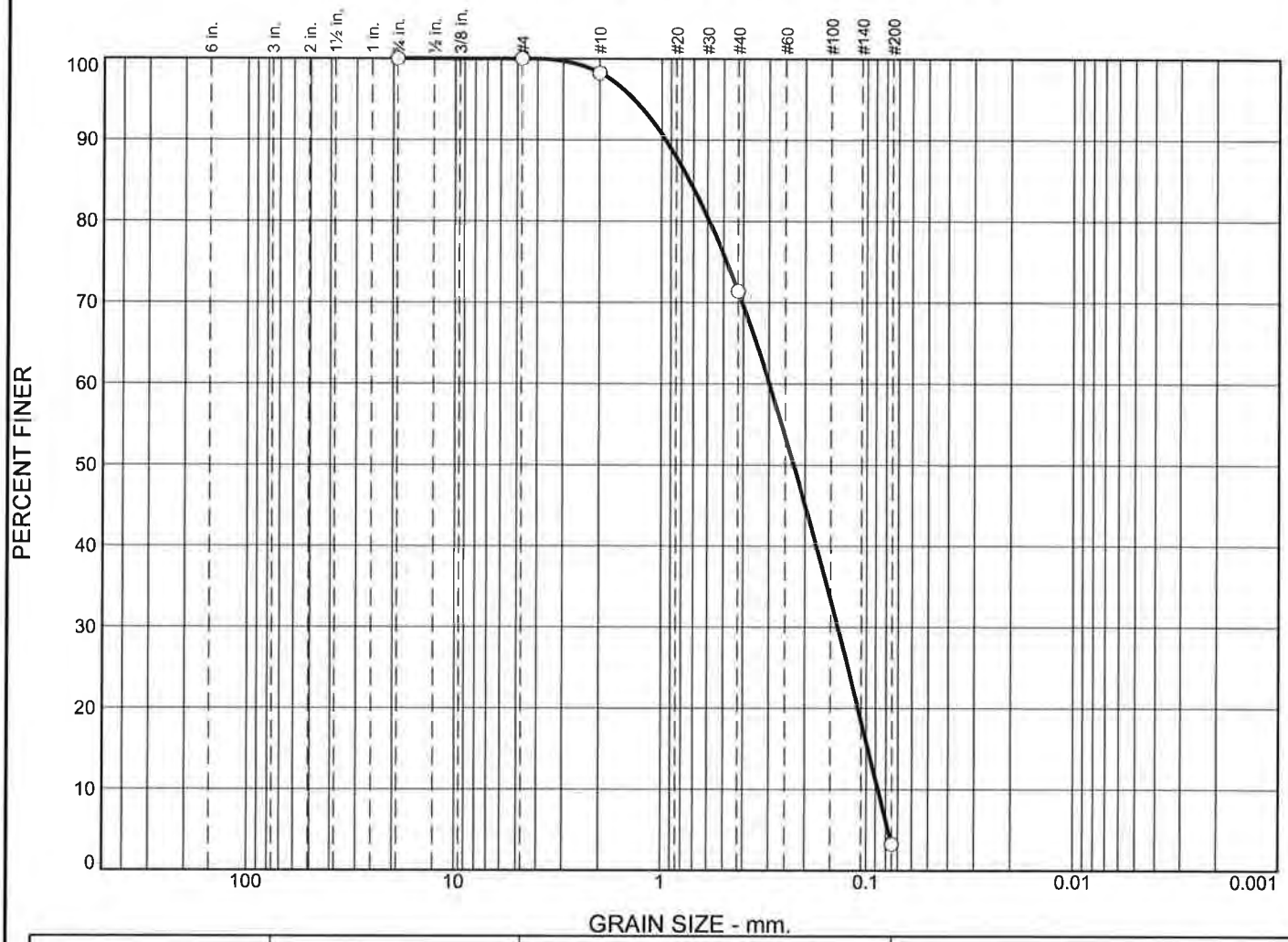
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.5	1.5	4.5	41.8	42.6	88.9			9.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0762	0.0959	0.1201	0.1852	0.3951	0.5477	1.0508	1.2684	1.5808	2.1573

Fineness Modulus	C_u	C_c
1.93	7.18	0.82

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.8	26.9	68.0	3.3	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.7334	0.2994	0.2277	0.1387	0.0979	0.0874	0.74	3.43

	Material Description	USCS	AASHTO
○		SP	

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-A-BOTTOM **Sample Number:** L1728229-07

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-A-BOTTOM
Sample Number: L1728229-07
USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 37.96
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
37.96	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.67	0.00	98.2
		#40	10.22	0.00	71.3
		#200	25.83	0.00	3.3

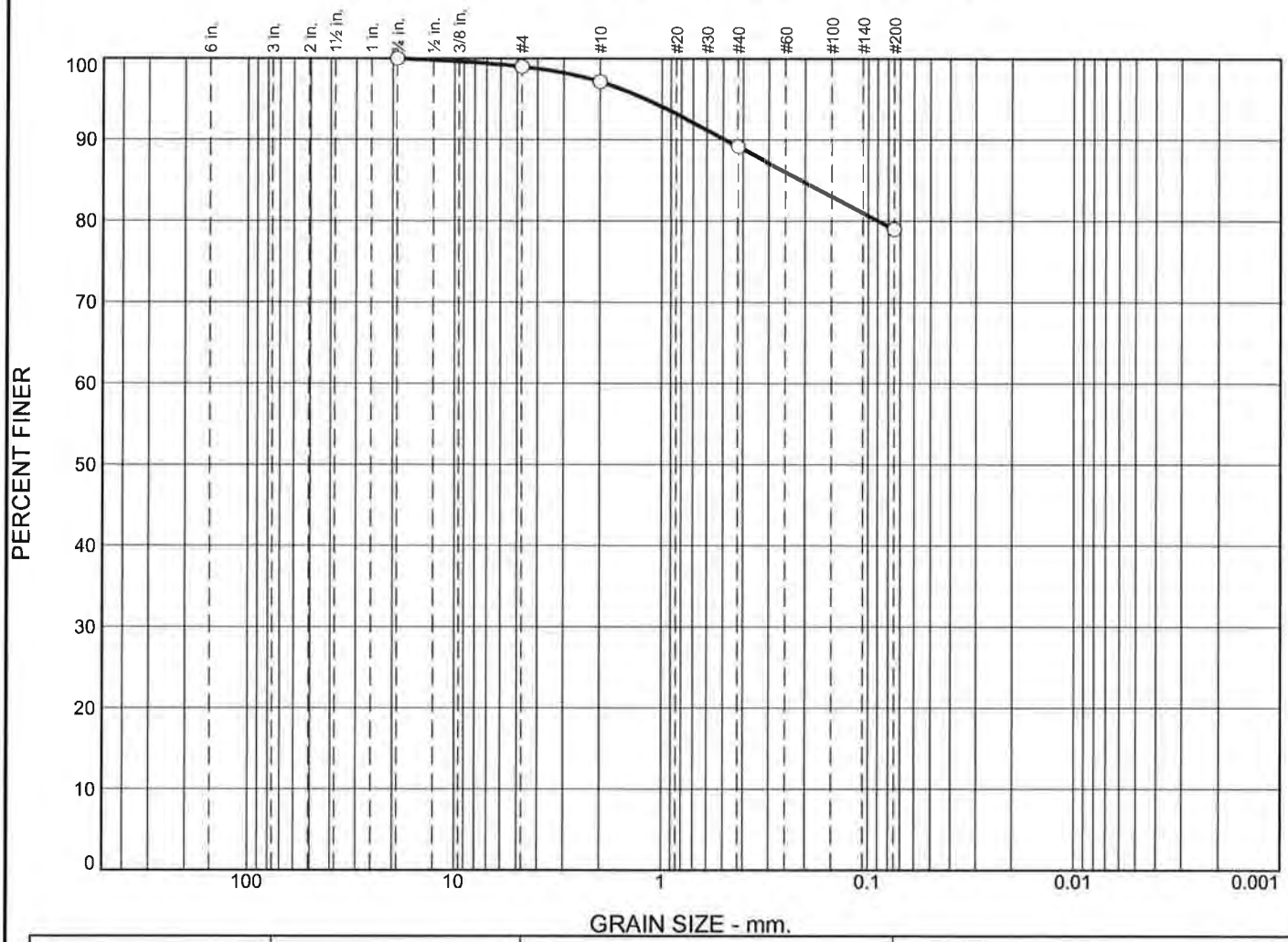
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.8	26.9	68.0	96.7			3.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0874	0.0979	0.1099	0.1387	0.2277	0.2994	0.5871	0.7334	0.9591	1.3739

Fineness Modulus	C_u	C_c
1.34	3.43	0.74

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.0	1.9	8.0	10.1	79.0	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2111							

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-D-TOP **Sample Number:** L1728229-08

Date: ○

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-D-TOP

Sample Number: L1728229-08

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 25.41
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.41	0.00	0.75	0.00	0.00	100.0
		#4	0.26	0.00	99.0
		#10	0.47	0.00	97.1
		#40	2.03	0.00	89.1
		#200	2.58	0.00	79.0

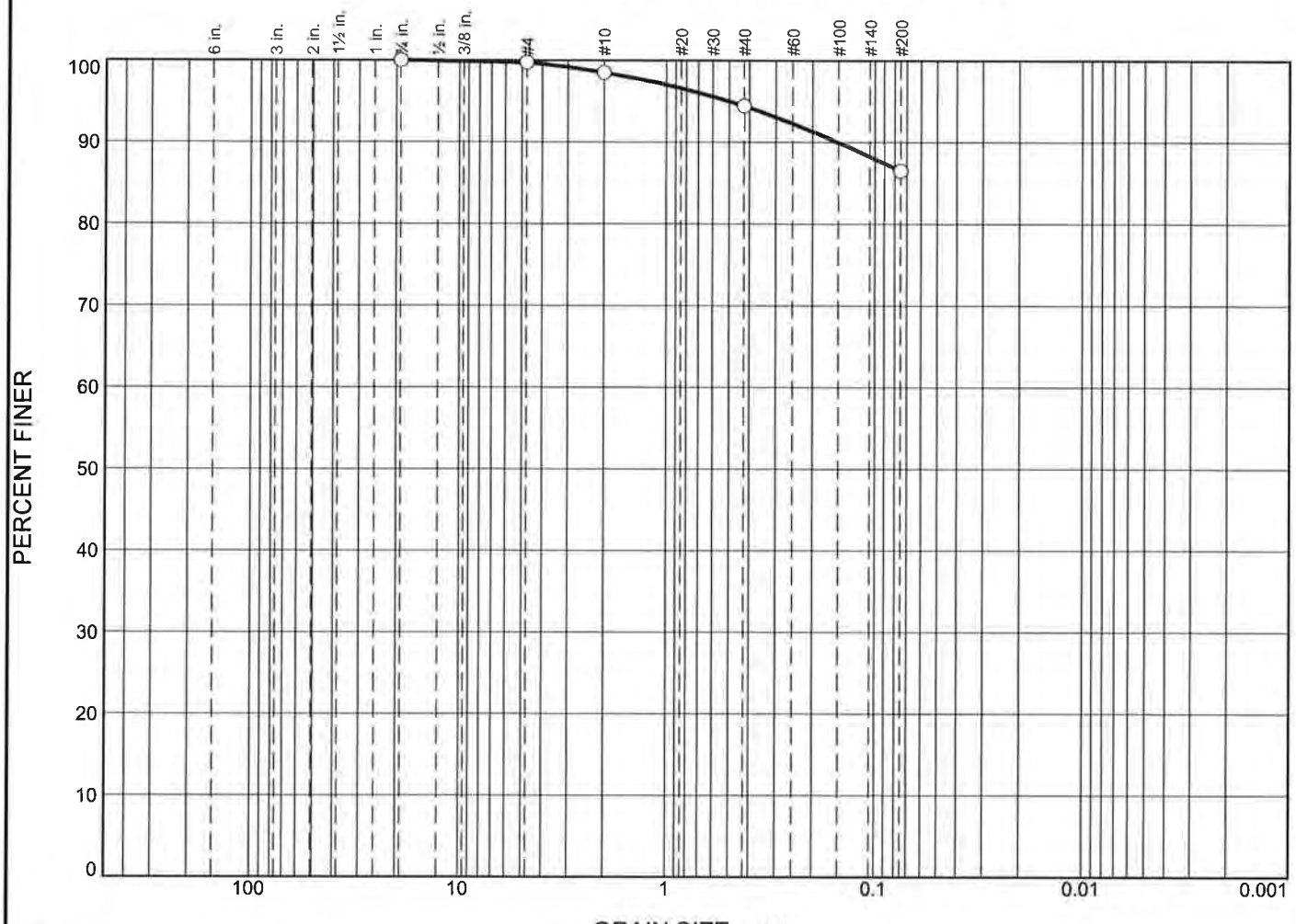
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	1.9	8.0	10.1	20.0			79.0

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.0894	0.2111	0.4908	1.2000

Fineness Modulus
0.48

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.2	4.1	7.9	86.5	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-D-BOTTOM **Sample Number:** L1728229-09

Date: ○

Remarks:

Alpha Analytical

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Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-D-BOTTOM
Sample Number: L1728229-09

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 22.58
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.58	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.28	0.00	98.5
		#40	0.92	0.00	94.4
		#200	1.79	0.00	86.5

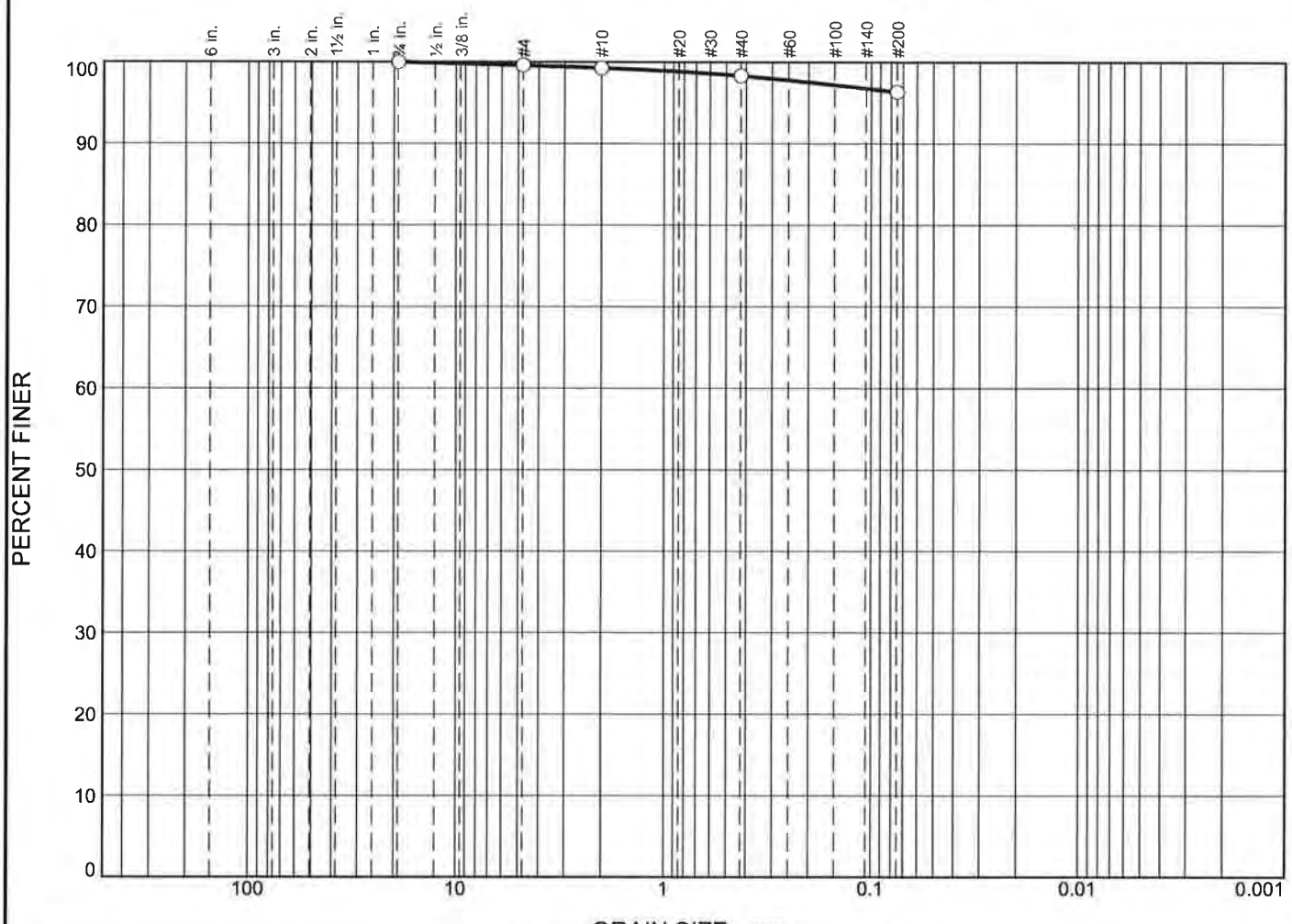
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	1.2	4.1	7.9	13.2			86.5

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1522	0.5014

Fineness Modulus
0.26

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.4	0.3	1.0	2.0	96.3	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-TOP **Sample Number:** L1728229-10

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-TOP

Sample Number: L1728229-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.02
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.02	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.6
		#10	0.06	0.00	99.3
		#40	0.18	0.00	98.3
		#200	0.38	0.00	96.3

Fractional Components

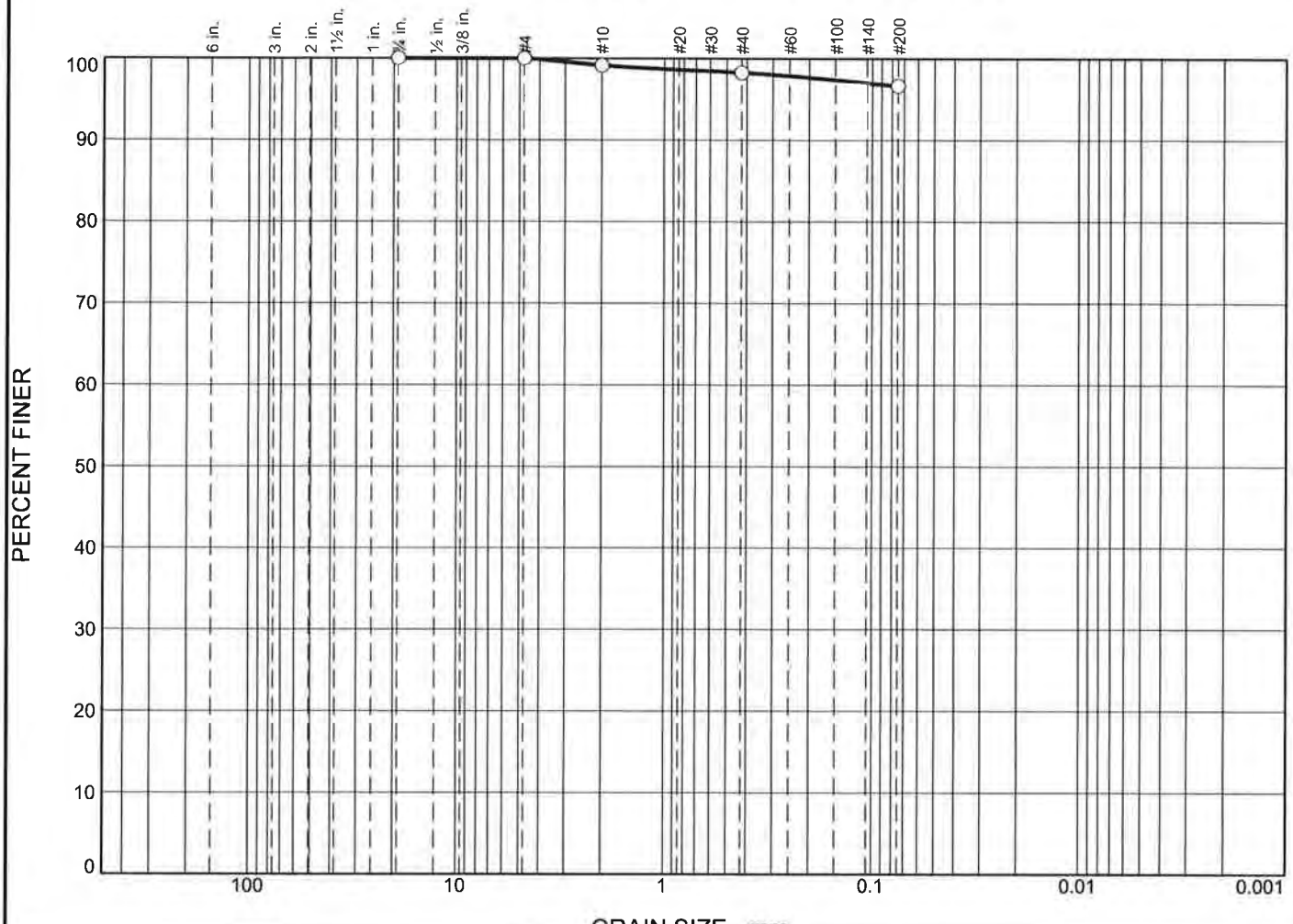
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.4	0.4	0.3	1.0	2.0	3.3			96.3

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.08

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.8	0.9	1.7	96.6	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-REP-TOP **Sample Number:** L1728229-11

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-REP-TOP
Sample Number: L1728229-11

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.26
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.26	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.17	0.00	99.2
		#40	0.18	0.00	98.3
		#200	0.33	0.00	96.6

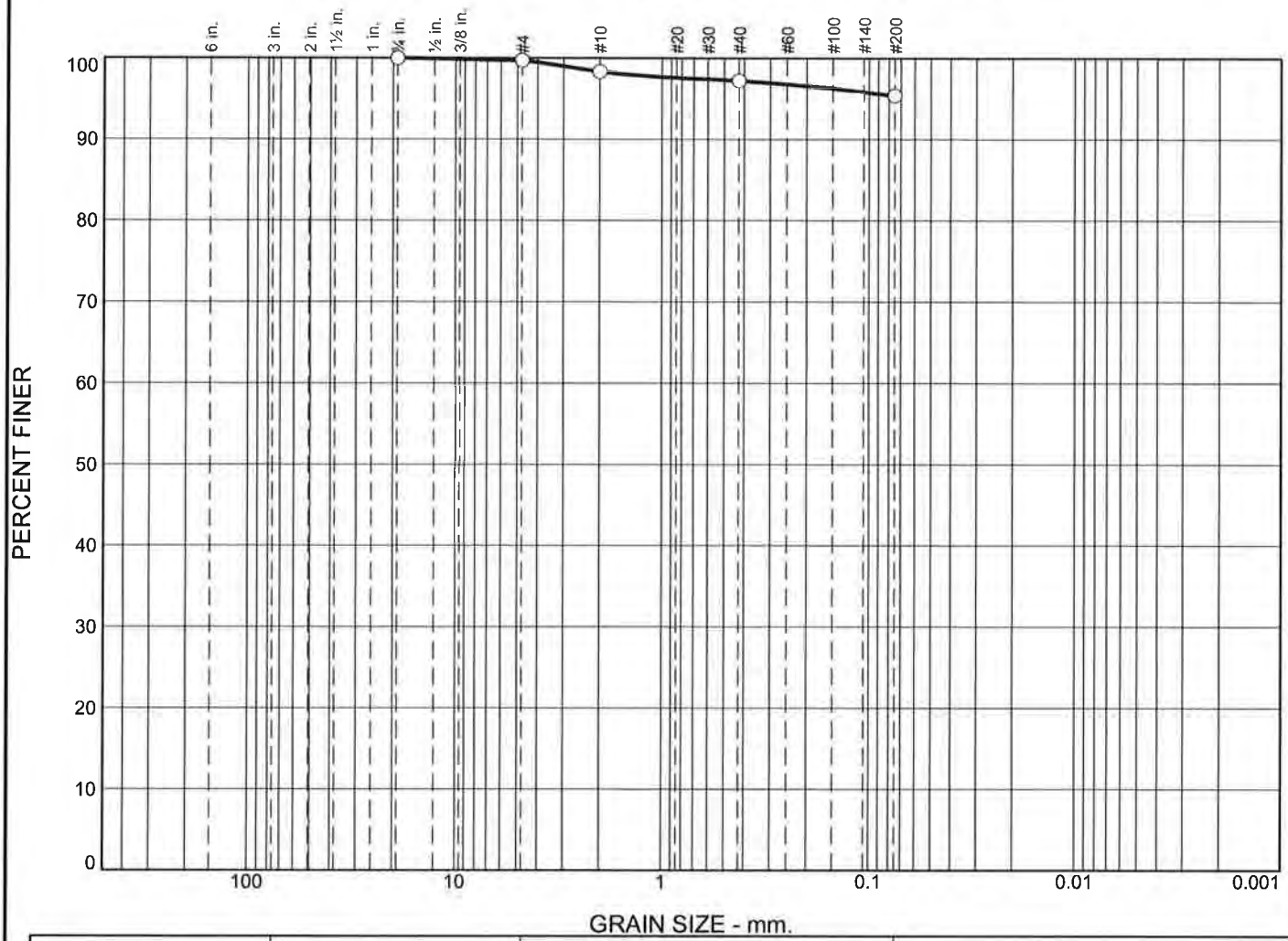
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.8	0.9	1.7	3.4			96.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.08

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	1.4	1.1	1.8	95.4	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-BOTTOM **Sample Number:** L1728229-12

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-BOTTOM

Sample Number: L1728229-12

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.78
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.78	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.7
		#10	0.27	0.00	98.3
		#40	0.22	0.00	97.2
		#200	0.36	0.00	95.4

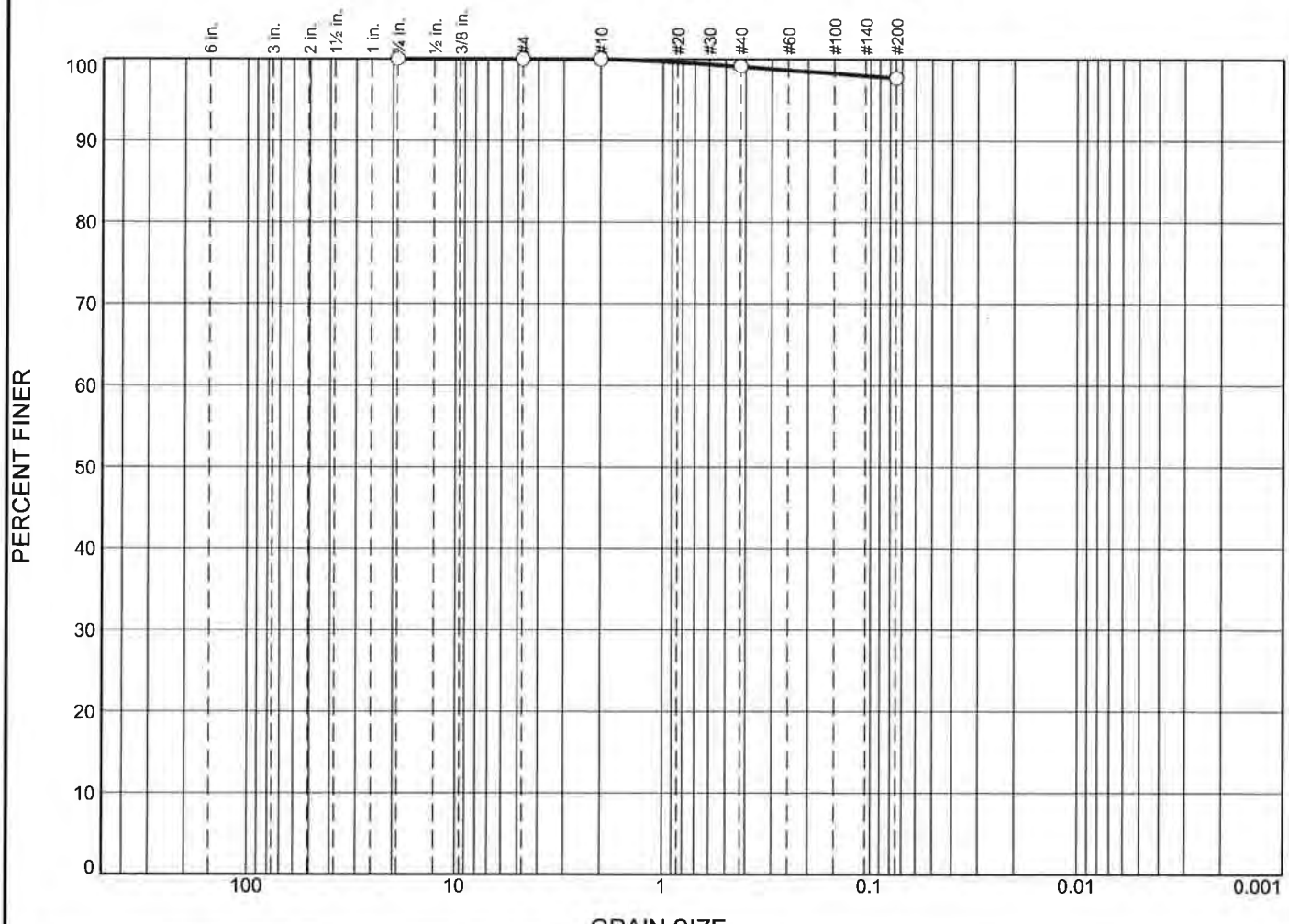
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	1.4	1.1	1.8	4.3			95.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.13

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.9	1.4	97.7	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-BOTTOM **Sample Number:** WG1031751-2

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/14/2017

Location: NHH-F-BOTTOM

Sample Number: WG1031751-2

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.09
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.09	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.17	0.00	99.1
		#200	0.27	0.00	97.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	1.4	2.3			97.7

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.04

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% fine gravel (53%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

L1728229

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature: C Steve

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals-6020A/7471A/7196	PCBs-8082/8270-SIM	Pesticides-8081B	PAHs-8270D-SIM	TOC-9060					Lab I.D.	Remarks
-01	NHH-G-Top	8/11/17	0837	X		8oz/1602	SD	4°C	NA	X	X	X	X	X	X						0-4'3"
-02	NHH-G-Bottom	8/11/17	0837	X		8oz/1602	SD	4°C		X	X	X	X	X	X						4'3"-13'8"
-03	NHH-C-Top		1033	X		8oz/1602	SD	4°C		X	X	X	X	X	X						0-2'10"
-04	NHH-C-Bottom		1033	X		8oz/1602	SD	4°C		X	X	X	X	X	X						2'10"-8'0"
-05	NHH-B		1157	X		Ziploc/1602	SD	4°C		X	X	X	X	X	X						0-4.2'
-05	NHH-B-MS		1157	X		Ziploc/1602	SD	4°C		X	X	X	X	X	X						0-4.2'
-05	NHH-B-MSD		1157	X		Ziploc/1602	SD	4°C		X	X	X	X	X	X						0-4.2'
-06	NHH-A-Top		1340	X		8oz/1602	SD	4°C		X	X	X	X	X	X						0-2'2"
-07	NHH-A-Bottom		1340	X		8 oz	SD	4°C		X											2'2"-9.9'
-08	NHH-D-Top		1507	X		8oz/1602	SD	4°C		X	X	X	X	X	X						0-4'9"
-09	NHH-D-Bottom		1507	X		8oz/1602	SD	4°C		X	X	X	X	X	X						4'9"-10'4"
-10	NHH-F-Top		1650	X		8oz/1602	SD	4°C		X	X	X	X	X	X						0-3'2"
-11	NHH-F-Rep-Top		1650	X		8oz/1602	SD	4°C		X	X	X	X	X	X						0-3'2"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/11/17 Time: 1925	Signature:	Date: 8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) AAL Bethany Bedard Signature:	Date: 8/11/17 Time: 22:37
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0178

L1728229

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7471A	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270-SIM	TOC - 9060					Lab I.D.	Remarks
-12 NHH-F-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						3'2" - 10'6"
-12 NHH-F-MS-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						3'2" - 10'6"
-12 NHH-F-MSD-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						3'2" - 10'6"

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/11/17 Time: 1925	Signature: AAL	8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) Bethany Bedard AAL Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0167

ANALYTICAL REPORT

Lab Number:	L1728340
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	08/15/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728340-01	NHH-E-TOP	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17
L1728340-02	NHH-E-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1728340
Project Number: 60543021 **Report Date:** 08/15/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1032082-1 Laboratory Duplicate RPD for % Total Gravel (133%), performed on L1728340-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 08/15/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

SAMPLE RESULTS

Lab ID: L1728340-01
Client ID: NHH-E-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.00		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Coarse Sand	0.800		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Medium Sand	0.400		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Fine Sand	1.00		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Total Fines	96.8		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

SAMPLE RESULTS

Lab ID: L1728340-02
Client ID: NHH-E-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Medium Sand	0.400		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Fine Sand	2.00		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Total Fines	97.6		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1032082-1 QC Sample: L1728340-01 Client ID: NHH-E-TOP						
% Total Gravel	1.00	0.200	%	**133**	Q	25
% Coarse Sand	0.800	0.800	%	0		25
% Medium Sand	0.400	0.500	%	22		25
% Fine Sand	1.00	1.10	%	10		25
% Total Fines	96.8	97.4	%	1		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728340-01A	Plastic 8oz unpreserved for Grain Size	A	NA		5.7	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728340-02A	Plastic 8oz unpreserved for Grain Size	A	NA		5.7	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728340
Project Number:	60543021	**Report Date:**	08/15/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728340
Project Number:	60543021	**Report Date:**	08/15/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

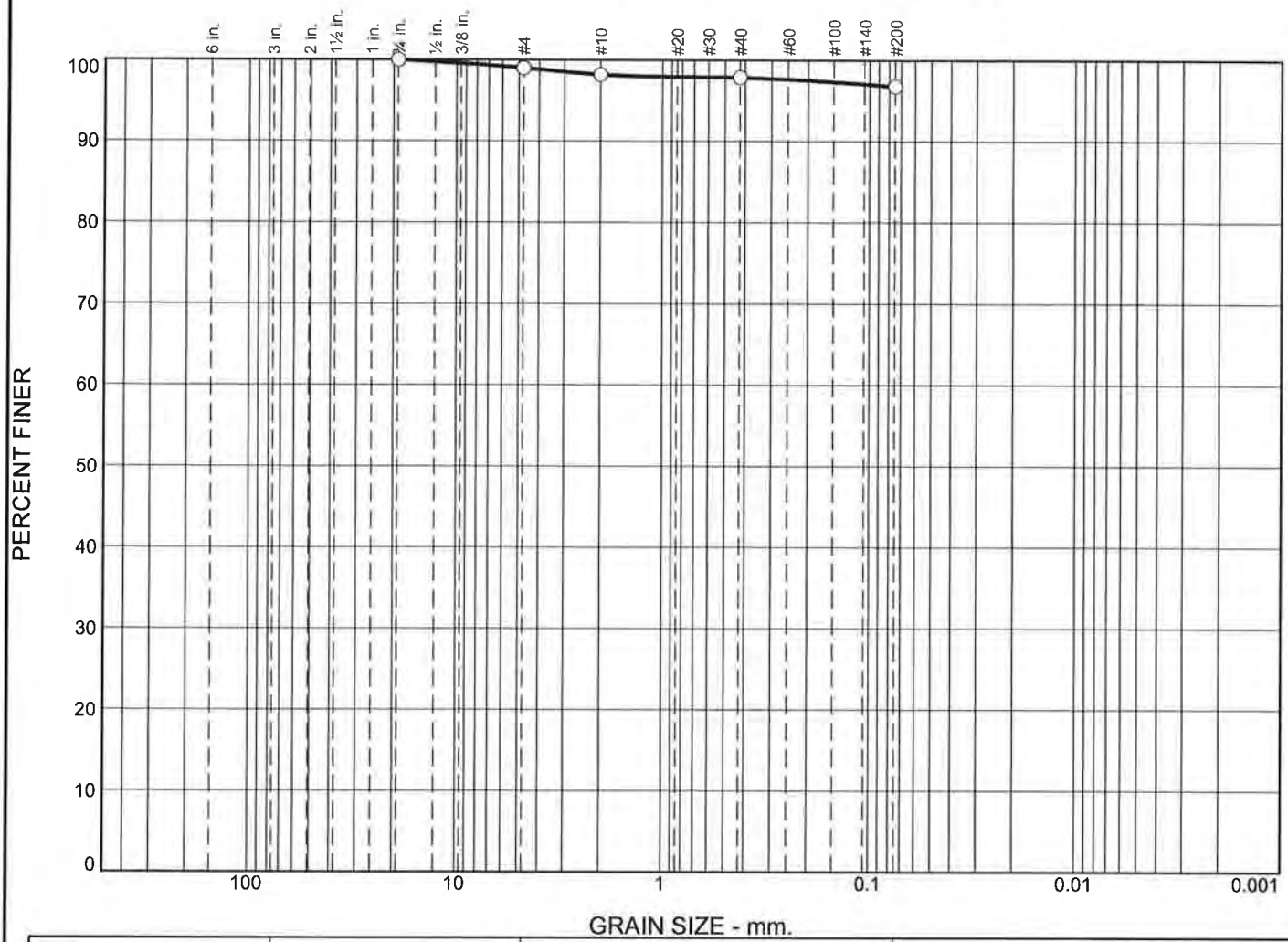
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.0	0.8	0.4	1.0	96.8	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-TOP **Sample Number:** I1728340-01

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-TOP

Sample Number: l1728340-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.91
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.91	0.00	0.75	0.00	0.00	100.0
		#4	0.20	0.00	99.0
		#10	0.16	0.00	98.2
		#40	0.07	0.00	97.8
		#200	0.21	0.00	96.8

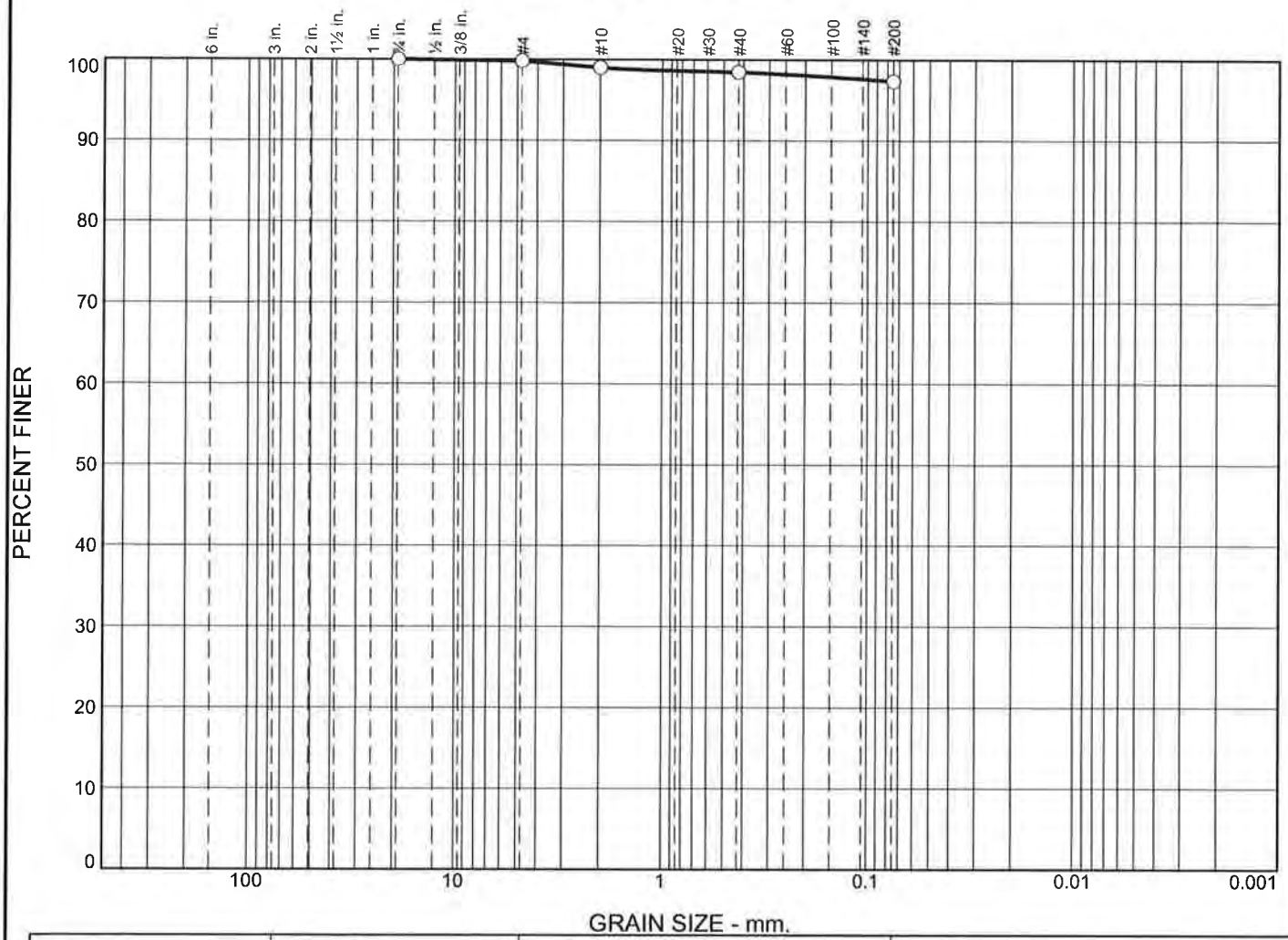
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	0.8	0.4	1.0	2.2			96.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.12

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.8	0.5	1.1	97.4	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-TOP **Sample Number:** WG1032082-1

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-TOP

Sample Number: WG1032082-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.07
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.07	0.00	0.75	0.00	0.00	100.0
		#4	0.04	0.00	99.8
		#10	0.16	0.00	99.0
		#40	0.11	0.00	98.5
		#200	0.22	0.00	97.4

Fractional Components

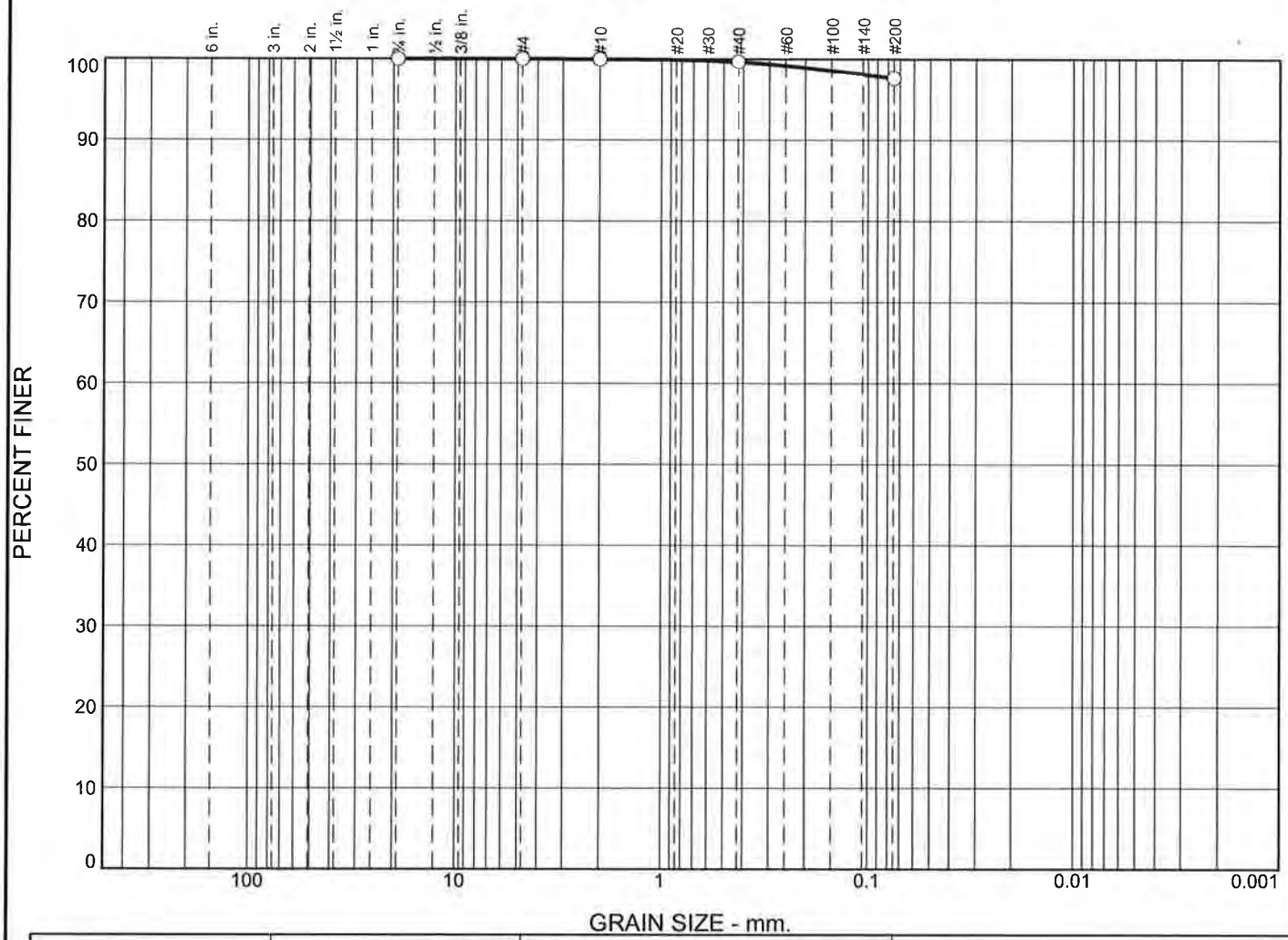
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.8	0.5	1.1	2.4			97.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.08

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.4	2.0	97.6	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-BOTTOM **Sample Number:** L1728340-02

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-BOTTOM

Sample Number: L1728340-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.64
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.64	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	100.0
		#40	0.07	0.00	99.6
		#200	0.43	0.00	97.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.4	2.0	2.4			97.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.02

Alpha Analytical

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% gravel (133%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

LA28340

Page ____ of ____

Client/Project Name: USACE - NHH - FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals 6020A/7471A/7471B	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270D	TOC - 9060					Lab I.D.	Remarks
.01	NHH-E-Top	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X						0-6'6"
.02	NHH-E-Bottom	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X						6'6"-8.1'

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/14/17 Time: 1509	Signature:	8/14/17 Time: 1509
Relinquished by: (Print Name)/(Affiliation) Signature:	8/14/17 Time: 1710	Received by: (Print Name)/(Affiliation) MARC A MUIR Signature:	8/14/17 Time: 1712
Relinquished by: (Print Name)/(Affiliation) MARC A MUIR Signature:	8/14/17 Time: 1815	Received by: (Print Name)/(Affiliation) Signature:	8/14/17 Time: 1815

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0168

ANALYTICAL REPORT

Lab Number:	L1728340
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	08/15/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728340-01	NHH-E-TOP	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17
L1728340-02	NHH-E-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1728340
Project Number: 60543021 **Report Date:** 08/15/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1032082-1 Laboratory Duplicate RPD for % Total Gravel (133%), performed on L1728340-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 08/15/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

SAMPLE RESULTS

Lab ID: L1728340-01
Client ID: NHH-E-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	1.00		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Coarse Sand	0.800		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Medium Sand	0.400		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Fine Sand	1.00		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Total Fines	96.8		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

SAMPLE RESULTS

Lab ID: L1728340-02
Client ID: NHH-E-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Total Gravel	ND		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Medium Sand	0.400		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Fine Sand	2.00		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP
% Total Fines	97.6		%	0.100	NA	1	-	08/15/17 12:39	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1032082-1 QC Sample: L1728340-01 Client ID: NHH-E-TOP						
% Total Gravel	1.00	0.200	%	**133**	Q	25
% Coarse Sand	0.800	0.800	%	0		25
% Medium Sand	0.400	0.500	%	22		25
% Fine Sand	1.00	1.10	%	10		25
% Total Fines	96.8	97.4	%	1		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728340
Report Date: 08/15/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728340-01A	Plastic 8oz unpreserved for Grain Size	A	NA		5.7	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()
L1728340-02A	Plastic 8oz unpreserved for Grain Size	A	NA		5.7	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-FSAND()

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728340
Project Number:	60543021	**Report Date:**	08/15/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728340
Project Number:	60543021	**Report Date:**	08/15/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

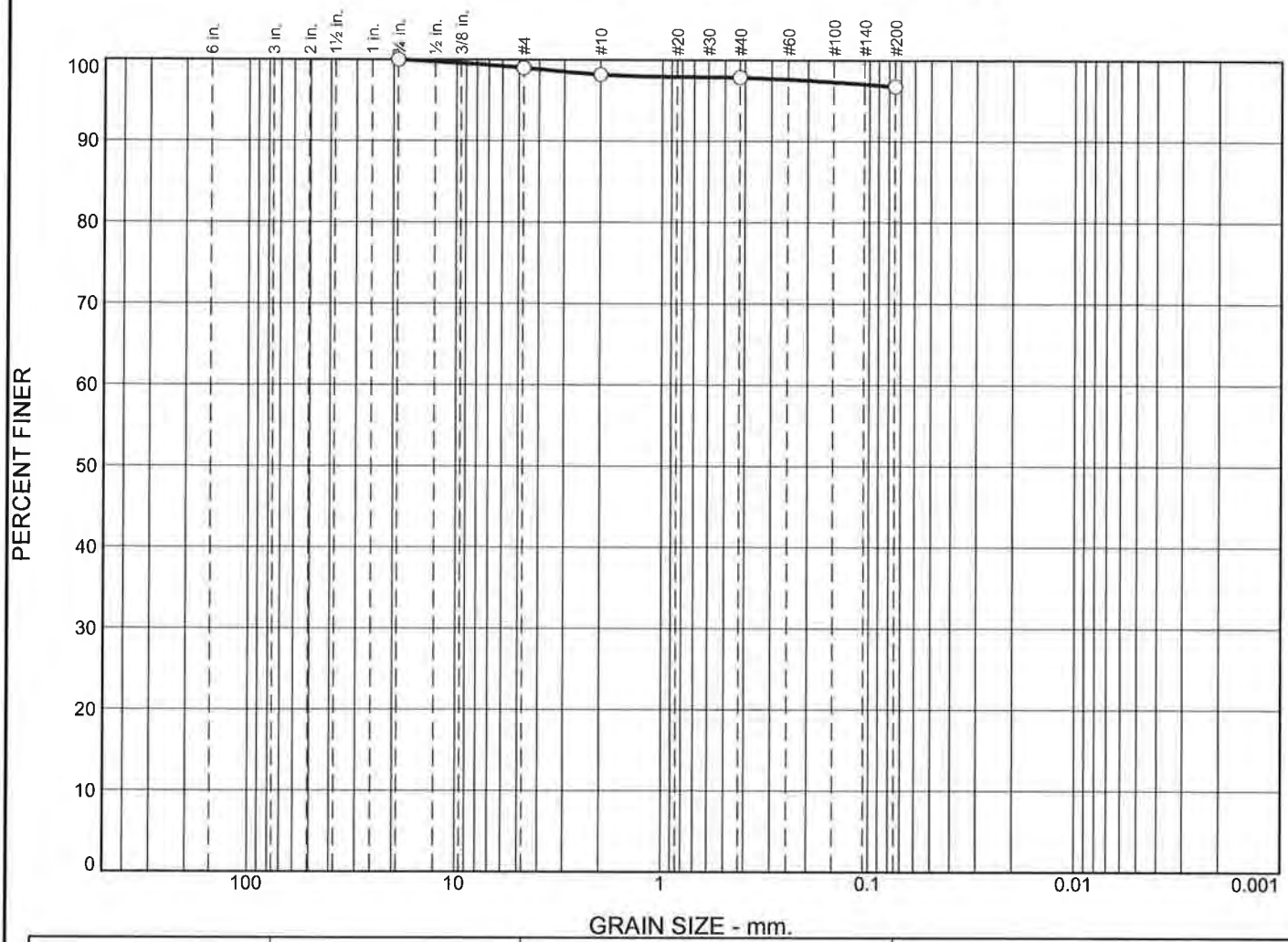
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.0	0.8	0.4	1.0	96.8	

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-TOP **Sample Number:** I1728340-01

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-TOP

Sample Number: l1728340-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.91
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.91	0.00	0.75	0.00	0.00	100.0
		#4	0.20	0.00	99.0
		#10	0.16	0.00	98.2
		#40	0.07	0.00	97.8
		#200	0.21	0.00	96.8

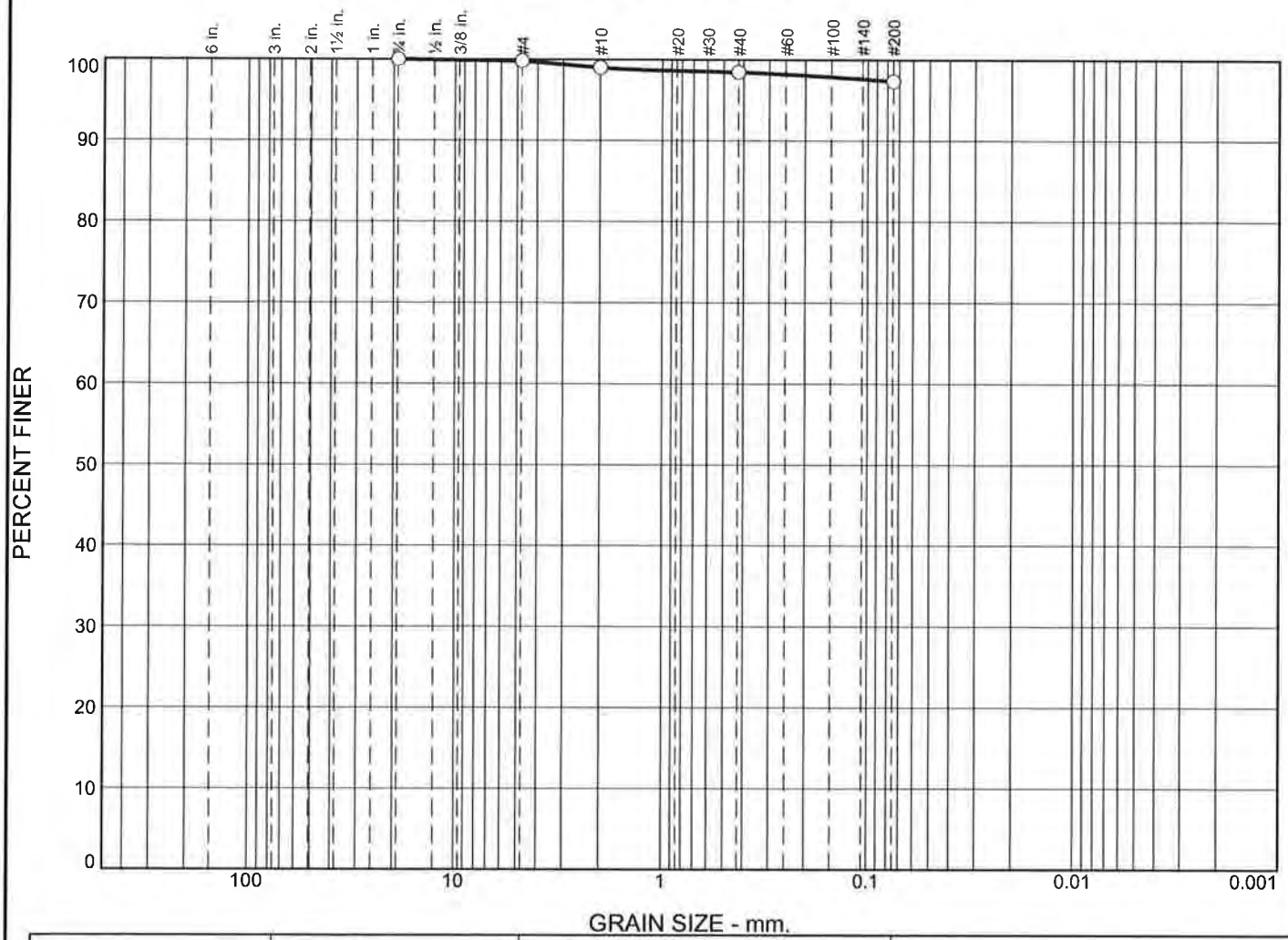
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.0	1.0	0.8	0.4	1.0	2.2			96.8

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.12

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.8	0.5	1.1	97.4	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-TOP **Sample Number:** WG1032082-1

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-TOP

Sample Number: WG1032082-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.07
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.07	0.00	0.75	0.00	0.00	100.0
		#4	0.04	0.00	99.8
		#10	0.16	0.00	99.0
		#40	0.11	0.00	98.5
		#200	0.22	0.00	97.4

Fractional Components

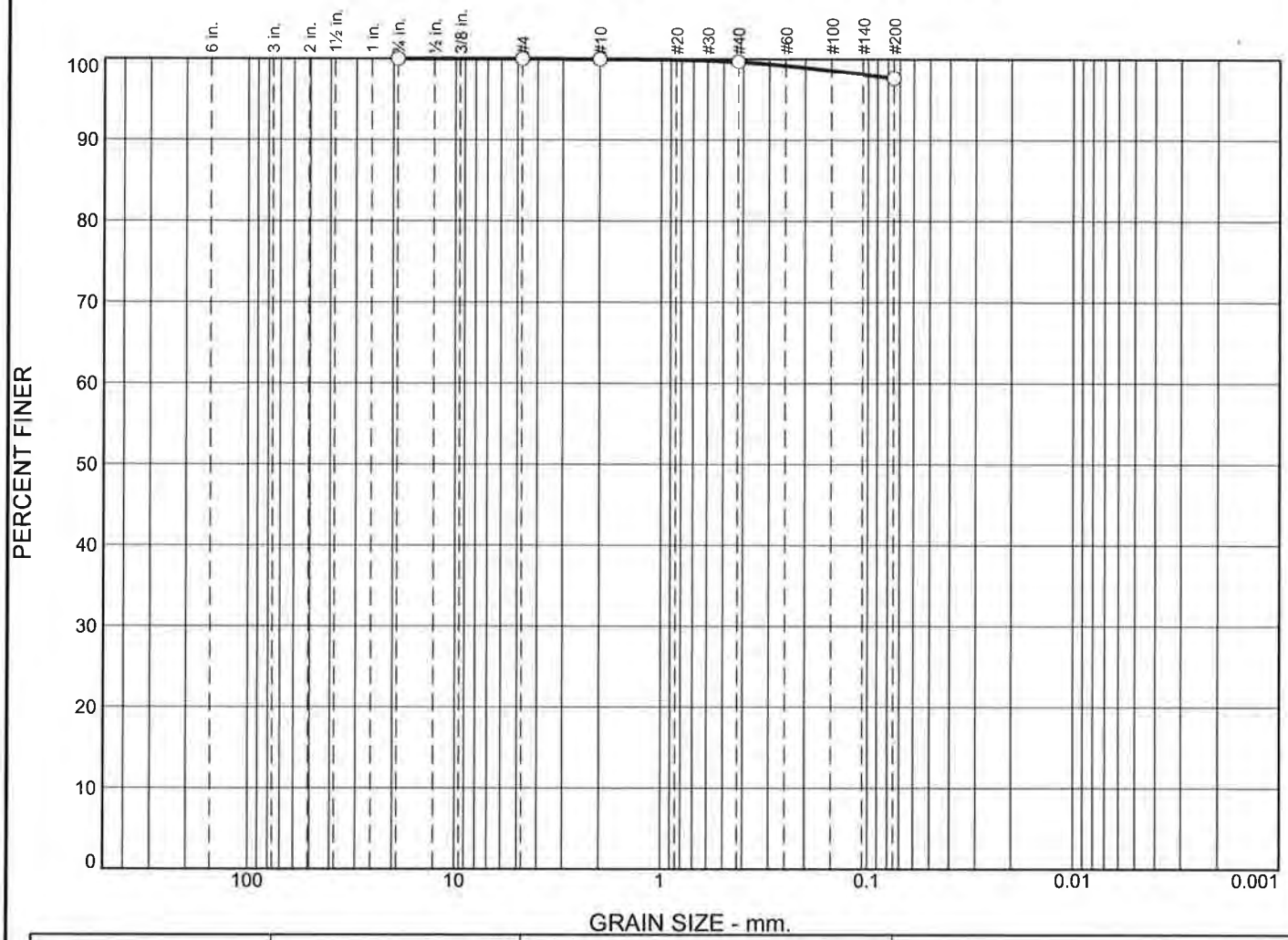
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.8	0.5	1.1	2.4			97.4

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.08

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.4	2.0	97.6	

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○											

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-BOTTOM **Sample Number:** L1728340-02

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

8/15/2017

Location: NHH-E-BOTTOM

Sample Number: L1728340-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.64
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.64	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	100.0
		#40	0.07	0.00	99.6
		#200	0.43	0.00	97.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.4	2.0	2.4			97.6

D_{10}	D_{15}	D_{20}	D_{30}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}

Fineness Modulus
0.02

Alpha Analytical

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% gravel (133%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

LA28340

Page ____ of ____

Client/Project Name: USACE - NHH - FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals 6020A/7471A/7471B	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270D	TOC - 9060					Lab I.D.	Remarks
.01	NHH-E-Top	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X						0-6'6"
.02	NHH-E-Bottom	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X						6'6"-8.1'

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/14/17 Time: 1509	Signature:	8/14/17 Time: 1509
Relinquished by: (Print Name)/(Affiliation) Signature:	8/14/17 Time: 1710	Received by: (Print Name)/(Affiliation) MARC A MUIR Signature:	8/14/17 Time: 1712
Relinquished by: (Print Name)/(Affiliation) MARC A MUIR Signature:	8/14/17 Time: 1815	Received by: (Print Name)/(Affiliation) Signature:	8/14/17 Time: 1815

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0168

Hydrometer Grain Size Results (ASTM D7928)

ANALYTICAL REPORT

Lab Number:	L1731354
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	09/28/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1731354-01	NHH-X-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1731354-02	NHH-X-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1731354-03	NHH-X-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1731354-04	NHH-Y-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 10:37	08/08/17
L1731354-05	NHH-Y-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 10:37	08/08/17
L1731354-06	NHH-Z-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 11:53	08/08/17
L1731354-07	NHH-Z-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 11:53	08/08/17
L1731354-08	NHH-N-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 13:05	08/08/17
L1731354-09	NHH-N-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 13:05	08/08/17
L1731354-10	NHH-O-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 14:45	08/08/17
L1731354-11	NHH-O-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 14:45	08/08/17
L1731354-12	NHH-M	SEDIMENT	NEW HAVEN, CT	08/08/17 16:10	08/08/17
L1731354-13	NHH-T-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 17:34	08/08/17
L1731354-14	NHH-T-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 17:34	08/08/17
L1731354-15	NHH-U-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 09:05	08/09/17
L1731354-16	NHH-U-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 09:05	08/09/17
L1731354-17	NHH-P-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 12:19	08/09/17
L1731354-18	NHH-P-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 12:19	08/09/17
L1731354-19	NHH-Q-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 14:27	08/09/17
L1731354-20	NHH-Q-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 14:27	08/09/17
L1731354-21	NHH-W-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 16:34	08/09/17
L1731354-22	NHH-W-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 16:34	08/09/17
L1731354-23	NHH-V-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 17:45	08/09/17
L1731354-24	NHH-V-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 17:45	08/09/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1731354-25	NHH-R-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 08:32	08/10/17
L1731354-26	NHH-R-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 08:32	08/10/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1731354
Project Number: 60543021 **Report Date:** 09/28/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1046269-1 Laboratory Duplicate RPD for % Clay fine (156%), performed on L1731354-08, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 09/28/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-01
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.800		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	6.90		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	7.70		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	83.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	8.90		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	92.3		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-02
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.700		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	7.10		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	7.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	82.6		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	9.60		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	92.2		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-03
Client ID: NHH-X-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	0.200		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	13.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	50.8		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	64.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	21.1		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	14.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	35.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-04
Client ID: NHH-Y-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.900		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	3.70		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	4.60		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	93.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	1.50		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	95.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-05
Client ID: NHH-Y-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	9.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	9.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	1.50		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	12.1		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	66.1		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	79.7		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	10.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	0.100		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	10.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-06
Client ID: NHH-Z-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.800		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	4.00		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	4.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	93.8		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	1.40		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	95.2		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-07
Client ID: NHH-Z-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.900		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	19.1		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	20.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	79.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	1.00		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	80.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-08
Client ID: NHH-N-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	3.70		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	3.70		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	5.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	26.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	23.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	55.7		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	38.2		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	2.40		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	40.6		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-09
Client ID: NHH-N-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	2.20		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	82.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	84.7		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	15.2		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	0.100		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	15.3		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-10
Client ID: NHH-O-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.600		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.70		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	2.30		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	88.8		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	8.90		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	97.7		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-11
Client ID: NHH-O-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	0.200		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	1.00		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	74.2		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	75.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	24.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	0.200		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	24.6		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-12
Client ID: NHH-M
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 16:10
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.500		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.50		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	2.00		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	52.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	46.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	98.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-13
Client ID: NHH-T-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.00		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	1.00		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	81.8		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	17.2		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	99.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-14
Client ID: NHH-T-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.700		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.40		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	2.10		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	62.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	35.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	97.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-15
Client ID: NHH-U-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	0.100		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.300		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.10		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	1.50		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	63.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	35.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	98.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-16
Client ID: NHH-U-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	0.100		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	1.40		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	3.20		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	4.70		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	75.4		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	19.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	95.3		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-17
Client ID: NHH-P-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.400		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.50		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	1.90		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	96.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	1.20		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	98.1		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-18
Client ID: NHH-P-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.200		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.30		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	1.50		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	92.7		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	5.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	98.5		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-19
Client ID: NHH-Q-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	0.200		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	0.900		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	1.10		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	82.0		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	16.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	98.9		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-20
Client ID: NHH-Q-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Coarse Sand	0.100		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Medium Sand	1.30		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Fine Sand	1.80		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Sand	3.20		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Silt Fine	84.7		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Clay Fine	12.1		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP
% Total Fines	96.8		%	0.100	NA	1	-	09/27/17 16:25	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-21
Client ID: NHH-W-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	2.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	3.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	48.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	53.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	35.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	11.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	46.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-22
Client ID: NHH-W-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	0.100		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	69.7		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	69.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	27.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	2.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	30.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-23
Client ID: NHH-V-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	4.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	4.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	8.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	5.40		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	4.40		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	18.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	58.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	18.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	76.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-24
Client ID: NHH-V-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	1.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	1.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	4.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	3.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	3.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	10.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	65.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	23.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	88.7		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-25
Client ID: NHH-R-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	0.200		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	0.200		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	6.30		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	6.40		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	6.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	18.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	52.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	28.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	81.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

SAMPLE RESULTS

Lab ID: L1731354-26
Client ID: NHH-R-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	2.60		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	1.70		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	4.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	8.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	68.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	23.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	91.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1046269-1 QC Sample: L1731354-08 Client ID: NHH-N-TOP						
% Coarse Gravel	ND	ND	%	NC		25
% Fine Gravel	3.70	ND	%	NC		25
% Total Gravel	3.70	ND	%	NC		25
% Coarse Sand	5.80	7.10	%	20		25
% Medium Sand	26.0	27.3	%	5		25
% Fine Sand	23.9	24.4	%	2		25
% Total Sand	55.7	58.8	%	5		25
% Silt Fine	38.2	40.9	%	7		25
% Clay Fine	2.40	0.300	%	**156**	Q	25
% Total Fines	40.6	41.2	%	1		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
A1	Absent
A2	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731354-01A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIM FORMS(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-02A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-03A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-04A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-05A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731354-06A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-07A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-08A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-08B	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-08C	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-09A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-10A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731354-11A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-12A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-13A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-14A	Plastic 8oz unpreserved for Grain Size	A	NA		5.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-15A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-16A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-17A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731354-18A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-19A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-20A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-21A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-22A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-23A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-24A	Plastic 8oz unpreserved for Grain Size	A1	NA		5.6	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731354
Report Date: 09/28/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731354-25A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731354-26A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1731354
Project Number:	60543021	**Report Date:**	09/28/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1731354
Project Number:	60543021	**Report Date:**	09/28/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

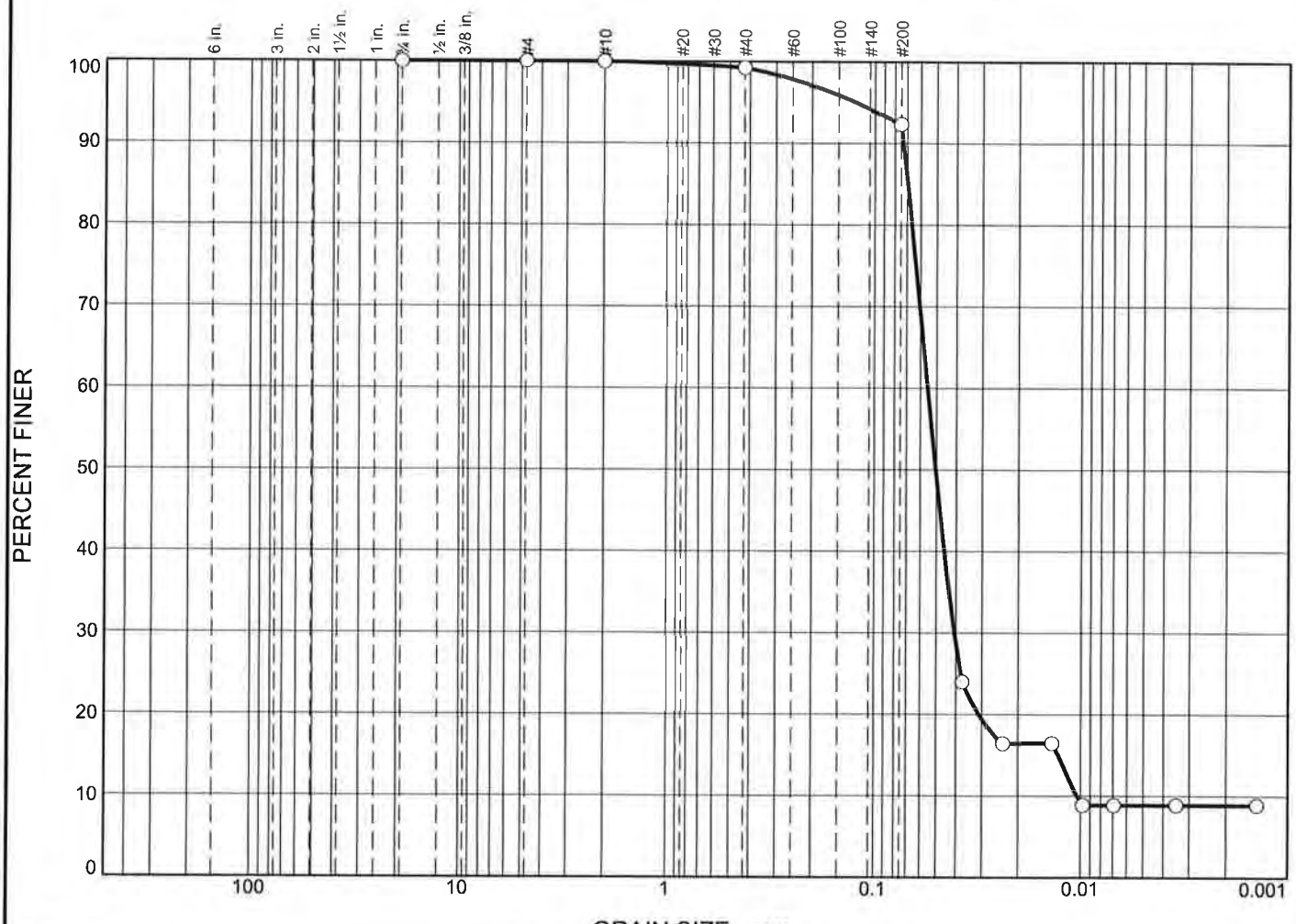
Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.8	6.9	83.4	8.9

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0694	0.0551	0.0503	0.0408	0.0128	0.0104	2.89	5.28

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-X-TOP **Sample Number:** L1731354-01

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-X-TOP

Sample Number: L1731354-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.67
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.67	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.15	0.00	99.2
		#200	1.37	0.00	92.3

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 92.3
Weight of hydrometer sample =19.67
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	23.9
5.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0238	16.4
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	16.4
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	8.9
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	8.9
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.9
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.9

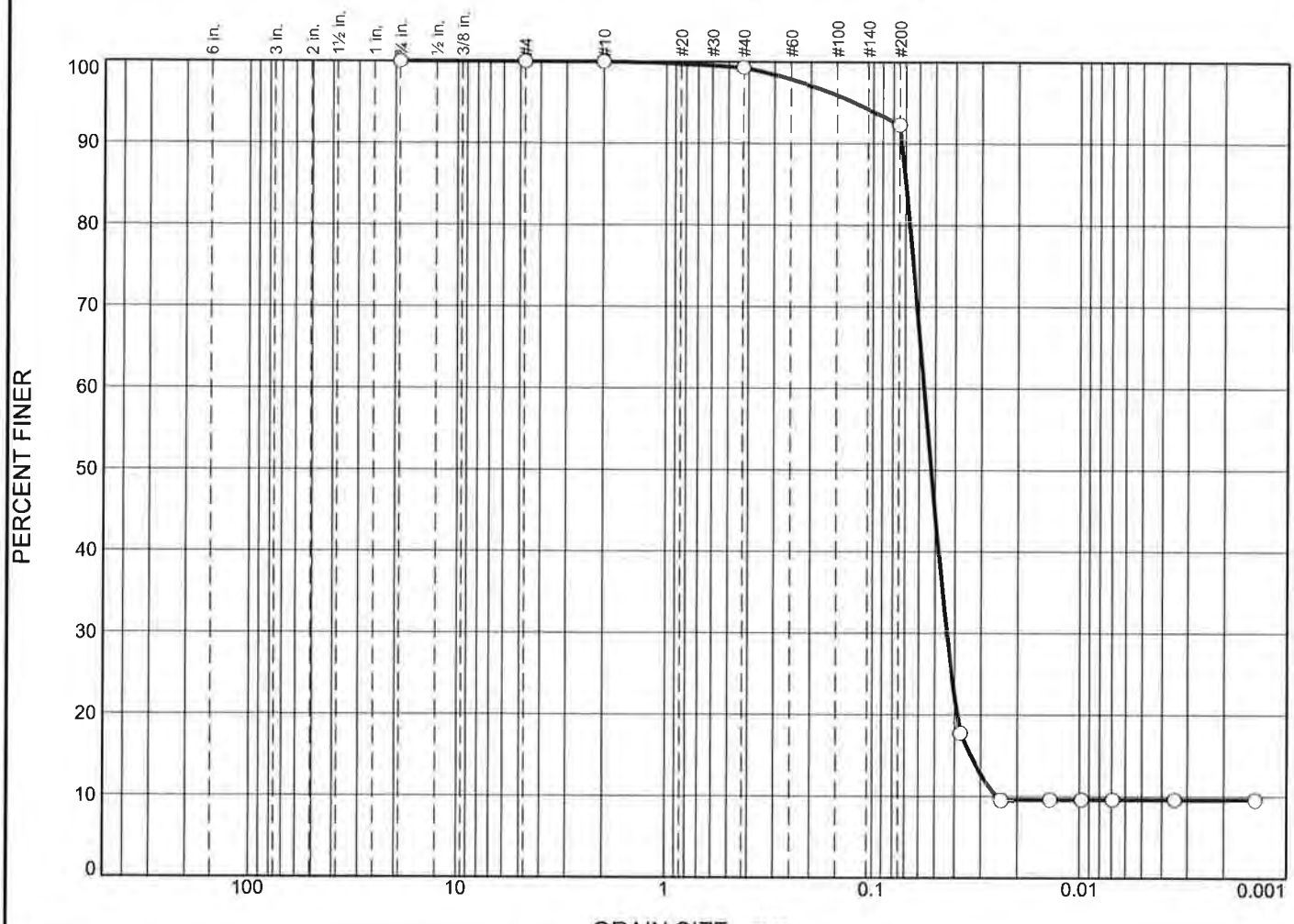
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.8	6.9	7.7	83.4	8.9	92.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0104	0.0128	0.0309	0.0408	0.0457	0.0503	0.0551	0.0661	0.0694	0.0731	0.1251

Fineness Modulus	C_u	C_c
0.06	5.28	2.89

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.7	7.1	82.6	9.6

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0700	0.0568	0.0523	0.0437	0.0336	0.0249	1.35	2.28

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-X-REP-TOP **Sample Number:** L1731354-02

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-X-REP-TOP

Sample Number: L1731354-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 18.19
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
18.19	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.13	0.00	99.3
		#200	1.28	0.00	92.2

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 92.2
Weight of hydrometer sample =18.19
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0376	17.7
5.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0240	9.6
15.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0138	9.6
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	9.6
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	9.6
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	9.6
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	9.6

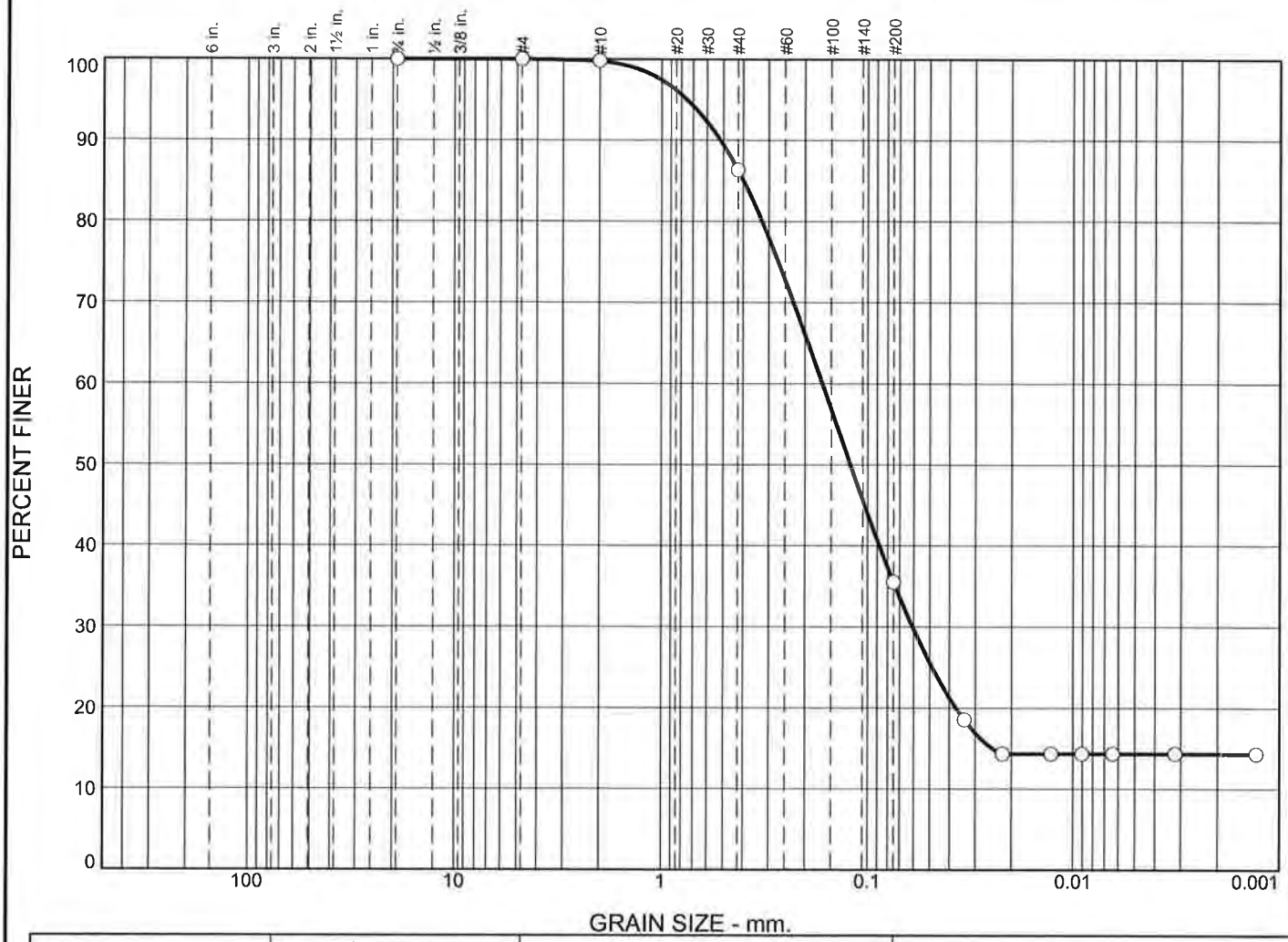
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.7	7.1	7.8	82.6	9.6	92.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0249	0.0336	0.0389	0.0437	0.0481	0.0523	0.0568	0.0669	0.0700	0.0733	0.1249

Fineness Modulus	C_u	C_c
0.06	2.28	1.35

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	13.5	50.8	21.1	14.4

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.3992	0.1657	0.1214	0.0606	0.0246			

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-X-BOTTOM **Sample Number:** L1731354-03

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-X-BOTTOM

Sample Number: L1731354-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 40.43
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
40.43	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.08	0.00	99.8
		#40	5.44	0.00	86.3
		#200	20.55	0.00	35.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 35.5
Weight of hydrometer sample =40.43
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0130	1.0132	0.0134	13.0	12.9	0.0340	18.6
5.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0221	14.4
15.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0128	14.4
30.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0090	14.4
60.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0064	14.4
240.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0032	14.4
1440.00	21.5	1.0100	1.0102	0.0134	10.0	13.6	0.0013	14.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	13.5	50.8	64.5	21.1	14.4	35.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0246	0.0372	0.0606	0.0878	0.1214	0.1657	0.3244	0.3992	0.5163	0.7480

Fineness Modulus
0.75

Alpha Analytical

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.9	3.7	93.9	1.5

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0697	0.0596	0.0561	0.0494	0.0442	0.0423	0.97	1.41

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Y-TOP **Sample Number:** L1731354-04

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Y-TOP

Sample Number: L1731354-04

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 18.61
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
18.61	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.16	0.00	99.1
		#200	0.69	0.00	95.4

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 95.4
Weight of hydrometer sample =18.61
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	1.5
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	1.5
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	1.5
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.5
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.5
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.5
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.5

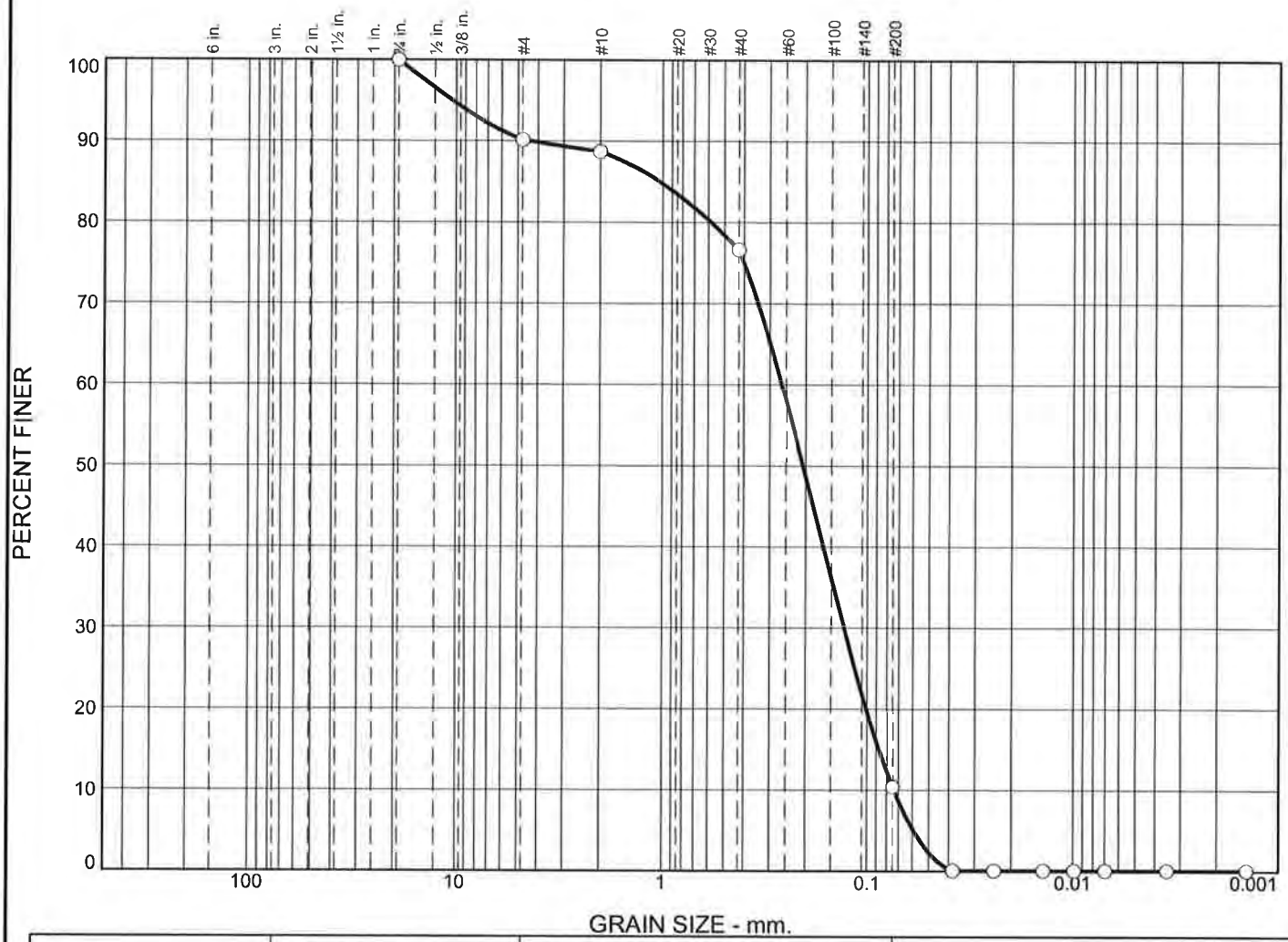
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	3.7	4.6	93.9	1.5	95.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0401	0.0423	0.0442	0.0460	0.0494	0.0527	0.0561	0.0596	0.0674	0.0697	0.0721	0.0748

Fineness Modulus	C_u	C_c
0.05	1.41	0.97

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	9.8	1.5	12.1	66.1	10.4	0.1

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.0338	0.2623	0.2066	0.1299	0.0872	0.0738	0.87	3.56

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Y-BOTTOM **Sample Number:** L1731354-05

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Y-BOTTOM

Sample Number: L1731354-05

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 43.25
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
43.25	0.00	0.75	0.00	0.00	100.0
		#4	4.26	0.00	90.2
		#10	0.64	0.00	88.7
		#40	5.23	0.00	76.6
		#200	28.60	0.00	10.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 10.5
Weight of hydrometer sample =43.25
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 **-** 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	0.1
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

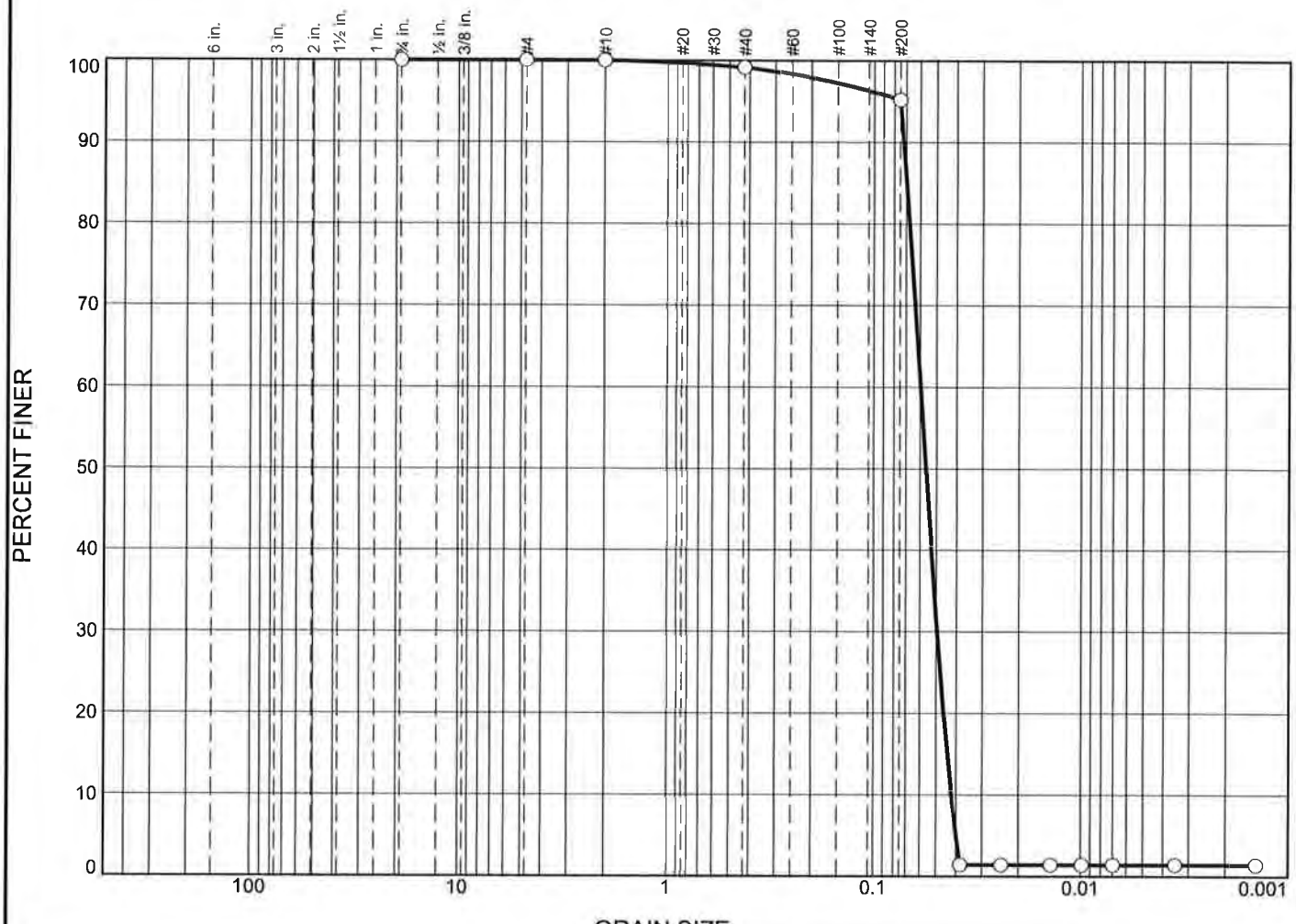
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	9.8	9.8	1.5	12.1	66.1	79.7	10.4	0.1	10.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0592	0.0738	0.0872	0.1008	0.1299	0.1642	0.2066	0.2623	0.5813	1.0338	4.3505	10.4352

Fineness Modulus	C_u	C_c
1.59	3.56	0.87

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.8	4.0	93.8	1.4

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0698	0.0596	0.0561	0.0494	0.0442	0.0423	0.97	1.41

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Z-TOP **Sample Number:** L1731354-06

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Z-TOP

Sample Number: L1731354-06

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 19.28
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
19.28	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.16	0.00	99.2
		#200	0.76	0.00	95.2

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 95.2
Weight of hydrometer sample =19.28
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	1.4
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	1.4
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	1.4
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.4
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.4
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.4
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.8	4.0	4.8	93.8	1.4	95.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0401	0.0423	0.0442	0.0460	0.0494	0.0527	0.0561	0.0596	0.0675	0.0698	0.0722	0.0749

Fineness Modulus	C_u	C_c
0.05	1.41	0.97

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.9	19.1	79.0	1.0

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1037	0.0641	0.0597	0.0515	0.0454	0.0432	0.96	1.48

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Z-BOTTOM **Sample Number:** L1731354-07

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Z-BOTTOM

Sample Number: L1731354-07

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.58
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.58	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.22	0.00	99.1
		#200	4.50	0.00	80.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 80.0
Weight of hydrometer sample =23.58
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	1.0
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	1.0
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	1.0
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.0
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.0
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.0
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.0

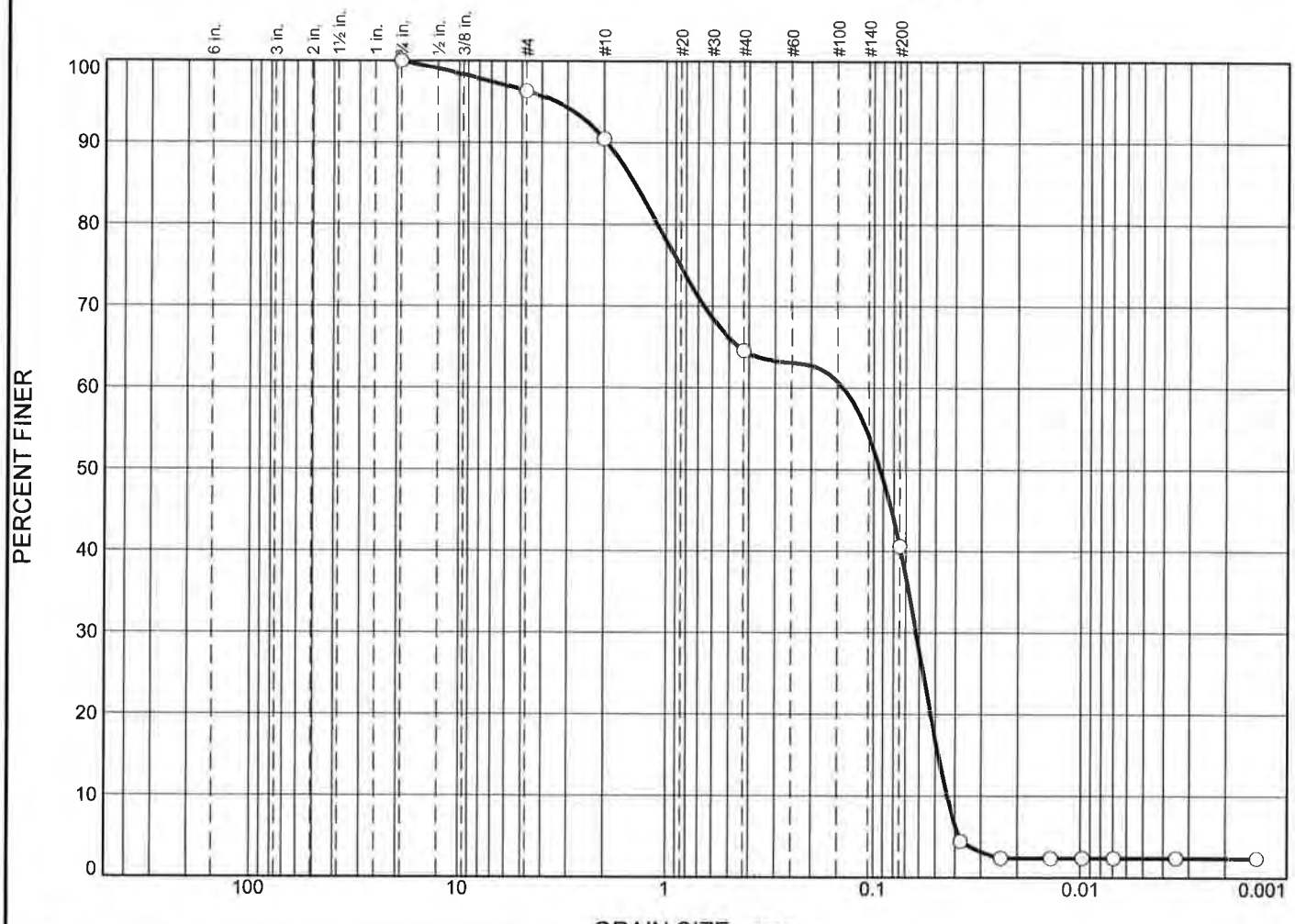
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.9	19.1	20.0	79.0	1.0	80.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0407	0.0432	0.0454	0.0475	0.0515	0.0555	0.0597	0.0641	0.0751	0.1037	0.1513	0.2431

Fineness Modulus	C_u	C_c
0.14	1.48	0.96

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.7	5.8	26.0	23.9	38.2	2.4

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				1.4255	0.1415	0.0930	0.0623	0.0484	0.0438	0.63	3.23

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-N-TOP **Sample Number:** L1731354-08

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-N-TOP

Sample Number: L1731354-08

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 31.86
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
31.86	0.00	0.75	0.00	0.00	100.0
		#4	1.19	0.00	96.3
		#10	1.85	0.00	90.5
		#40	8.26	0.00	64.5
		#200	7.62	0.00	40.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 40.6
Weight of hydrometer sample =31.86
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0376	4.5
5.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0240	2.4
15.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0138	2.4
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	2.4
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	2.4
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	2.4
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	2.4

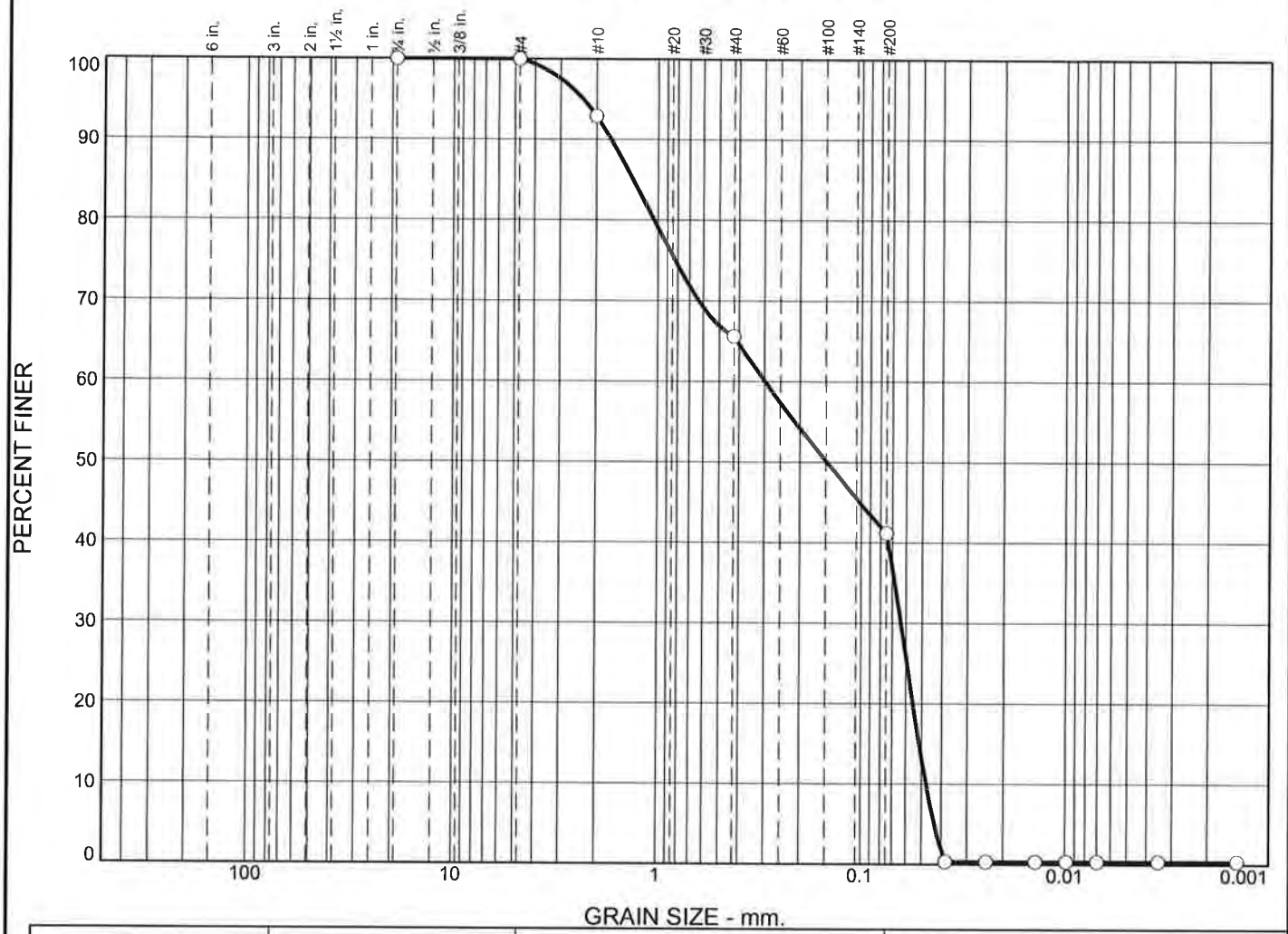
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.7	3.7	5.8	26.0	23.9	55.7	38.2	2.4	40.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0384	0.0438	0.0484	0.0528	0.0623	0.0741	0.0930	0.1415	1.1031	1.4255	1.9330	3.4267

Fineness Modulus	C_u	C_c
1.39	3.23	0.63

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	7.1	27.3	24.4	40.9	0.3

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			1.3166	0.2974	0.1486	0.0635	0.0513	0.0474	0.29	6.27

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-N-TOP **Sample Number:** WG1046269-1

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-N-TOP

Sample Number: WG1046269-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 34.14
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
34.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	2.43	0.00	92.9
		#40	9.33	0.00	65.6
		#200	8.32	0.00	41.2

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 41.2
Weight of hydrometer sample =34.14
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	0.3
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.3
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.3
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.3
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.3
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.3
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.3

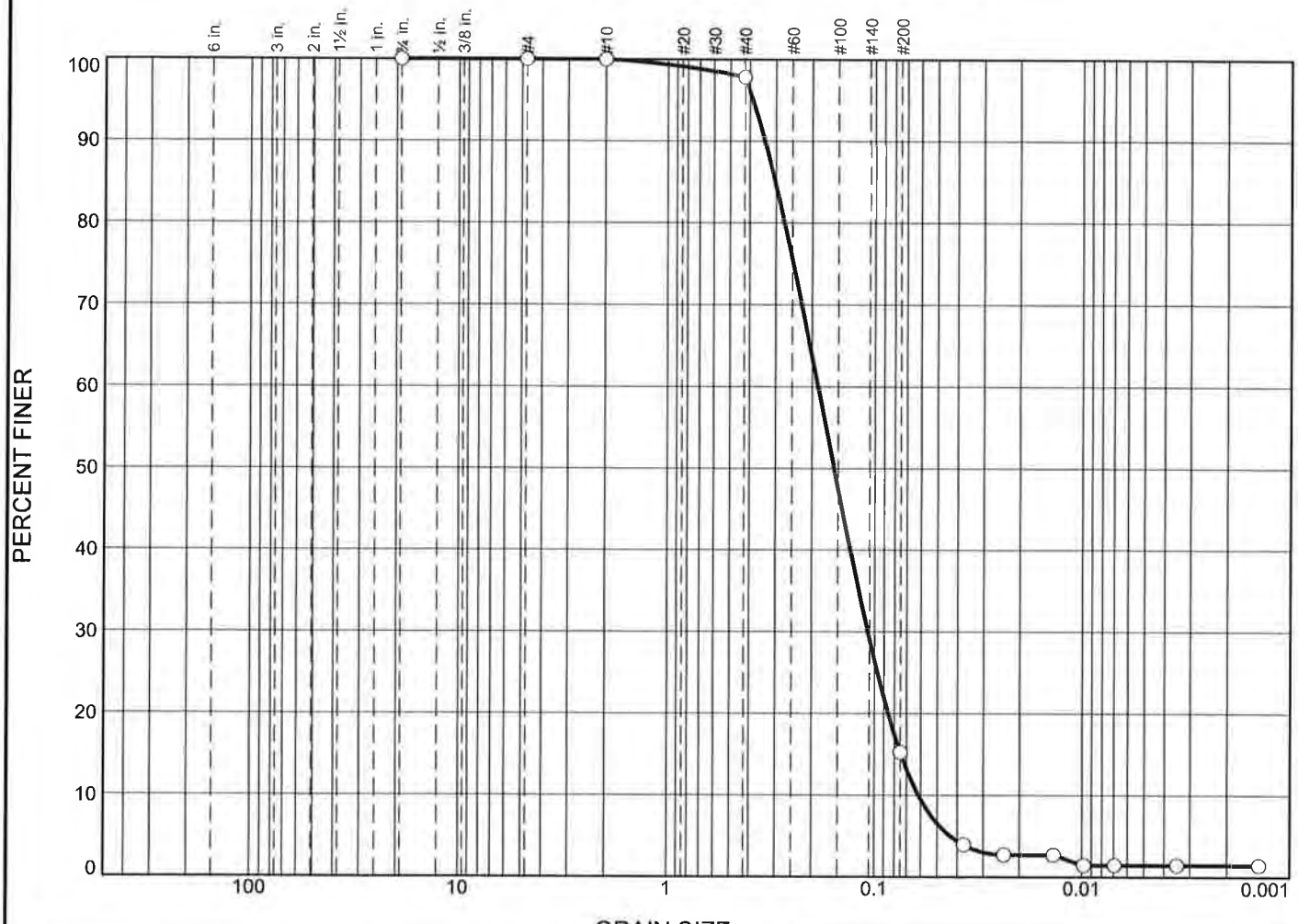
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	7.1	27.3	24.4	58.8	40.9	0.3	41.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0432	0.0474	0.0513	0.0552	0.0635	0.0736	0.1486	0.2974	1.0453	1.3166	1.6890	2.3309

Fineness Modulus	C_u	C_c
1.43	6.27	0.29

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	2.2	82.5	13.8	1.5

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.3028	0.1877	0.1571	0.1077	0.0744	0.0613	1.01	3.06

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-N-BOTTOM **Sample Number:** L1731354-09

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-N-BOTTOM

Sample Number: L1731354-09

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 41.75
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
41.75	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.91	0.00	97.8
		#200	34.47	0.00	15.3

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 15.3
Weight of hydrometer sample =41.75
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0379	0.7
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

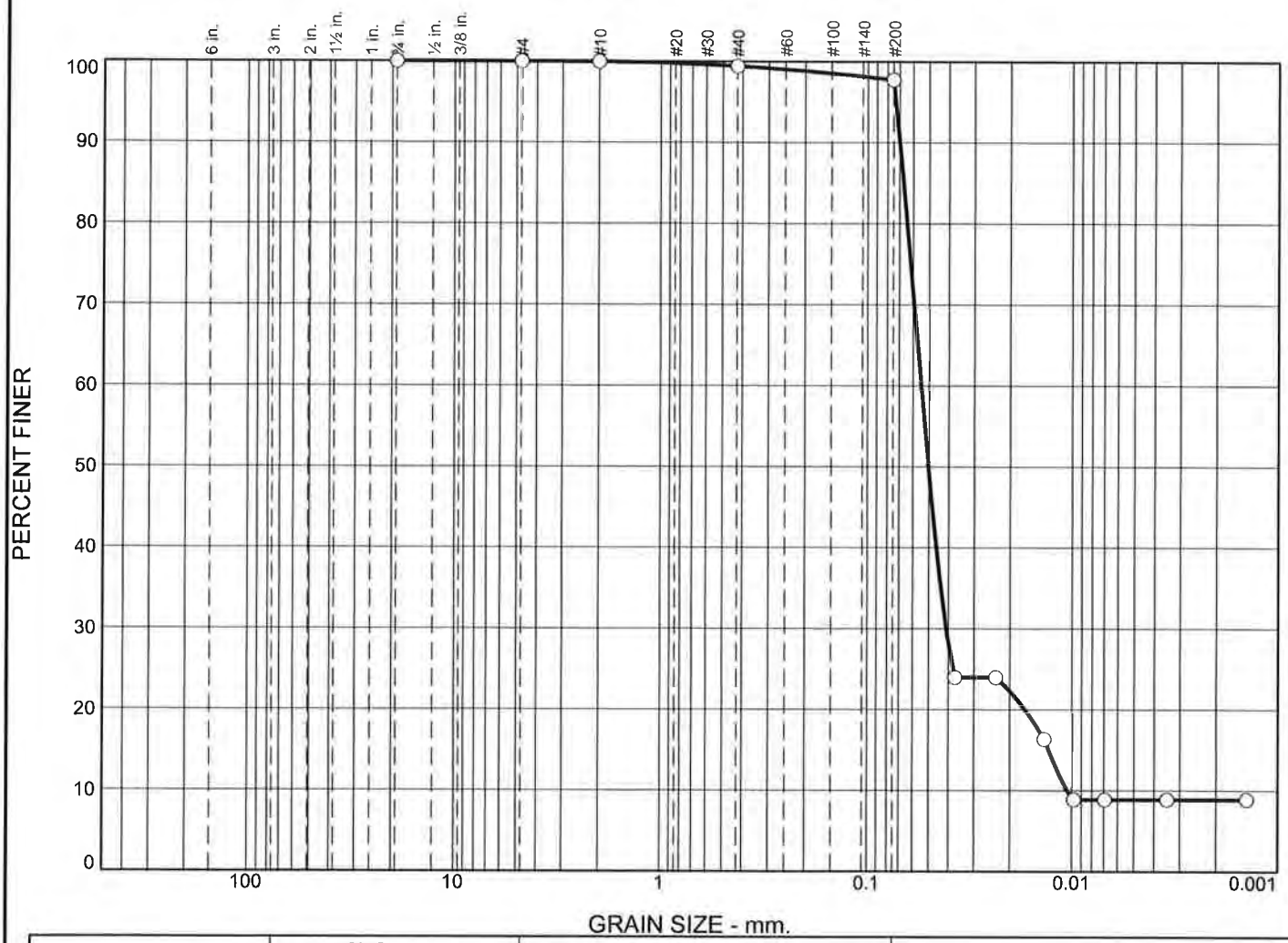
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	2.2	82.5	84.7	15.2	0.1	15.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0523	0.0640	0.0745	0.0845	0.1050	0.1274	0.1529	0.1831	0.2683	0.2990	0.3369	0.3869

Fineness Modulus	C_u	C_c
0.68	2.86	0.94

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.6	1.7	88.8	8.9

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0668	0.0546	0.0503	0.0411	0.0130	0.0106	2.93	5.17

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-O-TOP **Sample Number:** L1731354-10

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-O-TOP

Sample Number: L1731354-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.80
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.80	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.01	0.00	100.0
		#40	0.11	0.00	99.4
		#200	0.35	0.00	97.7

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 97.7
Weight of hydrometer sample =20.80
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	24.0
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	24.0
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	16.4
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	8.9
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	8.9
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.9
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.6	1.7	2.3	88.8	8.9	97.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0106	0.0130	0.0169	0.0411	0.0459	0.0503	0.0546	0.0641	0.0668	0.0698	0.0730

Fineness Modulus	C_u	C_c
0.03	5.17	2.93

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.2	1.0	74.2	24.4	0.2

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2653	0.1507	0.1235	0.0835	0.0613	0.0545	0.85	2.77

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-O-BOTTOM **Sample Number:** L1731354-11

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-O-BOTTOM

Sample Number: L1731354-11

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 41.28
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
41.28	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.09	0.00	99.8
		#40	0.40	0.00	98.8
		#200	30.63	0.00	24.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 24.6
Weight of hydrometer sample =41.28
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0382	0.2
5.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.2
15.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.2
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.2
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.2
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.2
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	1.0	74.2	75.4	24.4	0.2	24.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0474	0.0545	0.0613	0.0683	0.0835	0.1016	0.1235	0.1507	0.2336	0.2653	0.3057	0.3613

Fineness Modulus	C_u	C_c
0.52	2.77	0.85

Alpha Analytical

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.5	1.5	52.0	46.0

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0564	0.0350	0.0272					

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-M **Sample Number:** L1731354-12

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-M

Sample Number: L1731354-12

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.14
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.10	0.00	99.5
		#200	0.33	0.00	98.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 98.0
Weight of hydrometer sample =21.14
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0080	1.0082	0.0134	8.0	14.2	0.0357	60.9
5.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0230	46.0
15.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0133	46.0
30.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0094	46.0
60.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0066	46.0
240.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0033	46.0
1440.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0014	46.0

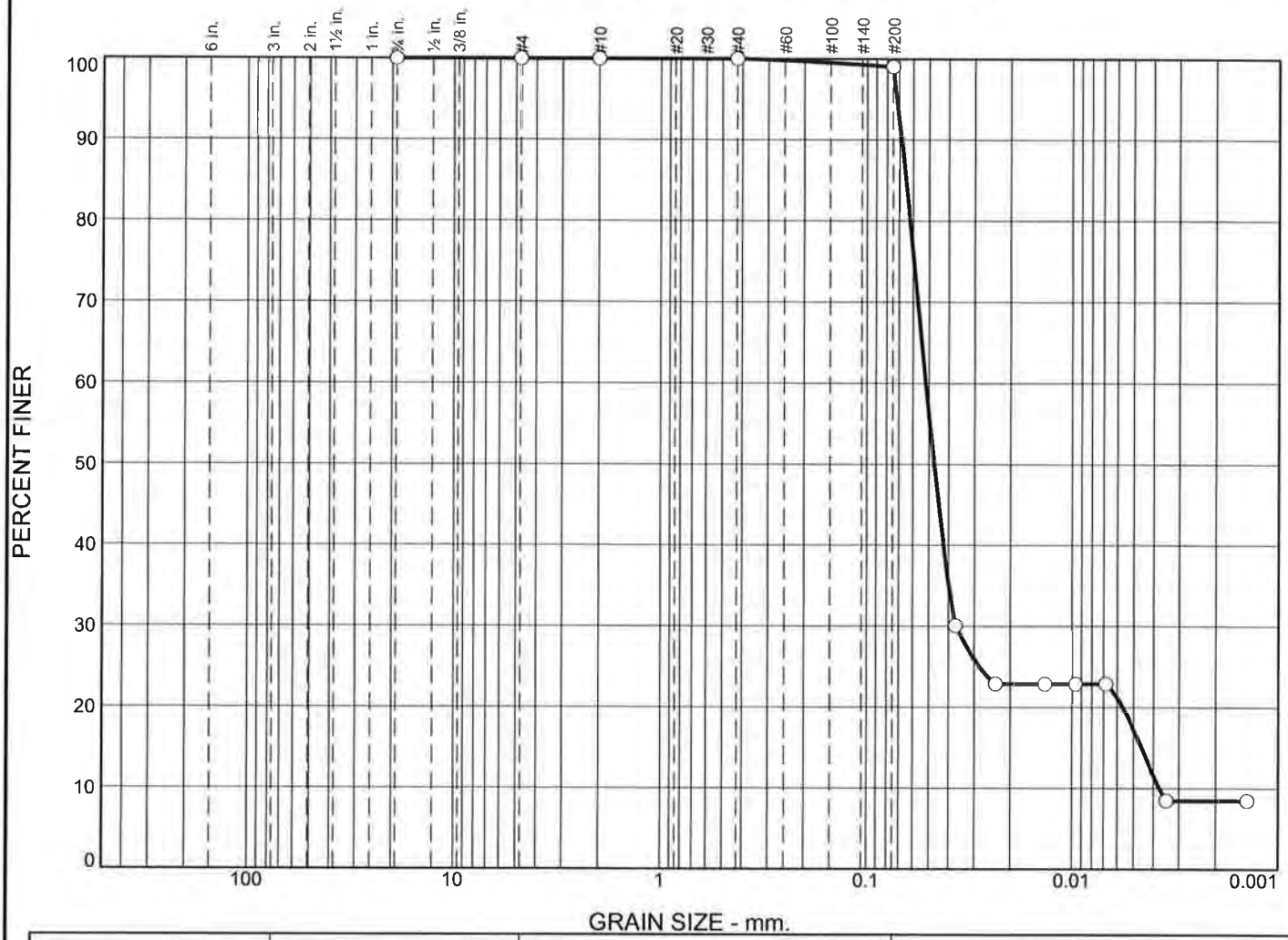
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.5	1.5	2.0	52.0	46.0	98.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
						0.0272	0.0350	0.0513	0.0564	0.0624	0.0696

Fineness Modulus
0.02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	1.0	81.8	17.2

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.0650	0.0519	0.0472	0.0368	0.0046	0.0037	6.99	13.87

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-T-TOP **Sample Number:** L1731354-13

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-T-TOP

Sample Number: L1731354-13

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 22.07
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.07	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.00	0.00	100.0
		#200	0.22	0.00	99.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 99.0
Weight of hydrometer sample =22.07
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0040	1.0042	0.0134	4.0	15.2	0.0370	30.1
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	22.9
15.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0136	22.9
30.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0096	22.9
60.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0068	22.9
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.5
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.5

Fractional Components

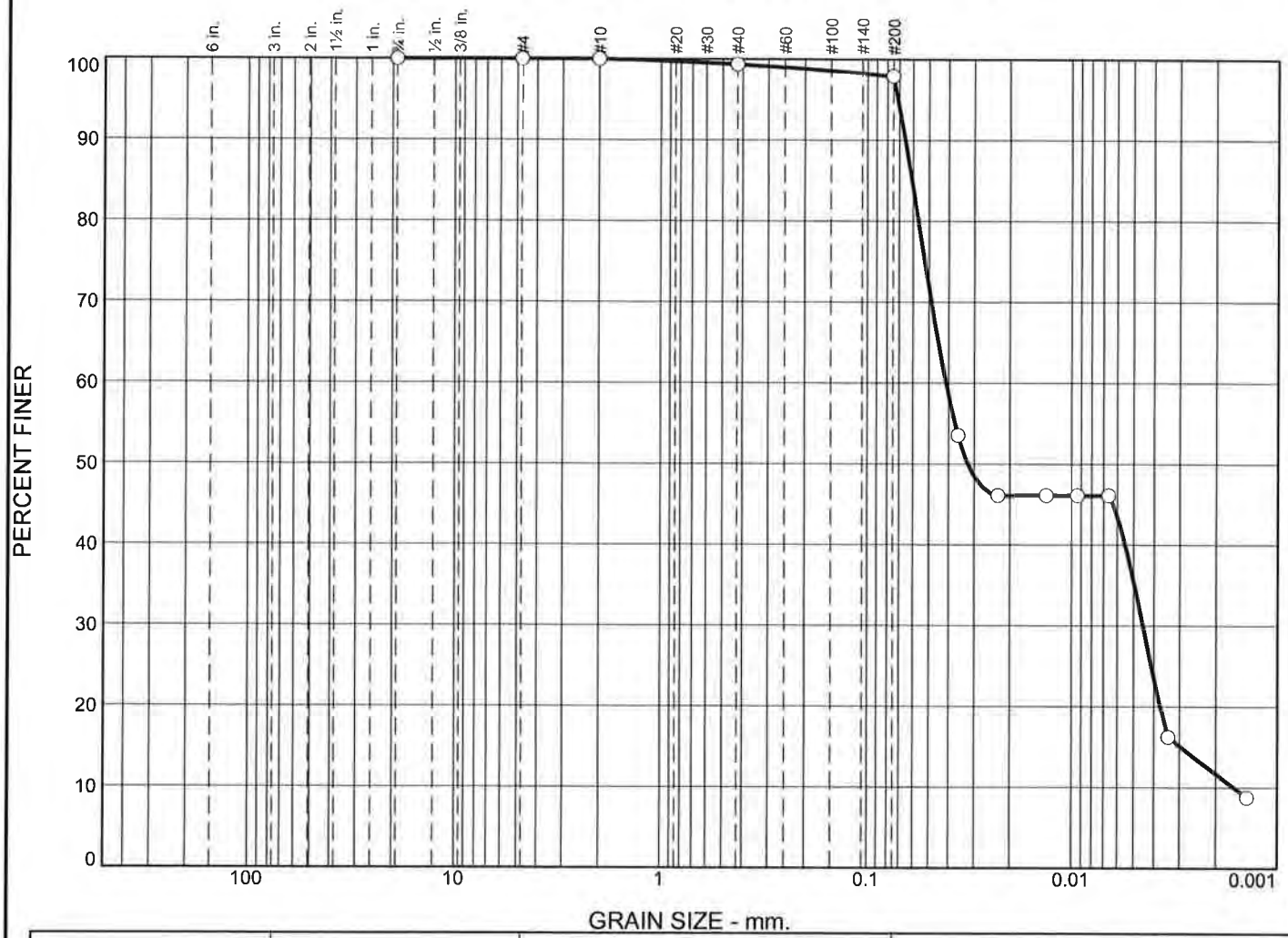
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	81.8	17.2	99.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0037	0.0046	0.0056	0.0368	0.0425	0.0472	0.0519	0.0621	0.0650	0.0682	0.0718

Fineness Modulus	C_u	C_c
0.01	13.87	6.99

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.7	1.4	62.4	35.5

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0606	0.0412	0.0322	0.0045	0.0030	0.0016	0.30	25.26

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-T-BOTTOM **Sample Number:** L1731354-14

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-T-BOTTOM

Sample Number: L1731354-14

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.08
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.08	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.14	0.00	99.3
		#200	0.30	0.00	97.9

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 97.9
Weight of hydrometer sample =21.08
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0070	1.0072	0.0134	7.0	14.4	0.0360	53.5
5.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0230	46.1
15.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0133	46.1
30.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0094	46.1
60.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0066	46.1
240.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0034	16.3
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.8

Fractional Components

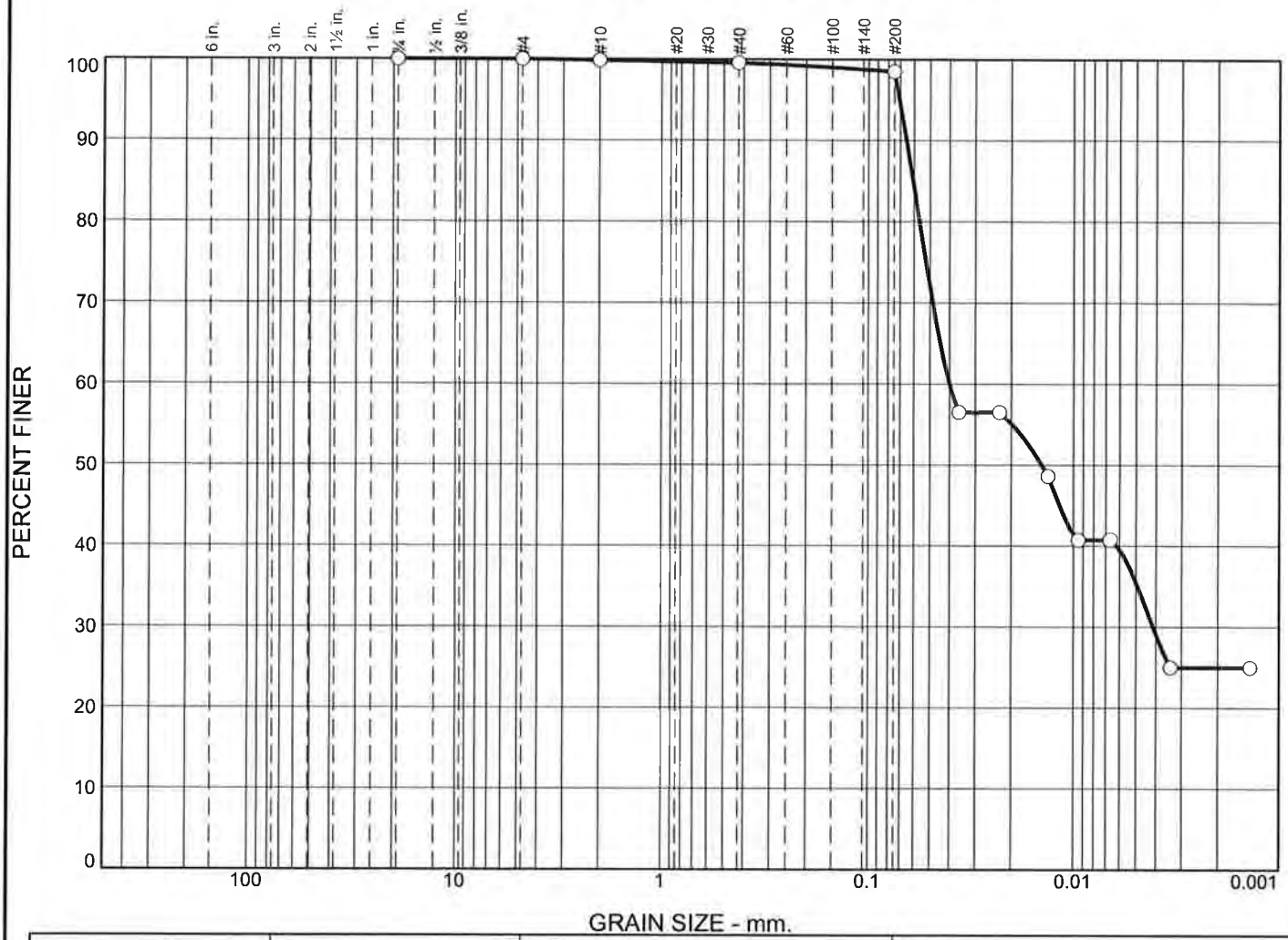
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.7	1.4	2.1	62.4	35.5	97.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0016	0.0030	0.0037	0.0045	0.0055	0.0322	0.0412	0.0563	0.0606	0.0655	0.0711

Fineness Modulus	C_u	C_c
0.03	25.26	0.30

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	0.3	1.1	63.0	35.5

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0605	0.0401	0.0143	0.0041				

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-U-TOP **Sample Number:** L1731354-15

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-U-TOP

Sample Number: L1731354-15

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.11
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.11	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.03	0.00	99.9
		#40	0.06	0.00	99.6
		#200	0.21	0.00	98.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 98.5
Weight of hydrometer sample =20.11
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0070	1.0072	0.0134	7.0	14.4	0.0360	56.5
5.00	21.5	1.0070	1.0072	0.0134	7.0	14.4	0.0228	56.5
15.00	21.5	1.0060	1.0062	0.0134	6.0	14.7	0.0133	48.6
30.00	21.5	1.0050	1.0052	0.0134	5.0	15.0	0.0095	40.7
60.00	21.5	1.0050	1.0052	0.0134	5.0	15.0	0.0067	40.7
240.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0034	25.0
1440.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0014	25.0

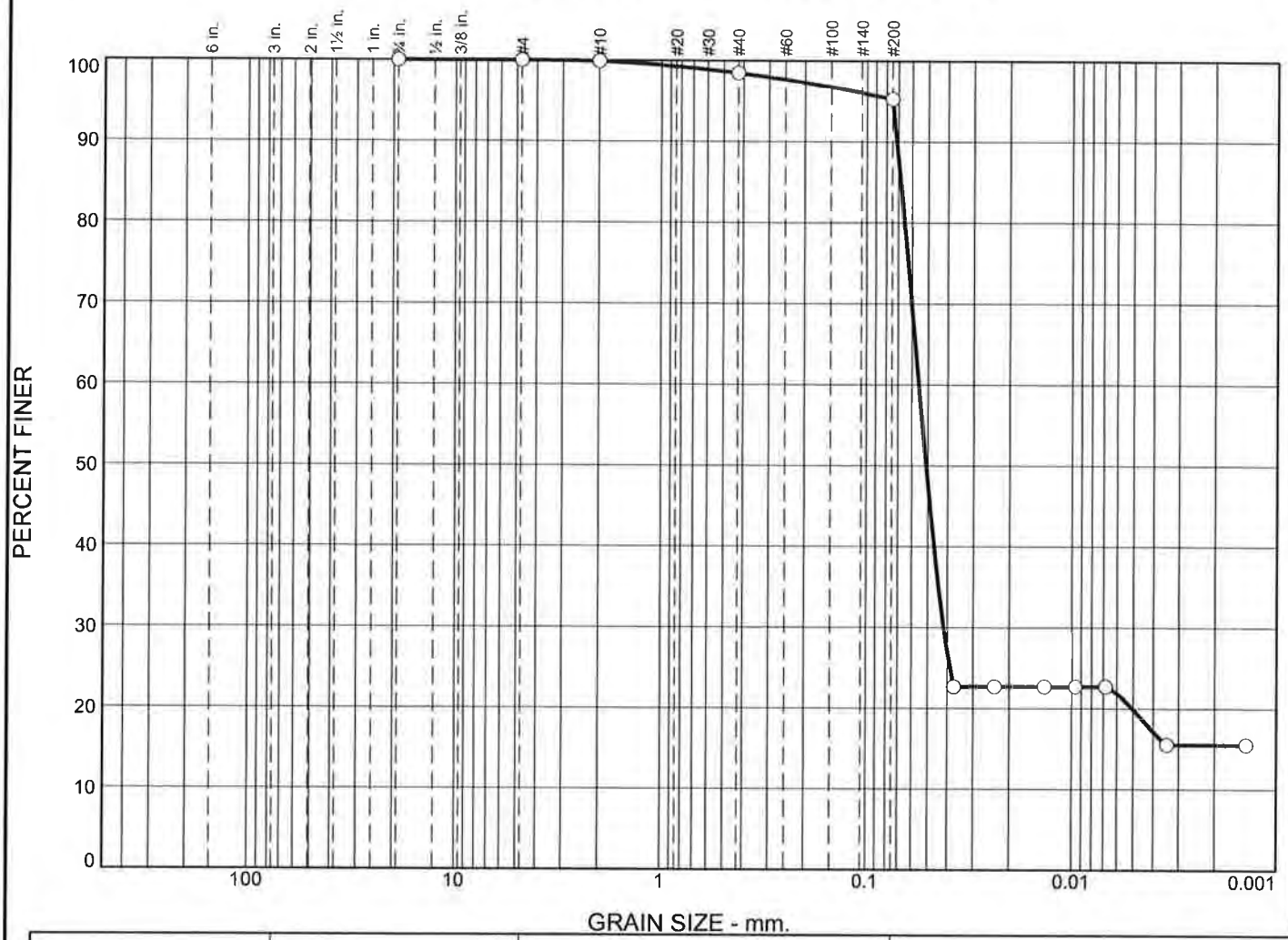
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	0.3	1.1	1.5	63.0	35.5	98.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0041	0.0062	0.0143	0.0401	0.0562	0.0605	0.0652	0.0706

Fineness Modulus
0.02

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	1.4	3.2	75.4	19.9

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0681	0.0554	0.0509	0.0418				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-U-BOTTOM **Sample Number:** L1731354-16

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-U-BOTTOM

Sample Number: L1731354-16

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 21.41
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
21.41	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.02	0.00	99.9
		#40	0.31	0.00	98.5
		#200	0.68	0.00	95.3

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 95.3
Weight of hydrometer sample =21.41
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	22.7
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	22.7
15.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0136	22.7
30.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0096	22.7
60.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0068	22.7
240.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0034	15.6
1440.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0014	15.6

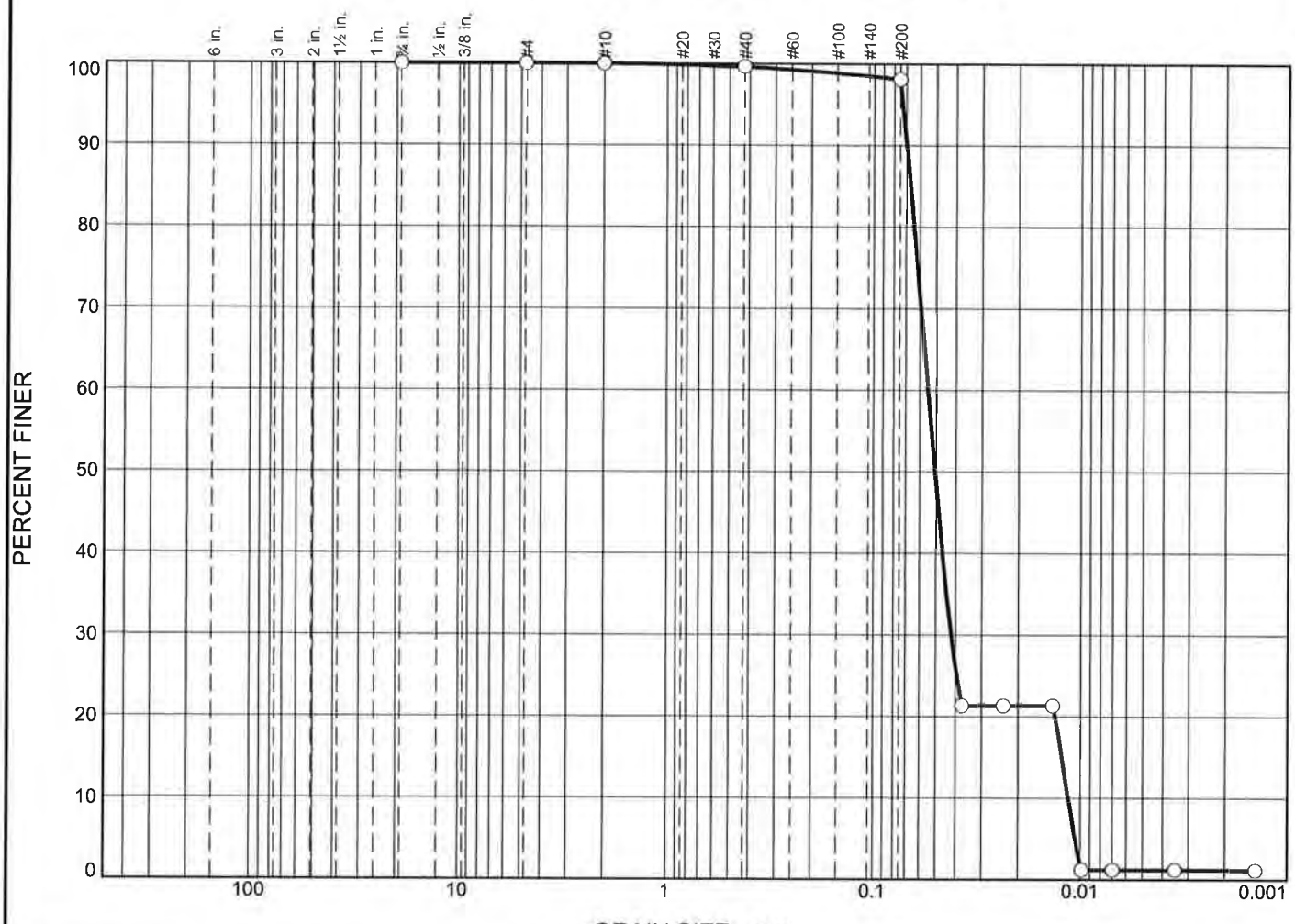
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.4	3.2	4.7	75.4	19.9	95.3

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0050	0.0418	0.0465	0.0509	0.0554	0.0652	0.0681	0.0713	0.0748

Fineness Modulus
0.07

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	1.5	96.9	1.2

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.0668	0.0548	0.0506	0.0420	0.0123	0.0115	2.81	4.78

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-P-TOP **Sample Number:** L1731354-17

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-P-TOP

Sample Number: L1731354-17

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.41
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.41	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.09	0.00	99.6
		#200	0.35	0.00	98.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 98.1
Weight of hydrometer sample =23.41
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	21.4
5.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0236	21.4
15.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0136	21.4
30.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0099	1.2
60.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0070	1.2
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.2
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.2

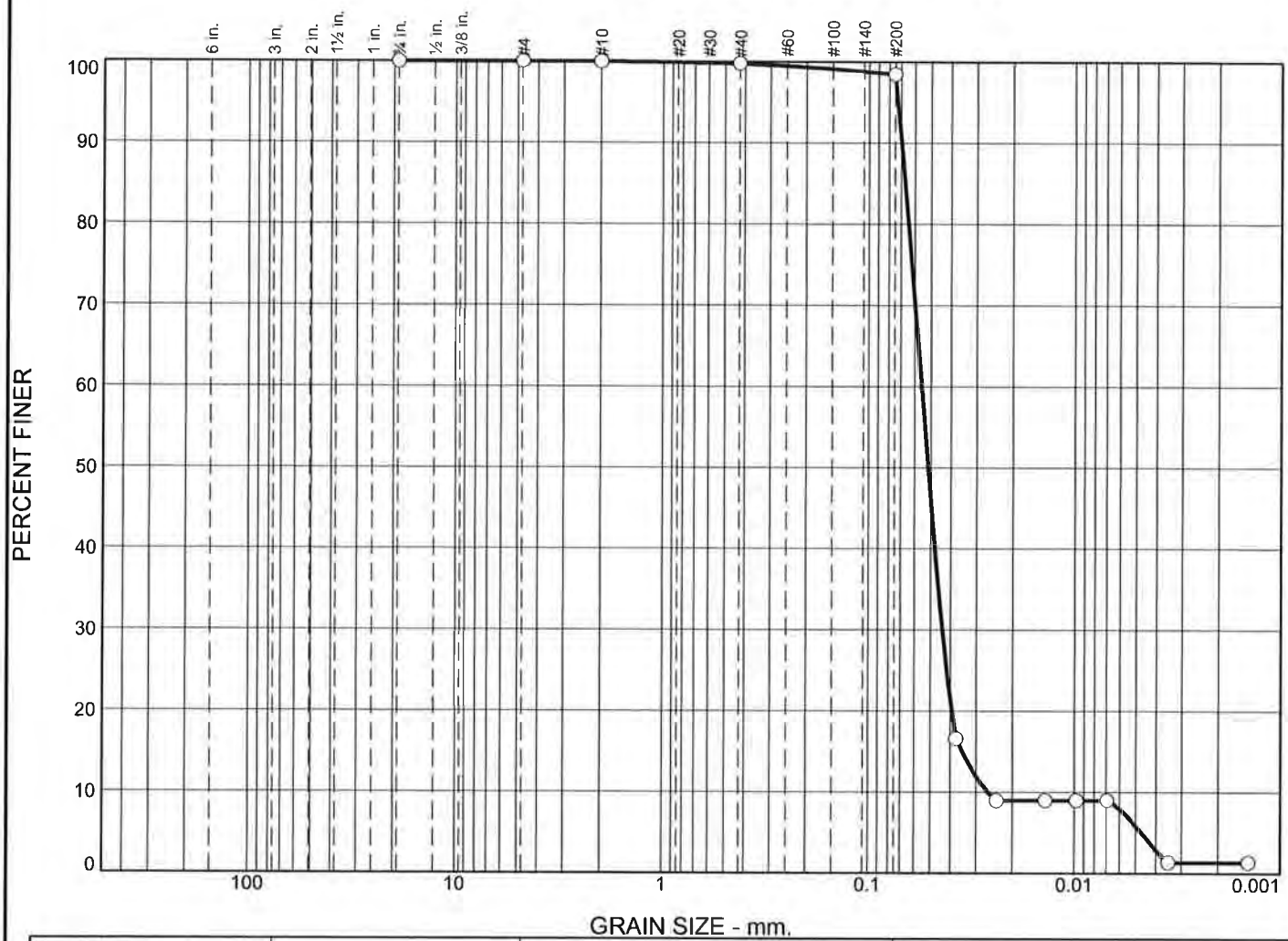
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.4	1.5	1.9	96.9	1.2	98.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0106	0.0115	0.0123	0.0133	0.0420	0.0465	0.0506	0.0548	0.0641	0.0668	0.0696	0.0728

Fineness Modulus	C_u	C_c
0.02	4.78	2.81

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	1.3	92.7	5.8

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.0669	0.0556	0.0516	0.0438	0.0351	0.0263	1.31	2.11

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-P-BOTTOM **Sample Number:** L1731354-18

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-P-BOTTOM

Sample Number: L1731354-18

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.72
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.72	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.05	0.00	99.8
		#200	0.27	0.00	98.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 98.5
Weight of hydrometer sample =20.72
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0376	16.6
5.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0240	9.0
15.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0138	9.0
30.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0098	9.0
60.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0069	9.0
240.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0035	1.4
1440.00	21.5	1.0000	1.0002	0.0134	0.0	16.3	0.0014	1.4

Fractional Components

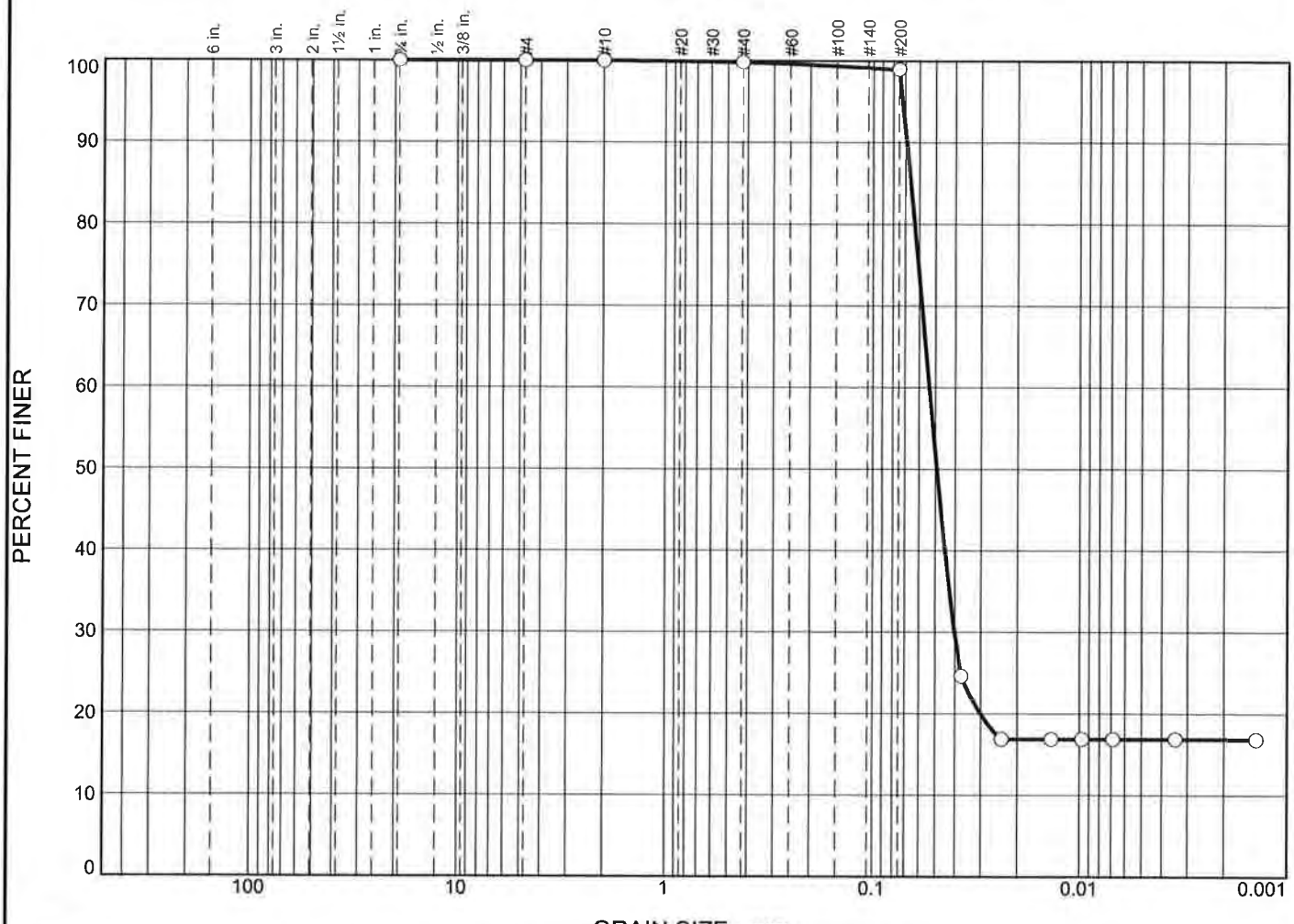
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	1.3	1.5	92.7	5.8	98.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0047	0.0263	0.0351	0.0394	0.0438	0.0477	0.0516	0.0556	0.0644	0.0669	0.0697	0.0727

Fineness Modulus	C_u	C_c
0.02	2.11	1.31

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.2	0.9	82.0	16.9

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0658	0.0535	0.0491	0.0402				

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Q-TOP **Sample Number:** L1731354-19

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Q-TOP

Sample Number: L1731354-19

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.49
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.49	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.04	0.00	99.8
		#200	0.18	0.00	98.9

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 98.9
Weight of hydrometer sample =20.49
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	24.6
5.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0238	16.9
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	16.9
30.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0097	16.9
60.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0069	16.9
240.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0034	16.9
1440.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0014	16.9

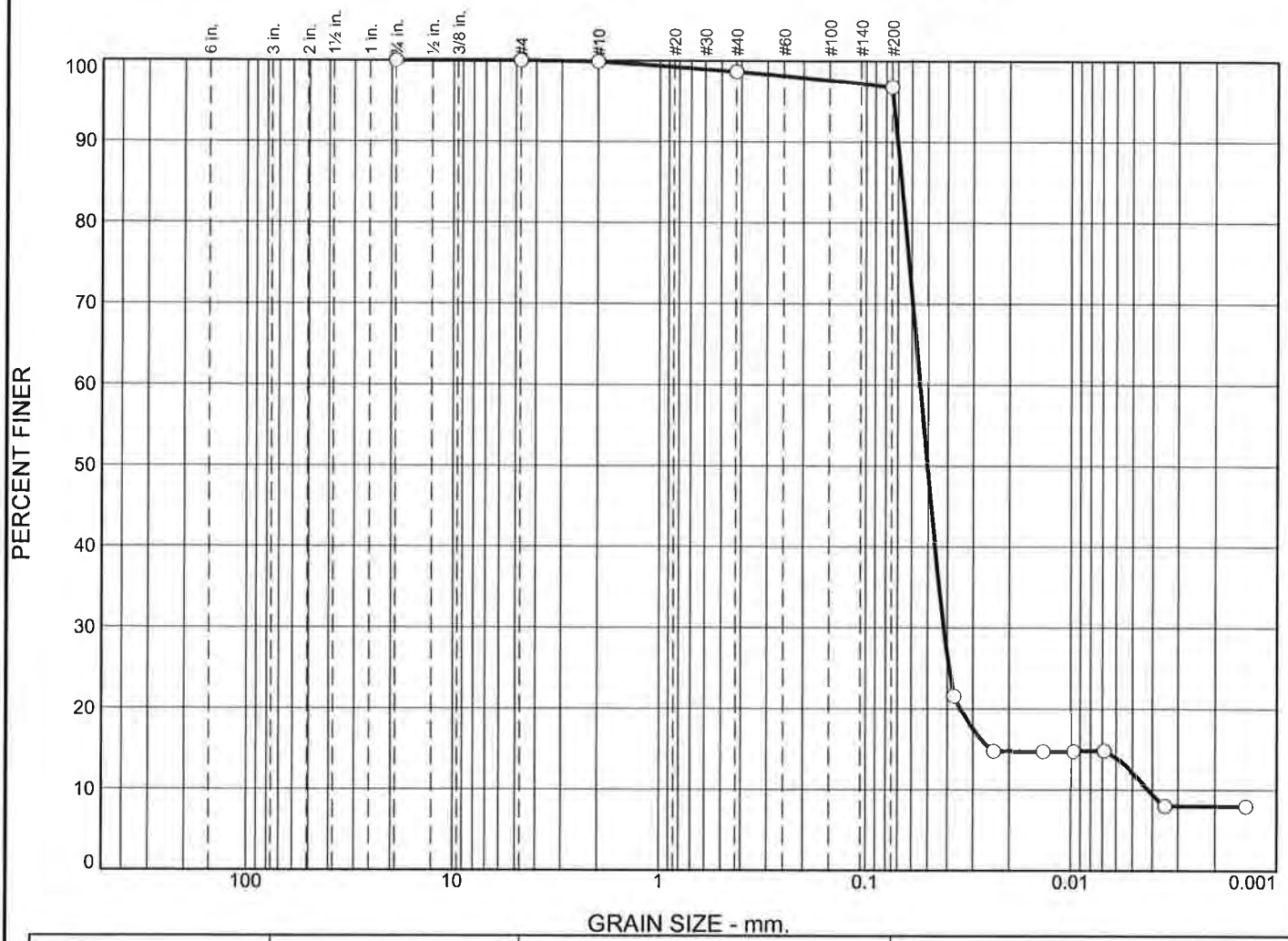
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.2	0.9	1.1	82.0	16.9	98.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0300	0.0402	0.0448	0.0491	0.0535	0.0630	0.0658	0.0688	0.0721

Fineness Modulus
0.01

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	1.3	1.8	84.7	12.1

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0672	0.0547	0.0504	0.0417	0.0243	0.0042	7.57	13.02

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-Q-BOTTOM **Sample Number:** L1731354-20

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/27/2017

Location: NHH-Q-BOTTOM
Sample Number: L1731354-20

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 22.85
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.85	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.03	0.00	99.9
		#40	0.28	0.00	98.6
		#200	0.42	0.00	96.8

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 96.8
Weight of hydrometer sample =22.85
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.5	1.0030	1.0032	0.0134	3.0	15.5	0.0373	21.6
5.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0238	14.8
15.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0137	14.8
30.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0097	14.8
60.00	21.5	1.0020	1.0022	0.0134	2.0	15.8	0.0069	14.8
240.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0035	8.0
1440.00	21.5	1.0010	1.0012	0.0134	1.0	16.0	0.0014	8.0

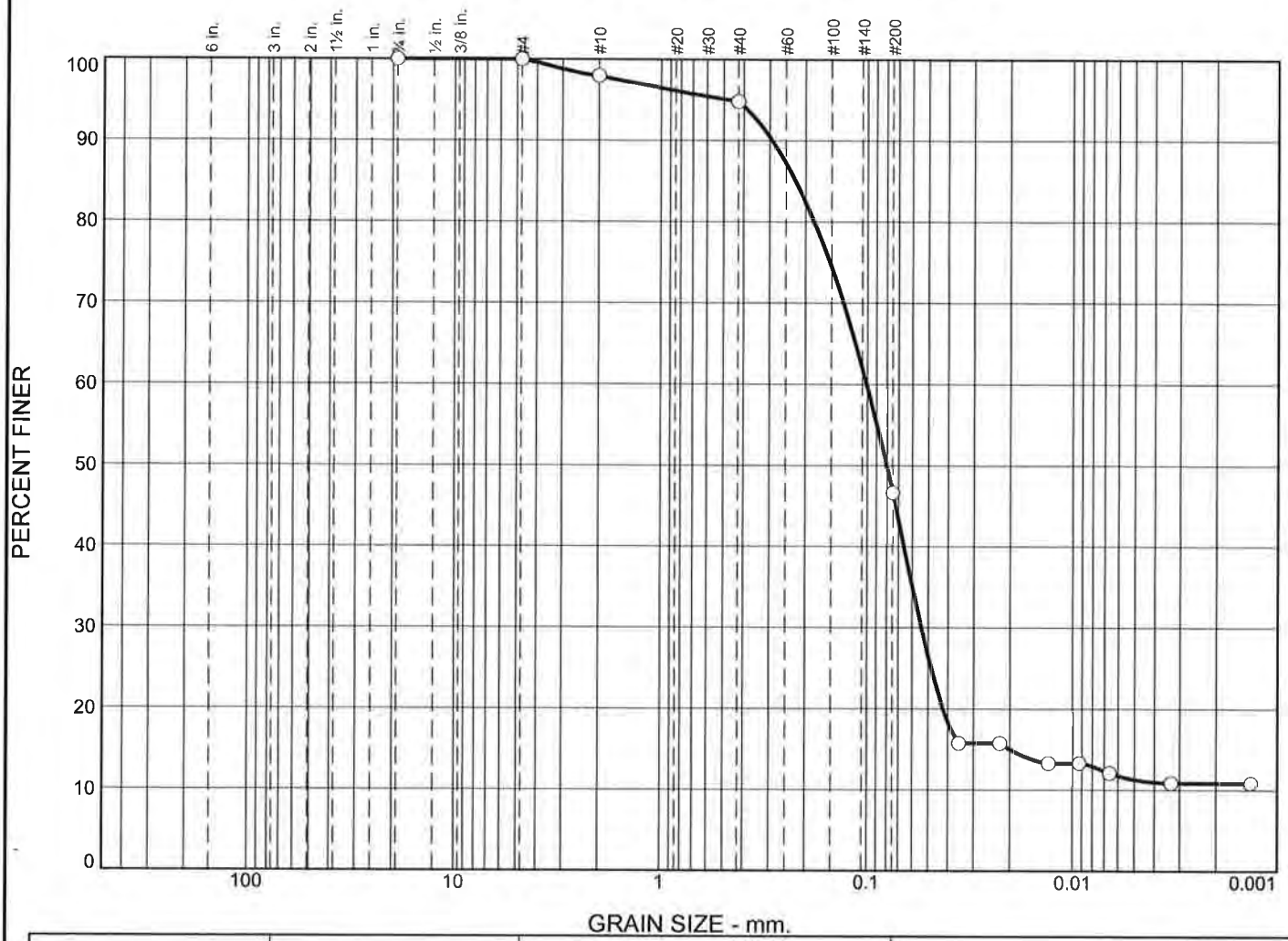
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	1.3	1.8	3.2	84.7	12.1	96.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0042	0.0243	0.0345	0.0417	0.0461	0.0504	0.0547	0.0644	0.0672	0.0702	0.0737

Fineness Modulus	C_u	C_c
0.06	13.02	7.57

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.1	3.1	48.2	35.3	11.3

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.2243	0.1007	0.0804	0.0540	0.0200			

Material Description	USCS	AASHTO

Project No. **Client:**
Project:
Source of Sample: NHH-W-TOP **Sample Number:** L1731354-21

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-W-TOP

Sample Number: L1731354-21

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 29.74
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
29.74	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.61	0.00	97.9
		#40	0.93	0.00	94.8
		#200	14.33	0.00	46.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 46.6
Weight of hydrometer sample =30.46
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0060	1.0064	0.0131	6.0	14.7	0.0356	15.8
5.00	23.1	1.0060	1.0064	0.0131	6.0	14.7	0.0225	15.8
15.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0131	13.3
30.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0093	13.3
60.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0066	12.1
240.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0033	10.9
1440.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0014	10.9

Fractional Components

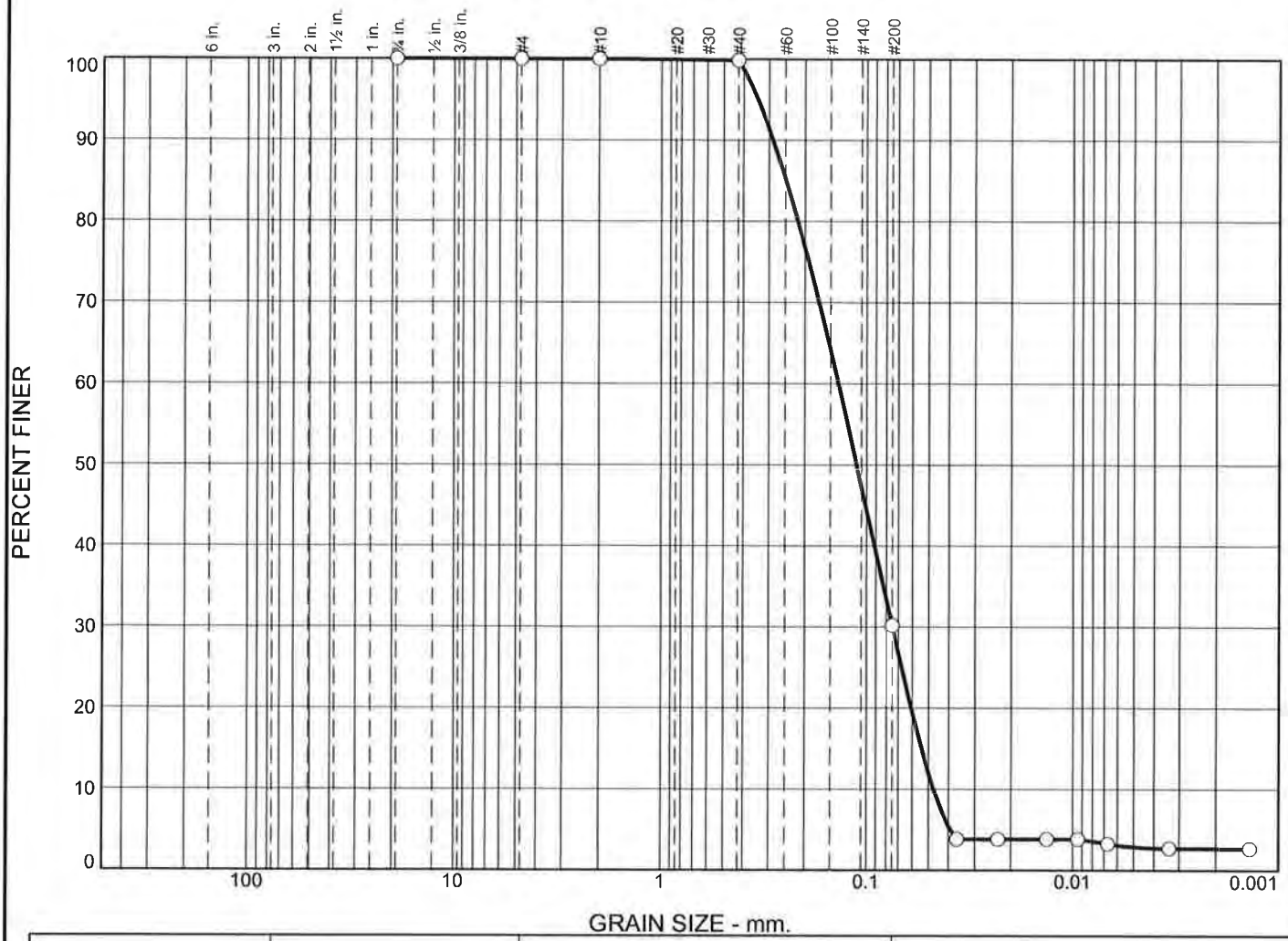
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.1	3.1	48.2	53.4	35.3	11.3	46.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0200	0.0424	0.0540	0.0658	0.0804	0.1007	0.1824	0.2243	0.2915	0.4690

Fineness Modulus
0.45

Alpha Analytical

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	69.7	27.3	2.9

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.2478	0.1375	0.1118	0.0747	0.0540	0.0473	0.86	2.91

Material Description	USCS	AASHTO

Project No. **Client:**
Project:
Source of Sample: NHH-W-BOTTOM **Sample Number:** L1731354-22

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-W-BOTTOM
Sample Number: L1731354-22

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 40.62
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
40.62	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.00	0.00	100.0
		#40	0.06	0.00	99.9
		#200	28.29	0.00	30.2

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 30.2
Weight of hydrometer sample =43.32
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0366	3.8
5.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0231	3.8
15.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0134	3.8
30.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0094	3.8
60.00	23.1	1.0025	1.0029	0.0131	2.5	15.6	0.0067	3.3
240.00	23.1	1.0020	1.0024	0.0131	2.0	15.8	0.0034	2.7
1440.00	23.1	1.0020	1.0024	0.0131	2.0	15.8	0.0014	2.7

Fractional Components

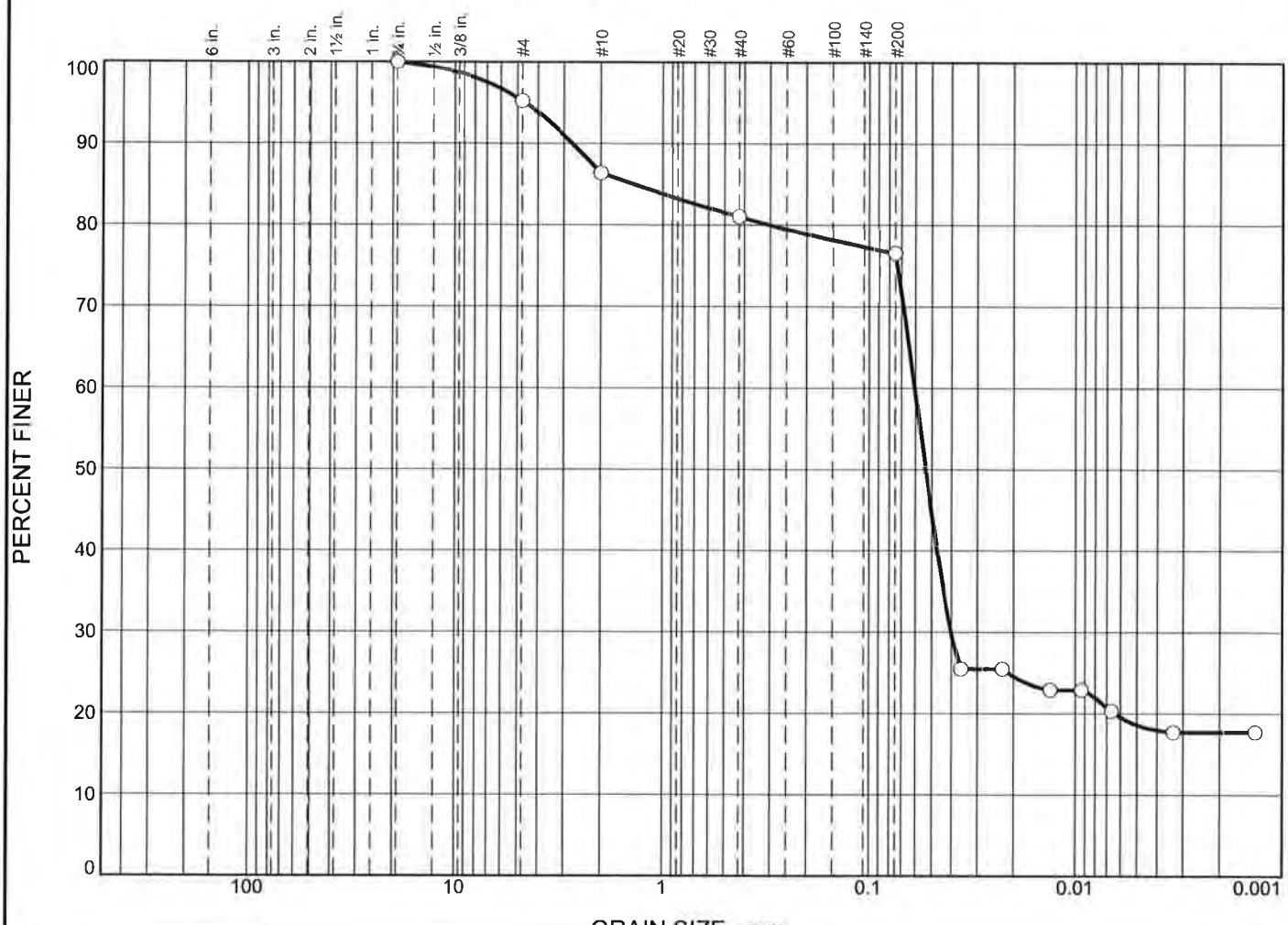
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	0.1	69.7	69.8	27.3	2.9	30.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0393	0.0473	0.0540	0.0606	0.0747	0.0913	0.1118	0.1375	0.2171	0.2478	0.2871	0.3411

Fineness Modulus	C_u	C_c
0.45	2.91	0.86

Alpha Analytical

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.8	8.8	5.4	4.4	58.0	18.6

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			1.3923	0.0604	0.0536	0.0403				

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-V-TOP **Sample Number:** L1731354-23

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-V-TOP

Sample Number: L1731354-23

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 23.85
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.85	0.00	0.75	0.00	0.00	100.0
		#4	1.14	0.00	95.2
		#10	2.11	0.00	86.4
		#40	1.28	0.00	81.0
		#200	1.06	0.00	76.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 76.6
Weight of hydrometer sample =23.76
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0361	25.5
5.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0228	25.5
15.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0132	22.9
30.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0094	22.9
60.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0066	20.3
240.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0033	17.7
1440.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0014	17.7

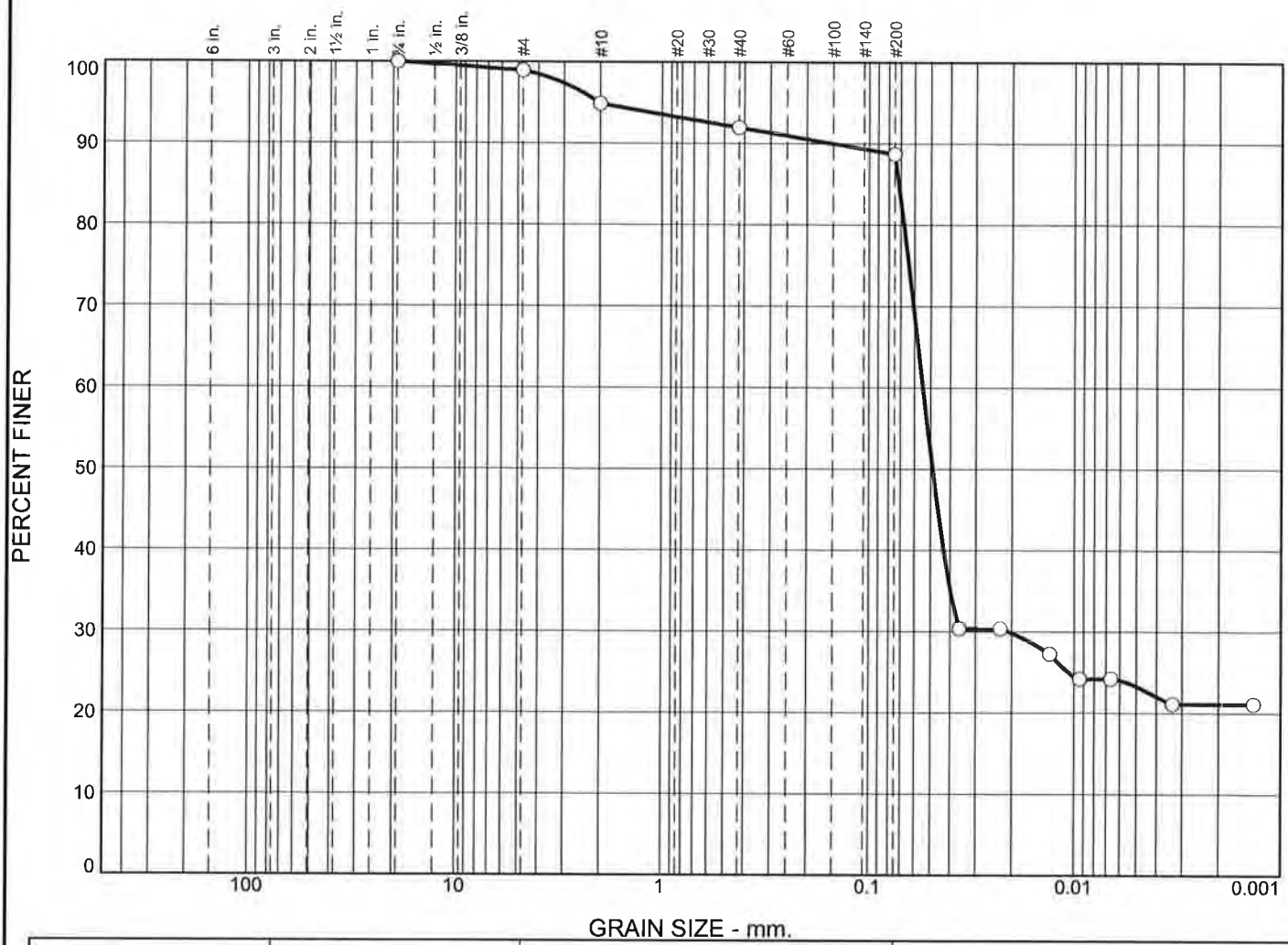
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.8	4.8	8.8	5.4	4.4	18.6	58.0	18.6	76.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
			0.0064	0.0403	0.0472	0.0536	0.0604	0.3020	1.3923	2.7403	4.6150

Fineness Modulus
0.93

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.1	4.0	3.0	3.2	65.4	23.3

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0716	0.0545	0.0488	0.0208				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-V-BOTTOM **Sample Number:** L1731354-24

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-V-BOTTOM

Sample Number: L1731354-24

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 22.48
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.48	0.00	0.75	0.00	0.00	100.0
		#4	0.24	0.00	98.9
		#10	0.91	0.00	94.9
		#40	0.66	0.00	91.9
		#200	0.73	0.00	88.7

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 88.7
Weight of hydrometer sample =23.11
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0361	30.4
5.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0228	30.4
15.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0132	27.3
30.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0094	24.2
60.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0066	24.2
240.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0033	21.1
1440.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0014	21.1

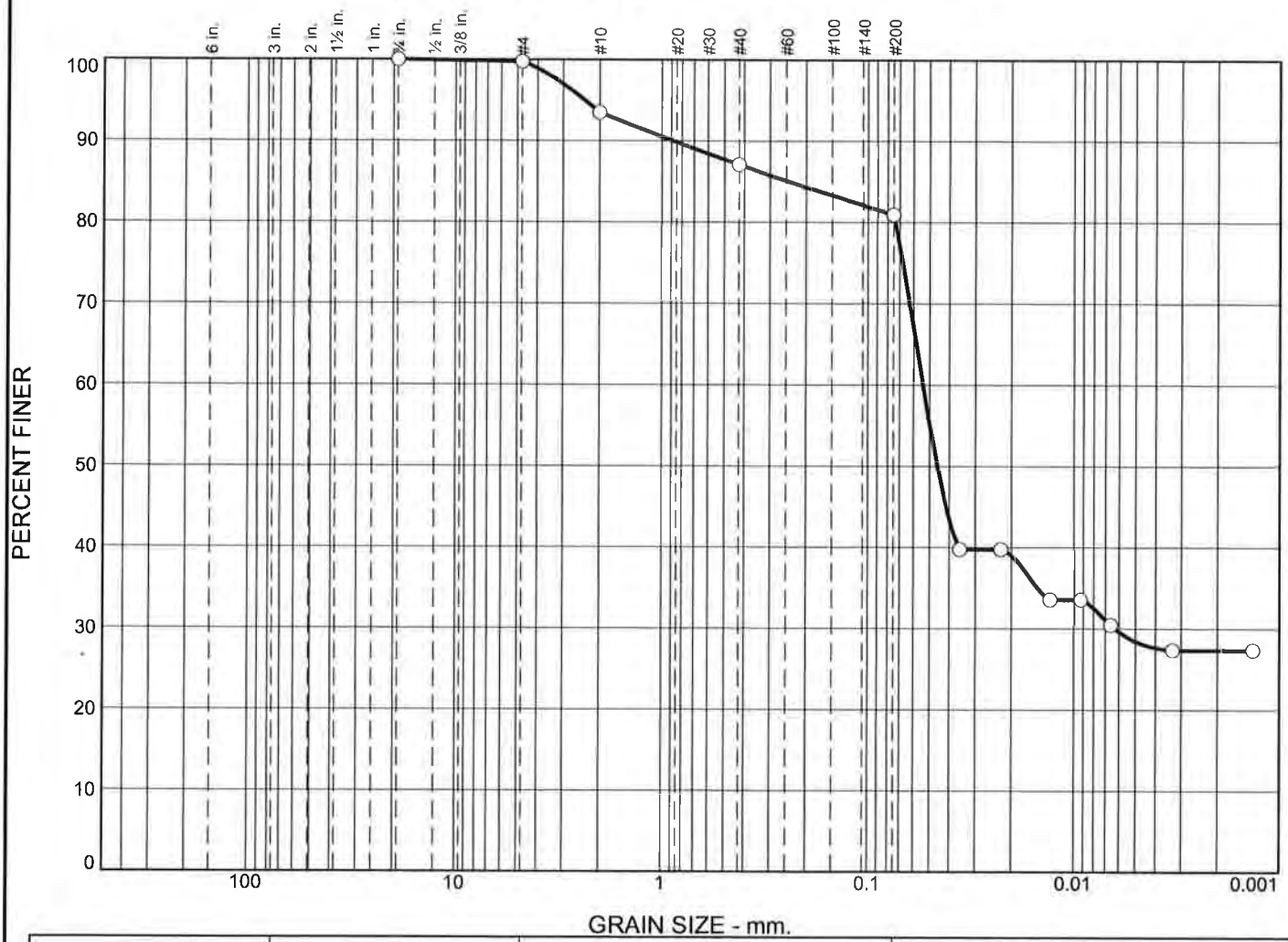
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.1	1.1	4.0	3.0	3.2	10.2	65.4	23.3	88.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0208	0.0431	0.0488	0.0545	0.0675	0.0716	0.1505	2.0301

Fineness Modulus
0.38

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	6.3	6.4	6.1	52.6	28.4

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.2446	0.0539	0.0458	0.0063				

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-R-TOP **Sample Number:** L1731354-25

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-R-TOP

Sample Number: L1731354-25

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.42
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.42	0.00	0.75	0.00	0.00	100.0
		#4	0.05	0.00	99.8
		#10	1.28	0.00	93.5
		#40	1.31	0.00	87.1
		#200	1.25	0.00	81.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 81.0
Weight of hydrometer sample =21.02
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0060	1.0064	0.0131	6.0	14.7	0.0356	39.8
5.00	23.1	1.0060	1.0064	0.0131	6.0	14.7	0.0225	39.8
15.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0131	33.6
30.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0093	33.6
60.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0066	30.5
240.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0033	27.4
1440.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0014	27.4

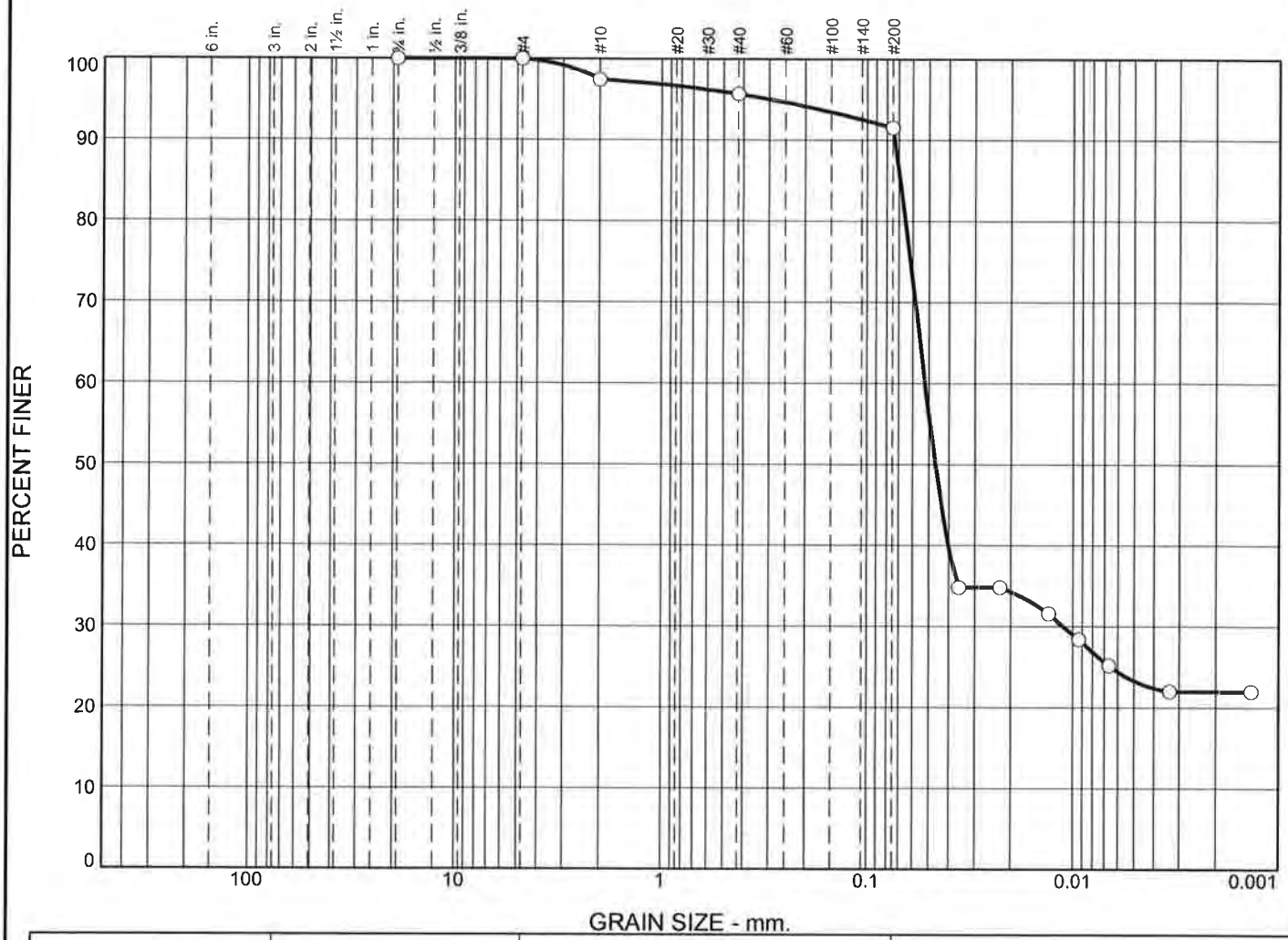
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	6.3	6.4	6.1	18.8	52.6	28.4	81.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0063	0.0360	0.0458	0.0539	0.0737	0.2446	0.8854	2.3570

Fineness Modulus
0.57

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	2.6	1.7	4.2	68.2	23.3

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0690	0.0523	0.0465	0.0112				

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-R-BOTTOM **Sample Number:** L1731354-26

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

9/28/2017

Location: NHH-R-BOTTOM

Sample Number: L1731354-26

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.61
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.61	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.61	0.00	97.4
		#40	0.41	0.00	95.7
		#200	0.98	0.00	91.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 91.5
Weight of hydrometer sample =22.91
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0359	34.8
5.00	23.1	1.0050	1.0054	0.0131	5.0	15.0	0.0227	34.8
15.00	23.1	1.0045	1.0049	0.0131	4.5	15.1	0.0132	31.6
30.00	23.1	1.0040	1.0044	0.0131	4.0	15.2	0.0094	28.4
60.00	23.1	1.0035	1.0039	0.0131	3.5	15.4	0.0066	25.2
240.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0033	22.0
1440.00	23.1	1.0030	1.0034	0.0131	3.0	15.5	0.0014	22.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.6	1.7	4.2	8.5	68.2	23.3	91.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0112	0.0403	0.0465	0.0523	0.0651	0.0690	0.0735	0.2950

Fineness Modulus
0.20

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	N/A
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	N/A
15. Were the SRM/CRM analyses within acceptance criteria?	N/A
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	N/A
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	N/A
19. Were surrogate recoveries within the required acceptance criteria?	N/A

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	% Clay fine (156%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

Serial No:09281717:18

L1721561

AECOM

CHAIN OF CUSTODY RECORD

kb 9/7/17 L1731354

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: 5-24 TAT CHEM - SD

Rim Hydrometer

Analysis Requested

Container Type	Preservation
P – Plastic	1 – HCl, 4°
A – Amber Glass	2 – H2SO4, 4°
G – Clear Glass	3 – HNO3, 4°
V – VOA Vial	4 – NaOH, 4°
O – Other	5 – NaOH/ZnAc, 4°
E – Encore	6 – Na2S2O3, 4°
	7 – 4°

Matrix Codes:

DW – Drinking Water	S – Soil
WW – Wastewater	SL – Sludge
GW – Groundwater	SD – Sediment
SW – Surface Water	SO – Solid
ST – Storm Water	A – Air
W – Water	L – Liquid
	P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6010A / 7471A-7471B	PCBs - 8082 / 8270 SIM	PESTICIDES - 8081B	PAHs - 8270D	TOC - 9060	Lab I.D.	Remarks
NHH-X-TOP	8/8/17	0922	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X		0-4'9"
NHH-X-REP-TOP	8/8/17	0922	X			SD			X	X	X	X	X	X		REPLICATE - 0-4'9"
NHH-X-BOTTOM	8/8/17	0922	X			SD			X	X	X	X	X	X		4'9" - 8.0'
NHH-Y-TOP	8/8/17	1037	X			SD			X	X	X	X	X	X		0-5'11"
NHH-Y-BOTTOM	8/8/17	1037	X		8oz	SD			X							5'11" - 8'6"
NHH-Z-TOP	8/8/17	1153	X		8oz/16oz	SD			X	X	X	X	X	X		0-5.0'
NHH-Z-BOTTOM	8/8/17	1153	X			SD			X	X	X	X	X	X		5.0' - 8'8"
NHH-N-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X		0-6.0'
NHH-N-MS-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X		0-6.0' MS
NHH-N-MSD-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X		0-6.0' MSD
NHH-N-BOTTOM	8/8/17	1305	X		8oz	SD			X							6.0' - 7'6"
NHH-O-TOP	8/8/17	1445	X		8oz/16oz	SD			X	X	X	X	X	X		0-8'4"
NHH-O-BOTTOM	8/8/17	1445	X		8oz	SD			X							8'8" - 10'1"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY - AECOM	Date: 8/8/17 Time: 1847		Date: 8/8/17 Time: 1847
	Date: 8/8/17 Time: 2138		Date: 8/8/17 Time: 2138
	Date: Time:		Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL 8 WALKER DRIVE WESTBOROUGH, MA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Serial No. № 0154

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White: Original (to Lab) Yellow: Lab Pink: Sampler

AECOM

CHAIN OF CUSTODY RECORD

L1731354 kb 9/7/17

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: 5-24 TAT

CHEM - STD

Rim Hydrometer

Analysis Requested

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - 5100	METALS - 6020	24-74 HB	PCBS - 8082	70 STD	PESTICIDES - 8081	B	PAHS - 8270 SIM	TOC - 9060	Lab I.D.	Remarks
12 NHH-M	8/8/17	1610	X		8oz/16oz	SD	4°C	NA	X	X		X		X		X	X		0-6'9"
13 NHH-T-TOP	8/8/17	1734	X		8oz/16oz	SD	⊥	⊥	X	X		X		X		X	X		0-4'10"
14 NHH-T-BOTTOM	8/8/17	1734	X		⊥	SD	⊥	⊥	X	X		X		X		X	X		4'10"-16'4"

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/8/17 Time: 1847	Signature:	Date: 8/8/17 Time: 1847
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/8/17 Time: 2138	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/8/17 Time: 2138
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WEST BOROUGH, MA, ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0180

Serial_No:09281717:18

kb 9/7/17 L1731354

~~L1727787~~

AECOM

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GRAINSIZE - 24hr CHEMISTRY - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Rim Hydrometer

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAINSIZE - SIEVE	METALS - 6010B/7471B	PCBS - 8082/8270D SIM	PESTICIDES - 8081B	PAHS - 8270D SIM	TOC - 9060						Lab I.D.	Remarks	
01	NHH - U - TOP	8/9/17	0705	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X							0 - 5'10"	.15
02	NHH - U - BOTTOM		0705	X						X	X	X	X	X	X							5'10" - 30"	.16
03	NHH - P - TOP		1219							X	X	X	X	X	X							0 - 5'9"	.17
04	NHH - P - BOTTOM		1219							X	X	X	X	X	X							5'9" - 12'4"	.18
05	NHH - Q - TOP		1427							X	X	X	X	X	X							0 - 5'3"	.19
06	NHH - Q - BOTTOM		1427							X	X	X	X	X	X							5'3" - 29.5"	.20
07	NHH - W - TOP		1634							X	X	X	X	X	X							0 - 5'6"	.21
08	NHH - W - BOTTOM		1634			8oz				X												5'6" - 8'2"	.22
09	NHH - V - TOP		1745			8oz/16oz				X	X	X	X	X	X							0 - 4'9"	.23
10	NHH - V - BOTTOM		1745							X	X	X	X	X	X							4'9" - 8'7"	.24

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1558
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0155

Serial_No:09281717:18

L1728048

L1728049 BB

kb 9/7/17 L1731354

AECOM

CHAIN OF CUSTODY RECORD

Page 1 of 2

Client/Project Name: USACE-NHH-FMP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Rim Hydrometer

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A / 7471B	PCBs - 8082 / 8310-SIM	Pesticides - 8081B	PAHs - 8270D-SIM	TOC - 9060	Lab I.D.	Remarks
NHH-R-Top	8/10/17	0832	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X		0-4'2" .25
NHH-R-Bottom		0832	X		"	SD	4°C		X	X	X	X	X	X		4'2"-7'8" .26
NHH-S-Top		0955	X		"	SD	4°C		X	X	X	X	X	X		0-6'0"
NHH-S-Bottom		0955	X		8oz	SD	4°C		X							6'0"-6'5"
NHH-J		1141	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-5'5"
NHH-L		1300	X		"	SD	4°C		X	X	X	X	X	X		0-6'9"
NHH-K-Top		1409	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-5'6"
NHH-K-Bottom		1409	X		8oz	SD	4°C		X							5'6"-8'2"
NHH-H-Top		1458	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-5'5"
NHH-H-Rep-Top		1458	X		"	SD	4°C		X	X	X	X	X	X		0-5'5"
NHH-H-Bottom		1458	X		"	SD	4°C		X	X	X	X	X	X		5'5"-7'8"
NHH-I-Top		1548	X		"	SD	4°C		X	X	X	X	X	X		0-8"
NHH-I-Bottom		1548	X		"	SD	4°C		X	X	X	X	X	X		8"-2'6"

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Relinquished by: (Print Name)/(Affiliation) C Steve Howe AECOM — Date: 8/10/17 — Time: 1922
Signature:

Received by: (Print Name)/(Affiliation) — Date: 8/11/17 — Time: 1928
Signature:

Relinquished by: (Print Name)/(Affiliation) — Date: 8/11/17 — Time: 2000
Signature:

Received by: (Print Name)/(Affiliation) — Date: — Time:
Signature:

Relinquished by: (Print Name)/(Affiliation) — Date: — Time:
Signature:

Received by: (Print Name)/(Affiliation) — Date: — Time:
Signature:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0156

ANALYTICAL REPORT

Lab Number:	L1731355
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	10/05/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1731355-01	NHH-S-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 09:55	08/10/17
L1731355-02	NHH-S-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 09:55	08/10/17
L1731355-03	NHH-J	SEDIMENT	NEW HAVEN, CT	08/10/17 11:41	08/10/17
L1731355-04	NHH-L	SEDIMENT	NEW HAVEN, CT	08/10/17 13:00	08/10/17
L1731355-05	NHH-K-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:09	08/10/17
L1731355-06	NHH-K-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 14:09	08/10/17
L1731355-07	NHH-H-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1731355-08	NHH-H-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1731355-09	NHH-H-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1731355-10	NHH-I-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 15:48	08/10/17
L1731355-11	NHH-I-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 15:48	08/10/17
L1731355-12	NHH-G-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 08:37	08/11/17
L1731355-13	NHH-G-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 08:37	08/11/17
L1731355-14	NHH-C-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 10:33	08/11/17
L1731355-15	NHH-C-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 10:33	08/11/17
L1731355-16	NHH-B	SEDIMENT	NEW HAVEN, CT	08/11/17 11:57	08/11/17
L1731355-17	NHH-A-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 13:40	08/11/17
L1731355-18	NHH-A-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 13:40	08/11/17
L1731355-19	NHH-D-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 15:07	08/11/17
L1731355-20	NHH-D-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 15:07	08/11/17
L1731355-21	NHH-F-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1731355-22	NHH-F-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1731355-23	NHH-F-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1731355-24	NHH-E-TOP	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1731355-25	NHH-E-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1731355
Report Date: 10/05/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1731355
Project Number: 60543021 **Report Date:** 10/05/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Grain Size

The WG1040348-1 Laboratory Duplicate RPD for % Fine gravel (93%), % Total gravel (93%) and % Coarse sand (54%), performed on L1731355-16, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1046682-2 Laboratory Duplicate RPD for % Coarse sand (36%) and % Clay fine (140%), performed on L1731355-23, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 10/05/17

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-01
Client ID: NHH-S-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	4.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	4.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	14.7		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	9.30		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	9.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	33.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	60.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.700		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	61.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-02
Client ID: NHH-S-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	0.400		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	3.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	68.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	71.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	28.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.200		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	28.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-03
Client ID: NHH-J
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 11:41
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	2.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	2.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	6.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	4.70		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	7.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	18.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	78.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.900		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	79.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-04
Client ID: NHH-L
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 13:00
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	2.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	20.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	9.60		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	32.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	62.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	5.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	67.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-05
Client ID: NHH-K-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Coarse Sand	0.700		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Medium Sand	9.40		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Fine Sand	8.10		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Total Sand	18.2		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Silt Fine	51.6		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Clay Fine	30.2		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP
% Total Fines	81.8		%	0.100	NA	1	-	09/19/17 08:55	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-06
Client ID: NHH-K-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	1.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	1.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	8.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	56.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	32.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	96.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	1.60		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	1.60		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-07
Client ID: NHH-H-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	9.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	6.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	8.40		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	24.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	67.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	8.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	75.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-08
Client ID: NHH-H-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	0.500		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	0.500		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	4.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	8.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	8.60		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	21.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	77.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.800		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	77.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-09
Client ID: NHH-H-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	0.400		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	6.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	24.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	30.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	69.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.500		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	69.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-10
Client ID: NHH-I-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	4.30		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	11.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	9.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	25.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	74.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.700		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	74.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-11
Client ID: NHH-I-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	0.700		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	4.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	10.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	15.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	31.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	53.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	85.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-12
Client ID: NHH-G-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	0.300		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	0.300		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	8.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	9.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	6.70		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	24.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	64.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	10.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	75.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-13
Client ID: NHH-G-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	1.70		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	6.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	10.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	18.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	70.7		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	10.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	81.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-14
Client ID: NHH-C-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	3.40		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	3.40		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	3.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	15.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	54.2		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	72.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	22.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	1.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	24.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-15
Client ID: NHH-C-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	0.600		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	0.600		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	2.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	10.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	42.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	55.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	43.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.300		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	44.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-16
Client ID: NHH-B
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 11:57
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	2.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	2.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	2.60		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	22.3		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	54.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	79.7		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	18.0		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.100		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	18.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-17
Client ID: NHH-A-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	1.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	1.90		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	6.80		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	44.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	39.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	91.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	7.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	7.00		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-18
Client ID: NHH-A-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	0.100		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	0.100		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	2.30		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	32.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	62.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	97.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	2.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	2.10		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-19
Client ID: NHH-D-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	0.200		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	0.200		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	0.900		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	6.70		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	8.50		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	16.1		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	65.9		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	17.8		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	83.7		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-20
Client ID: NHH-D-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Coarse Sand	0.900		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Medium Sand	5.20		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Fine Sand	10.5		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Sand	16.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Silt Fine	82.6		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Clay Fine	0.800		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP
% Total Fines	83.4		%	0.100	NA	1	-	09/11/17 11:49	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-21
Client ID: NHH-F-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Coarse Sand	18.2		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Medium Sand	9.00		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Sand	5.70		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Sand	32.9		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Silt Fine	66.1		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Clay Fine	1.00		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Fines	67.1		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-22
Client ID: NHH-F-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Coarse Sand	1.00		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Medium Sand	8.80		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Sand	6.20		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Sand	16.0		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Silt Fine	74.0		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Clay Fine	10.0		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Fines	84.0		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-23
Client ID: NHH-F-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Coarse Sand	2.30		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Medium Sand	2.70		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Sand	2.10		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Sand	7.10		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Silt Fine	84.9		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Clay Fine	8.00		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Fines	92.9		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-24
Client ID: NHH-E-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Coarse Sand	1.90		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Medium Sand	2.50		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Sand	2.50		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Sand	6.90		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Silt Fine	91.7		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Clay Fine	1.40		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Fines	93.1		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

SAMPLE RESULTS

Lab ID: L1731355-25
Client ID: NHH-E-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
RIM Grain Size Analysis - Mansfield Lab										
% Coarse Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Gravel	ND		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Coarse Sand	0.600		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Medium Sand	10.7		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Fine Sand	6.20		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Sand	17.5		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Silt Fine	81.2		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Clay Fine	1.30		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP
% Total Fines	82.5		%	0.100	NA	1	-	09/28/17 12:15	12,D6913/D7928	SP

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 01-04,06-20 QC Batch ID: WG1040348-1 QC Sample: L1731355-16 Client ID: NHH-B						
% Coarse Gravel	ND	ND	%	NC		25
% Fine Gravel	2.20	6.00	%	**93**	Q	25
% Total Gravel	2.20	6.00	%	**93**	Q	25
% Coarse Sand	2.60	4.50	%	**54**	Q	25
% Medium Sand	22.3	21.0	%	6		25
% Fine Sand	54.8	50.1	%	9		25
% Total Sand	79.7	75.6	%	6		25
% Silt Fine	18.0	18.3	%	3		25
% Clay Fine	0.100	0.100	%	0		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
RIM Grain Size Analysis - Mansfield Lab Associated sample(s): 21-25 QC Batch ID: WG1046682-2 QC Sample: L1731355-23 Client ID: NHH-F-BOTTOM						
% Coarse Gravel	ND	ND	%	NC		25
% Fine Gravel	ND	ND	%	NC		25
% Total Gravel	ND	ND	%	NC		25
% Coarse Sand	2.30	1.60	%	**36**	Q	25
% Medium Sand	2.70	2.50	%	8		25
% Fine Sand	2.10	2.00	%	5		25
% Total Sand	7.10	6.10	%	15		25
% Silt Fine	84.9	92.5	%	9		25
% Clay Fine	8.00	1.40	%	**140**	Q	25
% Total Fines	92.9	93.9	%	1		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A2	Absent
A3	Absent
A4	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731355-01A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIM FORMS(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-02A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-03A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-04A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-05A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731355-06A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-07A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-08A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-09A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-10A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-11A	Plastic 8oz unpreserved for Grain Size	A2	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-12A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731355-13A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-14A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-15A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-16A	Bag	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-16B	Bag	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-16C	Bag	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-17A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731355-18A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-19A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-20A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-21A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-22A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-23A	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-23B	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1731355
Report Date: 10/05/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1731355-23C	Plastic 8oz unpreserved for Grain Size	A3	NA		2.0	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-24A	Plastic 8oz unpreserved for Grain Size	A4	NA		5.7	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()
L1731355-25A	Plastic 8oz unpreserved for Grain Size	A4	NA		5.7	Y	Absent		A2-RIMHYDRO-CSAND(),A2-RIMHYDRO-TSAND(),A2-RIMHYDRO-MSAND(),A2-RIMHYDRO-TFINE(),A2-RIMHYDRO-TGRAVEL(),A2-RIMHYDRO-CFINE(),A2-RIMHYDRO-FGRAVEL(),A2-RIMHYDRO-FSAND(),A2-RIMHYDRO-CGRAVEL(),A2-RIMHYDRO-SFINE()

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1731355
Project Number:	60543021	**Report Date:**	10/05/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name: USACE/NHH FNP **Lab Number:** L1731355

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

12 Annual Book of ASTM Standards. (American Society for Testing and Materials) ASTM International.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

ASTM D6913/D7928

GRAIN SIZE ANALYSIS

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.9	14.7	9.3	9.5	60.9	0.7

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				2.5709	0.0734	0.0650	0.0519	0.0425	0.0385	0.95	1.91

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-S-TOP **Sample Number:** L1731355-01

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-S-TOP

Sample Number: L1731355-01

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 22.55
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
22.55	0.00	0.75	0.00	0.00	100.0
		#4	1.11	0.00	95.1
		#10	3.32	0.00	80.4
		#40	2.09	0.00	71.1
		#200	2.13	0.00	61.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 61.6
Weight of hydrometer sample =23.38
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	9.2
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	9.2
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	9.2
30.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0098	4.9
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.7
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.7
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.7

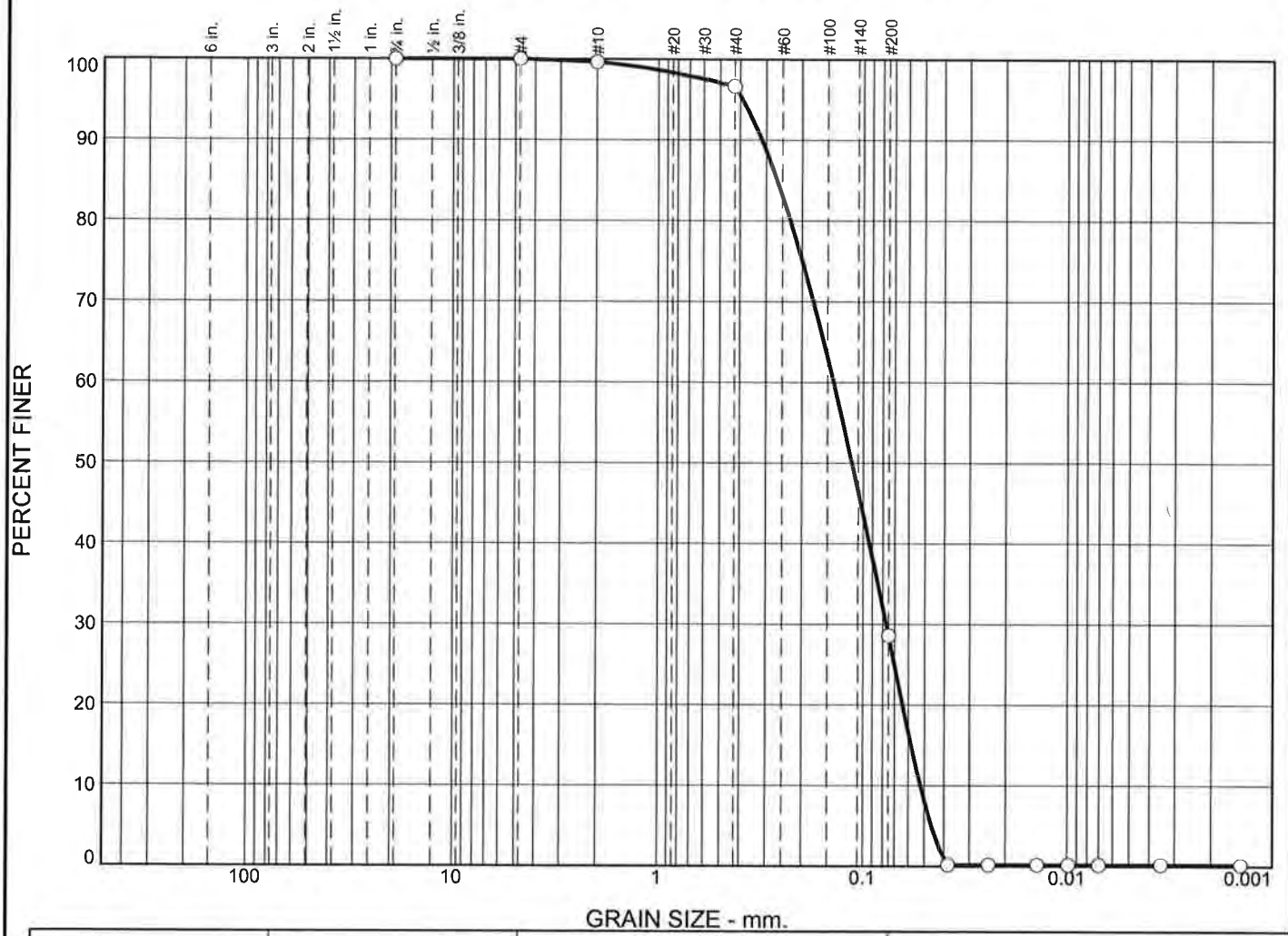
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	4.9	4.9	14.7	9.3	9.5	33.5	60.9	0.7	61.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0099	0.0385	0.0425	0.0458	0.0519	0.0581	0.0650	0.0734	1.8893	2.5709	3.3895	4.7204

Fineness Modulus	C_u	C_c
1.39	1.91	0.95

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.4	3.0	68.0	28.4	0.2

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2651	0.1400	0.1134	0.0770	0.0580	0.0522	0.81	2.68

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-S-BOTTOM **Sample Number:** L1731355-02

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-S-BOTTOM
Sample Number: L1731355-02

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 42.67
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
42.67	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.15	0.00	99.6
		#40	1.30	0.00	96.6
		#200	29.02	0.00	28.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 28.6
Weight of hydrometer sample =42.78
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.2
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.2
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.2
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.2
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.2
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.2
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.4	3.0	68.0	71.4	28.4	0.2	28.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0460	0.0522	0.0580	0.0639	0.0770	0.0931	0.1134	0.1400	0.2284	0.2651	0.3148	0.3899

Fineness Modulus	C_u	C_c
0.52	2.68	0.81

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	2.5	6.5	4.7	7.2	78.2	0.9

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.2955	0.0635	0.0587	0.0498	0.0431	0.0404	0.97	1.57

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-J **Sample Number:** L1731355-03

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-J

Sample Number: L1731355-03

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 24.00
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.00	0.00	0.75	0.00	0.00	100.0
		#4	0.59	0.00	97.5
		#10	1.58	0.00	91.0
		#40	1.11	0.00	86.3
		#200	1.73	0.00	79.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 79.1
Weight of hydrometer sample =23.42
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0380	6.3
5.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0240	6.3
15.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0139	6.3
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.9
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.9
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.9
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.9

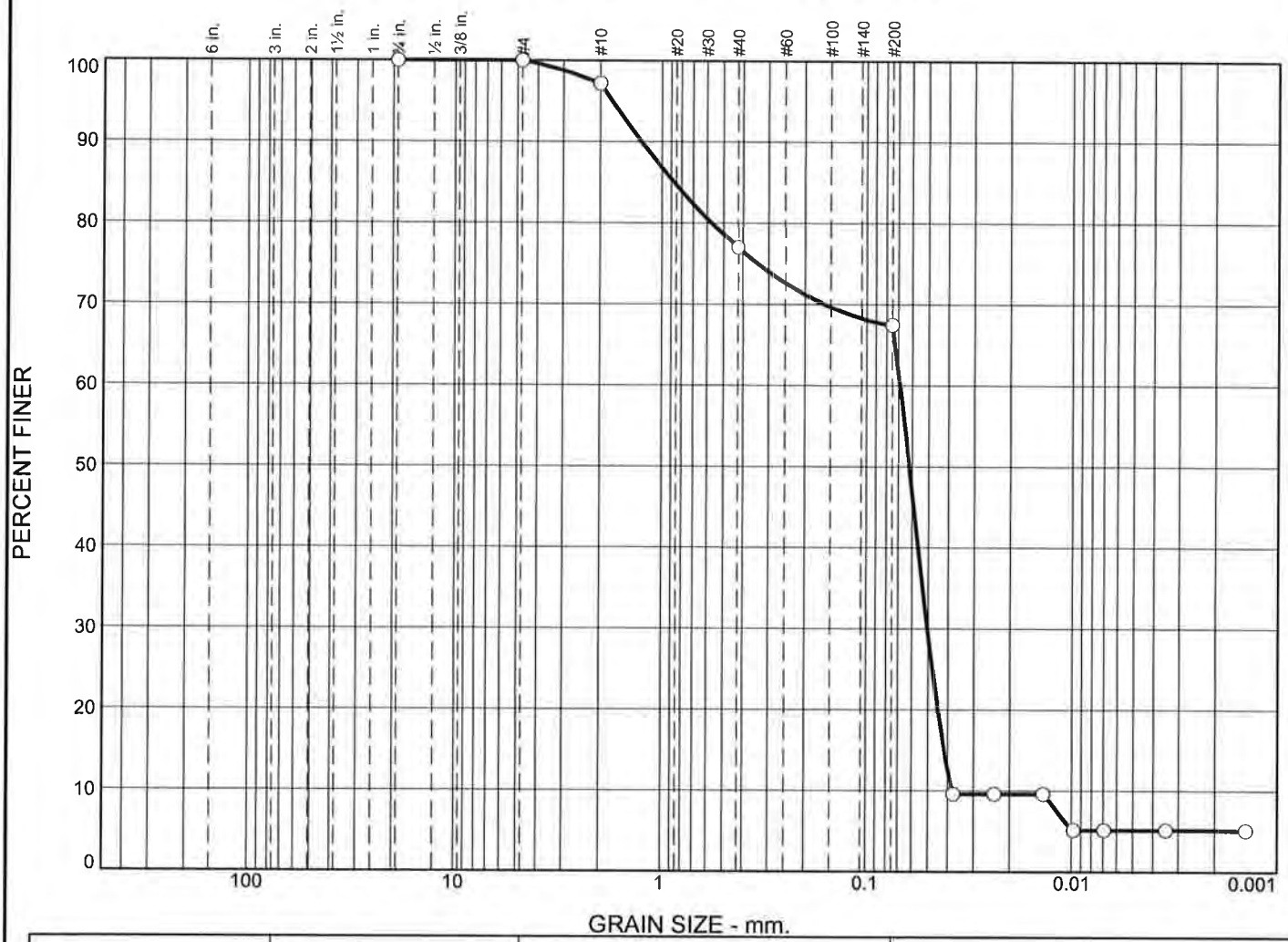
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.5	2.5	6.5	4.7	7.2	18.4	78.2	0.9	79.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0128	0.0404	0.0431	0.0454	0.0498	0.0542	0.0587	0.0635	0.0903	0.2955	1.3770	3.0807

Fineness Modulus	C_u	C_c
0.66	1.57	0.97

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	2.8	20.2	9.6	62.2	5.2

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.8713	0.0688	0.0619	0.0504	0.0418	0.0380	0.97	1.81

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-L **Sample Number:** L1731355-04

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-L

Sample Number: L1731355-04

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 25.64
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.64	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.73	0.00	97.2
		#40	5.16	0.00	77.0
		#200	2.46	0.00	67.4

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 67.4
Weight of hydrometer sample =24.42
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	9.6
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	9.6
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	9.6
30.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0098	5.2
60.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0069	5.2
240.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0035	5.2
1440.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0014	5.2

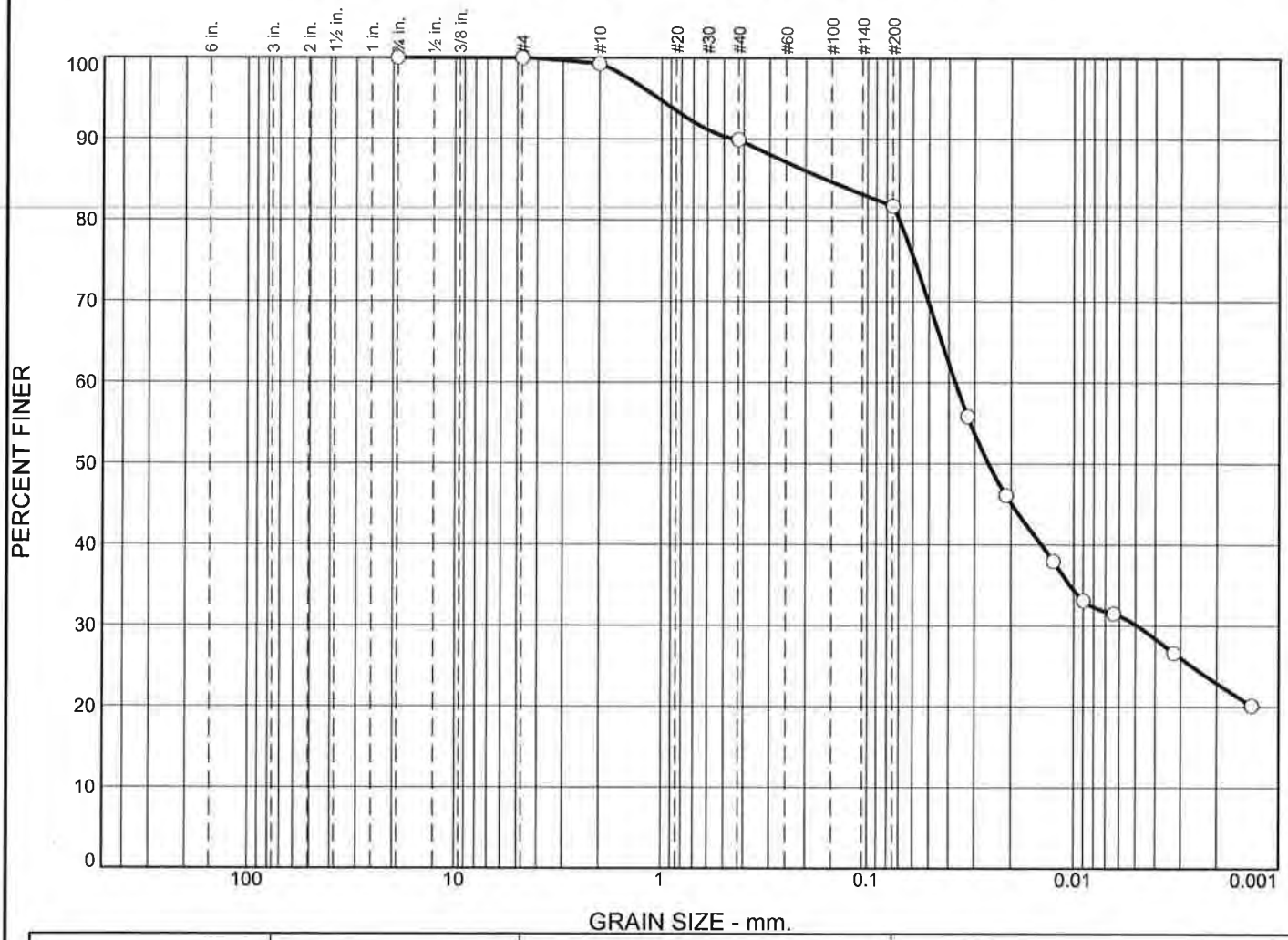
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.8	20.2	9.6	32.6	62.2	5.2	67.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0380	0.0418	0.0449	0.0504	0.0560	0.0619	0.0688	0.5697	0.8713	1.2593	1.7513

Fineness Modulus	C_u	C_c
0.89	1.81	0.97

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.7	9.4	8.1	51.6	30.2

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1592	0.0372	0.0257	0.0049				

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-K-TOP **Sample Number:** L1731355-05

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/5/2017

Location: NHH-K-TOP

Sample Number: L1731355-05

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 32.70
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
32.70	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.24	0.00	99.3
		#40	3.06	0.00	89.9
		#200	2.66	0.00	81.8

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 81.8
Weight of hydrometer sample =40.51
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0170	1.0172	0.0133	17.0	11.8	0.0324	55.8
5.00	21.8	1.0140	1.0142	0.0133	14.0	12.6	0.0212	46.1
15.00	21.8	1.0115	1.0117	0.0133	11.5	13.3	0.0125	38.0
30.00	21.8	1.0100	1.0102	0.0133	10.0	13.6	0.0090	33.1
60.00	21.8	1.0095	1.0097	0.0133	9.5	13.8	0.0064	31.5
240.00	21.8	1.0080	1.0082	0.0133	8.0	14.2	0.0032	26.7
1440.00	21.8	1.0060	1.0062	0.0133	6.0	14.7	0.0013	20.2

Fractional Components

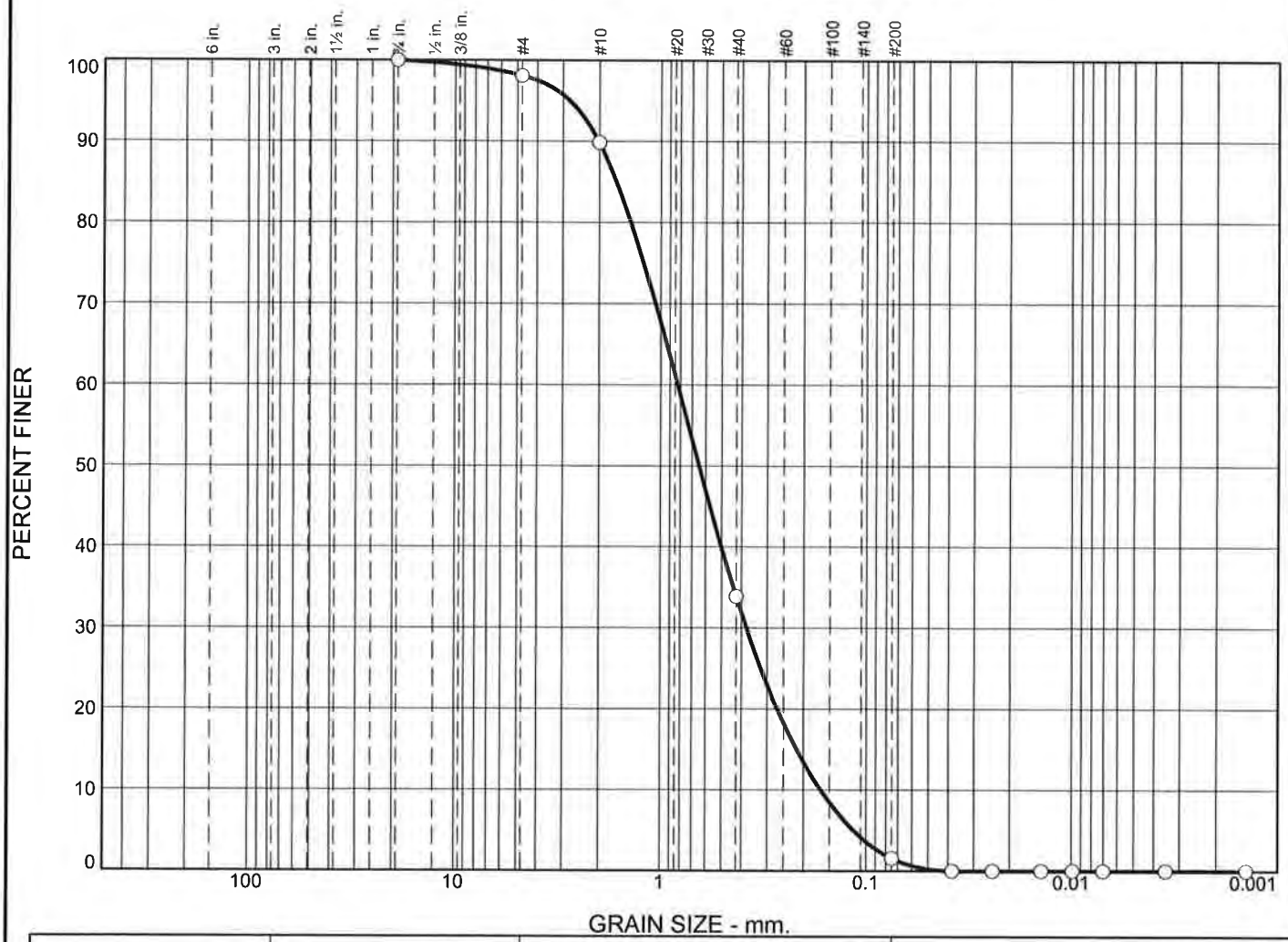
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	9.4	8.1	18.2	51.6	30.2	81.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
				0.0049	0.0143	0.0257	0.0372	0.0699	0.1592	0.4470	1.0347

Fineness Modulus
0.41

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.9	8.2	56.0	32.3	1.6	0.0

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				1.6467	0.8251	0.6464	0.3785	0.2156	0.1655	1.05	4.99

	Material Description	USCS	AASHTO
○		SP	

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-K-BOTTOM **Sample Number:** L1731355-06

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-K-BOTTOM
Sample Number: L1731355-06
USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 44.07
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
44.07	0.00	0.75	0.00	0.00	100.0
		#4	0.85	0.00	98.1
		#10	3.62	0.00	89.9
		#40	24.66	0.00	33.9
		#200	14.25	0.00	1.6

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 1.6
Weight of hydrometer sample =44.72
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.0
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.0
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.0
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.0
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.0
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.0
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.0

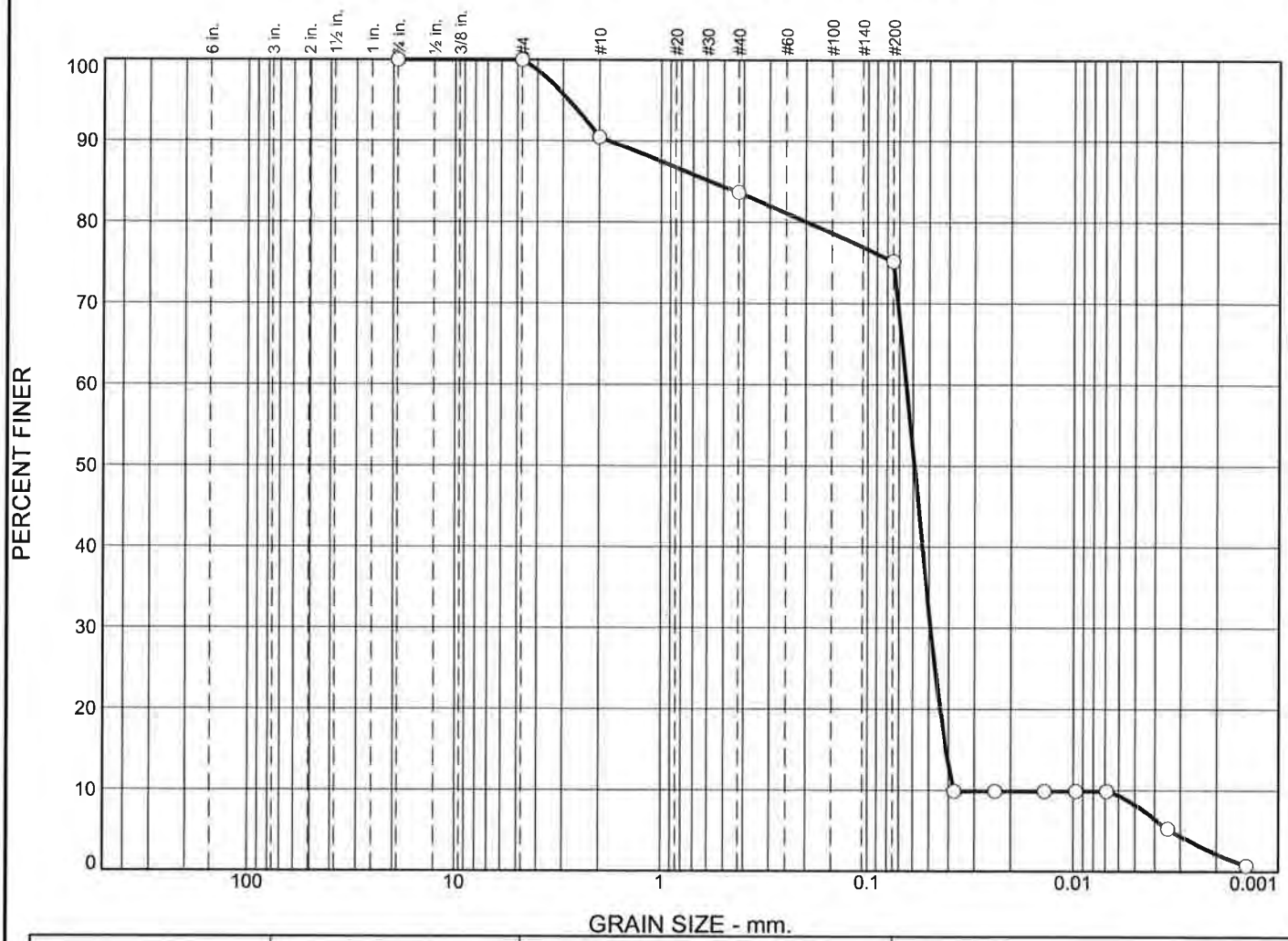
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	8.2	56.0	32.3	96.5	1.6	0.0	1.6

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.1150	0.1655	0.2156	0.2674	0.3785	0.5021	0.6464	0.8251	1.3996	1.6467	2.0135	2.7798

Fineness Modulus	C_u	C_c
2.57	4.99	1.05

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	9.5	6.9	8.4	67.0	8.2

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.5788	0.0646	0.0590	0.0491	0.0413	0.0377	0.99	1.71

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-H-TOP **Sample Number:** L1731355-07

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-H-TOP

Sample Number: L1731355-07

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 25.58
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.58	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	2.44	0.00	90.5
		#40	1.76	0.00	83.6
		#200	2.15	0.00	75.2

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 75.2
Weight of hydrometer sample =26.39
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	9.9
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	9.9
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	9.9
30.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0097	9.9
60.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0069	9.9
240.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0035	5.3
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	9.5	6.9	8.4	24.8	67.0	8.2	75.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0033	0.0377	0.0413	0.0441	0.0491	0.0540	0.0590	0.0646	0.1992	0.5788	1.7950	2.8135

Fineness Modulus	C_u	C_c
0.73	1.71	0.99

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.5	4.9	8.1	8.6	77.1	0.8

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.3141	0.0630	0.0576	0.0480	0.0405	0.0366	1.00	1.72

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-H-REP-TOP **Sample Number:** L1731355-08

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-H-REP-TOP

Sample Number: L1731355-08

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 26.43
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
26.43	0.00	0.75	0.00	0.00	100.0
		#4	0.12	0.00	99.5
		#10	1.31	0.00	94.6
		#40	2.13	0.00	86.5
		#200	2.27	0.00	77.9

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 77.9
Weight of hydrometer sample =25.98
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	10.4
5.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0240	5.6
15.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0139	5.6
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.8
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.8
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.8
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.5	0.5	4.9	8.1	8.6	21.6	77.1	0.8	77.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0132	0.0366	0.0405	0.0432	0.0480	0.0527	0.0576	0.0630	0.1146	0.3141	0.8351	2.0818

Fineness Modulus	C_u	C_c
0.58	1.72	1.00

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.4	6.0	24.1	69.0	0.5

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1946	0.0687	0.0631	0.0535	0.0466	0.0441	0.94	1.56

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-H-BOTTOM **Sample Number:** L1731355-09

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-H-BOTTOM

Sample Number: L1731355-09

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 35.26
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
35.26	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.13	0.00	99.6
		#40	2.13	0.00	93.6
		#200	8.50	0.00	69.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 69.5
Weight of hydrometer sample =37.37
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.5
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.5
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.5
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.5
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.5
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.5
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.4	6.0	24.1	30.5	69.0	0.5	69.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0414	0.0441	0.0466	0.0489	0.0535	0.0581	0.0631	0.0687	0.1376	0.1946	0.2939	0.5424

Fineness Modulus	C_u	C_c
0.35	1.56	0.94

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.3	11.4	9.5	74.1	0.7

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.4745	0.0661	0.0611	0.0523	0.0459	0.0436	0.95	1.52

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-I-TOP **Sample Number:** L1731355-10

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-I-TOP

Sample Number: L1731355-10

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 27.16
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
27.16	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	1.16	0.00	95.7
		#40	3.11	0.00	84.3
		#200	2.57	0.00	74.8

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 74.8
Weight of hydrometer sample =26.99
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.7
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.7
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.7
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.7
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.7
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.7
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.7

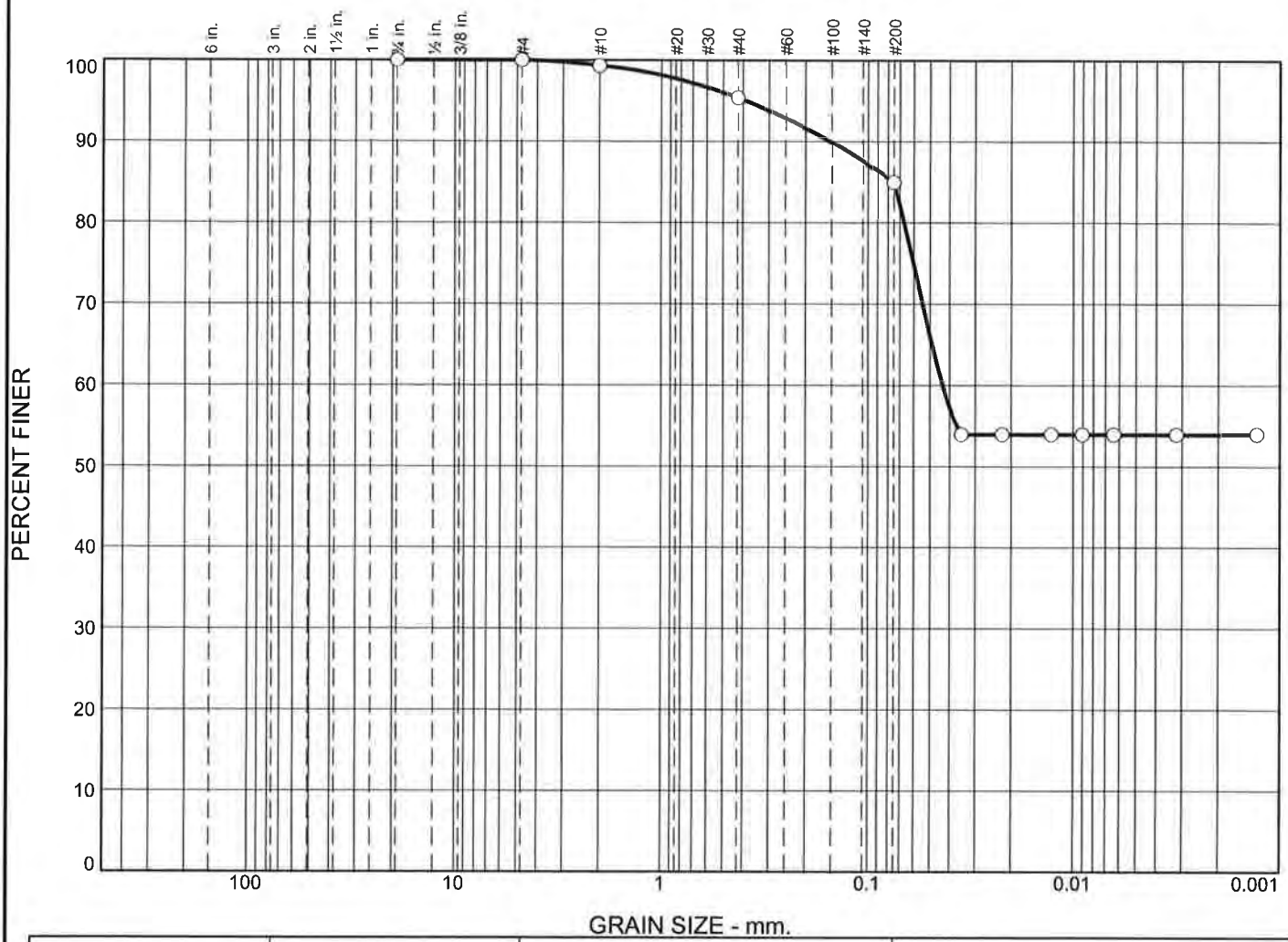
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	4.3	11.4	9.5	25.2	74.1	0.7	74.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0410	0.0436	0.0459	0.0481	0.0523	0.0566	0.0611	0.0661	0.2098	0.4745	0.9665	1.8310

Fineness Modulus	C_u	C_c
0.64	1.52	0.95

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.7	4.0	10.3	31.1	53.9

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0755	0.0433						

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-I-BOTTOM **Sample Number:** L1731355-11

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-I-BOTTOM

Sample Number: L1731355-11

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 25.12
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
25.12	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.17	0.00	99.3
		#40	1.00	0.00	95.3
		#200	2.61	0.00	85.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 85.0
Weight of hydrometer sample =25.72
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0350	53.9
5.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0222	53.9
15.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0128	53.9
30.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0090	53.9
60.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0064	53.9
240.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0032	53.9
1440.00	21.4	1.0100	1.0102	0.0134	10.0	13.6	0.0013	53.9

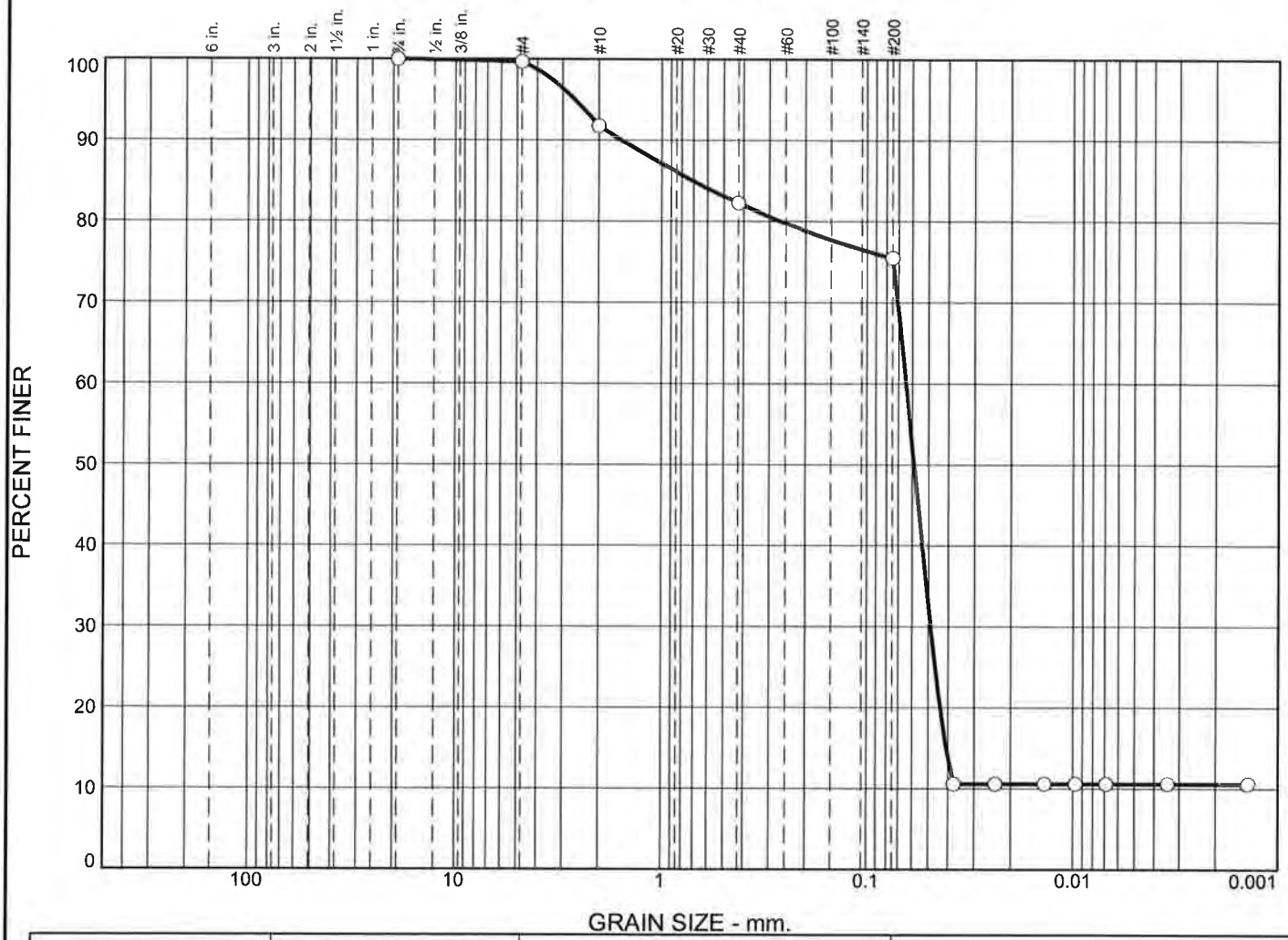
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.7	4.0	10.3	15.0	31.1	53.9	85.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
							0.0433	0.0669	0.0755	0.1535	0.3922

Fineness Modulus
0.22

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	8.0	9.5	6.7	64.9	10.6

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.7068	0.0643	0.0588	0.0488	0.0409			

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-G-TOP **Sample Number:** L1731355-12

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-G-TOP

Sample Number: L1731355-12

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 24.89
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.89	0.00	0.75	0.00	0.00	100.0
		#4	0.08	0.00	99.7
		#10	1.98	0.00	91.7
		#40	2.36	0.00	82.2
		#200	1.69	0.00	75.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 75.5
Weight of hydrometer sample =24.76
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0377	10.6
5.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0238	10.6
15.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0137	10.6
30.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0097	10.6
60.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0069	10.6
240.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0034	10.6
1440.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0014	10.6

Fractional Components

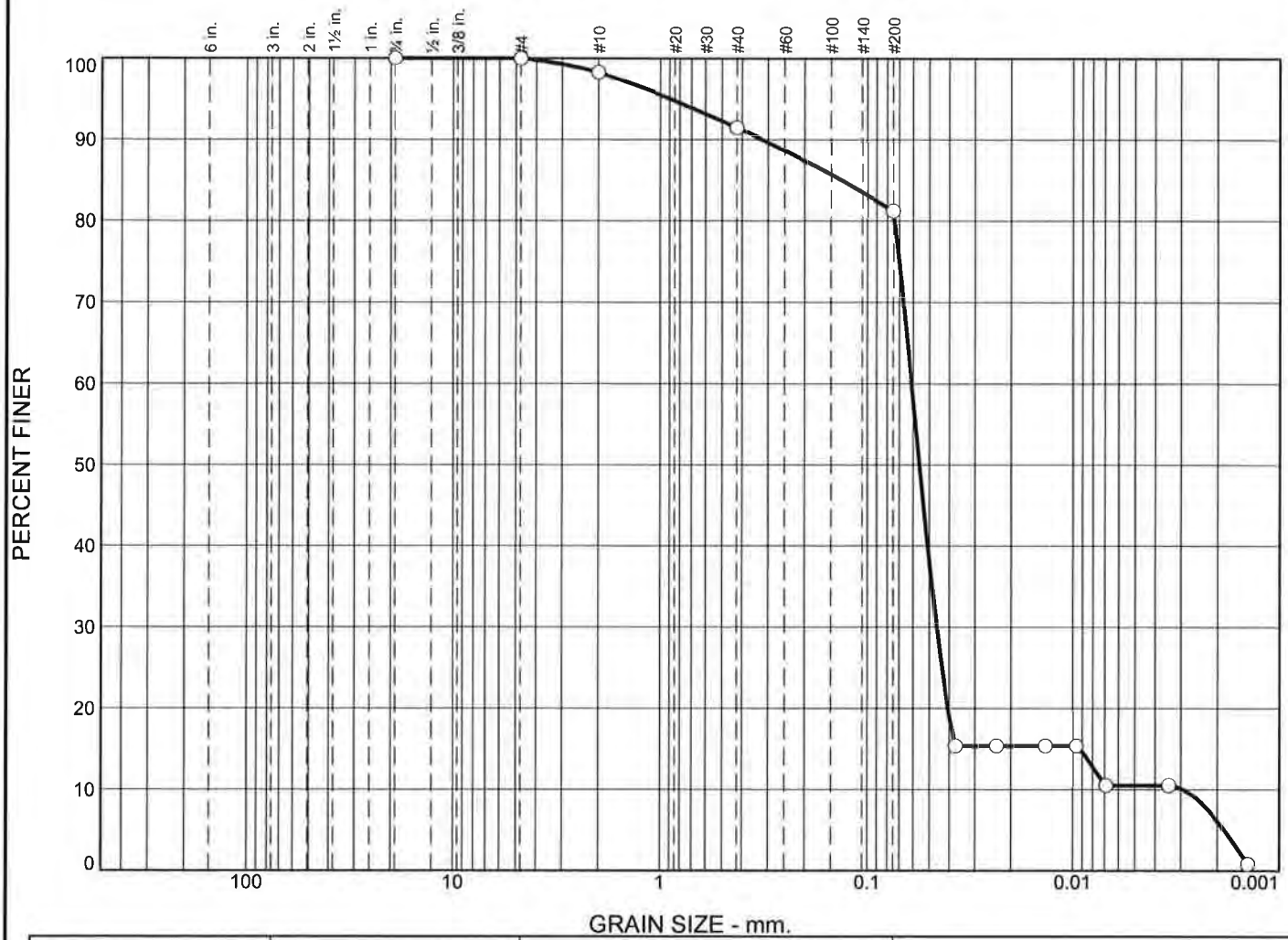
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.3	0.3	8.0	9.5	6.7	24.2	64.9	10.6	75.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0409	0.0437	0.0488	0.0537	0.0588	0.0643	0.2655	0.7068	1.5634	2.6115

Fineness Modulus
0.76

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.7	6.8	10.3	70.7	10.5

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1352	0.0611	0.0559	0.0461	0.0093	0.0029	11.91	20.94

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-G-BOTTOM **Sample Number:** L1731355-13

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-G-BOTTOM
Sample Number: L1731355-13

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 26.12
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
26.12	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.45	0.00	98.3
		#40	1.78	0.00	91.5
		#200	2.68	0.00	81.2

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 81.2
Weight of hydrometer sample =26.82
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0373	15.4
5.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0236	15.4
15.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0136	15.4
30.00	21.4	1.0030	1.0032	0.0134	3.0	15.5	0.0096	15.4
60.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0069	10.5
240.00	21.4	1.0020	1.0022	0.0134	2.0	15.8	0.0034	10.5
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

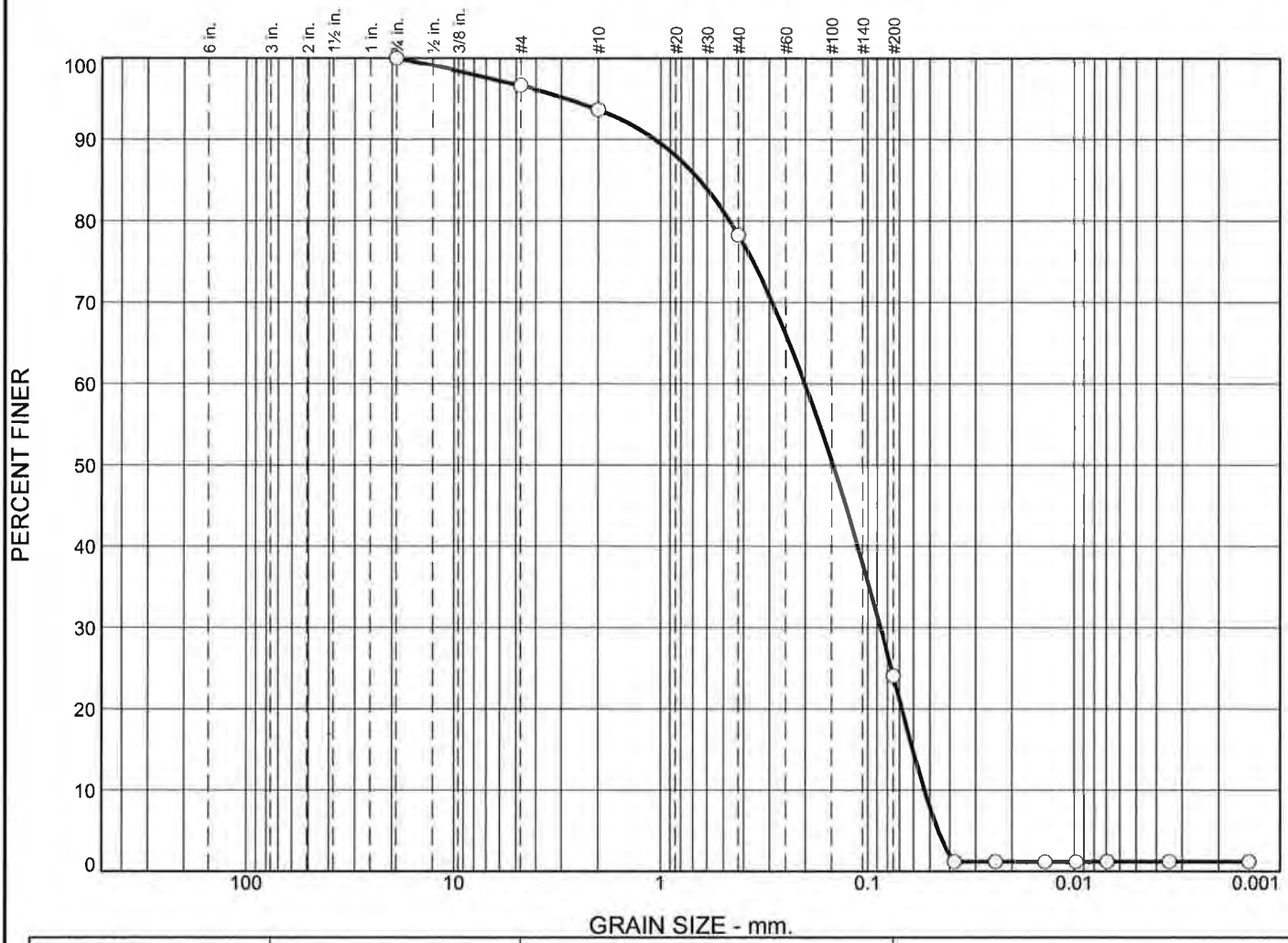
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.7	6.8	10.3	18.8	70.7	10.5	81.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0019	0.0029	0.0093	0.0407	0.0461	0.0510	0.0559	0.0611	0.0740	0.1352	0.3216	0.8919

Fineness Modulus	C_u	C_c
0.37	20.94	11.91

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.4	3.0	15.3	54.2	22.9	1.2

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.6519	0.2020	0.1478	0.0866	0.0604	0.0532	0.70	3.80

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-C-TOP **Sample Number:** L1731355-14

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-C-TOP

Sample Number: L1731355-14

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 38.05
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
38.05	0.00	0.75	0.00	0.00	100.0
		#4	1.30	0.00	96.6
		#10	1.12	0.00	93.6
		#40	5.85	0.00	78.3
		#200	20.62	0.00	24.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 24.1
Weight of hydrometer sample =37.87
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0380	1.2
5.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0240	1.2
15.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0139	1.2
30.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0098	1.2
60.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0069	1.2
240.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0035	1.2
1440.00	21.4	1.0010	1.0012	0.0134	1.0	16.0	0.0014	1.2

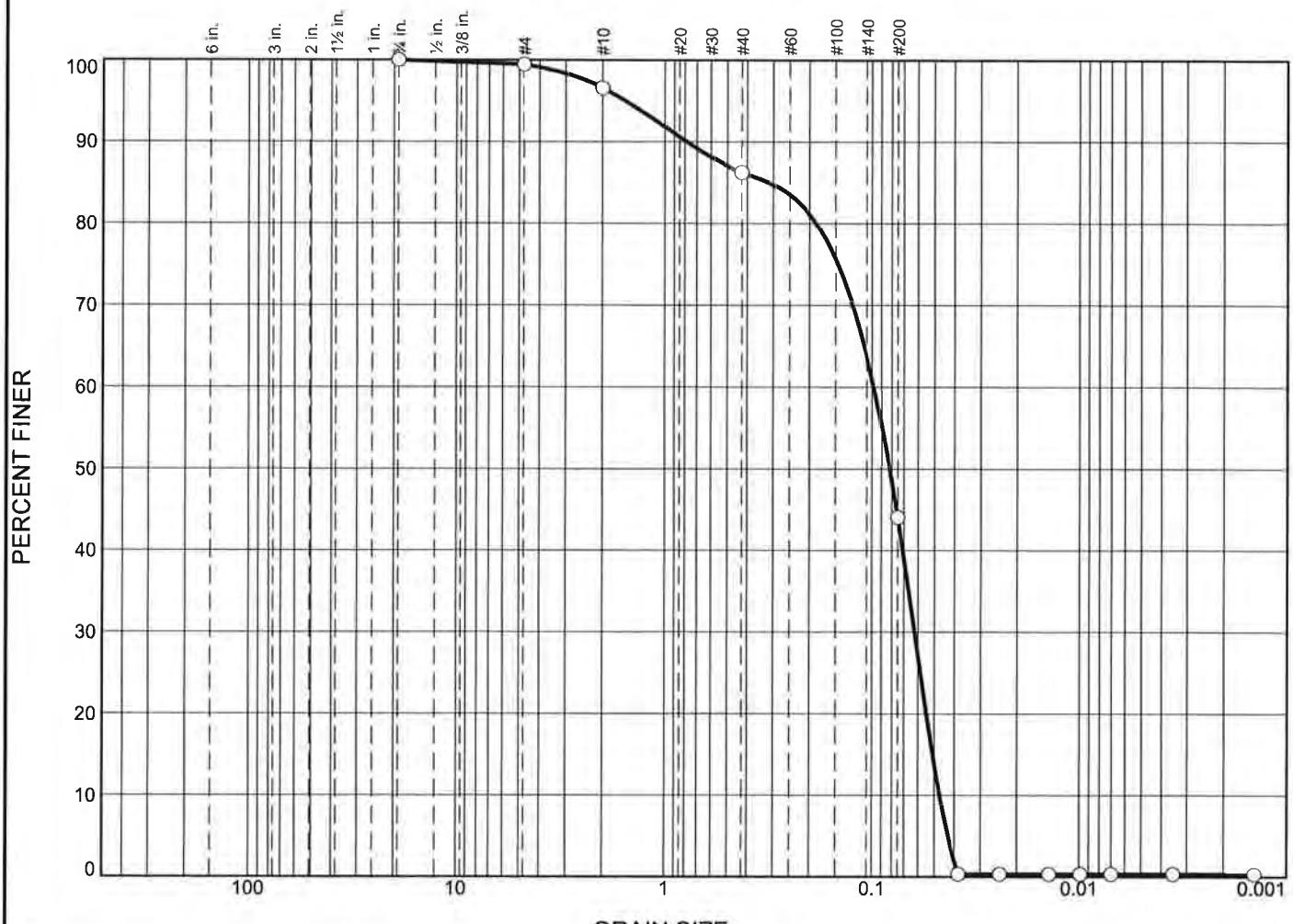
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.4	3.4	3.0	15.3	54.2	72.5	22.9	1.2	24.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0456	0.0532	0.0604	0.0681	0.0866	0.1118	0.1478	0.2020	0.4676	0.6519	1.0666	2.8396

Fineness Modulus	C_u	C_c
1.15	3.80	0.70

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	2.8	10.4	42.1	43.8	0.3

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.3206	0.0981	0.0820	0.0622	0.0509	0.0472	0.84	2.08

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-C-BOTTOM **Sample Number:** L1731355-15

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-C-BOTTOM
Sample Number: L1731355-15

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 34.00
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
34.00	0.00	0.75	0.00	0.00	100.0
		#4	0.19	0.00	99.4
		#10	0.98	0.00	96.6
		#40	3.52	0.00	86.2
		#200	14.33	0.00	44.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 44.1
Weight of hydrometer sample =33.37
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.3
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.3
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.3
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.3
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.3
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.3
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.3

Fractional Components

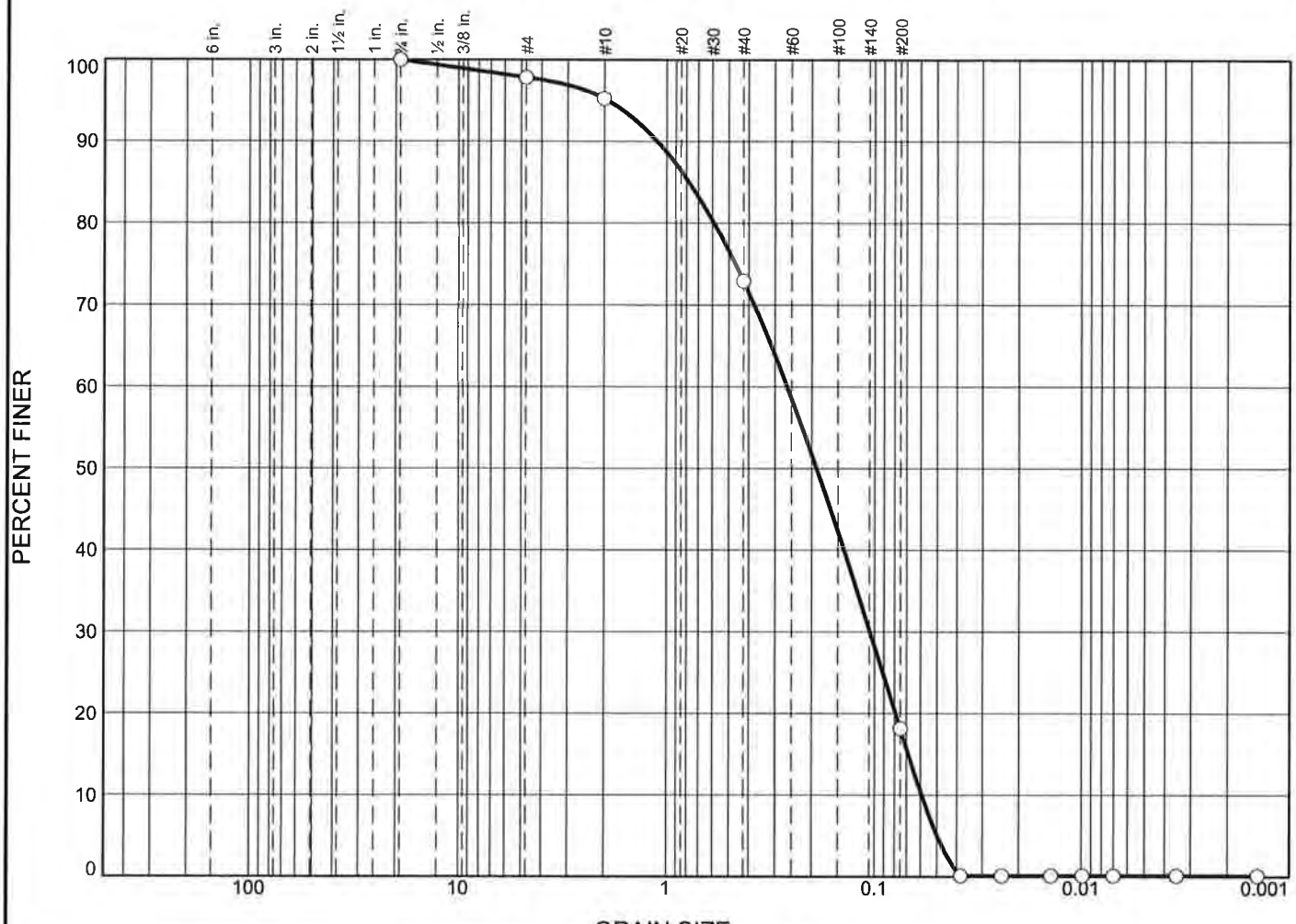
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.6	0.6	2.8	10.4	42.1	55.3	43.8	0.3	44.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0431	0.0472	0.0509	0.0546	0.0622	0.0709	0.0820	0.0981	0.1863	0.3206	0.7827	1.5493

Fineness Modulus	C_u	C_c
0.62	2.08	0.84

Alpha Analytical

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.2	2.6	22.3	54.8	18.0	0.1

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			0.7790	0.2625	0.1899	0.1050	0.0686	0.0591	0.71	4.44

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-B **Sample Number:** L1731355-16

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-B

Sample Number: L1731355-16

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 39.56
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
39.56	0.00	0.75	0.00	0.00	100.0
		#4	0.86	0.00	97.8
		#10	1.04	0.00	95.2
		#40	8.81	0.00	72.9
		#200	21.67	0.00	18.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 18.1
Weight of hydrometer sample =39.06
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.1
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

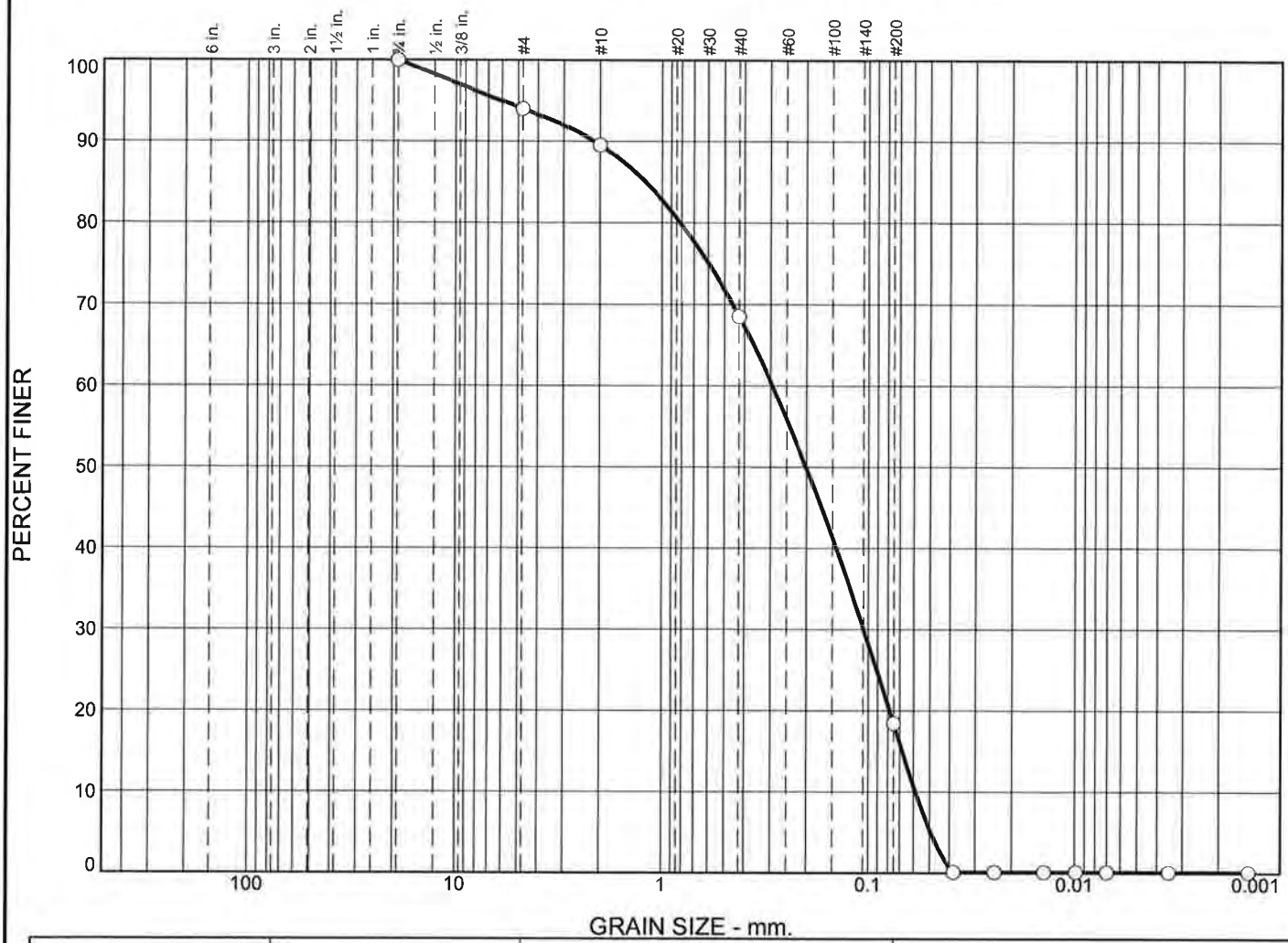
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	2.2	2.2	2.6	22.3	54.8	79.7	18.0	0.1	18.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0498	0.0591	0.0686	0.0790	0.1050	0.1404	0.1899	0.2625	0.5886	0.7790	1.1123	1.9356

Fineness Modulus	C_u	C_c
1.30	4.44	0.71

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	6.0	4.5	21.0	50.1	18.3	0.1

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				1.2093	0.2941	0.2020	0.1054	0.0679	0.0586	0.64	5.02

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-B **Sample Number:** WG1040348-1

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-B

Sample Number: WG1040348-1

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 38.38
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
38.38	0.00	0.75	0.00	0.00	100.0
		#4	2.32	0.00	94.0
		#10	1.70	0.00	89.5
		#40	8.08	0.00	68.5
		#200	19.20	0.00	18.4

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 18.4
Weight of hydrometer sample =39.18
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.1
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.1
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.1
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.1
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.1
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.1
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.1

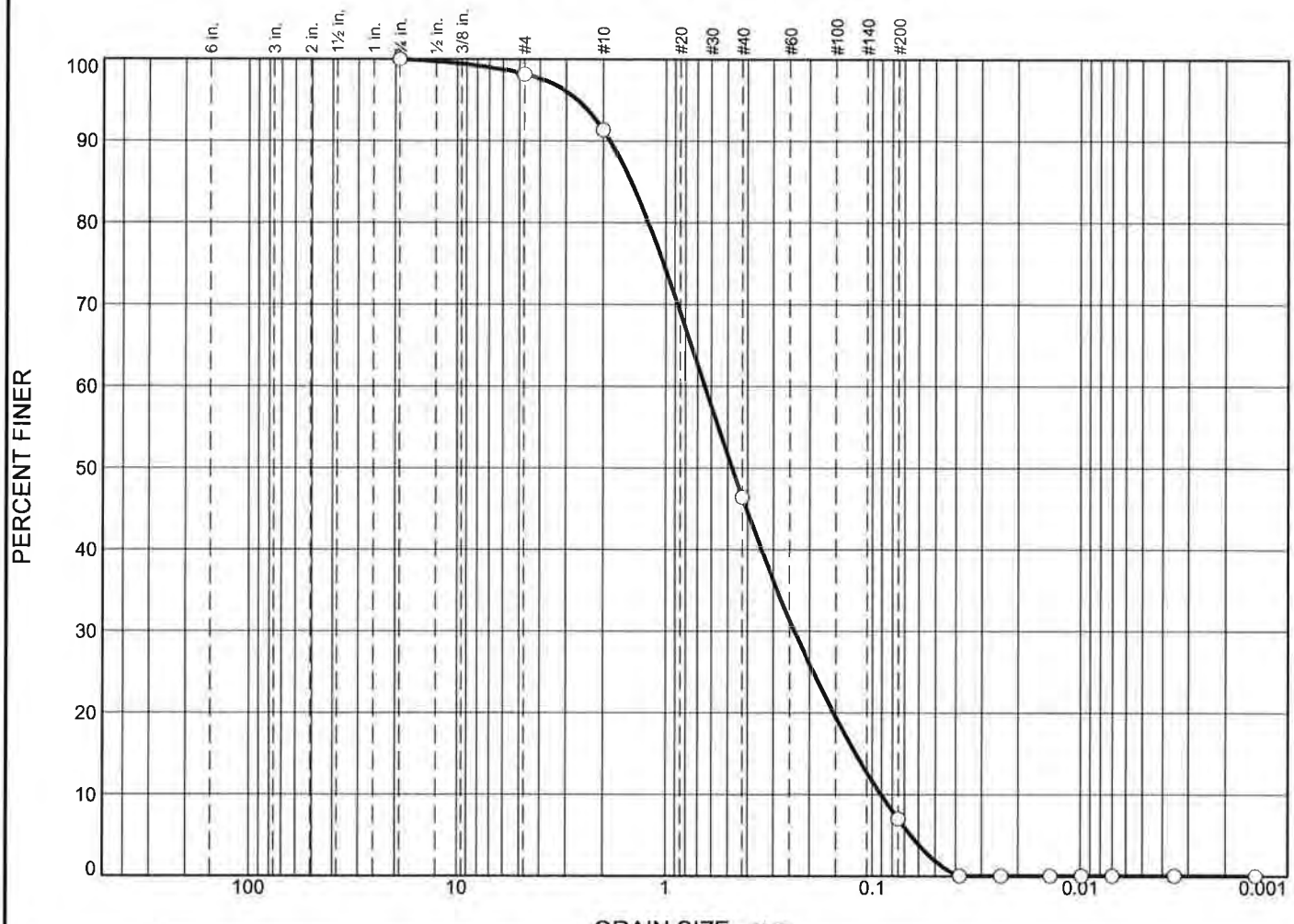
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.0	6.0	4.5	21.0	50.1	75.6	18.3	0.1	18.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0495	0.0586	0.0679	0.0784	0.1054	0.1441	0.2020	0.2941	0.8156	1.2093	2.1428	6.0786

Fineness Modulus	C_u	C_c
1.57	5.02	0.64

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.9	6.8	44.9	39.4	7.0	0.0

Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
			1.4734	0.6451	0.4759	0.2368	0.1198	0.0905	0.96	7.13

Material Description	USCS	AASHTO

Project No. **Client:**

Project:

Source of Sample: NHH-A-TOP **Sample Number:** L1731355-17

Date:

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-A-TOP

Sample Number: L1731355-17

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 46.40
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
46.40	0.00	0.75	0.00	0.00	100.0
		#4	0.87	0.00	98.1
		#10	3.15	0.00	91.3
		#40	20.84	0.00	46.4
		#200	18.28	0.00	7.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 7.0
Weight of hydrometer sample =42.00
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.0
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.0
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.0
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.0
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.0
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.0
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.0

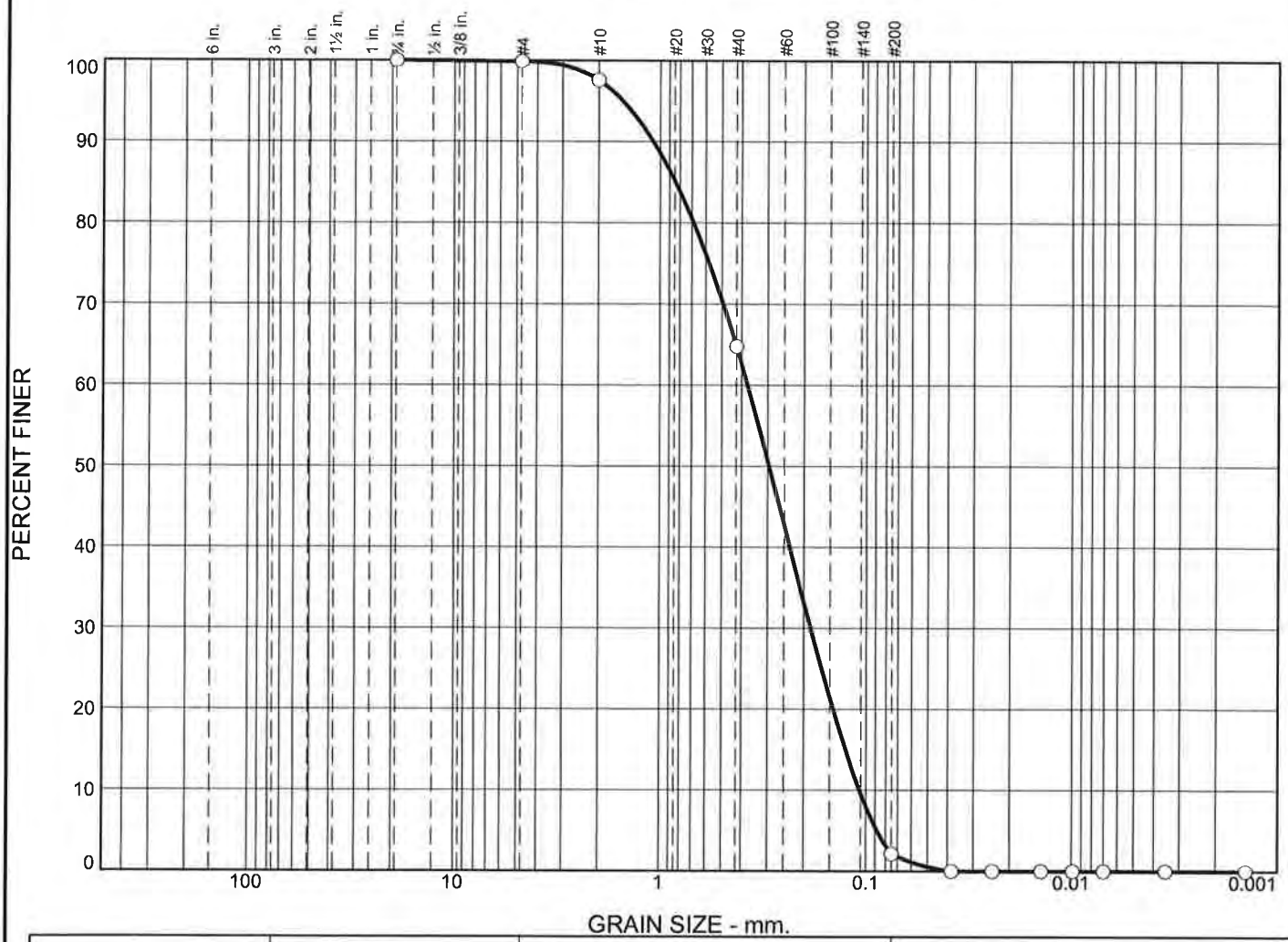
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	1.9	1.9	6.8	44.9	39.4	91.1	7.0	0.0	7.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0652	0.0905	0.1198	0.1537	0.2368	0.3430	0.4759	0.6451	1.2180	1.4734	1.8550	2.6526

Fineness Modulus	C_u	C_c
2.16	7.13	0.96

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.1	2.3	32.9	62.6	2.1	0.0

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.8423	0.3759	0.2954	0.1858	0.1259	0.1075	0.85	3.50

Material Description	USCS	AASHTO
○	SP	

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-A-BOTTOM **Sample Number:** L1731355-18

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-A-BOTTOM
Sample Number: L1731355-18
USCS Classification: SP

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 44.68
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
44.68	0.00	0.75	0.00	0.00	100.0
		#4	0.06	0.00	99.9
		#10	1.03	0.00	97.6
		#40	14.67	0.00	64.7
		#200	27.96	0.00	2.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 2.1
Weight of hydrometer sample =44.88
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.0
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.0
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.0
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.0
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.0
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.0
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.0

Fractional Components

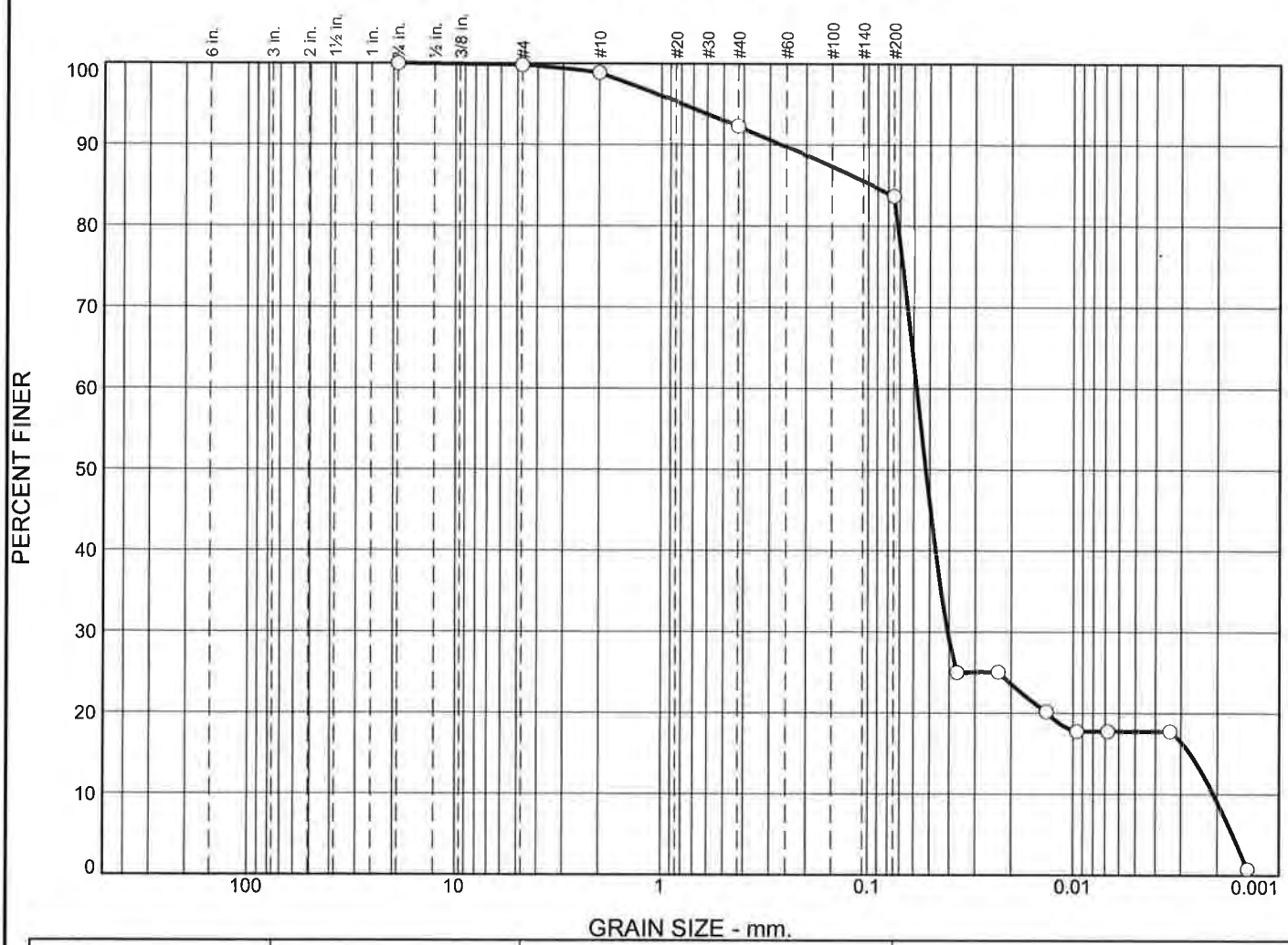
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.1	0.1	2.3	32.9	62.6	97.8	2.1	0.0	2.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0882	0.1075	0.1259	0.1447	0.1858	0.2346	0.2954	0.3759	0.6869	0.8423	1.0808	1.5221

Fineness Modulus	C_u	C_c
1.62	3.50	0.85

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.2	0.9	6.7	8.5	65.9	17.8

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0966	0.0579	0.0523	0.0407	0.0027	0.0021	13.72	27.78

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-D-TOP **Sample Number:** L1731355-19

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-D-TOP

Sample Number: L1731355-19

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 28.06
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
28.06	0.00	0.75	0.00	0.00	100.0
		#4	0.05	0.00	99.8
		#10	0.27	0.00	98.9
		#40	1.86	0.00	92.2
		#200	2.40	0.00	83.7

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 83.7
Weight of hydrometer sample =27.72
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0050	1.0052	0.0134	5.0	15.0	0.0367	25.0
5.00	21.4	1.0050	1.0052	0.0134	5.0	15.0	0.0232	25.0
15.00	21.4	1.0040	1.0042	0.0134	4.0	15.2	0.0135	20.2
30.00	21.4	1.0035	1.0037	0.0134	3.5	15.4	0.0096	17.8
60.00	21.4	1.0035	1.0037	0.0134	3.5	15.4	0.0068	17.8
240.00	21.4	1.0035	1.0037	0.0134	3.5	15.4	0.0034	17.8
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.2	0.2	0.9	6.7	8.5	16.1	65.9	17.8	83.7

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0017	0.0021	0.0027	0.0133	0.0407	0.0467	0.0523	0.0579	0.0717	0.0966	0.2639	0.7903

Fineness Modulus	C_u	C_c
0.33	27.78	13.72

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.9	5.2	10.5	82.6	0.8

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0930	0.0629	0.0587	0.0510	0.0452	0.0431	0.96	1.46

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-D-BOTTOM **Sample Number:** L1731355-20

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-D-BOTTOM

Sample Number: L1731355-20

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 28.14
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
28.14	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.25	0.00	99.1
		#40	1.47	0.00	93.9
		#200	2.94	0.00	83.4

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 83.4
Weight of hydrometer sample =28.34
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0383	0.8
5.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0242	0.8
15.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0140	0.8
30.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0099	0.8
60.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0070	0.8
240.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0035	0.8
1440.00	21.4	1.0000	1.0002	0.0134	0.0	16.3	0.0014	0.8

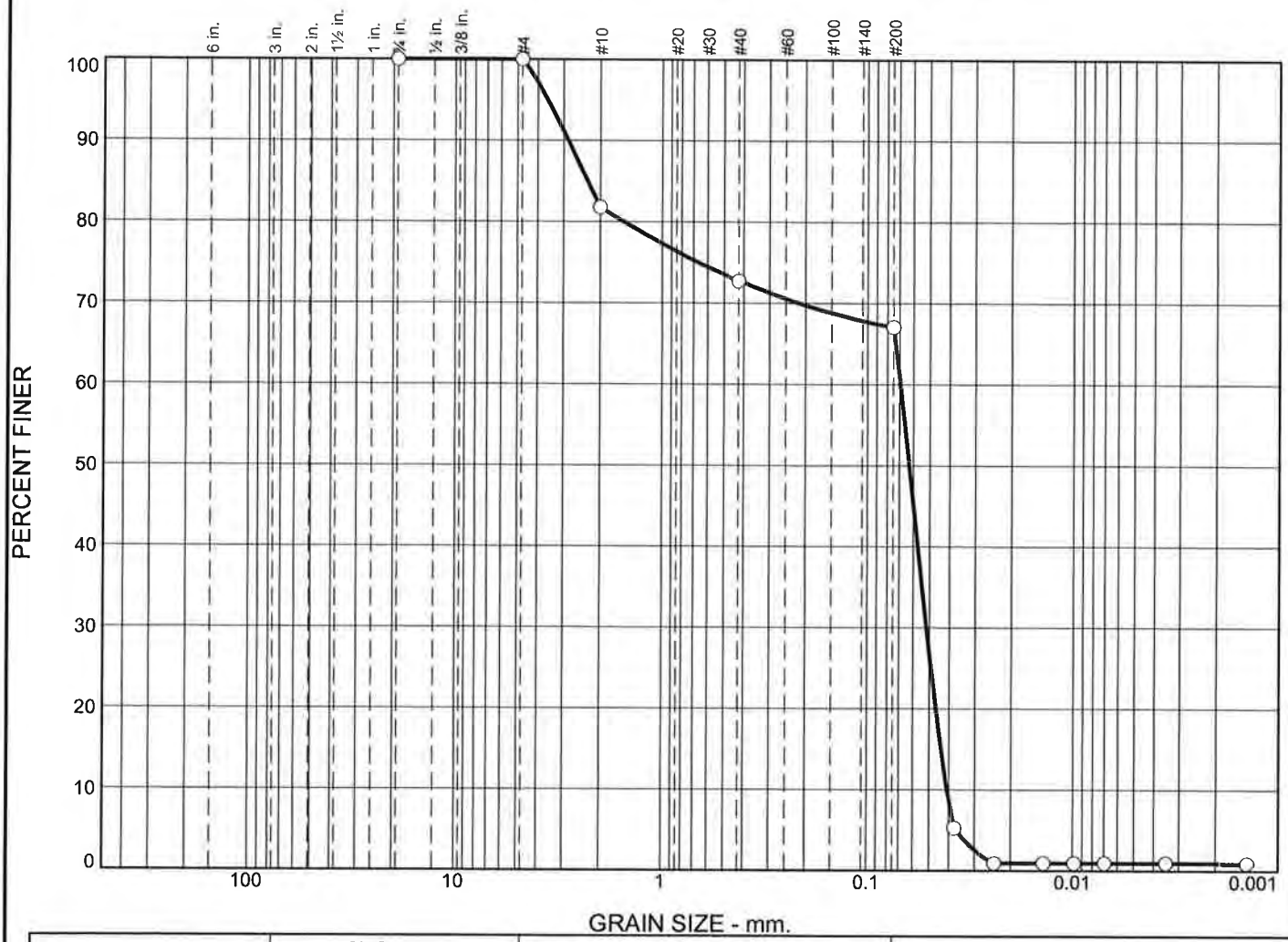
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.9	5.2	10.5	16.6	82.6	0.8	83.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0407	0.0431	0.0452	0.0472	0.0510	0.0548	0.0587	0.0629	0.0729	0.0930	0.2019	0.5466

Fineness Modulus	C_u	C_c
0.27	1.46	0.96

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	18.2	9.0	5.7	66.1	1.0

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				2.3018	0.0693	0.0627	0.0517	0.0439	0.0410	0.94	1.69

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-TOP **Sample Number:** L1731355-21

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-TOP

Sample Number: L1731355-21

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.44
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.44	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	4.27	0.00	81.8
		#40	2.11	0.00	72.8
		#200	1.34	0.00	67.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 67.1
Weight of hydrometer sample =24.69
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0378	5.3
5.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0241	1.0
15.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0139	1.0
30.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0098	1.0
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.0
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.0
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.0

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	18.2	9.0	5.7	32.9	66.1	1.0	67.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0369	0.0410	0.0439	0.0465	0.0517	0.0569	0.0627	0.0693	1.5385	2.3018	2.8497	3.5743

Fineness Modulus	C_u	C_c
1.22	1.69	0.94

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.0	8.8	6.2	74.0	10.0

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1073	0.0605	0.0557	0.0467	0.0390	0.0033	10.84	18.18

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-REP-TOP **Sample Number:** L1731355-22

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-REP-TOP
Sample Number: L1731355-22

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 24.20
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.20	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.24	0.00	99.0
		#40	2.13	0.00	90.2
		#200	1.49	0.00	84.0

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 84.0
Weight of hydrometer sample =23.14
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0375	13.0
5.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0237	13.0
15.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0137	13.0
30.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0097	13.0
60.00	21.8	1.0015	1.0017	0.0133	1.5	15.9	0.0069	10.0
240.00	21.8	1.0015	1.0017	0.0133	1.5	15.9	0.0034	10.0
1440.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0014	7.1

Fractional Components

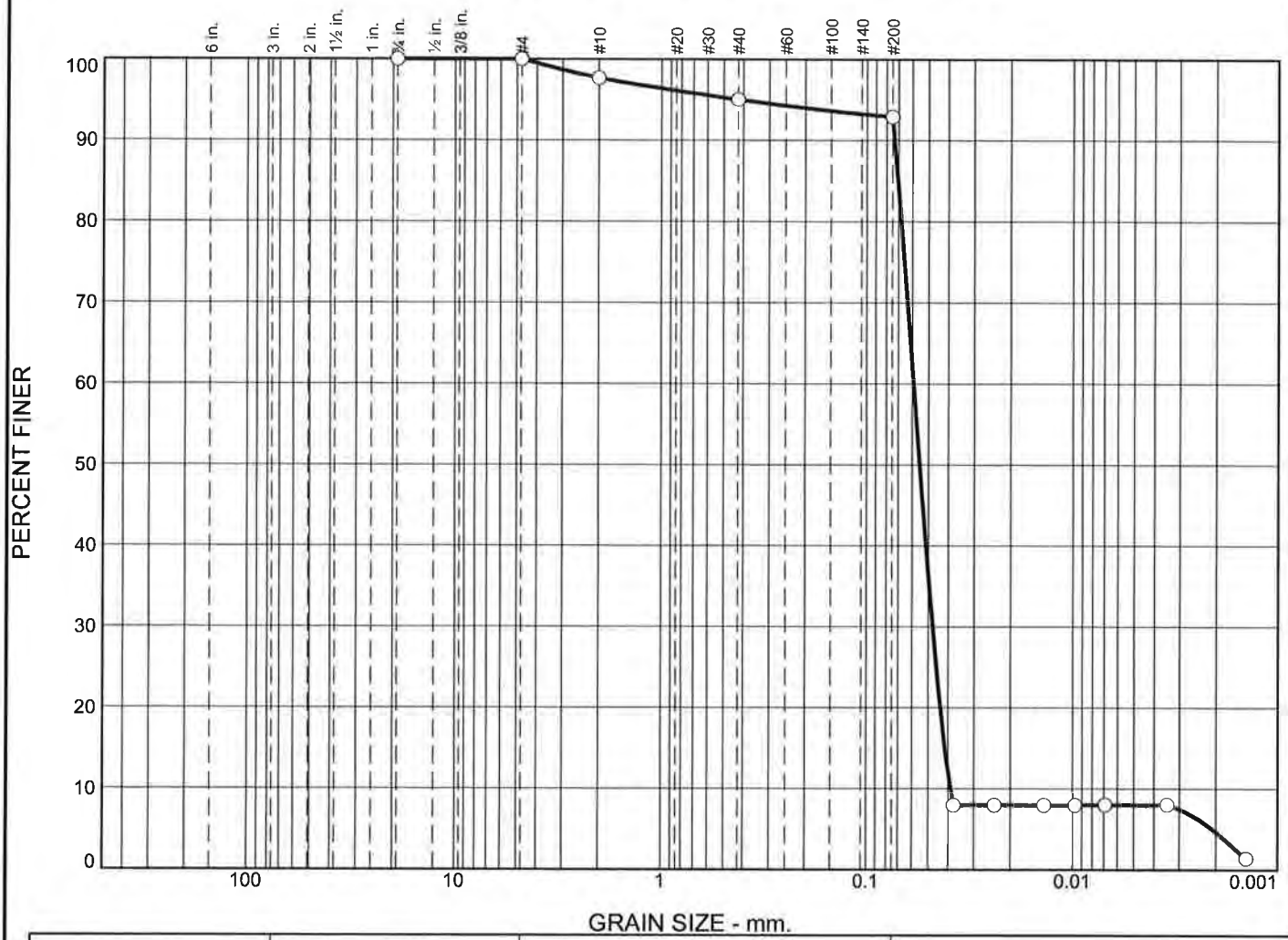
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.0	8.8	6.2	16.0	74.0	10.0	84.0

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
	0.0033	0.0390	0.0419	0.0467	0.0512	0.0557	0.0605	0.0721	0.1073	0.4065	1.0558

Fineness Modulus	C_u	C_c
0.38	18.18	10.84

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	2.3	2.7	2.1	84.9	8.0

	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0704	0.0590	0.0551	0.0476	0.0415	0.0390	0.99	1.51

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-BOTTOM **Sample Number:** L1731355-23

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-BOTTOM

Sample Number: L1731355-23

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.52
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.52	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.55	0.00	97.7
		#40	0.62	0.00	95.0
		#200	0.50	0.00	92.9

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 92.9
Weight of hydrometer sample =22.75
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0378	8.0
5.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0239	8.0
15.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0138	8.0
30.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0098	8.0
60.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0069	8.0
240.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0034	8.0
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.5

Fractional Components

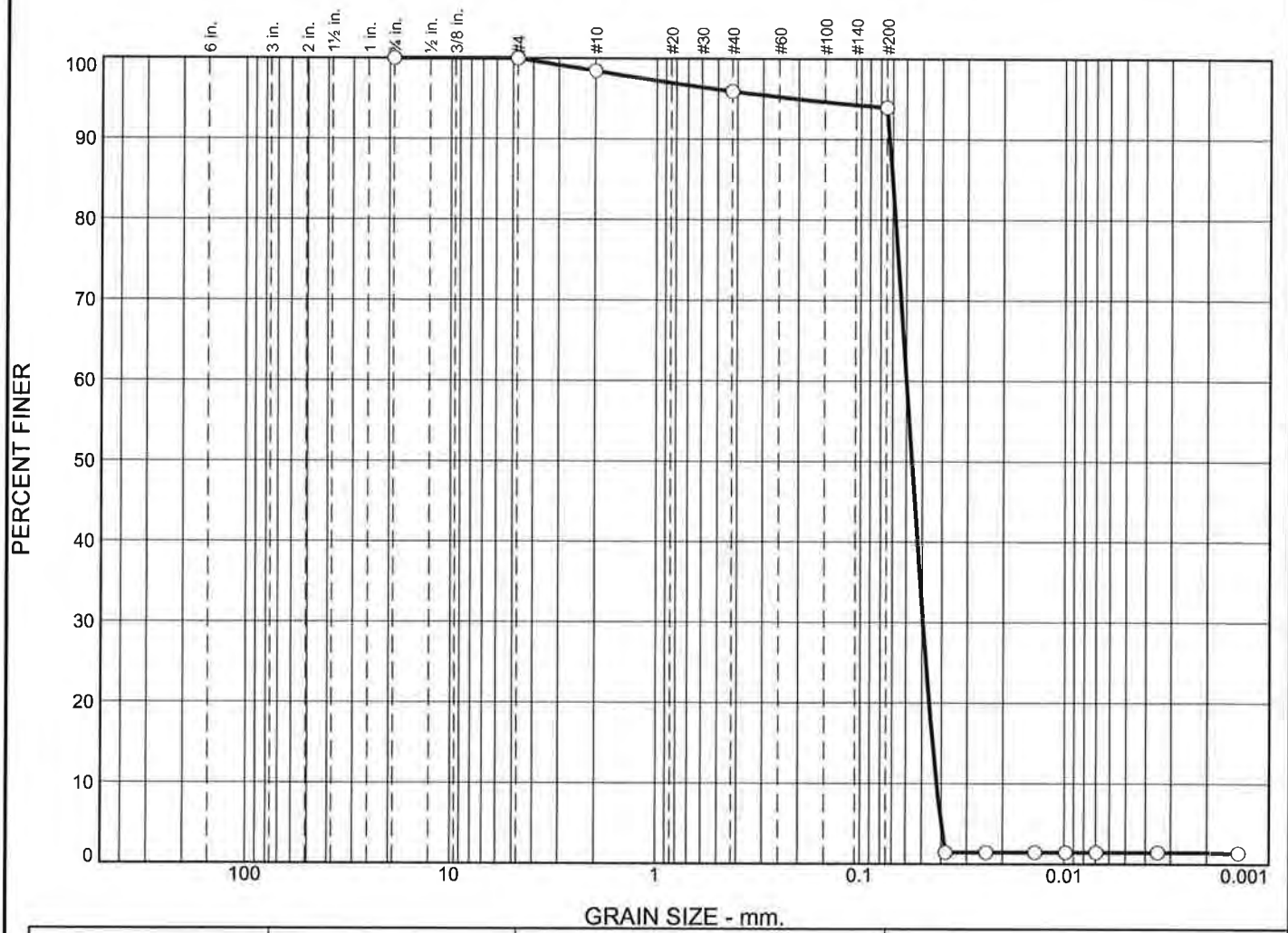
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.3	2.7	2.1	7.1	84.9	8.0	92.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0021	0.0390	0.0415	0.0437	0.0476	0.0513	0.0551	0.0590	0.0678	0.0704	0.0732	0.4177

Fineness Modulus	C_u	C_c
0.22	1.51	0.99

Alpha Analytical

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.6	2.5	2.0	92.5	1.4

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0703	0.0598	0.0562	0.0494	0.0442	0.0422	0.97	1.42

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-F-BOTTOM **Sample Number:** WG1046682-2

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-F-BOTTOM

Sample Number: WG1046682-2

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 20.48
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
20.48	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.32	0.00	98.4
		#40	0.51	0.00	95.9
		#200	0.41	0.00	93.9

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 93.9
Weight of hydrometer sample =23.26
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0381	1.4
5.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0241	1.4
15.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0139	1.4
30.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0098	1.4
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.4
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.4
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.4

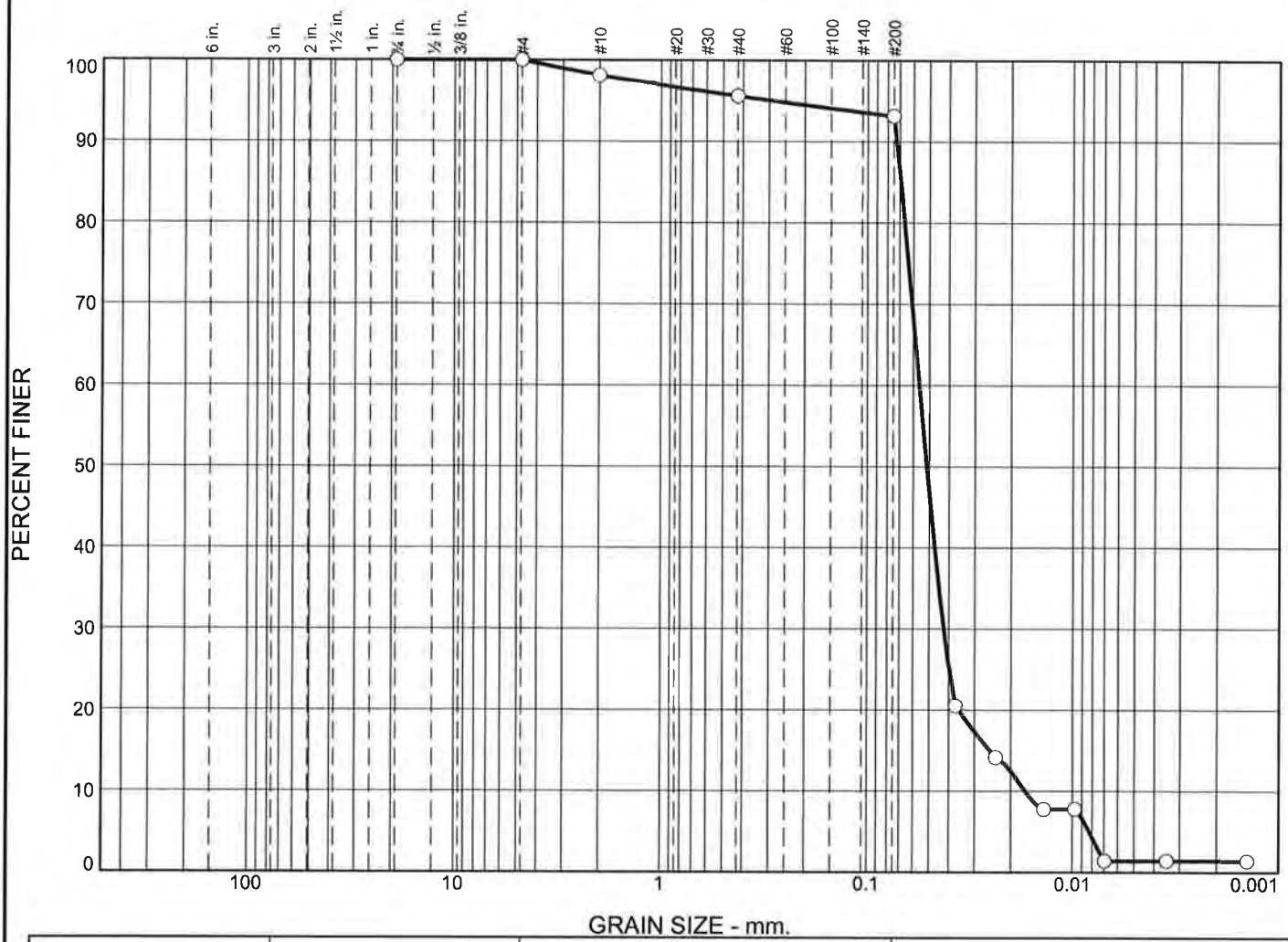
Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.6	2.5	2.0	6.1	92.5	1.4	93.9

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0400	0.0422	0.0442	0.0460	0.0494	0.0528	0.0562	0.0598	0.0679	0.0703	0.0728	0.2042

Fineness Modulus	C_u	C_c
0.17	1.42	0.97

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	1.9	2.5	2.5	91.7	1.4

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.0692	0.0559	0.0514	0.0424	0.0252	0.0171	1.89	3.28

Material Description	USCS	AASHTO
○		

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-TOP **Sample Number:** L1731355-24

Date: ○

Remarks:

Alpha Analytical

Mansfield, MA

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-E-TOP

Sample Number: L1731355-24

Sieve Test Data

Post #200 Wash Test Weights (grams): Dry Sample and Tare = 24.81
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
24.81	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.47	0.00	98.1
		#40	0.62	0.00	95.6
		#200	0.61	0.00	93.1

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 93.1
Weight of hydrometer sample =23.46
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 x Rm

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0030	1.0032	0.0133	3.0	15.5	0.0372	20.5
5.00	21.8	1.0020	1.0022	0.0133	2.0	15.8	0.0237	14.2
15.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0138	7.8
30.00	21.8	1.0010	1.0012	0.0133	1.0	16.0	0.0098	7.8
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.4
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.4
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	1.9	2.5	2.5	6.9	91.7	1.4	93.1

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0083	0.0171	0.0252	0.0358	0.0424	0.0470	0.0514	0.0559	0.0662	0.0692	0.0726	0.2834

Fineness Modulus	C_u	C_c
0.19	3.28	1.89

Alpha Analytical

Particle Size Distribution Report

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.6	10.7	6.2	81.2	1.3

☒	Colloids	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○				0.1891	0.0630	0.0587	0.0508	0.0449	0.0428	0.96	1.47

	Material Description	USCS	AASHTO
○			

Project No. **Client:**

Project:

○ **Source of Sample:** NHH-E-BOTTOM **Sample Number:** L1731355-25

Date: ○

Alpha Analytical

Mansfield, MA

Remarks:

Figure

GRAIN SIZE DISTRIBUTION TEST DATA

10/3/2017

Location: NHH-E-BOTTOM

Sample Number: L1731355-25

Sieve Test Data

Post #200 Wash Test Weights (grams): **Dry Sample and Tare =** 23.90
Tare Wt. = 0.00
Minus #200 from wash = 0.0%

Dry Sample and Tare (grams)	Tare (grams)	Sieve Opening Size	Weight Retained (grams)	Sieve Weight (grams)	Percent Finer
23.90	0.00	0.75	0.00	0.00	100.0
		#4	0.00	0.00	100.0
		#10	0.14	0.00	99.4
		#40	2.57	0.00	88.7
		#200	1.48	0.00	82.5

Hydrometer Test Data

Hydrometer test uses material passing #200
Percent passing #200 based upon complete sample = 82.5
Weight of hydrometer sample =23.35
Automatic temperature correction
Composite correction (fluid density and meniscus height) at 20 deg. C = 0
Meniscus correction only = 0.0
Specific gravity of solids = 2.65
Hydrometer type = 151H
Hydrometer effective depth equation: L = 16.294964 - 0.2645 **x Rm**

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0381	1.3
5.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0241	1.3
15.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0139	1.3
30.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0098	1.3
60.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0070	1.3
240.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0035	1.3
1440.00	21.8	1.0000	1.0002	0.0133	0.0	16.3	0.0014	1.3

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.6	10.7	6.2	17.5	81.2	1.3	82.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
0.0403	0.0428	0.0449	0.0470	0.0508	0.0547	0.0587	0.0630	0.0734	0.1891	0.5398	1.1490

Fineness Modulus	C_u	C_c
0.43	1.47	0.96

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	N/A
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	N/A
15. Were the SRM/CRM analyses within acceptance criteria?	N/A
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	N/A
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	N/A
19. Were surrogate recoveries within the required acceptance criteria?	N/A

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	No	WG1046682-1 % coarse sand (36%) and % clay fine (140%), WG1040348-1 % fine gravel (93%), gravel (93%) and % coarse sand (54%)	In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	N/A		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

Serial_No:10051713:01

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AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FMP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

RIM Hydrometer

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7471B	PCBs - 8082	Pesticides - 8081B	PAHs - 8270D-SIM	TOC - 9060	Lab I.D.	Remarks	
NHH-R-Top	8/10/17	0832	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X		0-4'2"	
NHH-R-Bottom		0832	X		"	SD	4°C		X	X	X	X	X	X		4'2"-7'8"	
NHH-S-Top		0955	X		"	SD	4°C		X	X	X	X	X	X		0-6'0"	.01
NHH-S-Bottom		0955	X		8oz	SD	4°C		X							6'0"-6'5"	.02
NHH-J		1141	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-5'5"	.03
NHH-L		1300	X		"	SD	4°C		X	X	X	X	X	X		0-6'9"	.04
NHH-K-Top		1409	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-5'6"	.05
NHH-K-Bottom		1409	X		8oz	SD	4°C		X							5'6"-8'2"	.06
NHH-H-Top		1458	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-5'5"	.07
NHH-H-Rep-Top		1458	X		"	SD	4°C		X	X	X	X	X	X		0-5'5"	.08
NHH-H-Bottom		1458	X		"	SD	4°C		X	X	X	X	X	X		5'5"-7'8"	.09
NHH-I-Top		1548	X		"	SD	4°C		X	X	X	X	X	X		0-8"	.10
NHH-I-Bottom		1548	X		"	SD	4°C		X	X	X	X	X	X		8"-2'6"	.11

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C Steve Howe AECOM Signature:	Date: 8/10/17 Time: 1922	Signature:	Date: 8/10/17 Time: 1928
Signature:	Date: 8/10/17 Time: 2000	Signature:	Date: Time:
Signature:	Date: Time:	Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0156

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AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature: C Steve Howe

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

RIM Hydrometer

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals (6020A/7471B)	PCBs - 8082/8270-SIM	Pesticides - 8081	PAHs - 8270D-SIM	TOC - 9060	Lab I.D.	Remarks	
-01	NHH-G-Top	8/11/17	0837	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X		0-4'3"	.12
-02	NHH-G-Bottom	8/11/17	0837	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		4'3"-13'8"	.13
-03	NHH-C-Top		1033	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-2'10"	.14
-04	NHH-C-Bottom		1033	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		2'10"-8'0"	.15
-05	NHH-B		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X		0-4.2'	.16
-05	NHH-B-MS		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X		0-4.2'	.16
-05	NHH-B-MSD		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X		0-4.2'	.16
-06	NHH-A-Top		1340	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-2'2"	.17
-07	NHH-A-Bottom		1340	X		8 oz	SD	4°C		X							2'2"-9.9'	.18
-08	NHH-D-Top		1507	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-4'9"	.19
-09	NHH-D-Bottom		1507	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		4'9"-10'4"	.20
-10	NHH-F-Top		1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-3'2"	.21
-11	NHH-F-Rep-Top		1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		0-3'2"	.22

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/11/17 Time: 1925	Signature:	Date: 8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) AAL Bethany Bedard Signature:	Date: 8/11/17 Time: 22:37
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0178

Serial No:10051713:01

L172 8229

kb 9/7/17 L1731355

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

RIM Hydrometer

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7471B	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270-SIM	TOC - 9060	Lab I.D.	Remarks
NHH-F-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X		3'2" - 10'6" .23
NHH-F-MS-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		3'2" - 10'6" .23
NHH-F-MSD-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X		3'2" - 10'6" .23

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/11/17 Time: 1925	Signature: AAL	Date: 8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) Bethany Bedard AAL Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0167

Serial_No:10051713:01

kb 9/7/17 L1731355

AECOM

CHAIN OF CUSTODY RECORD

~~LA28340~~

Page ____ of ____

Client/Project Name: USACE - NHH - FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Rim Hydrometer

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals 6020A/7471A	PCBs 8082/8270-SIM	Pesticides 8081B	PAHs 8270D	TOC 9060	Lab I.D.	Remarks
.01 NHH-E-Top	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X		0-6'6" .24
.02 NHH-E-Bottom	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X		6'6"-8.1' .25

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM	8/14/17	[illegible] AE	8/14/17
Signature:	Time: 1509	Signature:	Time: 1509
Relinquished by: (Print Name)/(Affiliation)	Date: 8/14/17	Received by: (Print Name)/(Affiliation) MARC A MUIR	Date: 8/14/17
Signature:	Time: 1710	Signature:	Time: 1712
Relinquished by: (Print Name)/(Affiliation) MARC A MUIR	Date: 8/14/17	Received by: (Print Name)/(Affiliation)	Date: 8/14/17
Signature:	Time: 1815	Signature:	Time: 1815

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0168

Appendix D Backup Chemistry Laboratory Data

Bulk Sediment Chemistry Data

ANALYTICAL REPORT

Lab Number:	L1727562
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	08/29/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1727562-01	NHH-X-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1727562-02	NHH-X-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1727562-03	NHH-X-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 09:22	08/08/17
L1727562-04	NHH-Y-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 10:37	08/08/17
L1727562-05	NHH-Z-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 11:53	08/08/17
L1727562-06	NHH-Z-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 11:53	08/08/17
L1727562-07	NHH-N-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 13:05	08/08/17
L1727562-08	NHH-O-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 14:45	08/08/17
L1727562-09	NHH-M	SEDIMENT	NEW HAVEN, CT	08/08/17 16:10	08/08/17
L1727562-10	NHH-T-TOP	SEDIMENT	NEW HAVEN, CT	08/08/17 17:34	08/08/17
L1727562-11	NHH-T-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/08/17 17:34	08/08/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1727562
Project Number: 60543021 **Report Date:** 08/29/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Semivolatile Organics

L1727562-01 and -02: The sample was re-analyzed on dilution in order to quantify the results within the calibration range. The result(s) should be considered estimated, and are qualified with an E flag, for any compound(s) that exceeded the calibration range in the initial analysis. The re-analysis was performed only for the compound(s) that exceeded the calibration range.

The WG1031095-5 Laboratory Duplicate RPDs for cl4-bz#52 (44%) and cl7-bz#170 (34%), performed on L1727562-07, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

Pesticides

The WG1031089-4 SRM recovery for trans-Nonachlor (220%) and the surrogate BZ 198 column B (159%), are above the acceptance criteria.

Total Metals

The WG1034116-5 Laboratory Duplicate RPDs for cadmium (25%), chromium (36%), copper (25%), lead (21%), nickel (25%) and zinc (24%), performed on L1727562-07, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

Total Organic Carbon

The WG1036551-5 MS recovery for total organic carbon (rep1) (60%) performed on L1727562-07, is outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 08/29/17

ORGANICS

SEMIVOLATILES

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-01
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 00:45
Analyst: GP
Percent Solids: 36%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	256		ug/kg	13.6	6.80	1
Acenaphthylene	221		ug/kg	13.6	6.80	1
Acenaphthene	303		ug/kg	13.6	6.80	1
Fluorene	263		ug/kg	13.6	6.80	1
Phenanthrene	924		ug/kg	13.6	6.80	1
Anthracene	364		ug/kg	13.6	6.80	1
Fluoranthene	2800	E	ug/kg	13.6	6.80	1
Pyrene	2240		ug/kg	13.6	6.80	1
Benz(a)anthracene	1140		ug/kg	13.6	6.80	1
Chrysene	1040		ug/kg	13.6	6.80	1
Benzo(b)fluoranthene	1130		ug/kg	13.6	6.80	1
Benzo(k)fluoranthene	746		ug/kg	13.6	6.80	1
Benzo(a)pyrene	853		ug/kg	13.6	6.80	1
Indeno(1,2,3-cd)Pyrene	592		ug/kg	13.6	6.80	1
Dibenz(a,h)anthracene	175		ug/kg	13.6	6.80	1
Benzo(ghi)perylene	650		ug/kg	13.6	6.80	1
Cl2-BZ#8	12.0		ug/kg	1.36	0.680	1
Cl3-BZ#18	42.8		ug/kg	1.36	0.680	1
Cl3-BZ#28	69.5		ug/kg	1.36	0.680	1
Cl4-BZ#44	46.5		ug/kg	1.36	0.680	1
Cl4-BZ#49	41.8		ug/kg	1.36	0.680	1
Cl4-BZ#52	109		ug/kg	1.36	0.680	1
Cl4-BZ#66	18.4		ug/kg	1.36	0.680	1
Cl5-BZ#87	4.69		ug/kg	1.36	0.680	1
Cl5-BZ#101	26.2		ug/kg	1.36	0.680	1
Cl5-BZ#105	42.6		ug/kg	1.36	0.680	1
Cl5-BZ#118	18.5		ug/kg	1.36	0.680	1
Cl6-BZ#128	2.82		ug/kg	1.36	0.680	1
Cl6-BZ#138	20.2		ug/kg	1.36	0.680	1
Cl6-BZ#153	19.6		ug/kg	1.36	0.680	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-01 Date Collected: 08/08/17 09:22

Client ID: NHH-X-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	5.69		ug/kg	1.36	0.680	1
Cl7-BZ#180	14.2		ug/kg	1.36	0.680	1
Cl7-BZ#183	3.30		ug/kg	1.36	0.680	1
Cl7-BZ#184	6.76		ug/kg	1.36	0.680	1
Cl7-BZ#187	10.4		ug/kg	1.36	0.680	1
Cl8-BZ#195	1.38		ug/kg	1.36	0.680	1
Cl9-BZ#206	3.11		ug/kg	1.36	0.680	1
Cl10-BZ#209	1.31	J	ug/kg	1.36	0.680	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	78		30-150
BZ 198	86		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-01 D
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 15:55
Analyst: GP
Percent Solids: 36%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Fluoranthene	3210		ug/kg	68.0	34.0	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	77		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	77		30-150
DBOB	95		30-150
BZ 198	76		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-02
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 01:18
Analyst: GP
Percent Solids: 35%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	308		ug/kg	13.5	6.75	1
Acenaphthylene	275		ug/kg	13.5	6.75	1
Acenaphthene	327		ug/kg	13.5	6.75	1
Fluorene	335		ug/kg	13.5	6.75	1
Phenanthrene	1270		ug/kg	13.5	6.75	1
Anthracene	449		ug/kg	13.5	6.75	1
Fluoranthene	3140	E	ug/kg	13.5	6.75	1
Pyrene	2550		ug/kg	13.5	6.75	1
Benz(a)anthracene	1400		ug/kg	13.5	6.75	1
Chrysene	1240		ug/kg	13.5	6.75	1
Benzo(b)fluoranthene	1490		ug/kg	13.5	6.75	1
Benzo(k)fluoranthene	736		ug/kg	13.5	6.75	1
Benzo(a)pyrene	1030		ug/kg	13.5	6.75	1
Indeno(1,2,3-cd)Pyrene	717		ug/kg	13.5	6.75	1
Dibenz(a,h)anthracene	207		ug/kg	13.5	6.75	1
Benzo(ghi)perylene	773		ug/kg	13.5	6.75	1
Cl2-BZ#8	20.0		ug/kg	1.35	0.675	1
Cl3-BZ#18	137		ug/kg	1.35	0.675	1
Cl3-BZ#28	145		ug/kg	1.35	0.675	1
Cl4-BZ#44	90.0		ug/kg	1.35	0.675	1
Cl4-BZ#49	87.5		ug/kg	1.35	0.675	1
Cl4-BZ#52	201		ug/kg	1.35	0.675	1
Cl4-BZ#66	30.4		ug/kg	1.35	0.675	1
Cl5-BZ#87	5.81		ug/kg	1.35	0.675	1
Cl5-BZ#101	38.6		ug/kg	1.35	0.675	1
Cl5-BZ#105	45.6		ug/kg	1.35	0.675	1
Cl5-BZ#118	22.4		ug/kg	1.35	0.675	1
Cl6-BZ#128	3.92		ug/kg	1.35	0.675	1
Cl6-BZ#138	25.2		ug/kg	1.35	0.675	1
Cl6-BZ#153	22.6		ug/kg	1.35	0.675	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-02 Date Collected: 08/08/17 09:22

Client ID: NHH-X-REP-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	6.86		ug/kg	1.35	0.675	1
Cl7-BZ#180	19.2		ug/kg	1.35	0.675	1
Cl7-BZ#183	3.84		ug/kg	1.35	0.675	1
Cl7-BZ#184	7.69		ug/kg	1.35	0.675	1
Cl7-BZ#187	11.4		ug/kg	1.35	0.675	1
Cl8-BZ#195	1.49		ug/kg	1.35	0.675	1
Cl9-BZ#206	5.18		ug/kg	1.35	0.675	1
Cl10-BZ#209	2.96		ug/kg	1.35	0.675	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	68		30-150
DBOB	72		30-150
BZ 198	79		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-02 D
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 16:29
Analyst: GP
Percent Solids: 35%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Fluoranthene	3360		ug/kg	67.5	33.8	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	64		30-150
Pyrene-d10	74		30-150
Benzo(b)fluoranthene-d12	70		30-150
DBOB	84		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-03
Client ID: NHH-X-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 01:52
Analyst: GP
Percent Solids: 80%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	5.91	2.95	1
Acenaphthylene	ND		ug/kg	5.91	2.95	1
Acenaphthene	ND		ug/kg	5.91	2.95	1
Fluorene	ND		ug/kg	5.91	2.95	1
Phenanthrene	ND		ug/kg	5.91	2.95	1
Anthracene	ND		ug/kg	5.91	2.95	1
Fluoranthene	ND		ug/kg	5.91	2.95	1
Pyrene	ND		ug/kg	5.91	2.95	1
Benz(a)anthracene	ND		ug/kg	5.91	2.95	1
Chrysene	ND		ug/kg	5.91	2.95	1
Benzo(b)fluoranthene	ND		ug/kg	5.91	2.95	1
Benzo(k)fluoranthene	ND		ug/kg	5.91	2.95	1
Benzo(a)pyrene	ND		ug/kg	5.91	2.95	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.91	2.95	1
Dibenz(a,h)anthracene	ND		ug/kg	5.91	2.95	1
Benzo(ghi)perylene	ND		ug/kg	5.91	2.95	1
Cl2-BZ#8	ND		ug/kg	0.591	0.295	1
Cl3-BZ#18	ND		ug/kg	0.591	0.295	1
Cl3-BZ#28	ND		ug/kg	0.591	0.295	1
Cl4-BZ#44	ND		ug/kg	0.591	0.295	1
Cl4-BZ#49	ND		ug/kg	0.591	0.295	1
Cl4-BZ#52	ND		ug/kg	0.591	0.295	1
Cl4-BZ#66	ND		ug/kg	0.591	0.295	1
Cl5-BZ#87	ND		ug/kg	0.591	0.295	1
Cl5-BZ#101	ND		ug/kg	0.591	0.295	1
Cl5-BZ#105	ND		ug/kg	0.591	0.295	1
Cl5-BZ#118	ND		ug/kg	0.591	0.295	1
Cl6-BZ#128	ND		ug/kg	0.591	0.295	1
Cl6-BZ#138	ND		ug/kg	0.591	0.295	1
Cl6-BZ#153	ND		ug/kg	0.591	0.295	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-03 Date Collected: 08/08/17 09:22

Client ID: NHH-X-BOTTOM Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.591	0.295	1
Cl7-BZ#180	ND		ug/kg	0.591	0.295	1
Cl7-BZ#183	ND		ug/kg	0.591	0.295	1
Cl7-BZ#184	ND		ug/kg	0.591	0.295	1
Cl7-BZ#187	ND		ug/kg	0.591	0.295	1
Cl8-BZ#195	ND		ug/kg	0.591	0.295	1
Cl9-BZ#206	ND		ug/kg	0.591	0.295	1
Cl10-BZ#209	ND		ug/kg	0.591	0.295	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	63		30-150
Pyrene-d10	70		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	70		30-150
BZ 198	75		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-04
Client ID: NHH-Y-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 02:25
Analyst: GP
Percent Solids: 37%

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	69.5		ug/kg	13.3	6.67	1
Acenaphthylene	83.2		ug/kg	13.3	6.67	1
Acenaphthene	36.6		ug/kg	13.3	6.67	1
Fluorene	30.8		ug/kg	13.3	6.67	1
Phenanthrene	227		ug/kg	13.3	6.67	1
Anthracene	98.7		ug/kg	13.3	6.67	1
Fluoranthene	1190		ug/kg	13.3	6.67	1
Pyrene	948		ug/kg	13.3	6.67	1
Benz(a)anthracene	545		ug/kg	13.3	6.67	1
Chrysene	458		ug/kg	13.3	6.67	1
Benzo(b)fluoranthene	576		ug/kg	13.3	6.67	1
Benzo(k)fluoranthene	361		ug/kg	13.3	6.67	1
Benzo(a)pyrene	410		ug/kg	13.3	6.67	1
Indeno(1,2,3-cd)Pyrene	290		ug/kg	13.3	6.67	1
Dibenz(a,h)anthracene	85.9		ug/kg	13.3	6.67	1
Benzo(ghi)perylene	327		ug/kg	13.3	6.67	1
Cl2-BZ#8	ND		ug/kg	1.33	0.667	1
Cl3-BZ#18	1.38		ug/kg	1.33	0.667	1
Cl3-BZ#28	2.97		ug/kg	1.33	0.667	1
Cl4-BZ#44	2.22		ug/kg	1.33	0.667	1
Cl4-BZ#49	1.87		ug/kg	1.33	0.667	1
Cl4-BZ#52	3.54		ug/kg	1.33	0.667	1
Cl4-BZ#66	2.83		ug/kg	1.33	0.667	1
Cl5-BZ#87	0.935	J	ug/kg	1.33	0.667	1
Cl5-BZ#101	3.68		ug/kg	1.33	0.667	1
Cl5-BZ#105	ND		ug/kg	1.33	0.667	1
Cl5-BZ#118	4.81		ug/kg	1.33	0.667	1
Cl6-BZ#128	1.08	J	ug/kg	1.33	0.667	1
Cl6-BZ#138	4.16		ug/kg	1.33	0.667	1
Cl6-BZ#153	3.95		ug/kg	1.33	0.667	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-04 Date Collected: 08/08/17 10:37

Client ID: NHH-Y-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.41		ug/kg	1.33	0.667	1
Cl7-BZ#180	2.69		ug/kg	1.33	0.667	1
Cl7-BZ#183	0.683	J	ug/kg	1.33	0.667	1
Cl7-BZ#184	ND		ug/kg	1.33	0.667	1
Cl7-BZ#187	1.81		ug/kg	1.33	0.667	1
Cl8-BZ#195	ND		ug/kg	1.33	0.667	1
Cl9-BZ#206	0.778	J	ug/kg	1.33	0.667	1
Cl10-BZ#209	ND		ug/kg	1.33	0.667	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	71		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	65		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-05
Client ID: NHH-Z-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 02:58
Analyst: GP
Percent Solids: 37%

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	86.1		ug/kg	12.3	6.16	1
Acenaphthylene	81.6		ug/kg	12.3	6.16	1
Acenaphthene	27.2		ug/kg	12.3	6.16	1
Fluorene	28.8		ug/kg	12.3	6.16	1
Phenanthrene	208		ug/kg	12.3	6.16	1
Anthracene	92.7		ug/kg	12.3	6.16	1
Fluoranthene	935		ug/kg	12.3	6.16	1
Pyrene	774		ug/kg	12.3	6.16	1
Benz(a)anthracene	429		ug/kg	12.3	6.16	1
Chrysene	416		ug/kg	12.3	6.16	1
Benzo(b)fluoranthene	530		ug/kg	12.3	6.16	1
Benzo(k)fluoranthene	354		ug/kg	12.3	6.16	1
Benzo(a)pyrene	389		ug/kg	12.3	6.16	1
Indeno(1,2,3-cd)Pyrene	290		ug/kg	12.3	6.16	1
Dibenz(a,h)anthracene	67.0		ug/kg	12.3	6.16	1
Benzo(ghi)perylene	331		ug/kg	12.3	6.16	1
Cl2-BZ#8	0.650	J	ug/kg	1.23	0.616	1
Cl3-BZ#18	1.44		ug/kg	1.23	0.616	1
Cl3-BZ#28	1.31		ug/kg	1.23	0.616	1
Cl4-BZ#44	2.13		ug/kg	1.23	0.616	1
Cl4-BZ#49	1.73		ug/kg	1.23	0.616	1
Cl4-BZ#52	3.03		ug/kg	1.23	0.616	1
Cl4-BZ#66	2.71		ug/kg	1.23	0.616	1
Cl5-BZ#87	0.790	J	ug/kg	1.23	0.616	1
Cl5-BZ#101	3.69		ug/kg	1.23	0.616	1
Cl5-BZ#105	0.860	J	ug/kg	1.23	0.616	1
Cl5-BZ#118	3.41		ug/kg	1.23	0.616	1
Cl6-BZ#128	0.971	J	ug/kg	1.23	0.616	1
Cl6-BZ#138	4.72		ug/kg	1.23	0.616	1
Cl6-BZ#153	4.24		ug/kg	1.23	0.616	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-05 Date Collected: 08/08/17 11:53

Client ID: NHH-Z-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	0.987	J	ug/kg	1.23	0.616	1
Cl7-BZ#180	2.12		ug/kg	1.23	0.616	1
Cl7-BZ#183	0.685	J	ug/kg	1.23	0.616	1
Cl7-BZ#184	ND		ug/kg	1.23	0.616	1
Cl7-BZ#187	1.62		ug/kg	1.23	0.616	1
Cl8-BZ#195	ND		ug/kg	1.23	0.616	1
Cl9-BZ#206	0.691	J	ug/kg	1.23	0.616	1
Cl10-BZ#209	0.633	J	ug/kg	1.23	0.616	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	63		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	67		30-150
BZ 198	70		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-06
Client ID: NHH-Z-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 03:31
Analyst: GP
Percent Solids: 45%

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	740		ug/kg	10.3	5.13	1
Acenaphthylene	199		ug/kg	10.3	5.13	1
Acenaphthene	142		ug/kg	10.3	5.13	1
Fluorene	271		ug/kg	10.3	5.13	1
Phenanthrene	1230		ug/kg	10.3	5.13	1
Anthracene	246		ug/kg	10.3	5.13	1
Fluoranthene	1810		ug/kg	10.3	5.13	1
Pyrene	1560		ug/kg	10.3	5.13	1
Benz(a)anthracene	833		ug/kg	10.3	5.13	1
Chrysene	791		ug/kg	10.3	5.13	1
Benzo(b)fluoranthene	1050		ug/kg	10.3	5.13	1
Benzo(k)fluoranthene	578		ug/kg	10.3	5.13	1
Benzo(a)pyrene	734		ug/kg	10.3	5.13	1
Indeno(1,2,3-cd)Pyrene	509		ug/kg	10.3	5.13	1
Dibenz(a,h)anthracene	158		ug/kg	10.3	5.13	1
Benzo(ghi)perylene	609		ug/kg	10.3	5.13	1
Cl2-BZ#8	3.91		ug/kg	1.03	0.513	1
Cl3-BZ#18	17.2		ug/kg	1.03	0.513	1
Cl3-BZ#28	32.5		ug/kg	1.03	0.513	1
Cl4-BZ#44	33.6		ug/kg	1.03	0.513	1
Cl4-BZ#49	21.0		ug/kg	1.03	0.513	1
Cl4-BZ#52	71.9		ug/kg	1.03	0.513	1
Cl4-BZ#66	21.4		ug/kg	1.03	0.513	1
Cl5-BZ#87	7.81		ug/kg	1.03	0.513	1
Cl5-BZ#101	27.3		ug/kg	1.03	0.513	1
Cl5-BZ#105	16.7		ug/kg	1.03	0.513	1
Cl5-BZ#118	24.2		ug/kg	1.03	0.513	1
Cl6-BZ#128	4.68		ug/kg	1.03	0.513	1
Cl6-BZ#138	27.4		ug/kg	1.03	0.513	1
Cl6-BZ#153	23.7		ug/kg	1.03	0.513	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-06 Date Collected: 08/08/17 11:53

Client ID: NHH-Z-BOTTOM Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	8.49		ug/kg	1.03	0.513	1
Cl7-BZ#180	20.9		ug/kg	1.03	0.513	1
Cl7-BZ#183	4.61		ug/kg	1.03	0.513	1
Cl7-BZ#184	2.40		ug/kg	1.03	0.513	1
Cl7-BZ#187	13.1		ug/kg	1.03	0.513	1
Cl8-BZ#195	1.79		ug/kg	1.03	0.513	1
Cl9-BZ#206	3.37		ug/kg	1.03	0.513	1
Cl10-BZ#209	1.53		ug/kg	1.03	0.513	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	64		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	68		30-150
BZ 198	75		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-07
Client ID: NHH-N-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 04:04
Analyst: GP
Percent Solids: 64%

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	153		ug/kg	7.66	3.83	1
Acenaphthylene	44.7		ug/kg	7.66	3.83	1
Acenaphthene	13.2		ug/kg	7.66	3.83	1
Fluorene	17.3		ug/kg	7.66	3.83	1
Phenanthrene	122		ug/kg	7.66	3.83	1
Anthracene	37.0		ug/kg	7.66	3.83	1
Fluoranthene	292		ug/kg	7.66	3.83	1
Pyrene	258		ug/kg	7.66	3.83	1
Benz(a)anthracene	141		ug/kg	7.66	3.83	1
Chrysene	143		ug/kg	7.66	3.83	1
Benzo(b)fluoranthene	168		ug/kg	7.66	3.83	1
Benzo(k)fluoranthene	125		ug/kg	7.66	3.83	1
Benzo(a)pyrene	142		ug/kg	7.66	3.83	1
Indeno(1,2,3-cd)Pyrene	104		ug/kg	7.66	3.83	1
Dibenz(a,h)anthracene	31.8		ug/kg	7.66	3.83	1
Benzo(ghi)perylene	119		ug/kg	7.66	3.83	1
Cl2-BZ#8	0.555	J	ug/kg	0.766	0.383	1
Cl3-BZ#18	1.49		ug/kg	0.766	0.383	1
Cl3-BZ#28	1.23		ug/kg	0.766	0.383	1
Cl4-BZ#44	2.59		ug/kg	0.766	0.383	1
Cl4-BZ#49	2.92		ug/kg	0.766	0.383	1
Cl4-BZ#52	5.17		ug/kg	0.766	0.383	1
Cl4-BZ#66	2.76		ug/kg	0.766	0.383	1
Cl5-BZ#87	0.720	J	ug/kg	0.766	0.383	1
Cl5-BZ#101	4.46		ug/kg	0.766	0.383	1
Cl5-BZ#105	ND		ug/kg	0.766	0.383	1
Cl5-BZ#118	4.18		ug/kg	0.766	0.383	1
Cl6-BZ#128	0.766		ug/kg	0.766	0.383	1
Cl6-BZ#138	4.21		ug/kg	0.766	0.383	1
Cl6-BZ#153	4.56		ug/kg	0.766	0.383	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-07 Date Collected: 08/08/17 13:05

Client ID: NHH-N-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	0.950		ug/kg	0.766	0.383	1
Cl7-BZ#180	2.52		ug/kg	0.766	0.383	1
Cl7-BZ#183	0.737	J	ug/kg	0.766	0.383	1
Cl7-BZ#184	ND		ug/kg	0.766	0.383	1
Cl7-BZ#187	1.72		ug/kg	0.766	0.383	1
Cl8-BZ#195	ND		ug/kg	0.766	0.383	1
Cl9-BZ#206	0.649	J	ug/kg	0.766	0.383	1
Cl10-BZ#209	0.852		ug/kg	0.766	0.383	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	64		30-150
Benzo(b)fluoranthene-d12	61		30-150
DBOB	70		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-08
Client ID: NHH-O-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 06:15
Analyst: GP
Percent Solids: 40%

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	228		ug/kg	11.7	5.84	1
Acenaphthylene	58.1		ug/kg	11.7	5.84	1
Acenaphthene	26.8		ug/kg	11.7	5.84	1
Fluorene	24.7		ug/kg	11.7	5.84	1
Phenanthrene	172		ug/kg	11.7	5.84	1
Anthracene	58.0		ug/kg	11.7	5.84	1
Fluoranthene	479		ug/kg	11.7	5.84	1
Pyrene	424		ug/kg	11.7	5.84	1
Benz(a)anthracene	234		ug/kg	11.7	5.84	1
Chrysene	234		ug/kg	11.7	5.84	1
Benzo(b)fluoranthene	310		ug/kg	11.7	5.84	1
Benzo(k)fluoranthene	210		ug/kg	11.7	5.84	1
Benzo(a)pyrene	247		ug/kg	11.7	5.84	1
Indeno(1,2,3-cd)Pyrene	187		ug/kg	11.7	5.84	1
Dibenz(a,h)anthracene	53.3		ug/kg	11.7	5.84	1
Benzo(ghi)perylene	214		ug/kg	11.7	5.84	1
Cl2-BZ#8	ND		ug/kg	1.17	0.584	1
Cl3-BZ#18	0.948	J	ug/kg	1.17	0.584	1
Cl3-BZ#28	0.905	J	ug/kg	1.17	0.584	1
Cl4-BZ#44	1.52		ug/kg	1.17	0.584	1
Cl4-BZ#49	1.62		ug/kg	1.17	0.584	1
Cl4-BZ#52	1.87		ug/kg	1.17	0.584	1
Cl4-BZ#66	2.12		ug/kg	1.17	0.584	1
Cl5-BZ#87	ND		ug/kg	1.17	0.584	1
Cl5-BZ#101	3.75		ug/kg	1.17	0.584	1
Cl5-BZ#105	ND		ug/kg	1.17	0.584	1
Cl5-BZ#118	3.41		ug/kg	1.17	0.584	1
Cl6-BZ#128	0.594	J	ug/kg	1.17	0.584	1
Cl6-BZ#138	4.03		ug/kg	1.17	0.584	1
Cl6-BZ#153	3.70		ug/kg	1.17	0.584	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-08 Date Collected: 08/08/17 14:45

Client ID: NHH-O-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.02	J	ug/kg	1.17	0.584	1
Cl7-BZ#180	2.00		ug/kg	1.17	0.584	1
Cl7-BZ#183	0.649	J	ug/kg	1.17	0.584	1
Cl7-BZ#184	ND		ug/kg	1.17	0.584	1
Cl7-BZ#187	1.63		ug/kg	1.17	0.584	1
Cl8-BZ#195	ND		ug/kg	1.17	0.584	1
Cl9-BZ#206	0.766	J	ug/kg	1.17	0.584	1
Cl10-BZ#209	ND		ug/kg	1.17	0.584	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	70		30-150
DBOB	75		30-150
BZ 198	75		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-09
Client ID: NHH-M
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 06:47
Analyst: GP
Percent Solids: 38%

Date Collected: 08/08/17 16:10
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	76.0		ug/kg	12.8	6.43	1
Acenaphthylene	64.7		ug/kg	12.8	6.43	1
Acenaphthene	22.7		ug/kg	12.8	6.43	1
Fluorene	23.1		ug/kg	12.8	6.43	1
Phenanthrene	177		ug/kg	12.8	6.43	1
Anthracene	68.0		ug/kg	12.8	6.43	1
Fluoranthene	550		ug/kg	12.8	6.43	1
Pyrene	483		ug/kg	12.8	6.43	1
Benz(a)anthracene	276		ug/kg	12.8	6.43	1
Chrysene	283		ug/kg	12.8	6.43	1
Benzo(b)fluoranthene	379		ug/kg	12.8	6.43	1
Benzo(k)fluoranthene	246		ug/kg	12.8	6.43	1
Benzo(a)pyrene	290		ug/kg	12.8	6.43	1
Indeno(1,2,3-cd)Pyrene	226		ug/kg	12.8	6.43	1
Dibenz(a,h)anthracene	53.7		ug/kg	12.8	6.43	1
Benzo(ghi)perylene	254		ug/kg	12.8	6.43	1
Cl2-BZ#8	0.838	J	ug/kg	1.28	0.643	1
Cl3-BZ#18	1.13	J	ug/kg	1.28	0.643	1
Cl3-BZ#28	0.865	J	ug/kg	1.28	0.643	1
Cl4-BZ#44	1.95		ug/kg	1.28	0.643	1
Cl4-BZ#49	1.57		ug/kg	1.28	0.643	1
Cl4-BZ#52	2.55		ug/kg	1.28	0.643	1
Cl4-BZ#66	1.86		ug/kg	1.28	0.643	1
Cl5-BZ#87	ND		ug/kg	1.28	0.643	1
Cl5-BZ#101	3.05		ug/kg	1.28	0.643	1
Cl5-BZ#105	ND		ug/kg	1.28	0.643	1
Cl5-BZ#118	2.68		ug/kg	1.28	0.643	1
Cl6-BZ#128	0.658	J	ug/kg	1.28	0.643	1
Cl6-BZ#138	3.46		ug/kg	1.28	0.643	1
Cl6-BZ#153	3.27		ug/kg	1.28	0.643	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-09 Date Collected: 08/08/17 16:10

Client ID: NHH-M Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	0.755	J	ug/kg	1.28	0.643	1
Cl7-BZ#180	1.72		ug/kg	1.28	0.643	1
Cl7-BZ#183	ND		ug/kg	1.28	0.643	1
Cl7-BZ#184	ND		ug/kg	1.28	0.643	1
Cl7-BZ#187	1.43		ug/kg	1.28	0.643	1
Cl8-BZ#195	ND		ug/kg	1.28	0.643	1
Cl9-BZ#206	0.670	J	ug/kg	1.28	0.643	1
Cl10-BZ#209	0.753	J	ug/kg	1.28	0.643	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	63		30-150
Pyrene-d10	71		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	71		30-150
BZ 198	72		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-10
Client ID: NHH-T-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 07:20
Analyst: GP
Percent Solids: 34%

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	71.4		ug/kg	13.4	6.71	1
Acenaphthylene	79.9		ug/kg	13.4	6.71	1
Acenaphthene	27.2		ug/kg	13.4	6.71	1
Fluorene	18.6		ug/kg	13.4	6.71	1
Phenanthrene	213		ug/kg	13.4	6.71	1
Anthracene	82.7		ug/kg	13.4	6.71	1
Fluoranthene	814		ug/kg	13.4	6.71	1
Pyrene	694		ug/kg	13.4	6.71	1
Benz(a)anthracene	373		ug/kg	13.4	6.71	1
Chrysene	379		ug/kg	13.4	6.71	1
Benzo(b)fluoranthene	527		ug/kg	13.4	6.71	1
Benzo(k)fluoranthene	362		ug/kg	13.4	6.71	1
Benzo(a)pyrene	392		ug/kg	13.4	6.71	1
Indeno(1,2,3-cd)Pyrene	301		ug/kg	13.4	6.71	1
Dibenz(a,h)anthracene	69.9		ug/kg	13.4	6.71	1
Benzo(ghi)perylene	350		ug/kg	13.4	6.71	1
Cl2-BZ#8	0.719	J	ug/kg	1.34	0.671	1
Cl3-BZ#18	0.816	J	ug/kg	1.34	0.671	1
Cl3-BZ#28	0.884	J	ug/kg	1.34	0.671	1
Cl4-BZ#44	2.05		ug/kg	1.34	0.671	1
Cl4-BZ#49	1.38		ug/kg	1.34	0.671	1
Cl4-BZ#52	1.86		ug/kg	1.34	0.671	1
Cl4-BZ#66	2.08		ug/kg	1.34	0.671	1
Cl5-BZ#87	1.09	J	ug/kg	1.34	0.671	1
Cl5-BZ#101	3.94		ug/kg	1.34	0.671	1
Cl5-BZ#105	2.89		ug/kg	1.34	0.671	1
Cl5-BZ#118	3.41		ug/kg	1.34	0.671	1
Cl6-BZ#128	0.886	J	ug/kg	1.34	0.671	1
Cl6-BZ#138	4.12		ug/kg	1.34	0.671	1
Cl6-BZ#153	3.73		ug/kg	1.34	0.671	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-10 Date Collected: 08/08/17 17:34

Client ID: NHH-T-TOP Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.08	J	ug/kg	1.34	0.671	1
Cl7-BZ#180	2.12		ug/kg	1.34	0.671	1
Cl7-BZ#183	0.735	J	ug/kg	1.34	0.671	1
Cl7-BZ#184	ND		ug/kg	1.34	0.671	1
Cl7-BZ#187	2.30		ug/kg	1.34	0.671	1
Cl8-BZ#195	ND		ug/kg	1.34	0.671	1
Cl9-BZ#206	0.866	J	ug/kg	1.34	0.671	1
Cl10-BZ#209	0.695	J	ug/kg	1.34	0.671	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	68		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-11
Client ID: NHH-T-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 07:53
Analyst: GP
Percent Solids: 41%

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	175		ug/kg	11.2	5.58	1
Acenaphthylene	151		ug/kg	11.2	5.58	1
Acenaphthene	53.1		ug/kg	11.2	5.58	1
Fluorene	75.4		ug/kg	11.2	5.58	1
Phenanthrene	498		ug/kg	11.2	5.58	1
Anthracene	147		ug/kg	11.2	5.58	1
Fluoranthene	1300		ug/kg	11.2	5.58	1
Pyrene	1090		ug/kg	11.2	5.58	1
Benz(a)anthracene	602		ug/kg	11.2	5.58	1
Chrysene	587		ug/kg	11.2	5.58	1
Benzo(b)fluoranthene	680		ug/kg	11.2	5.58	1
Benzo(k)fluoranthene	493		ug/kg	11.2	5.58	1
Benzo(a)pyrene	547		ug/kg	11.2	5.58	1
Indeno(1,2,3-cd)Pyrene	395		ug/kg	11.2	5.58	1
Dibenz(a,h)anthracene	113		ug/kg	11.2	5.58	1
Benzo(ghi)perylene	445		ug/kg	11.2	5.58	1
Cl2-BZ#8	4.47		ug/kg	1.12	0.558	1
Cl3-BZ#18	13.4		ug/kg	1.12	0.558	1
Cl3-BZ#28	22.2		ug/kg	1.12	0.558	1
Cl4-BZ#44	15.0		ug/kg	1.12	0.558	1
Cl4-BZ#49	13.8		ug/kg	1.12	0.558	1
Cl4-BZ#52	16.8		ug/kg	1.12	0.558	1
Cl4-BZ#66	9.82		ug/kg	1.12	0.558	1
Cl5-BZ#87	2.87		ug/kg	1.12	0.558	1
Cl5-BZ#101	11.6		ug/kg	1.12	0.558	1
Cl5-BZ#105	16.6		ug/kg	1.12	0.558	1
Cl5-BZ#118	11.3		ug/kg	1.12	0.558	1
Cl6-BZ#128	2.47		ug/kg	1.12	0.558	1
Cl6-BZ#138	13.5		ug/kg	1.12	0.558	1
Cl6-BZ#153	12.2		ug/kg	1.12	0.558	1

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-11 Date Collected: 08/08/17 17:34

Client ID: NHH-T-BOTTOM Date Received: 08/08/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	4.17		ug/kg	1.12	0.558	1
Cl7-BZ#180	8.15		ug/kg	1.12	0.558	1
Cl7-BZ#183	2.23		ug/kg	1.12	0.558	1
Cl7-BZ#184	2.93		ug/kg	1.12	0.558	1
Cl7-BZ#187	7.02		ug/kg	1.12	0.558	1
Cl8-BZ#195	1.16		ug/kg	1.12	0.558	1
Cl9-BZ#206	1.81		ug/kg	1.12	0.558	1
Cl10-BZ#209	1.01	J	ug/kg	1.12	0.558	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	56		30-150
Pyrene-d10	58		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	64		30-150
BZ 198	66		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 18:53
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-11 Batch: WG1031095-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 18:53
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-11 Batch: WG1031095-1					
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	62		30-150
BZ 198	63		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 Batch: WG1031095-2 WG1031095-3								
Naphthalene	64		71		50-120	10		30
Acenaphthylene	66		65		50-120	2		30
Acenaphthene	67		66		50-120	2		30
Fluorene	68		65		50-120	5		30
Phenanthrene	66		69		50-120	4		30
Anthracene	68		70		50-120	3		30
Fluoranthene	71		74		50-120	4		30
Pyrene	71		73		50-120	3		30
Benz(a)anthracene	74		79		50-120	7		30
Chrysene	74		75		50-120	1		30
Benzo(b)fluoranthene	79		86		50-120	8		30
Benzo(k)fluoranthene	77		74		50-120	4		30
Benzo(a)pyrene	75		77		50-120	3		30
Indeno(1,2,3-cd)Pyrene	70		75		50-120	7		30
Dibenz(a,h)anthracene	73		75		50-120	3		30
Benzo(ghi)perylene	76		79		50-120	4		30
Cl2-BZ#8	72		73		50-120	1		30
Cl3-BZ#18	69		70		50-120	1		30
Cl3-BZ#28	70		72		50-120	3		30
Cl4-BZ#44	73		76		50-120	4		30
Cl4-BZ#49	72		75		50-120	4		30
Cl4-BZ#52	71		72		50-120	1		30
Cl4-BZ#66	73		75		50-120	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 Batch: WG1031095-2 WG1031095-3								
Cl5-BZ#87	72		75		50-120	4		30
Cl5-BZ#101	69		72		50-120	4		30
Cl5-BZ#105	74		75		50-120	1		30
Cl5-BZ#118	74		76		50-120	3		30
Cl6-BZ#128	72		75		50-120	4		30
Cl6-BZ#138	73		75		50-120	3		30
Cl6-BZ#153	73		77		50-120	5		30
Cl7-BZ#170	69		72		50-120	4		30
Cl7-BZ#180	70		72		50-120	3		30
Cl7-BZ#183	69		71		50-120	3		30
Cl7-BZ#184	69		72		50-120	4		30
Cl7-BZ#187	68		72		50-120	6		30
Cl8-BZ#195	69		73		50-120	6		30
Cl9-BZ#206	68		72		50-120	6		30
Cl10-BZ#209	73		75		50-120	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	63		65		30-150
Pyrene-d10	76		75		30-150
Benzo(b)fluoranthene-d12	80		79		30-150
DBOB	67		68		30-150
BZ 198	70		71		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031095-6 WG1031095-7 QC Sample: L1727562-07 Client ID: NHH-N-TOP												
Naphthalene	153	380	461	81		424	71		50-120	8		30
Acenaphthylene	44.7	380	302	68		281	62		50-120	7		30
Acenaphthene	13.2	380	274	69		256	64		50-120	7		30
Fluorene	17.3	380	281	69		264	65		50-120	6		30
Phenanthrene	122	380	432	82		395	72		50-120	9		30
Anthracene	37.0	380	273	62		263	59		50-120	4		30
Fluoranthene	292	380	606	83		558	70		50-120	8		30
Pyrene	258	380	564	81		525	70		50-120	7		30
Benz(a)anthracene	141	380	478	89		438	78		50-120	9		30
Chrysene	143	380	403	68		373	60		50-120	8		30
Benzo(b)fluoranthene	168	380	537	97		488	84		50-120	10		30
Benzo(k)fluoranthene	125	380	344	58		322	52		50-120	7		30
Benzo(a)pyrene	142	380	416	72		383	63		50-120	8		30
Indeno(1,2,3-cd)Pyrene	104	380	393	76		346	64		50-120	13		30
Dibenz(a,h)anthracene	31.8	380	305	72		284	66		50-120	7		30
Benzo(ghi)perylene	119	380	410	77		377	68		50-120	8		30
Cl2-BZ#8	0.555J	76	55.9	74		56.3	74		50-120	1		30
Cl3-BZ#18	1.49	76	56.0	72		57.0	73		50-120	2		30
Cl3-BZ#28	1.23	76	57.1	74		57.2	73		50-120	0		30
Cl4-BZ#44	2.59	76	59.1	74		59.2	74		50-120	0		30
Cl4-BZ#49	2.92	76	47.5	59		49.0	60		50-120	3		30
Cl4-BZ#52	5.17	76	74.9	92		74.4	91		50-120	1		30
Cl4-BZ#66	2.76	76	64.7	82		65.5	82		50-120	1		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1727562

Report Date: 08/29/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031095-6 WG1031095-7 QC Sample: L1727562-07 Client ID: NHH-N-TOP												
Cl5-BZ#87	0.720J	76	64.2	85		65.6	86		50-120	2		30
Cl5-BZ#101	4.46	76	64.7	79		64.5	79		50-120	0		30
Cl5-BZ#105	ND	76	50.4	66		53.1	70		50-120	5		30
Cl5-BZ#118	4.18	76	63.9	79		64.7	79		50-120	1		30
Cl6-BZ#128	0.766	76	56.4	74		57.2	75		50-120	1		30
Cl6-BZ#138	4.21	76	63.7	78		63.0	77		50-120	1		30
Cl6-BZ#153	4.56	76	63.6	78		64.2	78		50-120	1		30
Cl7-BZ#170	0.950	76	56.4	73		56.6	73		50-120	0		30
Cl7-BZ#180	2.52	76	57.5	72		57.7	72		50-120	0		30
Cl7-BZ#183	0.737J	76	45.3	60		46.2	61		50-120	2		30
Cl7-BZ#184	ND	76	53.5	70		53.6	70		50-120	0		30
Cl7-BZ#187	1.72	76	64.4	83		63.9	82		50-120	1		30
Cl8-BZ#195	ND	76	55.6	73		56.1	74		50-120	1		30
Cl9-BZ#206	0.649J	76	55.0	72		55.7	73		50-120	1		30
Cl10-BZ#209	0.852	76	56.1	73		56.6	73		50-120	1		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		60		30-150
BZ 198	75		76		30-150
Benzo(b)fluoranthene-d12	70		63		30-150
DBOB	74		75		30-150
Pyrene-d10	73		66		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031095-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP						
Naphthalene	153	163	ug/kg	6		30
Acenaphthylene	44.7	43.6	ug/kg	2		30
Acenaphthene	13.2	12.8	ug/kg	3		30
Fluorene	17.3	19.0	ug/kg	9		30
Phenanthrene	122	113	ug/kg	8		30
Anthracene	37.0	33.4	ug/kg	10		30
Fluoranthene	292	279	ug/kg	5		30
Pyrene	258	253	ug/kg	2		30
Benz(a)anthracene	141	139	ug/kg	1		30
Chrysene	143	138	ug/kg	4		30
Benzo(b)fluoranthene	168	168	ug/kg	0		30
Benzo(k)fluoranthene	125	121	ug/kg	3		30
Benzo(a)pyrene	142	136	ug/kg	4		30
Indeno(1,2,3-cd)Pyrene	104	104	ug/kg	0		30
Dibenz(a,h)anthracene	31.8	31.9	ug/kg	0		30
Benzo(ghi)perylene	119	120	ug/kg	1		30
Cl2-BZ#8	0.555J	0.627J	ug/kg	NC		30
Cl3-BZ#18	1.49	1.78	ug/kg	18		30
Cl3-BZ#28	1.23	1.06	ug/kg	15		30
Cl4-BZ#44	2.59	3.52	ug/kg	30		30
Cl4-BZ#49	2.92	3.28	ug/kg	12		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031095-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP						
Cl4-BZ#52	5.17	3.30	ug/kg	**44**	Q	30
Cl4-BZ#66	2.76	2.72	ug/kg	1		30
Cl5-BZ#87	0.720J	ND	ug/kg	NC		30
Cl5-BZ#101	4.46	4.37	ug/kg	2		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	4.18	3.99	ug/kg	5		30
Cl6-BZ#128	0.766	0.739J	ug/kg	NC		30
Cl6-BZ#138	4.21	3.73	ug/kg	12		30
Cl6-BZ#153	4.56	4.20	ug/kg	8		30
Cl7-BZ#170	0.950	1.34	ug/kg	**34**	Q	30
Cl7-BZ#180	2.52	2.34	ug/kg	7		30
Cl7-BZ#183	0.737J	0.761J	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	1.72	1.70	ug/kg	1		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	0.649J	0.867	ug/kg	NC		30
Cl10-BZ#209	0.852	0.561J	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		58		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031095-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	64		63		30-150
Benzo(b)fluoranthene-d12	61		60		30-150
DBOB	70		66		30-150
BZ 198	67		70		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1031095-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	60		40-140
Fluoranthene	60		40-140
Pyrene	54		40-140
Benz(a)anthracene	65		40-140
Chrysene	61		40-140
Benzo(b)fluoranthene	70		40-140
Benzo(k)fluoranthene	76		40-140
Benzo(a)pyrene	42		40-140
Indeno(1,2,3-cd)Pyrene	54		40-140
Dibenz(a,h)anthracene	115		40-140
Benzo(ghi)perylene	52		40-140
Cl2-BZ#8	61		40-140
Cl3-BZ#18	100		40-140
Cl3-BZ#28	44		40-140
Cl4-BZ#44	98		40-140
Cl4-BZ#49	62		40-140
Cl4-BZ#52	55		40-140
Cl4-BZ#66	50		40-140
Cl5-BZ#87	51		40-140
Cl5-BZ#101	62		40-140
Cl5-BZ#105	66		40-140
Cl5-BZ#118	68		40-140
Cl6-BZ#128	100		40-140
Cl6-BZ#138	77		40-140
Cl6-BZ#153	52		40-140
Cl7-BZ#170	58		40-140
Cl7-BZ#180	58		40-140
Cl7-BZ#183	56		40-140
Cl7-BZ#187	55		40-140
Cl9-BZ#206	67		40-140
Cl10-BZ#209	86		40-140
2-Methylnaphthalene-d10 (Surrogate)	68		30-150
Pyrene-d10 (Surrogate)	76		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	71		30-150
DBOB (Surrogate)	74		30-150
BZ 198 (Surrogate)	66		30-150

PESTICIDES

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-01 D
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 19:42
Analyst: DP
Percent Solids: 36%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.72	2.72	2	A
gamma-BHC	3.66		ug/kg	1.36	1.36	2	A
Heptachlor	ND		ug/kg	1.36	1.36	2	A
Aldrin	ND		ug/kg	1.36	1.36	2	A
Heptachlor epoxide	ND		ug/kg	2.72	2.72	2	B
Oxychlordane	ND		ug/kg	2.72	2.72	2	B
trans-Chlordane	132	P	ug/kg	1.36	1.36	2	A
Endosulfan I	ND		ug/kg	1.36	1.36	2	A
cis-Chlordane	3.92		ug/kg	1.36	1.36	2	A
trans-Nonachlor	10.2	P	ug/kg	1.36	1.36	2	A
4,4'-DDE	7.83		ug/kg	1.36	1.36	2	A
Dieldrin	3.88	IP	ug/kg	1.36	1.36	2	A
Endrin	ND		ug/kg	1.36	1.36	2	A
Endosulfan II	23.3	I	ug/kg	1.36	1.36	2	B
4,4'-DDD	3.22		ug/kg	1.36	1.36	2	B
cis-Nonachlor	ND		ug/kg	1.36	1.36	2	A
4,4'-DDT	17.9		ug/kg	1.36	1.36	2	A
Methoxychlor	ND		ug/kg	13.6	13.6	2	A
Toxaphene	ND		ug/kg	68.3	68.3	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	86		30-150	A
DBOB	44		30-150	B
BZ 198	75		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-02 D
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 20:16
Analyst: DP
Percent Solids: 35%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.70	2.70	2	A
gamma-BHC	5.25		ug/kg	1.35	1.35	2	A
Heptachlor	ND		ug/kg	1.35	1.35	2	A
Aldrin	ND		ug/kg	1.35	1.35	2	A
Heptachlor epoxide	ND		ug/kg	2.70	2.70	2	B
Oxychlordane	ND		ug/kg	2.70	2.70	2	B
trans-Chlordane	146	P	ug/kg	1.35	1.35	2	A
Endosulfan I	ND		ug/kg	1.35	1.35	2	A
cis-Chlordane	6.99		ug/kg	1.35	1.35	2	A
trans-Nonachlor	12.4	P	ug/kg	1.35	1.35	2	A
4,4'-DDE	11.1		ug/kg	1.35	1.35	2	A
Dieldrin	5.52	IP	ug/kg	1.35	1.35	2	A
Endrin	ND		ug/kg	1.35	1.35	2	A
Endosulfan II	30.5	I	ug/kg	1.35	1.35	2	B
4,4'-DDD	5.56		ug/kg	1.35	1.35	2	A
cis-Nonachlor	ND		ug/kg	1.35	1.35	2	A
4,4'-DDT	20.3		ug/kg	1.35	1.35	2	A
Methoxychlor	ND		ug/kg	13.5	13.5	2	A
Toxaphene	ND		ug/kg	67.8	67.8	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	84		30-150	A
DBOB	45		30-150	B
BZ 198	75		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-03
Client ID: NHH-X-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 20:50
Analyst: DP
Percent Solids: 80%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.591	0.591	1	A
gamma-BHC	ND		ug/kg	0.295	0.295	1	A
Heptachlor	ND		ug/kg	0.295	0.295	1	A
Aldrin	ND		ug/kg	0.295	0.295	1	A
Heptachlor epoxide	ND		ug/kg	0.591	0.591	1	B
Oxychlordane	ND		ug/kg	0.591	0.591	1	B
trans-Chlordane	ND		ug/kg	0.295	0.295	1	A
Endosulfan I	ND		ug/kg	0.295	0.295	1	A
cis-Chlordane	ND		ug/kg	0.295	0.295	1	A
trans-Nonachlor	ND		ug/kg	0.295	0.295	1	A
4,4'-DDE	ND		ug/kg	0.295	0.295	1	A
Dieldrin	ND		ug/kg	0.295	0.295	1	A
Endrin	ND		ug/kg	0.295	0.295	1	A
Endosulfan II	ND		ug/kg	0.295	0.295	1	A
4,4'-DDD	ND		ug/kg	0.295	0.295	1	A
cis-Nonachlor	ND		ug/kg	0.295	0.295	1	A
4,4'-DDT	ND		ug/kg	0.295	0.295	1	A
Methoxychlor	ND		ug/kg	2.95	2.95	1	A
Toxaphene	ND		ug/kg	14.8	14.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	39		30-150	A
BZ 198	51		30-150	A
DBOB	37		30-150	B
BZ 198	51		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-04 D
Client ID: NHH-Y-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 21:24
Analyst: DP
Percent Solids: 37%

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.67	2.67	2	A
gamma-BHC	ND		ug/kg	1.33	1.33	2	A
Heptachlor	ND		ug/kg	1.33	1.33	2	A
Aldrin	ND		ug/kg	1.33	1.33	2	A
Heptachlor epoxide	ND		ug/kg	2.67	2.67	2	B
Oxychlordane	ND		ug/kg	2.67	2.67	2	B
trans-Chlordane	ND		ug/kg	1.33	1.33	2	A
Endosulfan I	ND		ug/kg	1.33	1.33	2	A
cis-Chlordane	ND		ug/kg	1.33	1.33	2	A
trans-Nonachlor	1.76		ug/kg	1.33	1.33	2	A
4,4'-DDE	3.32		ug/kg	1.33	1.33	2	B
Dieldrin	1.45	IP	ug/kg	1.33	1.33	2	A
Endrin	ND		ug/kg	1.33	1.33	2	A
Endosulfan II	2.08	IP	ug/kg	1.33	1.33	2	B
4,4'-DDD	1.51		ug/kg	1.33	1.33	2	B
cis-Nonachlor	ND		ug/kg	1.33	1.33	2	A
4,4'-DDT	2.54	I	ug/kg	1.33	1.33	2	A
Methoxychlor	ND		ug/kg	13.3	13.3	2	A
Toxaphene	ND		ug/kg	67.0	67.0	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	80		30-150	A
DBOB	52		30-150	B
BZ 198	84		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-05 D
Client ID: NHH-Z-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 21:59
Analyst: DP
Percent Solids: 37%

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.46	2.46	2	A
gamma-BHC	ND		ug/kg	1.23	1.23	2	A
Heptachlor	ND		ug/kg	1.23	1.23	2	A
Aldrin	ND		ug/kg	1.23	1.23	2	A
Heptachlor epoxide	ND		ug/kg	2.46	2.46	2	B
Oxychlordane	ND		ug/kg	2.46	2.46	2	B
trans-Chlordane	ND		ug/kg	1.23	1.23	2	A
Endosulfan I	ND		ug/kg	1.23	1.23	2	A
cis-Chlordane	ND		ug/kg	1.23	1.23	2	A
trans-Nonachlor	ND		ug/kg	1.23	1.23	2	A
4,4'-DDE	1.88		ug/kg	1.23	1.23	2	B
Dieldrin	ND		ug/kg	1.23	1.23	2	A
Endrin	ND		ug/kg	1.23	1.23	2	A
Endosulfan II	ND		ug/kg	1.23	1.23	2	A
4,4'-DDD	ND		ug/kg	1.23	1.23	2	A
cis-Nonachlor	ND		ug/kg	1.23	1.23	2	A
4,4'-DDT	1.57	I	ug/kg	1.23	1.23	2	A
Methoxychlor	ND		ug/kg	12.3	12.3	2	A
Toxaphene	ND		ug/kg	61.8	61.8	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	34		30-150	A
BZ 198	49		30-150	A
DBOB	31		30-150	B
BZ 198	56		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-06 D
Client ID: NHH-Z-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 22:33
Analyst: DP
Percent Solids: 45%

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.05	2.05	2	A
gamma-BHC	ND		ug/kg	1.03	1.03	2	A
Heptachlor	ND		ug/kg	1.03	1.03	2	A
Aldrin	ND		ug/kg	1.03	1.03	2	A
Heptachlor epoxide	ND		ug/kg	2.05	2.05	2	B
Oxychlordane	ND		ug/kg	2.05	2.05	2	B
trans-Chlordane	108	P	ug/kg	1.03	1.03	2	A
Endosulfan I	ND		ug/kg	1.03	1.03	2	A
cis-Chlordane	3.96		ug/kg	1.03	1.03	2	A
trans-Nonachlor	6.07		ug/kg	1.03	1.03	2	A
4,4'-DDE	13.9		ug/kg	1.03	1.03	2	A
Dieldrin	7.38	IP	ug/kg	1.03	1.03	2	A
Endrin	ND		ug/kg	1.03	1.03	2	A
Endosulfan II	6.61	IP	ug/kg	1.03	1.03	2	B
4,4'-DDD	6.62		ug/kg	1.03	1.03	2	A
cis-Nonachlor	ND		ug/kg	1.03	1.03	2	A
4,4'-DDT	11.5	IP	ug/kg	1.03	1.03	2	A
Methoxychlor	ND		ug/kg	10.3	10.3	2	A
Toxaphene	ND		ug/kg	51.5	51.5	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	79		30-150	A
DBOB	51		30-150	B
BZ 198	73		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-07
Client ID: NHH-N-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/28/17 23:07
Analyst: DP
Percent Solids: 64%

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.766	0.766	1	A
gamma-BHC	ND		ug/kg	0.383	0.383	1	A
Heptachlor	ND		ug/kg	0.383	0.383	1	A
Aldrin	ND		ug/kg	0.383	0.383	1	A
Heptachlor epoxide	ND		ug/kg	0.766	0.766	1	B
Oxychlordane	ND		ug/kg	0.766	0.766	1	B
trans-Chlordane	ND		ug/kg	0.383	0.383	1	A
Endosulfan I	ND		ug/kg	0.383	0.383	1	A
cis-Chlordane	ND		ug/kg	0.383	0.383	1	A
trans-Nonachlor	0.515		ug/kg	0.383	0.383	1	B
4,4'-DDE	2.96		ug/kg	0.383	0.383	1	A
Dieldrin	0.552	IP	ug/kg	0.383	0.383	1	A
Endrin	ND		ug/kg	0.383	0.383	1	A
Endosulfan II	0.645	IP	ug/kg	0.383	0.383	1	B
4,4'-DDD	0.857		ug/kg	0.383	0.383	1	A
cis-Nonachlor	ND		ug/kg	0.383	0.383	1	A
4,4'-DDT	1.24	IP	ug/kg	0.383	0.383	1	A
Methoxychlor	ND		ug/kg	3.83	3.83	1	A
Toxaphene	ND		ug/kg	19.2	19.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	69		30-150	A
DBOB	45		30-150	B
BZ 198	73		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-08 D
Client ID: NHH-O-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 01:23
Analyst: DP
Percent Solids: 40%

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.34	2.34	2	A
gamma-BHC	ND		ug/kg	1.17	1.17	2	A
Heptachlor	ND		ug/kg	1.17	1.17	2	A
Aldrin	ND		ug/kg	1.17	1.17	2	A
Heptachlor epoxide	ND		ug/kg	2.34	2.34	2	B
Oxychlordane	ND		ug/kg	2.34	2.34	2	B
trans-Chlordane	ND		ug/kg	1.17	1.17	2	A
Endosulfan I	ND		ug/kg	1.17	1.17	2	A
cis-Chlordane	ND		ug/kg	1.17	1.17	2	A
trans-Nonachlor	ND		ug/kg	1.17	1.17	2	A
4,4'-DDE	2.22		ug/kg	1.17	1.17	2	B
Dieldrin	ND		ug/kg	1.17	1.17	2	A
Endrin	ND		ug/kg	1.17	1.17	2	A
Endosulfan II	ND		ug/kg	1.17	1.17	2	A
4,4'-DDD	ND		ug/kg	1.17	1.17	2	A
cis-Nonachlor	ND		ug/kg	1.17	1.17	2	A
4,4'-DDT	1.19	IP	ug/kg	1.17	1.17	2	A
Methoxychlor	ND		ug/kg	11.7	11.7	2	A
Toxaphene	ND		ug/kg	58.6	58.6	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	69		30-150	A
DBOB	43		30-150	B
BZ 198	81		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-09 D
Client ID: NHH-M
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 01:57
Analyst: DP
Percent Solids: 38%

Date Collected: 08/08/17 16:10
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.57	2.57	2	A
gamma-BHC	ND		ug/kg	1.28	1.28	2	A
Heptachlor	ND		ug/kg	1.28	1.28	2	A
Aldrin	ND		ug/kg	1.28	1.28	2	A
Heptachlor epoxide	ND		ug/kg	2.57	2.57	2	B
Oxychlordane	ND		ug/kg	2.57	2.57	2	B
trans-Chlordane	ND		ug/kg	1.28	1.28	2	A
Endosulfan I	ND		ug/kg	1.28	1.28	2	A
cis-Chlordane	ND		ug/kg	1.28	1.28	2	A
trans-Nonachlor	1.33		ug/kg	1.28	1.28	2	B
4,4'-DDE	3.17		ug/kg	1.28	1.28	2	A
Dieldrin	ND		ug/kg	1.28	1.28	2	A
Endrin	ND		ug/kg	1.28	1.28	2	A
Endosulfan II	1.48	IP	ug/kg	1.28	1.28	2	B
4,4'-DDD	ND		ug/kg	1.28	1.28	2	A
cis-Nonachlor	ND		ug/kg	1.28	1.28	2	A
4,4'-DDT	1.58	IP	ug/kg	1.28	1.28	2	A
Methoxychlor	ND		ug/kg	12.8	12.8	2	A
Toxaphene	ND		ug/kg	64.5	64.5	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	83		30-150	A
BZ 198	89		30-150	A
DBOB	65		30-150	B
BZ 198	102		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-10 D
Client ID: NHH-T-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 02:31
Analyst: DP
Percent Solids: 34%

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.68	2.68	2	A
gamma-BHC	ND		ug/kg	1.34	1.34	2	A
Heptachlor	ND		ug/kg	1.34	1.34	2	A
Aldrin	ND		ug/kg	1.34	1.34	2	A
Heptachlor epoxide	ND		ug/kg	2.68	2.68	2	B
Oxychlordane	ND		ug/kg	2.68	2.68	2	B
trans-Chlordane	ND		ug/kg	1.34	1.34	2	A
Endosulfan I	ND		ug/kg	1.34	1.34	2	A
cis-Chlordane	ND		ug/kg	1.34	1.34	2	A
trans-Nonachlor	1.66		ug/kg	1.34	1.34	2	A
4,4'-DDE	4.56	P	ug/kg	1.34	1.34	2	B
Dieldrin	1.43	IP	ug/kg	1.34	1.34	2	A
Endrin	ND		ug/kg	1.34	1.34	2	A
Endosulfan II	1.92	IP	ug/kg	1.34	1.34	2	B
4,4'-DDD	1.44		ug/kg	1.34	1.34	2	B
cis-Nonachlor	ND		ug/kg	1.34	1.34	2	A
4,4'-DDT	1.69	IP	ug/kg	1.34	1.34	2	A
Methoxychlor	ND		ug/kg	13.4	13.4	2	A
Toxaphene	ND		ug/kg	67.4	67.4	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	81		30-150	A
DBOB	55		30-150	B
BZ 198	91		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-11 D
Client ID: NHH-T-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 03:05
Analyst: DP
Percent Solids: 41%

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.23	2.23	2	A
gamma-BHC	ND		ug/kg	1.12	1.12	2	A
Heptachlor	ND		ug/kg	1.12	1.12	2	A
Aldrin	ND		ug/kg	1.12	1.12	2	A
Heptachlor epoxide	ND		ug/kg	2.23	2.23	2	B
Oxychlordane	ND		ug/kg	2.23	2.23	2	B
trans-Chlordane	ND		ug/kg	1.12	1.12	2	A
Endosulfan I	ND		ug/kg	1.12	1.12	2	A
cis-Chlordane	4.01		ug/kg	1.12	1.12	2	A
trans-Nonachlor	6.28	P	ug/kg	1.12	1.12	2	A
4,4'-DDE	7.72		ug/kg	1.12	1.12	2	B
Dieldrin	3.52	IP	ug/kg	1.12	1.12	2	A
Endrin	ND		ug/kg	1.12	1.12	2	A
Endosulfan II	10.3	IP	ug/kg	1.12	1.12	2	B
4,4'-DDD	3.32		ug/kg	1.12	1.12	2	A
cis-Nonachlor	ND		ug/kg	1.12	1.12	2	A
4,4'-DDT	11.1		ug/kg	1.12	1.12	2	A
Methoxychlor	ND		ug/kg	11.2	11.2	2	A
Toxaphene	ND		ug/kg	56.0	56.0	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	83		30-150	A
DBOB	54		30-150	B
BZ 198	78		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/28/17 17:26
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-11 Batch: WG1031089-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	2.50	2.50	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	46		30-150	A
BZ 198	60		30-150	A
DBOB	45		30-150	B
BZ 198	58		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-11 Batch: WG1031089-2 WG1031089-3									
Hexachlorobenzene	50		50		50-120	0		30	A
gamma-BHC	53		51		50-120	4		30	A
Heptachlor	53		53		50-120	0		30	A
Aldrin	51		52		50-120	2		30	A
trans-Chlordane	64		64		50-120	0		30	A
Endosulfan I	63		62		50-120	2		30	A
cis-Chlordane	60		60		50-120	0		30	A
trans-Nonachlor	60		61		50-120	2		30	A
4,4'-DDE	74		75		50-120	1		30	A
Dieldrin	72		70		50-120	3		30	A
Endrin	63		63		50-120	0		30	A
4,4'-DDD	79		79		50-120	0		30	A
cis-Nonachlor	65		66		50-120	2		30	A
4,4'-DDT	81		81		50-120	0		30	A
Methoxychlor	75		73		50-120	3		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		53		30-150	A
BZ 198	83		79		30-150	A
DBOB	54		44		30-150	B
BZ 198	84		78		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-11 Batch: WG1031089-2 WG1031089-3									
Heptachlor epoxide	63		64		50-120	2		30	B
Oxychlordane	59		60		50-120	2		30	B
Endosulfan II	69		65		50-120	6		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		53		30-150	A
BZ 198	83		79		30-150	A
DBOB	54		44		30-150	B
BZ 198	84		78		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1727562

Report Date: 08/29/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031089-6 WG1031089-7 QC Sample: L1727562-07 Client ID: NHH-N-TOP													
Hexachlorobenzene	ND	76	39.2	52		40.8	54		50-120	4		30	A
gamma-BHC	ND	76	42.1	55		46.0	60		50-120	9		30	A
Heptachlor	ND	76	44.8	59		48.4	64		50-120	8		30	A
Aldrin	ND	76	47.0	62		49.9	65		50-120	6		30	A
Heptachlor epoxide	ND	76	49.1	65		50.9	67		50-120	4		30	B
Oxychlordane	ND	76	47.6	63		50.4	66		50-120	6		30	B
trans-Chlordane	ND	76	60.8	80		62.9	83		50-120	3		30	A
Endosulfan I	ND	76	51.1	67		55.2	72		50-120	8		30	A
cis-Chlordane	ND	76	51.0	67		53.3	70		50-120	4		30	A
trans-Nonachlor	ND	76	51.8	68		53.7	70		50-120	4		30	A
4,4'-DDE	2.96	76	67.6	85		71.2	90		50-120	5		30	A
Dieldrin	0.552	76	54.9	72		58.9	77		50-120	7		30	A
Endrin	ND	76	52.5	69		55.6	73		50-120	6		30	A
4,4'-DDD	0.857	76	67.0	87		70.8	92		50-120	6		30	A
cis-Nonachlor	ND	76	54.7	72		55.5	73		50-120	1		30	A
4,4'-DDT	1.24	76	57.3	74		61.9	80		50-120	8		30	A
Methoxychlor	ND	76	51.7	68		54.7	72		50-120	6		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	89		93		30-150	A
DBOB	58		63		30-150	A
BZ 198	104		98		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1727562

Report Date: 08/29/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031089-6 WG1031089-7 QC Sample: L1727562-07 Client ID: NHH-N-TOP												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
DBOB	51		51		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031089-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	0.515	0.530	ug/kg	3		30	B
4,4'-DDE	2.96	3.34	ug/kg	12		30	A
Dieldrin	0.552	0.577IP	ug/kg	4		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	0.645	0.634IP	ug/kg	2		30	B
4,4'-DDD	0.857	1.03	ug/kg	18		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	1.24	1.18IP	ug/kg	5		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031089-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		62		30-150	A
BZ 198	69		82		30-150	A
DBOB	45		57		30-150	B
BZ 198	73		88		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1031089-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	70		40-140
cis-Chlordane	79		40-140
trans-Nonachlor	220	Q	40-140
DBOB (Surrogate)	48		30-150
DBOB (Surrogate)	53		30-150
BZ 198 (Surrogate)	86		30-150
BZ 198 (Surrogate)	159	Q	30-150

METALS

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-01
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 36%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.98		mg/kg	0.227	0.030	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV
Cadmium, Total	4.42		mg/kg	0.091	0.012	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV
Chromium, Total	133		mg/kg	0.907	0.212	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV
Copper, Total	234		mg/kg	0.907	0.088	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV
Lead, Total	175		mg/kg	0.272	0.066	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV
Mercury, Total	0.654		mg/kg	0.040	0.005	5	08/22/17 14:10	08/24/17 12:47	EPA 7474	1,7474	BV
Nickel, Total	37.1		mg/kg	0.454	0.121	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV
Zinc, Total	330		mg/kg	4.54	1.18	2	08/22/17 14:20	08/29/17 15:53	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-02
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 35%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.9		mg/kg	0.213	0.028	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV
Cadmium, Total	5.34		mg/kg	0.085	0.011	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV
Chromium, Total	140		mg/kg	0.852	0.199	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV
Copper, Total	275		mg/kg	0.852	0.083	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV
Lead, Total	211		mg/kg	0.256	0.062	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV
Mercury, Total	0.704		mg/kg	0.042	0.005	5	08/22/17 14:10	08/24/17 12:49	EPA 7474	1,7474	BV
Nickel, Total	40.3		mg/kg	0.426	0.114	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV
Zinc, Total	390		mg/kg	4.26	1.11	2	08/22/17 14:20	08/29/17 16:53	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-03
Client ID: NHH-X-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 80%

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.10		mg/kg	0.109	0.014	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV
Cadmium, Total	0.056		mg/kg	0.044	0.006	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV
Chromium, Total	6.98		mg/kg	0.436	0.102	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV
Copper, Total	3.47		mg/kg	0.436	0.042	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV
Lead, Total	3.15		mg/kg	0.131	0.032	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV
Mercury, Total	ND		mg/kg	0.017	0.002	5	08/22/17 14:10	08/24/17 12:52	EPA 7474	1,7474	BV
Nickel, Total	4.32		mg/kg	0.218	0.058	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV
Zinc, Total	13.9		mg/kg	2.18	0.567	2	08/22/17 14:20	08/29/17 16:58	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1727562
Project Number:	60543021	**Report Date:**	08/29/17

SAMPLE RESULTS

Lab ID:	L1727562-04	Date Collected:	08/08/17 10:37
Client ID:	NHH-Y-TOP	Date Received:	08/08/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	37%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.83		mg/kg	0.250	0.033	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV
Cadmium, Total	1.70		mg/kg	0.100	0.013	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV
Chromium, Total	69.8		mg/kg	1.00	0.234	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV
Copper, Total	125		mg/kg	1.00	0.097	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV
Lead, Total	71.8		mg/kg	0.300	0.073	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV
Mercury, Total	0.292		mg/kg	0.039	0.005	5	08/22/17 14:10	08/24/17 12:54	EPA 7474	1,7474	BV
Nickel, Total	25.0		mg/kg	0.501	0.134	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV
Zinc, Total	193		mg/kg	5.01	1.30	2	08/22/17 14:20	08/29/17 17:02	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-05
Client ID: NHH-Z-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 37%

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.90		mg/kg	0.246	0.032	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV
Cadmium, Total	1.06		mg/kg	0.098	0.013	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV
Chromium, Total	65.0		mg/kg	0.983	0.230	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV
Copper, Total	109		mg/kg	0.983	0.095	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV
Lead, Total	63.6		mg/kg	0.295	0.072	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV
Mercury, Total	0.728		mg/kg	0.035	0.004	5	08/22/17 14:10	08/24/17 13:06	EPA 7474	1,7474	BV
Nickel, Total	23.6		mg/kg	0.491	0.131	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV
Zinc, Total	191		mg/kg	4.91	1.28	2	08/22/17 14:20	08/29/17 17:06	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1727562
Project Number:	60543021	**Report Date:**	08/29/17

SAMPLE RESULTS

Lab ID:	L1727562-06	Date Collected:	08/08/17 11:53
Client ID:	NHH-Z-BOTTOM	Date Received:	08/08/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	45%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	12.2		mg/kg	0.166	0.022	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV
Cadmium, Total	7.85		mg/kg	0.066	0.009	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV
Chromium, Total	195		mg/kg	0.664	0.155	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV
Copper, Total	320		mg/kg	0.664	0.064	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV
Lead, Total	177		mg/kg	0.199	0.049	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV
Mercury, Total	0.826		mg/kg	0.031	0.004	5	08/22/17 14:10	08/24/17 13:09	EPA 7474	1,7474	BV
Nickel, Total	41.9		mg/kg	0.332	0.089	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV
Zinc, Total	534		mg/kg	3.32	0.863	2	08/22/17 14:20	08/29/17 17:10	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-07
Client ID: NHH-N-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 64%

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	5.58		mg/kg	0.129	0.017	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV
Cadmium, Total	1.05		mg/kg	0.052	0.007	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV
Chromium, Total	50.2		mg/kg	0.515	0.120	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV
Copper, Total	74.3		mg/kg	0.515	0.050	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV
Lead, Total	35.5		mg/kg	0.154	0.038	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV
Mercury, Total	0.202		mg/kg	0.021	0.003	5	08/22/17 14:10	08/24/17 12:37	EPA 7474	1,7474	BV
Nickel, Total	14.3		mg/kg	0.258	0.069	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV
Zinc, Total	113		mg/kg	2.58	0.670	2	08/22/17 14:20	08/29/17 15:57	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-08
Client ID: NHH-O-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 40%

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.16		mg/kg	0.206	0.027	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV
Cadmium, Total	0.691		mg/kg	0.082	0.011	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV
Chromium, Total	58.8		mg/kg	0.822	0.192	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV
Copper, Total	81.0		mg/kg	0.822	0.080	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV
Lead, Total	48.5		mg/kg	0.247	0.060	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV
Mercury, Total	0.252		mg/kg	0.032	0.004	5	08/22/17 14:10	08/24/17 13:11	EPA 7474	1,7474	BV
Nickel, Total	21.9		mg/kg	0.411	0.110	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV
Zinc, Total	159		mg/kg	4.11	1.07	2	08/22/17 14:20	08/29/17 17:14	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-09
Client ID: NHH-M
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 38%

Date Collected: 08/08/17 16:10
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.36		mg/kg	0.225	0.030	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV
Cadmium, Total	0.763		mg/kg	0.090	0.012	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV
Chromium, Total	64.2		mg/kg	0.900	0.211	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV
Copper, Total	92.6		mg/kg	0.900	0.087	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV
Lead, Total	55.8		mg/kg	0.270	0.066	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV
Mercury, Total	0.274		mg/kg	0.034	0.004	5	08/22/17 14:10	08/24/17 13:14	EPA 7474	1,7474	BV
Nickel, Total	23.2		mg/kg	0.450	0.120	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV
Zinc, Total	170		mg/kg	4.50	1.17	2	08/22/17 14:20	08/29/17 17:18	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1727562
Project Number:	60543021	**Report Date:**	08/29/17

SAMPLE RESULTS

Lab ID:	L1727562-10	Date Collected:	08/08/17 17:34
Client ID:	NHH-T-TOP	Date Received:	08/08/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	34%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.77		mg/kg	0.240	0.032	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV
Cadmium, Total	0.886		mg/kg	0.096	0.013	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV
Chromium, Total	61.9		mg/kg	0.958	0.224	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV
Copper, Total	102		mg/kg	0.958	0.093	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV
Lead, Total	62.0		mg/kg	0.287	0.070	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV
Mercury, Total	0.254		mg/kg	0.039	0.005	5	08/22/17 14:10	08/24/17 13:16	EPA 7474	1,7474	BV
Nickel, Total	24.0		mg/kg	0.479	0.128	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV
Zinc, Total	183		mg/kg	4.79	1.24	2	08/22/17 14:20	08/29/17 17:22	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1727562
Project Number:	60543021	**Report Date:**	08/29/17

SAMPLE RESULTS

Lab ID:	L1727562-11	Date Collected:	08/08/17 17:34
Client ID:	NHH-T-BOTTOM	Date Received:	08/08/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	41%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	11.2		mg/kg	0.216	0.029	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV
Cadmium, Total	4.51		mg/kg	0.086	0.011	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV
Chromium, Total	153		mg/kg	0.863	0.202	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV
Copper, Total	266		mg/kg	0.863	0.084	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV
Lead, Total	193		mg/kg	0.259	0.063	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV
Mercury, Total	0.611		mg/kg	0.031	0.004	5	08/22/17 14:10	08/24/17 13:19	EPA 7474	1,7474	BV
Nickel, Total	43.6		mg/kg	0.431	0.115	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV
Zinc, Total	358		mg/kg	4.31	1.12	2	08/22/17 14:20	08/29/17 17:27	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-11 Batch: WG1034116-1										
Arsenic, Total	ND		mg/kg	0.100	0.013	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Cadmium, Total	ND		mg/kg	0.040	0.005	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Chromium, Total	ND		mg/kg	0.400	0.094	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Copper, Total	ND		mg/kg	0.400	0.039	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Lead, Total	ND		mg/kg	0.120	0.029	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Nickel, Total	ND		mg/kg	0.200	0.053	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Zinc, Total	ND		mg/kg	2.00	0.520	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-11 Batch: WG1034262-1										
Mercury, Total	ND		mg/kg	0.013	0.002	5	08/22/17 14:10	08/24/17 12:32	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11 Batch: WG1034116-2 SRM Lot Number: D093-540								
Arsenic, Total	105		-		70-130	-		20
Cadmium, Total	99		-		83-117	-		20
Chromium, Total	101		-		80-120	-		20
Copper, Total	100		-		82-118	-		20
Lead, Total	106		-		82-117	-		20
Nickel, Total	100		-		83-117	-		20
Zinc, Total	97		-		83-117	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-11 Batch: WG1034262-2 SRM Lot Number: D093-540								
Mercury, Total	80		-		72-128	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1034116-3 WG1034116-4 QC Sample: L1727562-07 Client ID: NHH-N-TOP												
Arsenic, Total	5.58	11.5	16.1	92		16.4	95		75-125	2		20
Cadmium, Total	1.05	4.88	6.12	104		6.27	108		75-125	2		20
Chromium, Total	50.2	19.1	70.0	103		72.0	115		75-125	3		20
Copper, Total	74.3	23.9	95.8	90		100	108		75-125	4		20
Lead, Total	35.5	48.8	83.2	98		85.6	104		75-125	3		20
Nickel, Total	14.3	47.8	61.5	99		62.0	101		75-125	1		20
Zinc, Total	113.	47.8	154	86		160	99		75-125	4		20
Total Metals - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1034262-3 WG1034262-4 QC Sample: L1727562-07 Client ID: NHH-N-TOP												
Mercury, Total	0.202	0.859	1.10	104		1.04	109		80-120	6		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1034116-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP						
Arsenic, Total	5.58	5.04	mg/kg	10		20
Cadmium, Total	1.05	0.813	mg/kg	**25**	Q	20
Chromium, Total	50.2	34.9	mg/kg	**36**	Q	20
Copper, Total	74.3	57.6	mg/kg	**25**	Q	20
Lead, Total	35.5	28.8	mg/kg	**21**	Q	20
Nickel, Total	14.3	11.1	mg/kg	**25**	Q	20
Zinc, Total	113.	89.2	mg/kg	**24**	Q	20
Total Metals - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1034262-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP						
Mercury, Total	0.202	0.222	mg/kg	9		20

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-01
Client ID: NHH-X-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	4.05		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	4.01		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	36.0		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	64.0		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-02
Client ID: NHH-X-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	4.55		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	4.31		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	35.2		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	64.8		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-03
Client ID: NHH-X-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 09:22
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.257		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.261		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	80.2		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	19.8		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-04
Client ID: NHH-Y-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 10:37
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.61		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.70		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	36.5		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	63.5		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-05
Client ID: NHH-Z-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.09		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.92		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	37.0		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	63.0		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-06
Client ID: NHH-Z-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 11:53
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.84		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.72		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	44.7		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	55.3		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-07
Client ID: NHH-N-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 13:05
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.30		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.06		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	64.2		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	35.8		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-08
Client ID: NHH-O-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 14:45
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.43		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.43		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	40.4		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	59.6		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-09
Client ID: NHH-M
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 16:10
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.36		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.52		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	38.2		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	61.8		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-10
Client ID: NHH-T-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.78		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.82		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	34.4		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	65.6		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

SAMPLE RESULTS

Lab ID: L1727562-11
Client ID: NHH-T-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/08/17 17:34
Date Received: 08/08/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.56		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.64		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	41.4		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO
Moisture	58.6		%	0.100	0.100	1	-	08/11/17 11:39	121,2540G	KO

Project Name: USACE/NHH FNP **Lab Number:** L1727562

Project Number: 60543021 **Report Date:** 08/29/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab for sample(s): 01-11 Batch: WG1036551-1										
Total Organic Carbon (Rep1)	ND		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	ND		%	0.010	0.010	1	-	08/29/17 00:00	1,9060A	SP

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1727562

Report Date: 08/29/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-11 Batch: WG1036551-2								
Total Organic Carbon (Rep1)	100		-		75-125	-		25
Total Organic Carbon (Rep2)	93		-		75-125	-		25

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1036551-4 WG1036551-5 QC Sample: L1727562-07 Client ID: NHH-N-TOP												
Total Organic Carbon (Rep1)	1.30	0.944	2.35	111		1.88	**60**	Q	75-125	22		25
Total Organic Carbon (Rep2)	1.06	1.17	2.25	102		2.86	92		75-125	24		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1031120-1 QC Sample: L1727562-01 Client ID: NHH-X-TOP						
Solids, Total	36.0	35.7	%	1		10
Moisture	64	64.3	%	0		10
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1036551-3 QC Sample: L1727562-07 Client ID: NHH-N-TOP						
Total Organic Carbon (Rep1)	1.30	1.30	%	0		25
Total Organic Carbon (Rep2)	1.06	1.35	%	24		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727562-01A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-SRM METALS(),A2-SRM PAH(),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-SRM PCB(),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14),A2-SRM PESTICIDES(),A2-SRM TOC()
L1727562-02A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-03A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-04A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727562-05A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-06A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-07A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-07A1	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-07A2	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1727562
Report Date: 08/29/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727562-08A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-08A1	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		-
L1727562-08A2	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		-
L1727562-09A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-10A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727562-11A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – see case narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see case narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – see case narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see case narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV opening for all samples: Column II: hexachlorobenzene @30%, gamma-BHC @ 16%, delta-BHC @ 20%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	Trans-Nonachlor @ 220%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	SRM: BZ198 @ 159%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1727562-07D: Cl4-BZ#52 @ 44%, Cl7-BZ#170 @ 34%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	N/A		In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	YES		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	YES		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

L1727562

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GS-24TAT CHEM-STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6020A / 7474-7471B	PCBs - 8082 / 8270 SIM	PESTICIDES - 8081B	PAHs - 8270D SIM	TOC - 9060					Lab I.D.	Remarks
-01 NHH-X-TOP	8/8/17	0922	X		8oz/16oz	SD	4°C	N/A	X	X	X	X	X	X						0-4'9"
-02 NHH-X-REP-TOP	8/8/17	0922	X			SD			X	X	X	X	X	X						REPLICATE - 0-4'9"
-03 NHH-X-BOTTOM	8/8/17	0922	X			SD			X	X	X	X	X	X						4'9" - 8.0'
-04 NHH-Y-TOP	8/8/17	1037	X			SD			X	X	X	X	X	X						0-5'11"
-05 NHH-Y-BOTTOM	8/8/17	1037	X		8oz	SD			X											5'11" - 8'6"
-05 NHH-Z-TOP	8/8/17	1153	X		8oz/16oz	SD			X	X	X	X	X	X						0-5.0'
-06 NHH-Z-BOTTOM	8/8/17	1153	X			SD			X	X	X	X	X	X						5.0' - 8'8"
-07 NHH-N-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X						0-6.0'
-07 NHH-N-MS-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X						0-6.0' MS
-07 NHH-N-MSD-TOP	8/8/17	1305	X			SD			X	X	X	X	X	X						0-6.0' MSD
-07 NHH-N-BOTTOM	8/8/17	1305	X		8oz	SD			X											6.0' - 7'6"
-08 NHH-O-TOP	8/8/17	1445	X		8oz/16oz	SD			X	X	X	X	X	X						0-8'4"
-11 NHH-O-BOTTOM	8/8/17	1445	X		8oz	SD			X											8'8" - 10'11"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY - AECOM	Date: 8/8/17 Time: 1847		Date: 8/8/17 Time: 1847
	Date: 8/8/17 Time: 2138		Date: 8/8/17 Time: 2138
	Date: Time:		Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0154

L172 1562

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE / NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: 65-24 TAT CHEM - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAIN SIZE - SIEVE	METALS - 6020A / 7474-7471B	PCBS - 8082 / 8270 SIM	PESTICIDES - 8081B	PAHS - 8270 SIM	TPC - 5060					Lab I.D.	Remarks
NHH-M	8/8/17	1610	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						0-6'9"
NHH-T-TOP	8/8/17	1734	X		8oz/16oz	SD	⊥	⊥	X	X	X	X	X	X						0-4'10"
NHH-T-BOTTOM	8/8/17	1734	X		⊥	SD	⊥	⊥	X	X	X	X	X	X						4'10" - 16'4"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM	Date: 8/8/17 Time: 1847		Date: 8/8/17 Time: 1847
	Date: 8/8/17 Time: 2138		Date: 8/8/17 Time: 2138
	Date: Time:		Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WEST BOROUGH, MA, ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0180

ANALYTICAL REPORT

Lab Number:	L1727788
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE-NHH FNP
Project Number:	60543021
Report Date:	09/01/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1727788-01	NHH-U-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 09:05	08/09/17
L1727788-02	NHH-U-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 09:05	08/09/17
L1727788-03	NHH-P-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 12:19	08/09/17
L1727788-04	NHH-P-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 12:19	08/10/17
L1727788-05	NHH-Q-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 14:27	08/09/17
L1727788-06	NHH-Q-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 14:27	08/09/17
L1727788-07	NHH-W-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 16:34	08/09/17
L1727788-08	NHH-V-TOP	SEDIMENT	NEW HAVEN, CT	08/09/17 17:45	08/09/17
L1727788-09	NHH-V-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/09/17 17:45	08/09/17
L1727788-10	NHH-EB-CORE-080917	WATER	NEW HAVEN, CT	08/09/17 17:45	08/09/17

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

CT DEP Reasonable Confidence Protocols
Laboratory Analysis
QA/QC Certification Form

1	For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed (including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents)?	YES
1a	Were the method specified preservation and holding time requirements met?	YES
1b	VPH & EPH Methods Only: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	N/A
2	Were all samples received by the laboratory in a condition consistent with that described on the associated chain-of-custody document(s)?	YES
3	Were all samples received at an appropriate temperature (<6°C)?	YES
4	Were all QA/QC performance criteria specified in the CT DEP Reasonable Confidence Protocol documents achieved?	NO
5a	Were reporting limits specified or referenced on the chain-of-custody?	NO
5b	Were these reporting limits met?	N/A
6	For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?	YES
7	Are project-specific matrix spikes and laboratory duplicates included in this data set?	NO

Note: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or question B is "No", the data package does not meet the requirements for "Reasonable Confidence".

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE-NHH FNP **Lab Number:** L1727788
Project Number: 60543021 **Report Date:** 09/01/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

RCP Related Narratives

Pesticides

In reference to question 4:

L1727788-10: The surrogate recovery is outside the individual acceptance criteria for BZ 198 (156%), but within the overall method allowances.

The WG1031089-4 SRM recovery for trans-Nonachlor (220%) and the surrogate BZ 198 column B (159%), are above the acceptance criteria.

WG1032133-3: The surrogate recovery is outside the individual acceptance criteria for BZ 198 (163%), but within the overall method allowances.

Total Organic Carbon

In reference to question 4:

The WG1037558-4 MS recovery for total organic carbon (rep2) (68%) performed on L1727788-03, is outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 09/01/17

ORGANICS

SEMIVOLATILES

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-01
Client ID: NHH-U-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 17:03
Analyst: GP
Percent Solids: 36%

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	82.5		ug/kg	14.0	6.98	1
Acenaphthylene	85.7		ug/kg	14.0	6.98	1
Acenaphthene	32.3		ug/kg	14.0	6.98	1
Fluorene	26.4		ug/kg	14.0	6.98	1
Phenanthrene	215		ug/kg	14.0	6.98	1
Anthracene	105		ug/kg	14.0	6.98	1
Fluoranthene	982		ug/kg	14.0	6.98	1
Pyrene	724		ug/kg	14.0	6.98	1
Benz(a)anthracene	376		ug/kg	14.0	6.98	1
Chrysene	491		ug/kg	14.0	6.98	1
Benzo(b)fluoranthene	528		ug/kg	14.0	6.98	1
Benzo(k)fluoranthene	400		ug/kg	14.0	6.98	1
Benzo(a)pyrene	440		ug/kg	14.0	6.98	1
Indeno(1,2,3-cd)Pyrene	365		ug/kg	14.0	6.98	1
Dibenz(a,h)anthracene	76.3		ug/kg	14.0	6.98	1
Benzo(ghi)perylene	372		ug/kg	14.0	6.98	1
Cl2-BZ#8	ND		ug/kg	1.40	0.698	1
Cl3-BZ#18	0.983	J	ug/kg	1.40	0.698	1
Cl3-BZ#28	4.39		ug/kg	1.40	0.698	1
Cl4-BZ#44	1.94		ug/kg	1.40	0.698	1
Cl4-BZ#49	2.00		ug/kg	1.40	0.698	1
Cl4-BZ#52	3.32		ug/kg	1.40	0.698	1
Cl4-BZ#66	2.34		ug/kg	1.40	0.698	1
Cl5-BZ#87	0.966	J	ug/kg	1.40	0.698	1
Cl5-BZ#101	4.60		ug/kg	1.40	0.698	1
Cl5-BZ#105	1.83		ug/kg	1.40	0.698	1
Cl5-BZ#118	3.95		ug/kg	1.40	0.698	1
Cl6-BZ#128	1.23	J	ug/kg	1.40	0.698	1
Cl6-BZ#138	5.18		ug/kg	1.40	0.698	1
Cl6-BZ#153	4.39		ug/kg	1.40	0.698	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-01 Date Collected: 08/09/17 09:05

Client ID: NHH-U-TOP Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.72		ug/kg	1.40	0.698	1
Cl7-BZ#180	2.88		ug/kg	1.40	0.698	1
Cl7-BZ#183	0.734	J	ug/kg	1.40	0.698	1
Cl7-BZ#184	ND		ug/kg	1.40	0.698	1
Cl7-BZ#187	2.06		ug/kg	1.40	0.698	1
Cl8-BZ#195	ND		ug/kg	1.40	0.698	1
Cl9-BZ#206	0.825	J	ug/kg	1.40	0.698	1
Cl10-BZ#209	0.738	J	ug/kg	1.40	0.698	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	66		30-150
Pyrene-d10	70		30-150
Benzo(b)fluoranthene-d12	68		30-150
DBOB	74		30-150
BZ 198	74		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-02
Client ID: NHH-U-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 17:37
Analyst: GP
Percent Solids: 41%

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	771		ug/kg	11.7	5.86	1
Acenaphthylene	203		ug/kg	11.7	5.86	1
Acenaphthene	86.3		ug/kg	11.7	5.86	1
Fluorene	154		ug/kg	11.7	5.86	1
Phenanthrene	909		ug/kg	11.7	5.86	1
Anthracene	233		ug/kg	11.7	5.86	1
Fluoranthene	1600		ug/kg	11.7	5.86	1
Pyrene	1290		ug/kg	11.7	5.86	1
Benz(a)anthracene	690		ug/kg	11.7	5.86	1
Chrysene	815		ug/kg	11.7	5.86	1
Benzo(b)fluoranthene	828		ug/kg	11.7	5.86	1
Benzo(k)fluoranthene	569		ug/kg	11.7	5.86	1
Benzo(a)pyrene	684		ug/kg	11.7	5.86	1
Indeno(1,2,3-cd)Pyrene	484		ug/kg	11.7	5.86	1
Dibenz(a,h)anthracene	143		ug/kg	11.7	5.86	1
Benzo(ghi)perylene	570		ug/kg	11.7	5.86	1
Cl2-BZ#8	5.07		ug/kg	1.17	0.586	1
Cl3-BZ#18	25.1		ug/kg	1.17	0.586	1
Cl3-BZ#28	11.7		ug/kg	1.17	0.586	1
Cl4-BZ#44	43.9		ug/kg	1.17	0.586	1
Cl4-BZ#49	33.7		ug/kg	1.17	0.586	1
Cl4-BZ#52	58.4		ug/kg	1.17	0.586	1
Cl4-BZ#66	41.5		ug/kg	1.17	0.586	1
Cl5-BZ#87	16.4		ug/kg	1.17	0.586	1
Cl5-BZ#101	48.7		ug/kg	1.17	0.586	1
Cl5-BZ#105	21.0		ug/kg	1.17	0.586	1
Cl5-BZ#118	37.6		ug/kg	1.17	0.586	1
Cl6-BZ#128	9.63		ug/kg	1.17	0.586	1
Cl6-BZ#138	39.3		ug/kg	1.17	0.586	1
Cl6-BZ#153	32.6		ug/kg	1.17	0.586	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-02 Date Collected: 08/09/17 09:05

Client ID: NHH-U-BOTTOM Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	13.0		ug/kg	1.17	0.586	1
Cl7-BZ#180	25.3		ug/kg	1.17	0.586	1
Cl7-BZ#183	6.48		ug/kg	1.17	0.586	1
Cl7-BZ#184	1.61		ug/kg	1.17	0.586	1
Cl7-BZ#187	15.5		ug/kg	1.17	0.586	1
Cl8-BZ#195	2.56		ug/kg	1.17	0.586	1
Cl9-BZ#206	4.44		ug/kg	1.17	0.586	1
Cl10-BZ#209	1.95		ug/kg	1.17	0.586	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	59		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	68		30-150
BZ 198	72		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-03
Client ID: NHH-P-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 18:11
Analyst: GP
Percent Solids: 43%

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	253		ug/kg	11.1	5.56	1
Acenaphthylene	142		ug/kg	11.1	5.56	1
Acenaphthene	47.4		ug/kg	11.1	5.56	1
Fluorene	71.1		ug/kg	11.1	5.56	1
Phenanthrene	488		ug/kg	11.1	5.56	1
Anthracene	153		ug/kg	11.1	5.56	1
Fluoranthene	1290		ug/kg	11.1	5.56	1
Pyrene	1020		ug/kg	11.1	5.56	1
Benz(a)anthracene	574		ug/kg	11.1	5.56	1
Chrysene	706		ug/kg	11.1	5.56	1
Benzo(b)fluoranthene	792		ug/kg	11.1	5.56	1
Benzo(k)fluoranthene	471		ug/kg	11.1	5.56	1
Benzo(a)pyrene	628		ug/kg	11.1	5.56	1
Indeno(1,2,3-cd)Pyrene	453		ug/kg	11.1	5.56	1
Dibenz(a,h)anthracene	133		ug/kg	11.1	5.56	1
Benzo(ghi)perylene	513		ug/kg	11.1	5.56	1
Cl2-BZ#8	2.06		ug/kg	1.11	0.556	1
Cl3-BZ#18	3.95		ug/kg	1.11	0.556	1
Cl3-BZ#28	3.98		ug/kg	1.11	0.556	1
Cl4-BZ#44	7.98		ug/kg	1.11	0.556	1
Cl4-BZ#49	6.53		ug/kg	1.11	0.556	1
Cl4-BZ#52	10.6		ug/kg	1.11	0.556	1
Cl4-BZ#66	8.08		ug/kg	1.11	0.556	1
Cl5-BZ#87	3.56		ug/kg	1.11	0.556	1
Cl5-BZ#101	10.5		ug/kg	1.11	0.556	1
Cl5-BZ#105	2.58		ug/kg	1.11	0.556	1
Cl5-BZ#118	9.22		ug/kg	1.11	0.556	1
Cl6-BZ#128	1.96		ug/kg	1.11	0.556	1
Cl6-BZ#138	11.4		ug/kg	1.11	0.556	1
Cl6-BZ#153	10.6		ug/kg	1.11	0.556	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-03 Date Collected: 08/09/17 12:19

Client ID: NHH-P-TOP Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	3.35		ug/kg	1.11	0.556	1
Cl7-BZ#180	7.82		ug/kg	1.11	0.556	1
Cl7-BZ#183	2.22		ug/kg	1.11	0.556	1
Cl7-BZ#184	ND		ug/kg	1.11	0.556	1
Cl7-BZ#187	5.20		ug/kg	1.11	0.556	1
Cl8-BZ#195	1.12		ug/kg	1.11	0.556	1
Cl9-BZ#206	3.06		ug/kg	1.11	0.556	1
Cl10-BZ#209	3.06		ug/kg	1.11	0.556	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	66		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	75		30-150
BZ 198	70		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-04
Client ID: NHH-P-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 18:45
Analyst: GP
Percent Solids: 42%

Date Collected: 08/09/17 12:19
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	234		ug/kg	11.0	5.48	1
Acenaphthylene	128		ug/kg	11.0	5.48	1
Acenaphthene	42.3		ug/kg	11.0	5.48	1
Fluorene	63.7		ug/kg	11.0	5.48	1
Phenanthrene	480		ug/kg	11.0	5.48	1
Anthracene	156		ug/kg	11.0	5.48	1
Fluoranthene	1320		ug/kg	11.0	5.48	1
Pyrene	952		ug/kg	11.0	5.48	1
Benz(a)anthracene	526		ug/kg	11.0	5.48	1
Chrysene	676		ug/kg	11.0	5.48	1
Benzo(b)fluoranthene	721		ug/kg	11.0	5.48	1
Benzo(k)fluoranthene	486		ug/kg	11.0	5.48	1
Benzo(a)pyrene	585		ug/kg	11.0	5.48	1
Indeno(1,2,3-cd)Pyrene	432		ug/kg	11.0	5.48	1
Dibenz(a,h)anthracene	127		ug/kg	11.0	5.48	1
Benzo(ghi)perylene	479		ug/kg	11.0	5.48	1
Cl2-BZ#8	2.41		ug/kg	1.10	0.548	1
Cl3-BZ#18	2.56		ug/kg	1.10	0.548	1
Cl3-BZ#28	3.62		ug/kg	1.10	0.548	1
Cl4-BZ#44	8.39		ug/kg	1.10	0.548	1
Cl4-BZ#49	5.72		ug/kg	1.10	0.548	1
Cl4-BZ#52	7.28		ug/kg	1.10	0.548	1
Cl4-BZ#66	7.06		ug/kg	1.10	0.548	1
Cl5-BZ#87	3.49		ug/kg	1.10	0.548	1
Cl5-BZ#101	11.7		ug/kg	1.10	0.548	1
Cl5-BZ#105	ND		ug/kg	1.10	0.548	1
Cl5-BZ#118	12.1		ug/kg	1.10	0.548	1
Cl6-BZ#128	2.48		ug/kg	1.10	0.548	1
Cl6-BZ#138	11.7		ug/kg	1.10	0.548	1
Cl6-BZ#153	10.4		ug/kg	1.10	0.548	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-04 Date Collected: 08/09/17 12:19

Client ID: NHH-P-BOTTOM Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	4.19		ug/kg	1.10	0.548	1
Cl7-BZ#180	7.06		ug/kg	1.10	0.548	1
Cl7-BZ#183	1.99		ug/kg	1.10	0.548	1
Cl7-BZ#184	ND		ug/kg	1.10	0.548	1
Cl7-BZ#187	5.46		ug/kg	1.10	0.548	1
Cl8-BZ#195	1.25		ug/kg	1.10	0.548	1
Cl9-BZ#206	2.89		ug/kg	1.10	0.548	1
Cl10-BZ#209	2.71		ug/kg	1.10	0.548	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	68		30-150
BZ 198	63		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-05
Client ID: NHH-Q-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 19:18
Analyst: GP
Percent Solids: 36%

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	68.0		ug/kg	13.6	6.78	1
Acenaphthylene	72.9		ug/kg	13.6	6.78	1
Acenaphthene	15.0		ug/kg	13.6	6.78	1
Fluorene	18.7		ug/kg	13.6	6.78	1
Phenanthrene	190		ug/kg	13.6	6.78	1
Anthracene	85.5		ug/kg	13.6	6.78	1
Fluoranthene	768		ug/kg	13.6	6.78	1
Pyrene	600		ug/kg	13.6	6.78	1
Benz(a)anthracene	321		ug/kg	13.6	6.78	1
Chrysene	405		ug/kg	13.6	6.78	1
Benzo(b)fluoranthene	497		ug/kg	13.6	6.78	1
Benzo(k)fluoranthene	311		ug/kg	13.6	6.78	1
Benzo(a)pyrene	395		ug/kg	13.6	6.78	1
Indeno(1,2,3-cd)Pyrene	304		ug/kg	13.6	6.78	1
Dibenz(a,h)anthracene	84.0		ug/kg	13.6	6.78	1
Benzo(ghi)perylene	328		ug/kg	13.6	6.78	1
Cl2-BZ#8	1.50		ug/kg	1.36	0.678	1
Cl3-BZ#18	1.18	J	ug/kg	1.36	0.678	1
Cl3-BZ#28	1.68		ug/kg	1.36	0.678	1
Cl4-BZ#44	1.75		ug/kg	1.36	0.678	1
Cl4-BZ#49	1.62		ug/kg	1.36	0.678	1
Cl4-BZ#52	3.25		ug/kg	1.36	0.678	1
Cl4-BZ#66	2.43		ug/kg	1.36	0.678	1
Cl5-BZ#87	ND		ug/kg	1.36	0.678	1
Cl5-BZ#101	4.12		ug/kg	1.36	0.678	1
Cl5-BZ#105	ND		ug/kg	1.36	0.678	1
Cl5-BZ#118	4.30		ug/kg	1.36	0.678	1
Cl6-BZ#128	1.30	J	ug/kg	1.36	0.678	1
Cl6-BZ#138	4.49		ug/kg	1.36	0.678	1
Cl6-BZ#153	4.26		ug/kg	1.36	0.678	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-05 Date Collected: 08/09/17 14:27

Client ID: NHH-Q-TOP Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.83		ug/kg	1.36	0.678	1
Cl7-BZ#180	2.53		ug/kg	1.36	0.678	1
Cl7-BZ#183	0.795	J	ug/kg	1.36	0.678	1
Cl7-BZ#184	ND		ug/kg	1.36	0.678	1
Cl7-BZ#187	2.11		ug/kg	1.36	0.678	1
Cl8-BZ#195	ND		ug/kg	1.36	0.678	1
Cl9-BZ#206	0.892	J	ug/kg	1.36	0.678	1
Cl10-BZ#209	0.859	J	ug/kg	1.36	0.678	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	60		30-150
DBOB	66		30-150
BZ 198	69		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-06
Client ID: NHH-Q-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 19:51
Analyst: GP
Percent Solids: 43%

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	1460		ug/kg	11.3	5.65	1
Acenaphthylene	238		ug/kg	11.3	5.65	1
Acenaphthene	81.1		ug/kg	11.3	5.65	1
Fluorene	142		ug/kg	11.3	5.65	1
Phenanthrene	1060		ug/kg	11.3	5.65	1
Anthracene	255		ug/kg	11.3	5.65	1
Fluoranthene	1710		ug/kg	11.3	5.65	1
Pyrene	1480		ug/kg	11.3	5.65	1
Benz(a)anthracene	788		ug/kg	11.3	5.65	1
Chrysene	943		ug/kg	11.3	5.65	1
Benzo(b)fluoranthene	912		ug/kg	11.3	5.65	1
Benzo(k)fluoranthene	663		ug/kg	11.3	5.65	1
Benzo(a)pyrene	774		ug/kg	11.3	5.65	1
Indeno(1,2,3-cd)Pyrene	550		ug/kg	11.3	5.65	1
Dibenz(a,h)anthracene	159		ug/kg	11.3	5.65	1
Benzo(ghi)perylene	594		ug/kg	11.3	5.65	1
Cl2-BZ#8	4.83		ug/kg	1.13	0.565	1
Cl3-BZ#18	17.8		ug/kg	1.13	0.565	1
Cl3-BZ#28	18.3		ug/kg	1.13	0.565	1
Cl4-BZ#44	36.5		ug/kg	1.13	0.565	1
Cl4-BZ#49	28.3		ug/kg	1.13	0.565	1
Cl4-BZ#52	40.4		ug/kg	1.13	0.565	1
Cl4-BZ#66	34.5		ug/kg	1.13	0.565	1
Cl5-BZ#87	18.8		ug/kg	1.13	0.565	1
Cl5-BZ#101	45.6		ug/kg	1.13	0.565	1
Cl5-BZ#105	14.8		ug/kg	1.13	0.565	1
Cl5-BZ#118	43.1		ug/kg	1.13	0.565	1
Cl6-BZ#128	10.6		ug/kg	1.13	0.565	1
Cl6-BZ#138	44.1		ug/kg	1.13	0.565	1
Cl6-BZ#153	36.3		ug/kg	1.13	0.565	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-06 Date Collected: 08/09/17 14:27

Client ID: NHH-Q-BOTTOM Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	14.3		ug/kg	1.13	0.565	1
Cl7-BZ#180	25.5		ug/kg	1.13	0.565	1
Cl7-BZ#183	6.74		ug/kg	1.13	0.565	1
Cl7-BZ#184	ND		ug/kg	1.13	0.565	1
Cl7-BZ#187	16.2		ug/kg	1.13	0.565	1
Cl8-BZ#195	3.05		ug/kg	1.13	0.565	1
Cl9-BZ#206	4.79		ug/kg	1.13	0.565	1
Cl10-BZ#209	2.25		ug/kg	1.13	0.565	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	61		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	70		30-150
BZ 198	76		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-07
Client ID: NHH-W-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 20:24
Analyst: GP
Percent Solids: 46%

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	354		ug/kg	10.8	5.39	1
Acenaphthylene	100		ug/kg	10.8	5.39	1
Acenaphthene	37.4		ug/kg	10.8	5.39	1
Fluorene	53.6		ug/kg	10.8	5.39	1
Phenanthrene	290		ug/kg	10.8	5.39	1
Anthracene	143		ug/kg	10.8	5.39	1
Fluoranthene	887		ug/kg	10.8	5.39	1
Pyrene	672		ug/kg	10.8	5.39	1
Benz(a)anthracene	376		ug/kg	10.8	5.39	1
Chrysene	436		ug/kg	10.8	5.39	1
Benzo(b)fluoranthene	489		ug/kg	10.8	5.39	1
Benzo(k)fluoranthene	288		ug/kg	10.8	5.39	1
Benzo(a)pyrene	390		ug/kg	10.8	5.39	1
Indeno(1,2,3-cd)Pyrene	285		ug/kg	10.8	5.39	1
Dibenz(a,h)anthracene	80.6		ug/kg	10.8	5.39	1
Benzo(ghi)perylene	313		ug/kg	10.8	5.39	1
Cl2-BZ#8	1.68		ug/kg	1.08	0.539	1
Cl3-BZ#18	3.57		ug/kg	1.08	0.539	1
Cl3-BZ#28	5.22		ug/kg	1.08	0.539	1
Cl4-BZ#44	9.29		ug/kg	1.08	0.539	1
Cl4-BZ#49	7.74		ug/kg	1.08	0.539	1
Cl4-BZ#52	11.3		ug/kg	1.08	0.539	1
Cl4-BZ#66	7.46		ug/kg	1.08	0.539	1
Cl5-BZ#87	3.48		ug/kg	1.08	0.539	1
Cl5-BZ#101	11.6		ug/kg	1.08	0.539	1
Cl5-BZ#105	6.90		ug/kg	1.08	0.539	1
Cl5-BZ#118	9.30		ug/kg	1.08	0.539	1
Cl6-BZ#128	3.09		ug/kg	1.08	0.539	1
Cl6-BZ#138	12.2		ug/kg	1.08	0.539	1
Cl6-BZ#153	10.7		ug/kg	1.08	0.539	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-07 Date Collected: 08/09/17 16:34

Client ID: NHH-W-TOP Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	3.78		ug/kg	1.08	0.539	1
Cl7-BZ#180	6.83		ug/kg	1.08	0.539	1
Cl7-BZ#183	1.87		ug/kg	1.08	0.539	1
Cl7-BZ#184	0.847	J	ug/kg	1.08	0.539	1
Cl7-BZ#187	5.05		ug/kg	1.08	0.539	1
Cl8-BZ#195	1.27		ug/kg	1.08	0.539	1
Cl9-BZ#206	1.88		ug/kg	1.08	0.539	1
Cl10-BZ#209	0.922	J	ug/kg	1.08	0.539	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	58		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	65		30-150
BZ 198	60		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-08
Client ID: NHH-V-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 20:57
Analyst: GP
Percent Solids: 41%

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	117		ug/kg	11.4	5.73	1
Acenaphthylene	106		ug/kg	11.4	5.73	1
Acenaphthene	52.8		ug/kg	11.4	5.73	1
Fluorene	48.9		ug/kg	11.4	5.73	1
Phenanthrene	349		ug/kg	11.4	5.73	1
Anthracene	121		ug/kg	11.4	5.73	1
Fluoranthene	979		ug/kg	11.4	5.73	1
Pyrene	803		ug/kg	11.4	5.73	1
Benz(a)anthracene	462		ug/kg	11.4	5.73	1
Chrysene	429		ug/kg	11.4	5.73	1
Benzo(b)fluoranthene	640		ug/kg	11.4	5.73	1
Benzo(k)fluoranthene	256		ug/kg	11.4	5.73	1
Benzo(a)pyrene	393		ug/kg	11.4	5.73	1
Indeno(1,2,3-cd)Pyrene	320		ug/kg	11.4	5.73	1
Dibenz(a,h)anthracene	87.0		ug/kg	11.4	5.73	1
Benzo(ghi)perylene	352		ug/kg	11.4	5.73	1
Cl2-BZ#8	2.15		ug/kg	1.14	0.573	1
Cl3-BZ#18	3.65		ug/kg	1.14	0.573	1
Cl3-BZ#28	2.94		ug/kg	1.14	0.573	1
Cl4-BZ#44	9.29		ug/kg	1.14	0.573	1
Cl4-BZ#49	6.66		ug/kg	1.14	0.573	1
Cl4-BZ#52	8.19		ug/kg	1.14	0.573	1
Cl4-BZ#66	4.86		ug/kg	1.14	0.573	1
Cl5-BZ#87	1.34		ug/kg	1.14	0.573	1
Cl5-BZ#101	8.01		ug/kg	1.14	0.573	1
Cl5-BZ#105	15.0		ug/kg	1.14	0.573	1
Cl5-BZ#118	4.96		ug/kg	1.14	0.573	1
Cl6-BZ#128	0.994	J	ug/kg	1.14	0.573	1
Cl6-BZ#138	7.34		ug/kg	1.14	0.573	1
Cl6-BZ#153	6.10		ug/kg	1.14	0.573	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-08 Date Collected: 08/09/17 17:45

Client ID: NHH-V-TOP Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.68		ug/kg	1.14	0.573	1
Cl7-BZ#180	4.72		ug/kg	1.14	0.573	1
Cl7-BZ#183	1.38		ug/kg	1.14	0.573	1
Cl7-BZ#184	1.90		ug/kg	1.14	0.573	1
Cl7-BZ#187	2.85		ug/kg	1.14	0.573	1
Cl8-BZ#195	ND		ug/kg	1.14	0.573	1
Cl9-BZ#206	1.25		ug/kg	1.14	0.573	1
Cl10-BZ#209	0.852	J	ug/kg	1.14	0.573	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	63		30-150
Benzo(b)fluoranthene-d12	60		30-150
DBOB	69		30-150
BZ 198	74		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-09
Client ID: NHH-V-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/17/17 21:30
Analyst: GP
Percent Solids: 41%

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	1340		ug/kg	11.9	5.94	1
Acenaphthylene	199		ug/kg	11.9	5.94	1
Acenaphthene	67.1		ug/kg	11.9	5.94	1
Fluorene	178		ug/kg	11.9	5.94	1
Phenanthrene	643		ug/kg	11.9	5.94	1
Anthracene	221		ug/kg	11.9	5.94	1
Fluoranthene	1400		ug/kg	11.9	5.94	1
Pyrene	1070		ug/kg	11.9	5.94	1
Benz(a)anthracene	621		ug/kg	11.9	5.94	1
Chrysene	730		ug/kg	11.9	5.94	1
Benzo(b)fluoranthene	824		ug/kg	11.9	5.94	1
Benzo(k)fluoranthene	456		ug/kg	11.9	5.94	1
Benzo(a)pyrene	635		ug/kg	11.9	5.94	1
Indeno(1,2,3-cd)Pyrene	452		ug/kg	11.9	5.94	1
Dibenz(a,h)anthracene	124		ug/kg	11.9	5.94	1
Benzo(ghi)perylene	499		ug/kg	11.9	5.94	1
Cl2-BZ#8	4.08		ug/kg	1.19	0.594	1
Cl3-BZ#18	11.2		ug/kg	1.19	0.594	1
Cl3-BZ#28	10.3		ug/kg	1.19	0.594	1
Cl4-BZ#44	22.0		ug/kg	1.19	0.594	1
Cl4-BZ#49	20.1		ug/kg	1.19	0.594	1
Cl4-BZ#52	28.4		ug/kg	1.19	0.594	1
Cl4-BZ#66	20.3		ug/kg	1.19	0.594	1
Cl5-BZ#87	6.80		ug/kg	1.19	0.594	1
Cl5-BZ#101	22.8		ug/kg	1.19	0.594	1
Cl5-BZ#105	21.2		ug/kg	1.19	0.594	1
Cl5-BZ#118	18.8		ug/kg	1.19	0.594	1
Cl6-BZ#128	4.59		ug/kg	1.19	0.594	1
Cl6-BZ#138	22.1		ug/kg	1.19	0.594	1
Cl6-BZ#153	20.1		ug/kg	1.19	0.594	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-09 Date Collected: 08/09/17 17:45

Client ID: NHH-V-BOTTOM Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	7.82		ug/kg	1.19	0.594	1
Cl7-BZ#180	13.4		ug/kg	1.19	0.594	1
Cl7-BZ#183	3.62		ug/kg	1.19	0.594	1
Cl7-BZ#184	3.89		ug/kg	1.19	0.594	1
Cl7-BZ#187	9.36		ug/kg	1.19	0.594	1
Cl8-BZ#195	1.29		ug/kg	1.19	0.594	1
Cl9-BZ#206	3.25		ug/kg	1.19	0.594	1
Cl10-BZ#209	1.77		ug/kg	1.19	0.594	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	65		30-150
Benzo(b)fluoranthene-d12	61		30-150
DBOB	66		30-150
BZ 198	61		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-10
Client ID: NHH-EB-CORE-080917
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 20:30
Analyst: GP

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/15/17 15:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	20.6		ng/l	10.1	5.05	1
Acenaphthylene	ND		ng/l	10.1	5.05	1
Acenaphthene	ND		ng/l	10.1	5.05	1
Fluorene	ND		ng/l	10.1	5.05	1
Phenanthrene	ND		ng/l	10.1	5.05	1
Anthracene	ND		ng/l	10.1	5.05	1
Fluoranthene	ND		ng/l	10.1	5.05	1
Pyrene	ND		ng/l	10.1	5.05	1
Benz(a)anthracene	ND		ng/l	10.1	5.05	1
Chrysene	ND		ng/l	10.1	5.05	1
Benzo(b)fluoranthene	ND		ng/l	10.1	5.05	1
Benzo(k)fluoranthene	ND		ng/l	10.1	5.05	1
Benzo(a)pyrene	ND		ng/l	10.1	5.05	1
Indeno(1,2,3-cd)Pyrene	ND		ng/l	10.1	5.05	1
Dibenz(a,h)anthracene	ND		ng/l	10.1	5.05	1
Benzo(ghi)perylene	ND		ng/l	10.1	5.05	1
Cl2-BZ#8	ND		ng/l	1.01	0.505	1
Cl3-BZ#18	ND		ng/l	1.01	0.505	1
Cl3-BZ#28	ND		ng/l	1.01	0.505	1
Cl4-BZ#44	ND		ng/l	1.01	0.505	1
Cl4-BZ#49	ND		ng/l	1.01	0.505	1
Cl4-BZ#52	ND		ng/l	1.01	0.505	1
Cl4-BZ#66	ND		ng/l	1.01	0.505	1
Cl5-BZ#87	ND		ng/l	1.01	0.505	1
Cl5-BZ#101	ND		ng/l	1.01	0.505	1
Cl5-BZ#105	ND		ng/l	1.01	0.505	1
Cl5-BZ#118	ND		ng/l	1.01	0.505	1
Cl6-BZ#128	ND		ng/l	1.01	0.505	1
Cl6-BZ#138	ND		ng/l	1.01	0.505	1
Cl6-BZ#153	ND		ng/l	1.01	0.505	1

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-10 Date Collected: 08/09/17 17:45

Client ID: NHH-EB-CORE-080917 Date Received: 08/09/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ng/l	1.01	0.505	1
Cl7-BZ#180	ND		ng/l	1.01	0.505	1
Cl7-BZ#183	ND		ng/l	1.01	0.505	1
Cl7-BZ#184	ND		ng/l	1.01	0.505	1
Cl7-BZ#187	ND		ng/l	1.01	0.505	1
Cl8-BZ#195	ND		ng/l	1.01	0.505	1
Cl9-BZ#206	ND		ng/l	1.01	0.505	1
Cl10-BZ#209	ND		ng/l	1.01	0.505	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	68		30-150
BZ 198	58		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 18:53
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-09 Batch: WG1031095-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 18:53
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-09 Batch: WG1031095-1					
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	62		30-150
BZ 198	63		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 17:17
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 08/15/17 15:15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 10 Batch: WG1032132-1					
Naphthalene	ND		ng/l	10.0	5.00
Acenaphthylene	ND		ng/l	10.0	5.00
Acenaphthene	ND		ng/l	10.0	5.00
Fluorene	ND		ng/l	10.0	5.00
Phenanthrene	ND		ng/l	10.0	5.00
Anthracene	ND		ng/l	10.0	5.00
Fluoranthene	ND		ng/l	10.0	5.00
Pyrene	ND		ng/l	10.0	5.00
Benz(a)anthracene	ND		ng/l	10.0	5.00
Chrysene	ND		ng/l	10.0	5.00
Benzo(b)fluoranthene	ND		ng/l	10.0	5.00
Benzo(k)fluoranthene	ND		ng/l	10.0	5.00
Benzo(a)pyrene	ND		ng/l	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ng/l	10.0	5.00
Dibenz(a,h)anthracene	ND		ng/l	10.0	5.00
Benzo(ghi)perylene	ND		ng/l	10.0	5.00
Cl2-BZ#8	ND		ng/l	1.00	0.500
Cl3-BZ#18	ND		ng/l	1.00	0.500
Cl3-BZ#28	ND		ng/l	1.00	0.500
Cl4-BZ#44	ND		ng/l	1.00	0.500
Cl4-BZ#49	ND		ng/l	1.00	0.500
Cl4-BZ#52	ND		ng/l	1.00	0.500
Cl4-BZ#66	ND		ng/l	1.00	0.500
Cl5-BZ#87	ND		ng/l	1.00	0.500
Cl5-BZ#101	ND		ng/l	1.00	0.500
Cl5-BZ#105	ND		ng/l	1.00	0.500
Cl5-BZ#118	ND		ng/l	1.00	0.500
Cl6-BZ#128	ND		ng/l	1.00	0.500
Cl6-BZ#138	ND		ng/l	1.00	0.500

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/16/17 17:17
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 08/15/17 15:15

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 10 Batch: WG1032132-1					
Cl6-BZ#153	ND		ng/l	1.00	0.500
Cl7-BZ#170	ND		ng/l	1.00	0.500
Cl7-BZ#180	ND		ng/l	1.00	0.500
Cl7-BZ#183	ND		ng/l	1.00	0.500
Cl7-BZ#184	ND		ng/l	1.00	0.500
Cl7-BZ#187	ND		ng/l	1.00	0.500
Cl8-BZ#195	ND		ng/l	1.00	0.500
Cl9-BZ#206	ND		ng/l	1.00	0.500
Cl10-BZ#209	ND		ng/l	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	84		30-150
Benzo(b)fluoranthene-d12	84		30-150
DBOB	78		30-150
BZ 198	79		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-09 Batch: WG1031095-2 WG1031095-3								
Naphthalene	64		71		50-120	10		30
Acenaphthylene	66		65		50-120	2		30
Acenaphthene	67		66		50-120	2		30
Fluorene	68		65		50-120	5		30
Phenanthrene	66		69		50-120	4		30
Anthracene	68		70		50-120	3		30
Fluoranthene	71		74		50-120	4		30
Pyrene	71		73		50-120	3		30
Benz(a)anthracene	74		79		50-120	7		30
Chrysene	74		75		50-120	1		30
Benzo(b)fluoranthene	79		86		50-120	8		30
Benzo(k)fluoranthene	77		74		50-120	4		30
Benzo(a)pyrene	75		77		50-120	3		30
Indeno(1,2,3-cd)Pyrene	70		75		50-120	7		30
Dibenz(a,h)anthracene	73		75		50-120	3		30
Benzo(ghi)perylene	76		79		50-120	4		30
Cl2-BZ#8	72		73		50-120	1		30
Cl3-BZ#18	69		70		50-120	1		30
Cl3-BZ#28	70		72		50-120	3		30
Cl4-BZ#44	73		76		50-120	4		30
Cl4-BZ#49	72		75		50-120	4		30
Cl4-BZ#52	71		72		50-120	1		30
Cl4-BZ#66	73		75		50-120	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-09 Batch: WG1031095-2 WG1031095-3								
Cl5-BZ#87	72		75		50-120	4		30
Cl5-BZ#101	69		72		50-120	4		30
Cl5-BZ#105	74		75		50-120	1		30
Cl5-BZ#118	74		76		50-120	3		30
Cl6-BZ#128	72		75		50-120	4		30
Cl6-BZ#138	73		75		50-120	3		30
Cl6-BZ#153	73		77		50-120	5		30
Cl7-BZ#170	69		72		50-120	4		30
Cl7-BZ#180	70		72		50-120	3		30
Cl7-BZ#183	69		71		50-120	3		30
Cl7-BZ#184	69		72		50-120	4		30
Cl7-BZ#187	68		72		50-120	6		30
Cl8-BZ#195	69		73		50-120	6		30
Cl9-BZ#206	68		72		50-120	6		30
Cl10-BZ#209	73		75		50-120	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	63		65		30-150
Pyrene-d10	76		75		30-150
Benzo(b)fluoranthene-d12	80		79		30-150
DBOB	67		68		30-150
BZ 198	70		71		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 10 Batch: WG1032132-2 WG1032132-3								
Naphthalene	85		82		50-120	4		30
Acenaphthylene	83		80		50-120	4		30
Acenaphthene	81		79		50-120	3		30
Fluorene	82		80		50-120	2		30
Phenanthrene	80		79		50-120	1		30
Anthracene	81		79		50-120	3		30
Fluoranthene	83		84		50-120	1		30
Pyrene	82		84		50-120	2		30
Benz(a)anthracene	89		91		50-120	2		30
Chrysene	85		88		50-120	3		30
Benzo(b)fluoranthene	93		94		50-120	1		30
Benzo(k)fluoranthene	86		88		50-120	2		30
Benzo(a)pyrene	89		91		50-120	2		30
Indeno(1,2,3-cd)Pyrene	84		105		50-120	22		30
Dibenz(a,h)anthracene	86		87		50-120	1		30
Benzo(ghi)perylene	89		91		50-120	2		30
Cl2-BZ#8	83		83		50-120	0		30
Cl3-BZ#18	80		80		50-120	0		30
Cl3-BZ#28	80		80		50-120	0		30
Cl4-BZ#44	84		85		50-120	1		30
Cl4-BZ#49	83		83		50-120	0		30
Cl4-BZ#52	81		82		50-120	1		30
Cl4-BZ#66	83		86		50-120	4		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 10 Batch: WG1032132-2 WG1032132-3								
Cl5-BZ#87	81		83		50-120	2		30
Cl5-BZ#101	79		82		50-120	4		30
Cl5-BZ#105	81		85		50-120	5		30
Cl5-BZ#118	83		86		50-120	4		30
Cl6-BZ#128	80		84		50-120	5		30
Cl6-BZ#138	81		84		50-120	4		30
Cl6-BZ#153	81		85		50-120	5		30
Cl7-BZ#170	76		80		50-120	5		30
Cl7-BZ#180	78		82		50-120	5		30
Cl7-BZ#183	76		80		50-120	5		30
Cl7-BZ#184	77		81		50-120	5		30
Cl7-BZ#187	77		80		50-120	4		30
Cl8-BZ#195	77		80		50-120	4		30
Cl9-BZ#206	74		77		50-120	4		30
Cl10-BZ#209	80		84		50-120	5		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	77		74		30-150
Pyrene-d10	81		81		30-150
Benzo(b)fluoranthene-d12	82		84		30-150
DBOB	75		75		30-150
BZ 198	78		88		30-150

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1031095-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	60		40-140
Fluoranthene	60		40-140
Pyrene	54		40-140
Benz(a)anthracene	65		40-140
Chrysene	61		40-140
Benzo(b)fluoranthene	70		40-140
Benzo(k)fluoranthene	76		40-140
Benzo(a)pyrene	42		40-140
Indeno(1,2,3-cd)Pyrene	54		40-140
Dibenz(a,h)anthracene	115		40-140
Benzo(ghi)perylene	52		40-140
Cl2-BZ#8	61		40-140
Cl3-BZ#18	100		40-140
Cl3-BZ#28	44		40-140
Cl4-BZ#44	98		40-140
Cl4-BZ#49	62		40-140
Cl4-BZ#52	55		40-140
Cl4-BZ#66	50		40-140
Cl5-BZ#87	51		40-140
Cl5-BZ#101	62		40-140
Cl5-BZ#105	66		40-140
Cl5-BZ#118	68		40-140
Cl6-BZ#128	100		40-140
Cl6-BZ#138	77		40-140
Cl6-BZ#153	52		40-140
Cl7-BZ#170	58		40-140
Cl7-BZ#180	58		40-140
Cl7-BZ#183	56		40-140
Cl7-BZ#187	55		40-140
Cl9-BZ#206	67		40-140
Cl10-BZ#209	86		40-140
2-Methylnaphthalene-d10 (Surrogate)	68		30-150
Pyrene-d10 (Surrogate)	76		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	71		30-150
DBOB (Surrogate)	74		30-150
BZ 198 (Surrogate)	66		30-150

PESTICIDES

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-01 D
Client ID: NHH-U-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 05:21
Analyst: DP
Percent Solids: 36%

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.79	2.79	2	A
gamma-BHC	ND		ug/kg	1.40	1.40	2	A
Heptachlor	ND		ug/kg	1.40	1.40	2	A
Aldrin	ND		ug/kg	1.40	1.40	2	A
Heptachlor epoxide	ND		ug/kg	2.79	2.79	2	B
Oxychlordane	ND		ug/kg	2.79	2.79	2	B
trans-Chlordane	9.10	P	ug/kg	1.40	1.40	2	A
Endosulfan I	ND		ug/kg	1.40	1.40	2	A
cis-Chlordane	1.59		ug/kg	1.40	1.40	2	B
trans-Nonachlor	1.56		ug/kg	1.40	1.40	2	B
4,4'-DDE	5.79	P	ug/kg	1.40	1.40	2	B
Dieldrin	ND		ug/kg	1.40	1.40	2	A
Endrin	ND		ug/kg	1.40	1.40	2	A
Endosulfan II	1.64	IP	ug/kg	1.40	1.40	2	B
4,4'-DDD	ND		ug/kg	1.40	1.40	2	A
cis-Nonachlor	ND		ug/kg	1.40	1.40	2	A
4,4'-DDT	1.80	IP	ug/kg	1.40	1.40	2	A
Methoxychlor	ND		ug/kg	14.0	14.0	2	A
Toxaphene	ND		ug/kg	70.1	70.1	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	68		30-150	A
DBOB	52		30-150	B
BZ 198	76		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-02 D
Client ID: NHH-U-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 05:55
Analyst: DP
Percent Solids: 41%

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.35	2.35	2	A
gamma-BHC	ND		ug/kg	1.17	1.17	2	A
Heptachlor	ND		ug/kg	1.17	1.17	2	A
Aldrin	ND		ug/kg	1.17	1.17	2	A
Heptachlor epoxide	ND		ug/kg	2.35	2.35	2	B
Oxychlordane	ND		ug/kg	2.35	2.35	2	B
trans-Chlordane	103	P	ug/kg	1.17	1.17	2	A
Endosulfan I	ND		ug/kg	1.17	1.17	2	A
cis-Chlordane	2.41		ug/kg	1.17	1.17	2	A
trans-Nonachlor	5.80		ug/kg	1.17	1.17	2	A
4,4'-DDE	18.2		ug/kg	1.17	1.17	2	A
Dieldrin	8.56	IP	ug/kg	1.17	1.17	2	A
Endrin	ND		ug/kg	1.17	1.17	2	A
Endosulfan II	11.0	IP	ug/kg	1.17	1.17	2	B
4,4'-DDD	8.15	P	ug/kg	1.17	1.17	2	A
cis-Nonachlor	ND		ug/kg	1.17	1.17	2	A
4,4'-DDT	10.9	IP	ug/kg	1.17	1.17	2	A
Methoxychlor	ND		ug/kg	11.7	11.7	2	A
Toxaphene	ND		ug/kg	58.9	58.9	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	71		30-150	A
DBOB	42		30-150	B
BZ 198	72		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-03 D
Client ID: NHH-P-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 06:29
Analyst: DP
Percent Solids: 43%

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.23	2.23	2	A
gamma-BHC	ND		ug/kg	1.11	1.11	2	A
Heptachlor	ND		ug/kg	1.11	1.11	2	A
Aldrin	ND		ug/kg	1.11	1.11	2	A
Heptachlor epoxide	ND		ug/kg	2.23	2.23	2	B
Oxychlordane	ND		ug/kg	2.23	2.23	2	B
trans-Chlordane	ND		ug/kg	1.11	1.11	2	A
Endosulfan I	ND		ug/kg	1.11	1.11	2	A
cis-Chlordane	1.93		ug/kg	1.11	1.11	2	A
trans-Nonachlor	2.18		ug/kg	1.11	1.11	2	B
4,4'-DDE	5.62		ug/kg	1.11	1.11	2	A
Dieldrin	2.12	IP	ug/kg	1.11	1.11	2	A
Endrin	ND		ug/kg	1.11	1.11	2	A
Endosulfan II	3.73	IP	ug/kg	1.11	1.11	2	B
4,4'-DDD	1.80		ug/kg	1.11	1.11	2	A
cis-Nonachlor	ND		ug/kg	1.11	1.11	2	A
4,4'-DDT	4.15	IP	ug/kg	1.11	1.11	2	A
Methoxychlor	ND		ug/kg	11.1	11.1	2	A
Toxaphene	ND		ug/kg	55.9	55.9	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	A
BZ 198	94		30-150	A
DBOB	61		30-150	B
BZ 198	99		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-04 D
Client ID: NHH-P-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 07:03
Analyst: DP
Percent Solids: 42%

Date Collected: 08/09/17 12:19
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.19	2.19	2	A
gamma-BHC	ND		ug/kg	1.10	1.10	2	A
Heptachlor	ND		ug/kg	1.10	1.10	2	A
Aldrin	ND		ug/kg	1.10	1.10	2	A
Heptachlor epoxide	ND		ug/kg	2.19	2.19	2	B
Oxychlordane	ND		ug/kg	2.19	2.19	2	B
trans-Chlordane	15.0	P	ug/kg	1.10	1.10	2	A
Endosulfan I	ND		ug/kg	1.10	1.10	2	A
cis-Chlordane	1.30		ug/kg	1.10	1.10	2	A
trans-Nonachlor	1.98		ug/kg	1.10	1.10	2	B
4,4'-DDE	5.32		ug/kg	1.10	1.10	2	A
Dieldrin	2.05	IP	ug/kg	1.10	1.10	2	A
Endrin	ND		ug/kg	1.10	1.10	2	A
Endosulfan II	2.77	IP	ug/kg	1.10	1.10	2	B
4,4'-DDD	1.74		ug/kg	1.10	1.10	2	A
cis-Nonachlor	ND		ug/kg	1.10	1.10	2	A
4,4'-DDT	2.98	IP	ug/kg	1.10	1.10	2	A
Methoxychlor	ND		ug/kg	11.0	11.0	2	A
Toxaphene	ND		ug/kg	55.0	55.0	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	77		30-150	A
DBOB	51		30-150	B
BZ 198	96		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-05 D
Client ID: NHH-Q-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 07:37
Analyst: DP
Percent Solids: 36%

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.71	2.71	2	A
gamma-BHC	ND		ug/kg	1.36	1.36	2	A
Heptachlor	ND		ug/kg	1.36	1.36	2	A
Aldrin	ND		ug/kg	1.36	1.36	2	A
Heptachlor epoxide	ND		ug/kg	2.71	2.71	2	B
Oxychlordane	ND		ug/kg	2.71	2.71	2	B
trans-Chlordane	ND		ug/kg	1.36	1.36	2	A
Endosulfan I	ND		ug/kg	1.36	1.36	2	A
cis-Chlordane	1.80		ug/kg	1.36	1.36	2	A
trans-Nonachlor	1.55		ug/kg	1.36	1.36	2	A
4,4'-DDE	3.79		ug/kg	1.36	1.36	2	A
Dieldrin	1.38	IP	ug/kg	1.36	1.36	2	A
Endrin	ND		ug/kg	1.36	1.36	2	A
Endosulfan II	2.21	I	ug/kg	1.36	1.36	2	B
4,4'-DDD	1.39		ug/kg	1.36	1.36	2	B
cis-Nonachlor	ND		ug/kg	1.36	1.36	2	A
4,4'-DDT	2.03	IP	ug/kg	1.36	1.36	2	A
Methoxychlor	ND		ug/kg	13.6	13.6	2	A
Toxaphene	ND		ug/kg	68.0	68.0	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	A
BZ 198	79		30-150	A
DBOB	57		30-150	B
BZ 198	95		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-06 D
Client ID: NHH-Q-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 08:11
Analyst: DP
Percent Solids: 43%

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.26	2.26	2	A
gamma-BHC	ND		ug/kg	1.13	1.13	2	A
Heptachlor	ND		ug/kg	1.13	1.13	2	A
Aldrin	ND		ug/kg	1.13	1.13	2	A
Heptachlor epoxide	ND		ug/kg	2.26	2.26	2	B
Oxychlordane	ND		ug/kg	2.26	2.26	2	B
trans-Chlordane	18.3	P	ug/kg	1.13	1.13	2	A
Endosulfan I	ND		ug/kg	1.13	1.13	2	A
cis-Chlordane	2.31		ug/kg	1.13	1.13	2	A
trans-Nonachlor	5.15	P	ug/kg	1.13	1.13	2	B
4,4'-DDE	21.5		ug/kg	1.13	1.13	2	A
Dieldrin	8.30	IP	ug/kg	1.13	1.13	2	A
Endrin	ND		ug/kg	1.13	1.13	2	A
Endosulfan II	2.33	IP	ug/kg	1.13	1.13	2	B
4,4'-DDD	9.39	P	ug/kg	1.13	1.13	2	A
cis-Nonachlor	ND		ug/kg	1.13	1.13	2	A
4,4'-DDT	4.12	IP	ug/kg	1.13	1.13	2	A
Methoxychlor	ND		ug/kg	11.3	11.3	2	A
Toxaphene	ND		ug/kg	56.7	56.7	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	70		30-150	A
DBOB	43		30-150	B
BZ 198	77		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-07 D
Client ID: NHH-W-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 08:45
Analyst: DP
Percent Solids: 46%

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.16	2.16	2	A
gamma-BHC	ND		ug/kg	1.08	1.08	2	A
Heptachlor	ND		ug/kg	1.08	1.08	2	A
Aldrin	ND		ug/kg	1.08	1.08	2	A
Heptachlor epoxide	ND		ug/kg	2.16	2.16	2	B
Oxychlordane	ND		ug/kg	2.16	2.16	2	B
trans-Chlordane	ND		ug/kg	1.08	1.08	2	A
Endosulfan I	ND		ug/kg	1.08	1.08	2	A
cis-Chlordane	1.60		ug/kg	1.08	1.08	2	A
trans-Nonachlor	2.57		ug/kg	1.08	1.08	2	A
4,4'-DDE	5.43		ug/kg	1.08	1.08	2	A
Dieldrin	2.06	IP	ug/kg	1.08	1.08	2	A
Endrin	ND		ug/kg	1.08	1.08	2	A
Endosulfan II	3.59	IP	ug/kg	1.08	1.08	2	B
4,4'-DDD	1.64	I	ug/kg	1.08	1.08	2	B
cis-Nonachlor	ND		ug/kg	1.08	1.08	2	A
4,4'-DDT	4.65	IP	ug/kg	1.08	1.08	2	A
Methoxychlor	ND		ug/kg	10.8	10.8	2	A
Toxaphene	ND		ug/kg	54.1	54.1	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	76		30-150	A
DBOB	53		30-150	B
BZ 198	77		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-08 D
Client ID: NHH-V-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 09:19
Analyst: DP
Percent Solids: 41%

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.29	2.29	2	A
gamma-BHC	ND		ug/kg	1.14	1.14	2	A
Heptachlor	ND		ug/kg	1.14	1.14	2	A
Aldrin	ND		ug/kg	1.14	1.14	2	A
Heptachlor epoxide	ND		ug/kg	2.29	2.29	2	B
Oxychlordane	ND		ug/kg	2.29	2.29	2	B
trans-Chlordane	77.9	P	ug/kg	1.14	1.14	2	A
Endosulfan I	ND		ug/kg	1.14	1.14	2	A
cis-Chlordane	2.41		ug/kg	1.14	1.14	2	A
trans-Nonachlor	5.15	P	ug/kg	1.14	1.14	2	A
4,4'-DDE	4.80		ug/kg	1.14	1.14	2	A
Dieldrin	1.83	IP	ug/kg	1.14	1.14	2	A
Endrin	ND		ug/kg	1.14	1.14	2	A
Endosulfan II	6.92	IP	ug/kg	1.14	1.14	2	B
4,4'-DDD	2.25		ug/kg	1.14	1.14	2	A
cis-Nonachlor	ND		ug/kg	1.14	1.14	2	A
4,4'-DDT	9.17	P	ug/kg	1.14	1.14	2	A
Methoxychlor	ND		ug/kg	11.4	11.4	2	A
Toxaphene	ND		ug/kg	57.5	57.5	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	84		30-150	A
DBOB	60		30-150	B
BZ 198	86		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-09 D
Client ID: NHH-V-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/29/17 09:53
Analyst: DP
Percent Solids: 41%

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	2.38	2.38	2	A
gamma-BHC	ND		ug/kg	1.19	1.19	2	A
Heptachlor	ND		ug/kg	1.19	1.19	2	A
Aldrin	ND		ug/kg	1.19	1.19	2	A
Heptachlor epoxide	ND		ug/kg	2.38	2.38	2	B
Oxychlordane	ND		ug/kg	2.38	2.38	2	B
trans-Chlordane	114	P	ug/kg	1.19	1.19	2	A
Endosulfan I	ND		ug/kg	1.19	1.19	2	A
cis-Chlordane	4.12		ug/kg	1.19	1.19	2	A
trans-Nonachlor	7.99	P	ug/kg	1.19	1.19	2	A
4,4'-DDE	14.7		ug/kg	1.19	1.19	2	A
Dieldrin	6.02	IP	ug/kg	1.19	1.19	2	A
Endrin	ND		ug/kg	1.19	1.19	2	A
Endosulfan II	25.1	P	ug/kg	1.19	1.19	2	A
4,4'-DDD	5.27		ug/kg	1.19	1.19	2	A
cis-Nonachlor	ND		ug/kg	1.19	1.19	2	A
4,4'-DDT	14.5		ug/kg	1.19	1.19	2	A
Methoxychlor	ND		ug/kg	11.9	11.9	2	A
Toxaphene	ND		ug/kg	59.6	59.6	2	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	87		30-150	A
DBOB	53		30-150	B
BZ 198	74		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-10
Client ID: NHH-EB-CORE-080917
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 08/24/17 17:34
Analyst: DP

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/15/17 15:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	1	A
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	1	B
Oxychlordane	ND		ug/l	0.0005	0.0005	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	1	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Methoxychlor	ND		ug/l	0.0050	0.0050	1	A
Toxaphene	ND		ug/l	0.0252	0.0252	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	54		30-150	A
BZ 198	**156**	Q	30-150	A
DBOB	49		30-150	B
BZ 198	62		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/28/17 17:26
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 08/11/17 16:34
Cleanup Method: EPA 3630
Cleanup Date: 08/14/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-09 Batch: WG1031089-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	2.50	2.50	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	46		30-150	A
BZ 198	60		30-150	A
DBOB	45		30-150	B
BZ 198	58		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/24/17 15:57
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 08/15/17 15:15

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 10 Batch: WG1032133-1						
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	A
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Methoxychlor	ND		ug/l	0.0050	0.0050	A
Toxaphene	ND		ug/l	0.0250	0.0250	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	B
Oxychlordane	ND		ug/l	0.0005	0.0005	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	76		30-150	A
DBOB	55		30-150	B
BZ 198	81		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-09 Batch: WG1031089-2 WG1031089-3									
Hexachlorobenzene	50		50		50-120	0		30	A
gamma-BHC	53		51		50-120	4		30	A
Heptachlor	53		53		50-120	0		30	A
Aldrin	51		52		50-120	2		30	A
trans-Chlordane	64		64		50-120	0		30	A
Endosulfan I	63		62		50-120	2		30	A
cis-Chlordane	60		60		50-120	0		30	A
trans-Nonachlor	60		61		50-120	2		30	A
4,4'-DDE	74		75		50-120	1		30	A
Dieldrin	72		70		50-120	3		30	A
Endrin	63		63		50-120	0		30	A
4,4'-DDD	79		79		50-120	0		30	A
cis-Nonachlor	65		66		50-120	2		30	A
4,4'-DDT	81		81		50-120	0		30	A
Methoxychlor	75		73		50-120	3		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		53		30-150	A
BZ 198	83		79		30-150	A
DBOB	54		44		30-150	B
BZ 198	84		78		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-09 Batch: WG1031089-2 WG1031089-3									
Heptachlor epoxide	63		64		50-120	2		30	B
Oxychlordane	59		60		50-120	2		30	B
Endosulfan II	69		65		50-120	6		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		53		30-150	A
BZ 198	83		79		30-150	A
DBOB	54		44		30-150	B
BZ 198	84		78		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 10 Batch: WG1032133-2 WG1032133-3									
Hexachlorobenzene	63		63		50-120	1		30	A
gamma-BHC	57		59		50-120	4		30	A
Heptachlor	63		66		50-120	4		30	A
Aldrin	64		66		50-120	4		30	A
trans-Chlordane	74		80		50-120	7		30	A
Endosulfan I	75		79		50-120	6		30	A
cis-Chlordane	71		77		50-120	7		30	A
trans-Nonachlor	71		77		50-120	8		30	A
4,4'-DDE	91		97		50-120	6		30	A
Dieldrin	87		92		50-120	5		30	A
Endrin	73		76		50-120	4		30	A
4,4'-DDD	89		91		50-120	2		30	A
cis-Nonachlor	75		79		50-120	6		30	A
4,4'-DDT	91		97		50-120	6		30	A
Methoxychlor	93		95		50-120	2		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	64		65		30-150	A
BZ 198	89		**163**	Q	30-150	A
DBOB	57		58		30-150	B
BZ 198	93		91		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 10 Batch: WG1032133-2 WG1032133-3									
Heptachlor epoxide	75		79		50-120	6		30	B
Oxychlordane	64		70		50-120	9		30	B
Endosulfan II	86		89		50-120	3		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	64		65		30-150	A
BZ 198	89		**163**	Q	30-150	A
DBOB	57		58		30-150	B
BZ 198	93		91		30-150	B

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1031089-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	70		40-140
cis-Chlordane	79		40-140
trans-Nonachlor	220	Q	40-140
DBOB (Surrogate)	48		30-150
DBOB (Surrogate)	53		30-150
BZ 198 (Surrogate)	86		30-150
BZ 198 (Surrogate)	159	Q	30-150

METALS

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-01
Client ID: NHH-U-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 36%

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.98		mg/kg	0.254	0.034	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV
Cadmium, Total	1.02		mg/kg	0.101	0.013	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV
Chromium, Total	69.8		mg/kg	1.01	0.237	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV
Copper, Total	118		mg/kg	1.01	0.098	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV
Lead, Total	64.8		mg/kg	0.304	0.074	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV
Mercury, Total	0.280		mg/kg	0.040	0.005	5	08/22/17 14:10	08/24/17 13:21	EPA 7474	1,7474	BV
Nickel, Total	26.5		mg/kg	0.507	0.135	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV
Zinc, Total	206		mg/kg	5.07	1.32	2	08/22/17 14:20	08/30/17 18:45	EPA 3050B	1,6020A	BV

Project Name:	USACE-NHH FNP	**Lab Number:**	L1727788
Project Number:	60543021	**Report Date:**	09/01/17

SAMPLE RESULTS

Lab ID:	L1727788-02	Date Collected:	08/09/17 09:05
Client ID:	NHH-U-BOTTOM	Date Received:	08/09/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	41%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	12.5		mg/kg	0.188	0.025	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV
Cadmium, Total	6.05		mg/kg	0.075	0.010	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV
Chromium, Total	181		mg/kg	0.751	0.176	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV
Copper, Total	325		mg/kg	0.751	0.073	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV
Lead, Total	174		mg/kg	0.225	0.055	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV
Mercury, Total	1.04		mg/kg	0.028	0.004	5	08/22/17 14:10	08/24/17 13:24	EPA 7474	1,7474	BV
Nickel, Total	41.6		mg/kg	0.376	0.100	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV
Zinc, Total	490		mg/kg	3.76	0.977	2	08/22/17 14:20	08/30/17 18:49	EPA 3050B	1,6020A	BV

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-03
Client ID: NHH-P-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 43%

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.4		mg/kg	0.201	0.027	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV
Cadmium, Total	2.37		mg/kg	0.080	0.011	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV
Chromium, Total	107		mg/kg	0.804	0.188	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV
Copper, Total	215		mg/kg	0.804	0.078	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV
Lead, Total	99.8		mg/kg	0.241	0.059	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV
Mercury, Total	0.608		mg/kg	0.023	0.003	5	08/22/17 14:10	08/24/17 13:26	EPA 7474	1,7474	BV
Nickel, Total	30.0		mg/kg	0.402	0.107	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV
Zinc, Total	275		mg/kg	4.02	1.04	2	08/22/17 14:20	08/30/17 19:10	EPA 3050B	1,6020A	BV

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-04
Client ID: NHH-P-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 42%

Date Collected: 08/09/17 12:19
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.6		mg/kg	0.180	0.024	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV
Cadmium, Total	2.43		mg/kg	0.072	0.010	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV
Chromium, Total	108		mg/kg	0.721	0.169	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV
Copper, Total	199		mg/kg	0.721	0.070	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV
Lead, Total	102		mg/kg	0.216	0.053	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV
Mercury, Total	0.621		mg/kg	0.024	0.003	5	08/22/17 14:10	08/24/17 13:29	EPA 7474	1,7474	BV
Nickel, Total	29.7		mg/kg	0.360	0.096	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV
Zinc, Total	281		mg/kg	3.60	0.937	2	08/22/17 14:20	08/30/17 19:14	EPA 3050B	1,6020A	BV

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-05
Client ID: NHH-Q-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 36%

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.77		mg/kg	0.216	0.029	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV
Cadmium, Total	1.05		mg/kg	0.087	0.011	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV
Chromium, Total	70.6		mg/kg	0.866	0.203	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV
Copper, Total	121		mg/kg	0.866	0.084	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV
Lead, Total	67.7		mg/kg	0.260	0.063	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV
Mercury, Total	0.282		mg/kg	0.036	0.005	5	08/22/17 14:10	08/24/17 13:36	EPA 7474	1,7474	BV
Nickel, Total	26.7		mg/kg	0.433	0.116	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV
Zinc, Total	211		mg/kg	4.33	1.12	2	08/22/17 14:20	08/30/17 19:18	EPA 3050B	1,6020A	BV

Project Name:	USACE-NHH FNP	**Lab Number:**	L1727788
Project Number:	60543021	**Report Date:**	09/01/17

SAMPLE RESULTS

Lab ID:	L1727788-06	Date Collected:	08/09/17 14:27
Client ID:	NHH-Q-BOTTOM	Date Received:	08/09/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	43%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	14.5		mg/kg	0.189	0.025	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV
Cadmium, Total	6.71		mg/kg	0.076	0.010	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV
Chromium, Total	210		mg/kg	0.757	0.177	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV
Copper, Total	376		mg/kg	0.757	0.073	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV
Lead, Total	151		mg/kg	0.227	0.055	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV
Mercury, Total	1.29		mg/kg	0.036	0.005	5	08/22/17 14:10	08/24/17 13:39	EPA 7474	1,7474	BV
Nickel, Total	35.6		mg/kg	0.378	0.101	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV
Zinc, Total	588		mg/kg	3.78	0.984	2	08/22/17 14:20	08/30/17 19:22	EPA 3050B	1,6020A	BV

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-07
Client ID: NHH-W-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 46%

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.14		mg/kg	0.172	0.023	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV
Cadmium, Total	1.84		mg/kg	0.069	0.009	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV
Chromium, Total	71.0		mg/kg	0.690	0.162	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV
Copper, Total	118		mg/kg	0.690	0.067	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV
Lead, Total	59.8		mg/kg	0.207	0.050	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV
Mercury, Total	0.437		mg/kg	0.022	0.003	5	08/22/17 14:10	08/24/17 13:41	EPA 7474	1,7474	BV
Nickel, Total	19.6		mg/kg	0.345	0.092	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV
Zinc, Total	183		mg/kg	3.45	0.898	2	08/22/17 14:20	08/30/17 19:26	EPA 3050B	1,6020A	BV

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-08
Client ID: NHH-V-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 41%

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	11.7		mg/kg	0.188	0.025	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV
Cadmium, Total	2.68		mg/kg	0.075	0.010	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV
Chromium, Total	116		mg/kg	0.753	0.176	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV
Copper, Total	198		mg/kg	0.753	0.073	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV
Lead, Total	123		mg/kg	0.226	0.055	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV
Mercury, Total	0.432		mg/kg	0.035	0.005	5	08/22/17 14:10	08/24/17 13:44	EPA 7474	1,7474	BV
Nickel, Total	36.3		mg/kg	0.376	0.100	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV
Zinc, Total	288		mg/kg	3.76	0.978	2	08/22/17 14:20	08/30/17 19:30	EPA 3050B	1,6020A	BV

Project Name:	USACE-NHH FNP	**Lab Number:**	L1727788
Project Number:	60543021	**Report Date:**	09/01/17

SAMPLE RESULTS

Lab ID:	L1727788-09	Date Collected:	08/09/17 17:45
Client ID:	NHH-V-BOTTOM	Date Received:	08/09/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	41%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	13.5		mg/kg	0.181	0.024	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV
Cadmium, Total	5.54		mg/kg	0.072	0.010	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV
Chromium, Total	178		mg/kg	0.723	0.169	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV
Copper, Total	289		mg/kg	0.723	0.070	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV
Lead, Total	188		mg/kg	0.217	0.053	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV
Mercury, Total	0.805		mg/kg	0.031	0.004	5	08/22/17 14:10	08/24/17 13:46	EPA 7474	1,7474	BV
Nickel, Total	47.3		mg/kg	0.362	0.097	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV
Zinc, Total	449		mg/kg	3.62	0.940	2	08/22/17 14:20	08/30/17 19:34	EPA 3050B	1,6020A	BV

Project Name:	USACE-NHH FNP	**Lab Number:**	L1727788
Project Number:	60543021	**Report Date:**	09/01/17

SAMPLE RESULTS

Lab ID:	L1727788-10	Date Collected:	08/09/17 17:45
Client ID:	NHH-EB-CORE-080917	Date Received:	08/09/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM
Chromium, Total	0.00226		mg/l	0.00100	0.00017	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	08/15/17 16:09	08/16/17 12:45	EPA 7474	1,7474	BV
Nickel, Total	0.02134		mg/l	0.00200	0.00055	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	08/15/17 12:00	08/23/17 14:01	EPA 3020A	1,6020A	AM

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 10 Batch: WG1032053-1										
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM
Chromium, Total	0.00054	J	mg/l	0.00100	0.00017	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM
Nickel, Total	0.00057	J	mg/l	0.00200	0.00055	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	08/15/17 12:00	08/23/17 10:54	1,6020A	AM

Prep Information

Digestion Method: EPA 3020A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 10 Batch: WG1032151-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	08/15/17 16:09	08/16/17 12:33	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-09 Batch: WG1034116-1										
Arsenic, Total	ND		mg/kg	0.100	0.013	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Cadmium, Total	ND		mg/kg	0.040	0.005	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Chromium, Total	ND		mg/kg	0.400	0.094	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Copper, Total	ND		mg/kg	0.400	0.039	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Lead, Total	ND		mg/kg	0.120	0.029	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Nickel, Total	ND		mg/kg	0.200	0.053	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV
Zinc, Total	ND		mg/kg	2.00	0.520	2	08/22/17 14:20	08/29/17 15:41	1,6020A	BV

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-09 Batch: WG1034262-1										
Mercury, Total	ND		mg/kg	0.013	0.002	5	08/22/17 14:10	08/24/17 12:32	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 10 Batch: WG1032053-2								
Arsenic, Total	106		-		80-120	-		20
Cadmium, Total	111		-		80-120	-		20
Chromium, Total	110		-		80-120	-		20
Copper, Total	108		-		80-120	-		20
Lead, Total	109		-		80-120	-		20
Nickel, Total	107		-		80-120	-		20
Zinc, Total	108		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 10 Batch: WG1032151-2 SRM Lot Number: HPHGAF								
Mercury, Total	95		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-09 Batch: WG1034116-2 SRM Lot Number: D093-540								
Arsenic, Total	105		-		70-130	-		20
Cadmium, Total	99		-		83-117	-		20
Chromium, Total	101		-		80-120	-		20
Copper, Total	100		-		82-118	-		20
Lead, Total	106		-		82-117	-		20
Nickel, Total	100		-		83-117	-		20
Zinc, Total	97		-		83-117	-		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-09 Batch: WG1034262-2 SRM Lot Number: D093-540					
Mercury, Total	80	-	72-128	-	20

INORGANICS
&
MISCELLANEOUS

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-01
Client ID: NHH-U-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.87		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.84		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	35.6		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	64.4		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-02
Client ID: NHH-U-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 09:05
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.65		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.42		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	41.1		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	58.9		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-03
Client ID: NHH-P-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 12:19
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.82		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.28		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	42.7		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	57.3		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-04
Client ID: NHH-P-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 12:19
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.94		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.90		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	42.2		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	57.8		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-05
Client ID: NHH-Q-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.80		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.68		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	36.0		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	64.0		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-06
Client ID: NHH-Q-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 14:27
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.78		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.77		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	42.6		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	57.4		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-07
Client ID: NHH-W-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 16:34
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.76		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.72		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	46.1		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	53.9		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-08
Client ID: NHH-V-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.03		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.09		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	40.8		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	59.2		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-09
Client ID: NHH-V-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.94		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.60		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	41.4		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO
Moisture	58.6		%	0.100	0.100	1	-	08/11/17 13:26	121,2540G	KO

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

SAMPLE RESULTS

Lab ID: L1727788-10
Client ID: NHH-EB-CORE-080917
Sample Location: NEW HAVEN, CT
Matrix: Water

Date Collected: 08/09/17 17:45
Date Received: 08/09/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/10/17 14:50	08/10/17 15:03	77,7196A	ML

Project Name: USACE-NHH FNP **Lab Number:** L1727788

Project Number: 60543021 **Report Date:** 09/01/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab for sample(s): 10 Batch: WG1030822-1										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/10/17 14:50	08/10/17 15:00	77,7196A	ML
Total Organic Carbon - Mansfield Lab for sample(s): 01-09 Batch: WG1037558-1										
Total Organic Carbon (Rep1)	0.011		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.010		%	0.010	0.010	1	-	08/31/17 00:00	1,9060A	SP

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
CT RCP General Chemistry - Westborough Lab Associated sample(s): 10 Batch: WG1030822-2 WG1030822-3								
Chromium, Hexavalent	94		99		80-120	5		20
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-09 Batch: WG1037558-2								
Total Organic Carbon (Rep1)	83		-		75-125	-		25
Total Organic Carbon (Rep2)	104		-		75-125	-		25

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1037558-4 QC Sample: L1727788-03 Client ID: NHH-P-TOP												
Total Organic Carbon (Rep1)	2.82	0.89	3.82	112		-	-		75-125	-		25
Total Organic Carbon (Rep2)	3.28	1.01	3.97	**68**	Q	-	-		75-125	-		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-09 QC Batch ID: WG1037558-3 QC Sample: L1727788-03 Client ID: NHH-P-TOP						
Total Organic Carbon (Rep1)	2.82	3.33	%	17		25
Total Organic Carbon (Rep2)	3.28	2.94	%	11		25

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Sample Receipt and Container Information

Were project specific reporting limits specified? NO

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727788-01A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-RIM FORMS(),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-02A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-03A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-04A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727788-05A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-06A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-07A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-08A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-09A	Glass 500ml/16oz unpreserved	A	NA		5.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1727788-10A	Plastic 250ml HNO3 preserved	A	<2	<2	5.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-CU-6020T(180)
L1727788-10B	Plastic 250ml unpreserved	A	7	7	5.0	Y	Absent		CT-HEXCR-7196(1)

*Values in parentheses indicate holding time in days

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1727788
Report Date: 09/01/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1727788-10C	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PEST-8081(7)
L1727788-10D	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PEST-8081(7)
L1727788-10E	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PAH/PCBCONG(7)
L1727788-10F	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PAH/PCBCONG(7)

Container Comments

L1727788-04A container rec'd 8/10/17

*Values in parentheses indicate holding time in days

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GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name: USACE-NHH FNP **Lab Number:** L1727788
Project Number: 60543021 **Report Date:** 09/01/17

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

77 Connecticut DEP Quality Assurance and Quality Control Requirements for SW-846 Methods. CTDEP Reasonable Confidence Protocols (RCPs). Version 1.0, July 2005.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	Yes
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No - see case narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see case narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	Yes
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see case narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV opening for all samples: Column II: hexachlorobenzene @30%, gamma-BHC @ 16%, delta-BHC @ 20%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	Trans-Nonachlor @ 220%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	SRM: BZ198 @ 159%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1727562-07D: Cl4-BZ#52 @ 44%, Cl7-BZ#170 @ 34%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	yes		In Data Package
Method Blank	No target analytes > RL	yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	no	cadmium (25%), chromium (36%), copper (25%), lead	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	YES		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	YES		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

4727788

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'CONNELL KOZIK

TAT: GRAINSIZE - 24hr CHEMISTRY - STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	GRAINSIZE - SIEVE	METALS - 6020A/7471-7473	PCBS - 8082/8270 SIM	PESTICIDES - 8081B	PAHS - 8270D SIM	TOC - 9060					Lab I.D.	Remarks
-01	NHH - U - TOP	8/9/17	0705	X		807/1607	SD	4°C	N/A	X	X	X	X	X	X						0 - 5'10"
-02	NHH - U - BOTTOM		0705	X						X	X	X	X	X	X						5'10" - 30"
-03	NHH - P - TOP		1219							X	X	X	X	X	X						0 - 5'9"
-04	NHH - P - BOTTOM		1219							X	X	X	X	X	X						5'9" - 12'4"
-05	NHH - Q - TOP		1427							X	X	X	X	X	X						0 - 5'3"
-06	NHH - Q - BOTTOM		1427							X	X	X	X	X	X						5'3" - 29.5"
-07	NHH - W - TOP		1634							X	X	X	X	X	X						0 - 5'6"
-08	NHH - W - BOTTOM		1634			807				X											5'6" - 8'2"
-08	NHH - V - TOP		1745			807/1607				X	X	X	X	X	X						0 - 4'9"
-9	NHH - V - BOTTOM		1745							X	X	X	X	X	X						4'9" - 8'7"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM	Date: 8/9/17 Time: 1900		Date: 8/9/17 Time: 1858
	Date: 8/9/17 Time: 2109		Date: 8/9/17 Time: 2129
	Date: Time:		Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0155

AECOM

CHAIN OF CUSTODY RECORD

L1727788

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 60548021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY O'DONNELL KOZIK

TAT: STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs / PCB	PESTICIDES	CRL	Lab I.D.	Remarks
-10 NHH-EB-CORE-080917	8/9/17			X		W	4°C-3	N/A	X	X	X	X		4x 1L AMBER 1x 250 mL 1x 250mL w/ HNO3

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / AECOM Signature:	Date: 8/9/17 Time: 1900	Signature:	Date: 8/9/17 Time: 1858
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 1929	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/9/17 Time: 2129
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKER DRIVE, WESTBOROUGH, MA ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0179

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe/AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Metals 6020A/7471A	PCBs 8082/8270-SIM	Pesticides-8081B	PAHs 8270-SIM	TOC 9060						Lab I.D.	Remarks
NHH-P-Bottom	8/9/17	1219	~~SO~~		1602	SD	4°C	NA	X	X	X	X	X							

Relinquished by: (Print Name)/(Affiliation)	Date: / Time:	Received by: (Print Name)/(Affiliation)	Date: / Time:
C. Steve Howe AECOM Signature:		Signature:	8/10/17 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0157

ANALYTICAL REPORT

Lab Number:	L1728049
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	09/08/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728049-01	NHH-R-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 08:32	08/10/17
L1728049-02	NHH-R-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 08:32	08/10/17
L1728049-03	NHH-S-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 09:55	08/10/17
L1728049-04	NHH-J	SEDIMENT	NEW HAVEN, CT	08/10/17 11:41	08/10/17
L1728049-05	NHH-L	SEDIMENT	NEW HAVEN, CT	08/10/17 13:00	08/10/17
L1728049-06	NHH-K-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:09	08/10/17
L1728049-07	NHH-H-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1728049-08	NHH-H-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1728049-09	NHH-H-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 14:58	08/10/17
L1728049-10	NHH-I-TOP	SEDIMENT	NEW HAVEN, CT	08/10/17 15:48	08/10/17
L1728049-11	NHH-I-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/10/17 15:48	08/10/17
L1728049-12	NHH-G-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 08:37	08/11/17
L1728049-13	NHH-G-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 08:37	08/11/17
L1728049-14	NHH-C-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 10:33	08/11/17
L1728049-15	NHH-C-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 10:33	08/11/17
L1728049-16	NHH-B	SEDIMENT	NEW HAVEN, CT	08/11/17 11:57	08/11/17
L1728049-17	NHH-A-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 13:40	08/11/17
L1728049-18	NHH-D-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 15:07	08/11/17
L1728049-19	NHH-D-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 15:07	08/11/17
L1728049-20	NHH-F-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1728049-21	NHH-F-REP-TOP	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17
L1728049-22	NHH-F-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/11/17 16:50	08/11/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Semivolatile Organics

The WG1033334-4 SRM recoveries, associated with L1728049-01, -02, -03, -04, -06, -07, -08, -09, -10 and -16, are outside the acceptance criteria for Cl3-BZ#28 (39%).

The WG1033339-4 SRM recovery is outside the acceptance criteria for Cl10-BZ#209 (232%).

The WG1033334-6/-7 MS/MSD recoveries, performed on L1728049-16, are outside the acceptance criteria for Naphthalene (47%/47%), Acenaphthylene (48%/48%), Acenaphthene (46%/46%), Fluorene (48%/49%) and Phenanthrene (46%/48%).

The WG1037293-6 MS recovery performed on L1728049-05, is outside the acceptance criteria for one compound; however, the associated LCS/LCSD recoveries are within overall method allowances. The results of the native sample are considered to have a potentially high bias for Benz(a)anthracene (121%).

The WG1033339-7 MSD recovery, performed on L1728049-22, is outside the acceptance criteria for twol compounds; however, the associated LCS/LCSD recoveries are within overall method allowances. The results of the native sample are considered to have a potentially low bias for Fluoranthene (41%) and Pyrene (49%).

The WG1037293-5 Laboratory Duplicate RPD for Acenaphthylene (35%), performed on L1728049-05, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1033339-5 Laboratory Duplicate RPD for Acenaphthylene (32%), Cl5-BZ#101 (35%) and Cl7-BZ#187 (32%), performed on L1728049-22, is outside the acceptance criteria. The elevated RPD has been

Case Narrative (continued)

attributed to the non-homogeneous nature of the native sample.

Pesticides
L1728049-05 was frozen upon receipt to arrest sample holding time.

The WG1033330-4 SRM recovery for trans-Nonachlor (476%) and the surrogate BZ198 column B (205%), are above the acceptance criteria.

The WG1033336-4 SRM recovery for trans-Nonachlor (290%) and the surrogate BZ198 column B (179%), are above the acceptance criteria.

The WG1037294-4 SRM recovery for trans-Nonachlor (320%) and the surrogate BZ198 column B (179%), are above the acceptance criteria.

All recoveries and percent differences (%RPD) for LCS WG1033336-2 and LCSD WG1033336-3 are within SOP criteria (40-140% recovery and 50%RPD); therefore no further action was taken.

The WG1033336-5 MS recovery for Hexachlorobenzene (48%), performed on L1728049-22, is outside the acceptance criteria; however, the associated LCS/LCSD are within the overall method allowances.

Total Metals
The WG1032246-7 MS recovery, performed on L1728049-22, is outside the acceptance criteria for Chromium (201%). A post digestion spike was performed and was within acceptance criteria.

The WG1032246-7 MS recoveries, performed on L1728049-22, are outside the acceptance criteria for Zinc (129%). A post digestion spike was performed and yielded an unacceptable recovery for Zinc (129%). This has been attributed to sample matrix.

Project Name: USACE/NHH FNP **Lab Number:** L1728049
Project Number: 60543021 **Report Date:** 09/08/17

Case Narrative (continued)

The WG1032246-7 MS recovery for Copper (239%), performed on L1728049-22, does not apply because the sample concentration is greater than four times the spike amount added.

The WG1032246-7/-8 MS/MSD RPDs for Chromium (22%) and Copper (27%), performed on L1728049-22, are above the acceptance criteria.

The WG1034140-5 Laboratory Duplicate RPD for Mercury (29%), performed on L1728049-22, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

Total Organic Carbon
L1728049-16: The Sample Replicate RPD is outside the acceptance criteria of 30%. A double-burn re-analysis was performed with confirming results. The results of the original analysis are reported. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1036606-1 Method Blank, associated with L1728049-03 through -22, has a concentration above the reporting limit. Since the associated sample concentrations are greater than 10x the blank concentration for this analyte, no corrective action is required.

The WG1036606-3 Laboratory Duplicate RPD for (Rep1 - 27%), performed on L1728049-16, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1036606-4/-5 MS/MSD recoveries (Rep1 - 32%/65%) and (Rep2 - 71% - MSD only), performed on L1728049-16, are outside the 75-125% acceptance criteria, possibly due to sample matrix. The associated SRM recoveries are within criteria indicating the sample batch was in control, and all sample results were accepted. In addition, the RPDs (Rep1 - 32%) and (Rep2 - 32%), performed on L1728049-16, are outside the acceptance criteria of 30%. The elevated RPD has been attributed to the non-homogeneous nature of the

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

Case Narrative (continued)

native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative

Date: 09/08/17

ORGANICS

SEMIVOLATILES

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-01
Client ID: NHH-R-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 13:35
Analyst: JT
Percent Solids: 37%

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	52.6		ug/kg	12.8	6.40	1
Acenaphthylene	49.4		ug/kg	12.8	6.40	1
Acenaphthene	15.8		ug/kg	12.8	6.40	1
Fluorene	24.0		ug/kg	12.8	6.40	1
Phenanthrene	140		ug/kg	12.8	6.40	1
Anthracene	64.5		ug/kg	12.8	6.40	1
Fluoranthene	462		ug/kg	12.8	6.40	1
Pyrene	386		ug/kg	12.8	6.40	1
Benz(a)anthracene	200		ug/kg	12.8	6.40	1
Chrysene	263		ug/kg	12.8	6.40	1
Benzo(b)fluoranthene	287		ug/kg	12.8	6.40	1
Benzo(k)fluoranthene	182		ug/kg	12.8	6.40	1
Benzo(a)pyrene	256		ug/kg	12.8	6.40	1
Indeno(1,2,3-cd)Pyrene	215		ug/kg	12.8	6.40	1
Dibenz(a,h)anthracene	48.6		ug/kg	12.8	6.40	1
Benzo(ghi)perylene	226		ug/kg	12.8	6.40	1
Cl2-BZ#8	ND		ug/kg	1.28	0.640	1
Cl3-BZ#18	0.709	J	ug/kg	1.28	0.640	1
Cl3-BZ#28	1.04	J	ug/kg	1.28	0.640	1
Cl4-BZ#44	2.00		ug/kg	1.28	0.640	1
Cl4-BZ#49	1.38		ug/kg	1.28	0.640	1
Cl4-BZ#52	2.98		ug/kg	1.28	0.640	1
Cl4-BZ#66	2.10		ug/kg	1.28	0.640	1
Cl5-BZ#87	0.842	J	ug/kg	1.28	0.640	1
Cl5-BZ#101	3.43		ug/kg	1.28	0.640	1
Cl5-BZ#105	1.93		ug/kg	1.28	0.640	1
Cl5-BZ#118	3.00		ug/kg	1.28	0.640	1
Cl6-BZ#128	ND		ug/kg	1.28	0.640	1
Cl6-BZ#138	4.10		ug/kg	1.28	0.640	1
Cl6-BZ#153	3.14		ug/kg	1.28	0.640	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-01 Date Collected: 08/10/17 08:32

Client ID: NHH-R-TOP Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.02	J	ug/kg	1.28	0.640	1
Cl7-BZ#180	2.09		ug/kg	1.28	0.640	1
Cl7-BZ#183	0.667	J	ug/kg	1.28	0.640	1
Cl7-BZ#184	ND		ug/kg	1.28	0.640	1
Cl7-BZ#187	1.61		ug/kg	1.28	0.640	1
Cl8-BZ#195	ND		ug/kg	1.28	0.640	1
Cl9-BZ#206	0.684	J	ug/kg	1.28	0.640	1
Cl10-BZ#209	ND		ug/kg	1.28	0.640	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	54		30-150
Pyrene-d10	59		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	76		30-150
BZ 198	71		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-02
Client ID: NHH-R-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 14:07
Analyst: JT
Percent Solids: 44%

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	62.8		ug/kg	10.5	5.24	1
Acenaphthylene	55.6		ug/kg	10.5	5.24	1
Acenaphthene	17.3		ug/kg	10.5	5.24	1
Fluorene	28.2		ug/kg	10.5	5.24	1
Phenanthrene	146		ug/kg	10.5	5.24	1
Anthracene	76.3		ug/kg	10.5	5.24	1
Fluoranthene	468		ug/kg	10.5	5.24	1
Pyrene	413		ug/kg	10.5	5.24	1
Benz(a)anthracene	219		ug/kg	10.5	5.24	1
Chrysene	268		ug/kg	10.5	5.24	1
Benzo(b)fluoranthene	302		ug/kg	10.5	5.24	1
Benzo(k)fluoranthene	194		ug/kg	10.5	5.24	1
Benzo(a)pyrene	247		ug/kg	10.5	5.24	1
Indeno(1,2,3-cd)Pyrene	195		ug/kg	10.5	5.24	1
Dibenz(a,h)anthracene	47.8		ug/kg	10.5	5.24	1
Benzo(ghi)perylene	213		ug/kg	10.5	5.24	1
Cl2-BZ#8	0.582	J	ug/kg	1.05	0.524	1
Cl3-BZ#18	1.13		ug/kg	1.05	0.524	1
Cl3-BZ#28	1.70		ug/kg	1.05	0.524	1
Cl4-BZ#44	3.07		ug/kg	1.05	0.524	1
Cl4-BZ#49	2.68		ug/kg	1.05	0.524	1
Cl4-BZ#52	4.22		ug/kg	1.05	0.524	1
Cl4-BZ#66	2.68		ug/kg	1.05	0.524	1
Cl5-BZ#87	ND		ug/kg	1.05	0.524	1
Cl5-BZ#101	3.96		ug/kg	1.05	0.524	1
Cl5-BZ#105	5.87		ug/kg	1.05	0.524	1
Cl5-BZ#118	4.28		ug/kg	1.05	0.524	1
Cl6-BZ#128	0.862	J	ug/kg	1.05	0.524	1
Cl6-BZ#138	4.53		ug/kg	1.05	0.524	1
Cl6-BZ#153	4.49		ug/kg	1.05	0.524	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-02 Date Collected: 08/10/17 08:32

Client ID: NHH-R-BOTTOM Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.18		ug/kg	1.05	0.524	1
Cl7-BZ#180	2.78		ug/kg	1.05	0.524	1
Cl7-BZ#183	0.684	J	ug/kg	1.05	0.524	1
Cl7-BZ#184	ND		ug/kg	1.05	0.524	1
Cl7-BZ#187	2.11		ug/kg	1.05	0.524	1
Cl8-BZ#195	ND		ug/kg	1.05	0.524	1
Cl9-BZ#206	0.800	J	ug/kg	1.05	0.524	1
Cl10-BZ#209	0.627	J	ug/kg	1.05	0.524	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	46		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	63		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-03
Client ID: NHH-S-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 14:39
Analyst: JT
Percent Solids: 40%

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	381		ug/kg	11.8	5.93	1
Acenaphthylene	79.4		ug/kg	11.8	5.93	1
Acenaphthene	40.8		ug/kg	11.8	5.93	1
Fluorene	77.9		ug/kg	11.8	5.93	1
Phenanthrene	326		ug/kg	11.8	5.93	1
Anthracene	91.6		ug/kg	11.8	5.93	1
Fluoranthene	835		ug/kg	11.8	5.93	1
Pyrene	706		ug/kg	11.8	5.93	1
Benz(a)anthracene	403		ug/kg	11.8	5.93	1
Chrysene	363		ug/kg	11.8	5.93	1
Benzo(b)fluoranthene	583		ug/kg	11.8	5.93	1
Benzo(k)fluoranthene	234		ug/kg	11.8	5.93	1
Benzo(a)pyrene	310		ug/kg	11.8	5.93	1
Indeno(1,2,3-cd)Pyrene	325		ug/kg	11.8	5.93	1
Dibenz(a,h)anthracene	70.4		ug/kg	11.8	5.93	1
Benzo(ghi)perylene	319		ug/kg	11.8	5.93	1
Cl2-BZ#8	2.60		ug/kg	1.18	0.593	1
Cl3-BZ#18	7.95		ug/kg	1.18	0.593	1
Cl3-BZ#28	5.83		ug/kg	1.18	0.593	1
Cl4-BZ#44	16.4		ug/kg	1.18	0.593	1
Cl4-BZ#49	9.02		ug/kg	1.18	0.593	1
Cl4-BZ#52	13.6		ug/kg	1.18	0.593	1
Cl4-BZ#66	9.84		ug/kg	1.18	0.593	1
Cl5-BZ#87	7.16		ug/kg	1.18	0.593	1
Cl5-BZ#101	22.6		ug/kg	1.18	0.593	1
Cl5-BZ#105	8.13		ug/kg	1.18	0.593	1
Cl5-BZ#118	14.7		ug/kg	1.18	0.593	1
Cl6-BZ#128	4.02		ug/kg	1.18	0.593	1
Cl6-BZ#138	20.2		ug/kg	1.18	0.593	1
Cl6-BZ#153	17.8		ug/kg	1.18	0.593	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-03 Date Collected: 08/10/17 09:55

Client ID: NHH-S-TOP Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	6.32		ug/kg	1.18	0.593	1
Cl7-BZ#180	11.2		ug/kg	1.18	0.593	1
Cl7-BZ#183	2.54		ug/kg	1.18	0.593	1
Cl7-BZ#184	ND		ug/kg	1.18	0.593	1
Cl7-BZ#187	8.90		ug/kg	1.18	0.593	1
Cl8-BZ#195	1.13	J	ug/kg	1.18	0.593	1
Cl9-BZ#206	2.38		ug/kg	1.18	0.593	1
Cl10-BZ#209	1.24		ug/kg	1.18	0.593	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	59		30-150
Benzo(b)fluoranthene-d12	56		30-150
DBOB	67		30-150
BZ 198	74		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-04
Client ID: NHH-J
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 15:12
Analyst: JT
Percent Solids: 42%

Date Collected: 08/10/17 11:41
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	207		ug/kg	12.0	5.99	1
Acenaphthylene	81.2		ug/kg	12.0	5.99	1
Acenaphthene	18.2		ug/kg	12.0	5.99	1
Fluorene	37.5		ug/kg	12.0	5.99	1
Phenanthrene	204		ug/kg	12.0	5.99	1
Anthracene	92.9		ug/kg	12.0	5.99	1
Fluoranthene	537		ug/kg	12.0	5.99	1
Pyrene	527		ug/kg	12.0	5.99	1
Benz(a)anthracene	298		ug/kg	12.0	5.99	1
Chrysene	321		ug/kg	12.0	5.99	1
Benzo(b)fluoranthene	391		ug/kg	12.0	5.99	1
Benzo(k)fluoranthene	309		ug/kg	12.0	5.99	1
Benzo(a)pyrene	354		ug/kg	12.0	5.99	1
Indeno(1,2,3-cd)Pyrene	290		ug/kg	12.0	5.99	1
Dibenz(a,h)anthracene	64.1		ug/kg	12.0	5.99	1
Benzo(ghi)perylene	302		ug/kg	12.0	5.99	1
Cl2-BZ#8	ND		ug/kg	1.20	0.599	1
Cl3-BZ#18	1.41		ug/kg	1.20	0.599	1
Cl3-BZ#28	2.04		ug/kg	1.20	0.599	1
Cl4-BZ#44	3.54		ug/kg	1.20	0.599	1
Cl4-BZ#49	2.45		ug/kg	1.20	0.599	1
Cl4-BZ#52	4.93		ug/kg	1.20	0.599	1
Cl4-BZ#66	3.31		ug/kg	1.20	0.599	1
Cl5-BZ#87	2.04		ug/kg	1.20	0.599	1
Cl5-BZ#101	5.33		ug/kg	1.20	0.599	1
Cl5-BZ#105	6.57		ug/kg	1.20	0.599	1
Cl5-BZ#118	5.51		ug/kg	1.20	0.599	1
Cl6-BZ#128	1.26		ug/kg	1.20	0.599	1
Cl6-BZ#138	6.85		ug/kg	1.20	0.599	1
Cl6-BZ#153	5.68		ug/kg	1.20	0.599	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-04 Date Collected: 08/10/17 11:41

Client ID: NHH-J Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	2.07		ug/kg	1.20	0.599	1
Cl7-BZ#180	3.46		ug/kg	1.20	0.599	1
Cl7-BZ#183	1.09	J	ug/kg	1.20	0.599	1
Cl7-BZ#184	ND		ug/kg	1.20	0.599	1
Cl7-BZ#187	3.29		ug/kg	1.20	0.599	1
Cl8-BZ#195	ND		ug/kg	1.20	0.599	1
Cl9-BZ#206	1.78		ug/kg	1.20	0.599	1
Cl10-BZ#209	1.06	J	ug/kg	1.20	0.599	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	50		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	73		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-05
Client ID: NHH-L
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 05:01
Analyst: GP
Percent Solids: 46%

Date Collected: 08/10/17 13:00
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/31/17 09:30
Cleanup Method: EPA 3630
Cleanup Date: 09/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	532		ug/kg	10.3	5.17	1
Acenaphthylene	109		ug/kg	10.3	5.17	1
Acenaphthene	38.4		ug/kg	10.3	5.17	1
Fluorene	53.1		ug/kg	10.3	5.17	1
Phenanthrene	370		ug/kg	10.3	5.17	1
Anthracene	148		ug/kg	10.3	5.17	1
Fluoranthene	900		ug/kg	10.3	5.17	1
Pyrene	929		ug/kg	10.3	5.17	1
Benz(a)anthracene	565		ug/kg	10.3	5.17	1
Chrysene	589		ug/kg	10.3	5.17	1
Benzo(b)fluoranthene	566		ug/kg	10.3	5.17	1
Benzo(k)fluoranthene	404		ug/kg	10.3	5.17	1
Benzo(a)pyrene	570		ug/kg	10.3	5.17	1
Indeno(1,2,3-cd)Pyrene	365		ug/kg	10.3	5.17	1
Dibenz(a,h)anthracene	85.1		ug/kg	10.3	5.17	1
Benzo(ghi)perylene	446		ug/kg	10.3	5.17	1
Cl2-BZ#8	ND		ug/kg	1.03	0.517	1
Cl3-BZ#18	ND		ug/kg	1.03	0.517	1
Cl3-BZ#28	ND		ug/kg	1.03	0.517	1
Cl4-BZ#44	ND		ug/kg	1.03	0.517	1
Cl4-BZ#49	ND		ug/kg	1.03	0.517	1
Cl4-BZ#52	ND		ug/kg	1.03	0.517	1
Cl4-BZ#66	ND		ug/kg	1.03	0.517	1
Cl5-BZ#87	ND		ug/kg	1.03	0.517	1
Cl5-BZ#101	ND		ug/kg	1.03	0.517	1
Cl5-BZ#105	ND		ug/kg	1.03	0.517	1
Cl5-BZ#118	0.621	J	ug/kg	1.03	0.517	1
Cl6-BZ#128	ND		ug/kg	1.03	0.517	1
Cl6-BZ#138	ND		ug/kg	1.03	0.517	1
Cl6-BZ#153	ND		ug/kg	1.03	0.517	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-05 Date Collected: 08/10/17 13:00

Client ID: NHH-L Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.03	0.517	1
Cl7-BZ#180	ND		ug/kg	1.03	0.517	1
Cl7-BZ#183	ND		ug/kg	1.03	0.517	1
Cl7-BZ#184	ND		ug/kg	1.03	0.517	1
Cl7-BZ#187	ND		ug/kg	1.03	0.517	1
Cl8-BZ#195	ND		ug/kg	1.03	0.517	1
Cl9-BZ#206	0.945	J	ug/kg	1.03	0.517	1
Cl10-BZ#209	0.760	J	ug/kg	1.03	0.517	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	78		30-150
DBOB	94		30-150
BZ 198	93		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-06
Client ID: NHH-K-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 16:16
Analyst: JT
Percent Solids: 48%

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	26.8		ug/kg	10.3	5.16	1
Acenaphthylene	21.3		ug/kg	10.3	5.16	1
Acenaphthene	5.43	J	ug/kg	10.3	5.16	1
Fluorene	10.1	J	ug/kg	10.3	5.16	1
Phenanthrene	63.0		ug/kg	10.3	5.16	1
Anthracene	20.8		ug/kg	10.3	5.16	1
Fluoranthene	185		ug/kg	10.3	5.16	1
Pyrene	179		ug/kg	10.3	5.16	1
Benz(a)anthracene	98.1		ug/kg	10.3	5.16	1
Chrysene	98.9		ug/kg	10.3	5.16	1
Benzo(b)fluoranthene	171		ug/kg	10.3	5.16	1
Benzo(k)fluoranthene	84.3		ug/kg	10.3	5.16	1
Benzo(a)pyrene	107		ug/kg	10.3	5.16	1
Indeno(1,2,3-cd)Pyrene	97.6		ug/kg	10.3	5.16	1
Dibenz(a,h)anthracene	25.8		ug/kg	10.3	5.16	1
Benzo(ghi)perylene	115		ug/kg	10.3	5.16	1
Cl2-BZ#8	ND		ug/kg	1.03	0.516	1
Cl3-BZ#18	ND		ug/kg	1.03	0.516	1
Cl3-BZ#28	ND		ug/kg	1.03	0.516	1
Cl4-BZ#44	0.675	J	ug/kg	1.03	0.516	1
Cl4-BZ#49	ND		ug/kg	1.03	0.516	1
Cl4-BZ#52	0.783	J	ug/kg	1.03	0.516	1
Cl4-BZ#66	0.815	J	ug/kg	1.03	0.516	1
Cl5-BZ#87	ND		ug/kg	1.03	0.516	1
Cl5-BZ#101	ND		ug/kg	1.03	0.516	1
Cl5-BZ#105	ND		ug/kg	1.03	0.516	1
Cl5-BZ#118	1.40		ug/kg	1.03	0.516	1
Cl6-BZ#128	ND		ug/kg	1.03	0.516	1
Cl6-BZ#138	1.60		ug/kg	1.03	0.516	1
Cl6-BZ#153	1.52		ug/kg	1.03	0.516	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-06 Date Collected: 08/10/17 14:09

Client ID: NHH-K-TOP Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.03	0.516	1
Cl7-BZ#180	0.865	J	ug/kg	1.03	0.516	1
Cl7-BZ#183	ND		ug/kg	1.03	0.516	1
Cl7-BZ#184	ND		ug/kg	1.03	0.516	1
Cl7-BZ#187	0.648	J	ug/kg	1.03	0.516	1
Cl8-BZ#195	ND		ug/kg	1.03	0.516	1
Cl9-BZ#206	ND		ug/kg	1.03	0.516	1
Cl10-BZ#209	ND		ug/kg	1.03	0.516	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	64		30-150
Benzo(b)fluoranthene-d12	61		30-150
DBOB	71		30-150
BZ 198	70		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-07
Client ID: NHH-H-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 16:48
Analyst: JT
Percent Solids: 49%

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	35.7		ug/kg	10.2	5.09	1
Acenaphthylene	26.6		ug/kg	10.2	5.09	1
Acenaphthene	9.53	J	ug/kg	10.2	5.09	1
Fluorene	18.6		ug/kg	10.2	5.09	1
Phenanthrene	108		ug/kg	10.2	5.09	1
Anthracene	26.3		ug/kg	10.2	5.09	1
Fluoranthene	227		ug/kg	10.2	5.09	1
Pyrene	215		ug/kg	10.2	5.09	1
Benz(a)anthracene	124		ug/kg	10.2	5.09	1
Chrysene	108		ug/kg	10.2	5.09	1
Benzo(b)fluoranthene	208		ug/kg	10.2	5.09	1
Benzo(k)fluoranthene	63.4		ug/kg	10.2	5.09	1
Benzo(a)pyrene	109		ug/kg	10.2	5.09	1
Indeno(1,2,3-cd)Pyrene	119		ug/kg	10.2	5.09	1
Dibenz(a,h)anthracene	22.6		ug/kg	10.2	5.09	1
Benzo(ghi)perylene	119		ug/kg	10.2	5.09	1
Cl2-BZ#8	ND		ug/kg	1.02	0.509	1
Cl3-BZ#18	1.17		ug/kg	1.02	0.509	1
Cl3-BZ#28	0.862	J	ug/kg	1.02	0.509	1
Cl4-BZ#44	1.92		ug/kg	1.02	0.509	1
Cl4-BZ#49	1.45		ug/kg	1.02	0.509	1
Cl4-BZ#52	2.56		ug/kg	1.02	0.509	1
Cl4-BZ#66	1.47		ug/kg	1.02	0.509	1
Cl5-BZ#87	ND		ug/kg	1.02	0.509	1
Cl5-BZ#101	2.73		ug/kg	1.02	0.509	1
Cl5-BZ#105	ND		ug/kg	1.02	0.509	1
Cl5-BZ#118	2.58		ug/kg	1.02	0.509	1
Cl6-BZ#128	ND		ug/kg	1.02	0.509	1
Cl6-BZ#138	3.14		ug/kg	1.02	0.509	1
Cl6-BZ#153	3.43		ug/kg	1.02	0.509	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-07 Date Collected: 08/10/17 14:58

Client ID: NHH-H-TOP Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	0.994	J	ug/kg	1.02	0.509	1
Cl7-BZ#180	1.53		ug/kg	1.02	0.509	1
Cl7-BZ#183	0.526	J	ug/kg	1.02	0.509	1
Cl7-BZ#184	ND		ug/kg	1.02	0.509	1
Cl7-BZ#187	2.15		ug/kg	1.02	0.509	1
Cl8-BZ#195	ND		ug/kg	1.02	0.509	1
Cl9-BZ#206	0.582	J	ug/kg	1.02	0.509	1
Cl10-BZ#209	ND		ug/kg	1.02	0.509	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	56		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	64		30-150
BZ 198	66		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-08
Client ID: NHH-H-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 17:21
Analyst: JT
Percent Solids: 47%

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	42.7		ug/kg	9.79	4.90	1
Acenaphthylene	36.0		ug/kg	9.79	4.90	1
Acenaphthene	9.37	J	ug/kg	9.79	4.90	1
Fluorene	18.6		ug/kg	9.79	4.90	1
Phenanthrene	114		ug/kg	9.79	4.90	1
Anthracene	31.8		ug/kg	9.79	4.90	1
Fluoranthene	286		ug/kg	9.79	4.90	1
Pyrene	277		ug/kg	9.79	4.90	1
Benz(a)anthracene	149		ug/kg	9.79	4.90	1
Chrysene	142		ug/kg	9.79	4.90	1
Benzo(b)fluoranthene	224		ug/kg	9.79	4.90	1
Benzo(k)fluoranthene	124		ug/kg	9.79	4.90	1
Benzo(a)pyrene	148		ug/kg	9.79	4.90	1
Indeno(1,2,3-cd)Pyrene	152		ug/kg	9.79	4.90	1
Dibenz(a,h)anthracene	27.6		ug/kg	9.79	4.90	1
Benzo(ghi)perylene	157		ug/kg	9.79	4.90	1
Cl2-BZ#8	0.553	J	ug/kg	0.979	0.490	1
Cl3-BZ#18	0.847	J	ug/kg	0.979	0.490	1
Cl3-BZ#28	0.972	J	ug/kg	0.979	0.490	1
Cl4-BZ#44	2.10		ug/kg	0.979	0.490	1
Cl4-BZ#49	2.15		ug/kg	0.979	0.490	1
Cl4-BZ#52	3.10		ug/kg	0.979	0.490	1
Cl4-BZ#66	2.32		ug/kg	0.979	0.490	1
Cl5-BZ#87	0.636	J	ug/kg	0.979	0.490	1
Cl5-BZ#101	3.45		ug/kg	0.979	0.490	1
Cl5-BZ#105	ND		ug/kg	0.979	0.490	1
Cl5-BZ#118	2.65		ug/kg	0.979	0.490	1
Cl6-BZ#128	0.614	J	ug/kg	0.979	0.490	1
Cl6-BZ#138	3.97		ug/kg	0.979	0.490	1
Cl6-BZ#153	3.97		ug/kg	0.979	0.490	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-08 Date Collected: 08/10/17 14:58

Client ID: NHH-H-REP-TOP Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.13		ug/kg	0.979	0.490	1
Cl7-BZ#180	2.19		ug/kg	0.979	0.490	1
Cl7-BZ#183	0.632	J	ug/kg	0.979	0.490	1
Cl7-BZ#184	ND		ug/kg	0.979	0.490	1
Cl7-BZ#187	2.57		ug/kg	0.979	0.490	1
Cl8-BZ#195	ND		ug/kg	0.979	0.490	1
Cl9-BZ#206	0.942	J	ug/kg	0.979	0.490	1
Cl10-BZ#209	0.548	J	ug/kg	0.979	0.490	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	57		30-150
DBOB	67		30-150
BZ 198	72		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-09
Client ID: NHH-H-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 17:53
Analyst: JT
Percent Solids: 71%

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	6.86	3.43	1
Acenaphthylene	ND		ug/kg	6.86	3.43	1
Acenaphthene	ND		ug/kg	6.86	3.43	1
Fluorene	ND		ug/kg	6.86	3.43	1
Phenanthrene	ND		ug/kg	6.86	3.43	1
Anthracene	ND		ug/kg	6.86	3.43	1
Fluoranthene	ND		ug/kg	6.86	3.43	1
Pyrene	ND		ug/kg	6.86	3.43	1
Benz(a)anthracene	ND		ug/kg	6.86	3.43	1
Chrysene	ND		ug/kg	6.86	3.43	1
Benzo(b)fluoranthene	ND		ug/kg	6.86	3.43	1
Benzo(k)fluoranthene	ND		ug/kg	6.86	3.43	1
Benzo(a)pyrene	ND		ug/kg	6.86	3.43	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	6.86	3.43	1
Dibenz(a,h)anthracene	ND		ug/kg	6.86	3.43	1
Benzo(ghi)perylene	ND		ug/kg	6.86	3.43	1
Cl2-BZ#8	ND		ug/kg	0.686	0.343	1
Cl3-BZ#18	ND		ug/kg	0.686	0.343	1
Cl3-BZ#28	ND		ug/kg	0.686	0.343	1
Cl4-BZ#44	ND		ug/kg	0.686	0.343	1
Cl4-BZ#49	ND		ug/kg	0.686	0.343	1
Cl4-BZ#52	ND		ug/kg	0.686	0.343	1
Cl4-BZ#66	ND		ug/kg	0.686	0.343	1
Cl5-BZ#87	ND		ug/kg	0.686	0.343	1
Cl5-BZ#101	ND		ug/kg	0.686	0.343	1
Cl5-BZ#105	ND		ug/kg	0.686	0.343	1
Cl5-BZ#118	ND		ug/kg	0.686	0.343	1
Cl6-BZ#128	ND		ug/kg	0.686	0.343	1
Cl6-BZ#138	ND		ug/kg	0.686	0.343	1
Cl6-BZ#153	ND		ug/kg	0.686	0.343	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-09 Date Collected: 08/10/17 14:58

Client ID: NHH-H-BOTTOM Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.686	0.343	1
Cl7-BZ#180	ND		ug/kg	0.686	0.343	1
Cl7-BZ#183	ND		ug/kg	0.686	0.343	1
Cl7-BZ#184	ND		ug/kg	0.686	0.343	1
Cl7-BZ#187	ND		ug/kg	0.686	0.343	1
Cl8-BZ#195	ND		ug/kg	0.686	0.343	1
Cl9-BZ#206	ND		ug/kg	0.686	0.343	1
Cl10-BZ#209	ND		ug/kg	0.686	0.343	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	61		30-150
Benzo(b)fluoranthene-d12	59		30-150
DBOB	73		30-150
BZ 198	71		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-10
Client ID: NHH-I-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 18:25
Analyst: JT
Percent Solids: 48%

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.61	4.80	1
Acenaphthylene	ND		ug/kg	9.61	4.80	1
Acenaphthene	ND		ug/kg	9.61	4.80	1
Fluorene	ND		ug/kg	9.61	4.80	1
Phenanthrene	5.41	J	ug/kg	9.61	4.80	1
Anthracene	ND		ug/kg	9.61	4.80	1
Fluoranthene	7.31	J	ug/kg	9.61	4.80	1
Pyrene	8.25	J	ug/kg	9.61	4.80	1
Benz(a)anthracene	ND		ug/kg	9.61	4.80	1
Chrysene	5.52	J	ug/kg	9.61	4.80	1
Benzo(b)fluoranthene	6.09	J	ug/kg	9.61	4.80	1
Benzo(k)fluoranthene	ND		ug/kg	9.61	4.80	1
Benzo(a)pyrene	ND		ug/kg	9.61	4.80	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.61	4.80	1
Dibenz(a,h)anthracene	ND		ug/kg	9.61	4.80	1
Benzo(ghi)perylene	5.01	J	ug/kg	9.61	4.80	1
Cl2-BZ#8	ND		ug/kg	0.961	0.480	1
Cl3-BZ#18	ND		ug/kg	0.961	0.480	1
Cl3-BZ#28	ND		ug/kg	0.961	0.480	1
Cl4-BZ#44	ND		ug/kg	0.961	0.480	1
Cl4-BZ#49	ND		ug/kg	0.961	0.480	1
Cl4-BZ#52	ND		ug/kg	0.961	0.480	1
Cl4-BZ#66	ND		ug/kg	0.961	0.480	1
Cl5-BZ#87	ND		ug/kg	0.961	0.480	1
Cl5-BZ#101	ND		ug/kg	0.961	0.480	1
Cl5-BZ#105	ND		ug/kg	0.961	0.480	1
Cl5-BZ#118	ND		ug/kg	0.961	0.480	1
Cl6-BZ#128	ND		ug/kg	0.961	0.480	1
Cl6-BZ#138	ND		ug/kg	0.961	0.480	1
Cl6-BZ#153	ND		ug/kg	0.961	0.480	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-10 Date Collected: 08/10/17 15:48

Client ID: NHH-I-TOP Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.961	0.480	1
Cl7-BZ#180	ND		ug/kg	0.961	0.480	1
Cl7-BZ#183	ND		ug/kg	0.961	0.480	1
Cl7-BZ#184	ND		ug/kg	0.961	0.480	1
Cl7-BZ#187	ND		ug/kg	0.961	0.480	1
Cl8-BZ#195	ND		ug/kg	0.961	0.480	1
Cl9-BZ#206	ND		ug/kg	0.961	0.480	1
Cl10-BZ#209	ND		ug/kg	0.961	0.480	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	49		30-150
Pyrene-d10	58		30-150
Benzo(b)fluoranthene-d12	53		30-150
DBOB	65		30-150
BZ 198	62		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-11
Client ID: NHH-I-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 10:19
Analyst: GP
Percent Solids: 48%

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	10.0	5.03	1
Acenaphthylene	ND		ug/kg	10.0	5.03	1
Acenaphthene	ND		ug/kg	10.0	5.03	1
Fluorene	ND		ug/kg	10.0	5.03	1
Phenanthrene	ND		ug/kg	10.0	5.03	1
Anthracene	ND		ug/kg	10.0	5.03	1
Fluoranthene	ND		ug/kg	10.0	5.03	1
Pyrene	ND		ug/kg	10.0	5.03	1
Benz(a)anthracene	ND		ug/kg	10.0	5.03	1
Chrysene	ND		ug/kg	10.0	5.03	1
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.03	1
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.03	1
Benzo(a)pyrene	ND		ug/kg	10.0	5.03	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.03	1
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.03	1
Benzo(ghi)perylene	ND		ug/kg	10.0	5.03	1
Cl2-BZ#8	ND		ug/kg	1.00	0.503	1
Cl3-BZ#18	ND		ug/kg	1.00	0.503	1
Cl3-BZ#28	ND		ug/kg	1.00	0.503	1
Cl4-BZ#44	ND		ug/kg	1.00	0.503	1
Cl4-BZ#49	ND		ug/kg	1.00	0.503	1
Cl4-BZ#52	ND		ug/kg	1.00	0.503	1
Cl4-BZ#66	ND		ug/kg	1.00	0.503	1
Cl5-BZ#87	ND		ug/kg	1.00	0.503	1
Cl5-BZ#101	ND		ug/kg	1.00	0.503	1
Cl5-BZ#105	ND		ug/kg	1.00	0.503	1
Cl5-BZ#118	ND		ug/kg	1.00	0.503	1
Cl6-BZ#128	ND		ug/kg	1.00	0.503	1
Cl6-BZ#138	ND		ug/kg	1.00	0.503	1
Cl6-BZ#153	ND		ug/kg	1.00	0.503	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-11 Date Collected: 08/10/17 15:48

Client ID: NHH-I-BOTTOM Date Received: 08/10/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.00	0.503	1
Cl7-BZ#180	ND		ug/kg	1.00	0.503	1
Cl7-BZ#183	ND		ug/kg	1.00	0.503	1
Cl7-BZ#184	ND		ug/kg	1.00	0.503	1
Cl7-BZ#187	ND		ug/kg	1.00	0.503	1
Cl8-BZ#195	ND		ug/kg	1.00	0.503	1
Cl9-BZ#206	ND		ug/kg	1.00	0.503	1
Cl10-BZ#209	ND		ug/kg	1.00	0.503	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	68		30-150
DBOB	89		30-150
BZ 198	85		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-12
Client ID: NHH-G-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 14:22
Analyst: GP
Percent Solids: 42%

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	83.8		ug/kg	11.0	5.51	1
Acenaphthylene	62.3		ug/kg	11.0	5.51	1
Acenaphthene	12.3		ug/kg	11.0	5.51	1
Fluorene	24.9		ug/kg	11.0	5.51	1
Phenanthrene	194		ug/kg	11.0	5.51	1
Anthracene	69.6		ug/kg	11.0	5.51	1
Fluoranthene	465		ug/kg	11.0	5.51	1
Pyrene	495		ug/kg	11.0	5.51	1
Benz(a)anthracene	245		ug/kg	11.0	5.51	1
Chrysene	277		ug/kg	11.0	5.51	1
Benzo(b)fluoranthene	338		ug/kg	11.0	5.51	1
Benzo(k)fluoranthene	235		ug/kg	11.0	5.51	1
Benzo(a)pyrene	278		ug/kg	11.0	5.51	1
Indeno(1,2,3-cd)Pyrene	215		ug/kg	11.0	5.51	1
Dibenz(a,h)anthracene	52.3		ug/kg	11.0	5.51	1
Benzo(ghi)perylene	247		ug/kg	11.0	5.51	1
Cl2-BZ#8	ND		ug/kg	1.10	0.551	1
Cl3-BZ#18	ND		ug/kg	1.10	0.551	1
Cl3-BZ#28	ND		ug/kg	1.10	0.551	1
Cl4-BZ#44	ND		ug/kg	1.10	0.551	1
Cl4-BZ#49	ND		ug/kg	1.10	0.551	1
Cl4-BZ#52	ND		ug/kg	1.10	0.551	1
Cl4-BZ#66	ND		ug/kg	1.10	0.551	1
Cl5-BZ#87	ND		ug/kg	1.10	0.551	1
Cl5-BZ#101	2.60		ug/kg	1.10	0.551	1
Cl5-BZ#105	ND		ug/kg	1.10	0.551	1
Cl5-BZ#118	ND		ug/kg	1.10	0.551	1
Cl6-BZ#128	ND		ug/kg	1.10	0.551	1
Cl6-BZ#138	3.40		ug/kg	1.10	0.551	1
Cl6-BZ#153	3.04		ug/kg	1.10	0.551	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-12 Date Collected: 08/11/17 08:37

Client ID: NHH-G-TOP Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.10	0.551	1
Cl7-BZ#180	2.73		ug/kg	1.10	0.551	1
Cl7-BZ#183	0.809	J	ug/kg	1.10	0.551	1
Cl7-BZ#184	ND		ug/kg	1.10	0.551	1
Cl7-BZ#187	1.83		ug/kg	1.10	0.551	1
Cl8-BZ#195	ND		ug/kg	1.10	0.551	1
Cl9-BZ#206	1.86		ug/kg	1.10	0.551	1
Cl10-BZ#209	1.70		ug/kg	1.10	0.551	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	66		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	98		30-150
BZ 198	101		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-13
Client ID: NHH-G-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 14:55
Analyst: GP
Percent Solids: 47%

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.93	4.97	1
Acenaphthylene	ND		ug/kg	9.93	4.97	1
Acenaphthene	ND		ug/kg	9.93	4.97	1
Fluorene	ND		ug/kg	9.93	4.97	1
Phenanthrene	ND		ug/kg	9.93	4.97	1
Anthracene	ND		ug/kg	9.93	4.97	1
Fluoranthene	ND		ug/kg	9.93	4.97	1
Pyrene	5.23	J	ug/kg	9.93	4.97	1
Benz(a)anthracene	ND		ug/kg	9.93	4.97	1
Chrysene	ND		ug/kg	9.93	4.97	1
Benzo(b)fluoranthene	ND		ug/kg	9.93	4.97	1
Benzo(k)fluoranthene	ND		ug/kg	9.93	4.97	1
Benzo(a)pyrene	ND		ug/kg	9.93	4.97	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.93	4.97	1
Dibenz(a,h)anthracene	ND		ug/kg	9.93	4.97	1
Benzo(ghi)perylene	ND		ug/kg	9.93	4.97	1
Cl2-BZ#8	ND		ug/kg	0.993	0.497	1
Cl3-BZ#18	ND		ug/kg	0.993	0.497	1
Cl3-BZ#28	ND		ug/kg	0.993	0.497	1
Cl4-BZ#44	ND		ug/kg	0.993	0.497	1
Cl4-BZ#49	ND		ug/kg	0.993	0.497	1
Cl4-BZ#52	ND		ug/kg	0.993	0.497	1
Cl4-BZ#66	ND		ug/kg	0.993	0.497	1
Cl5-BZ#87	ND		ug/kg	0.993	0.497	1
Cl5-BZ#101	ND		ug/kg	0.993	0.497	1
Cl5-BZ#105	ND		ug/kg	0.993	0.497	1
Cl5-BZ#118	ND		ug/kg	0.993	0.497	1
Cl6-BZ#128	ND		ug/kg	0.993	0.497	1
Cl6-BZ#138	ND		ug/kg	0.993	0.497	1
Cl6-BZ#153	ND		ug/kg	0.993	0.497	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-13 Date Collected: 08/11/17 08:37

Client ID: NHH-G-BOTTOM Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.993	0.497	1
Cl7-BZ#180	ND		ug/kg	0.993	0.497	1
Cl7-BZ#183	ND		ug/kg	0.993	0.497	1
Cl7-BZ#184	ND		ug/kg	0.993	0.497	1
Cl7-BZ#187	ND		ug/kg	0.993	0.497	1
Cl8-BZ#195	ND		ug/kg	0.993	0.497	1
Cl9-BZ#206	ND		ug/kg	0.993	0.497	1
Cl10-BZ#209	ND		ug/kg	0.993	0.497	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	66		30-150
Pyrene-d10	74		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	102		30-150
BZ 198	92		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-14
Client ID: NHH-C-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 15:28
Analyst: GP
Percent Solids: 70%

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	6.58	3.29	1
Acenaphthylene	ND		ug/kg	6.58	3.29	1
Acenaphthene	ND		ug/kg	6.58	3.29	1
Fluorene	ND		ug/kg	6.58	3.29	1
Phenanthrene	6.02	J	ug/kg	6.58	3.29	1
Anthracene	ND		ug/kg	6.58	3.29	1
Fluoranthene	8.65		ug/kg	6.58	3.29	1
Pyrene	12.6		ug/kg	6.58	3.29	1
Benz(a)anthracene	5.97	J	ug/kg	6.58	3.29	1
Chrysene	7.06		ug/kg	6.58	3.29	1
Benzo(b)fluoranthene	10.9		ug/kg	6.58	3.29	1
Benzo(k)fluoranthene	6.81		ug/kg	6.58	3.29	1
Benzo(a)pyrene	8.58		ug/kg	6.58	3.29	1
Indeno(1,2,3-cd)Pyrene	7.17		ug/kg	6.58	3.29	1
Dibenz(a,h)anthracene	ND		ug/kg	6.58	3.29	1
Benzo(ghi)perylene	8.33		ug/kg	6.58	3.29	1
Cl2-BZ#8	ND		ug/kg	0.658	0.329	1
Cl3-BZ#18	ND		ug/kg	0.658	0.329	1
Cl3-BZ#28	ND		ug/kg	0.658	0.329	1
Cl4-BZ#44	ND		ug/kg	0.658	0.329	1
Cl4-BZ#49	ND		ug/kg	0.658	0.329	1
Cl4-BZ#52	ND		ug/kg	0.658	0.329	1
Cl4-BZ#66	ND		ug/kg	0.658	0.329	1
Cl5-BZ#87	ND		ug/kg	0.658	0.329	1
Cl5-BZ#101	ND		ug/kg	0.658	0.329	1
Cl5-BZ#105	ND		ug/kg	0.658	0.329	1
Cl5-BZ#118	ND		ug/kg	0.658	0.329	1
Cl6-BZ#128	ND		ug/kg	0.658	0.329	1
Cl6-BZ#138	ND		ug/kg	0.658	0.329	1
Cl6-BZ#153	ND		ug/kg	0.658	0.329	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-14 Date Collected: 08/11/17 10:33

Client ID: NHH-C-TOP Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.658	0.329	1
Cl7-BZ#180	ND		ug/kg	0.658	0.329	1
Cl7-BZ#183	ND		ug/kg	0.658	0.329	1
Cl7-BZ#184	ND		ug/kg	0.658	0.329	1
Cl7-BZ#187	ND		ug/kg	0.658	0.329	1
Cl8-BZ#195	ND		ug/kg	0.658	0.329	1
Cl9-BZ#206	ND		ug/kg	0.658	0.329	1
Cl10-BZ#209	ND		ug/kg	0.658	0.329	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		30-150
Pyrene-d10	80		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	104		30-150
BZ 198	93		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-15
Client ID: NHH-C-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 16:01
Analyst: GP
Percent Solids: 62%

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.57	3.79	1
Acenaphthylene	ND		ug/kg	7.57	3.79	1
Acenaphthene	ND		ug/kg	7.57	3.79	1
Fluorene	ND		ug/kg	7.57	3.79	1
Phenanthrene	ND		ug/kg	7.57	3.79	1
Anthracene	ND		ug/kg	7.57	3.79	1
Fluoranthene	ND		ug/kg	7.57	3.79	1
Pyrene	ND		ug/kg	7.57	3.79	1
Benz(a)anthracene	ND		ug/kg	7.57	3.79	1
Chrysene	ND		ug/kg	7.57	3.79	1
Benzo(b)fluoranthene	ND		ug/kg	7.57	3.79	1
Benzo(k)fluoranthene	ND		ug/kg	7.57	3.79	1
Benzo(a)pyrene	ND		ug/kg	7.57	3.79	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	7.57	3.79	1
Dibenz(a,h)anthracene	ND		ug/kg	7.57	3.79	1
Benzo(ghi)perylene	ND		ug/kg	7.57	3.79	1
Cl2-BZ#8	ND		ug/kg	0.757	0.379	1
Cl3-BZ#18	ND		ug/kg	0.757	0.379	1
Cl3-BZ#28	ND		ug/kg	0.757	0.379	1
Cl4-BZ#44	ND		ug/kg	0.757	0.379	1
Cl4-BZ#49	ND		ug/kg	0.757	0.379	1
Cl4-BZ#52	ND		ug/kg	0.757	0.379	1
Cl4-BZ#66	ND		ug/kg	0.757	0.379	1
Cl5-BZ#87	ND		ug/kg	0.757	0.379	1
Cl5-BZ#101	ND		ug/kg	0.757	0.379	1
Cl5-BZ#105	ND		ug/kg	0.757	0.379	1
Cl5-BZ#118	ND		ug/kg	0.757	0.379	1
Cl6-BZ#128	ND		ug/kg	0.757	0.379	1
Cl6-BZ#138	ND		ug/kg	0.757	0.379	1
Cl6-BZ#153	ND		ug/kg	0.757	0.379	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-15 Date Collected: 08/11/17 10:33

Client ID: NHH-C-BOTTOM Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.757	0.379	1
Cl7-BZ#180	ND		ug/kg	0.757	0.379	1
Cl7-BZ#183	ND		ug/kg	0.757	0.379	1
Cl7-BZ#184	ND		ug/kg	0.757	0.379	1
Cl7-BZ#187	ND		ug/kg	0.757	0.379	1
Cl8-BZ#195	ND		ug/kg	0.757	0.379	1
Cl9-BZ#206	ND		ug/kg	0.757	0.379	1
Cl10-BZ#209	ND		ug/kg	0.757	0.379	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	95		30-150
BZ 198	85		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-16
Client ID: NHH-B
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 18:57
Analyst: JT
Percent Solids: 69%

Date Collected: 08/11/17 11:57
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	6.81	3.40	1
Acenaphthylene	ND		ug/kg	6.81	3.40	1
Acenaphthene	ND		ug/kg	6.81	3.40	1
Fluorene	ND		ug/kg	6.81	3.40	1
Phenanthrene	ND		ug/kg	6.81	3.40	1
Anthracene	ND		ug/kg	6.81	3.40	1
Fluoranthene	ND		ug/kg	6.81	3.40	1
Pyrene	ND		ug/kg	6.81	3.40	1
Benz(a)anthracene	ND		ug/kg	6.81	3.40	1
Chrysene	ND		ug/kg	6.81	3.40	1
Benzo(b)fluoranthene	ND		ug/kg	6.81	3.40	1
Benzo(k)fluoranthene	ND		ug/kg	6.81	3.40	1
Benzo(a)pyrene	ND		ug/kg	6.81	3.40	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	6.81	3.40	1
Dibenz(a,h)anthracene	ND		ug/kg	6.81	3.40	1
Benzo(ghi)perylene	ND		ug/kg	6.81	3.40	1
Cl2-BZ#8	ND		ug/kg	0.681	0.340	1
Cl3-BZ#18	ND		ug/kg	0.681	0.340	1
Cl3-BZ#28	ND		ug/kg	0.681	0.340	1
Cl4-BZ#44	ND		ug/kg	0.681	0.340	1
Cl4-BZ#49	ND		ug/kg	0.681	0.340	1
Cl4-BZ#52	ND		ug/kg	0.681	0.340	1
Cl4-BZ#66	ND		ug/kg	0.681	0.340	1
Cl5-BZ#87	ND		ug/kg	0.681	0.340	1
Cl5-BZ#101	ND		ug/kg	0.681	0.340	1
Cl5-BZ#105	ND		ug/kg	0.681	0.340	1
Cl5-BZ#118	ND		ug/kg	0.681	0.340	1
Cl6-BZ#128	ND		ug/kg	0.681	0.340	1
Cl6-BZ#138	ND		ug/kg	0.681	0.340	1
Cl6-BZ#153	ND		ug/kg	0.681	0.340	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-16 Date Collected: 08/11/17 11:57

Client ID: NHH-B Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.681	0.340	1
Cl7-BZ#180	ND		ug/kg	0.681	0.340	1
Cl7-BZ#183	ND		ug/kg	0.681	0.340	1
Cl7-BZ#184	ND		ug/kg	0.681	0.340	1
Cl7-BZ#187	ND		ug/kg	0.681	0.340	1
Cl8-BZ#195	ND		ug/kg	0.681	0.340	1
Cl9-BZ#206	ND		ug/kg	0.681	0.340	1
Cl10-BZ#209	ND		ug/kg	0.681	0.340	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	53		30-150
Pyrene-d10	56		30-150
Benzo(b)fluoranthene-d12	50		30-150
DBOB	62		30-150
BZ 198	57		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-17
Client ID: NHH-A-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 16:33
Analyst: GP
Percent Solids: 61%

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.06	4.03	1
Acenaphthylene	ND		ug/kg	8.06	4.03	1
Acenaphthene	ND		ug/kg	8.06	4.03	1
Fluorene	ND		ug/kg	8.06	4.03	1
Phenanthrene	5.18	J	ug/kg	8.06	4.03	1
Anthracene	ND		ug/kg	8.06	4.03	1
Fluoranthene	10.7		ug/kg	8.06	4.03	1
Pyrene	17.6		ug/kg	8.06	4.03	1
Benz(a)anthracene	6.64	J	ug/kg	8.06	4.03	1
Chrysene	7.58	J	ug/kg	8.06	4.03	1
Benzo(b)fluoranthene	8.12		ug/kg	8.06	4.03	1
Benzo(k)fluoranthene	8.93		ug/kg	8.06	4.03	1
Benzo(a)pyrene	8.08		ug/kg	8.06	4.03	1
Indeno(1,2,3-cd)Pyrene	6.56	J	ug/kg	8.06	4.03	1
Dibenz(a,h)anthracene	ND		ug/kg	8.06	4.03	1
Benzo(ghi)perylene	7.84	J	ug/kg	8.06	4.03	1
Cl2-BZ#8	ND		ug/kg	0.806	0.403	1
Cl3-BZ#18	ND		ug/kg	0.806	0.403	1
Cl3-BZ#28	ND		ug/kg	0.806	0.403	1
Cl4-BZ#44	ND		ug/kg	0.806	0.403	1
Cl4-BZ#49	ND		ug/kg	0.806	0.403	1
Cl4-BZ#52	ND		ug/kg	0.806	0.403	1
Cl4-BZ#66	ND		ug/kg	0.806	0.403	1
Cl5-BZ#87	ND		ug/kg	0.806	0.403	1
Cl5-BZ#101	ND		ug/kg	0.806	0.403	1
Cl5-BZ#105	ND		ug/kg	0.806	0.403	1
Cl5-BZ#118	ND		ug/kg	0.806	0.403	1
Cl6-BZ#128	ND		ug/kg	0.806	0.403	1
Cl6-BZ#138	ND		ug/kg	0.806	0.403	1
Cl6-BZ#153	ND		ug/kg	0.806	0.403	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-17 Date Collected: 08/11/17 13:40

Client ID: NHH-A-TOP Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.806	0.403	1
Cl7-BZ#180	ND		ug/kg	0.806	0.403	1
Cl7-BZ#183	ND		ug/kg	0.806	0.403	1
Cl7-BZ#184	ND		ug/kg	0.806	0.403	1
Cl7-BZ#187	ND		ug/kg	0.806	0.403	1
Cl8-BZ#195	ND		ug/kg	0.806	0.403	1
Cl9-BZ#206	ND		ug/kg	0.806	0.403	1
Cl10-BZ#209	ND		ug/kg	0.806	0.403	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	65		30-150
Pyrene-d10	77		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	98		30-150
BZ 198	91		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-18
Client ID: NHH-D-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 17:06
Analyst: GP
Percent Solids: 60%

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	7.94	3.97	1
Acenaphthylene	ND		ug/kg	7.94	3.97	1
Acenaphthene	ND		ug/kg	7.94	3.97	1
Fluorene	ND		ug/kg	7.94	3.97	1
Phenanthrene	ND		ug/kg	7.94	3.97	1
Anthracene	ND		ug/kg	7.94	3.97	1
Fluoranthene	ND		ug/kg	7.94	3.97	1
Pyrene	ND		ug/kg	7.94	3.97	1
Benz(a)anthracene	ND		ug/kg	7.94	3.97	1
Chrysene	ND		ug/kg	7.94	3.97	1
Benzo(b)fluoranthene	ND		ug/kg	7.94	3.97	1
Benzo(k)fluoranthene	ND		ug/kg	7.94	3.97	1
Benzo(a)pyrene	ND		ug/kg	7.94	3.97	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	7.94	3.97	1
Dibenz(a,h)anthracene	ND		ug/kg	7.94	3.97	1
Benzo(ghi)perylene	ND		ug/kg	7.94	3.97	1
Cl2-BZ#8	ND		ug/kg	0.794	0.397	1
Cl3-BZ#18	ND		ug/kg	0.794	0.397	1
Cl3-BZ#28	ND		ug/kg	0.794	0.397	1
Cl4-BZ#44	ND		ug/kg	0.794	0.397	1
Cl4-BZ#49	ND		ug/kg	0.794	0.397	1
Cl4-BZ#52	ND		ug/kg	0.794	0.397	1
Cl4-BZ#66	ND		ug/kg	0.794	0.397	1
Cl5-BZ#87	ND		ug/kg	0.794	0.397	1
Cl5-BZ#101	ND		ug/kg	0.794	0.397	1
Cl5-BZ#105	ND		ug/kg	0.794	0.397	1
Cl5-BZ#118	ND		ug/kg	0.794	0.397	1
Cl6-BZ#128	ND		ug/kg	0.794	0.397	1
Cl6-BZ#138	ND		ug/kg	0.794	0.397	1
Cl6-BZ#153	ND		ug/kg	0.794	0.397	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-18 Date Collected: 08/11/17 15:07

Client ID: NHH-D-TOP Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.794	0.397	1
Cl7-BZ#180	ND		ug/kg	0.794	0.397	1
Cl7-BZ#183	ND		ug/kg	0.794	0.397	1
Cl7-BZ#184	ND		ug/kg	0.794	0.397	1
Cl7-BZ#187	ND		ug/kg	0.794	0.397	1
Cl8-BZ#195	ND		ug/kg	0.794	0.397	1
Cl9-BZ#206	ND		ug/kg	0.794	0.397	1
Cl10-BZ#209	ND		ug/kg	0.794	0.397	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	91		30-150
BZ 198	83		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-19
Client ID: NHH-D-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 17:38
Analyst: GP
Percent Solids: 66%

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	6.92	3.46	1
Acenaphthylene	ND		ug/kg	6.92	3.46	1
Acenaphthene	ND		ug/kg	6.92	3.46	1
Fluorene	ND		ug/kg	6.92	3.46	1
Phenanthrene	ND		ug/kg	6.92	3.46	1
Anthracene	ND		ug/kg	6.92	3.46	1
Fluoranthene	ND		ug/kg	6.92	3.46	1
Pyrene	ND		ug/kg	6.92	3.46	1
Benz(a)anthracene	ND		ug/kg	6.92	3.46	1
Chrysene	ND		ug/kg	6.92	3.46	1
Benzo(b)fluoranthene	ND		ug/kg	6.92	3.46	1
Benzo(k)fluoranthene	ND		ug/kg	6.92	3.46	1
Benzo(a)pyrene	ND		ug/kg	6.92	3.46	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	6.92	3.46	1
Dibenz(a,h)anthracene	ND		ug/kg	6.92	3.46	1
Benzo(ghi)perylene	ND		ug/kg	6.92	3.46	1
Cl2-BZ#8	ND		ug/kg	0.692	0.346	1
Cl3-BZ#18	ND		ug/kg	0.692	0.346	1
Cl3-BZ#28	ND		ug/kg	0.692	0.346	1
Cl4-BZ#44	ND		ug/kg	0.692	0.346	1
Cl4-BZ#49	ND		ug/kg	0.692	0.346	1
Cl4-BZ#52	ND		ug/kg	0.692	0.346	1
Cl4-BZ#66	ND		ug/kg	0.692	0.346	1
Cl5-BZ#87	ND		ug/kg	0.692	0.346	1
Cl5-BZ#101	ND		ug/kg	0.692	0.346	1
Cl5-BZ#105	ND		ug/kg	0.692	0.346	1
Cl5-BZ#118	ND		ug/kg	0.692	0.346	1
Cl6-BZ#128	ND		ug/kg	0.692	0.346	1
Cl6-BZ#138	ND		ug/kg	0.692	0.346	1
Cl6-BZ#153	ND		ug/kg	0.692	0.346	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-19 Date Collected: 08/11/17 15:07

Client ID: NHH-D-BOTTOM Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.692	0.346	1
Cl7-BZ#180	ND		ug/kg	0.692	0.346	1
Cl7-BZ#183	ND		ug/kg	0.692	0.346	1
Cl7-BZ#184	ND		ug/kg	0.692	0.346	1
Cl7-BZ#187	ND		ug/kg	0.692	0.346	1
Cl8-BZ#195	ND		ug/kg	0.692	0.346	1
Cl9-BZ#206	ND		ug/kg	0.692	0.346	1
Cl10-BZ#209	ND		ug/kg	0.692	0.346	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	97		30-150
BZ 198	85		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-20
Client ID: NHH-F-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 18:11
Analyst: GP
Percent Solids: 40%

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	36.3		ug/kg	12.0	5.98	1
Acenaphthylene	41.7		ug/kg	12.0	5.98	1
Acenaphthene	20.4		ug/kg	12.0	5.98	1
Fluorene	27.3		ug/kg	12.0	5.98	1
Phenanthrene	134		ug/kg	12.0	5.98	1
Anthracene	44.0		ug/kg	12.0	5.98	1
Fluoranthene	226		ug/kg	12.0	5.98	1
Pyrene	269		ug/kg	12.0	5.98	1
Benz(a)anthracene	120		ug/kg	12.0	5.98	1
Chrysene	167		ug/kg	12.0	5.98	1
Benzo(b)fluoranthene	217		ug/kg	12.0	5.98	1
Benzo(k)fluoranthene	161		ug/kg	12.0	5.98	1
Benzo(a)pyrene	181		ug/kg	12.0	5.98	1
Indeno(1,2,3-cd)Pyrene	146		ug/kg	12.0	5.98	1
Dibenz(a,h)anthracene	42.5		ug/kg	12.0	5.98	1
Benzo(ghi)perylene	170		ug/kg	12.0	5.98	1
Cl2-BZ#8	ND		ug/kg	1.20	0.598	1
Cl3-BZ#18	ND		ug/kg	1.20	0.598	1
Cl3-BZ#28	ND		ug/kg	1.20	0.598	1
Cl4-BZ#44	ND		ug/kg	1.20	0.598	1
Cl4-BZ#49	ND		ug/kg	1.20	0.598	1
Cl4-BZ#52	1.97		ug/kg	1.20	0.598	1
Cl4-BZ#66	1.95		ug/kg	1.20	0.598	1
Cl5-BZ#87	ND		ug/kg	1.20	0.598	1
Cl5-BZ#101	2.88		ug/kg	1.20	0.598	1
Cl5-BZ#105	1.57		ug/kg	1.20	0.598	1
Cl5-BZ#118	3.06		ug/kg	1.20	0.598	1
Cl6-BZ#128	0.889	J	ug/kg	1.20	0.598	1
Cl6-BZ#138	4.13		ug/kg	1.20	0.598	1
Cl6-BZ#153	3.58		ug/kg	1.20	0.598	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-20 Date Collected: 08/11/17 16:50

Client ID: NHH-F-TOP Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	0.979	J	ug/kg	1.20	0.598	1
Cl7-BZ#180	1.74		ug/kg	1.20	0.598	1
Cl7-BZ#183	ND		ug/kg	1.20	0.598	1
Cl7-BZ#184	ND		ug/kg	1.20	0.598	1
Cl7-BZ#187	1.92		ug/kg	1.20	0.598	1
Cl8-BZ#195	ND		ug/kg	1.20	0.598	1
Cl9-BZ#206	ND		ug/kg	1.20	0.598	1
Cl10-BZ#209	ND		ug/kg	1.20	0.598	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	71		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	98		30-150
BZ 198	94		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-21
Client ID: NHH-F-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 18:43
Analyst: GP
Percent Solids: 43%

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	41.4		ug/kg	11.3	5.63	1
Acenaphthylene	49.6		ug/kg	11.3	5.63	1
Acenaphthene	6.58	J	ug/kg	11.3	5.63	1
Fluorene	14.1		ug/kg	11.3	5.63	1
Phenanthrene	95.1		ug/kg	11.3	5.63	1
Anthracene	52.1		ug/kg	11.3	5.63	1
Fluoranthene	259		ug/kg	11.3	5.63	1
Pyrene	297		ug/kg	11.3	5.63	1
Benz(a)anthracene	127		ug/kg	11.3	5.63	1
Chrysene	176		ug/kg	11.3	5.63	1
Benzo(b)fluoranthene	229		ug/kg	11.3	5.63	1
Benzo(k)fluoranthene	178		ug/kg	11.3	5.63	1
Benzo(a)pyrene	198		ug/kg	11.3	5.63	1
Indeno(1,2,3-cd)Pyrene	158		ug/kg	11.3	5.63	1
Dibenz(a,h)anthracene	45.0		ug/kg	11.3	5.63	1
Benzo(ghi)perylene	183		ug/kg	11.3	5.63	1
Cl2-BZ#8	ND		ug/kg	1.13	0.563	1
Cl3-BZ#18	ND		ug/kg	1.13	0.563	1
Cl3-BZ#28	ND		ug/kg	1.13	0.563	1
Cl4-BZ#44	ND		ug/kg	1.13	0.563	1
Cl4-BZ#49	ND		ug/kg	1.13	0.563	1
Cl4-BZ#52	2.89		ug/kg	1.13	0.563	1
Cl4-BZ#66	2.22		ug/kg	1.13	0.563	1
Cl5-BZ#87	ND		ug/kg	1.13	0.563	1
Cl5-BZ#101	3.33		ug/kg	1.13	0.563	1
Cl5-BZ#105	1.23		ug/kg	1.13	0.563	1
Cl5-BZ#118	3.44		ug/kg	1.13	0.563	1
Cl6-BZ#128	1.13		ug/kg	1.13	0.563	1
Cl6-BZ#138	5.06		ug/kg	1.13	0.563	1
Cl6-BZ#153	3.91		ug/kg	1.13	0.563	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-21 Date Collected: 08/11/17 16:50

Client ID: NHH-F-REP-TOP Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.33		ug/kg	1.13	0.563	1
Cl7-BZ#180	2.24		ug/kg	1.13	0.563	1
Cl7-BZ#183	0.758	J	ug/kg	1.13	0.563	1
Cl7-BZ#184	ND		ug/kg	1.13	0.563	1
Cl7-BZ#187	2.29		ug/kg	1.13	0.563	1
Cl8-BZ#195	ND		ug/kg	1.13	0.563	1
Cl9-BZ#206	0.988	J	ug/kg	1.13	0.563	1
Cl10-BZ#209	0.845	J	ug/kg	1.13	0.563	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	71		30-150
Pyrene-d10	77		30-150
Benzo(b)fluoranthene-d12	72		30-150
DBOB	108		30-150
BZ 198	99		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-22
Client ID: NHH-F-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 19:16
Analyst: GP
Percent Solids: 45%

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	116		ug/kg	10.2	5.10	1
Acenaphthylene	60.7		ug/kg	10.2	5.10	1
Acenaphthene	24.0		ug/kg	10.2	5.10	1
Fluorene	36.3		ug/kg	10.2	5.10	1
Phenanthrene	234		ug/kg	10.2	5.10	1
Anthracene	67.1		ug/kg	10.2	5.10	1
Fluoranthene	457		ug/kg	10.2	5.10	1
Pyrene	469		ug/kg	10.2	5.10	1
Benz(a)anthracene	243		ug/kg	10.2	5.10	1
Chrysene	263		ug/kg	10.2	5.10	1
Benzo(b)fluoranthene	323		ug/kg	10.2	5.10	1
Benzo(k)fluoranthene	184		ug/kg	10.2	5.10	1
Benzo(a)pyrene	235		ug/kg	10.2	5.10	1
Indeno(1,2,3-cd)Pyrene	194		ug/kg	10.2	5.10	1
Dibenz(a,h)anthracene	49.3		ug/kg	10.2	5.10	1
Benzo(ghi)perylene	229		ug/kg	10.2	5.10	1
Cl2-BZ#8	ND		ug/kg	1.02	0.510	1
Cl3-BZ#18	ND		ug/kg	1.02	0.510	1
Cl3-BZ#28	ND		ug/kg	1.02	0.510	1
Cl4-BZ#44	ND		ug/kg	1.02	0.510	1
Cl4-BZ#49	ND		ug/kg	1.02	0.510	1
Cl4-BZ#52	ND		ug/kg	1.02	0.510	1
Cl4-BZ#66	ND		ug/kg	1.02	0.510	1
Cl5-BZ#87	ND		ug/kg	1.02	0.510	1
Cl5-BZ#101	2.06		ug/kg	1.02	0.510	1
Cl5-BZ#105	ND		ug/kg	1.02	0.510	1
Cl5-BZ#118	3.80		ug/kg	1.02	0.510	1
Cl6-BZ#128	ND		ug/kg	1.02	0.510	1
Cl6-BZ#138	2.95		ug/kg	1.02	0.510	1
Cl6-BZ#153	2.87		ug/kg	1.02	0.510	1

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-22 Date Collected: 08/11/17 16:50

Client ID: NHH-F-BOTTOM Date Received: 08/11/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	0.605	J	ug/kg	1.02	0.510	1
Cl7-BZ#180	2.20		ug/kg	1.02	0.510	1
Cl7-BZ#183	0.692	J	ug/kg	1.02	0.510	1
Cl7-BZ#184	ND		ug/kg	1.02	0.510	1
Cl7-BZ#187	1.78		ug/kg	1.02	0.510	1
Cl8-BZ#195	ND		ug/kg	1.02	0.510	1
Cl9-BZ#206	2.28		ug/kg	1.02	0.510	1
Cl10-BZ#209	3.23		ug/kg	1.02	0.510	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	66		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	99		30-150
BZ 198	99		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 11:26
Analyst: JT

Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-04,06-10,16 Batch: WG1033334-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/29/17 11:26
Analyst: JT

Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-04,06-10,16 Batch: WG1033334-1					
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	63		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	74		30-150
BZ 198	69		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 11:29
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 11-15,17-22 Batch: WG1033339-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/30/17 11:29
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 11-15,17-22 Batch: WG1033339-1					
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	70		30-150
Benzo(b)fluoranthene-d12	72		30-150
DBOB	85		30-150
BZ 198	90		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 00:47
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/31/17 09:30
Cleanup Method: EPA 3630
Cleanup Date: 09/01/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 05 Batch: WG1037293-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 00:47
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/31/17 09:30
Cleanup Method: EPA 3630
Cleanup Date: 09/01/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 05 Batch: WG1037293-1					
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	70		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	95		30-150
BZ 198	87		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 Batch: WG1033334-2 WG1033334-3								
Naphthalene	59		56		50-120	5		30
Acenaphthylene	60		56		50-120	7		30
Acenaphthene	58		54		50-120	7		30
Fluorene	60		56		50-120	7		30
Phenanthrene	59		54		50-120	9		30
Anthracene	62		61		50-120	2		30
Fluoranthene	57		56		50-120	2		30
Pyrene	62		59		50-120	5		30
Benz(a)anthracene	63		64		50-120	2		30
Chrysene	62		60		50-120	3		30
Benzo(b)fluoranthene	68		60		50-120	13		30
Benzo(k)fluoranthene	59		64		50-120	8		30
Benzo(a)pyrene	65		60		50-120	8		30
Indeno(1,2,3-cd)Pyrene	62		64		50-120	3		30
Dibenz(a,h)anthracene	64		61		50-120	5		30
Benzo(ghi)perylene	67		65		50-120	3		30
Cl2-BZ#8	84		71		50-120	17		30
Cl3-BZ#18	79		66		50-120	18		30
Cl3-BZ#28	79		67		50-120	16		30
Cl4-BZ#44	79		70		50-120	12		30
Cl4-BZ#49	79		69		50-120	14		30
Cl4-BZ#52	76		66		50-120	14		30
Cl4-BZ#66	79		69		50-120	14		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 Batch: WG1033334-2 WG1033334-3								
Cl5-BZ#87	77		69		50-120	11		30
Cl5-BZ#101	75		66		50-120	13		30
Cl5-BZ#105	76		68		50-120	11		30
Cl5-BZ#118	77		69		50-120	11		30
Cl6-BZ#128	75		68		50-120	10		30
Cl6-BZ#138	76		68		50-120	11		30
Cl6-BZ#153	79		69		50-120	14		30
Cl7-BZ#170	75		66		50-120	13		30
Cl7-BZ#180	73		64		50-120	13		30
Cl7-BZ#183	71		65		50-120	9		30
Cl7-BZ#184	74		66		50-120	11		30
Cl7-BZ#187	74		65		50-120	13		30
Cl8-BZ#195	73		64		50-120	13		30
Cl9-BZ#206	71		63		50-120	12		30
Cl10-BZ#209	75		66		50-120	13		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	57		55		30-150
Pyrene-d10	67		62		30-150
Benzo(b)fluoranthene-d12	64		60		30-150
DBOB	76		65		30-150
BZ 198	75		64		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 Batch: WG1033339-2 WG1033339-3

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Naphthalene	60		56		50-120	7		30
Acenaphthylene	65		58		50-120	11		30
Acenaphthene	65		56		50-120	15		30
Fluorene	69		58		50-120	17		30
Phenanthrene	74		57		50-120	26		30
Anthracene	72		67		50-120	7		30
Fluoranthene	74		62		50-120	18		30
Pyrene	73		62		50-120	16		30
Benz(a)anthracene	82		60		50-120	**31**	Q	30
Chrysene	70		67		50-120	4		30
Benzo(b)fluoranthene	88		65		50-120	30		30
Benzo(k)fluoranthene	76		74		50-120	3		30
Benzo(a)pyrene	78		66		50-120	17		30
Indeno(1,2,3-cd)Pyrene	65		63		50-120	3		30
Dibenz(a,h)anthracene	73		62		50-120	16		30
Benzo(ghi)perylene	75		63		50-120	17		30
Cl2-BZ#8	104		87		50-120	18		30
Cl3-BZ#18	107		81		50-120	28		30
Cl3-BZ#28	98		82		50-120	18		30
Cl4-BZ#44	102		85		50-120	18		30
Cl4-BZ#49	90		88		50-120	2		30
Cl4-BZ#52	108		78		50-120	**32**	Q	30
Cl4-BZ#66	105		86		50-120	20		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 Batch: WG1033339-2 WG1033339-3								
Cl5-BZ#87	102		86		50-120	17		30
Cl5-BZ#101	102		84		50-120	19		30
Cl5-BZ#105	96		87		50-120	10		30
Cl5-BZ#118	102		86		50-120	17		30
Cl6-BZ#128	104		88		50-120	17		30
Cl6-BZ#138	103		86		50-120	18		30
Cl6-BZ#153	105		87		50-120	19		30
Cl7-BZ#170	100		85		50-120	16		30
Cl7-BZ#180	97		83		50-120	16		30
Cl7-BZ#183	91		86		50-120	6		30
Cl7-BZ#184	99		83		50-120	18		30
Cl7-BZ#187	107		81		50-120	28		30
Cl8-BZ#195	98		84		50-120	15		30
Cl9-BZ#206	95		80		50-120	17		30
Cl10-BZ#209	100		85		50-120	16		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	60		55		30-150
Pyrene-d10	74		63		30-150
Benzo(b)fluoranthene-d12	79		67		30-150
DBOB	101		87		30-150
BZ 198	97		83		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 Batch: WG1037293-2 WG1037293-3								
Naphthalene	76		73		50-120	4		30
Acenaphthylene	76		74		50-120	3		30
Acenaphthene	74		72		50-120	3		30
Fluorene	79		75		50-120	5		30
Phenanthrene	82		78		50-120	5		30
Anthracene	80		76		50-120	5		30
Fluoranthene	84		78		50-120	7		30
Pyrene	78		75		50-120	4		30
Benz(a)anthracene	87		84		50-120	4		30
Chrysene	84		81		50-120	4		30
Benzo(b)fluoranthene	84		80		50-120	5		30
Benzo(k)fluoranthene	88		86		50-120	2		30
Benzo(a)pyrene	87		84		50-120	4		30
Indeno(1,2,3-cd)Pyrene	87		82		50-120	6		30
Dibenz(a,h)anthracene	84		80		50-120	5		30
Benzo(ghi)perylene	88		85		50-120	3		30
Cl2-BZ#8	87		84		50-120	4		30
Cl3-BZ#18	89		84		50-120	6		30
Cl3-BZ#28	89		85		50-120	5		30
Cl4-BZ#44	92		86		50-120	7		30
Cl4-BZ#49	88		83		50-120	6		30
Cl4-BZ#52	90		84		50-120	7		30
Cl4-BZ#66	90		84		50-120	7		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 Batch: WG1037293-2 WG1037293-3								
Cl5-BZ#87	92		86		50-120	7		30
Cl5-BZ#101	93		87		50-120	7		30
Cl5-BZ#105	95		88		50-120	8		30
Cl5-BZ#118	90		83		50-120	8		30
Cl6-BZ#128	93		86		50-120	8		30
Cl6-BZ#138	92		85		50-120	8		30
Cl6-BZ#153	92		86		50-120	7		30
Cl7-BZ#170	92		87		50-120	6		30
Cl7-BZ#180	91		85		50-120	7		30
Cl7-BZ#183	87		81		50-120	7		30
Cl7-BZ#184	91		85		50-120	7		30
Cl7-BZ#187	94		89		50-120	5		30
Cl8-BZ#195	93		86		50-120	8		30
Cl9-BZ#206	90		84		50-120	7		30
Cl10-BZ#209	95		89		50-120	7		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	74		73		30-150
Pyrene-d10	83		80		30-150
Benzo(b)fluoranthene-d12	88		83		30-150
DBOB	94		88		30-150
BZ 198	89		81		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033334-6 WG1033334-7 QC Sample: L1728049-16 Client ID: NHH-B												
Naphthalene	ND	332	155	**47**	Q	164	**47**	Q	50-120	6		30
Acenaphthylene	ND	332	158	**48**	Q	169	**48**	Q	50-120	7		30
Acenaphthene	ND	332	152	**46**	Q	162	**46**	Q	50-120	6		30
Fluorene	ND	332	159	**48**	Q	172	**49**	Q	50-120	8		30
Phenanthrene	ND	332	154	**46**	Q	166	**48**	Q	50-120	8		30
Anthracene	ND	332	177	53		190	54		50-120	7		30
Fluoranthene	ND	332	167	50		177	51		50-120	6		30
Pyrene	ND	332	181	55		193	55		50-120	6		30
Benz(a)anthracene	ND	332	178	54		194	56		50-120	9		30
Chrysene	ND	332	180	54		190	54		50-120	5		30
Benzo(b)fluoranthene	ND	332	188	57		197	56		50-120	5		30
Benzo(k)fluoranthene	ND	332	171	52		178	51		50-120	4		30
Benzo(a)pyrene	ND	332	181	55		191	55		50-120	5		30
Indeno(1,2,3-cd)Pyrene	ND	332	177	53		185	53		50-120	4		30
Dibenz(a,h)anthracene	ND	332	172	52		180	52		50-120	5		30
Benzo(ghi)perylene	ND	332	180	54		190	54		50-120	5		30
Cl2-BZ#8	ND	66.4	40.0	60		43.7	63		50-120	9		30
Cl3-BZ#18	ND	66.4	37.9	57		40.8	58		50-120	7		30
Cl3-BZ#28	ND	66.4	38.1	57		41.5	59		50-120	9		30
Cl4-BZ#44	ND	66.4	40.1	60		42.7	61		50-120	6		30
Cl4-BZ#49	ND	66.4	39.8	60		42.7	61		50-120	7		30
Cl4-BZ#52	ND	66.4	38.2	58		41.3	59		50-120	8		30
Cl4-BZ#66	ND	66.4	40.0	60		42.8	61		50-120	7		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033334-6 WG1033334-7 QC Sample: L1728049-16 Client ID: NHH-B												
Cl5-BZ#87	ND	66.4	39.4	59		42.3	61		50-120	7		30
Cl5-BZ#101	ND	66.4	38.2	58		41.1	59		50-120	7		30
Cl5-BZ#105	ND	66.4	38.6	58		41.9	60		50-120	8		30
Cl5-BZ#118	ND	66.4	38.8	59		41.7	60		50-120	7		30
Cl6-BZ#128	ND	66.4	38.3	58		41.3	59		50-120	8		30
Cl6-BZ#138	ND	66.4	38.8	59		41.4	59		50-120	6		30
Cl6-BZ#153	ND	66.4	40.3	61		42.9	61		50-120	6		30
Cl7-BZ#170	ND	66.4	37.4	56		40.0	57		50-120	7		30
Cl7-BZ#180	ND	66.4	37.8	57		41.1	59		50-120	8		30
Cl7-BZ#183	ND	66.4	36.8	56		39.3	56		50-120	7		30
Cl7-BZ#184	ND	66.4	38.2	58		40.3	58		50-120	5		30
Cl7-BZ#187	ND	66.4	37.8	57		40.1	57		50-120	6		30
Cl8-BZ#195	ND	66.4	36.9	56		39.1	56		50-120	6		30
Cl9-BZ#206	ND	66.4	36.8	56		39.8	57		50-120	8		30
Cl10-BZ#209	ND	66.4	39.0	59		42.3	61		50-120	8		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	46		45		30-150
BZ 198	59		56		30-150
Benzo(b)fluoranthene-d12	50		49		30-150
DBOB	58		62		30-150
Pyrene-d10	55		54		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033339-6 WG1033339-7 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM												
Naphthalene	116	523	428	60		422	56		50-120	1		30
Acenaphthylene	60.7	523	426	70		429	67		50-120	1		30
Acenaphthene	24.0	523	365	65		362	62		50-120	1		30
Fluorene	36.3	523	392	68		379	62		50-120	3		30
Phenanthrene	234	523	596	69		555	59		50-120	7		30
Anthracene	67.1	523	420	67		428	66		50-120	2		30
Fluoranthene	457	523	784	63		683	**41**	Q	50-120	14		30
Pyrene	469	523	812	66		737	**49**	Q	50-120	10		30
Benz(a)anthracene	243	523	623	73		587	63		50-120	6		30
Chrysene	263	523	620	68		620	65		50-120	0		30
Benzo(b)fluoranthene	323	523	713	75		628	56		50-120	13		30
Benzo(k)fluoranthene	184	523	513	63		464	51		50-120	10		30
Benzo(a)pyrene	235	523	597	69		599	66		50-120	0		30
Indeno(1,2,3-cd)Pyrene	194	523	558	70		569	68		50-120	2		30
Dibenz(a,h)anthracene	49.3	523	405	68		422	68		50-120	4		30
Benzo(ghi)perylene	229	523	590	69		577	63		50-120	2		30
Cl2-BZ#8	ND	105	96.3	92		99.3	90		50-120	3		30
Cl3-BZ#18	ND	105	94.0	90		92.6	84		50-120	2		30
Cl3-BZ#28	ND	105	106	101		96.7	88		50-120	9		30
Cl4-BZ#44	ND	105	93.2	89		99.7	91		50-120	7		30
Cl4-BZ#49	ND	105	83.2	80		86.8	79		50-120	4		30
Cl4-BZ#52	ND	105	110	105		112	102		50-120	2		30
Cl4-BZ#66	ND	105	96.8	93		99.2	90		50-120	2		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033339-6 WG1033339-7 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM												
Cl5-BZ#87	ND	105	99.4	95		111	101		50-120	11		30
Cl5-BZ#101	2.06	105	102	96		102	91		50-120	0		30
Cl5-BZ#105	ND	105	93.4	89		94.0	86		50-120	1		30
Cl5-BZ#118	3.80	105	99.0	91		103	90		50-120	4		30
Cl6-BZ#128	ND	105	91.5	87		95.9	87		50-120	5		30
Cl6-BZ#138	2.95	105	99.0	92		103	91		50-120	4		30
Cl6-BZ#153	2.87	105	105	98		109	97		50-120	4		30
Cl7-BZ#170	0.605J	105	95.3	91		98.2	89		50-120	3		30
Cl7-BZ#180	2.20	105	93.5	87		95.3	85		50-120	2		30
Cl7-BZ#183	0.692J	105	84.2	80		88.0	80		50-120	4		30
Cl7-BZ#184	ND	105	89.8	86		94.0	86		50-120	5		30
Cl7-BZ#187	1.78	105	100	94		102	91		50-120	2		30
Cl8-BZ#195	ND	105	94.1	90		97.0	88		50-120	3		30
Cl9-BZ#206	2.28	105	96.4	90		99.4	89		50-120	3		30
Cl10-BZ#209	3.23	105	101	93		105	93		50-120	4		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		58		30-150
BZ 198	103		97		30-150
Benzo(b)fluoranthene-d12	67		62		30-150
DBOB	95		94		30-150
Pyrene-d10	68		68		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037293-6 WG1037293-7 QC Sample: L1728049-05 Client ID: NHH-L												
Naphthalene	532	526	1030	95		966	79		50-120	6		30
Acenaphthylene	109	526	580	90		552	81		50-120	5		30
Acenaphthene	38.4	526	467	82		465	78		50-120	0		30
Fluorene	53.1	526	505	86		501	82		50-120	1		30
Phenanthrene	370	526	920	105		849	87		50-120	8		30
Anthracene	148	526	578	82		557	75		50-120	4		30
Fluoranthene	900	526	1460	107		1410	93		50-120	3		30
Pyrene	929	526	1480	105		1340	75		50-120	10		30
Benz(a)anthracene	565	526	1200	**121**	Q	1100	98		50-120	9		30
Chrysene	589	526	1130	103		1040	82		50-120	8		30
Benzo(b)fluoranthene	566	526	1140	109		1030	85		50-120	10		30
Benzo(k)fluoranthene	404	526	925	99		844	80		50-120	9		30
Benzo(a)pyrene	570	526	1140	108		1020	82		50-120	11		30
Indeno(1,2,3-cd)Pyrene	365	526	934	108		816	82		50-120	13		30
Dibenz(a,h)anthracene	85.1	526	623	102		574	89		50-120	8		30
Benzo(ghi)perylene	446	526	1030	111		912	85		50-120	12		30
Cl2-BZ#8	ND	105	90.1	86		95.7	87		50-120	6		30
Cl3-BZ#18	ND	105	92.8	88		98.5	90		50-120	6		30
Cl3-BZ#28	ND	105	100	95		97.4	89		50-120	3		30
Cl4-BZ#44	ND	105	94.8	90		102	93		50-120	7		30
Cl4-BZ#49	ND	105	84.6	81		88.8	81		50-120	5		30
Cl4-BZ#52	ND	105	106	101		108	99		50-120	2		30
Cl4-BZ#66	ND	105	94.1	90		98.5	90		50-120	5		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037293-6 WG1037293-7 QC Sample: L1728049-05 Client ID: NHH-L												
Cl5-BZ#87	ND	105	94.8	90		99.3	91		50-120	5		30
Cl5-BZ#101	ND	105	96.4	92		101	92		50-120	5		30
Cl5-BZ#105	ND	105	92.9	88		97.3	89		50-120	5		30
Cl5-BZ#118	0.621J	105	95.4	91		99.3	91		50-120	4		30
Cl6-BZ#128	ND	105	92.6	88		96.6	88		50-120	4		30
Cl6-BZ#138	ND	105	96.5	92		100	91		50-120	4		30
Cl6-BZ#153	ND	105	92.5	88		97.2	89		50-120	5		30
Cl7-BZ#170	ND	105	102	97		106	97		50-120	4		30
Cl7-BZ#180	ND	105	96.2	92		99.9	91		50-120	4		30
Cl7-BZ#183	ND	105	87.3	83		89.8	82		50-120	3		30
Cl7-BZ#184	ND	105	96.0	91		98.6	90		50-120	3		30
Cl7-BZ#187	ND	105	108	103		113	103		50-120	5		30
Cl8-BZ#195	ND	105	101	96		106	97		50-120	5		30
Cl9-BZ#206	0.945J	105	103	98		108	99		50-120	5		30
Cl10-BZ#209	0.760J	105	107	102		112	102		50-120	5		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		78		30-150
BZ 198	93		94		30-150
Benzo(b)fluoranthene-d12	84		84		30-150
DBOB	98		97		30-150
Pyrene-d10	87		89		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033334-5 QC Sample: L1728049-16 Client ID: NHH-B						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	ND	ND	ug/kg	NC		30
Pyrene	ND	ND	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033334-5 QC Sample: L1728049-16 Client ID: NHH-B						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	ND	ND	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	ND	ND	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	53		51		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033334-5 QC Sample: L1728049-16 Client ID: NHH-B						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	56		59		30-150
Benzo(b)fluoranthene-d12	50		53		30-150
DBOB	62		64		30-150
BZ 198	57		61		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033339-5 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						
Naphthalene	116	116	ug/kg	0		30
Acenaphthylene	60.7	84.0	ug/kg	**32**	Q	30
Acenaphthene	24.0	30.0	ug/kg	22		30
Fluorene	36.3	42.0	ug/kg	15		30
Phenanthrene	234	216	ug/kg	8		30
Anthracene	67.1	87.9	ug/kg	27		30
Fluoranthene	457	448	ug/kg	2		30
Pyrene	469	438	ug/kg	7		30
Benz(a)anthracene	243	204	ug/kg	17		30
Chrysene	263	294	ug/kg	11		30
Benzo(b)fluoranthene	323	288	ug/kg	11		30
Benzo(k)fluoranthene	184	233	ug/kg	24		30
Benzo(a)pyrene	235	268	ug/kg	13		30
Indeno(1,2,3-cd)Pyrene	194	202	ug/kg	4		30
Dibenz(a,h)anthracene	49.3	61.3	ug/kg	22		30
Benzo(ghi)perylene	229	232	ug/kg	1		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033339-5 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	2.06	2.94	ug/kg	**35**	Q	30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	3.80	4.37	ug/kg	14		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	2.95	3.51	ug/kg	17		30
Cl6-BZ#153	2.87	3.50	ug/kg	20		30
Cl7-BZ#170	0.605J	0.675J	ug/kg	NC		30
Cl7-BZ#180	2.20	2.12	ug/kg	4		30
Cl7-BZ#183	0.692J	1.00J	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	1.78	2.46	ug/kg	**32**	Q	30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	2.28	2.28	ug/kg	0		30
Cl10-BZ#209	3.23	3.14	ug/kg	3		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	66		65		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033339-5 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	68		69		30-150
Benzo(b)fluoranthene-d12	66		65		30-150
DBOB	99		103		30-150
BZ 198	99		102		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037293-5 QC Sample: L1728049-05 Client ID: NHH-L						
Naphthalene	532	580	ug/kg	9		30
Acenaphthylene	109	156	ug/kg	**35**	Q	30
Acenaphthene	38.4	45.8	ug/kg	18		30
Fluorene	53.1	65.5	ug/kg	21		30
Phenanthrene	370	448	ug/kg	19		30
Anthracene	148	191	ug/kg	25		30
Fluoranthene	900	1070	ug/kg	17		30
Pyrene	929	1060	ug/kg	13		30
Benz(a)anthracene	565	680	ug/kg	18		30
Chrysene	589	722	ug/kg	20		30
Benzo(b)fluoranthene	566	718	ug/kg	24		30
Benzo(k)fluoranthene	404	509	ug/kg	23		30
Benzo(a)pyrene	570	714	ug/kg	22		30
Indeno(1,2,3-cd)Pyrene	365	478	ug/kg	27		30
Dibenz(a,h)anthracene	85.1	114	ug/kg	29		30
Benzo(ghi)perylene	446	581	ug/kg	26		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037293-5 QC Sample: L1728049-05 Client ID: NHH-L						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	ND	ND	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	0.621J	0.748J	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	ND	ND	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	0.945J	1.22	ug/kg	NC		30
Cl10-BZ#209	0.760J	0.732J	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		75		30-150
Pyrene-d10	82		82		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037293-5 QC Sample: L1728049-05 Client ID: NHH-L						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Benzo(b)fluoranthene-d12	78		79		30-150
DBOB	94		92		30-150
BZ 198	93		88		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1033334-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	56		40-140
Fluoranthene	54		40-140
Pyrene	50		40-140
Benz(a)anthracene	55		40-140
Chrysene	64		40-140
Benzo(b)fluoranthene	62		40-140
Benzo(k)fluoranthene	80		40-140
Benzo(a)pyrene	41		40-140
Indeno(1,2,3-cd)Pyrene	52		40-140
Dibenz(a,h)anthracene	88		40-140
Benzo(ghi)perylene	55		40-140
Cl2-BZ#8	56		40-140
Cl3-BZ#18	81		40-140
Cl3-BZ#28	39	Q	40-140
Cl4-BZ#44	68		40-140
Cl4-BZ#49	56		40-140
Cl4-BZ#52	60		40-140
Cl4-BZ#66	46		40-140
Cl5-BZ#87	60		40-140
Cl5-BZ#101	62		40-140
Cl5-BZ#105	66		40-140
Cl5-BZ#118	60		40-140
Cl6-BZ#128	119		40-140
Cl6-BZ#138	72		40-140
Cl6-BZ#153	51		40-140
Cl7-BZ#170	51		40-140
Cl7-BZ#180	65		40-140
Cl7-BZ#183	53		40-140
Cl7-BZ#187	69		40-140
Cl9-BZ#206	61		40-140
Cl10-BZ#209	84		40-140
2-Methylnaphthalene-d10 (Surrogate)	54		30-150
Pyrene-d10 (Surrogate)	60		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	56		30-150
DBOB (Surrogate)	69		30-150
BZ 198 (Surrogate)	70		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1033339-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	78		40-140
Fluoranthene	72		40-140
Pyrene	62		40-140
Benz(a)anthracene	79		40-140
Chrysene	92		40-140
Benzo(b)fluoranthene	77		40-140
Benzo(k)fluoranthene	121		40-140
Benzo(a)pyrene	62		40-140
Indeno(1,2,3-cd)Pyrene	70		40-140
Dibenz(a,h)anthracene	140		40-140
Benzo(ghi)perylene	80		40-140
Cl2-BZ#8	124		40-140
Cl3-BZ#18	84		40-140
Cl3-BZ#28	56		40-140
Cl4-BZ#44	107		40-140
Cl4-BZ#49	74		40-140
Cl4-BZ#52	71		40-140
Cl4-BZ#66	68		40-140
Cl5-BZ#87	90		40-140
Cl5-BZ#101	86		40-140
Cl5-BZ#105	106		40-140
Cl5-BZ#118	72		40-140
Cl6-BZ#128	99		40-140
Cl6-BZ#138	110		40-140
Cl6-BZ#153	68		40-140
Cl7-BZ#170	91		40-140
Cl7-BZ#180	86		40-140
Cl7-BZ#183	81		40-140
Cl7-BZ#187	104		40-140
Cl9-BZ#206	100		40-140
Cl10-BZ#209	232	Q	40-140
2-Methylnaphthalene-d10 (Surrogate)	74		30-150
Pyrene-d10 (Surrogate)	86		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	72		30-150
DBOB (Surrogate)	105		30-150
BZ 198 (Surrogate)	91		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1037293-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	70		40-140
Fluoranthene	66		40-140
Pyrene	57		40-140
Benz(a)anthracene	64		40-140
Chrysene	80		40-140
Benzo(b)fluoranthene	77		40-140
Benzo(k)fluoranthene	90		40-140
Benzo(a)pyrene	55		40-140
Indeno(1,2,3-cd)Pyrene	67		40-140
Dibenz(a,h)anthracene	109		40-140
Benzo(ghi)perylene	69		40-140
Cl2-BZ#8	77		40-140
Cl3-BZ#18	87		40-140
Cl3-BZ#28	65		40-140
Cl4-BZ#44	98		40-140
Cl4-BZ#49	65		40-140
Cl4-BZ#52	92		40-140
Cl4-BZ#66	58		40-140
Cl5-BZ#87	72		40-140
Cl5-BZ#101	76		40-140
Cl5-BZ#105	76		40-140
Cl5-BZ#118	70		40-140
Cl6-BZ#128	133		40-140
Cl6-BZ#138	92		40-140
Cl6-BZ#153	57		40-140
Cl7-BZ#170	70		40-140
Cl7-BZ#180	68		40-140
Cl7-BZ#183	59		40-140
Cl7-BZ#187	76		40-140
Cl9-BZ#206	70		40-140
Cl10-BZ#209	71		40-140
2-Methylnaphthalene-d10 (Surrogate)	80		30-150
Pyrene-d10 (Surrogate)	85		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	78		30-150
DBOB (Surrogate)	100		30-150
BZ 198 (Surrogate)	82		30-150

PESTICIDES

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-01
Client ID: NHH-R-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 22:09
Analyst: DP
Percent Solids: 37%

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.28	1.28	1	A
gamma-BHC	ND		ug/kg	0.640	0.640	1	A
Heptachlor	ND		ug/kg	0.640	0.640	1	A
Aldrin	ND		ug/kg	0.640	0.640	1	A
Heptachlor epoxide	ND		ug/kg	1.28	1.28	1	B
Oxychlordane	ND		ug/kg	1.28	1.28	1	B
trans-Chlordane	8.52	P	ug/kg	0.640	0.640	1	A
Endosulfan I	ND		ug/kg	0.640	0.640	1	A
cis-Chlordane	0.792		ug/kg	0.640	0.640	1	A
trans-Nonachlor	1.12		ug/kg	0.640	0.640	1	A
4,4'-DDE	2.20		ug/kg	0.640	0.640	1	B
Dieldrin	0.754	IP	ug/kg	0.640	0.640	1	A
Endrin	ND		ug/kg	0.640	0.640	1	A
Endosulfan II	2.20	P	ug/kg	0.640	0.640	1	A
4,4'-DDD	1.19		ug/kg	0.640	0.640	1	A
cis-Nonachlor	ND		ug/kg	0.640	0.640	1	A
4,4'-DDT	1.92		ug/kg	0.640	0.640	1	B
Methoxychlor	ND		ug/kg	6.40	6.40	1	A
Toxaphene	ND		ug/kg	32.1	32.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	78		30-150	A
DBOB	59		30-150	B
BZ 198	84		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-02
Client ID: NHH-R-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 20:26
Analyst: DP
Percent Solids: 44%

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.05	1.05	1	A
gamma-BHC	ND		ug/kg	0.524	0.524	1	A
Heptachlor	ND		ug/kg	0.524	0.524	1	A
Aldrin	ND		ug/kg	0.524	0.524	1	A
Heptachlor epoxide	ND		ug/kg	1.05	1.05	1	B
Oxychlordane	ND		ug/kg	1.05	1.05	1	B
trans-Chlordane	13.3	P	ug/kg	0.524	0.524	1	A
Endosulfan I	ND		ug/kg	0.524	0.524	1	A
cis-Chlordane	0.855	P	ug/kg	0.524	0.524	1	A
trans-Nonachlor	1.36	P	ug/kg	0.524	0.524	1	A
4,4'-DDE	2.71		ug/kg	0.524	0.524	1	A
Dieldrin	0.752	IP	ug/kg	0.524	0.524	1	A
Endrin	ND		ug/kg	0.524	0.524	1	A
Endosulfan II	3.31	P	ug/kg	0.524	0.524	1	A
4,4'-DDD	1.18		ug/kg	0.524	0.524	1	A
cis-Nonachlor	ND		ug/kg	0.524	0.524	1	A
4,4'-DDT	2.57		ug/kg	0.524	0.524	1	B
Methoxychlor	ND		ug/kg	5.24	5.24	1	A
Toxaphene	ND		ug/kg	26.3	26.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	66		30-150	A
DBOB	53		30-150	B
BZ 198	67		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-03
Client ID: NHH-S-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 21:00
Analyst: DP
Percent Solids: 40%

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.18	1.18	1	A
gamma-BHC	ND		ug/kg	0.593	0.593	1	A
Heptachlor	ND		ug/kg	0.593	0.593	1	A
Aldrin	ND		ug/kg	0.593	0.593	1	A
Heptachlor epoxide	ND		ug/kg	1.18	1.18	1	B
Oxychlordane	ND		ug/kg	1.18	1.18	1	B
trans-Chlordane	ND		ug/kg	0.593	0.593	1	A
Endosulfan I	ND		ug/kg	0.593	0.593	1	A
cis-Chlordane	1.30		ug/kg	0.593	0.593	1	A
trans-Nonachlor	2.55		ug/kg	0.593	0.593	1	B
4,4'-DDE	8.16		ug/kg	0.593	0.593	1	A
Dieldrin	3.24	IP	ug/kg	0.593	0.593	1	A
Endrin	ND		ug/kg	0.593	0.593	1	A
Endosulfan II	11.4	P	ug/kg	0.593	0.593	1	A
4,4'-DDD	1.72		ug/kg	0.593	0.593	1	A
cis-Nonachlor	ND		ug/kg	0.593	0.593	1	A
4,4'-DDT	14.4	P	ug/kg	0.593	0.593	1	B
Methoxychlor	ND		ug/kg	5.93	5.93	1	A
Toxaphene	ND		ug/kg	29.8	29.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	76		30-150	A
DBOB	51		30-150	B
BZ 198	82		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-04
Client ID: NHH-J
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 21:34
Analyst: DP
Percent Solids: 42%

Date Collected: 08/10/17 11:41
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.20	1.20	1	A
gamma-BHC	ND		ug/kg	0.599	0.599	1	A
Heptachlor	ND		ug/kg	0.599	0.599	1	A
Aldrin	ND		ug/kg	0.599	0.599	1	A
Heptachlor epoxide	ND		ug/kg	1.20	1.20	1	B
Oxychlordane	ND		ug/kg	1.20	1.20	1	B
trans-Chlordane	ND		ug/kg	0.599	0.599	1	A
Endosulfan I	ND		ug/kg	0.599	0.599	1	A
cis-Chlordane	ND		ug/kg	0.599	0.599	1	A
trans-Nonachlor	1.06		ug/kg	0.599	0.599	1	B
4,4'-DDE	3.57		ug/kg	0.599	0.599	1	A
Dieldrin	1.04	IP	ug/kg	0.599	0.599	1	A
Endrin	ND		ug/kg	0.599	0.599	1	A
Endosulfan II	4.03	P	ug/kg	0.599	0.599	1	A
4,4'-DDD	1.17		ug/kg	0.599	0.599	1	A
cis-Nonachlor	ND		ug/kg	0.599	0.599	1	A
4,4'-DDT	3.84	P	ug/kg	0.599	0.599	1	B
Methoxychlor	ND		ug/kg	5.99	5.99	1	A
Toxaphene	ND		ug/kg	30.1	30.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	73		30-150	A
DBOB	54		30-150	B
BZ 198	84		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-05
Client ID: NHH-L
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 09/05/17 18:31
Analyst: DP
Percent Solids: 46%

Date Collected: 08/10/17 13:00
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/31/17 09:30
Cleanup Method: EPA 3630
Cleanup Date: 09/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.03	1.03	1	A
gamma-BHC	ND		ug/kg	0.517	0.517	1	A
Heptachlor	ND		ug/kg	0.517	0.517	1	A
Aldrin	ND		ug/kg	0.517	0.517	1	A
Heptachlor epoxide	ND		ug/kg	1.03	1.03	1	B
Oxychlordane	ND		ug/kg	1.03	1.03	1	B
trans-Chlordane	ND		ug/kg	0.517	0.517	1	A
Endosulfan I	ND		ug/kg	0.517	0.517	1	A
cis-Chlordane	ND		ug/kg	0.517	0.517	1	A
trans-Nonachlor	ND		ug/kg	0.517	0.517	1	A
4,4'-DDE	ND		ug/kg	0.517	0.517	1	A
Dieldrin	ND		ug/kg	0.517	0.517	1	A
Endrin	ND		ug/kg	0.517	0.517	1	A
Endosulfan II	ND		ug/kg	0.517	0.517	1	A
4,4'-DDD	ND		ug/kg	0.517	0.517	1	A
cis-Nonachlor	ND		ug/kg	0.517	0.517	1	A
4,4'-DDT	ND		ug/kg	0.517	0.517	1	A
Methoxychlor	ND		ug/kg	5.17	5.17	1	A
Toxaphene	ND		ug/kg	26.0	26.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	84		30-150	A
DBOB	54		30-150	B
BZ 198	87		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-06
Client ID: NHH-K-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 22:43
Analyst: DP
Percent Solids: 48%

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.03	1.03	1	A
gamma-BHC	ND		ug/kg	0.516	0.516	1	A
Heptachlor	ND		ug/kg	0.516	0.516	1	A
Aldrin	ND		ug/kg	0.516	0.516	1	A
Heptachlor epoxide	ND		ug/kg	1.03	1.03	1	B
Oxychlordane	ND		ug/kg	1.03	1.03	1	B
trans-Chlordane	ND		ug/kg	0.516	0.516	1	A
Endosulfan I	ND		ug/kg	0.516	0.516	1	A
cis-Chlordane	ND		ug/kg	0.516	0.516	1	A
trans-Nonachlor	ND		ug/kg	0.516	0.516	1	A
4,4'-DDE	1.18		ug/kg	0.516	0.516	1	B
Dieldrin	ND		ug/kg	0.516	0.516	1	A
Endrin	ND		ug/kg	0.516	0.516	1	A
Endosulfan II	ND		ug/kg	0.516	0.516	1	A
4,4'-DDD	0.572		ug/kg	0.516	0.516	1	A
cis-Nonachlor	ND		ug/kg	0.516	0.516	1	A
4,4'-DDT	0.743		ug/kg	0.516	0.516	1	B
Methoxychlor	ND		ug/kg	5.16	5.16	1	A
Toxaphene	ND		ug/kg	25.9	25.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	A
BZ 198	79		30-150	A
DBOB	64		30-150	B
BZ 198	82		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-07
Client ID: NHH-H-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 23:17
Analyst: DP
Percent Solids: 49%

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.02	1.02	1	A
gamma-BHC	ND		ug/kg	0.509	0.509	1	A
Heptachlor	ND		ug/kg	0.509	0.509	1	A
Aldrin	ND		ug/kg	0.509	0.509	1	A
Heptachlor epoxide	ND		ug/kg	1.02	1.02	1	B
Oxychlordane	ND		ug/kg	1.02	1.02	1	B
trans-Chlordane	ND		ug/kg	0.509	0.509	1	A
Endosulfan I	ND		ug/kg	0.509	0.509	1	A
cis-Chlordane	ND		ug/kg	0.509	0.509	1	A
trans-Nonachlor	ND		ug/kg	0.509	0.509	1	A
4,4'-DDE	2.28		ug/kg	0.509	0.509	1	A
Dieldrin	0.514	IP	ug/kg	0.509	0.509	1	A
Endrin	ND		ug/kg	0.509	0.509	1	A
Endosulfan II	ND		ug/kg	0.509	0.509	1	A
4,4'-DDD	0.688		ug/kg	0.509	0.509	1	A
cis-Nonachlor	ND		ug/kg	0.509	0.509	1	A
4,4'-DDT	1.73	P	ug/kg	0.509	0.509	1	B
Methoxychlor	ND		ug/kg	5.09	5.09	1	A
Toxaphene	ND		ug/kg	25.6	25.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	68		30-150	A
DBOB	48		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-08
Client ID: NHH-H-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/30/17 23:51
Analyst: DP
Percent Solids: 47%

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.979	0.979	1	A
gamma-BHC	ND		ug/kg	0.490	0.490	1	A
Heptachlor	ND		ug/kg	0.490	0.490	1	A
Aldrin	ND		ug/kg	0.490	0.490	1	A
Heptachlor epoxide	ND		ug/kg	0.979	0.979	1	B
Oxychlordane	ND		ug/kg	0.979	0.979	1	B
trans-Chlordane	ND		ug/kg	0.490	0.490	1	A
Endosulfan I	ND		ug/kg	0.490	0.490	1	A
cis-Chlordane	ND		ug/kg	0.490	0.490	1	A
trans-Nonachlor	ND		ug/kg	0.490	0.490	1	A
4,4'-DDE	2.97		ug/kg	0.490	0.490	1	A
Dieldrin	0.582	IP	ug/kg	0.490	0.490	1	A
Endrin	ND		ug/kg	0.490	0.490	1	A
Endosulfan II	ND		ug/kg	0.490	0.490	1	A
4,4'-DDD	1.05		ug/kg	0.490	0.490	1	A
cis-Nonachlor	ND		ug/kg	0.490	0.490	1	A
4,4'-DDT	2.34	P	ug/kg	0.490	0.490	1	B
Methoxychlor	ND		ug/kg	4.90	4.90	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	75		30-150	A
DBOB	62		30-150	B
BZ 198	81		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-09
Client ID: NHH-H-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 00:25
Analyst: DP
Percent Solids: 71%

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.686	0.686	1	A
gamma-BHC	ND		ug/kg	0.343	0.343	1	A
Heptachlor	ND		ug/kg	0.343	0.343	1	A
Aldrin	ND		ug/kg	0.343	0.343	1	A
Heptachlor epoxide	ND		ug/kg	0.686	0.686	1	B
Oxychlordane	ND		ug/kg	0.686	0.686	1	B
trans-Chlordane	ND		ug/kg	0.343	0.343	1	A
Endosulfan I	ND		ug/kg	0.343	0.343	1	A
cis-Chlordane	ND		ug/kg	0.343	0.343	1	A
trans-Nonachlor	ND		ug/kg	0.343	0.343	1	A
4,4'-DDE	ND		ug/kg	0.343	0.343	1	A
Dieldrin	ND		ug/kg	0.343	0.343	1	A
Endrin	ND		ug/kg	0.343	0.343	1	A
Endosulfan II	ND		ug/kg	0.343	0.343	1	A
4,4'-DDD	ND		ug/kg	0.343	0.343	1	A
cis-Nonachlor	ND		ug/kg	0.343	0.343	1	A
4,4'-DDT	ND		ug/kg	0.343	0.343	1	A
Methoxychlor	ND		ug/kg	3.43	3.43	1	A
Toxaphene	ND		ug/kg	17.2	17.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	69		30-150	A
BZ 198	80		30-150	A
DBOB	63		30-150	B
BZ 198	88		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-10
Client ID: NHH-I-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 00:59
Analyst: DP
Percent Solids: 48%

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.961	0.961	1	A
gamma-BHC	ND		ug/kg	0.480	0.480	1	A
Heptachlor	ND		ug/kg	0.480	0.480	1	A
Aldrin	ND		ug/kg	0.480	0.480	1	A
Heptachlor epoxide	ND		ug/kg	0.961	0.961	1	B
Oxychlordane	ND		ug/kg	0.961	0.961	1	B
trans-Chlordane	ND		ug/kg	0.480	0.480	1	A
Endosulfan I	ND		ug/kg	0.480	0.480	1	A
cis-Chlordane	ND		ug/kg	0.480	0.480	1	A
trans-Nonachlor	ND		ug/kg	0.480	0.480	1	A
4,4'-DDE	ND		ug/kg	0.480	0.480	1	A
Dieldrin	ND		ug/kg	0.480	0.480	1	A
Endrin	ND		ug/kg	0.480	0.480	1	A
Endosulfan II	ND		ug/kg	0.480	0.480	1	A
4,4'-DDD	ND		ug/kg	0.480	0.480	1	A
cis-Nonachlor	ND		ug/kg	0.480	0.480	1	A
4,4'-DDT	ND		ug/kg	0.480	0.480	1	A
Methoxychlor	ND		ug/kg	4.80	4.80	1	A
Toxaphene	ND		ug/kg	24.1	24.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	71		30-150	A
DBOB	57		30-150	B
BZ 198	81		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-11
Client ID: NHH-I-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 19:23
Analyst: DP
Percent Solids: 48%

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.00	1.00	1	A
gamma-BHC	ND		ug/kg	0.503	0.503	1	A
Heptachlor	ND		ug/kg	0.503	0.503	1	A
Aldrin	ND		ug/kg	0.503	0.503	1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	1	B
Oxychlordane	ND		ug/kg	1.00	1.00	1	B
trans-Chlordane	ND		ug/kg	0.503	0.503	1	A
Endosulfan I	ND		ug/kg	0.503	0.503	1	A
cis-Chlordane	ND		ug/kg	0.503	0.503	1	A
trans-Nonachlor	ND		ug/kg	0.503	0.503	1	A
4,4'-DDE	ND		ug/kg	0.503	0.503	1	A
Dieldrin	ND		ug/kg	0.503	0.503	1	A
Endrin	ND		ug/kg	0.503	0.503	1	A
Endosulfan II	ND		ug/kg	0.503	0.503	1	A
4,4'-DDD	ND		ug/kg	0.503	0.503	1	A
cis-Nonachlor	ND		ug/kg	0.503	0.503	1	A
4,4'-DDT	ND		ug/kg	0.503	0.503	1	A
Methoxychlor	ND		ug/kg	5.03	5.03	1	A
Toxaphene	ND		ug/kg	25.2	25.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	71		30-150	A
DBOB	51		30-150	B
BZ 198	76		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-12
Client ID: NHH-G-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 19:57
Analyst: DP
Percent Solids: 42%

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.10	1.10	1	A
gamma-BHC	ND		ug/kg	0.551	0.551	1	A
Heptachlor	ND		ug/kg	0.551	0.551	1	A
Aldrin	ND		ug/kg	0.551	0.551	1	A
Heptachlor epoxide	ND		ug/kg	1.10	1.10	1	B
Oxychlordane	ND		ug/kg	1.10	1.10	1	B
trans-Chlordane	ND		ug/kg	0.551	0.551	1	A
Endosulfan I	ND		ug/kg	0.551	0.551	1	A
cis-Chlordane	ND		ug/kg	0.551	0.551	1	A
trans-Nonachlor	ND		ug/kg	0.551	0.551	1	A
4,4'-DDE	1.56		ug/kg	0.551	0.551	1	A
Dieldrin	ND		ug/kg	0.551	0.551	1	A
Endrin	ND		ug/kg	0.551	0.551	1	A
Endosulfan II	ND		ug/kg	0.551	0.551	1	A
4,4'-DDD	0.580		ug/kg	0.551	0.551	1	B
cis-Nonachlor	ND		ug/kg	0.551	0.551	1	A
4,4'-DDT	ND		ug/kg	0.551	0.551	1	A
Methoxychlor	ND		ug/kg	5.51	5.51	1	A
Toxaphene	ND		ug/kg	27.6	27.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	50		30-150	A
BZ 198	63		30-150	A
DBOB	45		30-150	B
BZ 198	69		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-13
Client ID: NHH-G-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 20:31
Analyst: DP
Percent Solids: 47%

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.993	0.993	1	A
gamma-BHC	ND		ug/kg	0.497	0.497	1	A
Heptachlor	ND		ug/kg	0.497	0.497	1	A
Aldrin	ND		ug/kg	0.497	0.497	1	A
Heptachlor epoxide	ND		ug/kg	0.993	0.993	1	B
Oxychlordane	ND		ug/kg	0.993	0.993	1	B
trans-Chlordane	ND		ug/kg	0.497	0.497	1	A
Endosulfan I	ND		ug/kg	0.497	0.497	1	A
cis-Chlordane	ND		ug/kg	0.497	0.497	1	A
trans-Nonachlor	ND		ug/kg	0.497	0.497	1	A
4,4'-DDE	ND		ug/kg	0.497	0.497	1	A
Dieldrin	ND		ug/kg	0.497	0.497	1	A
Endrin	ND		ug/kg	0.497	0.497	1	A
Endosulfan II	ND		ug/kg	0.497	0.497	1	A
4,4'-DDD	ND		ug/kg	0.497	0.497	1	A
cis-Nonachlor	ND		ug/kg	0.497	0.497	1	A
4,4'-DDT	ND		ug/kg	0.497	0.497	1	A
Methoxychlor	ND		ug/kg	4.97	4.97	1	A
Toxaphene	ND		ug/kg	24.9	24.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	49		30-150	A
BZ 198	67		30-150	A
DBOB	45		30-150	B
BZ 198	72		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-14
Client ID: NHH-C-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 21:05
Analyst: DP
Percent Solids: 70%

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.658	0.658	1	A
gamma-BHC	ND		ug/kg	0.329	0.329	1	A
Heptachlor	ND		ug/kg	0.329	0.329	1	A
Aldrin	ND		ug/kg	0.329	0.329	1	A
Heptachlor epoxide	ND		ug/kg	0.658	0.658	1	B
Oxychlordane	ND		ug/kg	0.658	0.658	1	B
trans-Chlordane	ND		ug/kg	0.329	0.329	1	A
Endosulfan I	ND		ug/kg	0.329	0.329	1	A
cis-Chlordane	ND		ug/kg	0.329	0.329	1	A
trans-Nonachlor	ND		ug/kg	0.329	0.329	1	A
4,4'-DDE	ND		ug/kg	0.329	0.329	1	A
Dieldrin	ND		ug/kg	0.329	0.329	1	A
Endrin	ND		ug/kg	0.329	0.329	1	A
Endosulfan II	ND		ug/kg	0.329	0.329	1	A
4,4'-DDD	ND		ug/kg	0.329	0.329	1	A
cis-Nonachlor	ND		ug/kg	0.329	0.329	1	A
4,4'-DDT	ND		ug/kg	0.329	0.329	1	A
Methoxychlor	ND		ug/kg	3.29	3.29	1	A
Toxaphene	ND		ug/kg	16.5	16.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	73		30-150	A
DBOB	50		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-15
Client ID: NHH-C-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 21:39
Analyst: DP
Percent Solids: 62%

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.757	0.757	1	A
gamma-BHC	ND		ug/kg	0.379	0.379	1	A
Heptachlor	ND		ug/kg	0.379	0.379	1	A
Aldrin	ND		ug/kg	0.379	0.379	1	A
Heptachlor epoxide	ND		ug/kg	0.757	0.757	1	B
Oxychlordane	ND		ug/kg	0.757	0.757	1	B
trans-Chlordane	ND		ug/kg	0.379	0.379	1	A
Endosulfan I	ND		ug/kg	0.379	0.379	1	A
cis-Chlordane	ND		ug/kg	0.379	0.379	1	A
trans-Nonachlor	ND		ug/kg	0.379	0.379	1	A
4,4'-DDE	ND		ug/kg	0.379	0.379	1	A
Dieldrin	ND		ug/kg	0.379	0.379	1	A
Endrin	ND		ug/kg	0.379	0.379	1	A
Endosulfan II	ND		ug/kg	0.379	0.379	1	A
4,4'-DDD	ND		ug/kg	0.379	0.379	1	A
cis-Nonachlor	ND		ug/kg	0.379	0.379	1	A
4,4'-DDT	ND		ug/kg	0.379	0.379	1	A
Methoxychlor	ND		ug/kg	3.79	3.79	1	A
Toxaphene	ND		ug/kg	19.0	19.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	73		30-150	A
DBOB	49		30-150	B
BZ 198	71		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-16
Client ID: NHH-B
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 01:33
Analyst: DP
Percent Solids: 69%

Date Collected: 08/11/17 11:57
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.681	0.681	1	A
gamma-BHC	ND		ug/kg	0.340	0.340	1	A
Heptachlor	ND		ug/kg	0.340	0.340	1	A
Aldrin	ND		ug/kg	0.340	0.340	1	A
Heptachlor epoxide	ND		ug/kg	0.681	0.681	1	B
Oxychlordane	ND		ug/kg	0.681	0.681	1	B
trans-Chlordane	ND		ug/kg	0.340	0.340	1	A
Endosulfan I	ND		ug/kg	0.340	0.340	1	A
cis-Chlordane	ND		ug/kg	0.340	0.340	1	A
trans-Nonachlor	ND		ug/kg	0.340	0.340	1	A
4,4'-DDE	ND		ug/kg	0.340	0.340	1	A
Dieldrin	ND		ug/kg	0.340	0.340	1	A
Endrin	ND		ug/kg	0.340	0.340	1	A
Endosulfan II	ND		ug/kg	0.340	0.340	1	A
4,4'-DDD	ND		ug/kg	0.340	0.340	1	A
cis-Nonachlor	ND		ug/kg	0.340	0.340	1	A
4,4'-DDT	ND		ug/kg	0.340	0.340	1	A
Methoxychlor	ND		ug/kg	3.40	3.40	1	A
Toxaphene	ND		ug/kg	17.1	17.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	70		30-150	A
DBOB	64		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-17
Client ID: NHH-A-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 22:13
Analyst: DP
Percent Solids: 61%

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.806	0.806	1	A
gamma-BHC	ND		ug/kg	0.403	0.403	1	A
Heptachlor	ND		ug/kg	0.403	0.403	1	A
Aldrin	ND		ug/kg	0.403	0.403	1	A
Heptachlor epoxide	ND		ug/kg	0.806	0.806	1	B
Oxychlordane	ND		ug/kg	0.806	0.806	1	B
trans-Chlordane	ND		ug/kg	0.403	0.403	1	A
Endosulfan I	ND		ug/kg	0.403	0.403	1	A
cis-Chlordane	ND		ug/kg	0.403	0.403	1	A
trans-Nonachlor	ND		ug/kg	0.403	0.403	1	A
4,4'-DDE	ND		ug/kg	0.403	0.403	1	A
Dieldrin	ND		ug/kg	0.403	0.403	1	A
Endrin	ND		ug/kg	0.403	0.403	1	A
Endosulfan II	ND		ug/kg	0.403	0.403	1	A
4,4'-DDD	ND		ug/kg	0.403	0.403	1	A
cis-Nonachlor	ND		ug/kg	0.403	0.403	1	A
4,4'-DDT	ND		ug/kg	0.403	0.403	1	A
Methoxychlor	ND		ug/kg	4.03	4.03	1	A
Toxaphene	ND		ug/kg	20.2	20.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	72		30-150	A
DBOB	53		30-150	B
BZ 198	73		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-18
Client ID: NHH-D-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 22:47
Analyst: DP
Percent Solids: 60%

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.794	0.794	1	A
gamma-BHC	ND		ug/kg	0.397	0.397	1	A
Heptachlor	ND		ug/kg	0.397	0.397	1	A
Aldrin	ND		ug/kg	0.397	0.397	1	A
Heptachlor epoxide	ND		ug/kg	0.794	0.794	1	B
Oxychlordane	ND		ug/kg	0.794	0.794	1	B
trans-Chlordane	ND		ug/kg	0.397	0.397	1	A
Endosulfan I	ND		ug/kg	0.397	0.397	1	A
cis-Chlordane	ND		ug/kg	0.397	0.397	1	A
trans-Nonachlor	ND		ug/kg	0.397	0.397	1	A
4,4'-DDE	ND		ug/kg	0.397	0.397	1	A
Dieldrin	ND		ug/kg	0.397	0.397	1	A
Endrin	ND		ug/kg	0.397	0.397	1	A
Endosulfan II	ND		ug/kg	0.397	0.397	1	A
4,4'-DDD	ND		ug/kg	0.397	0.397	1	A
cis-Nonachlor	ND		ug/kg	0.397	0.397	1	A
4,4'-DDT	ND		ug/kg	0.397	0.397	1	A
Methoxychlor	ND		ug/kg	3.97	3.97	1	A
Toxaphene	ND		ug/kg	19.9	19.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	53		30-150	A
BZ 198	68		30-150	A
DBOB	47		30-150	B
BZ 198	69		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-19
Client ID: NHH-D-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 23:21
Analyst: DP
Percent Solids: 66%

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.692	0.692	1	A
gamma-BHC	ND		ug/kg	0.346	0.346	1	A
Heptachlor	ND		ug/kg	0.346	0.346	1	A
Aldrin	ND		ug/kg	0.346	0.346	1	A
Heptachlor epoxide	ND		ug/kg	0.692	0.692	1	B
Oxychlordane	ND		ug/kg	0.692	0.692	1	B
trans-Chlordane	ND		ug/kg	0.346	0.346	1	A
Endosulfan I	ND		ug/kg	0.346	0.346	1	A
cis-Chlordane	ND		ug/kg	0.346	0.346	1	A
trans-Nonachlor	ND		ug/kg	0.346	0.346	1	A
4,4'-DDE	ND		ug/kg	0.346	0.346	1	A
Dieldrin	ND		ug/kg	0.346	0.346	1	A
Endrin	ND		ug/kg	0.346	0.346	1	A
Endosulfan II	ND		ug/kg	0.346	0.346	1	A
4,4'-DDD	ND		ug/kg	0.346	0.346	1	A
cis-Nonachlor	ND		ug/kg	0.346	0.346	1	A
4,4'-DDT	ND		ug/kg	0.346	0.346	1	A
Methoxychlor	ND		ug/kg	3.46	3.46	1	A
Toxaphene	ND		ug/kg	17.4	17.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	54		30-150	A
BZ 198	75		30-150	A
DBOB	46		30-150	B
BZ 198	75		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-20
Client ID: NHH-F-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 08/31/17 23:55
Analyst: DP
Percent Solids: 40%

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.20	1.20	1	A
gamma-BHC	ND		ug/kg	0.598	0.598	1	A
Heptachlor	ND		ug/kg	0.598	0.598	1	A
Aldrin	ND		ug/kg	0.598	0.598	1	A
Heptachlor epoxide	ND		ug/kg	1.20	1.20	1	B
Oxychlordane	ND		ug/kg	1.20	1.20	1	B
trans-Chlordane	ND		ug/kg	0.598	0.598	1	A
Endosulfan I	ND		ug/kg	0.598	0.598	1	A
cis-Chlordane	ND		ug/kg	0.598	0.598	1	A
trans-Nonachlor	0.662		ug/kg	0.598	0.598	1	B
4,4'-DDE	2.14		ug/kg	0.598	0.598	1	B
Dieldrin	0.619	IP	ug/kg	0.598	0.598	1	A
Endrin	ND		ug/kg	0.598	0.598	1	A
Endosulfan II	ND		ug/kg	0.598	0.598	1	A
4,4'-DDD	0.800		ug/kg	0.598	0.598	1	A
cis-Nonachlor	ND		ug/kg	0.598	0.598	1	A
4,4'-DDT	0.776	IP	ug/kg	0.598	0.598	1	A
Methoxychlor	ND		ug/kg	5.98	5.98	1	A
Toxaphene	ND		ug/kg	30.0	30.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	74		30-150	A
DBOB	57		30-150	B
BZ 198	79		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-21
Client ID: NHH-F-REP-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 09/01/17 00:29
Analyst: DP
Percent Solids: 43%

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.13	1.13	1	A
gamma-BHC	ND		ug/kg	0.563	0.563	1	A
Heptachlor	ND		ug/kg	0.563	0.563	1	A
Aldrin	ND		ug/kg	0.563	0.563	1	A
Heptachlor epoxide	ND		ug/kg	1.13	1.13	1	B
Oxychlordane	ND		ug/kg	1.13	1.13	1	B
trans-Chlordane	ND		ug/kg	0.563	0.563	1	A
Endosulfan I	ND		ug/kg	0.563	0.563	1	A
cis-Chlordane	ND		ug/kg	0.563	0.563	1	A
trans-Nonachlor	ND		ug/kg	0.563	0.563	1	A
4,4'-DDE	2.27		ug/kg	0.563	0.563	1	A
Dieldrin	0.594	IP	ug/kg	0.563	0.563	1	A
Endrin	ND		ug/kg	0.563	0.563	1	A
Endosulfan II	ND		ug/kg	0.563	0.563	1	A
4,4'-DDD	0.902		ug/kg	0.563	0.563	1	A
cis-Nonachlor	ND		ug/kg	0.563	0.563	1	A
4,4'-DDT	0.698	IP	ug/kg	0.563	0.563	1	A
Methoxychlor	ND		ug/kg	5.63	5.63	1	A
Toxaphene	ND		ug/kg	28.3	28.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	76		30-150	A
DBOB	57		30-150	B
BZ 198	80		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-22
Client ID: NHH-F-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 09/01/17 01:03
Analyst: DP
Percent Solids: 45%

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.02	1.02	1	A
gamma-BHC	ND		ug/kg	0.510	0.510	1	A
Heptachlor	ND		ug/kg	0.510	0.510	1	A
Aldrin	ND		ug/kg	0.510	0.510	1	A
Heptachlor epoxide	ND		ug/kg	1.02	1.02	1	B
Oxychlordane	ND		ug/kg	1.02	1.02	1	B
trans-Chlordane	ND		ug/kg	0.510	0.510	1	A
Endosulfan I	ND		ug/kg	0.510	0.510	1	A
cis-Chlordane	ND		ug/kg	0.510	0.510	1	A
trans-Nonachlor	0.701		ug/kg	0.510	0.510	1	B
4,4'-DDE	4.10		ug/kg	0.510	0.510	1	A
Dieldrin	0.536	IP	ug/kg	0.510	0.510	1	A
Endrin	ND		ug/kg	0.510	0.510	1	A
Endosulfan II	ND		ug/kg	0.510	0.510	1	A
4,4'-DDD	1.56		ug/kg	0.510	0.510	1	A
cis-Nonachlor	ND		ug/kg	0.510	0.510	1	A
4,4'-DDT	1.46	P	ug/kg	0.510	0.510	1	B
Methoxychlor	ND		ug/kg	5.10	5.10	1	A
Toxaphene	ND		ug/kg	25.6	25.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	80		30-150	A
DBOB	61		30-150	B
BZ 198	88		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/30/17 16:28
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 08/18/17 15:15
Cleanup Method: EPA 3630
Cleanup Date: 08/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-04,06-10,16 Batch: WG1033330-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	2.50	2.50	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	69		30-150	A
DBOB	65		30-150	B
BZ 198	76		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/31/17 15:58
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 08/18/17 16:00
Cleanup Method: EPA 3630
Cleanup Date: 08/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 11-15,17-22 Batch: WG1033336-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	2.50	2.50	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	48		30-150	A
BZ 198	66		30-150	A
DBOB	46		30-150	B
BZ 198	63		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 09/05/17 16:15
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 08/31/17 09:30
Cleanup Method: EPA 3630
Cleanup Date: 09/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 05 Batch: WG1037294-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	2.50	2.50	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	47		30-150	A
BZ 198	83		30-150	A
DBOB	48		30-150	B
BZ 198	81		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-04,06-10,16 Batch: WG1033330-2 WG1033330-3									
Hexachlorobenzene	65		64		50-120	2		30	A
gamma-BHC	66		64		50-120	3		30	A
Heptachlor	67		66		50-120	2		30	A
Aldrin	67		65		50-120	3		30	A
trans-Chlordane	75		72		50-120	4		30	A
Endosulfan I	73		70		50-120	4		30	A
cis-Chlordane	72		68		50-120	6		30	A
trans-Nonachlor	72		69		50-120	4		30	A
4,4'-DDE	87		82		50-120	6		30	A
Dieldrin	82		79		50-120	4		30	A
Endrin	70		67		50-120	4		30	A
4,4'-DDD	85		80		50-120	6		30	A
cis-Nonachlor	72		69		50-120	4		30	A
4,4'-DDT	84		80		50-120	5		30	A
Methoxychlor	79		74		50-120	7		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	67		66		30-150	A
BZ 198	82		75		30-150	A
DBOB	70		68		30-150	B
BZ 198	84		72		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-04,06-10,16 Batch: WG1033330-2 WG1033330-3									
Heptachlor epoxide	76		73		50-120	4		30	B
Oxychlordane	75		71		50-120	5		30	B
Endosulfan II	75		72		50-120	4		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	67		66		30-150	A
BZ 198	82		75		30-150	A
DBOB	70		68		30-150	B
BZ 198	84		72		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 11-15,17-22 Batch: WG1033336-2 WG1033336-3									
Hexachlorobenzene	53		**41**	Q	50-120	26		30	A
gamma-BHC	57		**46**	Q	50-120	21		30	A
Heptachlor	55		**44**	Q	50-120	22		30	A
Aldrin	55		**43**	Q	50-120	24		30	A
trans-Chlordane	68		56		50-120	19		30	A
Endosulfan I	66		55		50-120	18		30	A
cis-Chlordane	64		52		50-120	21		30	A
trans-Nonachlor	64		52		50-120	21		30	A
4,4'-DDE	79		65		50-120	19		30	A
Dieldrin	75		64		50-120	16		30	A
Endrin	60		53		50-120	12		30	A
4,4'-DDD	82		70		50-120	16		30	A
cis-Nonachlor	67		57		50-120	16		30	A
4,4'-DDT	80		70		50-120	13		30	A
Methoxychlor	75		66		50-120	13		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	56		44		30-150	A
BZ 198	83		70		30-150	A
DBOB	55		43		30-150	B
BZ 198	79		68		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 11-15,17-22 Batch: WG1033336-2 WG1033336-3									
Heptachlor epoxide	66		54		50-120	20		30	B
Oxychlordane	63		51		50-120	21		30	B
Endosulfan II	69		61		50-120	12		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	56		44		30-150	A
BZ 198	83		70		30-150	A
DBOB	55		43		30-150	B
BZ 198	79		68		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 05 Batch: WG1037294-2 WG1037294-3									
Hexachlorobenzene	60		71		50-120	17		30	A
gamma-BHC	65		71		50-120	9		30	A
Heptachlor	62		72		50-120	15		30	A
Aldrin	61		69		50-120	12		30	A
trans-Chlordane	73		81		50-120	10		30	A
Endosulfan I	73		80		50-120	9		30	A
cis-Chlordane	70		78		50-120	11		30	A
trans-Nonachlor	69		78		50-120	12		30	A
4,4'-DDE	85		94		50-120	10		30	A
Dieldrin	84		93		50-120	10		30	A
Endrin	64		75		50-120	16		30	A
4,4'-DDD	84		89		50-120	6		30	A
cis-Nonachlor	73		81		50-120	10		30	A
4,4'-DDT	87		94		50-120	8		30	A
Methoxychlor	87		93		50-120	7		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	61		69		30-150	A
BZ 198	95		90		30-150	A
DBOB	62		71		30-150	B
BZ 198	85		90		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 05 Batch: WG1037294-2 WG1037294-3									
Heptachlor epoxide	76		83		50-120	9		30	B
Oxychlordane	72		79		50-120	9		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	61		69		30-150	A
BZ 198	95		90		30-150	A
DBOB	62		71		30-150	B
BZ 198	85		90		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033330-6 WG1033330-7 QC Sample: L1728049-16 Client ID: NHH-B													
Hexachlorobenzene	ND	66.4	40.0	60		37.4	54		50-120	7		30	A
gamma-BHC	ND	66.4	40.3	61		38.7	55		50-120	4		30	A
Heptachlor	ND	66.4	39.6	60		38.0	54		50-120	4		30	A
Aldrin	ND	66.4	39.7	60		39.8	57		50-120	0		30	A
Heptachlor epoxide	ND	66.4	45.0	68		46.8	67		50-120	4		30	B
Oxychlordane	ND	66.4	43.9	66		43.8	63		50-120	0		30	B
trans-Chlordane	ND	66.4	44.9	68		46.1	66		50-120	3		30	A
Endosulfan I	ND	66.4	43.4	65		44.8	64		50-120	3		30	A
cis-Chlordane	ND	66.4	43.1	65		43.5	62		50-120	1		30	A
trans-Nonachlor	ND	66.4	43.3	65		43.6	62		50-120	1		30	A
4,4'-DDE	ND	66.4	51.7	78		53.2	76		50-120	3		30	A
Dieldrin	ND	66.4	48.8	74		50.1	72		50-120	3		30	A
Endrin	ND	66.4	42.7	64		43.4	62		50-120	2		30	A
Endosulfan II	ND	66.4	44.0	66		44.2	63		50-120	0		30	B
4,4'-DDD	ND	66.4	55.3	83		59.0	84		50-120	6		30	A
cis-Nonachlor	ND	66.4	42.9	65		45.2	65		50-120	5		30	A
4,4'-DDT	ND	66.4	39.7	60		45.4	65		50-120	13		30	A
Methoxychlor	ND	66.4	40.7	61		44.7	64		50-120	9		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	71		72		30-150	A
DBOB	63		57		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033330-6 WG1033330-7 QC Sample: L1728049-16 Client ID: NHH-B												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	77		75		30-150	B
DBOB	60		55		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033336-6 WG1033336-7 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM													
Hexachlorobenzene	ND	105	50.3	**48**	Q	58.2	53		50-120	15		30	A
gamma-BHC	ND	105	58.1	56		66.6	61		50-120	14		30	A
Heptachlor	ND	105	56.8	54		65.7	60		50-120	15		30	A
Aldrin	ND	105	59.0	56		67.0	61		50-120	13		30	A
Heptachlor epoxide	ND	105	59.6	57		67.1	61		50-120	12		30	B
Oxychlordane	ND	105	56.7	54		63.7	58		50-120	12		30	B
trans-Chlordane	ND	105	69.5	66		75.6	69		50-120	8		30	A
Endosulfan I	ND	105	67.4	64		72.9	66		50-120	8		30	A
cis-Chlordane	ND	105	64.7	62		70.4	64		50-120	8		30	A
trans-Nonachlor	ND	105	64.6	61		70.0	63		50-120	8		30	A
4,4'-DDE	4.10	105	85.0	77		90.2	78		50-120	6		30	A
Dieldrin	0.536	105	73.5	70		78.8	71		50-120	7		30	A
Endrin	ND	105	68.4	65		72.4	66		50-120	6		30	A
Endosulfan II	ND	105	61.4	59		65.1	59		50-120	6		30	B
4,4'-DDD	1.56	105	82.6	77		88.0	79		50-120	6		30	A
cis-Nonachlor	ND	105	66.0	63		70.6	64		50-120	7		30	A
4,4'-DDT	ND	105	74.6	71		78.5	71		50-120	5		30	A
Methoxychlor	ND	105	73.3	70		74.0	67		50-120	1		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	77		77		30-150	A
DBOB	58		64		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033336-6 WG1033336-7 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	83		82		30-150	B
DBOB	49		53		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab	Associated sample(s): 05		QC Batch ID: WG1037294-6			WG1037294-7		QC Sample: L1728049-05			Client ID: NHH-L		
Hexachlorobenzene	ND	105	90.0	86		77.9	71		50-120	14		30	A
gamma-BHC	ND	105	86.0	82		80.4	73		50-120	7		30	A
Heptachlor	ND	105	82.7	79		80.3	73		50-120	3		30	A
Aldrin	ND	105	87.0	83		85.2	78		50-120	2		30	A
Heptachlor epoxide	ND	105	85.7	82		85.4	78		50-120	0		30	B
Oxychlordane	ND	105	85.2	81		84.7	77		50-120	1		30	B
trans-Chlordane	ND	105	96.3	92		96.1	88		50-120	0		30	A
Endosulfan I	ND	105	93.4	89		92.9	85		50-120	1		30	A
cis-Chlordane	ND	105	91.0	87		90.1	82		50-120	1		30	A
trans-Nonachlor	ND	105	90.2	86		89.5	82		50-120	1		30	A
4,4'-DDE	ND	105	114	108		114	104		50-120	0		30	A
Dieldrin	ND	105	103	98		104	95		50-120	1		30	A
Endrin	ND	105	93.6	89		94.8	87		50-120	1		30	A
4,4'-DDD	ND	105	106	101		109	99		50-120	3		30	A
cis-Nonachlor	ND	105	90.2	86		91.5	83		50-120	1		30	A
4,4'-DDT	ND	105	103	98		108	99		50-120	5		30	A
Methoxychlor	ND	105	104	99		107	98		50-120	3		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	101		96		30-150	A
DBOB	84		71		30-150	A
BZ 198	102		98		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728049

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037294-6 WG1037294-7 QC Sample: L1728049-05 Client ID: NHH-L												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
DBOB	72		66		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033330-5 QC Sample: L1728049-16 Client ID: NHH-B							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-04,06-10,16 QC Batch ID: WG1033330-5 QC Sample: L1728049-16 Client ID: NHH-B

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		64		30-150	A
BZ 198	70		74		30-150	A
DBOB	64		62		30-150	B
BZ 198	74		75		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033336-5 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
4,4'-DDE	4.10	4.07	ug/kg	1		30	A
Dieldrin	0.536	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	1.56	1.66	ug/kg	6		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	1.46	1.45P	ug/kg	1		30	B
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 11-15,17-22 QC Batch ID: WG1033336-5 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		69		30-150	A
BZ 198	80		78		30-150	A
DBOB	61		60		30-150	B
BZ 198	88		88		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037294-5 QC Sample: L1728049-05 Client ID: NHH-L							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 05 QC Batch ID: WG1037294-5 QC Sample: L1728049-05 Client ID: NHH-L						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		70		30-150	A
BZ 198	84		99		30-150	A
DBOB	54		64		30-150	B
BZ 198	87		105		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1033330-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	84		40-140
cis-Chlordane	119		40-140
trans-Nonachlor	476	Q	40-140
DBOB (Surrogate)	70		30-150
DBOB (Surrogate)	93		30-150
BZ 198 (Surrogate)	93		30-150
BZ 198 (Surrogate)	205	Q	30-150

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1033336-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	82		40-140
cis-Chlordane	101		40-140
trans-Nonachlor	290	Q	40-140
DBOB (Surrogate)	52		30-150
DBOB (Surrogate)	60		30-150
BZ 198 (Surrogate)	94		30-150
BZ 198 (Surrogate)	179	Q	30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1037294-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	86		40-140
cis-Chlordane	113		40-140
trans-Nonachlor	320	Q	40-140
DBOB (Surrogate)	69		30-150
DBOB (Surrogate)	78		30-150
BZ 198 (Surrogate)	125		30-150
BZ 198 (Surrogate)	179	Q	30-150

METALS

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-01	Date Collected:	08/10/17 08:32
Client ID:	NHH-R-TOP	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	37%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.6		mg/kg	0.231	0.031	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV
Cadmium, Total	0.831		mg/kg	0.092	0.012	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV
Chromium, Total	67.9		mg/kg	0.924	0.216	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV
Copper, Total	98.8		mg/kg	0.924	0.090	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV
Lead, Total	58.5		mg/kg	0.277	0.068	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV
Mercury, Total	0.250		mg/kg	0.039	0.005	5	08/22/17 10:02	08/24/17 15:29	EPA 7474	1,7474	BV
Nickel, Total	26.2		mg/kg	0.462	0.124	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV
Zinc, Total	193		mg/kg	4.62	1.20	2	08/22/17 10:09	08/31/17 14:08	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-02	Date Collected:	08/10/17 08:32
Client ID:	NHH-R-BOTTOM	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	44%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.3		mg/kg	0.200	0.026	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV
Cadmium, Total	1.14		mg/kg	0.080	0.011	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV
Chromium, Total	82.8		mg/kg	0.798	0.187	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV
Copper, Total	135		mg/kg	0.798	0.077	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV
Lead, Total	76.8		mg/kg	0.240	0.058	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV
Mercury, Total	0.325		mg/kg	0.027	0.003	5	08/22/17 10:02	08/24/17 15:32	EPA 7474	1,7474	BV
Nickel, Total	28.8		mg/kg	0.399	0.107	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV
Zinc, Total	221		mg/kg	3.99	1.04	2	08/22/17 10:09	08/31/17 14:12	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-03
Client ID: NHH-S-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 40%

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	11.5		mg/kg	0.217	0.029	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV
Cadmium, Total	3.06		mg/kg	0.087	0.011	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV
Chromium, Total	143		mg/kg	0.868	0.203	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV
Copper, Total	206		mg/kg	0.868	0.084	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV
Lead, Total	113		mg/kg	0.260	0.063	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV
Mercury, Total	0.543		mg/kg	0.031	0.004	5	08/22/17 10:02	08/24/17 15:34	EPA 7474	1,7474	BV
Nickel, Total	31.6		mg/kg	0.434	0.116	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV
Zinc, Total	338		mg/kg	4.34	1.13	2	08/22/17 10:09	08/31/17 14:16	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-04	Date Collected:	08/10/17 11:41
Client ID:	NHH-J	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	42%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	11.8		mg/kg	0.185	0.025	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV
Cadmium, Total	1.60		mg/kg	0.074	0.010	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV
Chromium, Total	84.8		mg/kg	0.742	0.174	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV
Copper, Total	150		mg/kg	0.742	0.072	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV
Lead, Total	71.8		mg/kg	0.222	0.054	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV
Mercury, Total	0.925		mg/kg	0.025	0.003	5	08/22/17 10:02	08/24/17 15:36	EPA 7474	1,7474	BV
Nickel, Total	25.8		mg/kg	0.371	0.099	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV
Zinc, Total	223		mg/kg	3.71	0.964	2	08/22/17 10:09	08/31/17 14:20	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-05	Date Collected:	08/10/17 13:00
Client ID:	NHH-L	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	46%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	13.8		mg/kg	0.165	0.022	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV
Cadmium, Total	0.991		mg/kg	0.066	0.009	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV
Chromium, Total	52.6		mg/kg	0.660	0.154	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV
Copper, Total	170		mg/kg	0.660	0.064	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV
Lead, Total	157		mg/kg	0.198	0.048	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV
Mercury, Total	1.12		mg/kg	0.030	0.004	5	08/22/17 10:02	08/24/17 15:44	EPA 7474	1,7474	BV
Nickel, Total	22.1		mg/kg	0.330	0.088	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV
Zinc, Total	212		mg/kg	3.30	0.859	2	08/22/17 10:09	08/31/17 14:25	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-06	Date Collected:	08/10/17 14:09
Client ID:	NHH-K-TOP	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	48%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.12		mg/kg	0.148	0.020	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV
Cadmium, Total	0.402		mg/kg	0.059	0.008	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV
Chromium, Total	47.5		mg/kg	0.593	0.139	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV
Copper, Total	57.4		mg/kg	0.593	0.058	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV
Lead, Total	37.6		mg/kg	0.178	0.043	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV
Mercury, Total	0.144		mg/kg	0.025	0.003	5	08/22/17 10:02	08/24/17 15:47	EPA 7474	1,7474	BV
Nickel, Total	19.4		mg/kg	0.297	0.079	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV
Zinc, Total	132		mg/kg	2.97	0.771	2	08/22/17 10:09	08/31/17 14:29	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-07	Date Collected:	08/10/17 14:58
Client ID:	NHH-H-TOP	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	49%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.4		mg/kg	0.142	0.019	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV
Cadmium, Total	0.860		mg/kg	0.057	0.008	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV
Chromium, Total	69.4		mg/kg	0.568	0.133	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV
Copper, Total	80.0		mg/kg	0.568	0.055	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV
Lead, Total	47.0		mg/kg	0.170	0.042	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV
Mercury, Total	0.189		mg/kg	0.024	0.003	5	08/22/17 10:02	08/24/17 15:49	EPA 7474	1,7474	BV
Nickel, Total	22.7		mg/kg	0.284	0.076	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV
Zinc, Total	155		mg/kg	2.84	0.738	2	08/22/17 10:09	08/31/17 14:33	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-08	Date Collected:	08/10/17 14:58
Client ID:	NHH-H-REP-TOP	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	47%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.7		mg/kg	0.138	0.018	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV
Cadmium, Total	0.974		mg/kg	0.055	0.007	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV
Chromium, Total	80.9		mg/kg	0.554	0.130	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV
Copper, Total	96.2		mg/kg	0.554	0.054	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV
Lead, Total	56.6		mg/kg	0.166	0.040	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV
Mercury, Total	0.331		mg/kg	0.025	0.003	5	08/22/17 10:02	08/24/17 15:52	EPA 7474	1,7474	BV
Nickel, Total	24.9		mg/kg	0.277	0.074	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV
Zinc, Total	183		mg/kg	2.77	0.720	2	08/22/17 10:09	08/31/17 14:37	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-09	Date Collected:	08/10/17 14:58
Client ID:	NHH-H-BOTTOM	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	71%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	4.58		mg/kg	0.103	0.014	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV
Cadmium, Total	0.134		mg/kg	0.041	0.005	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV
Chromium, Total	12.4		mg/kg	0.411	0.096	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV
Copper, Total	6.63		mg/kg	0.411	0.040	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV
Lead, Total	6.12		mg/kg	0.123	0.030	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV
Mercury, Total	0.003	J	mg/kg	0.016	0.002	5	08/22/17 10:02	08/24/17 15:54	EPA 7474	1,7474	BV
Nickel, Total	7.54		mg/kg	0.206	0.055	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV
Zinc, Total	24.5		mg/kg	2.06	0.535	2	08/22/17 10:09	08/31/17 14:52	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-10	Date Collected:	08/10/17 15:48
Client ID:	NHH-I-TOP	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	48%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.18		mg/kg	0.143	0.019	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV
Cadmium, Total	0.143		mg/kg	0.057	0.008	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV
Chromium, Total	22.8		mg/kg	0.574	0.134	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV
Copper, Total	11.0		mg/kg	0.574	0.056	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV
Lead, Total	9.33		mg/kg	0.172	0.042	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV
Mercury, Total	0.018	J	mg/kg	0.021	0.003	5	08/22/17 10:02	08/24/17 15:57	EPA 7474	1,7474	BV
Nickel, Total	14.7		mg/kg	0.287	0.077	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV
Zinc, Total	50.7		mg/kg	2.87	0.746	2	08/22/17 10:09	08/31/17 14:57	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-11	Date Collected:	08/10/17 15:48
Client ID:	NHH-I-BOTTOM	Date Received:	08/10/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	48%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.3		mg/kg	0.149	0.020	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV
Cadmium, Total	0.155		mg/kg	0.060	0.008	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV
Chromium, Total	30.6		mg/kg	0.595	0.139	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV
Copper, Total	12.2		mg/kg	0.595	0.058	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV
Lead, Total	10.9		mg/kg	0.178	0.043	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV
Mercury, Total	ND		mg/kg	0.023	0.003	5	08/22/17 10:02	08/24/17 15:59	EPA 7474	1,7474	BV
Nickel, Total	19.9		mg/kg	0.298	0.080	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV
Zinc, Total	64.3		mg/kg	2.98	0.774	2	08/22/17 10:09	08/31/17 15:01	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-12	Date Collected:	08/11/17 08:37
Client ID:	NHH-G-TOP	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	42%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	12.1		mg/kg	0.176	0.023	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV
Cadmium, Total	0.736		mg/kg	0.070	0.009	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV
Chromium, Total	67.4		mg/kg	0.704	0.165	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV
Copper, Total	118		mg/kg	0.704	0.068	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV
Lead, Total	51.3		mg/kg	0.211	0.051	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV
Mercury, Total	0.457		mg/kg	0.036	0.005	5	08/22/17 10:02	08/24/17 16:02	EPA 7474	1,7474	BV
Nickel, Total	23.2		mg/kg	0.352	0.094	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV
Zinc, Total	183		mg/kg	3.52	0.916	2	08/22/17 10:09	08/31/17 15:05	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-13	Date Collected:	08/11/17 08:37
Client ID:	NHH-G-BOTTOM	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	47%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.8		mg/kg	0.145	0.019	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV
Cadmium, Total	0.188		mg/kg	0.058	0.008	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV
Chromium, Total	30.2		mg/kg	0.580	0.136	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV
Copper, Total	12.5		mg/kg	0.580	0.056	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV
Lead, Total	10.6		mg/kg	0.174	0.042	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV
Mercury, Total	ND		mg/kg	0.028	0.004	5	08/22/17 10:02	08/24/17 16:04	EPA 7474	1,7474	BV
Nickel, Total	19.7		mg/kg	0.290	0.077	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV
Zinc, Total	64.2		mg/kg	2.90	0.753	2	08/22/17 10:09	08/31/17 15:09	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-14	Date Collected:	08/11/17 10:33
Client ID:	NHH-C-TOP	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	70%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	4.10		mg/kg	0.111	0.015	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV
Cadmium, Total	0.064		mg/kg	0.044	0.006	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV
Chromium, Total	13.0		mg/kg	0.444	0.104	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV
Copper, Total	8.41		mg/kg	0.444	0.043	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV
Lead, Total	5.77		mg/kg	0.133	0.032	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV
Mercury, Total	0.015	J	mg/kg	0.017	0.002	5	08/22/17 10:02	08/24/17 16:07	EPA 7474	1,7474	BV
Nickel, Total	7.40		mg/kg	0.222	0.059	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV
Zinc, Total	31.5		mg/kg	2.22	0.577	2	08/22/17 10:09	08/31/17 15:13	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-15	Date Collected:	08/11/17 10:33
Client ID:	NHH-C-BOTTOM	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	62%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	6.14		mg/kg	0.121	0.016	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV
Cadmium, Total	0.071		mg/kg	0.049	0.006	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV
Chromium, Total	16.1		mg/kg	0.486	0.114	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV
Copper, Total	6.45		mg/kg	0.486	0.047	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV
Lead, Total	5.20		mg/kg	0.146	0.036	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV
Mercury, Total	ND		mg/kg	0.021	0.003	5	08/22/17 10:02	08/24/17 16:15	EPA 7474	1,7474	BV
Nickel, Total	10.4		mg/kg	0.243	0.065	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV
Zinc, Total	32.8		mg/kg	2.43	0.632	2	08/22/17 10:09	08/31/17 15:17	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-16	Date Collected:	08/11/17 11:57
Client ID:	NHH-B	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	69%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.12		mg/kg	0.106	0.014	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV
Cadmium, Total	0.069		mg/kg	0.043	0.006	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV
Chromium, Total	10.3		mg/kg	0.426	0.100	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV
Copper, Total	5.41		mg/kg	0.426	0.041	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV
Lead, Total	3.76		mg/kg	0.128	0.031	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV
Mercury, Total	ND		mg/kg	0.020	0.002	5	08/22/17 10:02	08/24/17 15:19	EPA 7474	1,7474	BV
Nickel, Total	6.36		mg/kg	0.213	0.057	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV
Zinc, Total	21.0		mg/kg	2.13	0.554	2	08/22/17 10:09	08/31/17 13:35	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-17	Date Collected:	08/11/17 13:40
Client ID:	NHH-A-TOP	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	61%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.41		mg/kg	0.126	0.017	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV
Cadmium, Total	0.077		mg/kg	0.051	0.007	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV
Chromium, Total	10.6		mg/kg	0.505	0.118	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV
Copper, Total	10.0		mg/kg	0.505	0.049	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV
Lead, Total	6.76		mg/kg	0.152	0.037	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV
Mercury, Total	0.028		mg/kg	0.017	0.002	5	08/22/17 10:02	08/24/17 16:17	EPA 7474	1,7474	BV
Nickel, Total	5.30		mg/kg	0.253	0.068	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV
Zinc, Total	29.3		mg/kg	2.53	0.657	2	08/22/17 10:09	08/31/17 15:21	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-18	Date Collected:	08/11/17 15:07
Client ID:	NHH-D-TOP	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	60%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.61		mg/kg	0.136	0.018	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV
Cadmium, Total	0.064		mg/kg	0.055	0.007	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV
Chromium, Total	10.8		mg/kg	0.545	0.127	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV
Copper, Total	8.98		mg/kg	0.545	0.053	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV
Lead, Total	5.80		mg/kg	0.163	0.040	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV
Mercury, Total	0.031		mg/kg	0.018	0.002	5	08/22/17 10:02	08/24/17 16:20	EPA 7474	1,7474	BV
Nickel, Total	5.37		mg/kg	0.272	0.073	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV
Zinc, Total	26.3		mg/kg	2.72	0.708	2	08/22/17 10:09	08/31/17 15:25	EPA 3050B	1,6020A	BV

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-19
Client ID: NHH-D-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment
Percent Solids: 66%

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.01		mg/kg	0.106	0.014	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV
Cadmium, Total	0.102		mg/kg	0.042	0.006	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV
Chromium, Total	20.9		mg/kg	0.423	0.099	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV
Copper, Total	7.74		mg/kg	0.423	0.041	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV
Lead, Total	6.83		mg/kg	0.127	0.031	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV
Mercury, Total	ND		mg/kg	0.018	0.002	5	08/22/17 10:02	08/24/17 16:22	EPA 7474	1,7474	BV
Nickel, Total	13.5		mg/kg	0.212	0.057	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV
Zinc, Total	42.9		mg/kg	2.12	0.550	2	08/22/17 10:09	08/31/17 15:30	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-20	Date Collected:	08/11/17 16:50
Client ID:	NHH-F-TOP	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	40%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.49		mg/kg	0.222	0.029	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV
Cadmium, Total	0.556		mg/kg	0.089	0.012	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV
Chromium, Total	69.8		mg/kg	0.888	0.208	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV
Copper, Total	81.4		mg/kg	0.888	0.086	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV
Lead, Total	51.2		mg/kg	0.266	0.065	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV
Mercury, Total	0.270		mg/kg	0.027	0.003	5	08/22/17 10:02	08/24/17 16:25	EPA 7474	1,7474	BV
Nickel, Total	24.6		mg/kg	0.444	0.119	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV
Zinc, Total	184		mg/kg	4.44	1.15	2	08/22/17 10:09	08/31/17 15:42	EPA 3050B	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-21	Date Collected:	08/11/17 16:50
Client ID:	NHH-F-REP-TOP	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	43%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.51		mg/kg	0.225	0.030	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM
Cadmium, Total	0.644		mg/kg	0.090	0.012	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM
Chromium, Total	72.2		mg/kg	0.899	0.210	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM
Copper, Total	96.7		mg/kg	0.899	0.087	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM
Lead, Total	48.8		mg/kg	0.270	0.066	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM
Mercury, Total	0.241		mg/kg	0.028	0.004	5	08/22/17 10:02	08/24/17 11:05	EPA 7474	1,7474	BV
Nickel, Total	27.4		mg/kg	0.449	0.120	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM
Zinc, Total	186		mg/kg	4.49	1.17	2	08/15/17 22:15	08/22/17 17:27	EPA 3050B	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728049-22	Date Collected:	08/11/17 16:50
Client ID:	NHH-F-BOTTOM	Date Received:	08/11/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	45%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	11.1		mg/kg	0.221	0.029	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM
Cadmium, Total	1.12		mg/kg	0.088	0.012	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM
Chromium, Total	94.2		mg/kg	0.883	0.206	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM
Copper, Total	184		mg/kg	0.883	0.086	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM
Lead, Total	63.4		mg/kg	0.265	0.064	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM
Mercury, Total	0.490		mg/kg	0.029	0.004	5	08/22/17 10:02	08/24/17 10:53	EPA 7474	1,7474	BV
Nickel, Total	24.5		mg/kg	0.441	0.118	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM
Zinc, Total	246		mg/kg	4.41	1.15	2	08/15/17 22:15	08/22/17 16:42	EPA 3050B	1,6020A	AM

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21-22 Batch: WG1032246-1										
Arsenic, Total	ND		mg/kg	0.100	0.013	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.005	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.094	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Copper, Total	ND		mg/kg	0.400	0.039	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Lead, Total	ND		mg/kg	0.120	0.029	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Nickel, Total	ND		mg/kg	0.200	0.053	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Zinc, Total	ND		mg/kg	2.00	0.520	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-20 Batch: WG1034123-1										
Arsenic, Total	ND		mg/kg	0.100	0.013	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV
Cadmium, Total	ND		mg/kg	0.040	0.005	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV
Chromium, Total	ND		mg/kg	0.400	0.094	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV
Copper, Total	ND		mg/kg	0.400	0.039	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV
Lead, Total	ND		mg/kg	0.120	0.029	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV
Nickel, Total	ND		mg/kg	0.200	0.053	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV
Zinc, Total	ND		mg/kg	2.00	0.520	2	08/22/17 10:09	08/31/17 13:10	1,6020A	BV

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-20 Batch: WG1034139-1										
Mercury, Total	ND		mg/kg	0.013	0.002	5	08/22/17 10:02	08/24/17 15:14	1,7474	BV

Project Name: USACE/NHH FNP **Lab Number:** L1728049

Project Number: 60543021 **Report Date:** 09/08/17

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21-22 Batch: WG1034140-1										
Mercury, Total	ND		mg/kg	0.013	0.002	5	08/22/17 10:02	08/24/17 10:48	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 21-22 Batch: WG1032246-2 SRM Lot Number: D093-540								
Arsenic, Total	92		-		70-130	-		20
Cadmium, Total	92		-		83-117	-		20
Chromium, Total	92		-		80-120	-		20
Copper, Total	88		-		82-118	-		20
Lead, Total	87		-		82-117	-		20
Nickel, Total	91		-		83-117	-		20
Zinc, Total	88		-		83-117	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 Batch: WG1034123-2 SRM Lot Number: D093-540								
Arsenic, Total	100		-		70-130	-		20
Cadmium, Total	90		-		83-117	-		20
Chromium, Total	96		-		80-120	-		20
Copper, Total	94		-		82-118	-		20
Lead, Total	93		-		82-117	-		20
Nickel, Total	95		-		83-117	-		20
Zinc, Total	93		-		83-117	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 Batch: WG1034139-2 SRM Lot Number: D093-540								
Mercury, Total	90		-		72-128	-		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 21-22 Batch: WG1034140-2 SRM Lot Number: D093-540					
Mercury, Total	97	-	72-128	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1032246-3 WG1032246-4 QC Sample: L1726857-01 Client ID: MS Sample												
Arsenic, Total	4.04	10.2	13.6	93		13.7	95		75-125	1		20
Cadmium, Total	0.039J	4.36	4.72	108		4.55	106		75-125	4		20
Chromium, Total	27.3	17.1	43.7	96		47.4	119		75-125	8		20
Copper, Total	7.39	21.3	28.8	100		29.5	105		75-125	2		20
Lead, Total	4.19	43.6	46.4	97		47.1	100		75-125	1		20
Nickel, Total	16.3	42.7	58.2	98		60.0	103		75-125	3		20
Zinc, Total	22.7	42.7	64.7	98		68.3	108		75-125	5		20
Total Metals - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1032246-7 WG1032246-8 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM												
Arsenic, Total	11.1	20.8	31.3	97		29.9	88		75-125	5		20
Cadmium, Total	1.12	8.86	10.4	105		10.2	100		75-125	2		20
Chromium, Total	94.2	34.8	164	**201**	Q	132	106		75-125	**22**	Q	20
Copper, Total	184.	43.4	288	**239**	Q	220	81		75-125	**27**	Q	20
Lead, Total	63.4	88.6	154	102		140	84		75-125	10		20
Nickel, Total	24.5	86.9	111	100		108	94		75-125	3		20
Zinc, Total	246.	86.9	358	**129**	Q	316	78		75-125	12		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1034123-3 WG1034123-4 QC Sample: L1728049-16 Client ID: NHH-B									
Arsenic, Total	3.12	9.77	12.8	99	12.2	104	75-125	5	20
Cadmium, Total	0.069	4.15	4.40	104	4.13	109	75-125	6	20
Chromium, Total	10.3	16.3	27.9	108	26.3	110	75-125	6	20
Copper, Total	5.41	20.4	26.1	102	24.2	103	75-125	8	20
Lead, Total	3.76	41.5	44.8	99	41.3	101	75-125	8	20
Nickel, Total	6.36	40.7	47.3	100	44.9	106	75-125	5	20
Zinc, Total	21.0	40.7	64.5	107	60.2	108	75-125	7	20
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1034139-3 WG1034139-4 QC Sample: L1728049-16 Client ID: NHH-B									
Mercury, Total	ND	0.846	0.721	85	0.784	86	80-120	8	20
Total Metals - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1034140-3 WG1034140-4 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM									
Mercury, Total	0.490	1.57	2.32	116	2.33	114	80-120	0	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1032246-9 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						
Arsenic, Total	11.1	11.9	mg/kg	7		20
Cadmium, Total	1.12	1.08	mg/kg	4		20
Chromium, Total	94.2	99.1	mg/kg	5		20
Copper, Total	184.	191	mg/kg	4		20
Lead, Total	63.4	69.9	mg/kg	10		20
Nickel, Total	24.5	26.3	mg/kg	7		20
Zinc, Total	246.	259	mg/kg	5		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1034123-5 QC Sample: L1728049-16 Client ID: NHH-B						
Arsenic, Total	3.12	3.71	mg/kg	17		20
Cadmium, Total	0.069	0.070	mg/kg	1		20
Chromium, Total	10.3	10.1	mg/kg	2		20
Copper, Total	5.41	5.28	mg/kg	2		20
Lead, Total	3.76	3.85	mg/kg	2		20
Nickel, Total	6.36	6.15	mg/kg	3		20
Zinc, Total	21.0	22.0	mg/kg	5		20
Total Metals - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1034139-5 QC Sample: L1728049-16 Client ID: NHH-B						
Mercury, Total	ND	ND	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1034140-5 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						
Mercury, Total	0.490	0.653	mg/kg	**29**	Q	20

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-01
Client ID: NHH-R-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.92		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.69		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	37.3		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	62.7		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-02
Client ID: NHH-R-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 08:32
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.84		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.94		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	44.1		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	55.9		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-03
Client ID: NHH-S-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 09:55
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.66		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.61		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	40.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	60.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-04
Client ID: NHH-J
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 11:41
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.46		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.31		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	41.6		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	58.4		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-05
Client ID: NHH-L
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 13:00
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.27		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.17		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	45.6		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	54.4		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-06
Client ID: NHH-K-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:09
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.93		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.72		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	47.6		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	52.4		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-07
Client ID: NHH-H-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.90		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.94		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	48.9		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	51.1		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-08
Client ID: NHH-H-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.27		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.02		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	46.8		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	53.2		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-09
Client ID: NHH-H-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 14:58
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.843		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.828		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	71.1		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	28.9		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-10
Client ID: NHH-I-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.56		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.42		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	48.4		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	51.6		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-11
Client ID: NHH-I-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/10/17 15:48
Date Received: 08/10/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.33		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.33		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	48.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	52.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-12
Client ID: NHH-G-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.80		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.57		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	41.5		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	58.5		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-13
Client ID: NHH-G-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 08:37
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.37		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.42		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	47.4		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	52.6		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-14
Client ID: NHH-C-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.467		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.382		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	70.4		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	29.6		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-15
Client ID: NHH-C-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 10:33
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.556		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.578		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	62.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	38.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-16
Client ID: NHH-B
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 11:57
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.49		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.924		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	69.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	31.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-17
Client ID: NHH-A-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 13:40
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.211		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.215		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	60.7		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	39.3		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-18
Client ID: NHH-D-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.16		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.998		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	60.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	40.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-19
Client ID: NHH-D-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 15:07
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.18		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.12		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	66.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	34.0		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-20
Client ID: NHH-F-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.85		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.89		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	40.2		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV
Moisture	59.8		%	0.100	0.100	1	-	08/23/17 08:57	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-21
Client ID: NHH-F-REP-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.87		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.92		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	43.1		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV
Moisture	56.9		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728049
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728049-22
Client ID: NHH-F-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/11/17 16:50
Date Received: 08/11/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.00		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.98		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	44.6		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV
Moisture	55.4		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV

Project Name: USACE/NHH FNP **Lab Number:** L1728049

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Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab for sample(s): 03-22 Batch: WG1036606-1										
Total Organic Carbon (Rep1)	0.013		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.018		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon - Mansfield Lab for sample(s): 01-02 Batch: WG1037985-1										
Total Organic Carbon (Rep1)	ND		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	ND		%	0.010	0.010	1	-	09/01/17 00:00	1,9060A	SP

Lab Control Sample Analysis

Batch Quality Control

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Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 03-22 Batch: WG1036606-2								
Total Organic Carbon (Rep1)	98		-		75-125	-		25
Total Organic Carbon (Rep2)	93		-		75-125	-		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 Batch: WG1037985-2								
Total Organic Carbon (Rep1)	88		-		75-125	-		25
Total Organic Carbon (Rep2)	84		-		75-125	-		25

Matrix Spike Analysis
Batch Quality Control

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Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 03-22 QC Batch ID: WG1036606-4 WG1036606-5 QC Sample: L1728049-16 Client ID: NHH-B												
Total Organic Carbon (Rep1)	1.49	1.38	1.93	**32**	Q	2.67	**65**	Q	75-125	**32**	Q	25
Total Organic Carbon (Rep2)	0.924	1.5	2.41	99		1.74	**71**	Q	75-125	**32**	Q	25
Total Organic Carbon - Mansfield Lab Associated sample(s): 03-22 QC Batch ID: WG1036606-7 WG1036606-8 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM												
Total Organic Carbon (Rep1)	2.00	1.31	3.51	115		3.66	105		75-125	4		25
Total Organic Carbon (Rep2)	1.98	1.66	3.84	112		4.12	114		75-125	7		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1037985-4 QC Sample: L1728049-01 Client ID: NHH-R-TOP												
Total Organic Carbon (Rep1)	2.92	1.59	4.35	90		-	-		75-125	-		25
Total Organic Carbon (Rep2)	2.69	1.98	4.75	104		-	-		75-125	-		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
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Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 21-22 QC Batch ID: WG1034557-1 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						
Solids, Total	44.6	40.5	%	10		10
Moisture	55.4	59.5	%	7		10
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1034558-1 QC Sample: L1728049-16 Client ID: NHH-B						
Solids, Total	69.0	70.0	%	1		10
Moisture	31	30.0	%	3		10
Total Organic Carbon - Mansfield Lab Associated sample(s): 03-22 QC Batch ID: WG1036606-3 QC Sample: L1728049-16 Client ID: NHH-B						
Total Organic Carbon (Rep1)	1.49	1.14	%	**27**	Q	25
Total Organic Carbon (Rep2)	0.924	0.854	%	8		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 03-22 QC Batch ID: WG1036606-6 QC Sample: L1728049-22 Client ID: NHH-F-BOTTOM						
Total Organic Carbon (Rep1)	2.00	2.19	%	9		25
Total Organic Carbon (Rep2)	1.98	2.00	%	1		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1037985-3 QC Sample: L1728049-01 Client ID: NHH-R-TOP						
Total Organic Carbon (Rep1)	2.92	2.80	%	4		25
Total Organic Carbon (Rep2)	2.69	2.73	%	1		25

Project Name: USACE/NHH FNP
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Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728049-01A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-02A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-03A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-04A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728049-05A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-06A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-07A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-08A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-09A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728049-10A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-11A	Glass 500ml/16oz unpreserved	A	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-12A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-13A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-14A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Lab Number: L1728049
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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728049-15A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-16A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-16A1	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-16A2	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-17A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728049-18A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-19A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-20A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-21A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-22A	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728049-22A1	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728049-22A2	Glass 500ml/16oz unpreserved	B	NA		2.0	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728049
Project Number:	60543021	**Report Date:**	09/08/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

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Project Number: 60543021 **Report Date:** 09/08/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name: USACE/NHH FNP **Lab Number:** L1728049
Project Number: 60543021 **Report Date:** 09/08/17

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – see Narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – See Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	16MS/MSD: Naphathalene 47%/47%, Acenaphthalene 48%/48%, Acenaphthene (46%/46%, Fluorene 48%/49%, Phenanthrene 46%/48% 05MS: Benz(a)anthracene 121% 22MSD: Fluoranthene 41%, Pyrene 49%	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	05D: Acenaphthylene 35% 22D: Acenaphthylene 32%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes= average No = individual	Opening CCV for Blank/LCS/LCSD: Column B: hexachlorobenzene @ 30%, Opening CCV for 8049-11-14, 15, 17-22: Column B: hexachlorobenzene @ 18%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM1: trans-Nonachlor @476% SRM2: trans-Nonachlor @290% SRM3: trans-Nonachlor @ 320%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	22MS: Hexachlorobenzene @ 48%	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	SRM1: BZ198 205% column B SRM2: BZ198 179% column B SRM3: BZ198 179% column B	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM: Cl3-BZ#28: 39% SRM2: Cl10-BZ#209: 232%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	22D: Cl5-BZ#101: 35%,Cl7-BZ#187: 32%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	No	Annual	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	22MS: Chromium (201%); Zinc (129%); Copper (239%) RPDs: Chromium (22%) and Copper (27%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	No	-16: TOC (Rep1) (27%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

L1728049

Page 1 of 2

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7474/7471B	PCBs - 8082	Pesticides - 8081B	PAHs - 8270D-SIM	TOC - 9060					Lab I.D.	Remarks
-01	NHH-R-Top	8/10/17	0832	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						0-4'2"
-02	NHH-R-Bottom		0832	X		"	SD	4°C		X	X	X	X	X	X						4'2"-7'8"
-03	NHH-S-Top		0955	X		"	SD	4°C		X	X	X	X	X	X						0-6'0"
--	NHH-S-Bottom		0955	X		8oz	SD	4°C		X											6'0"-6'5"
-04	NHH-J		1141	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'5"
-05	NHH-L		1300	X		"	SD	4°C		X	X	X	X	X	X						0-6'9"
-06	NHH-K-Top		1409	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'6"
--	NHH-K-Bottom		1409	X		8oz	SD	4°C		X											5'6"-8'2"
-07	NHH-H-Top		1458	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-5'5"
-08	NHH-H-Rep-Top		1458	X		"	SD	4°C		X	X	X	X	X	X						0-5'5"
-09	NHH-H-Bottom		1458	X		"	SD	4°C		X	X	X	X	X	X						5'5"-7'8"
-10	NHH-I-Top		1548	X		"	SD	4°C		X	X	X	X	X	X						0-8"
-11	NHH-I-Bottom		1548	X		"	SD	4°C		X	X	X	X	X	X						8"-2'6"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C Steve Howe AECOM Signature:	Date: 8/10/17 Time: 1922	Signature:	Date: 8/10/17 Time: 1928
Signature:	Date: 8/10/17 Time: 2150	Signature:	Date: 8/10/17 Time: 2150
Signature:	Date: Time:	Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0156

AECOM

CHAIN OF CUSTODY RECORD

L1728049

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature: C Steve

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals-6020A/7471A/7196	PCBs-8082/8270-SIM	Pesticides-8081B	PAHs-8270D-SIM	TOC-9060					Lab I.D.	Remarks
NHH-G-Top	8/11/17	0837	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						0-4'3"
NHH-G-Bottom	8/11/17	0837	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						4'3"-13'8"
NHH-C-Top		1033	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-2'10"
NHH-C-Bottom		1033	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						2'10"-8'0"
NHH-B		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X						0-4.2'
NHH-B-MS		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X						0-4.2'
NHH-B-MSD		1157	X		Ziploc/16oz	SD	4°C		X	X	X	X	X	X						0-4.2'
NHH-A-Top		1340	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-2'2"
NHH-A-Bottom		1340	X		8 oz	SD	4°C		X											2'2"-9.9'
NHH-D-Top		1507	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-4'9"
NHH-D-Bottom		1507	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						4'9"-10'4"
NHH-F-Top		1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-3'2"
NHH-F-Rep-Top		1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						0-3'2"

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/11/17 Time: 1925	Signature:	Date: 8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) Signature: Bethany Beo	Date: 8/11/17 Time: 2237
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0178

Serial No:09081718:38

L1728049

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals - 6020A/7471A/7471B	PCBs - 8082	Pesticides - 8270-SIM	PAHs - 8270D-SIM	TOC - 9060					Lab I.D.	Remarks
NHH-F-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C	NA	X	X	X	X	X	X						3'2" - 10'6"
NHH-F-MS-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						3'2" - 10'6"
NHH-F-MSD-Bottom	8/11/17	1650	X		8oz/16oz	SD	4°C		X	X	X	X	X	X						3'2" - 10'6"

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/11/17 Time: 1925	Signature:	8/11/17 Time: 1925
Relinquished by: (Print Name)/(Affiliation) Signature:	8/11/17 Time: 2237	Received by: (Print Name)/(Affiliation) Bethany Bodard Signature:	8/11/17 Time: 22:37
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0167

ANALYTICAL REPORT

Lab Number:	L1728343
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	09/08/17

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728343-01	NHH-E-TOP	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17
L1728343-02	NHH-E-BOTTOM	SEDIMENT	NEW HAVEN, CT	08/14/17 08:32	08/14/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1728343
Project Number: 60543021 **Report Date:** 09/08/17

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Semivolatile Organics

The WG1036086-4 Laboratory Duplicate RPD for, Cl4-BZ#49 (33%), performed on L1728343-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1036086-5/-6 MS/MSD recoveries, performed on L1728343-01, are outside the acceptance criteria for two compounds; however, the associated LCS/LCSD recoveries are within overall method allowances. The results of the native sample are considered to have a potentially high bias for Benzo(b)fluoranthene (121%-MS only) and Fluoranthene (123%-MSD only)

Pesticides

The WG1036085-7 SRM recovery for trans-Nonachlor (367%) and the surrogate BZ198 column B (223%), are above the acceptable criteria.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 09/08/17

ORGANICS

SEMIVOLATILES

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-01
Client ID: NHH-E-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 07:07
Analyst: GP
Percent Solids: 44%

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	42.3		ug/kg	10.7	5.34	1
Acenaphthylene	45.6		ug/kg	10.7	5.34	1
Acenaphthene	9.42	J	ug/kg	10.7	5.34	1
Fluorene	19.1		ug/kg	10.7	5.34	1
Phenanthrene	125		ug/kg	10.7	5.34	1
Anthracene	36.1		ug/kg	10.7	5.34	1
Fluoranthene	276		ug/kg	10.7	5.34	1
Pyrene	254		ug/kg	10.7	5.34	1
Benz(a)anthracene	135		ug/kg	10.7	5.34	1
Chrysene	169		ug/kg	10.7	5.34	1
Benzo(b)fluoranthene	213		ug/kg	10.7	5.34	1
Benzo(k)fluoranthene	138		ug/kg	10.7	5.34	1
Benzo(a)pyrene	182		ug/kg	10.7	5.34	1
Indeno(1,2,3-cd)Pyrene	152		ug/kg	10.7	5.34	1
Dibenz(a,h)anthracene	34.9		ug/kg	10.7	5.34	1
Benzo(ghi)perylene	172		ug/kg	10.7	5.34	1
Cl2-BZ#8	ND		ug/kg	1.07	0.534	1
Cl3-BZ#18	0.955	J	ug/kg	1.07	0.534	1
Cl3-BZ#28	1.29		ug/kg	1.07	0.534	1
Cl4-BZ#44	2.60		ug/kg	1.07	0.534	1
Cl4-BZ#49	2.31		ug/kg	1.07	0.534	1
Cl4-BZ#52	3.16		ug/kg	1.07	0.534	1
Cl4-BZ#66	2.55		ug/kg	1.07	0.534	1
Cl5-BZ#87	0.683	J	ug/kg	1.07	0.534	1
Cl5-BZ#101	3.78		ug/kg	1.07	0.534	1
Cl5-BZ#105	ND		ug/kg	1.07	0.534	1
Cl5-BZ#118	3.80		ug/kg	1.07	0.534	1
Cl6-BZ#128	1.26		ug/kg	1.07	0.534	1
Cl6-BZ#138	3.72		ug/kg	1.07	0.534	1
Cl6-BZ#153	3.85		ug/kg	1.07	0.534	1

Project Name: USACE/NHH FNP **Lab Number:** L1728343

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-01 Date Collected: 08/14/17 08:32

Client ID: NHH-E-TOP Date Received: 08/14/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.06	J	ug/kg	1.07	0.534	1
Cl7-BZ#180	1.81		ug/kg	1.07	0.534	1
Cl7-BZ#183	0.714	J	ug/kg	1.07	0.534	1
Cl7-BZ#184	ND		ug/kg	1.07	0.534	1
Cl7-BZ#187	2.51		ug/kg	1.07	0.534	1
Cl8-BZ#195	ND		ug/kg	1.07	0.534	1
Cl9-BZ#206	1.18		ug/kg	1.07	0.534	1
Cl10-BZ#209	0.755	J	ug/kg	1.07	0.534	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	84		30-150
Benzo(b)fluoranthene-d12	82		30-150
DBOB	98		30-150
BZ 198	93		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-02
Client ID: NHH-E-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 09:14
Analyst: JT
Percent Solids: 47%

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	113		ug/kg	10.5	5.24	1
Acenaphthylene	78.9		ug/kg	10.5	5.24	1
Acenaphthene	22.2		ug/kg	10.5	5.24	1
Fluorene	58.8		ug/kg	10.5	5.24	1
Phenanthrene	298		ug/kg	10.5	5.24	1
Anthracene	65.0		ug/kg	10.5	5.24	1
Fluoranthene	517		ug/kg	10.5	5.24	1
Pyrene	456		ug/kg	10.5	5.24	1
Benz(a)anthracene	233		ug/kg	10.5	5.24	1
Chrysene	290		ug/kg	10.5	5.24	1
Benzo(b)fluoranthene	339		ug/kg	10.5	5.24	1
Benzo(k)fluoranthene	183		ug/kg	10.5	5.24	1
Benzo(a)pyrene	276		ug/kg	10.5	5.24	1
Indeno(1,2,3-cd)Pyrene	204		ug/kg	10.5	5.24	1
Dibenz(a,h)anthracene	47.8		ug/kg	10.5	5.24	1
Benzo(ghi)perylene	246		ug/kg	10.5	5.24	1
Cl2-BZ#8	ND		ug/kg	1.05	0.524	1
Cl3-BZ#18	2.27		ug/kg	1.05	0.524	1
Cl3-BZ#28	1.78		ug/kg	1.05	0.524	1
Cl4-BZ#44	4.46		ug/kg	1.05	0.524	1
Cl4-BZ#49	5.33		ug/kg	1.05	0.524	1
Cl4-BZ#52	5.05		ug/kg	1.05	0.524	1
Cl4-BZ#66	4.15		ug/kg	1.05	0.524	1
Cl5-BZ#87	ND		ug/kg	1.05	0.524	1
Cl5-BZ#101	6.87		ug/kg	1.05	0.524	1
Cl5-BZ#105	0.878	J	ug/kg	1.05	0.524	1
Cl5-BZ#118	5.16		ug/kg	1.05	0.524	1
Cl6-BZ#128	1.08		ug/kg	1.05	0.524	1
Cl6-BZ#138	4.85		ug/kg	1.05	0.524	1
Cl6-BZ#153	6.28		ug/kg	1.05	0.524	1

Project Name: USACE/NHH FNP **Lab Number:** L1728343

Project Number: 60543021 **Report Date:** 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-02 Date Collected: 08/14/17 08:32

Client ID: NHH-E-BOTTOM Date Received: 08/14/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	1.72		ug/kg	1.05	0.524	1
Cl7-BZ#180	2.78		ug/kg	1.05	0.524	1
Cl7-BZ#183	1.03	J	ug/kg	1.05	0.524	1
Cl7-BZ#184	ND		ug/kg	1.05	0.524	1
Cl7-BZ#187	3.36		ug/kg	1.05	0.524	1
Cl8-BZ#195	0.693	J	ug/kg	1.05	0.524	1
Cl9-BZ#206	1.44		ug/kg	1.05	0.524	1
Cl10-BZ#209	1.16		ug/kg	1.05	0.524	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	82		30-150
DBOB	97		30-150
BZ 198	100		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 02:22
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-02 Batch: WG1036086-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 09/08/17 02:22
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-02 Batch: WG1036086-1					
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	44		30-150
Pyrene-d10	48		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	51		30-150
BZ 198	48		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 Batch: WG1036086-2 WG1036086-3								
Naphthalene	79		84		50-120	6		30
Acenaphthylene	78		84		50-120	7		30
Acenaphthene	74		80		50-120	8		30
Fluorene	78		84		50-120	7		30
Phenanthrene	79		87		50-120	10		30
Anthracene	78		84		50-120	7		30
Fluoranthene	80		88		50-120	10		30
Pyrene	74		83		50-120	11		30
Benz(a)anthracene	83		93		50-120	11		30
Chrysene	80		90		50-120	12		30
Benzo(b)fluoranthene	81		90		50-120	11		30
Benzo(k)fluoranthene	85		93		50-120	9		30
Benzo(a)pyrene	83		92		50-120	10		30
Indeno(1,2,3-cd)Pyrene	81		85		50-120	5		30
Dibenz(a,h)anthracene	80		88		50-120	10		30
Benzo(ghi)perylene	84		94		50-120	11		30
Cl2-BZ#8	86		92		50-120	7		30
Cl3-BZ#18	85		92		50-120	8		30
Cl3-BZ#28	84		94		50-120	11		30
Cl4-BZ#44	87		96		50-120	10		30
Cl4-BZ#49	85		92		50-120	8		30
Cl4-BZ#52	85		93		50-120	9		30
Cl4-BZ#66	85		94		50-120	10		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 Batch: WG1036086-2 WG1036086-3								
Cl5-BZ#87	86		95		50-120	10		30
Cl5-BZ#101	88		96		50-120	9		30
Cl5-BZ#105	88		97		50-120	10		30
Cl5-BZ#118	84		92		50-120	9		30
Cl6-BZ#128	88		95		50-120	8		30
Cl6-BZ#138	86		94		50-120	9		30
Cl6-BZ#153	86		95		50-120	10		30
Cl7-BZ#170	86		96		50-120	11		30
Cl7-BZ#180	86		93		50-120	8		30
Cl7-BZ#183	82		90		50-120	9		30
Cl7-BZ#184	86		94		50-120	9		30
Cl7-BZ#187	89		97		50-120	9		30
Cl8-BZ#195	87		95		50-120	9		30
Cl9-BZ#206	85		93		50-120	9		30
Cl10-BZ#209	89		98		50-120	10		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	82		87		30-150
Pyrene-d10	83		91		30-150
Benzo(b)fluoranthene-d12	88		96		30-150
DBOB	91		96		30-150
BZ 198	83		90		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036086-5 WG1036086-6 QC Sample: L1728343-01 Client ID: NHH-E-TOP												
Naphthalene	42.3	549	536	90		521	88		50-120	3		30
Acenaphthylene	45.6	549	532	89		516	86		50-120	3		30
Acenaphthene	9.42J	549	445	81		436	80		50-120	2		30
Fluorene	19.1	549	469	82		455	80		50-120	3		30
Phenanthrene	125	549	700	105		682	102		50-120	3		30
Anthracene	36.1	549	469	79		460	78		50-120	2		30
Fluoranthene	276	549	854	105		944	**123**	Q	50-120	10		30
Pyrene	254	549	806	101		842	108		50-120	4		30
Benz(a)anthracene	135	549	728	108		715	106		50-120	2		30
Chrysene	169	549	692	95		684	95		50-120	1		30
Benzo(b)fluoranthene	213	549	876	**121**	Q	827	113		50-120	6		30
Benzo(k)fluoranthene	138	549	588	82		558	77		50-120	5		30
Benzo(a)pyrene	182	549	746	103		700	95		50-120	6		30
Indeno(1,2,3-cd)Pyrene	152	549	717	103		659	93		50-120	8		30
Dibenz(a,h)anthracene	34.9	549	530	90		496	85		50-120	7		30
Benzo(ghi)perylene	172	549	759	107		711	99		50-120	7		30
Cl2-BZ#8	ND	110	92.9	85		94.6	87		50-120	2		30
Cl3-BZ#18	0.955J	110	97.3	89		97.6	90		50-120	0		30
Cl3-BZ#28	1.29	110	99.5	90		99.1	90		50-120	0		30
Cl4-BZ#44	2.60	110	103	92		105	94		50-120	2		30
Cl4-BZ#49	2.31	110	89.8	80		92.6	83		50-120	3		30
Cl4-BZ#52	3.16	110	117	104		119	106		50-120	2		30
Cl4-BZ#66	2.55	110	104	93		108	97		50-120	4		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728343

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036086-5 WG1036086-6 QC Sample: L1728343-01 Client ID: NHH-E-TOP												
Cl5-BZ#87	0.683J	110	96.9	88		100	92		50-120	3		30
Cl5-BZ#101	3.78	110	104	91		107	95		50-120	3		30
Cl5-BZ#105	ND	110	94.2	86		97.3	89		50-120	3		30
Cl5-BZ#118	3.80	110	100	88		104	92		50-120	4		30
Cl6-BZ#128	1.26	110	101	91		104	94		50-120	3		30
Cl6-BZ#138	3.72	110	106	93		110	98		50-120	4		30
Cl6-BZ#153	3.85	110	100	88		104	92		50-120	4		30
Cl7-BZ#170	1.06J	110	103	94		107	98		50-120	4		30
Cl7-BZ#180	1.81	110	101	90		104	94		50-120	3		30
Cl7-BZ#183	0.714J	110	87.0	79		88.9	82		50-120	2		30
Cl7-BZ#184	ND	110	95.9	87		98.2	90		50-120	2		30
Cl7-BZ#187	2.51	110	114	102		116	104		50-120	2		30
Cl8-BZ#195	ND	110	103	94		107	98		50-120	4		30
Cl9-BZ#206	1.18	110	103	93		108	98		50-120	5		30
Cl10-BZ#209	0.755J	110	107	98		110	101		50-120	3		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	86		84		30-150
BZ 198	100		105		30-150
Benzo(b)fluoranthene-d12	87		81		30-150
DBOB	98		101		30-150
Pyrene-d10	87		84		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036086-4 QC Sample: L1728343-01 Client ID: NHH-E-TOP						
Naphthalene	42.3	55.1	ug/kg	26		30
Acenaphthylene	45.6	53.8	ug/kg	16		30
Acenaphthene	9.42J	11.4	ug/kg	NC		30
Fluorene	19.1	25.9	ug/kg	30		30
Phenanthrene	125	164	ug/kg	27		30
Anthracene	36.1	42.6	ug/kg	17		30
Fluoranthene	276	372	ug/kg	30		30
Pyrene	254	320	ug/kg	23		30
Benz(a)anthracene	135	169	ug/kg	22		30
Chrysene	169	201	ug/kg	17		30
Benzo(b)fluoranthene	213	253	ug/kg	17		30
Benzo(k)fluoranthene	138	160	ug/kg	15		30
Benzo(a)pyrene	182	214	ug/kg	16		30
Indeno(1,2,3-cd)Pyrene	152	164	ug/kg	8		30
Dibenz(a,h)anthracene	34.9	36.7	ug/kg	5		30
Benzo(ghi)perylene	172	200	ug/kg	15		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	0.955J	1.38	ug/kg	NC		30
Cl3-BZ#28	1.29	1.48	ug/kg	14		30
Cl4-BZ#44	2.60	2.89	ug/kg	11		30
Cl4-BZ#49	2.31	3.21	ug/kg	**33**	Q	30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036086-4 QC Sample: L1728343-01 Client ID: NHH-E-TOP						
Cl4-BZ#52	3.16	4.27	ug/kg	30		30
Cl4-BZ#66	2.55	3.45	ug/kg	30		30
Cl5-BZ#87	0.683J	0.996J	ug/kg	NC		30
Cl5-BZ#101	3.78	4.77	ug/kg	23		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	3.80	4.67	ug/kg	21		30
Cl6-BZ#128	1.26	1.14	ug/kg	10		30
Cl6-BZ#138	3.72	4.67	ug/kg	23		30
Cl6-BZ#153	3.85	5.15	ug/kg	29		30
Cl7-BZ#170	1.06J	1.60	ug/kg	NC		30
Cl7-BZ#180	1.81	2.22	ug/kg	20		30
Cl7-BZ#183	0.714J	0.782J	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	2.51	2.97	ug/kg	17		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	1.18	1.28	ug/kg	8		30
Cl10-BZ#209	0.755J	0.741J	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		81		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036086-4 QC Sample: L1728343-01 Client ID: NHH-E-TOP						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	84		85		30-150
Benzo(b)fluoranthene-d12	82		80		30-150
DBOB	98		101		30-150
BZ 198	93		100		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1036086-7

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	76		40-140
Fluoranthene	75		40-140
Pyrene	62		40-140
Benz(a)anthracene	72		40-140
Chrysene	87		40-140
Benzo(b)fluoranthene	84		40-140
Benzo(k)fluoranthene	101		40-140
Benzo(a)pyrene	60		40-140
Indeno(1,2,3-cd)Pyrene	65		40-140
Dibenz(a,h)anthracene	122		40-140
Benzo(ghi)perylene	77		40-140
Cl2-BZ#8	76		40-140
Cl3-BZ#18	87		40-140
Cl3-BZ#28	58		40-140
Cl4-BZ#44	95		40-140
Cl4-BZ#49	77		40-140
Cl4-BZ#52	112		40-140
Cl4-BZ#66	57		40-140
Cl5-BZ#87	74		40-140
Cl5-BZ#101	83		40-140
Cl5-BZ#105	85		40-140
Cl5-BZ#118	73		40-140
Cl6-BZ#128	108		40-140
Cl6-BZ#138	92		40-140
Cl6-BZ#153	66		40-140
Cl7-BZ#170	103		40-140
Cl7-BZ#180	88		40-140
Cl7-BZ#183	70		40-140
Cl7-BZ#187	89		40-140
Cl9-BZ#206	82		40-140
Cl10-BZ#209	98		40-140
2-Methylnaphthalene-d10 (Surrogate)	82		30-150
Pyrene-d10 (Surrogate)	90		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	81		30-150
DBOB (Surrogate)	107		30-150
BZ 198 (Surrogate)	85		30-150

PESTICIDES

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-01
Client ID: NHH-E-TOP
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 09/01/17 15:33
Analyst: DP
Percent Solids: 44%

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.07	1.07	1	A
gamma-BHC	ND		ug/kg	0.534	0.534	1	A
Heptachlor	ND		ug/kg	0.534	0.534	1	A
Aldrin	ND		ug/kg	0.534	0.534	1	A
Heptachlor epoxide	ND		ug/kg	1.07	1.07	1	B
Oxychlordane	ND		ug/kg	1.07	1.07	1	B
trans-Chlordane	1.92		ug/kg	0.534	0.534	1	A
Endosulfan I	ND		ug/kg	0.534	0.534	1	A
cis-Chlordane	ND		ug/kg	0.534	0.534	1	A
trans-Nonachlor	ND		ug/kg	0.534	0.534	1	A
4,4'-DDE	2.92		ug/kg	0.534	0.534	1	A
Dieldrin	0.643	IP	ug/kg	0.534	0.534	1	A
Endrin	ND		ug/kg	0.534	0.534	1	A
Endosulfan II	ND		ug/kg	0.534	0.534	1	A
4,4'-DDD	0.756		ug/kg	0.534	0.534	1	A
cis-Nonachlor	ND		ug/kg	0.534	0.534	1	A
4,4'-DDT	2.10	P	ug/kg	0.534	0.534	1	B
Methoxychlor	ND		ug/kg	5.34	5.34	1	A
Toxaphene	ND		ug/kg	26.8	26.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	A
BZ 198	87		30-150	A
DBOB	66		30-150	B
BZ 198	94		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-02
Client ID: NHH-E-BOTTOM
Sample Location: NEW HAVEN, CT

Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 09/01/17 17:49
Analyst: DP
Percent Solids: 47%

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.05	1.05	1	A
gamma-BHC	ND		ug/kg	0.524	0.524	1	A
Heptachlor	ND		ug/kg	0.524	0.524	1	A
Aldrin	ND		ug/kg	0.524	0.524	1	A
Heptachlor epoxide	ND		ug/kg	1.05	1.05	1	B
Oxychlordane	ND		ug/kg	1.05	1.05	1	B
trans-Chlordane	1.46	IP	ug/kg	0.524	0.524	1	A
Endosulfan I	ND		ug/kg	0.524	0.524	1	A
cis-Chlordane	ND		ug/kg	0.524	0.524	1	A
trans-Nonachlor	ND		ug/kg	0.524	0.524	1	A
4,4'-DDE	4.75		ug/kg	0.524	0.524	1	A
Dieldrin	0.563	IP	ug/kg	0.524	0.524	1	A
Endrin	ND		ug/kg	0.524	0.524	1	A
Endosulfan II	ND		ug/kg	0.524	0.524	1	A
4,4'-DDD	1.68		ug/kg	0.524	0.524	1	A
cis-Nonachlor	ND		ug/kg	0.524	0.524	1	A
4,4'-DDT	ND		ug/kg	0.524	0.524	1	A
Methoxychlor	ND		ug/kg	5.24	5.24	1	A
Toxaphene	ND		ug/kg	26.3	26.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	A
BZ 198	89		30-150	A
DBOB	68		30-150	B
BZ 198	99		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 09/01/17 13:17
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 08/28/17 10:47
Cleanup Method: EPA 3630
Cleanup Date: 08/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-02 Batch: WG1036085-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	2.50	2.50	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	41		30-150	A
BZ 198	45		30-150	A
DBOB	39		30-150	B
BZ 198	52		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1036085-2 WG1036085-3									
Hexachlorobenzene	59		73		50-120	21		30	A
gamma-BHC	64		77		50-120	18		30	A
Heptachlor	63		79		50-120	23		30	A
Aldrin	64		78		50-120	20		30	A
trans-Chlordane	71		88		50-120	21		30	A
Endosulfan I	70		86		50-120	21		30	A
cis-Chlordane	66		83		50-120	23		30	A
trans-Nonachlor	66		83		50-120	23		30	A
4,4'-DDE	80		101		50-120	23		30	A
Dieldrin	81		99		50-120	20		30	A
Endrin	67		85		50-120	24		30	A
4,4'-DDD	81		100		50-120	21		30	A
cis-Nonachlor	69		87		50-120	23		30	A
4,4'-DDT	85		105		50-120	21		30	A
Methoxychlor	85		94		50-120	10		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	66		77		30-150	A
BZ 198	93		109		30-150	A
DBOB	63		73		30-150	B
BZ 198	79		102		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1036085-2 WG1036085-3									
Heptachlor epoxide	70		84		50-120	18		30	B
Oxychlordane	67		82		50-120	20		30	B
Endosulfan II	72		84		50-120	15		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	66		77		30-150	A
BZ 198	93		109		30-150	A
DBOB	63		73		30-150	B
BZ 198	79		102		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728343

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036085-5 WG1036085-6 QC Sample: L1728343-01 Client ID: NHH-E-TOP													
Hexachlorobenzene	ND	110	73.5	67		73.3	67		50-120	0		30	A
gamma-BHC	ND	110	76.4	70		85.8	79		50-120	12		30	A
Heptachlor	ND	110	76.5	70		81.7	75		50-120	7		30	A
Aldrin	ND	110	76.4	70		82.6	76		50-120	8		30	A
Heptachlor epoxide	ND	110	77.0	70		81.9	75		50-120	6		30	B
Oxychlordane	ND	110	74.5	68		80.6	74		50-120	8		30	B
trans-Chlordane	1.92	110	87.7	78		94.9	85		50-120	8		30	A
Endosulfan I	ND	110	84.4	77		91.3	84		50-120	8		30	A
cis-Chlordane	ND	110	79.7	73		86.4	79		50-120	8		30	A
trans-Nonachlor	ND	110	79.4	72		86.0	79		50-120	8		30	A
4,4'-DDE	2.92	110	107	95		114	102		50-120	6		30	A
Dieldrin	0.643	110	93.2	84		101	92		50-120	8		30	A
Endrin	ND	110	85.3	78		92.4	85		50-120	8		30	A
Endosulfan II	ND	110	77.5	71		84.1	77		50-120	8		30	B
4,4'-DDD	0.756	110	97.1	88		106	97		50-120	9		30	A
cis-Nonachlor	ND	110	81.7	75		88.5	81		50-120	8		30	A
4,4'-DDT	ND	110	98.7	89		106	96		50-120	7		30	A
Methoxychlor	ND	110	96.7	88		103	95		50-120	6		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	86		91		30-150	A
DBOB	72		74		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728343

Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036085-5 WG1036085-6 QC Sample: L1728343-01 Client ID: NHH-E-TOP												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	91		101		30-150	B
DBOB	61		65		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036085-4 QC Sample: L1728343-01 Client ID: NHH-E-TOP							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	1.92	2.58	ug/kg	29		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	2.92	3.36	ug/kg	14		30	A
Dieldrin	0.643	0.591IP	ug/kg	8		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	0.756	1.02	ug/kg	30		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	2.10	2.23P	ug/kg	6		30	B
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036085-4 QC Sample: L1728343-01 Client ID: NHH-E-TOP						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		71		30-150	A
BZ 198	87		87		30-150	A
DBOB	66		64		30-150	B
BZ 198	94		97		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1036085-7

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	91		40-140
cis-Chlordane	113		40-140
trans-Nonachlor	367	Q	40-140
DBOB (Surrogate)	60		30-150
DBOB (Surrogate)	66		30-150
BZ 198 (Surrogate)	111		30-150
BZ 198 (Surrogate)	223	Q	30-150

METALS

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728343
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728343-01	Date Collected:	08/14/17 08:32
Client ID:	NHH-E-TOP	Date Received:	08/14/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	44%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.20		mg/kg	0.217	0.029	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM
Cadmium, Total	0.889		mg/kg	0.087	0.012	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM
Chromium, Total	88.1		mg/kg	0.869	0.203	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM
Copper, Total	106		mg/kg	0.869	0.084	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM
Lead, Total	64.2		mg/kg	0.261	0.064	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM
Mercury, Total	0.390		mg/kg	0.021	0.003	5	09/02/17 10:13	09/05/17 11:41	EPA 7474	1,7474	LC
Nickel, Total	29.0		mg/kg	0.435	0.116	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM
Zinc, Total	202		mg/kg	4.35	1.13	2	08/15/17 22:15	08/22/17 17:31	EPA 3050B	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728343
Project Number:	60543021	**Report Date:**	09/08/17

SAMPLE RESULTS

Lab ID:	L1728343-02	Date Collected:	08/14/17 08:32
Client ID:	NHH-E-BOTTOM	Date Received:	08/14/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Sediment		
Percent Solids:	47%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.69		mg/kg	0.205	0.027	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM
Cadmium, Total	1.44		mg/kg	0.082	0.011	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM
Chromium, Total	91.9		mg/kg	0.821	0.192	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM
Copper, Total	140		mg/kg	0.821	0.080	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM
Lead, Total	58.1		mg/kg	0.246	0.060	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM
Mercury, Total	0.499		mg/kg	0.023	0.003	5	09/02/17 10:13	09/05/17 11:51	EPA 7474	1,7474	LC
Nickel, Total	21.4		mg/kg	0.410	0.110	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM
Zinc, Total	223		mg/kg	4.10	1.07	2	08/15/17 22:15	08/22/17 17:35	EPA 3050B	1,6020A	AM

Project Name: USACE/NHH FNP **Lab Number:** L1728343

Project Number: 60543021 **Report Date:** 09/08/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1032246-1										
Arsenic, Total	ND		mg/kg	0.100	0.013	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.005	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.094	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Copper, Total	ND		mg/kg	0.400	0.039	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Lead, Total	ND		mg/kg	0.120	0.029	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Nickel, Total	ND		mg/kg	0.200	0.053	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM
Zinc, Total	ND		mg/kg	2.00	0.520	2	08/15/17 22:15	08/22/17 16:14	1,6020A	AM

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1036957-1										
Mercury, Total	ND		mg/kg	0.013	0.002	5	09/02/17 10:13	09/05/17 11:35	1,7474	LC

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1032246-2 SRM Lot Number: D093-540								
Arsenic, Total	92		-		70-130	-		20
Cadmium, Total	92		-		83-117	-		20
Chromium, Total	92		-		80-120	-		20
Copper, Total	88		-		82-118	-		20
Lead, Total	87		-		82-117	-		20
Nickel, Total	91		-		83-117	-		20
Zinc, Total	88		-		83-117	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1036957-2 SRM Lot Number: D093-540								
Mercury, Total	95		-		72-128	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1032246-3 WG1032246-4 QC Sample: L1726857-01 Client ID: MS Sample												
Arsenic, Total	4.04	10.2	13.6	93		13.7	95		75-125	1		20
Cadmium, Total	0.039J	4.36	4.72	108		4.55	106		75-125	4		20
Chromium, Total	27.3	17.1	43.7	96		47.4	119		75-125	8		20
Copper, Total	7.39	21.3	28.8	100		29.5	105		75-125	2		20
Lead, Total	4.19	43.6	46.4	97		47.1	100		75-125	1		20
Nickel, Total	16.3	42.7	58.2	98		60.0	103		75-125	3		20
Zinc, Total	22.7	42.7	64.7	98		68.3	108		75-125	5		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1032246-7 WG1032246-8 QC Sample: L1728049-22 Client ID: MS Sample												
Arsenic, Total	11.1	20.8	31.3	97		29.9	88		75-125	5		20
Cadmium, Total	1.12	8.86	10.4	105		10.2	100		75-125	2		20
Chromium, Total	94.2	34.8	164	**201**	Q	132	106		75-125	**22**	Q	20
Copper, Total	184.	43.4	288	**239**	Q	220	81		75-125	**27**	Q	20
Lead, Total	63.4	88.6	154	102		140	84		75-125	10		20
Nickel, Total	24.5	86.9	111	100		108	94		75-125	3		20
Zinc, Total	246.	86.9	358	**129**	Q	316	78		75-125	12		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036957-3 WG1036957-4 QC Sample: L1728343-01 Client ID: NHH-E-TOP												
Mercury, Total	0.390	1.1	1.60	110		1.58	107		80-120	1		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1032246-9 QC Sample: L1728049-22 Client ID: DUP Sample						
Arsenic, Total	11.1	11.9	mg/kg	7		20
Cadmium, Total	1.12	1.08	mg/kg	4		20
Chromium, Total	94.2	99.1	mg/kg	5		20
Copper, Total	184.	191	mg/kg	4		20
Lead, Total	63.4	69.9	mg/kg	10		20
Nickel, Total	24.5	26.3	mg/kg	7		20
Zinc, Total	246.	259	mg/kg	5		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1036957-5 QC Sample: L1728343-01 Client ID: NHH-E-TOP						
Mercury, Total	0.390	0.401	mg/kg	3		20

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-01
Client ID: NHH-E-TOP
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.19		%	0.010	0.010	1	-	09/05/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.30		%	0.010	0.010	1	-	09/05/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	43.9		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV
Moisture	56.1		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

SAMPLE RESULTS

Lab ID: L1728343-02
Client ID: NHH-E-BOTTOM
Sample Location: NEW HAVEN, CT
Matrix: Sediment

Date Collected: 08/14/17 08:32
Date Received: 08/14/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.32		%	0.010	0.010	1	-	09/05/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.34		%	0.010	0.010	1	-	09/05/17 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	46.6		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV
Moisture	53.4		%	0.100	0.100	1	-	08/23/17 09:10	121,2540G	BV

Project Name: USACE/NHH FNP **Lab Number:** L1728343

Project Number: 60543021 **Report Date:** 09/08/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab for sample(s): 01-02 Batch: WG1038564-1										
Total Organic Carbon (Rep1)	ND		%	0.010	0.010	1	-	09/05/17 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	ND		%	0.010	0.010	1	-	09/05/17 00:00	1,9060A	SP

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728343

Report Date: 09/08/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 Batch: WG1038564-2								
Total Organic Carbon (Rep1)	94		-		75-125	-		25
Total Organic Carbon (Rep2)	92		-		75-125	-		25

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1038564-4 QC Sample: L1726936-04 Client ID: MS Sample												
Total Organic Carbon (Rep1)	0.912	1.76	2.65	99		-	-		75-125	-		25
Total Organic Carbon (Rep2)	0.911	1.51	2.47	103		-	-		75-125	-		25
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1038564-5 QC Sample: L1726936-13 Client ID: MS Sample												
Total Organic Carbon (Rep1)	0.634	1.22	1.77	93		-	-		75-125	-		25
Total Organic Carbon (Rep2)	0.703	1.26	1.92	97		-	-		75-125	-		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1034557-1 QC Sample: L1728049-22 Client ID: DUP Sample						
Solids, Total	44.6	40.5	%	10		10
Moisture	55.4	59.5	%	7		10
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1038564-3 QC Sample: L1726936-04 Client ID: DUP Sample						
Total Organic Carbon (Rep1)	0.912	0.943	%	3		25
Total Organic Carbon (Rep2)	0.911	0.906	%	1		25

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728343
Report Date: 09/08/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728343-01A	Glass 500ml/16oz unpreserved	A	NA		5.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1728343-02A	Glass 500ml/16oz unpreserved	A	NA		5.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728343
Project Number:	60543021	**Report Date:**	09/08/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728343
Project Number:	60543021	**Report Date:**	09/08/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – see Narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – See Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	01MS: Benzo(b)fluoranthene @ 121% 01MSD: Fluoranthene @ 123%	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	Trans-Nonachlor @ 367%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	SRM = BZ198 – 223% column B	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	No	Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)	Yes		In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

L1728343

Page ____ of ____

Client/Project Name: USACE - NHH - FNP

Project Location: New Haven, CT

Project Number: 60543021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Grain Size	Metals 6020A/7471/7471B	PCBs - 8082/8270-SIM	Pesticides - 8081B	PAHs - 8270D	TOC - 9060	Lab I.D.	Remarks
.01 NHH-E-Top	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X		0-6'6"
.02 NHH-E-Bottom	8/14/17	0832	X		8oz/16oz	SO	4°C	NA	X	X	X	X	X	X		6'6"-8.1'

Container Type
P – Plastic
A – Amber Glass
G – Clear Glass
V – VOA Vial
O – Other
E – Encore

Preservation
1 – HCl, 4°
2 – H2SO4, 4°
3 – HNO3, 4°
4 – NaOH, 4°
5 – NaOH/ZnAc, 4°
6 – Na2S2O3, 4°
7 – 4°

Matrix Codes:
DW – Drinking Water
WW – Wastewater
GW – Groundwater
SW – Surface Water
ST – Storm Water
W – Water
S – Soil
SL – Sludge
SD – Sediment
SO – Solid
A – Air
L – Liquid
P – Product

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hone AECOM Signature:	Date: 8/14/17 Time: 1509	Signature:	Date: 8/14/17 Time: 1509
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/14/17 Time: 1712	Received by: (Print Name)/(Affiliation) MARC A MUIR Signature:	Date: 8/14/17 Time: 1712
Relinquished by: (Print Name)/(Affiliation) MARC A MUIR Signature:	Date: 8/14/17 Time: 1815	Received by: (Print Name)/(Affiliation) Signature:	Date: 8/14/17 Time: 1815

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0168

ANALYTICAL REPORT

Lab Number:	L1728961
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE-NHH FNP
Project Number:	60543021
Report Date:	11/06/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728961-01	NHH-EB-NISK-081717	WATER	NEW HAVEN, CT	08/17/17 11:35	08/17/17

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE-NHH FNP **Lab Number:** L1728961
Project Number: 60543021 **Report Date:** 11/06/17

Case Narrative (continued)

Report Submission

This report replaces the report issued on September 8, 2017. The RIM QC Summary Forms are attached as an addendum.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Pesticides

L1728961-01: The surrogate recovery is outside the individual acceptance criteria for BZ198 (174%), but within the overall method allowances.

WG1034932-3 (LCSD): The surrogate recovery is outside the individual acceptance criteria for BZ198 (193%), but within the overall method allowances.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 11/06/17

ORGANICS

SEMIVOLATILES

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728961-01
Client ID: NHH-EB-NISK-081717
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 22:00
Analyst: JT

Date Collected: 08/17/17 11:35
Date Received: 08/17/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	19.1		ng/l	10.3	5.15	1
Acenaphthylene	ND		ng/l	10.3	5.15	1
Acenaphthene	ND		ng/l	10.3	5.15	1
Fluorene	ND		ng/l	10.3	5.15	1
Phenanthrene	ND		ng/l	10.3	5.15	1
Anthracene	ND		ng/l	10.3	5.15	1
Fluoranthene	ND		ng/l	10.3	5.15	1
Pyrene	ND		ng/l	10.3	5.15	1
Benz(a)anthracene	ND		ng/l	10.3	5.15	1
Chrysene	ND		ng/l	10.3	5.15	1
Benzo(b)fluoranthene	ND		ng/l	10.3	5.15	1
Benzo(k)fluoranthene	ND		ng/l	10.3	5.15	1
Benzo(a)pyrene	ND		ng/l	10.3	5.15	1
Indeno(1,2,3-cd)Pyrene	ND		ng/l	10.3	5.15	1
Dibenz(a,h)anthracene	ND		ng/l	10.3	5.15	1
Benzo(ghi)perylene	ND		ng/l	10.3	5.15	1
Cl2-BZ#8	ND		ng/l	1.03	0.515	1
Cl3-BZ#18	ND		ng/l	1.03	0.515	1
Cl3-BZ#28	ND		ng/l	1.03	0.515	1
Cl4-BZ#44	ND		ng/l	1.03	0.515	1
Cl4-BZ#49	ND		ng/l	1.03	0.515	1
Cl4-BZ#52	ND		ng/l	1.03	0.515	1
Cl4-BZ#66	ND		ng/l	1.03	0.515	1
Cl5-BZ#87	ND		ng/l	1.03	0.515	1
Cl5-BZ#101	ND		ng/l	1.03	0.515	1
Cl5-BZ#105	ND		ng/l	1.03	0.515	1
Cl5-BZ#118	ND		ng/l	1.03	0.515	1
Cl6-BZ#128	ND		ng/l	1.03	0.515	1
Cl6-BZ#138	ND		ng/l	1.03	0.515	1
Cl6-BZ#153	ND		ng/l	1.03	0.515	1

Project Name: USACE-NHH FNP **Lab Number:** L1728961

Project Number: 60543021 **Report Date:** 11/06/17

SAMPLE RESULTS

Lab ID: L1728961-01 Date Collected: 08/17/17 11:35

Client ID: NHH-EB-NISK-081717 Date Received: 08/17/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ng/l	1.03	0.515	1
Cl7-BZ#180	ND		ng/l	1.03	0.515	1
Cl7-BZ#183	ND		ng/l	1.03	0.515	1
Cl7-BZ#184	ND		ng/l	1.03	0.515	1
Cl7-BZ#187	ND		ng/l	1.03	0.515	1
Cl8-BZ#195	ND		ng/l	1.03	0.515	1
Cl9-BZ#206	ND		ng/l	1.03	0.515	1
Cl10-BZ#209	ND		ng/l	1.03	0.515	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	67		30-150
BZ 198	62		30-150

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 18:56
Analyst: JT

Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01 Batch: WG1034933-1					
Naphthalene	ND		ng/l	10.0	5.00
Acenaphthylene	ND		ng/l	10.0	5.00
Acenaphthene	ND		ng/l	10.0	5.00
Fluorene	ND		ng/l	10.0	5.00
Phenanthrene	ND		ng/l	10.0	5.00
Anthracene	ND		ng/l	10.0	5.00
Fluoranthene	ND		ng/l	10.0	5.00
Pyrene	ND		ng/l	10.0	5.00
Benz(a)anthracene	ND		ng/l	10.0	5.00
Chrysene	ND		ng/l	10.0	5.00
Benzo(b)fluoranthene	ND		ng/l	10.0	5.00
Benzo(k)fluoranthene	ND		ng/l	10.0	5.00
Benzo(a)pyrene	ND		ng/l	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ng/l	10.0	5.00
Dibenz(a,h)anthracene	ND		ng/l	10.0	5.00
Benzo(ghi)perylene	ND		ng/l	10.0	5.00
Cl2-BZ#8	ND		ng/l	1.00	0.500
Cl3-BZ#18	ND		ng/l	1.00	0.500
Cl3-BZ#28	ND		ng/l	1.00	0.500
Cl4-BZ#44	ND		ng/l	1.00	0.500
Cl4-BZ#49	ND		ng/l	1.00	0.500
Cl4-BZ#52	ND		ng/l	1.00	0.500
Cl4-BZ#66	ND		ng/l	1.00	0.500
Cl5-BZ#87	ND		ng/l	1.00	0.500
Cl5-BZ#101	ND		ng/l	1.00	0.500
Cl5-BZ#105	ND		ng/l	1.00	0.500
Cl5-BZ#118	ND		ng/l	1.00	0.500
Cl6-BZ#128	ND		ng/l	1.00	0.500
Cl6-BZ#138	ND		ng/l	1.00	0.500

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 18:56
Analyst: JT

Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01 Batch: WG1034933-1					
Cl6-BZ#153	ND		ng/l	1.00	0.500
Cl7-BZ#170	ND		ng/l	1.00	0.500
Cl7-BZ#180	ND		ng/l	1.00	0.500
Cl7-BZ#183	ND		ng/l	1.00	0.500
Cl7-BZ#184	ND		ng/l	1.00	0.500
Cl7-BZ#187	ND		ng/l	1.00	0.500
Cl8-BZ#195	ND		ng/l	1.00	0.500
Cl9-BZ#206	ND		ng/l	1.00	0.500
Cl10-BZ#209	ND		ng/l	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	82		30-150
BZ 198	80		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01 Batch: WG1034933-2 WG1034933-3

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Naphthalene	75		73		50-120	3		30
Acenaphthylene	76		73		50-120	4		30
Acenaphthene	73		70		50-120	4		30
Fluorene	75		73		50-120	3		30
Phenanthrene	72		70		50-120	3		30
Anthracene	83		80		50-120	4		30
Fluoranthene	76		76		50-120	0		30
Pyrene	79		77		50-120	3		30
Benz(a)anthracene	83		81		50-120	2		30
Chrysene	86		84		50-120	2		30
Benzo(b)fluoranthene	81		81		50-120	0		30
Benzo(k)fluoranthene	89		84		50-120	6		30
Benzo(a)pyrene	86		85		50-120	1		30
Indeno(1,2,3-cd)Pyrene	82		80		50-120	2		30
Dibenz(a,h)anthracene	83		80		50-120	4		30
Benzo(ghi)perylene	87		84		50-120	4		30
Cl2-BZ#8	90		89		50-120	1		30
Cl3-BZ#18	87		85		50-120	2		30
Cl3-BZ#28	88		88		50-120	0		30
Cl4-BZ#44	92		92		50-120	0		30
Cl4-BZ#49	91		91		50-120	0		30
Cl4-BZ#52	87		88		50-120	1		30
Cl4-BZ#66	91		91		50-120	0		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1728961
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01 Batch: WG1034933-2 WG1034933-3								
Cl5-BZ#87	89		90		50-120	1		30
Cl5-BZ#101	87		88		50-120	1		30
Cl5-BZ#105	91		91		50-120	0		30
Cl5-BZ#118	91		90		50-120	1		30
Cl6-BZ#128	89		89		50-120	0		30
Cl6-BZ#138	88		89		50-120	1		30
Cl6-BZ#153	90		90		50-120	0		30
Cl7-BZ#170	87		86		50-120	1		30
Cl7-BZ#180	86		86		50-120	0		30
Cl7-BZ#183	86		87		50-120	1		30
Cl7-BZ#184	86		87		50-120	1		30
Cl7-BZ#187	84		84		50-120	0		30
Cl8-BZ#195	86		86		50-120	0		30
Cl9-BZ#206	82		82		50-120	0		30
Cl10-BZ#209	89		89		50-120	0		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	68		66		30-150
Pyrene-d10	83		81		30-150
Benzo(b)fluoranthene-d12	84		82		30-150
DBOB	81		81		30-150
BZ 198	83		82		30-150

PESTICIDES

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728961-01
Client ID: NHH-EB-NISK-081717
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 08/24/17 19:44
Analyst: DP

Date Collected: 08/17/17 11:35
Date Received: 08/17/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/24/17 06:17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	1	A
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	1	B
Oxychlordane	ND		ug/l	0.0005	0.0005	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	1	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Methoxychlor	ND		ug/l	0.0051	0.0051	1	A
Toxaphene	ND		ug/l	0.0257	0.0257	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	**174**	Q	30-150	A
DBOB	57		30-150	B
BZ 198	72		30-150	B

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/24/17 18:07
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 08/24/17 06:17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01 Batch: WG1034932-1						
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	A
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Methoxychlor	ND		ug/l	0.0050	0.0050	A
Toxaphene	ND		ug/l	0.0250	0.0250	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	B
Oxychlordane	ND		ug/l	0.0005	0.0005	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		30-150	A
BZ 198	95		30-150	A
DBOB	80		30-150	B
BZ 198	100		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021
Lab Number: L1728961
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01 Batch: WG1034932-2 WG1034932-3									
Hexachlorobenzene	71		83		50-120	16		30	A
gamma-BHC	64		77		50-120	19		30	A
Heptachlor	73		87		50-120	17		30	A
Aldrin	75		91		50-120	20		30	A
trans-Chlordane	81		96		50-120	17		30	A
Endosulfan I	79		94		50-120	17		30	A
cis-Chlordane	78		93		50-120	17		30	A
trans-Nonachlor	79		93		50-120	17		30	A
4,4'-DDE	97		108		50-120	11		30	A
Dieldrin	92		107		50-120	15		30	A
Endrin	78		90		50-120	14		30	A
4,4'-DDD	92		104		50-120	12		30	A
cis-Nonachlor	81		93		50-120	14		30	A
4,4'-DDT	100		114		50-120	13		30	A
Methoxychlor	98		108		50-120	10		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	71		85		30-150	A
BZ 198	89		**193**	Q	30-150	A
DBOB	65		79		30-150	B
BZ 198	95		103		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE-NHH FNP

Project Number: 60543021

Lab Number: L1728961

Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01 Batch: WG1034932-2 WG1034932-3									
Heptachlor epoxide	79		95		50-120	18		30	B
Oxychlordane	73		87		50-120	18		30	B
Endosulfan II	91		101		50-120	10		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	71		85		30-150	A
BZ 198	89		**193**	Q	30-150	A
DBOB	65		79		30-150	B
BZ 198	95		103		30-150	B

METALS

Project Name:	USACE-NHH FNP	**Lab Number:**	L1728961
Project Number:	60543021	**Report Date:**	11/06/17

SAMPLE RESULTS

Lab ID:	L1728961-01	Date Collected:	08/17/17 11:35
Client ID:	NHH-EB-NISK-081717	Date Received:	08/17/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV
Chromium, Total	0.00040	J	mg/l	0.00050	0.00017	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV
Copper, Total	ND		mg/l	0.00100	0.00038	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV
Mercury, Total	ND		mg/l	0.00005	0.00001	1	09/05/17 09:30	09/06/17 13:50	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV
Zinc, Total	ND		mg/l	0.0100	0.00341	1	08/31/17 10:18	09/01/17 11:56	EPA 3020A	1,6020A	BV

Project Name: USACE-NHH FNP **Lab Number:** L1728961

Project Number: 60543021 **Report Date:** 11/06/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1037302-1										
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Chromium, Total	0.00032	J	mg/l	0.00050	0.00017	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Copper, Total	ND		mg/l	0.00100	0.00038	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Zinc, Total	ND		mg/l	0.0100	0.00341	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV

Prep Information

Digestion Method: EPA 3020A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1037306-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	09/05/17 09:30	09/06/17 13:38	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1037302-2								
Arsenic, Total	98		-		80-120	-		20
Cadmium, Total	102		-		80-120	-		20
Chromium, Total	100		-		80-120	-		20
Copper, Total	101		-		80-120	-		20
Lead, Total	102		-		80-120	-		20
Nickel, Total	101		-		80-120	-		20
Zinc, Total	98		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1037306-2 SRM Lot Number: HPHGAF								
Mercury, Total	97		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1037302-3 QC Sample: L1728961-01 Client ID: NHH-EB-NISK-081717												
Arsenic, Total	ND	0.12	0.1159	96		-	-		75-125	-		20
Cadmium, Total	ND	0.051	0.05095	100		-	-		75-125	-		20
Chromium, Total	0.00040J	0.2	0.199	100		-	-		75-125	-		20
Copper, Total	ND	0.25	0.248	99		-	-		75-125	-		20
Lead, Total	ND	0.51	0.502	98		-	-		75-125	-		20
Nickel, Total	ND	0.5	0.4958	99		-	-		75-125	-		20
Zinc, Total	ND	0.5	0.479	96		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1037306-3 QC Sample: L1728962-02 Client ID: MS Sample												
Mercury, Total	ND	0.0025	0.00237	95		-	-		80-120	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1037302-4 QC Sample: L1728961-01 Client ID: NHH-EB-NISK-081717						
Arsenic, Total	ND	ND	mg/l	NC		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	0.00040J	0.00039J	mg/l	NC		20
Copper, Total	ND	ND	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Zinc, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1037306-4 QC Sample: L1728962-02 Client ID: DUP Sample						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728961-01
Client ID: NHH-EB-NISK-081717
Sample Location: NEW HAVEN, CT
Matrix: Water

Date Collected: 08/17/17 11:35
Date Received: 08/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/18/17 00:01	08/18/17 00:24	77,7196A	ML

Project Name: USACE-NHH FNP **Lab Number:** L1728961

Project Number: 60543021 **Report Date:** 11/06/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab for sample(s): 01 Batch: WG1033086-1										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/18/17 00:01	08/18/17 00:23	77,7196A	ML

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE-NHH FNP

Project Number: 60543021

Lab Number: L1728961

Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
CT RCP General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG1033086-2 WG1033086-3								
Chromium, Hexavalent	103		104		80-120	1		20

Project Name: USACE-NHH FNP
Project Number: 60543021

Lab Number: L1728961
Report Date: 11/06/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728961-01A	Plastic 250ml HNO3 preserved	A	<2	<2	5.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-CU-6020T(180)
L1728961-01B	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728961-01C	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728961-01D	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728961-01E	Amber 1000ml unpreserved	A	7	7	5.0	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728961-01F	Plastic 250ml unpreserved	A	7	7	5.0	Y	Absent		CT-HEXCR-7196(1)

*Values in parentheses indicate holding time in days

Project Name:	USACE-NHH FNP	**Lab Number:**	L1728961
Project Number:	60543021	**Report Date:**	11/06/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name: USACE-NHH FNP **Lab Number:** L1728961
Project Number: 60543021 **Report Date:** 11/06/17

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

77 Connecticut DEP Quality Assurance and Quality Control Requirements for SW-846 Methods. CTDEP Reasonable Confidence Protocols (RCPs). Version 1.0, July 2005.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – See Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	N/A		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	N/A		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	N/A		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	N/A		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1728961-01- BZ198 column A = 174%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	N/A		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	N/A		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A	Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

21728961

Page 1 of 1

Client/Project Name: USACE- NHH FUP	Project Location: NEW HAVEN, CT
Project Number: 60543021	Field Logbook No.:
Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM	Chain of Custody Tape Nos.:
Signature:	Send Results/Report to: MARY O'CONNELL KOZIK / TAT: STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs/PCB	PESTICIDES	CR6							Lab I.D.	Remarks
NHH-EB-NISIL-081717	8/17/17	1135		X		W	4°C-3	N/A	X	X	X	X								

Relinquished by: (Print Name)/(Affiliation) RYAN MCCARTHY Signature:	Date: 8/17/17 Time: 1840	Received by: (Print Name)/(Affiliation) AAL Signature:	Date: 8/17/17 Time: 1840	Analytical Laboratory (Destination): ALPHA ANALYTICAL 8 WALKUP DRIVE WESTBOROUGH, MA ATTN: HZ PORTA
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: 8/17/17 Time: 2055	Received by: (Print Name)/(Affiliation) AAL Signature:	Date: 8/17/17 Time: 2055	
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other / Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0158

ANALYTICAL REPORT

Lab Number:	L1728962
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	11/06/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), NJ NELAP (MA935), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-14-00197).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1728962-01	NHH-EB-GRAB-081717	WATER	NEW HAVEN, CT	08/17/17 11:55	08/17/17
L1728962-02	NHH-EB-PUMP-081717	WATER	NEW HAVEN, CT	08/17/17 16:00	08/17/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1728962
Project Number: 60543021 **Report Date:** 11/06/17

Case Narrative (continued)

Report Submission

This report replaces the report issued on September 8, 2017. The RIM QC Summary Forms are attached as an addendum.

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Pesticides

WG1034932-3 (LCSD): The surrogate recovery is outside the individual acceptance criteria for BZ198 (193%), but within the overall method allowances.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 11/06/17

ORGANICS

SEMIVOLATILES

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-01
Client ID: NHH-EB-GRAB-081717
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 22:32
Analyst: JT

Date Collected: 08/17/17 11:55
Date Received: 08/17/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	18.2		ng/l	10.1	5.05	1
Acenaphthylene	ND		ng/l	10.1	5.05	1
Acenaphthene	ND		ng/l	10.1	5.05	1
Fluorene	ND		ng/l	10.1	5.05	1
Phenanthrene	20.7		ng/l	10.1	5.05	1
Anthracene	ND		ng/l	10.1	5.05	1
Fluoranthene	36.2		ng/l	10.1	5.05	1
Pyrene	30.4		ng/l	10.1	5.05	1
Benz(a)anthracene	15.4		ng/l	10.1	5.05	1
Chrysene	14.9		ng/l	10.1	5.05	1
Benzo(b)fluoranthene	12.1		ng/l	10.1	5.05	1
Benzo(k)fluoranthene	9.37	J	ng/l	10.1	5.05	1
Benzo(a)pyrene	11.2		ng/l	10.1	5.05	1
Indeno(1,2,3-cd)Pyrene	8.12	J	ng/l	10.1	5.05	1
Dibenz(a,h)anthracene	ND		ng/l	10.1	5.05	1
Benzo(ghi)perylene	7.81	J	ng/l	10.1	5.05	1
Cl2-BZ#8	ND		ng/l	1.01	0.505	1
Cl3-BZ#18	ND		ng/l	1.01	0.505	1
Cl3-BZ#28	ND		ng/l	1.01	0.505	1
Cl4-BZ#44	ND		ng/l	1.01	0.505	1
Cl4-BZ#49	ND		ng/l	1.01	0.505	1
Cl4-BZ#52	ND		ng/l	1.01	0.505	1
Cl4-BZ#66	ND		ng/l	1.01	0.505	1
Cl5-BZ#87	ND		ng/l	1.01	0.505	1
Cl5-BZ#101	ND		ng/l	1.01	0.505	1
Cl5-BZ#105	ND		ng/l	1.01	0.505	1
Cl5-BZ#118	ND		ng/l	1.01	0.505	1
Cl6-BZ#128	ND		ng/l	1.01	0.505	1
Cl6-BZ#138	ND		ng/l	1.01	0.505	1
Cl6-BZ#153	ND		ng/l	1.01	0.505	1

Project Name: USACE/NHH FNP **Lab Number:** L1728962

Project Number: 60543021 **Report Date:** 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-01 Date Collected: 08/17/17 11:55

Client ID: NHH-EB-GRAB-081717 Date Received: 08/17/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ng/l	1.01	0.505	1
Cl7-BZ#180	ND		ng/l	1.01	0.505	1
Cl7-BZ#183	ND		ng/l	1.01	0.505	1
Cl7-BZ#184	ND		ng/l	1.01	0.505	1
Cl7-BZ#187	ND		ng/l	1.01	0.505	1
Cl8-BZ#195	ND		ng/l	1.01	0.505	1
Cl9-BZ#206	ND		ng/l	1.01	0.505	1
Cl10-BZ#209	ND		ng/l	1.01	0.505	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	71		30-150
DBOB	66		30-150
BZ 198	54		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-02
Client ID: NHH-EB-PUMP-081717
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 23:04
Analyst: JT

Date Collected: 08/17/17 16:00
Date Received: 08/17/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	21.2		ng/l	10.0	5.00	1
Acenaphthylene	ND		ng/l	10.0	5.00	1
Acenaphthene	ND		ng/l	10.0	5.00	1
Fluorene	ND		ng/l	10.0	5.00	1
Phenanthrene	ND		ng/l	10.0	5.00	1
Anthracene	ND		ng/l	10.0	5.00	1
Fluoranthene	ND		ng/l	10.0	5.00	1
Pyrene	ND		ng/l	10.0	5.00	1
Benz(a)anthracene	ND		ng/l	10.0	5.00	1
Chrysene	ND		ng/l	10.0	5.00	1
Benzo(b)fluoranthene	ND		ng/l	10.0	5.00	1
Benzo(k)fluoranthene	ND		ng/l	10.0	5.00	1
Benzo(a)pyrene	ND		ng/l	10.0	5.00	1
Indeno(1,2,3-cd)Pyrene	ND		ng/l	10.0	5.00	1
Dibenz(a,h)anthracene	ND		ng/l	10.0	5.00	1
Benzo(ghi)perylene	ND		ng/l	10.0	5.00	1
Cl2-BZ#8	ND		ng/l	1.00	0.500	1
Cl3-BZ#18	ND		ng/l	1.00	0.500	1
Cl3-BZ#28	ND		ng/l	1.00	0.500	1
Cl4-BZ#44	ND		ng/l	1.00	0.500	1
Cl4-BZ#49	ND		ng/l	1.00	0.500	1
Cl4-BZ#52	ND		ng/l	1.00	0.500	1
Cl4-BZ#66	ND		ng/l	1.00	0.500	1
Cl5-BZ#87	ND		ng/l	1.00	0.500	1
Cl5-BZ#101	ND		ng/l	1.00	0.500	1
Cl5-BZ#105	ND		ng/l	1.00	0.500	1
Cl5-BZ#118	ND		ng/l	1.00	0.500	1
Cl6-BZ#128	ND		ng/l	1.00	0.500	1
Cl6-BZ#138	ND		ng/l	1.00	0.500	1
Cl6-BZ#153	ND		ng/l	1.00	0.500	1

Project Name: USACE/NHH FNP **Lab Number:** L1728962

Project Number: 60543021 **Report Date:** 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-02 Date Collected: 08/17/17 16:00

Client ID: NHH-EB-PUMP-081717 Date Received: 08/17/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ng/l	1.00	0.500	1
Cl7-BZ#180	ND		ng/l	1.00	0.500	1
Cl7-BZ#183	ND		ng/l	1.00	0.500	1
Cl7-BZ#184	ND		ng/l	1.00	0.500	1
Cl7-BZ#187	ND		ng/l	1.00	0.500	1
Cl8-BZ#195	ND		ng/l	1.00	0.500	1
Cl9-BZ#206	ND		ng/l	1.00	0.500	1
Cl10-BZ#209	ND		ng/l	1.00	0.500	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	69		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	73		30-150
BZ 198	63		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 18:56
Analyst: JT

Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-02 Batch: WG1034933-1					
Naphthalene	ND		ng/l	10.0	5.00
Acenaphthylene	ND		ng/l	10.0	5.00
Acenaphthene	ND		ng/l	10.0	5.00
Fluorene	ND		ng/l	10.0	5.00
Phenanthrene	ND		ng/l	10.0	5.00
Anthracene	ND		ng/l	10.0	5.00
Fluoranthene	ND		ng/l	10.0	5.00
Pyrene	ND		ng/l	10.0	5.00
Benz(a)anthracene	ND		ng/l	10.0	5.00
Chrysene	ND		ng/l	10.0	5.00
Benzo(b)fluoranthene	ND		ng/l	10.0	5.00
Benzo(k)fluoranthene	ND		ng/l	10.0	5.00
Benzo(a)pyrene	ND		ng/l	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ng/l	10.0	5.00
Dibenz(a,h)anthracene	ND		ng/l	10.0	5.00
Benzo(ghi)perylene	ND		ng/l	10.0	5.00
Cl2-BZ#8	ND		ng/l	1.00	0.500
Cl3-BZ#18	ND		ng/l	1.00	0.500
Cl3-BZ#28	ND		ng/l	1.00	0.500
Cl4-BZ#44	ND		ng/l	1.00	0.500
Cl4-BZ#49	ND		ng/l	1.00	0.500
Cl4-BZ#52	ND		ng/l	1.00	0.500
Cl4-BZ#66	ND		ng/l	1.00	0.500
Cl5-BZ#87	ND		ng/l	1.00	0.500
Cl5-BZ#101	ND		ng/l	1.00	0.500
Cl5-BZ#105	ND		ng/l	1.00	0.500
Cl5-BZ#118	ND		ng/l	1.00	0.500
Cl6-BZ#128	ND		ng/l	1.00	0.500
Cl6-BZ#138	ND		ng/l	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 08/28/17 18:56
Analyst: JT

Extraction Method: EPA 3510C
Extraction Date: 08/24/17 05:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-02 Batch: WG1034933-1					
Cl6-BZ#153	ND		ng/l	1.00	0.500
Cl7-BZ#170	ND		ng/l	1.00	0.500
Cl7-BZ#180	ND		ng/l	1.00	0.500
Cl7-BZ#183	ND		ng/l	1.00	0.500
Cl7-BZ#184	ND		ng/l	1.00	0.500
Cl7-BZ#187	ND		ng/l	1.00	0.500
Cl8-BZ#195	ND		ng/l	1.00	0.500
Cl9-BZ#206	ND		ng/l	1.00	0.500
Cl10-BZ#209	ND		ng/l	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	82		30-150
BZ 198	80		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 Batch: WG1034933-2 WG1034933-3								
Naphthalene	75		73		50-120	3		30
Acenaphthylene	76		73		50-120	4		30
Acenaphthene	73		70		50-120	4		30
Fluorene	75		73		50-120	3		30
Phenanthrene	72		70		50-120	3		30
Anthracene	83		80		50-120	4		30
Fluoranthene	76		76		50-120	0		30
Pyrene	79		77		50-120	3		30
Benz(a)anthracene	83		81		50-120	2		30
Chrysene	86		84		50-120	2		30
Benzo(b)fluoranthene	81		81		50-120	0		30
Benzo(k)fluoranthene	89		84		50-120	6		30
Benzo(a)pyrene	86		85		50-120	1		30
Indeno(1,2,3-cd)Pyrene	82		80		50-120	2		30
Dibenz(a,h)anthracene	83		80		50-120	4		30
Benzo(ghi)perylene	87		84		50-120	4		30
Cl2-BZ#8	90		89		50-120	1		30
Cl3-BZ#18	87		85		50-120	2		30
Cl3-BZ#28	88		88		50-120	0		30
Cl4-BZ#44	92		92		50-120	0		30
Cl4-BZ#49	91		91		50-120	0		30
Cl4-BZ#52	87		88		50-120	1		30
Cl4-BZ#66	91		91		50-120	0		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728962
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-02 Batch: WG1034933-2 WG1034933-3								
Cl5-BZ#87	89		90		50-120	1		30
Cl5-BZ#101	87		88		50-120	1		30
Cl5-BZ#105	91		91		50-120	0		30
Cl5-BZ#118	91		90		50-120	1		30
Cl6-BZ#128	89		89		50-120	0		30
Cl6-BZ#138	88		89		50-120	1		30
Cl6-BZ#153	90		90		50-120	0		30
Cl7-BZ#170	87		86		50-120	1		30
Cl7-BZ#180	86		86		50-120	0		30
Cl7-BZ#183	86		87		50-120	1		30
Cl7-BZ#184	86		87		50-120	1		30
Cl7-BZ#187	84		84		50-120	0		30
Cl8-BZ#195	86		86		50-120	0		30
Cl9-BZ#206	82		82		50-120	0		30
Cl10-BZ#209	89		89		50-120	0		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	68		66		30-150
Pyrene-d10	83		81		30-150
Benzo(b)fluoranthene-d12	84		82		30-150
DBOB	81		81		30-150
BZ 198	83		82		30-150

PESTICIDES

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-01
Client ID: NHH-EB-GRAB-081717
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 08/24/17 20:17
Analyst: DP

Date Collected: 08/17/17 11:55
Date Received: 08/17/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/24/17 06:17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	1	A
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	1	B
Oxychlordane	ND		ug/l	0.0005	0.0005	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	1	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Methoxychlor	ND		ug/l	0.0050	0.0050	1	A
Toxaphene	ND		ug/l	0.0252	0.0252	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	A
BZ 198	67		30-150	A
DBOB	65		30-150	B
BZ 198	72		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-02
Client ID: NHH-EB-PUMP-081717
Sample Location: NEW HAVEN, CT

Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 08/24/17 20:49
Analyst: DP

Date Collected: 08/17/17 16:00
Date Received: 08/17/17
Field Prep: Not Specified
Extraction Method: EPA 3510C
Extraction Date: 08/24/17 06:17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	1	A
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	1	B
Oxychlordane	ND		ug/l	0.0005	0.0005	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	1	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Methoxychlor	ND		ug/l	0.0050	0.0050	1	A
Toxaphene	ND		ug/l	0.0250	0.0250	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	A
BZ 198	70		30-150	A
DBOB	64		30-150	B
BZ 198	73		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 08/24/17 18:07
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 08/24/17 06:17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-02 Batch: WG1034932-1						
Hexachlorobenzene	ND		ug/l	0.0020	0.0020	A
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
trans-Nonachlor	ND		ug/l	0.0005	0.0005	A
4,4'-DDE	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDD	ND		ug/l	0.0005	0.0005	A
cis-Nonachlor	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Methoxychlor	ND		ug/l	0.0050	0.0050	A
Toxaphene	ND		ug/l	0.0250	0.0250	A
Heptachlor epoxide	ND		ug/l	0.0005	0.0005	B
Oxychlordane	ND		ug/l	0.0005	0.0005	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		30-150	A
BZ 198	95		30-150	A
DBOB	80		30-150	B
BZ 198	100		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1728962
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1034932-2 WG1034932-3									
Hexachlorobenzene	71		83		50-120	16		30	A
gamma-BHC	64		77		50-120	19		30	A
Heptachlor	73		87		50-120	17		30	A
Aldrin	75		91		50-120	20		30	A
trans-Chlordane	81		96		50-120	17		30	A
Endosulfan I	79		94		50-120	17		30	A
cis-Chlordane	78		93		50-120	17		30	A
trans-Nonachlor	79		93		50-120	17		30	A
4,4'-DDE	97		108		50-120	11		30	A
Dieldrin	92		107		50-120	15		30	A
Endrin	78		90		50-120	14		30	A
4,4'-DDD	92		104		50-120	12		30	A
cis-Nonachlor	81		93		50-120	14		30	A
4,4'-DDT	100		114		50-120	13		30	A
Methoxychlor	98		108		50-120	10		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	71		85		30-150	A
BZ 198	89		**193**	Q	30-150	A
DBOB	65		79		30-150	B
BZ 198	95		103		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728962

Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1034932-2 WG1034932-3									
Heptachlor epoxide	79		95		50-120	18		30	B
Oxychlordane	73		87		50-120	18		30	B
Endosulfan II	91		101		50-120	10		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	71		85		30-150	A
BZ 198	89		**193**	Q	30-150	A
DBOB	65		79		30-150	B
BZ 198	95		103		30-150	B

METALS

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728962
Project Number:	60543021	**Report Date:**	11/06/17

SAMPLE RESULTS

Lab ID:	L1728962-01	Date Collected:	08/17/17 11:55
Client ID:	NHH-EB-GRAB-081717	Date Received:	08/17/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV
Chromium, Total	0.00249		mg/l	0.00050	0.00017	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV
Copper, Total	0.00076	J	mg/l	0.00100	0.00038	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV
Mercury, Total	ND		mg/l	0.00005	0.00001	1	09/05/17 09:30	09/06/17 13:53	EPA 7474	1,7474	BV
Nickel, Total	0.00389		mg/l	0.00200	0.00055	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV
Zinc, Total	0.00891	J	mg/l	0.0100	0.00341	1	08/31/17 10:18	09/01/17 12:37	EPA 3020A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728962
Project Number:	60543021	**Report Date:**	11/06/17

SAMPLE RESULTS

Lab ID:	L1728962-02	Date Collected:	08/17/17 16:00
Client ID:	NHH-EB-PUMP-081717	Date Received:	08/17/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Water		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV
Chromium, Total	0.00035	J	mg/l	0.00050	0.00017	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV
Copper, Total	ND		mg/l	0.00100	0.00038	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV
Mercury, Total	ND		mg/l	0.00005	0.00001	1	09/05/17 09:30	09/06/17 13:43	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV
Zinc, Total	ND		mg/l	0.0100	0.00341	1	08/31/17 10:18	09/01/17 13:08	EPA 3020A	1,6020A	BV

Project Name: USACE/NHH FNP **Lab Number:** L1728962

Project Number: 60543021 **Report Date:** 11/06/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1037302-1										
Arsenic, Total	ND		mg/l	0.00050	0.00016	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Chromium, Total	0.00032	J	mg/l	0.00050	0.00017	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Copper, Total	ND		mg/l	0.00100	0.00038	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Lead, Total	ND		mg/l	0.00100	0.00034	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV
Zinc, Total	ND		mg/l	0.0100	0.00341	1	08/31/17 10:18	09/01/17 11:23	1,6020A	BV

Prep Information

Digestion Method: EPA 3020A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1037306-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	09/05/17 09:30	09/06/17 13:38	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1037302-2								
Arsenic, Total	98		-		80-120	-		20
Cadmium, Total	102		-		80-120	-		20
Chromium, Total	100		-		80-120	-		20
Copper, Total	101		-		80-120	-		20
Lead, Total	102		-		80-120	-		20
Nickel, Total	101		-		80-120	-		20
Zinc, Total	98		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1037306-2 SRM Lot Number: HPHGAF								
Mercury, Total	97		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1037302-3 QC Sample: L1728961-01 Client ID: MS Sample												
Arsenic, Total	ND	0.12	0.1159	96		-	-		75-125	-		20
Cadmium, Total	ND	0.051	0.05095	100		-	-		75-125	-		20
Chromium, Total	0.00040J	0.2	0.199	100		-	-		75-125	-		20
Copper, Total	ND	0.25	0.248	99		-	-		75-125	-		20
Lead, Total	ND	0.51	0.502	98		-	-		75-125	-		20
Nickel, Total	ND	0.5	0.4958	99		-	-		75-125	-		20
Zinc, Total	ND	0.5	0.479	96		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1037306-3 QC Sample: L1728962-02 Client ID: NHH-EB-PUMP-081717												
Mercury, Total	ND	0.0025	0.00237	95		-	-		80-120	-		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1037302-4 QC Sample: L1728961-01 Client ID: DUP Sample						
Arsenic, Total	ND	ND	mg/l	NC		20
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	0.00040J	0.00039J	mg/l	NC		20
Copper, Total	ND	ND	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Zinc, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1037306-4 QC Sample: L1728962-02 Client ID: NHH-EB-PUMP-081717						
Mercury, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-01
Client ID: NHH-EB-GRAB-081717
Sample Location: NEW HAVEN, CT
Matrix: Water

Date Collected: 08/17/17 11:55
Date Received: 08/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/18/17 00:01	08/18/17 00:26	77,7196A	ML

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

SAMPLE RESULTS

Lab ID: L1728962-02
Client ID: NHH-EB-PUMP-081717
Sample Location: NEW HAVEN, CT
Matrix: Water

Date Collected: 08/17/17 16:00
Date Received: 08/17/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/18/17 00:01	08/18/17 00:27	77,7196A	ML

Project Name: USACE/NHH FNP **Lab Number:** L1728962

Project Number: 60543021 **Report Date:** 11/06/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
CT RCP General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1033086-1										
Chromium, Hexavalent	ND		mg/l	0.01	0.003	1	08/18/17 00:01	08/18/17 00:23	77,7196A	ML

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1728962

Report Date: 11/06/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
CT RCP General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1033086-2 WG1033086-3								
Chromium, Hexavalent	103		104		80-120	1		20

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1728962
Report Date: 11/06/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1728962-01A	Plastic 250ml HNO3 preserved	B	<2	<2	4.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-CU-6020T(180)
L1728962-01B	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-01C	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-01D	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-01E	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-01F	Plastic 250ml unpreserved	B	7	7	4.1	Y	Absent		CT-HEXCR-7196(1)
L1728962-02A	Plastic 250ml HNO3 preserved	B	<2	<2	4.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-CU-6020T(180)
L1728962-02B	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-02C	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-02D	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-02E	Amber 1000ml unpreserved	B	7	7	4.1	Y	Absent		A2-RIM-PEST-8081(7),A2-RIM-PAH/PCBCONG(7)
L1728962-02F	Plastic 250ml unpreserved	B	7	7	4.1	Y	Absent		CT-HEXCR-7196(1)

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728962
Project Number:	60543021	**Report Date:**	11/06/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

Report Format: DU Report with 'J' Qualifiers

Project Name:	USACE/NHH FNP	**Lab Number:**	L1728962
Project Number:	60543021	**Report Date:**	11/06/17

Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name: USACE/NHH FNP **Lab Number:** L1728962
Project Number: 60543021 **Report Date:** 11/06/17

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

77 Connecticut DEP Quality Assurance and Quality Control Requirements for SW-846 Methods. CTDEP Reasonable Confidence Protocols (RCPs). Version 1.0, July 2005.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	N/A
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	N/A
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	N/A
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – See Narrative (LCSD)

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	N/A		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	N/A		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	N/A		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	N/A		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	N/A		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	N/A		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A	Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

AECOM

CHAIN OF CUSTODY RECORD

4728962

Page 1 of 1

Client/Project Name: USACE - NHH FNP

Project Location: NEW HAVEN, CT

Project Number: 605 43021

Field Logbook No.:

Sampler (Print Name)/(Affiliation): RYAN MCCARTHY / AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to: MARY OYONIECK KOZIK

TAT: STD

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	PAHs/PCBs	PESTICIDES	CR6	Lab I.D.	Remarks
NHH-EB-GRAB-081717	8/17/17	1155		X					X	X	X	X		
NHH-EB-PUMP-081717	8/17/17	1600		X					X	X	X	X		

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
RYAN MCCARTHY / Signature:	Date: 8/17/17 Time: 1840	Signature:	Date: 8/17/17 Time: 1840
Signature:	Date: 8/17/17 Time: 2055	Signature:	Date: 8/17/17 Time: 2055
Signature:	Date: Time:	Signature:	Date: Time:

Analytical Laboratory (Destination): ALPHA ANALYTICAL, 8 WALKUP DRIVE, WESTBOROUGH, MA — ATTN: LIZ PORTA

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0159

Elutriate Chemistry Data

CHEMICAL ANALYSIS
OF A MARINE SEDIMENT - ELUTRIATE SOLUTION:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven Harbor, New Haven, Connecticut

New England District Corps of Engineers
USACE Contract No. W912WJ-17-D-003

Prepared For:

AECOM
250 Apollo Drive
Chelmsford, Massachusetts

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

EnviroSystems, Inc. Master Reference 29516

Study Specific Reference 29522
October 2017

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, Incorporated at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's Regional Implementation Manual (RIM) for Evaluation of Dredged Material Proposed for Disposal In New England Waters. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation Section of this Report.

For EnviroSystems, Inc. Kenneth A. Simon February 25, 2016

Kenneth A. Simon
Technical Director

Date

CHEMICAL ANALYSIS
OF A MARINE SEDIMENT - ELUTRIATE SOLUTION:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven Harbor, New Haven Connecticut

1.0 SAMPLE COLLECTION, PRESERVATION AND STORAGE

Sediment samples for chemical and physical analysis were provided by AECOM from locations specified within the project work plan. Samples were received under chain of custody in sample containers appropriate for the specified analysis. Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Samples were placed in a secure sample holding location and stored at a temperature of 4±2°C until analysis.

2.0 ANALYSIS

Sample analysis was carried out following methods and protocol specified in the project Sample Analysis Plan by EnviroSystems, Inc. at its Hampton, NH facility. Review of the data report document showed that all sample holding times were met, unless otherwise qualified, that the analytical methods used in the analysis were appropriate for the parameter and sample matrix and met New England District Regional Implementation Manual requirements. Review of supporting quality assurance data documented that, except where qualified, all data collected meet all of the requirements of NELAC, for all NELAC accredited parameters.

3.0 RESULTS

The analysis of elutriate samples were performed following analytical methods as recommended in Table 5 of the New England District RIM document with appropriate updates related to current methods. Trace metals were evaluated using EPA Method 200.9, Inductively Coupled Plasma - Mass Spectrometry (ICP-MS), mercury was evaluated using EPA Method 245.7, Cold Vapor Atomic Fluorescence Spectrometry. Hexavalent Chromium was analyzed using SM 3500 Cr-D. Pentachlorophenol was analyzed by EPA Method 8270C. PCB Congeners were analyzed by EPA Method 8270C - SIM. Pesticides were analyzed by EPA Method 8081B. In cases where dilution of the sample extract was required the final reporting limit remained above the RIM document specified limits and did not result in artificial "Non Detects."

A review of QC data documented one incidence where the %RPD in a matrix spike duplicate was above the limit. There were four incidences of low surrogate recoveries.

A full copy of the analytical report is included in the following data appendix

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 1 Elutriate Blank - Rep 1	Composite 1 Elutriate Blank - Rep 2	Composite 1 Elutriate Blank - Rep 3
Lab ID:	29522-001	29522-002	29522-003
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0016		0.0015		0.0017	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.001	U	0.001	U	0.001	U
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0010		0.0010		0.0009	
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.0044		0.0044		0.0044	
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0075		0.0109		0.0072	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 1 Elutriate - Rep 1	Composite 1 Elutriate - Rep 2	Composite 1 Elutriate - Rep 3
Lab ID:	29522-019	29522-020	29522-021
Date Sampled:	08/22/17 1425	08/22/17 1425	08/22/17 1425
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0194		0.0195		0.0192	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.001	U	0.001	U	0.001	U
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0048		0.0046		0.0022	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 2 Elutriate - Rep 1	Composite 2 Elutriate - Rep 2	Composite 2 Elutriate - Rep 3
Lab ID:	29522-055	29522-056	29522-057
Date Sampled:	08/22/17 1055	08/22/17 1055	08/22/17 1055
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0304		0.0300		0.0308	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.0014		0.0015		0.0013	
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0095		0.0083		0.0134	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 3 Elutriate Blank - Rep 1	Composite 3 Elutriate Blank - Rep 2	Composite 3 Elutriate Blank - Rep 3
Lab ID:	29522-073	29522-074	29522-075
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0016		0.0017		0.0016	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.001	U	0.001	U	0.001	U
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0009		0.0009		0.0009	
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.0022		0.0021		0.0021	
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0107		0.0074		0.0066	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 3 Elutriate - Rep 1	Composite 3 Elutriate - Rep 2	Composite 3 Elutriate - Rep 3
Lab ID:	29522-091	29522-092	29522-093
Date Sampled:	08/22/17 1310	08/22/17 1310	08/22/17 1310
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0197		0.0195		0.0202	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.001	U	0.001	U	0.001	U
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0040		0.0060		0.0051	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 4 Elutriate - Rep 1	Composite 4 Elutriate - Rep 2	Composite 4 Elutriate - Rep 3
Lab ID:	29522-127	29522-128	29522-129
Date Sampled:	08/22/17 1212	08/22/17 1212	08/22/17 1212
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0431		0.0427		0.0418	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.0017		0.0018		0.0016	
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0156		0.0077		0.0039	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 5 Elutriate - Rep 1	Composite 5 Elutriate - Rep 2	Composite 5 Elutriate - Rep 3
Lab ID:	29522-163	29522-164	29522-165
Date Sampled:	08/23/17 1020	08/23/17 1020	08/23/17 1020
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0440		0.0440		0.0443	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.0014		0.0014		0.0014	
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0061		0.0049		0.0047	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	CLDS Ref Site Blank - Rep 1	CLDS Ref Site Blank - Rep 2	CLDS Ref Site Blank - Rep 3
Lab ID:	29522-181	29522-182	29522-183
Date Sampled:	08/25/17 0930	08/25/17 0930	08/25/17 0930
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0014		0.0014		0.0014	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.001	U	0.001	U	0.001	U
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0008		0.0009		0.0008	
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0062		0.0042		0.0028	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 6 Elutriate - Rep 1	Composite 6 Elutriate - Rep 2	Composite 6 Elutriate - Rep 3
Lab ID:	29522-199	29522-200	29522-201
Date Sampled:	08/23/17 1100	08/23/17 1100	08/23/17 1100
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0256		0.0252		0.0270	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.0016		0.0015		0.0015	
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.001	U	0.001	U	0.001	U
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0030		0.0100		0.0061	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 7 Elutriate Blank - Rep 1	Composite 7 Elutriate Blank - Rep 2	Composite 7 Elutriate Blank - Rep 3
Lab ID:	29522-217	29522-218	29522-219
Date Sampled:	08/23/17 0840	08/23/17 0840	08/23/17 0840
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0015		0.0015		0.0015	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.001	U	0.001	U	0.001	U
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0011		0.0011		0.0011	
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.0010		0.0010		0.0010	
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0030		0.0034		0.0069	

U = Below quantitation limit

ESI

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Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 7 Elutriate - Rep 1		Composite 7 Elutriate - Rep 2		Composite 7 Elutriate - Rep 3	
Lab ID:	29522-235		29522-236		29522-237	
Date Sampled:	08/23/17 0920		08/23/17 0920		08/23/17 0920	
Matrix:	Water		Water		Water	
Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0126		0.0126		0.0124	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.0012		0.0013		0.0014	
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.0015		0.0017		0.0017	
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0096		0.0062		0.0069	

U = Below quantitation limit

Inorganic Analytes in Elutriates
SW 846 6020/EPA 200.8 modified
EPA 245.7 and SM 3500-Cr D

Project: New Haven

Sample ID:	Composite 8 Elutriate - Rep 1	Composite 8 Elutriate - Rep 2	Composite 8 Elutriate - Rep 3
Lab ID:	29522-271	29522-272	29522-273
Date Sampled:	08/23/17 1223	08/23/17 1223	08/23/17 1223
Matrix:	Water	Water	Water

Analyte	Units	Result	Qual	Result	Qual	Result	Qual
Arsenic, total	mg/L	0.0166		0.0164		0.0161	
Cadmium, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Chromium, total	mg/L	0.0012		0.0011		0.0011	
Chromium, hexavalent	mg/L	0.005	U	0.005	U	0.005	U
Copper, total	mg/L	0.0005	U	0.0005	U	0.0005	U
Lead, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Mercury, total	ug/L	0.01	U	0.01	U	0.01	U
Nickel, total	mg/L	0.0014		0.0012		0.0012	
Selenium, total	mg/L	0.002	U	0.002	U	0.002	U
Silver, total	mg/L	0.0002	U	0.0002	U	0.0002	U
Zinc, total	mg/L	0.0125		0.0108		0.0045	

U = Below quantitation limit

Project: New Haven
Composite 1 Elutriate Blank

Lab Number:	29522-010	29522-011	29522-012
Sample Designation:	Composite 1 Elutriate Blank - Rep 1	Composite 1 Elutriate Blank - Rep 2	Composite 1 Elutriate Blank - Rep 3
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Date Extracted:	08/24/17 1500	08/24/17 1500	08/24/17 1500
Date Analyzed:	09/07/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	104	102	115	30-150

J = Value below reporting limit but above detection limit.

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Project: New Haven
Composite 1

Lab Number:	29522-028	29522-029	29522-030
Sample Designation:	Composite 1 Elutriate - Rep 1	Composite 1 Elutriate - Rep 2	Composite 1 Elutriate - Rep 3
Date Sampled:	08/22/17 1425	08/22/17 1425	08/22/17 1425
Date Extracted:	08/24/17 1500	08/24/17 1500	08/24/17 1500
Date Analyzed:	09/08/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	128	112	112	30-150

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PCB Congeners in Water
SW 846 8082/EPA 680 modified

Project:	New Haven Composite 2

Lab Number:	29522-064	29522-065	29522-066
Sample Designation:	Composite 2 Elutriate - Rep 1	Composite 2 Elutriate - Rep 2	Composite 2 Elutriate - Rep 3
Date Sampled:	08/22/17 1055	08/22/17 1055	08/22/17 1055
Date Extracted:	08/24/17 1500	08/24/17 1500	08/24/17 1500
Date Analyzed:	09/07/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	910
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	105	104	102	30-150

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Project: New Haven
Composite 3 Elutriate Blank

Lab Number:	29522-082	29522-083	29522-084
Sample Designation:	Composite 3 Elutriate Blank - Rep 1	Composite 3 Elutriate Blank - Rep 2	Composite 3 Elutriate Blank - Rep 3
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Date Extracted:	08/24/17 1500	08/24/17 1500	08/24/17 1500
Date Analyzed:	09/07/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	920	940	930
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	106	112	126	30-150

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PCB Congeners in Water
SW 846 8082/EPA 680 modified

Project:	New Haven Composite 3

Lab Number:	29522-100	29522-101	29522-102
Sample Designation:	Composite 3 Elutriate - Rep 1	Composite 3 Elutriate - Rep 2	Composite 3 Elutriate - Rep 3
Date Sampled:	08/22/17 1310	08/22/17 1310	08/22/17 1310
Date Extracted:	08/24/17 1500	08/24/17 1500	08/24/17 1500
Date Analyzed:	09/06/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	116	100	109	30-150

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Project: New Haven
Composite 4

Lab Number:	29522-136	29522-137	29522-138
Sample Designation:	Composite 4 Elutriate - Rep 1	Composite 4 Elutriate - Rep 2	Composite 4 Elutriate - Rep 3
Date Sampled:	08/22/17 1212	08/22/17 1212	08/22/17 1212
Date Extracted:	08/24/17 1500	08/24/17 1500	08/24/17 1500
Date Analyzed:	09/08/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.001	J
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011		0.0009	J
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0008	J	0.0011	
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0013		0.0009	J
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0014		0.0012	
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.001	J	0.0009	J
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0008	J	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	109	97	108	30-150

J = Value below reporting limit but above detection limit.

Project: New Haven
Composite 5

Lab Number:	29522-172	29522-173	29522-174
Sample Designation:	Composite 5 Elutriate - Rep 1	Composite 5 Elutriate - Rep 2	Composite 5 Elutriate - Rep 3
Date Sampled:	08/23/17 1020	08/23/17 1020	08/23/17 1020
Date Extracted:	08/24/17 1500	08/24/17 1500	08/25/17 1200
Date Analyzed:	09/07/17	09/07/17	10/06/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	920
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0008	J	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0008	J	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0014		0.0012		0.0016	
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0013		0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0009	J	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0008	J	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	101	105	96	30-150

J = Value below reporting limit but above detection limit.

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Project: New Haven
CLDS Ref Site Blank

Lab Number:	29522-190	29522-191	29522-192
Sample Designation:	CLDS Ref Site Blank - Rep 1	CLDS Ref Site Blank - Rep 2	CLDS Ref Site Blank - Rep 3
Date Sampled:	08/25/17 0930	08/25/17 0930	08/25/17 0930
Date Extracted:	08/25/17 1200	08/25/17 1200	08/25/17 1200
Date Analyzed:	09/07/17	09/07/17	09/07/17
Matrix:	Water	Water	Water
Sample Amount (mL):	960	950	960
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.001	U	0.0011	U	0.001	U
18	2,2',5-trichlorobiphenyl	0.001	U	0.0011	U	0.001	U
28	2,4,4'-trichlorobiphenyl	0.001	U	0.0011	U	0.001	U
44	2,2',3,5'-tetrachlorobiphenyl	0.001	U	0.0011	U	0.001	U
49	2,2',4,5'-tetrachlorobiphenyl	0.001	U	0.0011	U	0.001	U
52	2,2',5,5'-tetrachlorobiphenyl	0.001	U	0.0011	U	0.001	U
66	2,3',4,4'-tetrachlorobiphenyl	0.001	U	0.0011	U	0.001	U
77	3,3',4,4'-tetrachlorobiphenyl	0.001	U	0.0011	U	0.001	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.001	U	0.0011	U	0.001	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.001	U	0.0011	U	0.001	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.001	U	0.0011	U	0.001	U
118	2,3',4,4',5-pentachlorobiphenyl	0.001	U	0.0011	U	0.001	U
126	3,3',4,4',5-pentachlorobiphenyl	0.001	U	0.0011	U	0.001	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.001	U	0.0011	U	0.001	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.001	U	0.0011	U	0.001	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.001	U	0.0011	U	0.001	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.001	U	0.0011	U	0.001	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.001	U	0.0011	U	0.001	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.001	U	0.0011	U	0.001	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.001	U	0.0011	U	0.001	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0019	0	0.0011	U	0.001	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.001	U	0.0011	U	0.001	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.001	U	0.0011	U	0.001	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.001	U	0.0011	U	0.001	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	113	124	101	30-150

PCB Congeners in Water
SW 846 8082/EPA 680 modified

Project:	New Haven Composite 6

Lab Number:	29522-208	29522-209	29522-210
Sample Designation:	Composite 6 Elutriate - Rep 1	Composite 6 Elutriate - Rep 2	Composite 6 Elutriate - Rep 3
Date Sampled:	08/23/17 1100	08/23/17 1100	08/23/17 1100
Date Extracted:	08/25/17 1200	08/25/17 1200	08/25/17 1200
Date Analyzed:	09/08/17	09/08/17	09/08/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	930
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0026	
18	2,2',5-trichlorobiphenyl	0.0056		0.0069		0.0087	
28	2,4,4'-trichlorobiphenyl	0.017		0.013		0.013	
44	2,2',3,5'-tetrachlorobiphenyl	0.011		0.018		0.013	
49	2,2',4,5'-tetrachlorobiphenyl	0.016		0.017		0.015	
52	2,2',5,5'-tetrachlorobiphenyl	0.02		0.026		0.026	
66	2,3',4,4'-tetrachlorobiphenyl	0.013		0.016		0.016	
77	3,3',4,4'-tetrachlorobiphenyl	0.0023		0.0011	U	0.0009	J
87	2,2',3,4,5'-pentachlorobiphenyl	0.0072		0.0099		0.0092	
101	2,2',4,5,5'-pentachlorobiphenyl	0.024		0.03		0.029	
105	2,3,3',4,4'-pentachlorobiphenyl	0.0051		0.0072		0.0077	
118	2,3',4,4',5-pentachlorobiphenyl	0.015		0.014		0.017	
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0053		0.0039		0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.021		0.023		0.024	
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.021		0.023		0.024	
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0079		0.0077		0.0061	
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.012		0.0087		0.017	
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0047		0.0043		0.0045	
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0073		0.01		0.011	
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011		0.0016		0.0011	
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0021		0.002		0.0015	
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011		0.0014		0.0022	

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	82	97	95	30-150

J = Value below reporting limit but above detection limit.

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Project: New Haven
Composite 7 Elutriate Blank

Lab Number:	29522-226	29522-227	29522-228
Sample Designation:	Composite 7 Elutriate Blank - Rep 1	Composite 7 Elutriate Blank - Rep 2	Composite 7 Elutriate Blank - Rep 3
Date Sampled:	08/23/17 0840	08/23/17 0840	08/23/17 0840
Date Extracted:	08/25/17 1200	08/25/17 1200	08/25/17 1200
Date Analyzed:	09/07/17	09/08/17	09/08/17
Matrix:	Water	Water	Water
Sample Amount (mL):	920	950	950
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
28	2,4,4'-trichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
49	2,2',4,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
52	2,2',5,5'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	108	97	94	30-150

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PCB Congeners in Water
SW 846 8082/EPA 680 modified

Project:	New Haven Composite 7

Lab Number:	29522-244	29522-245	29522-246
Sample Designation:	Composite 7 Elutriate - Rep 1	Composite 7 Elutriate - Rep 2	Composite 7 Elutriate - Rep 3
Date Sampled:	08/23/17 0920	08/23/17 0920	08/23/17 0920
Date Extracted:	08/25/17 1200	08/25/17 1200	08/25/17 1200
Date Analyzed:	09/07/17	09/08/17	09/08/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	950	940
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.014		0.015		0.0012	
18	2,2',5-trichlorobiphenyl	0.0057		0.0051		0.011	
28	2,4,4'-trichlorobiphenyl	0.024		0.026		0.026	
44	2,2',3,5'-tetrachlorobiphenyl	0.022		0.02		0.023	
49	2,2',4,5'-tetrachlorobiphenyl	0.022		0.023		0.024	
52	2,2',5,5'-tetrachlorobiphenyl	0.041		0.042		0.041	
66	2,3',4,4'-tetrachlorobiphenyl	0.022		0.019		0.026	
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0037	
87	2,2',3,4,5'-pentachlorobiphenyl	0.0097		0.009	J	0.011	
101	2,2',4,5,5'-pentachlorobiphenyl	0.028		0.03		0.033	
105	2,3,3',4,4'-pentachlorobiphenyl	0.0058		0.0057		0.0076	
118	2,3',4,4',5-pentachlorobiphenyl	0.02		0.014		0.024	
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0015		0.003		0.0055	
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.02		0.018		0.024	
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.02		0.02		0.023	
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0061		0.0054		0.0068	
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.011		0.012		0.013	
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0041		0.0044		0.0039	
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0071		0.0073		0.0093	
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0009	J	0.0011	
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0018		0.0014		0.0016	
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0018	

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	93	102	90	30-150

J = Value below reporting limit but above detection limit.

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PCB Congeners in Water
SW 846 8082/EPA 680 modified

Project:	New Haven Composite 8

Lab Number:	29522-280	29522-281	29522-282
Sample Designation:	Composite 8 Elutriate - Rep 1	Composite 8 Elutriate - Rep 2	Composite 8 Elutriate - Rep 3
Date Sampled:	08/23/17 1223	08/23/17 1223	08/23/17 1223
Date Extracted:	08/25/17 1200	08/25/17 1200	08/25/17 1200
Date Analyzed:	09/08/17	09/08/17	09/08/17
Matrix:	Water	Water	Water
Sample Amount (mL):	930	930	930
Final Volume (mL)	0.5	0.5	0.5
Dilution Factor:	1	1	1

Number	PCB Congener	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
8	2,4'-dichlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
18	2,2',5-trichlorobiphenyl	0.00087		0.0011	U	0.0009	J
28	2,4,4'-trichlorobiphenyl	0.0017		0.0013		0.0011	U
44	2,2',3,5'-tetrachlorobiphenyl	0.0008	J	0.001	J	0.0009	J
49	2,2',4,5'-tetrachlorobiphenyl	0.0012		0.0011		0.0011	
52	2,2',5,5'-tetrachlorobiphenyl	0.0018		0.0016		0.002	
66	2,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0009	J	0.0011	U
77	3,3',4,4'-tetrachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.0014		0.0016		0.0019	
105	2,3,3',4,4'-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
118	2,3',4,4',5-pentachlorobiphenyl	0.0012		0.0011	U	0.0011	
126	3,3',4,4',5-pentachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.001	U	0.001	U	0.0013	
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.0012		0.0009	J	0.0015	
156	2,3,3',4,4',5-hexachlorobiphenyl						
169	3,3',4,4',5,5'-hexachlorobiphenyl						
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0009	J
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.0011	U	0.0011	U	0.0011	U

	Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
198	2,2',3,3',4,5,5',6-octachlorobiphenyl	92	114	106	30-150

J = Value below reporting limit but above detection limit.

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New Haven
Composite 1 Elutriate Blank

Lab Number:	29522-007	29522-008	29522-009
Sample Designation:	Composite 1 Elutriate Blank - R	Composite 1 Elutriate Blank - R	Composite 1 Elutriate Blank - Rep 3
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Date Extracted:	08/28/17 0800	08/28/17 0800	08/28/17 0800
Date Analyzed:	08/30/17	08/30/17	08/30/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	930
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	103	100	89	30-150

New Haven
Composite 1

Lab Number:	29522-025	29522-026	29522-027
Sample Designation:	Composite 1 Elutriate - Rep 1	Composite 1 Elutriate - Rep 2	Composite 1 Elutriate - Rep 3
Date Sampled:	08/22/17 1425	08/22/17 1425	08/22/17 1425
Date Extracted:	08/28/17 0800	08/28/17 0800	08/28/17 0800
Date Analyzed:	08/30/17	08/30/17	08/30/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	86	83	99	30-150

New Haven
Composite 2

Lab Number:	29522-061	29522-062	29522-063
Sample Designation:	Composite 2 Elutriate - Rep 1	Composite 2 Elutriate - Rep 2	Composite 2 Elutriate - Rep 3
Date Sampled:	08/22/17 1055	08/22/17 1055	08/22/17 1055
Date Extracted:	08/28/17 0800	08/28/17 0800	08/28/17 0800
Date Analyzed:	08/30/17	08/30/17	08/30/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	104	94	98	30-150

New Haven
Composite 3 Elutriate Blank

Lab Number:	29522-079	29522-080	29522-081
Sample Designation:	Composite 3 Elutriate Blank - Rep 1	Composite 3 Elutriate Blank - Rep 2	Composite 3 Elutriate Blank - Rep 3
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Date Extracted:	08/28/17 0800	08/28/17 0800	08/28/17 0800
Date Analyzed:	08/30/17	08/31/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	940
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	89	75	84	30-150

New Haven
Composite 3

Lab Number:	29522-097	29522-098	29522-099
Sample Designation:	Composite 3 Elutriate - Rep 1	Composite 3 Elutriate - Rep 2	Composite 3 Elutriate - Rep 3
Date Sampled:	08/22/17 1310	08/22/17 1310	08/22/17 1310
Date Extracted:	08/28/17 0800	08/28/17 0800	08/28/17 0800
Date Analyzed:	08/30/17	08/31/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	930	930
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	58	84	106	30-150

New Haven
Composite 4

Lab Number:	29522-133	29522-134	29522-135
Sample Designation:	Composite 4 Elutriate - Rep 1	Composite 4 Elutriate - Rep 2	Composite 4 Elutriate - Rep 3
Date Sampled:	08/22/17 1212	08/22/17 1212	08/22/17 1212
Date Extracted:	08/28/17 0800	08/28/17 0800	08/28/17 0800
Date Analyzed:	08/31/17	08/31/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	84	106	104	30-150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

New Haven
Composite 5

Lab Number:	29522-169	29522-170	29522-171
Sample Designation:	Composite 5 Elutriate - Rep 1	Composite 5 Elutriate - Rep 2	Composite 5 Elutriate - Rep 3
Date Sampled:	08/23/17 1020	08/23/17 1020	08/23/17 1020
Date Extracted:	08/28/17 0800	08/28/17 0800	08/29/17 1200
Date Analyzed:	08/31/17	08/31/17	09/01/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	940
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	111	106	80	30-150

New Haven
CLDS Ref Site Blank

Lab Number:	29522-187	29522-188	29522-189
Sample Designation:	CLDS Ref Site Blank - Rep 1	CLDS Ref SiteBlank - Rep 2	CLDS Ref Site Blank - Rep 3
Date Sampled:	08/25/17 0930	08/25/17 0930	08/25/17 0930
Date Extracted:	08/29/17 1200	08/29/17 1200	08/29/17 1200
Date Analyzed:	09/05/17	09/05/17	09/05/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	940
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	38	32	31	30-150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

New Haven
Composite 6

Lab Number:	29522-205	29522-206	29522-207
Sample Designation:	Composite 6 Elutriate - Rep 1	Composite 6 Elutriate - Rep 2	Composite 6 Elutriate - Rep 3
Date Sampled:	08/23/17 1100	08/23/17 1100	08/23/17 1100
Date Extracted:	08/29/17 1200	08/29/17 1200	08/29/17 1200
Date Analyzed:	08/31/17	09/01/17	09/01/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	920	910
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	87	62	71	30-150

New Haven
Composite 7 Elutriate Blank

Lab Number:	29522-223	29522-224	29522-225
Sample Designation:	Composite 7 Elutriate Blank - Rep 1	Composite 7 Elutriate Blank - Rep 2	Composite 7 Elutriate Blank - Rep 3
Date Sampled:	08/23/17 0840	08/23/17 0840	08/23/17 0840
Date Extracted:	08/29/17 1200	08/29/17 1200	08/29/17 1200
Date Analyzed:	09/05/17	09/05/17	09/05/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	82	75	74	30-150

New Haven
Composite 7

Lab Number:	29522-241	29522-242	29522-243
Sample Designation:	Composite 7 Elutriate - Rep 1	Composite 7 Elutriate - Rep 2	Composite 7 Elutriate - Rep 3
Date Sampled:	08/23/17 0920	08/23/17 0920	08/23/17 0920
Date Extracted:	08/29/17 1200	08/29/17 1200	08/29/17 1200
Date Analyzed:	08/31/17	08/31/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	950	950
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	62	64	70	30-150

New Haven
Composite 8

Lab Number:	29522-277	29522-278	29522-279
Sample Designation:	Composite 8 Elutriate - Rep 1	Composite 8 Elutriate - Rep 2	Composite 8 Elutriate - Rep 3
Date Sampled:	08/23/17 1223	08/23/17 1223	08/23/17 1223
Date Extracted:	08/29/17 1200	08/29/17 1200	08/29/17 1200
Date Analyzed:	09/05/17	09/05/17	09/05/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	0.50	0.50	0.50
Dilution Factor:	1	1	1

Compound	Result (ug/L)	Qual	Result (ug/L)	Qual	Result (ug/L)	Qual
pentachlorophenol	1.1	U	1.1	U	1.1	U

Surrogate Standards	Recovery (%)	Recovery (%)	Recovery (%)	Limit (%)
2,4,6-tribromophenol	88	82	79	30-150

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-016	29522-017	29522-018
Sample Designation:	Composite 1 Elutriate Blank - Rep 1	Composite 1 Elutriate Blank - Rep 2	Composite 1 Elutriate Blank - Rep 3
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Date Extracted:	08/23/17 0930	08/23/17 0930	08/23/17 0930
Date Analyzed:	08/29/17	08/29/17	08/29/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	87	30 - 150	93	30 - 150	87	30 - 150
decachlorobiphenyl	100	30 - 150	105	30 - 150	100	30 - 150

U = Not detected at indicated level.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-034	29522-035	29522-036
Sample Designation:	Composite 1 Elutriate - Rep 1	Composite 1 Elutriate - Rep 2	Composite 1 Elutriate - Rep 3
Date Sampled:	08/22/17 1425	08/22/17 1425	08/22/17 1425
Date Extracted:	08/23/17 0930	08/23/17 0930	08/23/17 0930
Date Analyzed:	08/29/17	08/29/17	08/29/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	950	930
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	78	30 - 150	67	30 - 150	68	30 - 150
decachlorobiphenyl	87	30 - 150	91	30 - 150	82	30 - 150

U = Not detected at indicated level.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-070	29522-071	29522-072
Sample Designation:	Composite 2 Elutriate - Rep 1	Composite 2 Elutriate - Rep 2	Composite 2 Elutriate - Rep 3
Date Sampled:	08/22/17 1055	08/22/17 1055	08/22/17 1055
Date Extracted:	08/23/17 0930	08/23/17 0930	08/23/17 0930
Date Analyzed:	08/29/17	08/29/17	08/29/17
Matrix:	Water	Water	Water
Sample Amount (mL):	910	950	950
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	47	30 - 150	62	30 - 150	82	30 - 150
decachlorobiphenyl	94	30 - 150	103	30 - 150	109	30 - 150

U = Not detected at indicated level.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-088	29522-089	29522-090
Sample Designation:	Composite 3 Elutriate Blank - Rep 1	Composite 3 Elutriate Blank - Rep 2	Composite 3 Elutriate Blank - Rep 3
Date Sampled:	08/22/17 1005	08/22/17 1005	08/22/17 1005
Date Extracted:	08/23/17 0930	08/23/17 0930	08/23/17 0930
Date Analyzed:	08/29/17	08/29/17	08/29/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	920	920
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.0023	T	0.0032	T
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	104	30 - 150	36	30 - 150	77	30 - 150
decachlorobiphenyl	105	30 - 150	117	30 - 150	108	30 - 150

U = Not detected at indicated level.
T =Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-106	29522-107	29522-108
Sample Designation:	Composite 3 Elutriate - Rep 1	Composite 3 Elutriate - Rep 2	Composite 3 Elutriate - Rep 3
Date Sampled:	08/22/17 1310	08/22/17 1310	08/22/17 1310
Date Extracted:	08/23/17 0930	08/23/17 0930	08/23/17 0930
Date Analyzed:	08/30/17	08/30/17	08/30/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	910	920
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.0032	T	0.0036	T	0.0034	T
dieldrin	0.004	U	0.0081	T	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.0031	T	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	109	30 - 150	110	30 - 150	121	30 - 150
decachlorobiphenyl	102	30 - 150	107	30 - 150	103	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-142	29522-143	29522-144
Sample Designation:	Composite 4 Elutriate - Rep 1	Composite 4 Elutriate - Rep 2	Composite 4 Elutriate - Rep 3
Date Sampled:	08/22/17 1212	08/22/17 1212	08/22/17 1212
Date Extracted:	08/23/17 0930	08/23/17 0930	08/23/17 0930
Date Analyzed:	08/29/17	08/29/17	08/29/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	82	30 - 150	79	30 - 150	77	30 - 150
decachlorobiphenyl	96	30 - 150	99	30 - 150	91	30 - 150

U = Not detected at indicated level.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-178	29522-179	29522-180
Sample Designation:	Composite 5 Elutriate - Rep 1	Composite 5 Elutriate - Rep 2	Composite 5 Elutriate - Rep 3
Date Sampled:	08/23/17 1020	08/23/17 1020	08/23/17 1020
Date Extracted:	08/23/17 0930	08/23/17 0930	08/24/17 0830
Date Analyzed:	08/30/17	08/29/17	08/30/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	950
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.0033	T	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	83	30 - 150	41	30 - 150	45	30 - 150
decachlorobiphenyl	109	30 - 150	101	30 - 150	44	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-196	29522-197	29522-198
Sample Designation:	CLDS Ref Site Blank - Rep 1	CLDS Ref Site Blank - Rep 2	CLDS Ref Site Blank - Rep 3
Date Sampled:	08/25/17 0930	08/25/17 0930	08/25/17 0930
Date Extracted:	08/24/17 0830	08/24/17 0830	08/24/17 0830
Date Analyzed:	08/31/17	08/31/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	940
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.0043	T	0.0038	T	0.0037	T
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	150	30 - 150	132	30 - 150	123	30 - 150
decachlorobiphenyl	8,J17	30 - 150	3,J17	30 - 150	5,J17	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.
J17 = SUR %R below limit.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-214	29522-215	29522-216
Sample Designation:	Composite 6 Elutriate - Rep 1	Composite 6 Elutriate - Rep 2	Composite 6 Elutriate - Rep 3
Date Sampled:	08/23/17 1100	08/23/17 1100	08/23/17 1100
Date Extracted:	08/24/17 0830	08/24/17 0830	08/24/17 0830
Date Analyzed:	08/30/17	08/30/17	08/30/17
Matrix:	Water	Water	Water
Sample Amount (mL):	950	950	950
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	82	30 - 150	54	30 - 150	99	30 - 150
decachlorobiphenyl	80	30 - 150	75	30 - 150	95	30 - 150

U = Not detected at indicated level.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-232	29522-233	29522-234
Sample Designation:	Composite 7 Elutriate Blank - Rep 1	Composite 7 Elutriate Blank - Rep 2	Composite 7 Elutriate Blank - Rep 3
Date Sampled:	08/23/17 0840	08/23/17 0840	08/23/17 0840
Date Extracted:	08/24/17 0830	08/24/17 0830	08/24/17 0830
Date Analyzed:	08/30/17	08/30/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	940	950
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.002	U
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	53	30 - 150	57	30 - 150	74	30 - 150
decachlorobiphenyl	76	30 - 150	76	30 - 150	88	30 - 150

U = Not detected at indicated level.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-250	29522-251	29522-252
Sample Designation:	Composite 7 Elutriate - Rep 1	Composite 7 Elutriate - Rep 2	Composite 7 Elutriate - Rep 3
Date Sampled:	08/23/17 0920	08/23/17 0920	08/23/17 0920
Date Extracted:	08/24/17 0830	08/24/17 0830	08/24/17 0830
Date Analyzed:	08/30/17	08/31/17	08/31/17
Matrix:	Water	Water	Water
Sample Amount (mL):	940	930	910
Final Volume (mL)	1.0	1.0	1.0
Dilution Factor:	1	1	1

	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.0048	T	0.0046	T
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.002	U	0.002	U	0.0071	T
gamma-BHC (lindane)	0.002	U	0.0029	T	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	46	30 - 150	62	30 - 150	68	30 - 150
decachlorobiphenyl	98	30 - 150	90	30 - 150	120	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.

Pesticides in Elutriates
SW 846 8081B

Lab Number:	29522-286		29522-287		29522-288	
Sample Designation:	Composite 8 Elutriate - Rep 1		Composite 8 Elutriate - Rep 2		Composite 8 Elutriate - Rep 3	
Date Sampled:	08/23/17 1223		08/23/17 1223		08/23/17 1223	
Date Extracted:	08/24/17 0830		08/24/17 0830		08/24/17 0830	
Date Analyzed:	08/31/17		08/31/17		08/31/17	
Matrix:	Water		Water		Water	
Sample Amount (mL):	960		950		950	
Final Volume (mL)	1.0		1.0		1.0	
Dilution Factor:	1		1		1	
	Elutriate Replicate 1		Elutriate Replicate 2		Elutriate Replicate 3	
Analyte	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier	Concentration (ug/L)	Qualifier
aldrin	0.002	U	0.002	U	0.002	U
gamma-chlordane (cis)	0.002	U	0.002	U	0.002	U
alpha-chlordane (trans)	0.002	U	0.002	U	0.002	U
chlopyrifos	0.002	U	0.002	U	0.002	U
dieldrin	0.004	U	0.004	U	0.004	U
4,4'-DDT	0.004	U	0.004	U	0.004	U
endosulfan I	0.002	U	0.002	U	0.002	U
endosulfan II	0.004	U	0.004	U	0.004	U
endrin	0.004	U	0.004	U	0.004	U
heptachlor	0.002	U	0.002	U	0.002	U
heptachlor epoxide	0.004	T	0.0039	T	0.0028	T
gamma-BHC (lindane)	0.002	U	0.002	U	0.002	U
toxaphene	0.1	U	0.1	U	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	57	30 - 150	26,J17	30 - 150	45	30 - 150
decachlorobiphenyl	81	30 - 150	75	30 - 150	68	30 - 150

U = Not detected at indicated level.
T = Concentrations of target analytes were too low for GCMS confirmation. Compound identification is tentative.
J17 = SUR %R below limit.

Quality Control Summary

Parameter: Arsenic, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.0005	0.0005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0249	0.025	100	0.0248	0.025	99	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.0192		0.0194		1		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.1430	0.125	0.0194		99		Pass
29522-019SD	80-120	0.1450	0.125	0.0194		100		Pass

U = Below quantitation limit

Quality Control Summary

Parameter: Cadmium, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.0001	0.0001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0126	0.0125	101	0.0125	0.0125	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.0001	U	0.0001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.0605	0.0625	0.0001	U	97		Pass
29522-019SD	80-120	0.0601	0.0625	0.0001	U	96		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

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Quality Control Summary

Parameter: Chromium, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.001	0.001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0198	0.020	99	0.0199	0.020	99	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.001	U	0.001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.102	0.100	0.001	U	102		Pass
29522-019SD	80-120	0.0997	0.100	0.001	U	100		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

Quality Control Summary

Parameter: Copper, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.0005	0.0005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0244	0.025	98	0.0248	0.025	99	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.0005	U	0.0005	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.121	0.125	0.0005	U	97		Pass
29522-019SD	80-120	0.118	0.125	0.0005	U	94		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

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Quality Control Summary

Parameter: Lead, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.0002	0.0002	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0251	0.025	100	0.0250	0.025	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.0002	U	0.0002	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.128	0.125	0.0002	U	102		Pass
29522-019SD	80-120	0.127	0.125	0.0002	U	102		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

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Quality Control Summary

Parameter: Mercury, total
Project: New Haven
Matrix: Water
QC Batch No: 268W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-022	Composite 1 Elutriate - Rep 1	29522-095	Composite 3 Elutriate - Rep 2
29522-023	Composite 1 Elutriate - Rep 2	29522-096	Composite 3 Elutriate - Rep 3
29522-024	Composite 1 Elutriate - Rep 3	29522-076	Composite 3 Elutriate Blank - Rep 1
29522-004	Composite 1 Elutriate Blank - Rep 1	29522-077	Composite 3 Elutriate Blank - Rep 2
29522-005	Composite 1 Elutriate Blank - Rep 2	29522-078	Composite 3 Elutriate Blank - Rep 3
29522-006	Composite 1 Elutriate Blank - Rep 3	29522-130	Composite 4 Elutriate - Rep 1
29522-058	Composite 2 Elutriate - Rep 1	29522-131	Composite 4 Elutriate - Rep 2
29522-059	Composite 2 Elutriate - Rep 2	29522-132	Composite 4 Elutriate - Rep 3
29522-060	Composite 2 Elutriate - Rep 3		
29522-094	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result ug/L	Q		M
PB268W	0.01	0.01	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/L	True Value ug/L	%R	Lab Control Dup Sample Result ug/L	True Value ug/L	%R	
LCS	85-115	0.097	0.100	97	0.098	0.100	98	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/L	Q	Sample Result ug/L	Q	RPD	Q	
29522-022	20	0.01	U	0.01	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/L	Spike Added ug/L	Sample Result ug/L	Q	%R	Q	
29522-022S	80-120	0.100	0.100	0.01	U	100		Pass
29522-022SD	80-120	0.101	0.100	0.01	U	101		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

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Quality Control Summary

Parameter: Nickel, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.001	0.001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0492	0.050	98	0.0500	0.050	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.001	U	0.001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.244	0.250	0.001	U	98		Pass
29522-019SD	80-120	0.242	0.250	0.001	U	97		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Selenium, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.001	0.001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0247	0.025	99	0.0249	0.025	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.001	U	0.001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.130	0.125	0.001	U	104		Pass
29522-019SD	80-120	0.127	0.125	0.001	U	102		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

EnviroSystems, Inc. One Lafayette Road Hampton, NH 03843-0778 603-926-3345 fax 603-926-3521 www.envirosystems.com

Quality Control Summary

Parameter: Silver, total
Project: New Haven
Matrix: Water
QC Batch No: 534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.0002	0.0002	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0252	0.025	101	0.0252	0.025	101	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.0002	U	0.0002	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.123	0.125	0.0002	U	98		Pass
29522-019SD	80-120	0.122	0.125	0.0002	U	98		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter:	Zinc, total
Project:	New Haven
Matrix:	Water
QC Batch No:	534W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-019	Composite 1 Elutriate - Rep 1	29522-092	Composite 3 Elutriate - Rep 2
29522-020	Composite 1 Elutriate - Rep 2	29522-093	Composite 3 Elutriate - Rep 3
29522-021	Composite 1 Elutriate - Rep 3	29522-055	Composite 2 Elutriate - Rep 1
29522-073	Composite 3 Elutriate Blank - Rep 1	29522-056	Composite 2 Elutriate - Rep 2
29522-074	Composite 3 Elutriate Blank - Rep 2	29522-057	Composite 2 Elutriate - Rep 3
29522-075	Composite 3 Elutriate Blank - Rep 3	29522-127	Composite 4 Elutriate - Rep 1
29522-001	Composite 1 Elutriate Blank - Rep 1	29522-128	Composite 4 Elutriate - Rep 2
29522-002	Composite 1 Elutriate Blank - Rep 2	29522-129	Composite 4 Elutriate - Rep 3
29522-003	Composite 1 Elutriate Blank - Rep 3		
29522-091	Composite 3 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB534W	0.002	0.002	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0493	0.050	99	0.0498	0.050	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-019	20	0.0048		0.0048		NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-019S	80-120	0.243	0.250	0.0048		95		Pass
29522-019SD	80-120	0.238	0.250	0.0048		93		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

Quality Control Summary

Parameter: Hexavalent Chromium
Project: New Haven
Matrix: Water
QC Batch No: 444W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-013	Composite 1 Elutriate Blank - Rep 1	29522-086	Composite 3 Elutriate Blank - Rep 2
29522-014	Composite 1 Elutriate Blank - Rep 2	29522-087	Composite 3 Elutriate Blank - Rep 3
29522-015	Composite 1 Elutriate Blank - Rep 3	29522-103	Composite 3 Elutriate - Rep 1
29522-031	Composite 1 Elutriate - Rep 1	29522-104	Composite 3 Elutriate - Rep 2
29522-032	Composite 1 Elutriate - Rep 2	29522-105	Composite 3 Elutriate - Rep 3
29522-033	Composite 1 Elutriate - Rep 3	29522-139	Composite 4 Elutriate - Rep 1
29522-067	Composite 2 Elutriate - Rep 1	29522-140	Composite 4 Elutriate - Rep 2
29522-068	Composite 2 Elutriate - Rep 2	29522-141	Composite 4 Elutriate - Rep 3
29522-069	Composite 2 Elutriate - Rep 3	29522-141	Composite 4 Elutriate - Rep 3
29522-085	Composite 3 Elutriate Blank - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB444W	0.005	0.005			High

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.101	0.100	101	0.103	0.100	103	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-013	20	0.005	U	0.005	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-013S	80-120	0.105	0.100	0.005	U	105		Pass
29522-013SD	80-120	0.100	0.100	0.005	U	100		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Arsenic, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.0005	0.0005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0247	0.025	99	0.0249	0.025	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0447		0.0440		2		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.1660	0.125	0.0440		98		Pass
29522-163SD	80-120	0.1660	0.125	0.0440		98		Pass

U = Below quantitation limit

ESI

Quality Control Summary

Parameter: Cadmium, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.0001	0.0001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0121	0.0125	97	0.0122	0.0125	98	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0001	U	0.0001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.0576	0.0625	0.0001	U	92		Pass
29522-163SD	80-120	0.0581	0.0625	0.0001	U	93		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Chromium, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.001	0.001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0194	0.020	97	0.0194	0.020	97	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0014		0.0014		NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.098	0.100	0.0014		96		Pass
29522-163SD	80-120	0.0977	0.100	0.0014		96		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Copper, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.0005	0.0005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0237	0.025	95	0.0237	0.025	95	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0005	U	0.0005	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.114	0.125	0.0005	U	91		Pass
29522-163SD	80-120	0.113	0.125	0.0005	U	90		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Lead, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.0002	0.0002	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0249	0.025	100	0.0250	0.025	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0002	U	0.0002	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.127	0.125	0.0002	U	102		Pass
29522-163SD	80-120	0.127	0.125	0.0002	U	102		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Mercury, total
Project: New Haven
Matrix: Water
QC Batch No: 269W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-166	Composite 5 Elutriate - Rep 1	29522-239	Composite 7 Elutriate - Rep 2
29522-167	Composite 5 Elutriate - Rep 2	29522-240	Composite 7 Elutriate - Rep 3
29522-168	Composite 5 Elutriate - Rep 3	29522-220	Composite 7 Elutriate Blank - Rep 1
29522-184	CLDS Ref Site Blank - Rep 1	29522-221	Composite 7 Elutriate Blank - Rep 2
29522-185	CLDS Ref Site Blank - Rep 2	29522-222	Composite 7 Elutriate Blank - Rep 3
29522-186	CLDS Ref Site Blank - Rep 3	29522-274	Composite 8 Elutriate - Rep 1
29522-202	Composite 6 Elutriate - Rep 1	29522-275	Composite 8 Elutriate - Rep 2
29522-203	Composite 6 Elutriate - Rep 2	29522-276	Composite 8 Elutriate - Rep 3
29522-204	Composite 6 Elutriate - Rep 3		
29522-238	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result ug/L	Q		M
PB269W	0.01	0.01	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result ug/L	True Value ug/L	%R	Lab Control Dup Sample Result ug/L	True Value ug/L	%R	
LCS	85-115	0.092	0.100	92	0.097	0.100	97	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result ug/L	Q	Sample Result ug/L	Q	RPD	Q	
29522-166	20	0.01	U	0.01	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result ug/L	Spike Added ug/L	Sample Result ug/L	Q	%R	Q	
29522-166S	80-120	0.096	0.100	0.01	U	96		Pass
29522-166SD	80-120	0.092	0.100	0.01	U	92		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Nickel, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.001	0.001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0477	0.050	95	0.0480	0.050	96	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.001	U	0.001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.233	0.250	0.001	U	93		Pass
29522-163SD	80-120	0.231	0.250	0.001	U	92		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Selenium, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.001	0.001	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0252	0.025	101	0.0250	0.025	100	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.001	U	0.001	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.126	0.125	0.001	U	101		Pass
29522-163SD	80-120	0.126	0.125	0.001	U	101		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

ESI

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Quality Control Summary

Parameter: Silver, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.0002	0.0002	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0240	0.025	96	0.0241	0.025	96	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0002	U	0.0002	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.116	0.125	0.0002	U	93		Pass
29522-163SD	80-120	0.117	0.125	0.0002	U	94		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

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Quality Control Summary

Parameter: Zinc, total
Project: New Haven
Matrix: Water
QC Batch No: 535W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-163	Composite 5 Elutriate - Rep 1	29522-236	Composite 7 Elutriate - Rep 2
29522-164	Composite 5 Elutriate - Rep 2	29522-237	Composite 7 Elutriate - Rep 3
29522-165	Composite 5 Elutriate - Rep 3	29522-199	Composite 6 Elutriate - Rep 1
29522-181	CLDS Ref Site Blank - Rep 1	29522-200	Composite 6 Elutriate - Rep 2
29522-182	CLDS Ref Site Blank - Rep 2	29522-201	Composite 6 Elutriate - Rep 3
29522-183	CLDS Ref Site Blank - Rep 3	29522-217	Composite 7 Elutriate Blank - Rep 1
29522-271	Composite 8 Elutriate - Rep 1	29522-218	Composite 7 Elutriate Blank - Rep 2
29522-272	Composite 8 Elutriate - Rep 2	29522-219	Composite 7 Elutriate Blank - Rep 3
29522-273	Composite 8 Elutriate - Rep 3		
29522-235	Composite 7 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB535W	0.002	0.002	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.0473	0.050	95	0.0475	0.050	95	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-163	20	0.0059		0.0061		NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-163S	80-120	0.231	0.250	0.0061		90		Pass
29522-163SD	80-120	0.230	0.250	0.0061		90		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

Quality Control Summary

Parameter: Hexavalent Chromium
Project: New Haven
Matrix: Water
QC Batch No: 445W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-175	Composite 5 Elutriate - Rep 1	29522-284	Composite 8 Elutriate - Rep 2
29522-176	Composite 5 Elutriate - Rep 2	29522-285	Composite 8 Elutriate - Rep 3
29522-177	Composite 5 Elutriate - Rep 3		
29522-211	Composite 6 Elutriate - Rep 1		
29522-212	Composite 6 Elutriate - Rep 2		
29522-213	Composite 6 Elutriate - Rep 3		
29522-229	Composite 7 Elutriate Blank - Rep 1		
29522-230	Composite 7 Elutriate Blank - Rep 2		
29522-231	Composite 7 Elutriate Blank - Rep 3		
29522-283	Composite 8 Elutriate - Rep 1		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB445W	0.005	0.005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.105	0.100	105	0.103	0.100	103	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29522-175	20	0.005	U	0.005	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29522-175S	80-120	0.089	0.100	0.005	U	89		Pass
29522-175SD	80-120	0.090	0.100	0.005	U	90		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

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Quality Control Summary

Parameter: Hexavalent Chromium
Project: New Haven
Matrix: Water
QC Batch No: 446W

Pertains to samples:

Lab ID	Sample ID	Lab ID	Sample ID
29522-193	CLDS Ref Site Blank - Rep 1		
29522-194	CLDS Ref Site Blank - Rep 2		
29522-195	CLDS Ref Site Blank - Rep 3		

	Control Limit +/-	Preparation Blank Result mg/L	Q		M
PB446W	0.005	0.005	U		Pass

LABORATORY CONTROL SAMPLE RECOVERY

ID	Control Limit %	Lab Control Sample Result mg/L	True Value mg/L	%R	Lab Control Dup Sample Result mg/L	True Value mg/L	%R	
LCS	85-115	0.105	0.100	105	0.103	0.100	103	Pass

DUPLICATE ANALYSIS

ID	Control Limit %	Duplicate Result mg/L	Q	Sample Result mg/L	Q	RPD	Q	
29552-193	20	0.005	U	0.005	U	NC		Pass

SPIKE SAMPLE ANALYSIS

ID	Control Limit %	Spiked Sample Result mg/L	Spike Added mg/L	Sample Result mg/L	Q	%R	Q	
29552-193S	80-120	0.096	0.100	0.005	U	96		Pass
29552-193SD	80-120	0.101	0.100	0.005	U	101		Pass

U = Below quantitation limit
NC = Not calculated due to one or both values less than five times the reporting limit.

Metals by ICPMS
EPA 200.8

Lab Number:	MDL2017
Sample Designation:	Water
Date Analyzed:	03/07/17
Matrix:	Salt water
Sample Amount (mL):	1
Final Volume (mL)	50

	True Value ug/L	MDLA2017 Found ug/L	MDLB2017 Found ug/L	MDLC2017 Found ug/L	MDLD2017 Found ug/L	MDLE2017 Found ug/L	MDLF2017 Found ug/L	MDLG2017 Found ug/L	Std Dev ug/L	MDL ug/L
Aluminum, total	1	1.092	0.958	0.899	0.8	0.692	1.548	0.749	0.2696	0.847
Antimony, total	0.05	0.017	0.023	0.017	0.018	0.022	0.016	0.017	0.0026	0.008
Arsenic, total	0.125	0.046	0.047	0.043	0.051	0.035	0.057	0.044	0.0063	0.020
Barium, total	1	0.383	0.388	0.407	0.345	0.453	0.382	0.426	0.0322	0.101
Beryllium, total	0.025	0.013	0.012	0.012	0.013	0.012	0.01	0.011	0.0010	0.003
Cadmium, total	0.0625	0.023	0.023	0.024	0.025	0.026	0.026	0.026	0.0013	0.004
Chromium, total	0.1	0.061	0.081	0.079	0.077	0.088	0.076	0.075	0.0076	0.024
Cobalt, total	0.25	0.097	0.103	0.101	0.099	0.103	0.109	0.109	0.0043	0.013
Copper, total	0.125	0.049	0.041	0.057	0.062	0.053	0.062	0.068	0.0085	0.027
Iron, total	0.5	0.363	0.41	0.361	0.35	0.431	0.434	0.383	0.0322	0.101
Lead, total	0.125	0.043	0.05	0.049	0.051	0.046	0.049	0.041	0.0035	0.011
Manganese, total	0.25	0.11	0.101	0.098	0.112	0.109	0.099	0.104	0.0052	0.016
Nickel, total	0.25	0.112	0.097	0.087	0.109	0.109	0.084	0.121	0.0127	0.040
Selenium, total	0.125	0.048	0.045	0.063	0.064	0.032	0.063	0.055	0.0111	0.035
Silver, total	0.125	0.051	0.05	0.053	0.049	0.049	0.046	0.053	0.0023	0.007
Thallium, total	0.125	0.05	0.045	0.04	0.044	0.037	0.055	0.055	0.0065	0.020
Tin, total	0.1	0.042	0.037	0.026	0.036	0.031	0.044	0.035	0.0057	0.018
Vanadium, total	0.25	0.063	0.076	0.097	0.088	0.099	0.149	0.131	0.0279	0.088
Zinc, total	0.25	0.208	0.204	0.154	0.166	0.194	0.245	0.194	0.0274	0.086

EnviroSystems, Inc.
Method Detection Limit Evaluation Results

Group: Inorganic Wet Chemistry
MDL Year: 2017
Lab Number: MDL2017
Sample Designation: Water
Date Analyzed: 01/11/17- 03/22/17
Matrix: Freshwater

Parameter	EPA Method Reference	Reference Value (mg/L)	Rep A mg/L	Rep B mg/L	Rep C mg/L	Rep D mg/L	Rep E mg/L	Rep F mg/L	Rep G mg/L	MDL mg/L
Alkalinity as CaCO3	EPA 310.2	2	2.22	1.74	1.78	2.18	2.06	1.63	1.58	0.77
Ammonia-N	SM 4500-NH3 G	0.1	0.0898	0.102	0.0951	0.092	0.0957	0.0972	0.0929	0.012
Ammonia-N, distilled	SM 4500-NH3 B	0.2	0.199	0.239	0.184	0.184	0.199	0.222	0.207	0.058
Chemical oxygen demand	SM4500 5220 C	25	31.7	30	33.5	28.3	25.1	31.4	28.3	8.1
Chloride	EPA 300.0	2	2.28	2.18	2.21	2.21	2.2	2.33	2.33	0.18
Fluoride	EPA 300.0	0.2	0.24	0.25	0.31	0.28	0.22	0.22	0.28	0.10
Hexavalent Chromium	SM 3500-Cr D	0.005	0.006	0.006	0.005	0.006	0.005	0.006	0.006	0.000
Nitrate	EPA 300.0	0.1	0.12	0.11	0.13	0.11	0.1	0.11	0.11	0.03
Nitrate plus nitrite-N	SM 4500-NO3 F	0.05	0.0472	0.0434	0.0439	0.0481	0.0444	0.0483	0.0511	0.008
Nitrite	EPA 300.0	0.1	0.14	0.12	0.13	0.13	0.12	0.1	0.15	0.047
Nitrite	SM 4500-NO3 F	0.05	0.0493	0.05	0.0491	0.0479	0.0498	0.0486	0.0535	0.005
Sulfate	EPA 300.0	0.8	0.81	0.97	0.68	0.71	0.68	0.9	0.77	0.33
Sulfide	SW 846 9034	0.04	0.038	0.039	0.038	0.029	0.027	0.025	0.027	0.018
Total Kjeldahl Nitrogen	SM 4500-N C	0.5	0.583	0.565	0.548	0.589	0.55	0.528	0.553	0.06
Total Solids	SM 2540B	20	20	20	18	24	18	22	22	6.5
Total cyanide	SM 4500-CN C	0.01	0.009	0.01	0.008	0.008	0.006	0.011	0.014	0.011
Total dissolved solids	SM 2540C	10	9	9	11	9	10	9	9	2.3
Total phosphorus	SM 4500-P E	0.01	0.01	0.012	0.012	0.007	0.007	0.005	0.007	0.008
Total suspended solids	SM 2540D	1	0.9	1	1	1.1	0.8	1.1	0.8	0.37
ortho-Phosphate Phosphorus	SM 4500-P E	0.005	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.001

PCB Congeners in Water
SW 846 8082/EPA 680 modified

Lab Number:	PB005W
Sample Designation:	Laboratory Blank
Date Sampled:	08/24/17 1500
Date Extracted:	08/24/17 1500
Date Analyzed:	09/06/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	0.50
Dilution Factor:	1

Congener Number	PCB Congener	Concentration (ug/L)	Qualifier
8	2,4'-dichlorobiphenyl	0.001	U
18	2,2',5-trichlorobiphenyl	0.001	U
28	2,4,4'-trichlorobiphenyl	0.001	U
44	2,2',3,5'-tetrachlorobiphenyl	0.001	U
49	2,2',4,5'-tetrachlorobiphenyl	0.001	U
52	2,2',5,5'-tetrachlorobiphenyl	0.001	U
66	2,3',4,4'-tetrachlorobiphenyl	0.001	U
77	3,3',4,4'-tetrachlorobiphenyl	0.001	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.001	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.001	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.001	U
118	2,3',4,4',5-pentachlorobiphenyl	0.001	U
126	3,3',4,4',5-pentachlorobiphenyl	0.001	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.001	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.001	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.001	U
156	2,3,3',4,4',5-hexachlorobiphenyl		
169	3,3',4,4',5,5'-hexachlorobiphenyl		
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.001	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.001	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.001	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.001	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.001	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.001	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.001	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.001	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
PCB 198	109	30 - 150

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PCB Congeners in Water
SW 846 8082/EPA 680 modified

Lab Number:	LCS005W / LCSD005W
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	08/24/17 1500
Date Extracted:	08/24/17 1500
Date Analyzed:	09/06/17
Matrix:	Water
Sample Amount (g):	1000
Final Volume (mL)	0.50
Dilution Factor:	1

Congener Number	PCB Congener	True Value (ug/L)	LCS Result (ug/L)	Recovery (%)	Recovery Limit (%)	LCSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
8	2,4'-dichlorobiphenyl	0.100	0.085	85	30 - 150	0.079	79	30 - 150	8	30
18	2,2',5-trichlorobiphenyl	0.100	0.080	80	30 - 150	0.076	76	30 - 150	4	30
28	2,4,4'-trichlorobiphenyl	0.100	0.085	85	30 - 150	0.079	79	30 - 150	8	30
44	2,2',3,5'-tetrachlorobiphenyl	0.100	0.087	87	30 - 150	0.086	86	30 - 150	1	30
49	2,2',4,5'-tetrachlorobiphenyl	0.100	0.070	70	30 - 150	0.067	67	30 - 150	4	30
52	2,2',5,5'-tetrachlorobiphenyl	0.100	0.084	84	30 - 150	0.084	84	30 - 150	1	30
66	2,3',4,4'-tetrachlorobiphenyl	0.100	0.087	87	30 - 150	0.082	82	30 - 150	6	30
77	3,3',4,4'-tetrachlorobiphenyl	0.100	0.089	89	30 - 150	0.084	84	30 - 150	6	30
87	2,2',3,4,5'-pentachlorobiphenyl	0.100	0.074	74	30 - 150	0.074	74	30 - 150	0	30
101	2,2',4,5,5'-pentachlorobiphenyl	0.100	0.086	86	30 - 150	0.084	84	30 - 150	1	30
105	2,3,3',4,4'-pentachlorobiphenyl	0.100	0.085	85	30 - 150	0.083	83	30 - 150	3	30
118	2,3',4,4',5-pentachlorobiphenyl	0.100	0.083	83	30 - 150	0.081	81	30 - 150	2	30
126	3,3',4,4',5-pentachlorobiphenyl	0.100	0.085	85	30 - 150	0.089	89	30 - 150	5	30
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.100	0.081	81	30 - 150	0.085	85	30 - 150	6	30
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.100	0.079	79	30 - 150	0.083	83	30 - 150	5	30
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.100	0.081	81	30 - 150	0.080	80	30 - 150	1	30
156	2,3,3',4,4',5-hexachlorobiphenyl				30 - 150			30 - 150		30
169	3,3',4,4',5,5'-hexachlorobiphenyl				30 - 150			30 - 150		30
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.100	0.077	77	30 - 150	0.083	83	30 - 150	8	30
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.100	0.074	74	30 - 150	0.080	80	30 - 150	7	30
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.100	0.066	66	30 - 150	0.069	69	30 - 150	5	30
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.100	0.068	68	30 - 150	0.069	69	30 - 150	1	30
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.100	0.077	77	30 - 150	0.082	82	30 - 150	7	30
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.100	0.070	70	30 - 150	0.077	77	30 - 150	9	30
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.100	0.066	66	30 - 150	0.078	78	30 - 150	17	30
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.100	0.067	67	30 - 150	0.071	71	30 - 150	7	30

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
198 2,2',3,3',4,5,5',6-octachlorobiphenyl	104	30 - 150	108	30 - 150

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PCB Congeners in Water
SW 846 8082/EPA 680 modified

Lab Number:	29522-100MSD
Sample Designation:	Composite 3 Elutriate - Rep 1 (Matrix Spike Duplicate)
Date Sampled:	08/24/17 1500
Date Extracted:	08/24/17 1500
Date Analyzed:	09/06/17
Matrix:	Water
Sample Amount (mL):	940
Final Volume (mL)	0.50
Dilution Factor:	1.00

Congener Number	PCB Congener	Sample Result (ug/L)	Amount Added (ug/L)	MS Result (ug/L)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
8	2,4'-dichlorobiphenyl	ND	0.105	0.090	85	30 - 150	0.088	83	30 - 150	2	30
18	2,2',5-trichlorobiphenyl	ND	0.105	0.085	81	30 - 150	0.087	81	30 - 150	1	30
28	2,4,4'-trichlorobiphenyl	ND	0.105	0.088	83	30 - 150	0.094	88	30 - 150	7	30
44	2,2',3,5'-tetrachlorobiphenyl	ND	0.105	0.091	87	30 - 150	0.100	94	30 - 150	9	30
49	2,2',4,5'-tetrachlorobiphenyl	ND	0.105	0.074	70	30 - 150	0.079	74	30 - 150	7	30
52	2,2',5,5'-tetrachlorobiphenyl	ND	0.105	0.088	83	30 - 150	0.093	87	30 - 150	6	30
66	2,3',4,4'-tetrachlorobiphenyl	ND	0.105	0.091	86	30 - 150	0.092	87	30 - 150	2	30
77	3,3',4,4'-tetrachlorobiphenyl	ND	0.105	0.091	86	30 - 150	0.100	94	30 - 150	10	30
87	2,2',3,4,5'-pentachlorobiphenyl	ND	0.105	0.081	77	30 - 150	0.086	81	30 - 150	6	30
101	2,2',4,5,5'-pentachlorobiphenyl	ND	0.105	0.090	86	30 - 150	0.092	87	30 - 150	2	30
105	2,3,3',4,4'-pentachlorobiphenyl	ND	0.105	0.090	85	30 - 150	0.090	85	30 - 150	0	30
118	2,3',4,4',5-pentachlorobiphenyl	ND	0.105	0.088	84	30 - 150	0.092	86	30 - 150	4	30
126	3,3',4,4',5-pentachlorobiphenyl	ND	0.105	0.101	96	30 - 150	0.100	95	30 - 150	0	30
128	2,2',3,3',4,4'-hexachlorobiphenyl	ND	0.105	0.096	91	30 - 150	0.094	89	30 - 150	2	30
138	2,2',3,4,4',5'-hexachlorobiphenyl	ND	0.105	0.093	88	30 - 150	0.093	87	30 - 150	0	30
153	2,2',4,4',5,5'-hexachlorobiphenyl	ND	0.105	0.088	84	30 - 150	0.086	81	30 - 150	2	30
156	2,3,3',4,4',5-hexachlorobiphenyl										
169	3,3',4,4',5,5'-hexachlorobiphenyl										
170	2,2',3,3',4,4',5-heptachlorobiphenyl	ND	0.105	0.093	89	30 - 150	0.089	84	30 - 150	4	30
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	ND	0.105	0.089	85	30 - 150	0.087	82	30 - 150	3	30
183	2,2',3,4,4',5',6-heptachlorobiphenyl	ND	0.105	0.078	74	30 - 150	0.077	72	30 - 150	1	30
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	ND	0.105	0.075	71	30 - 150	0.074	69	30 - 150	2	30
187	2,2',3,4',5,5',6-heptachlorobiphenyl	ND	0.105	0.094	89	30 - 150	0.091	86	30 - 150	3	30
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	ND	0.105	0.088	84	30 - 150	0.082	77	30 - 150	8	30
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	ND	0.105	0.085	81	30 - 150	0.084	79	30 - 150	1	30
209	2,2',3,3',4,4',5,5',6,6'-decachlorobipheny	ND	0.105	0.084	80	30 - 150	0.078	73	30 - 150	8	30

Surrogate Standard	MS Recovery (%)	Advisory Limits (%)	MSD Recovery (%)	Advisory Limits (%)
PCB 198	119	30 - 150	94	30 - 150

ESI

PCB Congeners in Water
SW 846 8082/EPA 680 modified

Lab Number:	PB006W
Sample Designation:	Laboratory Blank
Date Sampled:	08/25/17 1200
Date Extracted:	08/25/17 1200
Date Analyzed:	09/06/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	0.50
Dilution Factor:	1

Congener Number	PCB Congener	Concentration (ug/L)	Qualifier
8	2,4'-dichlorobiphenyl	0.001	U
18	2,2',5-trichlorobiphenyl	0.001	U
28	2,4,4'-trichlorobiphenyl	0.001	U
44	2,2',3,5'-tetrachlorobiphenyl	0.001	U
49	2,2',4,5'-tetrachlorobiphenyl	0.001	U
52	2,2',5,5'-tetrachlorobiphenyl	0.001	U
66	2,3',4,4'-tetrachlorobiphenyl	0.001	U
77	3,3',4,4'-tetrachlorobiphenyl	0.001	U
87	2,2',3,4,5'-pentachlorobiphenyl	0.001	U
101	2,2',4,5,5'-pentachlorobiphenyl	0.001	U
105	2,3,3',4,4'-pentachlorobiphenyl	0.001	U
118	2,3',4,4',5-pentachlorobiphenyl	0.001	U
126	3,3',4,4',5-pentachlorobiphenyl	0.001	U
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.001	U
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.001	U
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.001	U
156	2,3,3',4,4',5-hexachlorobiphenyl		
169	3,3',4,4',5,5'-hexachlorobiphenyl		
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.001	U
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.001	U
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.001	U
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.001	U
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.001	U
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.001	U
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.001	U
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.001	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
PCB 198	111	30 - 150

ESI

PCB Congeners in Water
SW 846 8082/EPA 680 modified

Lab Number:	LCS006W / LCSD006W
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	08/25/17 1200
Date Extracted:	08/25/17 1200
Date Analyzed:	09/06/17
Matrix:	Water
Sample Amount (g):	1000
Final Volume (mL)	0.50
Dilution Factor:	1

Congener Number	PCB Congener	True Value (ug/L)	LCS Result (ug/L)	Recovery (%)	Recovery Limit (%)	LCSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
8	2,4'-dichlorobiphenyl	0.100	0.080	80	30 - 150	0.071	71	30 - 150	12	30
18	2,2',5-trichlorobiphenyl	0.100	0.079	79	30 - 150	0.070	70	30 - 150	12	30
28	2,4,4'-trichlorobiphenyl	0.100	0.082	82	30 - 150	0.071	71	30 - 150	14	30
44	2,2',3,5'-tetrachlorobiphenyl	0.100	0.086	86	30 - 150	0.075	75	30 - 150	14	30
49	2,2',4,5'-tetrachlorobiphenyl	0.100	0.070	70	30 - 150	0.059	59	30 - 150	16	30
52	2,2',5,5'-tetrachlorobiphenyl	0.100	0.085	85	30 - 150	0.072	72	30 - 150	17	30
66	2,3',4,4'-tetrachlorobiphenyl	0.100	0.084	84	30 - 150	0.069	69	30 - 150	19	30
77	3,3',4,4'-tetrachlorobiphenyl	0.100	0.085	85	30 - 150	0.068	68	30 - 150	22	30
87	2,2',3,4,5'-pentachlorobiphenyl	0.100	0.073	73	30 - 150	0.061	61	30 - 150	17	30
101	2,2',4,5,5'-pentachlorobiphenyl	0.100	0.086	86	30 - 150	0.071	71	30 - 150	19	30
105	2,3,3',4,4'-pentachlorobiphenyl	0.100	0.082	82	30 - 150	0.068	68	30 - 150	19	30
118	2,3',4,4',5-pentachlorobiphenyl	0.100	0.082	82	30 - 150	0.067	67	30 - 150	20	30
126	3,3',4,4',5-pentachlorobiphenyl	0.100	0.093	93	30 - 150	0.082	82	30 - 150	14	30
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.100	0.087	87	30 - 150	0.078	78	30 - 150	10	30
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.100	0.086	86	30 - 150	0.075	75	30 - 150	13	30
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.100	0.080	80	30 - 150	0.067	67	30 - 150	17	30
156	2,3,3',4,4',5-hexachlorobiphenyl				30 - 150			30 - 150		30
169	3,3',4,4',5,5'-hexachlorobiphenyl				30 - 150			30 - 150		30
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.100	0.088	88	30 - 150	0.082	82	30 - 150	7	30
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.100	0.081	81	30 - 150	0.074	74	30 - 150	9	30
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.100	0.075	74	30 - 150	0.066	66	30 - 150	13	30
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	0.100	0.068	68	30 - 150	0.058	58	30 - 150	16	30
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.100	0.089	89	30 - 150	0.077	77	30 - 150	14	30
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.100	0.082	82	30 - 150	0.077	77	30 - 150	6	30
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.100	0.081	80	30 - 150	0.074	74	30 - 150	8	30
209	2,2',3,3',4,4',5,5',6,6'-decachlorobiphenyl	0.100	0.080	80	30 - 150	0.074	74	30 - 150	8	30

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
198 2,2',3,3',4,5,5',6-octachlorobiphenyl	117	30 - 150	111	30 - 150

ESI

PCB Congeners in Water
SW 846 8082/EPA 680 modified

Lab Number:	29522-244MSD
Sample Designation:	Composite 7 Elutriate - Rep 1 (Matrix Spike Duplicate)
Date Sampled:	08/25/17 1200
Date Extracted:	08/25/17 1200
Date Analyzed:	09/07/17
Matrix:	Water
Sample Amount (mL):	940
Final Volume (mL)	0.50
Dilution Factor:	1.00

Congener Number	PCB Congener	Sample Result (ug/L)	Amount Added (ug/L)	MS Result (ug/L)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
8	2,4'-dichlorobiphenyl	0.014	0.106	0.083	65	30 - 150	0.081	63	30 - 150	3	30
18	2,2',5-trichlorobiphenyl	0.006	0.106	0.096	85	30 - 150	0.092	81	30 - 150	4	30
28	2,4,4'-trichlorobiphenyl	0.024	0.106	0.106	76	30 - 150	0.110	85	30 - 150	8	30
44	2,2',3,5'-tetrachlorobiphenyl	0.022	0.106	0.113	86	30 - 150	0.110	86	30 - 150	0	30
49	2,2',4,5'-tetrachlorobiphenyl	0.022	0.106	0.099	72	30 - 150	0.092	66	30 - 150	6	30
52	2,2',5,5'-tetrachlorobiphenyl	0.041	0.106	0.147	100	30 - 150	0.150	99	30 - 150	1	30
66	2,3',4,4'-tetrachlorobiphenyl	0.022	0.106	0.115	87	30 - 150	0.097	71	30 - 150	16	30
77	3,3',4,4'-tetrachlorobiphenyl	ND	0.106	0.092	86	30 - 150	0.076	72	30 - 150	18	30
87	2,2',3,4,5'-pentachlorobiphenyl	0.010	0.106	0.081	67	30 - 150	0.079	65	30 - 150	2	30
101	2,2',4,5,5'-pentachlorobiphenyl	0.028	0.106	0.116	83	30 - 150	0.110	79	30 - 150	4	30
105	2,3,3',4,4'-pentachlorobiphenyl	0.006	0.106	0.087	76	30 - 150	0.080	69	30 - 150	9	30
118	2,3',4,4',5-pentachlorobiphenyl	0.020	0.106	0.102	78	30 - 150	0.100	77	30 - 150	1	30
126	3,3',4,4',5-pentachlorobiphenyl	ND	0.106	0.075	71	30 - 150	0.084	79	30 - 150	11	30
128	2,2',3,3',4,4'-hexachlorobiphenyl	0.002	0.106	0.086	79	30 - 150	0.088	81	30 - 150	2	30
138	2,2',3,4,4',5'-hexachlorobiphenyl	0.020	0.106	0.106	80	30 - 150	0.120	89	30 - 150	9	30
153	2,2',4,4',5,5'-hexachlorobiphenyl	0.020	0.106	0.104	79	30 - 150	0.097	73	30 - 150	7	30
156	2,3,3',4,4',5-hexachlorobiphenyl										
169	3,3',4,4',5,5'-hexachlorobiphenyl										
170	2,2',3,3',4,4',5-heptachlorobiphenyl	0.006	0.106	0.090	79	30 - 150	0.098	86	30 - 150	9	30
180	2,2',3,4,4',5,5'-heptachlorobiphenyl	0.011	0.106	0.100	84	30 - 150	0.100	85	30 - 150	2	30
183	2,2',3,4,4',5',6-heptachlorobiphenyl	0.004	0.106	0.072	64	30 - 150	0.075	67	30 - 150	4	30
184	2,2',3,4,4',6,6'-heptachlorobiphenyl	ND	0.106	0.064	60	30 - 150	0.059	56	30 - 150	7	30
187	2,2',3,4',5,5',6-heptachlorobiphenyl	0.007	0.106	0.087	75	30 - 150	0.093	81	30 - 150	7	30
195	2,2',3,3',4,4',5,6-octachlorobiphenyl	0.001	0.106	0.073	68	30 - 150	0.072	67	30 - 150	1	30
206	2,2',3,3',4,4',5,5',6-nonachlorobiphenyl	0.002	0.106	0.063	58	30 - 150	0.062	56	30 - 150	2	30
209	2,2',3,3',4,4',5,5',6,6'-decachlorobipheny	0.001	0.106	0.058	54	30 - 150	0.055	52	30 - 150	4	30

Surrogate Standard	MS Recovery (%)	Advisory Limits (%)	MSD Recovery (%)	Advisory Limits (%)
PCB 198	100	30 - 150	94	30 - 150

ESI

PCB Congeners in Sediment
SW 846 8082/EPA 680 modified

Lab Number:	Method Detection Limit Study 2017W
Sample Designation:	Water MDL Study
Date Sampled:	03/17/2017
Date Extracted:	03/17/2017
Date Analyzed:	04/10/2017
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	1
Dilution Factor:	1

Congener Number	PCB Congener	Reference Value (ug/L)	Replicate 1 (ug/L)	Replicate 2 (ug/L)	Replicate 3 (ug/L)	Replicate 4 (ug/L)	Replicate 5 (ug/L)	Replicate 6 (ug/L)	Replicate 7 (ug/L)	MDL (ug/L)
8	2,4'-Dichlorobiphenyl	0.0008	0.0047	0.0048	0.0049	0.0048	0.0053	0.0052	0.0053	0.0008
18	2,2',5-Trichlorobiphenyl	0.0008	0.0050	0.0044	0.0045	0.0045	0.0049	0.0051	0.0047	0.0008
28	2,4,4'-Trichlorobiphenyl	0.0008	0.0055	0.0058	0.0061	0.0059	0.0063	0.0061	0.0063	0.0009
52	2,2',5,5'-Tetrachlorobiphenyl	0.0008	0.0057	0.0061	0.0060	0.0058	0.0063	0.0065	0.0065	0.0010
49	2,2',4,5'-Tetrachlorobiphenyl	0.0008	0.0057	0.0059	0.0051	0.0055	0.0063	0.0058	0.0060	0.0012
44	2,2',3,5'-Tetrachlorobiphenyl	0.0008	0.0058	0.0060	0.0058	0.0055	0.0063	0.0061	0.0060	0.0007
66	2,3',4,4'-Tetrachlorobiphenyl	0.0008	0.0067	0.0067	0.0061	0.0065	0.0069	0.0065	0.0068	0.0008
101	2,2',4,5,5'-Pentachlorobiphenyl	0.0008	0.0070	0.0073	0.0065	0.0065	0.0071	0.0064	0.0073	0.0011
87	2,2',3,4,5'-Pentachlorobiphenyl	0.0008	0.0074	0.0068	0.0065	0.0068	0.0071	0.0068	0.0074	0.0010
77	3,3',4,4'-Tetrachlorobiphenyl	0.0008	0.0070	0.0064	0.0069	0.0068	0.0071	0.0071	0.0067	0.0007
118	2,3',4,4',5-Pentachlorobiphenyl	0.0008	0.0068	0.0065	0.0067	0.0069	0.0070	0.0070	0.0069	0.0005
184	2,2',3,4,4',6,6'-Heptachlorobiphenyl	0.0008	0.0070	0.0064	0.0064	0.0068	0.0068	0.0069	0.0069	0.0007
153	2,2',4,4',5,5'-Hexachlorobiphenyl	0.0008	0.0072	0.0070	0.0076	0.0071	0.0071	0.0069	0.0065	0.0010
105	2,3,3',4,4'-Pentachlorobiphenyl	0.0008	0.0070	0.0065	0.0068	0.0070	0.0072	0.0071	0.0069	0.0007
138	2,2',3,4,4',5'-Hexachlorobiphenyl	0.0008	0.0073	0.0075	0.0073	0.0077	0.0076	0.0070	0.0074	0.0006
126	3,3',4,4',5-Pentachlorobiphenyl	0.0008	0.0067	0.0070	0.0077	0.0064	0.0069	0.0068	0.0070	0.0012
187	2,2',3,4',5,5',6-Heptachlorobiphenyl	0.0008	0.0072	0.0066	0.0067	0.0069	0.0068	0.0068	0.0066	0.0006
183	2,2',3,4,4',5',6-Heptachlorobiphenyl	0.0008	0.0071	0.0068	0.0071	0.0076	0.0072	0.0072	0.0072	0.0007
128	2,2',3,3',4,4'-Hexachlorobiphenyl	0.0008	0.0066	0.0073	0.0072	0.0070	0.0072	0.0068	0.0068	0.0008
156	2,3,3',4,4',5-Hexachlorobiphenyl									
180	2,2',3,4,4',5,5'-Heptachlorobiphenyl	0.0008	0.0064	0.0073	0.0076	0.0073	0.0070	0.0073	0.0068	0.0012
169	3,3',4,4',5,5'-Hexachlorobiphenyl									
170	2,2',3,3',4,4',5-Heptachlorobiphenyl	0.0008	0.0077	0.0076	0.0079	0.0085	0.0078	0.0076	0.0077	0.0009
195	2,2',3,3',4,4',5,6-Octachlorobiphenyl	0.0008	0.0055	0.0055	0.0054	0.0060	0.0053	0.0052	0.0048	0.0011
206	2,2',3,3',4,4',5,5',6-Nonachlorobipheny	0.0008	0.0079	0.0077	0.0080	0.0076	0.0082	0.0084	0.0082	0.0009
209	Decachlorobiphenyl	0.0008	0.0059	0.0064	0.0066	0.0067	0.0064	0.0062	0.0062	0.0008

Lab Number:	PB007W
Sample Designation:	Laboratory Blank
Date Sampled:	08/28/17 0800
Date Extracted:	08/28/17 0800
Date Analyzed:	08/30/17
Matrix:	Water
Sample Amount (mL):	1000.00
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	Concentration (ug/L)	Qualifier
pentachlorophenol	1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	72	30 - 150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

Lab Number:	LCS007W / LCSD007W
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	08/28/17 0800
Date Extracted:	08/28/17 0800
Date Analyzed:	08/29/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	True Value (ug/L)	LCS Result (ug/L)	Recovery (%)	Recovery Limit (%)	LCSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
pentachlorophenol	10.0	7.9	79	30 - 150	7.4	74	30 - 150	7	30

Surrogate Standards	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	83	30 - 150	68	30 - 150

Lab Number:	SRM007W
Sample Designation:	Standard Reference Material
Date Sampled:	08/28/17 0800
Date Extracted:	08/28/17 0800
Date Analyzed:	08/30/17
Matrix:	Water
Sample Amount (mL):	1000.00
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	Concentration (ug/L)	True Value (ug/L)	Recovery (%)	Limit (%)
pentachlorophenol	7.1	9.9	72	30 - 150

Surrogate Standard	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	87	30 - 150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

Lab Number:	29522-097MSD
Sample Designation:	Composite 3 Elutriate - Rep 1 (Matrix Spike Duplicate)
Date Sampled:	08/28/17 0800
Date Extracted:	08/28/17 0800
Date Analyzed:	08/31/17
Matrix:	Water
Sample Amount (mL):	940
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	Sample Result (ug/L)	Amount Added (ug/L)	MS Result (ug/L)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
pentachlorophenol	U	10	8.3	83	30 - 150	10.5	105	30 - 150	23	30

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	100	30 - 150	110	30 - 150

ESI

Lab Number:	PB008W
Sample Designation:	Laboratory Blank
Date Sampled:	08/29/17 1200
Date Extracted:	08/29/17 1200
Date Analyzed:	08/31/17
Matrix:	Water
Sample Amount (mL):	1000.00
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	Concentration (ug/L)	Qualifier
pentachlorophenol	1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	95	30 - 150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

Lab Number:	LCS008W / LCSD008W
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	08/29/17 1200
Date Extracted:	08/29/17 1200
Date Analyzed:	08/31/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	True Value (ug/L)	LCS Result (ug/L)	Recovery (%)	Recovery Limit (%)	LCSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
pentachlorophenol	10.0	7.4	74	30 - 150	8.0	80	30 - 150	7	30

Surrogate Standards	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	64	30 - 150	69	30 - 150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

Lab Number:	SRM008W
Sample Designation:	Standard Reference Material
Date Sampled:	08/29/17 1200
Date Extracted:	08/29/17 1200
Date Analyzed:	08/31/17
Matrix:	Water
Sample Amount (mL):	1000.00
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	Concentration (ug/L)	True Value (ug/L)	Recovery (%)	Limit (%)
pentachlorophenol	6.3	9.9	64	30 - 150

Surrogate Standard	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	74	30 - 150

Lab Number:	29522-241MSD
Sample Designation:	Composite 7 Elutriate - Rep 1 (Matrix Spike Duplicate)
Date Sampled:	08/29/17 1200
Date Extracted:	08/29/17 1200
Date Analyzed:	08/31/17
Matrix:	Water
Sample Amount (mL):	940
Final Volume (mL)	0.50
Dilution Factor:	1

Compound	Sample Result (ug/L)	Amount Added (ug/L)	MS Result (ug/L)	Recovery (%)	Recovery Limit (%)	MSD Result (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference (%)	RPD Limit (%)
pentachlorophenol	U	10.6	6.7	63	30 - 150	6.4	64	30 - 150	5	30

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
2,4,6-tribromophenol	85	30 - 150	75	30 - 150

Semivolatile Organics in Water
SW 846 8270/EPA 680 modified

Sample Designation:	MDLW989W
Date Sampled:	06/20/2017
Date Prepared:	06/20/2017
Date Analyzed:	07/31/2017
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	1.00
Dilution Factor:	1

Compound	Reference Value (ug/L)	Replicate 1 (ug/L)	Replicate 2 (ug/L)	Replicate 3 (ug/L)	Replicate 4 (ug/L)	Replicate 5 (ug/L)	Replicate 6 (ug/L)	Replicate 7 (ug/L)	Calcd MDL (ug/L)
pentachlorophenol	2.5	2.13	2.19	2.2	2.14	2.11	2.28	2.09	0.19

Pesticides in Water
SW 846 8081B

Lab Number:	PB003W
Sample Designation:	Laboratory Blank
Date Sampled:	08/23/17 0930
Date Extracted:	08/23/17 0930
Date Analyzed:	08/29/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	1
Dilution Factor:	1

Analyte	Concentration (ug/L)	Qualifier
aldrin	0.002	U
gamma-chlordane (cis)	0.002	U
alpha-chlordane (trans)	0.002	U
chlorpyrifos	0.002	U
dieldrin	0.004	U
4,4'-DDT	0.004	U
endosulfan I	0.002	U
endosulfan II	0.004	U
endrin	0.004	U
heptachlor	0.002	U
heptachlor epoxide	0.002	U
gamma-BHC (lindane)	0.002	U
toxaphene	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	85	30 - 150
decachlorobiphenyl	87	30 - 150

U = Not detected at indicated level.

Pesticides in Water
SW 846 8081B

Lab Number:	LCS003W
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	08/23/17 0930
Date Extracted:	08/23/17 0930
Date Analyzed:	08/29/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	1
Dilution Factor:	

Analyte	True Value (ug/L)	LCS Concentration (ug/L)	Recovery (%)	Recovery Limit (%)	LCSD Concentration (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference	RPD Limit
aldrin	0.01	0.006	60	30-150	0.006	57	30-150	5	30
gamma-chlordane (cis)	0.01	0.008	75	30-150	0.008	69	30-150	9	30
alpha-chlordane (trans)	0.01	0.006	60	30-150	0.006	59	30-150	2	30
chlorpyrifos	0.01	0.007	74	30-150	0.008	80	30-150	8	30
dieldrin	0.02	0.013	63	30-150	0.012	61	30-150	3	30
4,4'-DDT	0.02	0.013	65	30-150	0.013	66	30-150	1	30
endosulfan I	0.01	0.006	58	30-150	0.006	60	30-150	2	30
endosulfan II	0.02	0.013	65	30-150	0.012	62	30-150	5	30
endrin	0.02	0.012	62	30-150	0.013	66	30-150	7	30
heptachlor	0.01	0.005	47	30-150	0.004	43	30-150	8	30
heptachlor epoxide	0.01	0.008	80	30-150	0.007	74	30-150	7	30
gamma-BHC (lindane)	0.01	0.009	91	30-150	0.010	103	30-150	12	30
toxaphene	NA	NA	NA	30-150	NA	NA	30-150	NA	30

Surrogate Standard	Recovery (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	101	98	30 - 150
decachlorobiphenyl	113	111	30 - 150

U = Not detected at indicated level.
NC = Not calculated due to one or both values less than five times quantitation limit.

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Pesticides in Water
SW 846 8081B

Lab Number:	SRM003W
Sample Designation:	Standard Reference Material
Date Sampled:	08/23/17 0930
Date Extracted:	08/23/17 0930
Date Analyzed:	08/30/17
Matrix:	Water
Inital Volume (mL)	1000
Final Volume (mL)	1
Dilution Factor:	1

Anayte	Concentration (ug/L)	True Value (ug/L)	Recovery (%)	Limit (%)
aldrin	0.029	0.037	79	30-150
gamma-chlordane	0.043	0.042	101	30-150
alpha-chlordane	0.016	0.018	89	30-150
cis-nonachlor	NA	NA	NA	30-150
trans-nonachlor	NA	NA	NA	30-150
oxychlordane	NA	NA	NA	30-150
4,4'-DDT	0.015	0.016	93	30-150
4,4'-DDE	0.029	0.036	80	30-150
4,4'-DDD	NA	NA	NA	30-150
alpha-BHC	0.031	0.033	95	30-150
dieldrin	0.046	0.053	87	30-150
endosulfan I	NA	NA	NA	30-150
endosulfan II	NA	NA	NA	30-150
endrin	0.011	0.014	80	30-150
heptachlor	0.025	0.034	73	30-150
heptachlor epoxide	0.027	0.023	117	30-150
hexachlorobenzene	NA	NA	NA	30-150
gamma-BHC (Lindane)	0.065	0.068	96	30-150
methoxychlor	0.04	0.039	103	30-150
toxaphene	NA	NA	NA	30-150

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	75	30 - 150
decachlorobiphenyl	119	30 - 150

NA = No reference value available

Pesticides in Water
SW 846 8081B

Lab Number:	29522-106
Sample Designation:	Composite 3 Elutriate - Rep 1 (Matrix Spike Duplicate)
Date Sampled:	08/23/17 0930
Date Extracted:	08/23/17 0930
Date Analyzed:	08/30/17
Matrix:	Water
Sample Amount (mL):	940.00
Final Volume (mL)	1
Dilution Factor:	1

Analyte	Added (ug/L)	Sample Concentration (ug/L)	MS Concentration (ug/L)	MS Recovery (%)	Limit (%)	MSD Concentration (ug/L)	MSD Recovery (%)	Limit (%)	Relatve Diff (%)	Limit (%)
aldrin	0.01	U	0.006	59	30-150	0.007	59	30-150	10	30
gamma-chlordane (cis)	0.01	U	0.006	64	30-150	0.007	65	30-150	10	30
alpha-chlordane (trans)	0.01	U	0.007	72	30-150	0.009	83	30-150	23	30
chlorpyrifos	0.01	0.003	0.013	96	30-150	0.010	64	30-150	22	30
dieldrin	0.02	U	0.021	103	30-150	0.018	83	30-150	12	30
4,4'-DDT	0.02	U	0.013	65	30-150	0.015	67	30-150	13	30
endosulfan I	0.01	U	0.008	76	30-150	0.008	73	30-150	6	30
endosulfan II	0.02	U	0.014	68	30-150	0.015	70	30-150	13	30
endrin	0.02	U	0.020	100	30-150	0.018	81	30-150	12	30
heptachlor	0.01	U	0.005	49	30-150	0.005	49	30-150	9	30
heptachlor epoxide	0.01	U	0.009	91	30-150	0.009	83	30-150	1	30
gamma-BHC (lindane)	0.01	U	0.006	57	30-150	0.006	59	30-150	12	30
toxaphene	NA	U	U	NA	30-150	U	NA	30-150	NA	30

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	128	30 - 150	92	30 - 150
decachlorobiphenyl	122	30 - 150	126	30 - 150

U = Not detected at indicated level.
NA = Not added or evaluated.

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Pesticides in Water
SW 846 8081B

Lab Number:	PB004W
Sample Designation:	Laboratory Blank
Date Sampled:	08/24/17 0830
Date Extracted:	08/24/17 0830
Date Analyzed:	08/29/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	1
Dilution Factor:	1

Analyte	Concentration (ug/L)	Qualifier
aldrin	0.002	U
gamma-chlordane (cis)	0.002	U
alpha-chlordane (trans)	0.002	U
chlorpyrifos	0.002	U
dieldrin	0.004	U
4,4'-DDT	0.004	U
endosulfan I	0.002	U
endosulfan II	0.004	U
endrin	0.004	U
heptachlor	0.002	U
heptachlor epoxide	0.002	U
gamma-BHC (lindane)	0.002	U
toxaphene	0.1	U

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	85	30 - 150
decachlorobiphenyl	87	30 - 150

U = Not detected at indicated level.

Pesticides in Water
SW 846 8081B

Lab Number:	LCS004W
Sample Designation:	Laboratory Control Sample Duplicate
Date Sampled:	08/24/17 0830
Date Extracted:	08/24/17 0830
Date Analyzed:	08/30/17
Matrix:	Water
Sample Amount (mL):	1000
Final Volume (mL)	1
Dilution Factor:	

Analyte	True Value (ug/L)	LCS Concentration (ug/L)	Recovery (%)	Recovery Limit (%)	LCSD Concentration (ug/L)	Recovery (%)	Recovery Limit (%)	Relative Difference	RPD Limit
aldrin	0.01	0.008	78	30-150	0.009	88	30-150	11	30
gamma-chlordane (cis)	0.01	0.007	70	30-150	0.007	88	30-150	24	30
alpha-chlordane (trans)	0.01	0.010	102	30-150	0.010	89	30-150	13	30
chlorpyrifos	0.01	0.012	115	30-150	0.009	93	30-150	21	30
dieldrin	0.02	0.019	93	30-150	0.021	105	30-150	12	30
4,4'-DDT	0.02	0.016	80	30-150	0.014	72	30-150	11	30
endosulfan I	0.01	0.008	78	30-150	0.007	69	30-150	13	30
endosulfan II	0.02	0.015	76	30-150	0.019	93	30-150	20	30
endrin	0.02	0.017	85	30-150	0.013	66	30-150	25	30
heptachlor	0.01	0.007	72	30-150	0.007	74	30-150	2	30
heptachlor epoxide	0.01	0.012	119	30-150	0.009	90	30-150	28	30
gamma-BHC (lindane)	0.01	0.006	60	30-150	0.007	70	30-150	16	30
toxaphene	NA	NA	NA	30-150	NA	NA	30-150	NA	30

Surrogate Standard	Recovery (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	91	98	30 - 150
decachlorobiphenyl	97	111	30 - 150

U = Not detected at indicated level.
NC = Not calculated due to one or both values less than five times quantitation limit.

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Pesticides in Water
SW 846 8081B

Lab Number:	SRM004W
Sample Designation:	Standard Reference Material
Date Sampled:	08/24/17 0830
Date Extracted:	08/24/17 0830
Date Analyzed:	08/30/17
Matrix:	Water
Inital Volume (mL)	1000
Final Volume (mL)	1
Dilution Factor:	1

Anayte	Concentration (ug/L)	True Value (ug/L)	Recovery (%)	Limit (%)
aldrin	0.039	0.037	106	30-150
gamma-chlordane	0.051	0.042	121	30-150
alpha-chlordane	0.016	0.018	89	30-150
cis-nonachlor	NA	NA	NA	30-150
trans-nonachlor	NA	NA	NA	30-150
oxychlordane	NA	NA	NA	30-150
4,4'-DDT	0.016	0.016	102	30-150
4,4'-DDE	0.035	0.036	97	30-150
4,4'-DDD	NA	NA	NA	30-150
alpha-BHC	0.034	0.033	106	30-150
dieldrin	0.051	0.053	97	30-150
endosulfan I	NA	NA	NA	30-150
endosulfan II	NA	NA	NA	30-150
endrin	0.011	0.014	78	30-150
heptachlor	0.032	0.034	93	30-150
heptachlor epoxide	0.032	0.023	137	30-150
hexachlorobenzene	NA	NA	NA	30-150
gamma-BHC (Lindane)	0.075	0.068	111	30-150
methoxychlor	0.039	0.039	99	30-150
toxaphene	NA	NA	NA	30-150

Surrogate Standard	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	95	30 - 150
decachlorobiphenyl	108	30 - 150

NA = No reference value available

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Pesticides in Water
SW 846 8081B

Lab Number:	29522-250
Sample Designation:	Composite 7 Elutriate - Rep 1 (Matrix Spike Duplicate)
Date Sampled:	08/24/17 0830
Date Extracted:	08/24/17 0830
Date Analyzed:	08/30/17
Matrix:	Water
Sample Amount (mL):	940.00
Final Volume (mL)	1
Dilution Factor:	1

Analyte	Added (ug/L)	Sample Concentration (ug/L)	MS Concentration (ug/L)	MS Recovery (%)	Limit (%)	MSD Concentration (ug/L)	MSD Recovery (%)	Limit (%)	Relatve Diff (%)	Limit (%)	Qual
aldrin	0.01	U	0.007	75	30-150	0.010	95	30-150	34	30	J7
gamma-chlordane (cis)	0.01	U	0.012	117	30-150	0.013	123	30-150	14	30	
alpha-chlordane (trans)	0.01	U	0.014	135	30-150	0.011	97	30-150	23	30	
chlorpyrifos	0.01	U	0.008	80	30-150	0.009	80	30-150	9	30	
dieldrin	0.02	U	0.020	98	30-150	0.026	123	30-150	28	30	
4,4'-DDT	0.02	U	0.013	64	30-150	0.010	49	30-150	21	30	
endosulfan I	0.01	U	0.006	62	30-150	0.007	68	30-150	19	30	
endosulfan II	0.02	U	0.010	49	30-150	0.009	44	30-150	5	30	
endrin	0.02	U	0.021	106	30-150	0.024	115	30-150	13	30	
heptachlor	0.01	U	0.005	50	30-150	0.006	58	30-150	24	30	
heptachlor epoxide	0.01	U	0.005	50	30-150	0.005	49	30-150	7	30	
gamma-BHC (lindane)	0.01	U	0.008	82	30-150	0.009	85	30-150	13	30	
toxaphene	NA	U	U	NA	30-150	U	NA	30-150	NA	30	

Surrogate Standard	Recovery (%)	Advisory Limits (%)	Recovery (%)	Advisory Limits (%)
tetrachloro-m-xylene	62	30 - 150	53	30 - 150
decachlorobiphenyl	77	30 - 150	67	30 - 150

U = Not detected at indicated level.
NA = Not added or evaluated.
J7 = MSD %RR above limit.

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Pesticides in Water Matrix
SW 846 8081

Lab Number:	MDLW A 2017	MDLW B 2017	MDLW C 2017	MDLW D 2017	MDLW E 2017	MDLW F 2017	MDLW G 2017
Sample Designation:	Water	Water	Water	Water	Water	Water	Water
Date Sampled:	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200
Date Extracted:	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200	03/10/17 1200
Date Analyzed:	03/16/17	03/16/17	03/16/17	03/16/17	03/16/17	03/16/17	03/16/17
Matrix:	Water	Water	Water	Water	Water	Water	Water
Moisture:	NA	NA	NA	NA	NA	NA	NA
Sample Amount (mL):	1000	1000	1000	1000	1000	1000	1000
Final Volume (mL)	1	1	1	1	1	1	1
Dilution Factor:	1	1	1	1	1	1	1

	True Value (ug/L)	MDL01 Found (ug/L)	MDL02 Found (ug/L)	MDL03 Found (ug/L)	MDL04 Found (ug/L)	MDL05 Found (ug/L)	MDL06 Found (ug/L)	MDL07 Found (ug/L)	STD (ug/L)	MDL (ug/L)
hexachlorobenzene	0.004	0.0023	0.0006	0.0036	0.0042	0.0055	0.0035	0.0033	0.001	0.004
alpha-BHC	0.004	0.0023	0.0015	0.0024	0.0026	0.0028	0.0024	0.0027	0.00041	0.001
gamma-BHC (Lindane)	0.004	0.0027	0.0023	0.0032	0.0031	0.0032	0.0028	0.0033	0.00032	0.001
beta-BHC	0.004	0.0044	0.0036	0.0049	0.0050	0.0056	0.0051	0.0052	0.00060	0.0019
delta-BHC	0.004	0.0021	0.0017	0.0023	0.0027	0.0022	0.0028	0.0025	0.00034	0.001
heptachlor	0.004	0.0017	0.0020	0.0021	0.0022	0.0021	0.0020	0.0022	0.00016	0.0005
aldrin	0.004	0.0021	0.0019	0.0026	0.0026	0.0025	0.0026	0.0026	0.00028	0.001
oxychlordane	0.004	0.0030	0.0021	0.0034	0.0036	0.0027	0.0033	0.0032	0.00046	0.001
chlorpyrifos	0.004	0.0028	0.0021	0.0033	0.0031	0.0031	0.0034	0.0035	0.00045	0.001
heptachlor epoxide	0.004	0.0029	0.0022	0.0035	0.0037	0.0031	0.0034	0.0033	0.00045	0.001
gamma-chlordane	0.004	0.0033	0.0030	0.0036	0.0039	0.0036	0.0036	0.0036	0.00027	0.001
trans-nonachlor	0.004	0.0032	0.0029	0.0042	0.0045	0.0041	0.0026	0.0027	0.00071	0.002
alpha-chlordane	0.004	0.0027	0.0025	0.0031	0.0039	0.0032	0.0035	0.0034	0.00044	0.001
endosulfan I	0.004	0.0020	0.0017	0.0028	0.0027	0.0026	0.0025	0.0027	0.00037	0.001
4,4'-DDE	0.008	0.0055	0.0056	0.0064	0.0066	0.0063	0.0066	0.0067	0.00046	0.001
dieldrin	0.008	0.0053	0.0045	0.0059	0.0066	0.0065	0.0054	0.0063	0.00071	0.002
endrin	0.008	0.0053	0.0047	0.0058	0.0061	0.0057	0.0056	0.0061	0.00047	0.001
cis-nonachlor	0.004	0.0024	0.0025	0.0028	0.0032	0.0028	0.0027	0.0030	0.00024	0.001
4,4'-DDD	0.008	0.0051	0.0050	0.0056	0.0056	0.0054	0.0053	0.0059	0.00031	0.001
endosulfan II	0.008	0.0064	0.0058	0.0068	0.0066	0.0062	0.0067	0.0067	0.00033	0.001
toxaphene		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
4,4'-DDT	0.008	0.0062	0.0068	0.0066	0.0071	0.0065	0.0062	0.0070	0.00033	0.001
endrin aldehyde	0.008	0.0051	0.0052	0.0058	0.0061	0.0057	0.0060	0.0059	0.00035	0.001
endosulfan sulfate	0.008	0.0052	0.0053	0.0055	0.0056	0.0059	0.0057	0.0054	0.00023	0.001
methoxychlor	0.04	0.0258	0.0289	0.0291	0.0298	0.0298	0.0266	0.0298	0.00154	0.005
endrin ketone	0.008	0.0059	0.0057	0.0062	0.0061	0.0062	0.0066	0.0063	0.00025	0.001

Surrogate Standard	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	Recovery (%)	(%)
tetrachloro-m-xylene	49	1	79	73	71	66	70	30 - 150
decachlorobiphenyl	83	81	103	83	81	80	81	30 - 150

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	Yes
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	Yes, with one noted exception.
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	Yes
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes, with four noted exception.
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	NA
22. Were the test-specific age requirements met for each test species?	NA
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	NA
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	NA
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	NA

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift ((15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for Analyses of Pesticides in Sediment, Tissue and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (< 20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (≤ 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	Aldrin MSD %RPD was above the limit.	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	Tetrachloro-m-xylene surrogate recovery was below the limit for Composite 8 Elutriate - Rep 2. Decachlorobiphenyl surrogate was low for CLDS Ref Site Bank Rep 1, 2, and 3.	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychorinated Biphenyls (PCB congeners) in Sediment, Tissue and Water Matrices

Method Reference Number: 8082A

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In Data Package
Calibration Verification (Second Source)	Once, after initial calibration. (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	Yes		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In Data Package
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	NA
Received By:	JTP	Logged into Lab by:	KC KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	3		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes	Does the info on the COC match the samples?	No
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	No
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	No	Were samples received intact? (none broken or leaking)	No
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
See Chains of Custody						

Notes and qualifications:

-Majority of samples not listed on chains of custody based on container sampling information. Samples rejected and on hold until further notice.
* Residual samples from grain size analyses received to include in final composites
-Field ID NHH-Q and NHH-U presented on the associated chains of custody for this sample receipt document (ESI samples -054 and -055) wer accurately denoted based on sample containers, and were not present on revised chains of custody issued by AECOM on 08/21/17.

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-Z	29516-001	S	Hold:Composite	2x5 Gal.	4C	
NHH-Z	29516-002	S	Hold:Composite	4x5 Gal.	4C	
NHH-P	29516-003	S	Hold:Composite	1x5 Gal.	4C	
NHH-P	29516-004	S	Hold:Composite	2x5 Gal.	4C	
NHH-L	29516-005	S	Hold:Composite	1x5 Gal.	4C	
NHH-L	29516-006	S	Hold:Composite	1x5 Gal.	4C	
NHH-J	29516-007	S	Hold:Composite	2x5 Gal.	4C	
NHH-J	29516-008	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-009	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-010	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-011	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-012	S	Hold:Composite	1x5 Gal.	4C	
NHH-B	29516-013	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-014	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-015	S	Hold:Composite	1x5 Gal.	4C	
NHH-O	29516-016	S	Hold:Composite	2x5 Gal.	4C	
NHH-O	29516-017	S	Hold:Composite	1x5 Gal.	4C	
NHH-Y	29516-018	S	Hold:Composite	2x5 Gal.	4C	
NHH-Y	29516-019	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-020	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-021	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-022	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-023	S	Hold:Composite	1x5 Gal.	4C	

Notes and qualifications:

- See COC

* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-N	29516-024	S	Hold:Composite	1x5 Gal.	4C	
NHH-N	29516-025	S	Hold:Composite	1x5 Gal.	4C	
NHH-A	29516-026	S	Hold:Composite	1x5 Gal.	4C	
NHH-C	29516-027	S	Hold:Composite	5x5 Gal.	4C	
NHH-C	29516-028	S	Hold:Composite	2x5 Gal.	4C	
NHH-D	29516-029	S	Hold:Composite	1x5 Gal.	4C	
NHH-D	29516-030	S	Hold:Composite	2x5 Gal.	4C	
NHH-T	29516-031	S	Hold:Composite	1x5 Gal.	4C	
NHH-T	29516-032	S	Hold:Composite	3x5 Gal.	4C	
NHH-E	29516-033	S	Hold:Composite	2x5 Gal.	4C	
NHH-E	29516-034	S	Hold:Composite	2x5 Gal.	4C	
NHH-S	29516-035	S	Hold:Composite	1x5 Gal.	4C	
NHH-S	29516-036	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-037	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-038	S	Hold:Composite	2x5 Gal.	4C	
NHH-H	29516-039	S	Hold:Composite	3x5 Gal.	4C	
NHH-H	29516-040	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-041	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-042	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-043	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-044	S	Hold:Composite	1x5 Gal.	4C	
NHH-X	29516-045	S	Hold:Composite	2x5 Gal.	4C	
NHH-X	29516-046	S	Hold:Composite	2x5 Gal.	4C	

Notes and qualifications: 29516-024 S Hold:Composite

- See COC

* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
CLDS-Ref	29516-047	S	Hold:Composite	4x5 Gal.	4C	
NHC-I	29516-048	W	Hold:Composite	7x5 Gal.	4C	
NHC-V	29516-049	W	Hold:Composite	12x5 Gal.	4C	
NHC-F	29516-050	W	Hold:Composite	6x5 Gal.	4C	
CLDS-Ref-Top	29516-051	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Mid	29516-052	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Bottom	29516-053	W	Hold:Composite	2x5 Gal.	4C	
NHH-Q **	29516-054	S	Hold:Composite	4x5 Gal.	4C	
NHH-U **	29516-055	S	Hold:Composite	5x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encom all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viab containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.
** Samples denoted on original chain of custody, not on revised documents discussed above.

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature: C Howe

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Seq. Eval									Lab I.D.	Remarks
NHC-I	8/17/17	1430		X	5gal	W	4°C	NA	X										7 carboys
NHC-V	8/17/17	1528		X		W			X										12 carboys, 2 DIs
NHC-F	8/17/17	1300		X		W			X										6 carboys
CLDS-Ref-Top	8/17/17	1015		X		W			X										2 carboys
LDS-Ref-Mid				X		W			X										2 carboys
LDS-Ref-Bottom				X		W			X										2 carboys
NHH-C •	8/11	1033		X	5gal bucket	SD			X										7 buckets
NHH-D •	8/11	1507		X		SD			X							CSH		3 ~~2~~	buckets
NHH-E •	8/14	0832		X		SD			X										4 buckets
NHH-F •	8/11	1650		X		SD			X										3 buckets
NHH-G •	8/11	0837		X		SD			X										2 buckets
NHH-H •	8/10	1548		X		SD			X										4 buckets
NHH-I •	8/17	1627		X		SD			X										3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature: C Howe	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature: J. T. Provencher	Date: 08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ 8/18

Notes: Discrepancies between most sample date & time and what is labeled on sample containers. Total container count not accurate. Conditions unacceptable for sample receipt & processing. –KC 8/18/17 1700

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sediment Eval

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval	Lab I.D.	Remarks
NHH-J	8/15/17	1405		X	5g bucket	SO	4°C	NA	X		3 buckets
NHH-K	8/10/17	1409		X					X		2 buckets
NHH-L	8/15/17	1515		X					X		2 buckets
NHH-M	8/8/17	1610		X					X		3 buckets
NHH-N	8/13/17	1515		X					X		2 buckets
NHH-O	8/8/17	1445		X					X		3 buckets
NHH-P	8/9/17	1219		X					X		3 buckets
NHH-Q (EID 8/21 -054)	8/9/17	1427		X					X		4 buckets
NHH-R	8/10/17	0832		X					X		3 buckets
NHH-S	8/10/17	0955		X					X		2 buckets
NHH-T 1734 CSH	8/8/17	~~1707~~ CSH		X					X		4 buckets
NHH-U (EID 8/21 -055)	8/9/17	0905		X					X		5 buckets
NHH-V	8/15/17	1646		X					X		3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ EID 8/18

Notes:

See page 1 of 3

EID 8/21 Samples NHH-Q & NHH-U are accurate based on sample container and were not denoted on revised CoC's.

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sed Grnl

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed Grnl	Lab I.D.	Remarks
NHH-W	8/15/17	0938		X	5gal bucket	SD	4°C	NA	X		2 buckets
NHH-X	8/13/17	1545		X					X		2 buckets
NHH-Y	8/8/17	1037		X					X		3 buckets
NHH-Z	8/8/17	1153		X					X		6 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ E3 8/18

Notes: See page 1 of 3

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

New Haven Harbor Federal Navigation Project
USACE Contract No. W912WJ-17-D-003
October 2017

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sediment Eval (DSE)

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval (DSE)	Lab I.D.	Remarks
NHH-Z	8/12	1350		X	5g bucket	SD	4°C	NA	X		2 buckets
NHH-Z	8/8	1153		X					X		4 buckets
NHH-P	8/12	0850		X					X		1 bucket
NHH-P	8/9	1219		X					X		2 buckets
NHH-L	8/15	1405		X					X		1 bucket
NHH-L	8/10	1300		X					X		1 bucket
NHH-J	8/15	1405		X					X		2 buckets
NHH-J	8/10	1141		X					X		1 bucket
NHH-F	8/16	1658		X					X		1 bucket
NHH-F	8/11	1680		X					X		2 buckets
NHH-M	8/13	1220		X					X		2 buckets
NHH-M	8/8	1610		X					X		1 bucket
NHH-B	8/11	1157		X					X		1 bucket

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/18/17 Time: 1300	James T Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised on 8/21/17 C. Steve Howe AECOM Rich Leg - ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature: [signature]

Send Results/Report to:

TAT:

Analysis Requested: DSE

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE	Lab I.D.	Remarks
NHH-W	8/9	1634		X	5g bucket	SD	4°C	NA	X		1 bucket
NHH-W	8/15	0938		X					X		1 bucket
NHH-O	8/14	1614		X					X		2 buckets
NHH-O	8/8	1445		X					X		1 bucket
NHH-Y	8/13	0920		X					X		2 buckets
NHH-Y	8/8	1153		X					X		1 bucket
NHH-G	8/17	0934		X					X		1 bucket
NHH-G	8/11	0837		X					X		1 bucket
NHH-K	8/10	1409		X					X		1 bucket
NHH-K	8/14	1232		X					X		1 bucket
NHH-N	8/13	1315		X					X		1 bucket
NHH-N	8/8	1305		X					X		1 bucket
NHH-A	8/11	1340		X					X		1 bucke

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature: [signature]	8/18/17 Time: 1300	James T. Provencher ESI Signature: [signature]	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 [signature] AECOM [signature] - ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE	Lab I.D.	Remarks
NHH-C	8/17/17	1213		X	5g bucket	SD	4°C	N/A	X		5 buckets
NHH-C	8/11/17	1033		X					X		2 buckets
NHH-D	8/16	1443		X					X		1 bucket
NHH-D	8/11	1507		X					X		2 buckets
NHH-T	8/12	1220		X					X		1 bucket
NHH-T	8/8	1731		X					X		3 buckets
NHH-E	8/14	0832		X					X		2 buckets
NHH-E	8/16	1230		X					X		2 buckets
NHH-S	8/15	1158		X					X		1 bucket
NHH-S	8/10	0955		X					X		1 bucket
NHH-R	8/16	0829		X					X		1 bucket
NHH-R	8/10	0832		X					X		2 buckets

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hone AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE	Lab I.D.	Remarks
NHH-H	8/10	1548		X	5g bucket	SD	4°C	NA	X		3 buckets
NHH-A	8/16	1027		X					X		1 bucket
NHH-I	8/10	1746		X					X		1 bucket
NHH-J	8/17	1627		X					X		2 buckets
NHH-V	8/9	1745		X					X		2 buckets
NHH-V	8/15	1646		X					X		1 bucket
~~NHH-X~~	~~8/8~~	~~1153~~			~~CSH~~						~~2 buckets~~
NHH-X	8/8	0922		X	5g bucket	SD	4°C	NA	X		2 buckets
NHH-X	8/12	1600		X					X		2 buckets
CLOS-Ref	8/17	0800		X					X		4 buckets

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM	Date: 8/18/17 Time: 1300	James T. Provencher ESI	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation)	Date: Time:	Received by: (Print Name)/(Affiliation)	Date: Time:
Relinquished by: (Print Name)/(Affiliation)	Date: Time:	Received by: (Print Name)/(Affiliation)	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 ESI - 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

New Haven Harbor Federal Navigation Project
USACE Contract No. W912WJ-17-D-003
October 2017

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE	Lab I.D.	Remarks
NHC-I	8/17/17	1430		X	5g carboys	W	4°C	NA	X		7 carboys
NHC-V	8/17	1528		X					X		12 carboys, 2DIs*
NHC-F	8/17	1300		X					X		6 carboys
CLDS-Ref-Top	8/17	1015		X					X		2 carboys
CLDS-Ref-Mid	8/17	1015		X					X		2 carboys
CLDS-Ref-Bottom	8/17	1015		X					X		2 carboys

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hone AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) COCs amended and revised 8/21/17 Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) C. Steve Hone AECOM Signature: -ESI 8/21/17	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

* water from a leaking carboy was transferred into to lab supplied distilled water containers

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 1

Composite Lab ID.: 29517-001

Composite Final Volume: 22 gallons

Composite Matrix: Solid

Composite Container(s): 5x5 gallon buckets, 1x 1 gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 0840

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-C	29516-027	Solid	—	≈2 gallons	≈24.5 gallons	gray to black sediment with lots of shell hash
↓	↓ -028	↓	↓	↓	↓	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 29517-002 Composite Final Volume: ≈27½ gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/24/17 1x1 gallon bucket

Composite Prepared Time: 0950

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-D	29516-029 030	Solid	—	—	≈10 gallons	
NHH-E	033 034	Solid	—	~~≈7 gal~~	≈7 gallons	
NHH-F	009 010	Solid	—	—	≈10 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 29517-003 Composite Final Volume: 31 gal

Composite Matrix: Solid Composite Container(s): 6x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon buckets

Composite Prepared Time: 1400

Initials: BY JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-G	29516-020 021	Solid	—	—	≈9.5gallons	
NHH-H	↓ - 039 040	Solid	—	—	≈9gallons	
NHH-I	↓ - 041 042	Solid	—	—	≈11gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 29517-004

Composite Final Volume: 23 gallons

Composite Matrix: Solid

Composite Container(s): 5x5 gallon buckets, 1x1 gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1445

Initials: DG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-J	29516-007 008	Solid	—	—	≈8 gallons	
NHH-K	↓ -022 023	Solid	—	—	≈8 gallons	
NHH-L	↓ -005 006	Solid	—	—	≈ 7.5 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 29517-005

Composite Final Volume: ≈ 29 gallons

Composite Matrix: Solid

Composite Container(s): 6 x 5 gallon, 1 x 1 gallon

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1530

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-M	29516-011 012	Solid	—	—	≈ 9.5 g	
NHH-N	↓ -024 025	Solid	—	—	≈ 9 g	
NHH-O	↓ -016 017	Solid	—	—	≈ 10.5 g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 29517-006 Composite Final Volume: 28gallons

Composite Matrix: Solid Composite Container(s): 7x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1205

Initials: BG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-P	29516-003 004	Solid	—	—	≈8.5gallons	
NHH-Q	-054	Solid	—	—	≈14gallons	
NHH-R	-037 038	Solid	—	—	≈7gallons	
NHH-S	-035 036	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 7

Composite Lab ID.: 29517-007

Composite Final Volume: 31gallons

Composite Matrix: Solid

Composite Container(s): 7x5gallon buckets
1x1gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1540

Initials: BGI JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-T	29516-031 032	Solid	—	—	≈9.5gallons	
NHH-U	-055	Solid	—	—	≈14.5gallons	
NHH-V	-043 044	Solid	—	—	≈7gallons	
NHH-W	-014 015	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 8

Composite Lab ID.: 29517-008

Composite Final Volume: ≈26 gallons

Composite Matrix: Solid

Composite Container(s): 5 × 5 gallon buckets, 1 × 1 gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1130

Initials: TJG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-X	29516-045 046	Solid	—	—	≈9.5 gallons	
NHH-Y	-018 019	Solid	—	—	≈ 8.5 gallons	
NHH-Z	-001 002	Solid	—	—	≈11.5 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Homogenization Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: CLDS Reference Site

Composite Lab ID.: 29517-009

Composite Final Volume: ≈ 20 gallons

Composite Matrix: Solid

Composite Container(s): 4x5 gallons, 1x1 gallon

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1630

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-CLDS	29516-047	Solid	—	few shells	≈20g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
~~29521~~	~~Elutriate Preparation~~ JTP 08/25/17
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite Reference Site Water

Composite Lab ID.: 29517-010 Composite Final Volume: 30 gal

Composite Matrix: Water Composite Container(s): 6 x 5 gal

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1445

Initials: DD

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
CLDS-Ref-Bottom	29516-~~001~~ 053	Water	—	—	10 gal	
CLDS-Ref-Mid	29516-~~003~~ 052	Water	—	—	10 gal	
CLDS-Ref-Top	29516-~~004~~ 051	Water	—	—	10 gal	
	E3 NR 9/5/17					

Subsamples Removed:

Lab Number	Sample Use
29521	Elutriate Preparation

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 1 Blank	Time Mixing Started	0835
Amount of Sediment	0 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	0905
		Time Elutriate Siphoned Off	1005
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 1 Blank	29521-001	-	-	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 1	Time Mixing Started	1255
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1325
		Time Elutriate Siphoned Off	1425
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 1	29521-002	Composite 1	29517-001	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 2	Time Mixing Started	0925
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	0955
		Time Elutriate Siphoned Off	1055
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 2	29521-004	Composite 2	29517-002	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 3 Blank	Time Mixing Started	1140 0835
Amount of Sediment	0 12 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 48 L	Time Mixing Stopped	1210 0905
	(ES) BG 08/22	Time Elutriate Siphoned Off	1310 1005
		Centrifuged?	(Yes) No (ES) BG 08/22
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 3 Blank	29521-005	-	-	NHC - I	29516-0~~50~~ 48

(ES) JTP 08/22/17

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 3	Time Mixing Started	1140
Amount of Sediment	12 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	48 L	Time Mixing Stopped	1210
		Time Elutriate Siphoned Off	1310
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 3	29521-006	Composite 3	29517-003	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 18 L
29523	SPP Assays	~ 6 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 4	Time Mixing Started	1042
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1112
		Time Elutriate Siphoned Off	1212
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 4	29521-008	Composite 4	29517-004	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

ESI

ELUTRIATE PREPARATION SUMMARY

EnviroSystems, Inc.
One Lafayette Road
~~P.O. Box 778~~
Hampton, N.H. 03843-0778
~~p 603.926.3345 • f 603.926.3521~~
envirosystems.com

Date: 08/23/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 5	Time Mixing Started	0850
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	0920
		Time Elutriate Siphoned Off	1020
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 5	29521-010	Composite 5	29517-005	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 18 L
29523	SPP Assays	~ 6 L

NOTES:

ESI

ELUTRIATE PREPARATION SUMMARY

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Date: 08/23/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 6	Time Mixing Started	0930
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1000
		Time Elutriate Siphoned Off	1100
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 6	29521-012	Composite 6	29517-006	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ESI

ELUTRIATE PREPARATION SUMMARY

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envirosystems.com

Date: 08/23/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 7 Blank	Time Mixing Started	0710
Amount of Sediment	0 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	0740
		Time Elutriate Siphoned Off	0840
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 7 Blank	29521-013	-	-	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	≃ 11 L

NOTES:

ESI

ELUTRIATE PREPARATION SUMMARY

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Date: 08/23/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 7	Time Mixing Started	0750
Amount of Sediment	12 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	48 L	Time Mixing Stopped	0820
		Time Elutriate Siphoned Off	0920
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 7	29521-014	Composite7	29517-007	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ESI

ELUTRIATE PREPARATION SUMMARY

EnviroSystems, Inc.
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Date: 08/23/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 8	Time Mixing Started	1053
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1123
		Time Elutriate Siphoned Off	1223
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 8	29521-016	Composite 8	C 29517-008	NHC-V	29516-049

(E3) JTP 08/23/17

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17

ESI Study: 29521

Client: AECOM

Project: New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 1	Time Mixing Started	0800
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	0830
		Time Elutriate Siphoned Off	0930
Preparer's Initials	JTP	Centrifuged?	(Yes) No

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 1 ~~Blank~~ (E3) MR 8/30/17	29521-017	Composite 1	29517-001	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	SPP Assays	~4 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 2	Time Mixing Started	0905
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	0935
		Time Elutriate Siphoned Off	1035
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 2	29521-018	Composite 2	29517-002	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	SPP Assays	~4 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 3	Time Mixing Started	0905
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	0935
		Time Elutriate Siphoned Off	1035
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 3	29521-019	Composite 3	29517-003	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	SPP Assays	~4 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 4	Time Mixing Started	0943
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	1013
		Time Elutriate Siphoned Off	1113
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 4	29521-020	Composite 4	29517-004	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	SPP Assays	~ 4 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	CLDS Ref Site Blank	Time Mixing Started	0800
Amount of Sediment	— L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	0830
		Time Elutriate Siphoned Off	0930
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
CLDS Ref Site Blank	29521-021	-	-	Composite Reference Site Water	29517-010

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L

NOTES:

Tissue Chemistry Data

ANALYTICAL REPORT

Lab Number:	L1735126
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	11/10/17

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320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1735126-01	MN NATIVE BACKGROUND REP A	TISSUE	NEW HAVEN, CT	09/28/17 16:00	09/29/17
L1735126-02	MN NATIVE BACKGROUND REP B	TISSUE	NEW HAVEN, CT	09/28/17 16:00	09/29/17
L1735126-03	MN NATIVE BACKGROUND REP C	TISSUE	NEW HAVEN, CT	09/28/17 16:00	09/29/17
L1735126-04	MN NATIVE BACKGROUND REP D	TISSUE	NEW HAVEN, CT	09/28/17 16:00	09/29/17
L1735126-05	MN NATIVE BACKGROUND REP E	TISSUE	NEW HAVEN, CT	09/28/17 16:00	09/29/17
L1735126-06	MN LABORATORY CONTROL REP A	TISSUE	NEW HAVEN, CT	09/28/17 16:30	09/29/17
L1735126-07	MN LABORATORY CONTROL REP B	TISSUE	NEW HAVEN, CT	09/28/17 16:30	09/29/17
L1735126-08	MN LABORATORY CONTROL REP C	TISSUE	NEW HAVEN, CT	09/28/17 16:30	09/29/17
L1735126-09	MN LABORATORY CONTROL REP D	TISSUE	NEW HAVEN, CT	09/28/17 16:30	09/29/17
L1735126-10	MN LABORATORY CONTROL REP E	TISSUE	NEW HAVEN, CT	09/28/17 16:30	09/29/17
L1735126-11	MN CLDS REFERENCE SEDIMENT REP A	TISSUE	NEW HAVEN, CT	09/29/17 08:00	09/29/17
L1735126-12	MN CLDS REFERENCE SEDIMENT REP B	TISSUE	NEW HAVEN, CT	09/29/17 08:00	09/29/17
L1735126-13	MN CLDS REFERENCE SEDIMENT REP C	TISSUE	NEW HAVEN, CT	09/29/17 08:00	09/29/17
L1735126-14	MN CLDS REFERENCE SEDIMENT REP D	TISSUE	NEW HAVEN, CT	09/29/17 08:00	09/29/17
L1735126-15	MN CLDS REFERENCE SEDIMENT REP E	TISSUE	NEW HAVEN, CT	09/29/17 08:00	09/29/17
L1735126-16	MN COMPOSITE 1 REP A	TISSUE	NEW HAVEN, CT	09/29/17 08:15	09/29/17
L1735126-17	MN COMPOSITE 1 REP B	TISSUE	NEW HAVEN, CT	09/29/17 08:15	09/29/17
L1735126-18	MN COMPOSITE 1 REP C	TISSUE	NEW HAVEN, CT	09/29/17 08:15	09/29/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1735126-19	MN COMPOSITE 1 REP D	TISSUE	NEW HAVEN, CT	09/29/17 08:15	09/29/17
L1735126-20	MN COMPOSITE 1 REP E	TISSUE	NEW HAVEN, CT	09/29/17 08:15	09/29/17
L1735126-21	MN COMPOSITE 2 REP A	TISSUE	NEW HAVEN, CT	09/29/17 08:30	09/29/17
L1735126-22	MN COMPOSITE 2 REP B	TISSUE	NEW HAVEN, CT	09/29/17 08:30	09/29/17
L1735126-23	MN COMPOSITE 2 REP C	TISSUE	NEW HAVEN, CT	09/29/17 08:30	09/29/17
L1735126-24	MN COMPOSITE 2 REP D	TISSUE	NEW HAVEN, CT	09/29/17 08:30	09/29/17
L1735126-25	MN COMPOSITE 2 REP E	TISSUE	NEW HAVEN, CT	09/29/17 08:30	09/29/17
L1735126-26	MN COMPOSITE 3 REP A	TISSUE	NEW HAVEN, CT	09/29/17 08:45	09/29/17
L1735126-27	MN COMPOSITE 3 REP B	TISSUE	NEW HAVEN, CT	09/29/17 08:45	09/29/17
L1735126-28	MN COMPOSITE 3 REP C	TISSUE	NEW HAVEN, CT	09/29/17 08:45	09/29/17
L1735126-29	MN COMPOSITE 3 REP D	TISSUE	NEW HAVEN, CT	09/29/17 08:45	09/29/17
L1735126-30	MN COMPOSITE 3 REP E	TISSUE	NEW HAVEN, CT	09/29/17 08:45	09/29/17
L1735126-31	MN COMPOSITE 4 REP A	TISSUE	NEW HAVEN, CT	09/29/17 09:00	09/29/17
L1735126-32	MN COMPOSITE 4 REP B	TISSUE	NEW HAVEN, CT	09/29/17 09:00	09/29/17
L1735126-33	MN COMPOSITE 4 REP C	TISSUE	NEW HAVEN, CT	09/29/17 09:00	09/29/17
L1735126-34	MN COMPOSITE 4 REP D	TISSUE	NEW HAVEN, CT	09/29/17 09:00	09/29/17
L1735126-35	MN COMPOSITE 4 REP E	TISSUE	NEW HAVEN, CT	09/29/17 09:00	09/29/17
L1735126-36	MN COMPOSITE 5 REP A	TISSUE	NEW HAVEN, CT	09/29/17 09:30	09/29/17
L1735126-37	MN COMPOSITE 5 REP B	TISSUE	NEW HAVEN, CT	09/29/17 09:30	09/29/17
L1735126-38	MN COMPOSITE 5 REP C	TISSUE	NEW HAVEN, CT	09/29/17 09:30	09/29/17
L1735126-39	MN COMPOSITE 5 REP D	TISSUE	NEW HAVEN, CT	09/29/17 09:30	09/29/17
L1735126-40	MN COMPOSITE 5 REP E	TISSUE	NEW HAVEN, CT	09/29/17 09:30	09/29/17
L1735126-41	MN COMPOSITE 6 REP A	TISSUE	NEW HAVEN, CT	09/29/17 10:00	09/29/17
L1735126-42	MN COMPOSITE 6 REP B	TISSUE	NEW HAVEN, CT	09/29/17 10:00	09/29/17
L1735126-43	MN COMPOSITE 6 REP C	TISSUE	NEW HAVEN, CT	09/29/17 10:00	09/29/17
L1735126-44	MN COMPOSITE 6 REP D	TISSUE	NEW HAVEN, CT	09/29/17 10:00	09/29/17
L1735126-45	MN COMPOSITE 6 REP E	TISSUE	NEW HAVEN, CT	09/29/17 10:00	09/29/17
L1735126-46	MN COMPOSITE 7 REP A	TISSUE	NEW HAVEN, CT	09/29/17 10:15	09/29/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1735126-47	MN COMPOSITE 7 REP B	TISSUE	NEW HAVEN, CT	09/29/17 10:15	09/29/17
L1735126-48	MN COMPOSITE 7 REP C	TISSUE	NEW HAVEN, CT	09/29/17 10:15	09/29/17
L1735126-49	MN COMPOSITE 7 REP D	TISSUE	NEW HAVEN, CT	09/29/17 10:15	09/29/17
L1735126-50	MN COMPOSITE 7 REP E	TISSUE	NEW HAVEN, CT	09/29/17 10:15	09/29/17
L1735126-51	MN COMPOSITE 8 REP A	TISSUE	NEW HAVEN, CT	09/29/17 11:00	09/29/17
L1735126-52	MN COMPOSITE 8 REP B	TISSUE	NEW HAVEN, CT	09/29/17 11:00	09/29/17
L1735126-53	MN COMPOSITE 8 REP C	TISSUE	NEW HAVEN, CT	09/29/17 11:00	09/29/17
L1735126-54	MN COMPOSITE 8 REP D	TISSUE	NEW HAVEN, CT	09/29/17 11:00	09/29/17
L1735126-55	MN COMPOSITE 8 REP E	TISSUE	NEW HAVEN, CT	09/29/17 11:00	09/29/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

Case Narrative (continued)

Report Submission

November 10, 2017: This is a Final Report

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L1735126 was frozen upon receipt in order to arrest the holding time.

Semivolatile Organics

L1735126-01-55: The samples have elevated detection limits due to the dilution required by the sample matrix.

The WG1055360-6/-7 MS/MSD recoveries, performed on L1735126-01, are outside the acceptance criteria for Cl3-BZ#18 (131%/125%), Cl4-BZ#49 (46%-MS only) and Cl7-BZ#183 (46%-MS only).

The WG1055393-6/-7 MS/MSD recoveries, performed on L1735126-21, are outside the acceptance criteria for Cl3-BZ#18 (135%/124%).

The WG1055419-6/-7 MS/MSD recoveries, performed on L1735126-41, are outside the acceptance criteria for several compounds. See the QC Report and MS/MSD recovery section for additional details.

The WG1055393-4 Standard Reference Material is outside the QC limits for Cl3-BZ#28.

The WG1055419-4 Standard Reference Material is outside the QC limits for Cl3-BZ#28.

Pesticides

All recoveries for the LCS/LCSD WG1055392-2/-3 are within SOP criteria (40-140%); therefore no further action was taken.

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

Case Narrative (continued)

All recoveries for MS/MSD WG1055361-6/-7 and WG1055392-6/-7 are within Lab SOP criteria (40-140%); therefoe no further action was taken.

The WG1055417-6/-7 MS/MSD recoveries, performed on L1735126-55, are outside the acceptance criteria for 4,4'-DDE (42%/35%) and cis-Nonachlor (45%-MSD only); however, the associated LCS/LCSD recoveries are within overall method allowances.

WG1055417-7: The surrogate recoveries are outside the acceptance criteria for BZ198 (229%); however, the sample was not re-extracted due to obvious matrix interference.

The WG1055392-5 Laboratory Duplicate RPDs for 4,4'-DDE (58%) and Endrin (49%), performed on L1735126-21, are outside the acceptance criteria.

The WG1055417-5 Laboratory Duplicate RPD for 4,4'-DDE (67%), performed on L1735126-41, is outside the acceptance criteria.

Total Metals
The WG1051696-5 Laboratory Duplicate RPD for Lead (41%) and Zinc (39%), performed on L1735126-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1052852-5 Laboratory Duplicate RPD for Lead (21%) and Nickel (52%), performed on L1735126-21, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1049111-5 Laboratory Duplicate RPD for Chromium (22%), performed on L1735126-41, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

Project Name: USACE/NHH FNP **Lab Number:** L1735126
Project Number: 60543021 **Report Date:** 11/10/17

Case Narrative (continued)

The WG1050284-5 Laboratory Duplicate RPD for Chromium (42%), Copper (24%), Lead (54%) and Zinc (49%), performed on L1735126-49, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1052853-3/-4 MS/MSD recovery, performed on L1735126-21, is outside the acceptance criteria for Mercury (77%/78%); however, the associated LCS recovery is within overall method allowances. No further action was required.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 11/10/17

ORGANICS

SEMIVOLATILES

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-01 D
Client ID: MN NATIVE BACKGROUND REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 14:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.4	9.69	2
Acenaphthylene	ND		ug/kg	19.4	9.69	2
Acenaphthene	ND		ug/kg	19.4	9.69	2
Fluorene	ND		ug/kg	19.4	9.69	2
Phenanthrene	ND		ug/kg	19.4	9.69	2
Anthracene	ND		ug/kg	19.4	9.69	2
Fluoranthene	ND		ug/kg	19.4	9.69	2
Pyrene	ND		ug/kg	19.4	9.69	2
Benz(a)anthracene	ND		ug/kg	19.4	9.69	2
Chrysene	ND		ug/kg	19.4	9.69	2
Benzo(b)fluoranthene	ND		ug/kg	19.4	9.69	2
Benzo(k)fluoranthene	ND		ug/kg	19.4	9.69	2
Benzo(a)pyrene	ND		ug/kg	19.4	9.69	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.4	9.69	2
Dibenz(a,h)anthracene	ND		ug/kg	19.4	9.69	2
Benzo(ghi)perylene	ND		ug/kg	19.4	9.69	2
Cl2-BZ#8	ND		ug/kg	1.94	0.969	2
Cl3-BZ#18	ND		ug/kg	1.94	0.969	2
Cl3-BZ#28	ND		ug/kg	1.94	0.969	2
Cl4-BZ#44	ND		ug/kg	1.94	0.969	2
Cl4-BZ#49	ND		ug/kg	1.94	0.969	2
Cl4-BZ#52	ND		ug/kg	1.94	0.969	2
Cl4-BZ#66	ND		ug/kg	1.94	0.969	2
Cl5-BZ#87	ND		ug/kg	1.94	0.969	2
Cl5-BZ#101	ND		ug/kg	1.94	0.969	2
Cl5-BZ#105	ND		ug/kg	1.94	0.969	2
Cl5-BZ#118	ND		ug/kg	1.94	0.969	2
Cl6-BZ#128	ND		ug/kg	1.94	0.969	2
Cl6-BZ#138	ND		ug/kg	1.94	0.969	2
Cl6-BZ#153	ND		ug/kg	1.94	0.969	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-01 D Date Collected: 09/28/17 16:00

Client ID: MN NATIVE BACKGROUND REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.94	0.969	2
Cl7-BZ#180	ND		ug/kg	1.94	0.969	2
Cl7-BZ#183	ND		ug/kg	1.94	0.969	2
Cl7-BZ#184	ND		ug/kg	1.94	0.969	2
Cl7-BZ#187	ND		ug/kg	1.94	0.969	2
Cl8-BZ#195	ND		ug/kg	1.94	0.969	2
Cl9-BZ#206	ND		ug/kg	1.94	0.969	2
Cl10-BZ#209	ND		ug/kg	1.94	0.969	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	79		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	83		30-150
BZ 198	77		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-02 D
Client ID: MN NATIVE BACKGROUND REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 17:59
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.3	9.65	2
Acenaphthylene	ND		ug/kg	19.3	9.65	2
Acenaphthene	ND		ug/kg	19.3	9.65	2
Fluorene	ND		ug/kg	19.3	9.65	2
Phenanthrene	ND		ug/kg	19.3	9.65	2
Anthracene	ND		ug/kg	19.3	9.65	2
Fluoranthene	ND		ug/kg	19.3	9.65	2
Pyrene	ND		ug/kg	19.3	9.65	2
Benz(a)anthracene	ND		ug/kg	19.3	9.65	2
Chrysene	ND		ug/kg	19.3	9.65	2
Benzo(b)fluoranthene	ND		ug/kg	19.3	9.65	2
Benzo(k)fluoranthene	ND		ug/kg	19.3	9.65	2
Benzo(a)pyrene	ND		ug/kg	19.3	9.65	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.3	9.65	2
Dibenz(a,h)anthracene	ND		ug/kg	19.3	9.65	2
Benzo(ghi)perylene	ND		ug/kg	19.3	9.65	2
Cl2-BZ#8	ND		ug/kg	1.93	0.965	2
Cl3-BZ#18	ND		ug/kg	1.93	0.965	2
Cl3-BZ#28	ND		ug/kg	1.93	0.965	2
Cl4-BZ#44	ND		ug/kg	1.93	0.965	2
Cl4-BZ#49	ND		ug/kg	1.93	0.965	2
Cl4-BZ#52	ND		ug/kg	1.93	0.965	2
Cl4-BZ#66	ND		ug/kg	1.93	0.965	2
Cl5-BZ#87	ND		ug/kg	1.93	0.965	2
Cl5-BZ#101	ND		ug/kg	1.93	0.965	2
Cl5-BZ#105	ND		ug/kg	1.93	0.965	2
Cl5-BZ#118	ND		ug/kg	1.93	0.965	2
Cl6-BZ#128	ND		ug/kg	1.93	0.965	2
Cl6-BZ#138	ND		ug/kg	1.93	0.965	2
Cl6-BZ#153	ND		ug/kg	1.93	0.965	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-02 D Date Collected: 09/28/17 16:00

Client ID: MN NATIVE BACKGROUND REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.93	0.965	2
Cl7-BZ#180	ND		ug/kg	1.93	0.965	2
Cl7-BZ#183	ND		ug/kg	1.93	0.965	2
Cl7-BZ#184	ND		ug/kg	1.93	0.965	2
Cl7-BZ#187	ND		ug/kg	1.93	0.965	2
Cl8-BZ#195	ND		ug/kg	1.93	0.965	2
Cl9-BZ#206	ND		ug/kg	1.93	0.965	2
Cl10-BZ#209	ND		ug/kg	1.93	0.965	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	71		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	75		30-150
DBOB	77		30-150
BZ 198	71		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-03 D
Client ID: MN NATIVE BACKGROUND REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 18:31
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.6	8.82	2
Acenaphthylene	ND		ug/kg	17.6	8.82	2
Acenaphthene	ND		ug/kg	17.6	8.82	2
Fluorene	ND		ug/kg	17.6	8.82	2
Phenanthrene	ND		ug/kg	17.6	8.82	2
Anthracene	ND		ug/kg	17.6	8.82	2
Fluoranthene	ND		ug/kg	17.6	8.82	2
Pyrene	ND		ug/kg	17.6	8.82	2
Benz(a)anthracene	ND		ug/kg	17.6	8.82	2
Chrysene	ND		ug/kg	17.6	8.82	2
Benzo(b)fluoranthene	ND		ug/kg	17.6	8.82	2
Benzo(k)fluoranthene	ND		ug/kg	17.6	8.82	2
Benzo(a)pyrene	ND		ug/kg	17.6	8.82	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.6	8.82	2
Dibenz(a,h)anthracene	ND		ug/kg	17.6	8.82	2
Benzo(ghi)perylene	ND		ug/kg	17.6	8.82	2
Cl2-BZ#8	ND		ug/kg	1.76	0.882	2
Cl3-BZ#18	ND		ug/kg	1.76	0.882	2
Cl3-BZ#28	ND		ug/kg	1.76	0.882	2
Cl4-BZ#44	ND		ug/kg	1.76	0.882	2
Cl4-BZ#49	ND		ug/kg	1.76	0.882	2
Cl4-BZ#52	ND		ug/kg	1.76	0.882	2
Cl4-BZ#66	ND		ug/kg	1.76	0.882	2
Cl5-BZ#87	ND		ug/kg	1.76	0.882	2
Cl5-BZ#101	ND		ug/kg	1.76	0.882	2
Cl5-BZ#105	ND		ug/kg	1.76	0.882	2
Cl5-BZ#118	ND		ug/kg	1.76	0.882	2
Cl6-BZ#128	ND		ug/kg	1.76	0.882	2
Cl6-BZ#138	ND		ug/kg	1.76	0.882	2
Cl6-BZ#153	ND		ug/kg	1.76	0.882	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-03 D Date Collected: 09/28/17 16:00

Client ID: MN NATIVE BACKGROUND REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.76	0.882	2
Cl7-BZ#180	ND		ug/kg	1.76	0.882	2
Cl7-BZ#183	ND		ug/kg	1.76	0.882	2
Cl7-BZ#184	ND		ug/kg	1.76	0.882	2
Cl7-BZ#187	ND		ug/kg	1.76	0.882	2
Cl8-BZ#195	ND		ug/kg	1.76	0.882	2
Cl9-BZ#206	ND		ug/kg	1.76	0.882	2
Cl10-BZ#209	ND		ug/kg	1.76	0.882	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	81		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	81		30-150
BZ 198	76		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-04 D
Client ID: MN NATIVE BACKGROUND REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 19:03
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.5	9.26	2
Acenaphthylene	ND		ug/kg	18.5	9.26	2
Acenaphthene	ND		ug/kg	18.5	9.26	2
Fluorene	ND		ug/kg	18.5	9.26	2
Phenanthrene	ND		ug/kg	18.5	9.26	2
Anthracene	ND		ug/kg	18.5	9.26	2
Fluoranthene	ND		ug/kg	18.5	9.26	2
Pyrene	ND		ug/kg	18.5	9.26	2
Benz(a)anthracene	ND		ug/kg	18.5	9.26	2
Chrysene	ND		ug/kg	18.5	9.26	2
Benzo(b)fluoranthene	ND		ug/kg	18.5	9.26	2
Benzo(k)fluoranthene	ND		ug/kg	18.5	9.26	2
Benzo(a)pyrene	ND		ug/kg	18.5	9.26	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.5	9.26	2
Dibenz(a,h)anthracene	ND		ug/kg	18.5	9.26	2
Benzo(ghi)perylene	ND		ug/kg	18.5	9.26	2
Cl2-BZ#8	ND		ug/kg	1.85	0.926	2
Cl3-BZ#18	ND		ug/kg	1.85	0.926	2
Cl3-BZ#28	ND		ug/kg	1.85	0.926	2
Cl4-BZ#44	ND		ug/kg	1.85	0.926	2
Cl4-BZ#49	ND		ug/kg	1.85	0.926	2
Cl4-BZ#52	ND		ug/kg	1.85	0.926	2
Cl4-BZ#66	ND		ug/kg	1.85	0.926	2
Cl5-BZ#87	ND		ug/kg	1.85	0.926	2
Cl5-BZ#101	ND		ug/kg	1.85	0.926	2
Cl5-BZ#105	ND		ug/kg	1.85	0.926	2
Cl5-BZ#118	ND		ug/kg	1.85	0.926	2
Cl6-BZ#128	ND		ug/kg	1.85	0.926	2
Cl6-BZ#138	ND		ug/kg	1.85	0.926	2
Cl6-BZ#153	ND		ug/kg	1.85	0.926	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-04 D Date Collected: 09/28/17 16:00

Client ID: MN NATIVE BACKGROUND REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.85	0.926	2
Cl7-BZ#180	ND		ug/kg	1.85	0.926	2
Cl7-BZ#183	ND		ug/kg	1.85	0.926	2
Cl7-BZ#184	ND		ug/kg	1.85	0.926	2
Cl7-BZ#187	ND		ug/kg	1.85	0.926	2
Cl8-BZ#195	ND		ug/kg	1.85	0.926	2
Cl9-BZ#206	ND		ug/kg	1.85	0.926	2
Cl10-BZ#209	ND		ug/kg	1.85	0.926	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	79		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	77		30-150
BZ 198	73		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-05 D
Client ID: MN NATIVE BACKGROUND REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 19:36
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.2	9.09	2
Acenaphthylene	ND		ug/kg	18.2	9.09	2
Acenaphthene	ND		ug/kg	18.2	9.09	2
Fluorene	ND		ug/kg	18.2	9.09	2
Phenanthrene	ND		ug/kg	18.2	9.09	2
Anthracene	ND		ug/kg	18.2	9.09	2
Fluoranthene	ND		ug/kg	18.2	9.09	2
Pyrene	ND		ug/kg	18.2	9.09	2
Benz(a)anthracene	ND		ug/kg	18.2	9.09	2
Chrysene	ND		ug/kg	18.2	9.09	2
Benzo(b)fluoranthene	ND		ug/kg	18.2	9.09	2
Benzo(k)fluoranthene	ND		ug/kg	18.2	9.09	2
Benzo(a)pyrene	ND		ug/kg	18.2	9.09	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.2	9.09	2
Dibenz(a,h)anthracene	ND		ug/kg	18.2	9.09	2
Benzo(ghi)perylene	ND		ug/kg	18.2	9.09	2
Cl2-BZ#8	ND		ug/kg	1.82	0.909	2
Cl3-BZ#18	ND		ug/kg	1.82	0.909	2
Cl3-BZ#28	ND		ug/kg	1.82	0.909	2
Cl4-BZ#44	ND		ug/kg	1.82	0.909	2
Cl4-BZ#49	ND		ug/kg	1.82	0.909	2
Cl4-BZ#52	ND		ug/kg	1.82	0.909	2
Cl4-BZ#66	ND		ug/kg	1.82	0.909	2
Cl5-BZ#87	ND		ug/kg	1.82	0.909	2
Cl5-BZ#101	ND		ug/kg	1.82	0.909	2
Cl5-BZ#105	ND		ug/kg	1.82	0.909	2
Cl5-BZ#118	ND		ug/kg	1.82	0.909	2
Cl6-BZ#128	ND		ug/kg	1.82	0.909	2
Cl6-BZ#138	ND		ug/kg	1.82	0.909	2
Cl6-BZ#153	ND		ug/kg	1.82	0.909	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-05 D Date Collected: 09/28/17 16:00

Client ID: MN NATIVE BACKGROUND REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.82	0.909	2
Cl7-BZ#180	ND		ug/kg	1.82	0.909	2
Cl7-BZ#183	ND		ug/kg	1.82	0.909	2
Cl7-BZ#184	ND		ug/kg	1.82	0.909	2
Cl7-BZ#187	ND		ug/kg	1.82	0.909	2
Cl8-BZ#195	ND		ug/kg	1.82	0.909	2
Cl9-BZ#206	ND		ug/kg	1.82	0.909	2
Cl10-BZ#209	ND		ug/kg	1.82	0.909	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	76		30-150
Benzo(b)fluoranthene-d12	74		30-150
DBOB	80		30-150
BZ 198	75		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-06 D
Client ID: MN LABORATORY CONTROL REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 20:09
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.8	8.93	2
Acenaphthylene	ND		ug/kg	17.8	8.93	2
Acenaphthene	ND		ug/kg	17.8	8.93	2
Fluorene	ND		ug/kg	17.8	8.93	2
Phenanthrene	ND		ug/kg	17.8	8.93	2
Anthracene	ND		ug/kg	17.8	8.93	2
Fluoranthene	ND		ug/kg	17.8	8.93	2
Pyrene	ND		ug/kg	17.8	8.93	2
Benz(a)anthracene	ND		ug/kg	17.8	8.93	2
Chrysene	ND		ug/kg	17.8	8.93	2
Benzo(b)fluoranthene	ND		ug/kg	17.8	8.93	2
Benzo(k)fluoranthene	ND		ug/kg	17.8	8.93	2
Benzo(a)pyrene	ND		ug/kg	17.8	8.93	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.8	8.93	2
Dibenz(a,h)anthracene	ND		ug/kg	17.8	8.93	2
Benzo(ghi)perylene	ND		ug/kg	17.8	8.93	2
Cl2-BZ#8	ND		ug/kg	1.78	0.893	2
Cl3-BZ#18	ND		ug/kg	1.78	0.893	2
Cl3-BZ#28	ND		ug/kg	1.78	0.893	2
Cl4-BZ#44	ND		ug/kg	1.78	0.893	2
Cl4-BZ#49	ND		ug/kg	1.78	0.893	2
Cl4-BZ#52	ND		ug/kg	1.78	0.893	2
Cl4-BZ#66	ND		ug/kg	1.78	0.893	2
Cl5-BZ#87	ND		ug/kg	1.78	0.893	2
Cl5-BZ#101	ND		ug/kg	1.78	0.893	2
Cl5-BZ#105	ND		ug/kg	1.78	0.893	2
Cl5-BZ#118	ND		ug/kg	1.78	0.893	2
Cl6-BZ#128	ND		ug/kg	1.78	0.893	2
Cl6-BZ#138	ND		ug/kg	1.78	0.893	2
Cl6-BZ#153	ND		ug/kg	1.78	0.893	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-06 D Date Collected: 09/28/17 16:30

Client ID: MN LABORATORY CONTROL REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.78	0.893	2
Cl7-BZ#180	ND		ug/kg	1.78	0.893	2
Cl7-BZ#183	ND		ug/kg	1.78	0.893	2
Cl7-BZ#184	ND		ug/kg	1.78	0.893	2
Cl7-BZ#187	ND		ug/kg	1.78	0.893	2
Cl8-BZ#195	ND		ug/kg	1.78	0.893	2
Cl9-BZ#206	ND		ug/kg	1.78	0.893	2
Cl10-BZ#209	ND		ug/kg	1.78	0.893	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	71		30-150
Benzo(b)fluoranthene-d12	70		30-150
DBOB	78		30-150
BZ 198	72		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-07 D
Client ID: MN LABORATORY CONTROL REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 20:41
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.2	8.59	2
Acenaphthylene	ND		ug/kg	17.2	8.59	2
Acenaphthene	ND		ug/kg	17.2	8.59	2
Fluorene	ND		ug/kg	17.2	8.59	2
Phenanthrene	ND		ug/kg	17.2	8.59	2
Anthracene	ND		ug/kg	17.2	8.59	2
Fluoranthene	ND		ug/kg	17.2	8.59	2
Pyrene	ND		ug/kg	17.2	8.59	2
Benz(a)anthracene	ND		ug/kg	17.2	8.59	2
Chrysene	ND		ug/kg	17.2	8.59	2
Benzo(b)fluoranthene	ND		ug/kg	17.2	8.59	2
Benzo(k)fluoranthene	ND		ug/kg	17.2	8.59	2
Benzo(a)pyrene	ND		ug/kg	17.2	8.59	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.2	8.59	2
Dibenz(a,h)anthracene	ND		ug/kg	17.2	8.59	2
Benzo(ghi)perylene	ND		ug/kg	17.2	8.59	2
Cl2-BZ#8	ND		ug/kg	1.72	0.859	2
Cl3-BZ#18	ND		ug/kg	1.72	0.859	2
Cl3-BZ#28	ND		ug/kg	1.72	0.859	2
Cl4-BZ#44	ND		ug/kg	1.72	0.859	2
Cl4-BZ#49	ND		ug/kg	1.72	0.859	2
Cl4-BZ#52	ND		ug/kg	1.72	0.859	2
Cl4-BZ#66	ND		ug/kg	1.72	0.859	2
Cl5-BZ#87	ND		ug/kg	1.72	0.859	2
Cl5-BZ#101	ND		ug/kg	1.72	0.859	2
Cl5-BZ#105	ND		ug/kg	1.72	0.859	2
Cl5-BZ#118	ND		ug/kg	1.72	0.859	2
Cl6-BZ#128	ND		ug/kg	1.72	0.859	2
Cl6-BZ#138	ND		ug/kg	1.72	0.859	2
Cl6-BZ#153	ND		ug/kg	1.72	0.859	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-07 D Date Collected: 09/28/17 16:30

Client ID: MN LABORATORY CONTROL REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.72	0.859	2
Cl7-BZ#180	ND		ug/kg	1.72	0.859	2
Cl7-BZ#183	ND		ug/kg	1.72	0.859	2
Cl7-BZ#184	ND		ug/kg	1.72	0.859	2
Cl7-BZ#187	ND		ug/kg	1.72	0.859	2
Cl8-BZ#195	ND		ug/kg	1.72	0.859	2
Cl9-BZ#206	ND		ug/kg	1.72	0.859	2
Cl10-BZ#209	ND		ug/kg	1.72	0.859	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	78		30-150
DBOB	81		30-150
BZ 198	76		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-08 D
Client ID: MN LABORATORY CONTROL REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 21:14
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.43	2
Acenaphthylene	ND		ug/kg	16.9	8.43	2
Acenaphthene	ND		ug/kg	16.9	8.43	2
Fluorene	ND		ug/kg	16.9	8.43	2
Phenanthrene	ND		ug/kg	16.9	8.43	2
Anthracene	ND		ug/kg	16.9	8.43	2
Fluoranthene	ND		ug/kg	16.9	8.43	2
Pyrene	ND		ug/kg	16.9	8.43	2
Benz(a)anthracene	ND		ug/kg	16.9	8.43	2
Chrysene	ND		ug/kg	16.9	8.43	2
Benzo(b)fluoranthene	ND		ug/kg	16.9	8.43	2
Benzo(k)fluoranthene	ND		ug/kg	16.9	8.43	2
Benzo(a)pyrene	ND		ug/kg	16.9	8.43	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	16.9	8.43	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.43	2
Benzo(ghi)perylene	ND		ug/kg	16.9	8.43	2
Cl2-BZ#8	ND		ug/kg	1.69	0.843	2
Cl3-BZ#18	ND		ug/kg	1.69	0.843	2
Cl3-BZ#28	ND		ug/kg	1.69	0.843	2
Cl4-BZ#44	ND		ug/kg	1.69	0.843	2
Cl4-BZ#49	ND		ug/kg	1.69	0.843	2
Cl4-BZ#52	ND		ug/kg	1.69	0.843	2
Cl4-BZ#66	ND		ug/kg	1.69	0.843	2
Cl5-BZ#87	ND		ug/kg	1.69	0.843	2
Cl5-BZ#101	ND		ug/kg	1.69	0.843	2
Cl5-BZ#105	ND		ug/kg	1.69	0.843	2
Cl5-BZ#118	ND		ug/kg	1.69	0.843	2
Cl6-BZ#128	ND		ug/kg	1.69	0.843	2
Cl6-BZ#138	ND		ug/kg	1.69	0.843	2
Cl6-BZ#153	ND		ug/kg	1.69	0.843	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-08 D Date Collected: 09/28/17 16:30

Client ID: MN LABORATORY CONTROL REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.843	2
Cl7-BZ#180	ND		ug/kg	1.69	0.843	2
Cl7-BZ#183	ND		ug/kg	1.69	0.843	2
Cl7-BZ#184	ND		ug/kg	1.69	0.843	2
Cl7-BZ#187	ND		ug/kg	1.69	0.843	2
Cl8-BZ#195	ND		ug/kg	1.69	0.843	2
Cl9-BZ#206	ND		ug/kg	1.69	0.843	2
Cl10-BZ#209	ND		ug/kg	1.69	0.843	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	79		30-150
Benzo(b)fluoranthene-d12	78		30-150
DBOB	78		30-150
BZ 198	74		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-09 D
Client ID: MN LABORATORY CONTROL REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 21:47
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.3	9.16	2
Acenaphthylene	ND		ug/kg	18.3	9.16	2
Acenaphthene	ND		ug/kg	18.3	9.16	2
Fluorene	ND		ug/kg	18.3	9.16	2
Phenanthrene	ND		ug/kg	18.3	9.16	2
Anthracene	ND		ug/kg	18.3	9.16	2
Fluoranthene	ND		ug/kg	18.3	9.16	2
Pyrene	ND		ug/kg	18.3	9.16	2
Benz(a)anthracene	ND		ug/kg	18.3	9.16	2
Chrysene	ND		ug/kg	18.3	9.16	2
Benzo(b)fluoranthene	ND		ug/kg	18.3	9.16	2
Benzo(k)fluoranthene	ND		ug/kg	18.3	9.16	2
Benzo(a)pyrene	ND		ug/kg	18.3	9.16	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.3	9.16	2
Dibenz(a,h)anthracene	ND		ug/kg	18.3	9.16	2
Benzo(ghi)perylene	ND		ug/kg	18.3	9.16	2
Cl2-BZ#8	ND		ug/kg	1.83	0.916	2
Cl3-BZ#18	ND		ug/kg	1.83	0.916	2
Cl3-BZ#28	ND		ug/kg	1.83	0.916	2
Cl4-BZ#44	ND		ug/kg	1.83	0.916	2
Cl4-BZ#49	ND		ug/kg	1.83	0.916	2
Cl4-BZ#52	ND		ug/kg	1.83	0.916	2
Cl4-BZ#66	ND		ug/kg	1.83	0.916	2
Cl5-BZ#87	ND		ug/kg	1.83	0.916	2
Cl5-BZ#101	ND		ug/kg	1.83	0.916	2
Cl5-BZ#105	ND		ug/kg	1.83	0.916	2
Cl5-BZ#118	ND		ug/kg	1.83	0.916	2
Cl6-BZ#128	ND		ug/kg	1.83	0.916	2
Cl6-BZ#138	ND		ug/kg	1.83	0.916	2
Cl6-BZ#153	ND		ug/kg	1.83	0.916	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-09 D Date Collected: 09/28/17 16:30

Client ID: MN LABORATORY CONTROL REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.83	0.916	2
Cl7-BZ#180	ND		ug/kg	1.83	0.916	2
Cl7-BZ#183	ND		ug/kg	1.83	0.916	2
Cl7-BZ#184	ND		ug/kg	1.83	0.916	2
Cl7-BZ#187	ND		ug/kg	1.83	0.916	2
Cl8-BZ#195	ND		ug/kg	1.83	0.916	2
Cl9-BZ#206	ND		ug/kg	1.83	0.916	2
Cl10-BZ#209	ND		ug/kg	1.83	0.916	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	54		30-150
Pyrene-d10	61		30-150
Benzo(b)fluoranthene-d12	60		30-150
DBOB	64		30-150
BZ 198	59		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-10 D
Client ID: MN LABORATORY CONTROL REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 22:19
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.40	2
Acenaphthylene	ND		ug/kg	18.8	9.40	2
Acenaphthene	13.4	J	ug/kg	18.8	9.40	2
Fluorene	ND		ug/kg	18.8	9.40	2
Phenanthrene	ND		ug/kg	18.8	9.40	2
Anthracene	ND		ug/kg	18.8	9.40	2
Fluoranthene	ND		ug/kg	18.8	9.40	2
Pyrene	ND		ug/kg	18.8	9.40	2
Benz(a)anthracene	ND		ug/kg	18.8	9.40	2
Chrysene	ND		ug/kg	18.8	9.40	2
Benzo(b)fluoranthene	ND		ug/kg	18.8	9.40	2
Benzo(k)fluoranthene	ND		ug/kg	18.8	9.40	2
Benzo(a)pyrene	ND		ug/kg	18.8	9.40	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.8	9.40	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.40	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.40	2
Cl2-BZ#8	ND		ug/kg	1.88	0.940	2
Cl3-BZ#18	ND		ug/kg	1.88	0.940	2
Cl3-BZ#28	ND		ug/kg	1.88	0.940	2
Cl4-BZ#44	ND		ug/kg	1.88	0.940	2
Cl4-BZ#49	ND		ug/kg	1.88	0.940	2
Cl4-BZ#52	ND		ug/kg	1.88	0.940	2
Cl4-BZ#66	ND		ug/kg	1.88	0.940	2
Cl5-BZ#87	ND		ug/kg	1.88	0.940	2
Cl5-BZ#101	ND		ug/kg	1.88	0.940	2
Cl5-BZ#105	ND		ug/kg	1.88	0.940	2
Cl5-BZ#118	ND		ug/kg	1.88	0.940	2
Cl6-BZ#128	ND		ug/kg	1.88	0.940	2
Cl6-BZ#138	ND		ug/kg	1.88	0.940	2
Cl6-BZ#153	ND		ug/kg	1.88	0.940	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-10 D Date Collected: 09/28/17 16:30

Client ID: MN LABORATORY CONTROL REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.940	2
Cl7-BZ#180	ND		ug/kg	1.88	0.940	2
Cl7-BZ#183	ND		ug/kg	1.88	0.940	2
Cl7-BZ#184	ND		ug/kg	1.88	0.940	2
Cl7-BZ#187	ND		ug/kg	1.88	0.940	2
Cl8-BZ#195	ND		ug/kg	1.88	0.940	2
Cl9-BZ#206	ND		ug/kg	1.88	0.940	2
Cl10-BZ#209	ND		ug/kg	1.88	0.940	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	80		30-150
BZ 198	78		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-11 D
Client ID: MN CLDS REFERENCE SEDIMENT REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 22:52
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.3	9.65	2
Acenaphthylene	ND		ug/kg	19.3	9.65	2
Acenaphthene	ND		ug/kg	19.3	9.65	2
Fluorene	ND		ug/kg	19.3	9.65	2
Phenanthrene	ND		ug/kg	19.3	9.65	2
Anthracene	ND		ug/kg	19.3	9.65	2
Fluoranthene	ND		ug/kg	19.3	9.65	2
Pyrene	ND		ug/kg	19.3	9.65	2
Benz(a)anthracene	ND		ug/kg	19.3	9.65	2
Chrysene	ND		ug/kg	19.3	9.65	2
Benzo(b)fluoranthene	ND		ug/kg	19.3	9.65	2
Benzo(k)fluoranthene	ND		ug/kg	19.3	9.65	2
Benzo(a)pyrene	ND		ug/kg	19.3	9.65	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.3	9.65	2
Dibenz(a,h)anthracene	ND		ug/kg	19.3	9.65	2
Benzo(ghi)perylene	ND		ug/kg	19.3	9.65	2
Cl2-BZ#8	ND		ug/kg	1.93	0.965	2
Cl3-BZ#18	ND		ug/kg	1.93	0.965	2
Cl3-BZ#28	ND		ug/kg	1.93	0.965	2
Cl4-BZ#44	ND		ug/kg	1.93	0.965	2
Cl4-BZ#49	ND		ug/kg	1.93	0.965	2
Cl4-BZ#52	ND		ug/kg	1.93	0.965	2
Cl4-BZ#66	ND		ug/kg	1.93	0.965	2
Cl5-BZ#87	ND		ug/kg	1.93	0.965	2
Cl5-BZ#101	ND		ug/kg	1.93	0.965	2
Cl5-BZ#105	ND		ug/kg	1.93	0.965	2
Cl5-BZ#118	ND		ug/kg	1.93	0.965	2
Cl6-BZ#128	ND		ug/kg	1.93	0.965	2
Cl6-BZ#138	ND		ug/kg	1.93	0.965	2
Cl6-BZ#153	ND		ug/kg	1.93	0.965	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-11 D Date Collected: 09/29/17 08:00

Client ID: MN CLDS REFERENCE SEDIMENT REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.93	0.965	2
Cl7-BZ#180	ND		ug/kg	1.93	0.965	2
Cl7-BZ#183	ND		ug/kg	1.93	0.965	2
Cl7-BZ#184	ND		ug/kg	1.93	0.965	2
Cl7-BZ#187	ND		ug/kg	1.93	0.965	2
Cl8-BZ#195	ND		ug/kg	1.93	0.965	2
Cl9-BZ#206	ND		ug/kg	1.93	0.965	2
Cl10-BZ#209	ND		ug/kg	1.93	0.965	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	71		30-150
Pyrene-d10	74		30-150
Benzo(b)fluoranthene-d12	73		30-150
DBOB	80		30-150
BZ 198	78		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-12 D
Client ID: MN CLDS REFERENCE SEDIMENT REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 23:25
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.0	9.01	2
Acenaphthylene	ND		ug/kg	18.0	9.01	2
Acenaphthene	ND		ug/kg	18.0	9.01	2
Fluorene	ND		ug/kg	18.0	9.01	2
Phenanthrene	ND		ug/kg	18.0	9.01	2
Anthracene	ND		ug/kg	18.0	9.01	2
Fluoranthene	ND		ug/kg	18.0	9.01	2
Pyrene	ND		ug/kg	18.0	9.01	2
Benz(a)anthracene	ND		ug/kg	18.0	9.01	2
Chrysene	ND		ug/kg	18.0	9.01	2
Benzo(b)fluoranthene	ND		ug/kg	18.0	9.01	2
Benzo(k)fluoranthene	ND		ug/kg	18.0	9.01	2
Benzo(a)pyrene	ND		ug/kg	18.0	9.01	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.0	9.01	2
Dibenz(a,h)anthracene	ND		ug/kg	18.0	9.01	2
Benzo(ghi)perylene	ND		ug/kg	18.0	9.01	2
Cl2-BZ#8	ND		ug/kg	1.80	0.901	2
Cl3-BZ#18	ND		ug/kg	1.80	0.901	2
Cl3-BZ#28	ND		ug/kg	1.80	0.901	2
Cl4-BZ#44	ND		ug/kg	1.80	0.901	2
Cl4-BZ#49	ND		ug/kg	1.80	0.901	2
Cl4-BZ#52	ND		ug/kg	1.80	0.901	2
Cl4-BZ#66	ND		ug/kg	1.80	0.901	2
Cl5-BZ#87	ND		ug/kg	1.80	0.901	2
Cl5-BZ#101	ND		ug/kg	1.80	0.901	2
Cl5-BZ#105	ND		ug/kg	1.80	0.901	2
Cl5-BZ#118	ND		ug/kg	1.80	0.901	2
Cl6-BZ#128	ND		ug/kg	1.80	0.901	2
Cl6-BZ#138	ND		ug/kg	1.80	0.901	2
Cl6-BZ#153	ND		ug/kg	1.80	0.901	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-12 D Date Collected: 09/29/17 08:00

Client ID: MN CLDS REFERENCE SEDIMENT REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.80	0.901	2
Cl7-BZ#180	ND		ug/kg	1.80	0.901	2
Cl7-BZ#183	ND		ug/kg	1.80	0.901	2
Cl7-BZ#184	ND		ug/kg	1.80	0.901	2
Cl7-BZ#187	ND		ug/kg	1.80	0.901	2
Cl8-BZ#195	ND		ug/kg	1.80	0.901	2
Cl9-BZ#206	ND		ug/kg	1.80	0.901	2
Cl10-BZ#209	ND		ug/kg	1.80	0.901	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	69		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	72		30-150
DBOB	78		30-150
BZ 198	74		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-13 D
Client ID: MN CLDS REFERENCE SEDIMENT REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/01/17 23:57
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.1	9.06	2
Acenaphthylene	ND		ug/kg	18.1	9.06	2
Acenaphthene	ND		ug/kg	18.1	9.06	2
Fluorene	ND		ug/kg	18.1	9.06	2
Phenanthrene	ND		ug/kg	18.1	9.06	2
Anthracene	ND		ug/kg	18.1	9.06	2
Fluoranthene	ND		ug/kg	18.1	9.06	2
Pyrene	ND		ug/kg	18.1	9.06	2
Benz(a)anthracene	ND		ug/kg	18.1	9.06	2
Chrysene	ND		ug/kg	18.1	9.06	2
Benzo(b)fluoranthene	ND		ug/kg	18.1	9.06	2
Benzo(k)fluoranthene	ND		ug/kg	18.1	9.06	2
Benzo(a)pyrene	ND		ug/kg	18.1	9.06	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.1	9.06	2
Dibenz(a,h)anthracene	ND		ug/kg	18.1	9.06	2
Benzo(ghi)perylene	ND		ug/kg	18.1	9.06	2
Cl2-BZ#8	ND		ug/kg	1.81	0.906	2
Cl3-BZ#18	ND		ug/kg	1.81	0.906	2
Cl3-BZ#28	ND		ug/kg	1.81	0.906	2
Cl4-BZ#44	ND		ug/kg	1.81	0.906	2
Cl4-BZ#49	ND		ug/kg	1.81	0.906	2
Cl4-BZ#52	ND		ug/kg	1.81	0.906	2
Cl4-BZ#66	ND		ug/kg	1.81	0.906	2
Cl5-BZ#87	ND		ug/kg	1.81	0.906	2
Cl5-BZ#101	ND		ug/kg	1.81	0.906	2
Cl5-BZ#105	ND		ug/kg	1.81	0.906	2
Cl5-BZ#118	ND		ug/kg	1.81	0.906	2
Cl6-BZ#128	ND		ug/kg	1.81	0.906	2
Cl6-BZ#138	ND		ug/kg	1.81	0.906	2
Cl6-BZ#153	ND		ug/kg	1.81	0.906	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-13 D Date Collected: 09/29/17 08:00

Client ID: MN CLDS REFERENCE SEDIMENT REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.81	0.906	2
Cl7-BZ#180	ND		ug/kg	1.81	0.906	2
Cl7-BZ#183	ND		ug/kg	1.81	0.906	2
Cl7-BZ#184	ND		ug/kg	1.81	0.906	2
Cl7-BZ#187	ND		ug/kg	1.81	0.906	2
Cl8-BZ#195	ND		ug/kg	1.81	0.906	2
Cl9-BZ#206	ND		ug/kg	1.81	0.906	2
Cl10-BZ#209	ND		ug/kg	1.81	0.906	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	73		30-150
DBOB	81		30-150
BZ 198	76		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-14 D
Client ID: MN CLDS REFERENCE SEDIMENT REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 00:30
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.3	8.65	2
Acenaphthylene	ND		ug/kg	17.3	8.65	2
Acenaphthene	ND		ug/kg	17.3	8.65	2
Fluorene	ND		ug/kg	17.3	8.65	2
Phenanthrene	9.37	J	ug/kg	17.3	8.65	2
Anthracene	ND		ug/kg	17.3	8.65	2
Fluoranthene	13.6	J	ug/kg	17.3	8.65	2
Pyrene	14.6	J	ug/kg	17.3	8.65	2
Benz(a)anthracene	19.0		ug/kg	17.3	8.65	2
Chrysene	ND		ug/kg	17.3	8.65	2
Benzo(b)fluoranthene	11.7	J	ug/kg	17.3	8.65	2
Benzo(k)fluoranthene	ND		ug/kg	17.3	8.65	2
Benzo(a)pyrene	ND		ug/kg	17.3	8.65	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.3	8.65	2
Dibenz(a,h)anthracene	ND		ug/kg	17.3	8.65	2
Benzo(ghi)perylene	ND		ug/kg	17.3	8.65	2
Cl2-BZ#8	ND		ug/kg	1.73	0.865	2
Cl3-BZ#18	ND		ug/kg	1.73	0.865	2
Cl3-BZ#28	ND		ug/kg	1.73	0.865	2
Cl4-BZ#44	ND		ug/kg	1.73	0.865	2
Cl4-BZ#49	ND		ug/kg	1.73	0.865	2
Cl4-BZ#52	ND		ug/kg	1.73	0.865	2
Cl4-BZ#66	ND		ug/kg	1.73	0.865	2
Cl5-BZ#87	ND		ug/kg	1.73	0.865	2
Cl5-BZ#101	ND		ug/kg	1.73	0.865	2
Cl5-BZ#105	ND		ug/kg	1.73	0.865	2
Cl5-BZ#118	ND		ug/kg	1.73	0.865	2
Cl6-BZ#128	ND		ug/kg	1.73	0.865	2
Cl6-BZ#138	ND		ug/kg	1.73	0.865	2
Cl6-BZ#153	ND		ug/kg	1.73	0.865	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-14 D Date Collected: 09/29/17 08:00

Client ID: MN CLDS REFERENCE SEDIMENT REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.73	0.865	2
Cl7-BZ#180	ND		ug/kg	1.73	0.865	2
Cl7-BZ#183	ND		ug/kg	1.73	0.865	2
Cl7-BZ#184	ND		ug/kg	1.73	0.865	2
Cl7-BZ#187	ND		ug/kg	1.73	0.865	2
Cl8-BZ#195	ND		ug/kg	1.73	0.865	2
Cl9-BZ#206	ND		ug/kg	1.73	0.865	2
Cl10-BZ#209	ND		ug/kg	1.73	0.865	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	89		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	91		30-150
BZ 198	86		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-15 D
Client ID: MN CLDS REFERENCE SEDIMENT REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 01:02
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.40	2
Acenaphthylene	ND		ug/kg	18.8	9.40	2
Acenaphthene	ND		ug/kg	18.8	9.40	2
Fluorene	ND		ug/kg	18.8	9.40	2
Phenanthrene	ND		ug/kg	18.8	9.40	2
Anthracene	ND		ug/kg	18.8	9.40	2
Fluoranthene	ND		ug/kg	18.8	9.40	2
Pyrene	ND		ug/kg	18.8	9.40	2
Benz(a)anthracene	ND		ug/kg	18.8	9.40	2
Chrysene	ND		ug/kg	18.8	9.40	2
Benzo(b)fluoranthene	ND		ug/kg	18.8	9.40	2
Benzo(k)fluoranthene	ND		ug/kg	18.8	9.40	2
Benzo(a)pyrene	ND		ug/kg	18.8	9.40	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.8	9.40	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.40	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.40	2
Cl2-BZ#8	ND		ug/kg	1.88	0.940	2
Cl3-BZ#18	ND		ug/kg	1.88	0.940	2
Cl3-BZ#28	ND		ug/kg	1.88	0.940	2
Cl4-BZ#44	ND		ug/kg	1.88	0.940	2
Cl4-BZ#49	ND		ug/kg	1.88	0.940	2
Cl4-BZ#52	ND		ug/kg	1.88	0.940	2
Cl4-BZ#66	ND		ug/kg	1.88	0.940	2
Cl5-BZ#87	ND		ug/kg	1.88	0.940	2
Cl5-BZ#101	ND		ug/kg	1.88	0.940	2
Cl5-BZ#105	ND		ug/kg	1.88	0.940	2
Cl5-BZ#118	ND		ug/kg	1.88	0.940	2
Cl6-BZ#128	ND		ug/kg	1.88	0.940	2
Cl6-BZ#138	ND		ug/kg	1.88	0.940	2
Cl6-BZ#153	ND		ug/kg	1.88	0.940	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-15 D Date Collected: 09/29/17 08:00

Client ID: MN CLDS REFERENCE SEDIMENT REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.940	2
Cl7-BZ#180	ND		ug/kg	1.88	0.940	2
Cl7-BZ#183	ND		ug/kg	1.88	0.940	2
Cl7-BZ#184	ND		ug/kg	1.88	0.940	2
Cl7-BZ#187	ND		ug/kg	1.88	0.940	2
Cl8-BZ#195	ND		ug/kg	1.88	0.940	2
Cl9-BZ#206	ND		ug/kg	1.88	0.940	2
Cl10-BZ#209	ND		ug/kg	1.88	0.940	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	81		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	83		30-150
BZ 198	83		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-16 D
Client ID: MN COMPOSITE 1 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 01:35
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.8	8.88	2
Acenaphthylene	ND		ug/kg	17.8	8.88	2
Acenaphthene	ND		ug/kg	17.8	8.88	2
Fluorene	ND		ug/kg	17.8	8.88	2
Phenanthrene	ND		ug/kg	17.8	8.88	2
Anthracene	ND		ug/kg	17.8	8.88	2
Fluoranthene	ND		ug/kg	17.8	8.88	2
Pyrene	ND		ug/kg	17.8	8.88	2
Benz(a)anthracene	ND		ug/kg	17.8	8.88	2
Chrysene	ND		ug/kg	17.8	8.88	2
Benzo(b)fluoranthene	ND		ug/kg	17.8	8.88	2
Benzo(k)fluoranthene	ND		ug/kg	17.8	8.88	2
Benzo(a)pyrene	ND		ug/kg	17.8	8.88	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.8	8.88	2
Dibenz(a,h)anthracene	ND		ug/kg	17.8	8.88	2
Benzo(ghi)perylene	ND		ug/kg	17.8	8.88	2
Cl2-BZ#8	ND		ug/kg	1.78	0.888	2
Cl3-BZ#18	ND		ug/kg	1.78	0.888	2
Cl3-BZ#28	ND		ug/kg	1.78	0.888	2
Cl4-BZ#44	ND		ug/kg	1.78	0.888	2
Cl4-BZ#49	ND		ug/kg	1.78	0.888	2
Cl4-BZ#52	ND		ug/kg	1.78	0.888	2
Cl4-BZ#66	ND		ug/kg	1.78	0.888	2
Cl5-BZ#87	ND		ug/kg	1.78	0.888	2
Cl5-BZ#101	ND		ug/kg	1.78	0.888	2
Cl5-BZ#105	ND		ug/kg	1.78	0.888	2
Cl5-BZ#118	ND		ug/kg	1.78	0.888	2
Cl6-BZ#128	ND		ug/kg	1.78	0.888	2
Cl6-BZ#138	ND		ug/kg	1.78	0.888	2
Cl6-BZ#153	ND		ug/kg	1.78	0.888	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-16 D Date Collected: 09/29/17 08:15

Client ID: MN COMPOSITE 1 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.78	0.888	2
Cl7-BZ#180	ND		ug/kg	1.78	0.888	2
Cl7-BZ#183	ND		ug/kg	1.78	0.888	2
Cl7-BZ#184	ND		ug/kg	1.78	0.888	2
Cl7-BZ#187	ND		ug/kg	1.78	0.888	2
Cl8-BZ#195	ND		ug/kg	1.78	0.888	2
Cl9-BZ#206	ND		ug/kg	1.78	0.888	2
Cl10-BZ#209	ND		ug/kg	1.78	0.888	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	65		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	68		30-150
DBOB	72		30-150
BZ 198	70		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-17 D
Client ID: MN COMPOSITE 1 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 02:07
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.46	2
Acenaphthylene	ND		ug/kg	16.9	8.46	2
Acenaphthene	ND		ug/kg	16.9	8.46	2
Fluorene	ND		ug/kg	16.9	8.46	2
Phenanthrene	ND		ug/kg	16.9	8.46	2
Anthracene	ND		ug/kg	16.9	8.46	2
Fluoranthene	ND		ug/kg	16.9	8.46	2
Pyrene	ND		ug/kg	16.9	8.46	2
Benz(a)anthracene	ND		ug/kg	16.9	8.46	2
Chrysene	ND		ug/kg	16.9	8.46	2
Benzo(b)fluoranthene	ND		ug/kg	16.9	8.46	2
Benzo(k)fluoranthene	ND		ug/kg	16.9	8.46	2
Benzo(a)pyrene	ND		ug/kg	16.9	8.46	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	16.9	8.46	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.46	2
Benzo(ghi)perylene	ND		ug/kg	16.9	8.46	2
Cl2-BZ#8	ND		ug/kg	1.69	0.846	2
Cl3-BZ#18	ND		ug/kg	1.69	0.846	2
Cl3-BZ#28	ND		ug/kg	1.69	0.846	2
Cl4-BZ#44	ND		ug/kg	1.69	0.846	2
Cl4-BZ#49	ND		ug/kg	1.69	0.846	2
Cl4-BZ#52	ND		ug/kg	1.69	0.846	2
Cl4-BZ#66	ND		ug/kg	1.69	0.846	2
Cl5-BZ#87	ND		ug/kg	1.69	0.846	2
Cl5-BZ#101	ND		ug/kg	1.69	0.846	2
Cl5-BZ#105	ND		ug/kg	1.69	0.846	2
Cl5-BZ#118	ND		ug/kg	1.69	0.846	2
Cl6-BZ#128	ND		ug/kg	1.69	0.846	2
Cl6-BZ#138	ND		ug/kg	1.69	0.846	2
Cl6-BZ#153	ND		ug/kg	1.69	0.846	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-17 D Date Collected: 09/29/17 08:15

Client ID: MN COMPOSITE 1 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.846	2
Cl7-BZ#180	ND		ug/kg	1.69	0.846	2
Cl7-BZ#183	ND		ug/kg	1.69	0.846	2
Cl7-BZ#184	ND		ug/kg	1.69	0.846	2
Cl7-BZ#187	ND		ug/kg	1.69	0.846	2
Cl8-BZ#195	ND		ug/kg	1.69	0.846	2
Cl9-BZ#206	ND		ug/kg	1.69	0.846	2
Cl10-BZ#209	ND		ug/kg	1.69	0.846	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	79		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	87		30-150
BZ 198	81		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-18 D
Client ID: MN COMPOSITE 1 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 02:40
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.5	8.74	2
Acenaphthylene	ND		ug/kg	17.5	8.74	2
Acenaphthene	ND		ug/kg	17.5	8.74	2
Fluorene	ND		ug/kg	17.5	8.74	2
Phenanthrene	ND		ug/kg	17.5	8.74	2
Anthracene	ND		ug/kg	17.5	8.74	2
Fluoranthene	ND		ug/kg	17.5	8.74	2
Pyrene	ND		ug/kg	17.5	8.74	2
Benz(a)anthracene	ND		ug/kg	17.5	8.74	2
Chrysene	ND		ug/kg	17.5	8.74	2
Benzo(b)fluoranthene	ND		ug/kg	17.5	8.74	2
Benzo(k)fluoranthene	ND		ug/kg	17.5	8.74	2
Benzo(a)pyrene	ND		ug/kg	17.5	8.74	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.5	8.74	2
Dibenz(a,h)anthracene	ND		ug/kg	17.5	8.74	2
Benzo(ghi)perylene	ND		ug/kg	17.5	8.74	2
Cl2-BZ#8	ND		ug/kg	1.75	0.874	2
Cl3-BZ#18	ND		ug/kg	1.75	0.874	2
Cl3-BZ#28	ND		ug/kg	1.75	0.874	2
Cl4-BZ#44	ND		ug/kg	1.75	0.874	2
Cl4-BZ#49	ND		ug/kg	1.75	0.874	2
Cl4-BZ#52	ND		ug/kg	1.75	0.874	2
Cl4-BZ#66	ND		ug/kg	1.75	0.874	2
Cl5-BZ#87	ND		ug/kg	1.75	0.874	2
Cl5-BZ#101	ND		ug/kg	1.75	0.874	2
Cl5-BZ#105	ND		ug/kg	1.75	0.874	2
Cl5-BZ#118	ND		ug/kg	1.75	0.874	2
Cl6-BZ#128	ND		ug/kg	1.75	0.874	2
Cl6-BZ#138	ND		ug/kg	1.75	0.874	2
Cl6-BZ#153	ND		ug/kg	1.75	0.874	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-18 D Date Collected: 09/29/17 08:15

Client ID: MN COMPOSITE 1 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.75	0.874	2
Cl7-BZ#180	ND		ug/kg	1.75	0.874	2
Cl7-BZ#183	ND		ug/kg	1.75	0.874	2
Cl7-BZ#184	ND		ug/kg	1.75	0.874	2
Cl7-BZ#187	ND		ug/kg	1.75	0.874	2
Cl8-BZ#195	ND		ug/kg	1.75	0.874	2
Cl9-BZ#206	ND		ug/kg	1.75	0.874	2
Cl10-BZ#209	ND		ug/kg	1.75	0.874	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	84		30-150
DBOB	90		30-150
BZ 198	89		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-19 D
Client ID: MN COMPOSITE 1 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 03:12
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.0	9.52	2
Acenaphthylene	ND		ug/kg	19.0	9.52	2
Acenaphthene	ND		ug/kg	19.0	9.52	2
Fluorene	ND		ug/kg	19.0	9.52	2
Phenanthrene	ND		ug/kg	19.0	9.52	2
Anthracene	ND		ug/kg	19.0	9.52	2
Fluoranthene	ND		ug/kg	19.0	9.52	2
Pyrene	ND		ug/kg	19.0	9.52	2
Benz(a)anthracene	ND		ug/kg	19.0	9.52	2
Chrysene	ND		ug/kg	19.0	9.52	2
Benzo(b)fluoranthene	ND		ug/kg	19.0	9.52	2
Benzo(k)fluoranthene	ND		ug/kg	19.0	9.52	2
Benzo(a)pyrene	ND		ug/kg	19.0	9.52	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.0	9.52	2
Dibenz(a,h)anthracene	ND		ug/kg	19.0	9.52	2
Benzo(ghi)perylene	ND		ug/kg	19.0	9.52	2
Cl2-BZ#8	ND		ug/kg	1.90	0.952	2
Cl3-BZ#18	ND		ug/kg	1.90	0.952	2
Cl3-BZ#28	ND		ug/kg	1.90	0.952	2
Cl4-BZ#44	ND		ug/kg	1.90	0.952	2
Cl4-BZ#49	ND		ug/kg	1.90	0.952	2
Cl4-BZ#52	ND		ug/kg	1.90	0.952	2
Cl4-BZ#66	ND		ug/kg	1.90	0.952	2
Cl5-BZ#87	ND		ug/kg	1.90	0.952	2
Cl5-BZ#101	ND		ug/kg	1.90	0.952	2
Cl5-BZ#105	ND		ug/kg	1.90	0.952	2
Cl5-BZ#118	ND		ug/kg	1.90	0.952	2
Cl6-BZ#128	ND		ug/kg	1.90	0.952	2
Cl6-BZ#138	ND		ug/kg	1.90	0.952	2
Cl6-BZ#153	ND		ug/kg	1.90	0.952	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-19 D Date Collected: 09/29/17 08:15

Client ID: MN COMPOSITE 1 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.90	0.952	2
Cl7-BZ#180	ND		ug/kg	1.90	0.952	2
Cl7-BZ#183	ND		ug/kg	1.90	0.952	2
Cl7-BZ#184	ND		ug/kg	1.90	0.952	2
Cl7-BZ#187	ND		ug/kg	1.90	0.952	2
Cl8-BZ#195	ND		ug/kg	1.90	0.952	2
Cl9-BZ#206	ND		ug/kg	1.90	0.952	2
Cl10-BZ#209	ND		ug/kg	1.90	0.952	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	71		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	73		30-150
DBOB	77		30-150
BZ 198	76		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-20 D
Client ID: MN COMPOSITE 1 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 03:45
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.34	2
Acenaphthylene	ND		ug/kg	18.7	9.34	2
Acenaphthene	ND		ug/kg	18.7	9.34	2
Fluorene	ND		ug/kg	18.7	9.34	2
Phenanthrene	ND		ug/kg	18.7	9.34	2
Anthracene	ND		ug/kg	18.7	9.34	2
Fluoranthene	ND		ug/kg	18.7	9.34	2
Pyrene	ND		ug/kg	18.7	9.34	2
Benz(a)anthracene	ND		ug/kg	18.7	9.34	2
Chrysene	ND		ug/kg	18.7	9.34	2
Benzo(b)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(k)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(a)pyrene	ND		ug/kg	18.7	9.34	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.7	9.34	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.34	2
Benzo(ghi)perylene	ND		ug/kg	18.7	9.34	2
Cl2-BZ#8	ND		ug/kg	1.87	0.934	2
Cl3-BZ#18	ND		ug/kg	1.87	0.934	2
Cl3-BZ#28	ND		ug/kg	1.87	0.934	2
Cl4-BZ#44	ND		ug/kg	1.87	0.934	2
Cl4-BZ#49	ND		ug/kg	1.87	0.934	2
Cl4-BZ#52	ND		ug/kg	1.87	0.934	2
Cl4-BZ#66	ND		ug/kg	1.87	0.934	2
Cl5-BZ#87	ND		ug/kg	1.87	0.934	2
Cl5-BZ#101	ND		ug/kg	1.87	0.934	2
Cl5-BZ#105	ND		ug/kg	1.87	0.934	2
Cl5-BZ#118	ND		ug/kg	1.87	0.934	2
Cl6-BZ#128	ND		ug/kg	1.87	0.934	2
Cl6-BZ#138	ND		ug/kg	1.87	0.934	2
Cl6-BZ#153	ND		ug/kg	1.87	0.934	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-20 D Date Collected: 09/29/17 08:15

Client ID: MN COMPOSITE 1 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.934	2
Cl7-BZ#180	ND		ug/kg	1.87	0.934	2
Cl7-BZ#183	ND		ug/kg	1.87	0.934	2
Cl7-BZ#184	ND		ug/kg	1.87	0.934	2
Cl7-BZ#187	ND		ug/kg	1.87	0.934	2
Cl8-BZ#195	ND		ug/kg	1.87	0.934	2
Cl9-BZ#206	ND		ug/kg	1.87	0.934	2
Cl10-BZ#209	ND		ug/kg	1.87	0.934	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	76		30-150
Pyrene-d10	80		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	81		30-150
BZ 198	82		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-21 D
Client ID: MN COMPOSITE 2 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 15:45
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.8	8.88	2
Acenaphthylene	ND		ug/kg	17.8	8.88	2
Acenaphthene	ND		ug/kg	17.8	8.88	2
Fluorene	ND		ug/kg	17.8	8.88	2
Phenanthrene	ND		ug/kg	17.8	8.88	2
Anthracene	ND		ug/kg	17.8	8.88	2
Fluoranthene	20.2		ug/kg	17.8	8.88	2
Pyrene	19.5		ug/kg	17.8	8.88	2
Benz(a)anthracene	ND		ug/kg	17.8	8.88	2
Chrysene	ND		ug/kg	17.8	8.88	2
Benzo(b)fluoranthene	ND		ug/kg	17.8	8.88	2
Benzo(k)fluoranthene	ND		ug/kg	17.8	8.88	2
Benzo(a)pyrene	ND		ug/kg	17.8	8.88	2
Indeno(1,2,3-cd)Pyrene	17.1	J	ug/kg	17.8	8.88	2
Dibenz(a,h)anthracene	ND		ug/kg	17.8	8.88	2
Benzo(ghi)perylene	ND		ug/kg	17.8	8.88	2
Cl2-BZ#8	ND		ug/kg	1.78	0.888	2
Cl3-BZ#18	ND		ug/kg	1.78	0.888	2
Cl3-BZ#28	ND		ug/kg	1.78	0.888	2
Cl4-BZ#44	ND		ug/kg	1.78	0.888	2
Cl4-BZ#49	ND		ug/kg	1.78	0.888	2
Cl4-BZ#52	ND		ug/kg	1.78	0.888	2
Cl4-BZ#66	ND		ug/kg	1.78	0.888	2
Cl5-BZ#87	ND		ug/kg	1.78	0.888	2
Cl5-BZ#101	2.01		ug/kg	1.78	0.888	2
Cl5-BZ#105	ND		ug/kg	1.78	0.888	2
Cl5-BZ#118	ND		ug/kg	1.78	0.888	2
Cl6-BZ#128	ND		ug/kg	1.78	0.888	2
Cl6-BZ#138	ND		ug/kg	1.78	0.888	2
Cl6-BZ#153	ND		ug/kg	1.78	0.888	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-21 D Date Collected: 09/29/17 08:30

Client ID: MN COMPOSITE 2 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.78	0.888	2
Cl7-BZ#180	ND		ug/kg	1.78	0.888	2
Cl7-BZ#183	ND		ug/kg	1.78	0.888	2
Cl7-BZ#184	ND		ug/kg	1.78	0.888	2
Cl7-BZ#187	ND		ug/kg	1.78	0.888	2
Cl8-BZ#195	ND		ug/kg	1.78	0.888	2
Cl9-BZ#206	ND		ug/kg	1.78	0.888	2
Cl10-BZ#209	ND		ug/kg	1.78	0.888	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	86		30-150
BZ 198	83		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-22 D
Client ID: MN COMPOSITE 2 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 18:53
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.42	2
Acenaphthylene	ND		ug/kg	18.8	9.42	2
Acenaphthene	ND		ug/kg	18.8	9.42	2
Fluorene	ND		ug/kg	18.8	9.42	2
Phenanthrene	ND		ug/kg	18.8	9.42	2
Anthracene	ND		ug/kg	18.8	9.42	2
Fluoranthene	20.1		ug/kg	18.8	9.42	2
Pyrene	20.6		ug/kg	18.8	9.42	2
Benz(a)anthracene	10.2	J	ug/kg	18.8	9.42	2
Chrysene	ND		ug/kg	18.8	9.42	2
Benzo(b)fluoranthene	ND		ug/kg	18.8	9.42	2
Benzo(k)fluoranthene	ND		ug/kg	18.8	9.42	2
Benzo(a)pyrene	ND		ug/kg	18.8	9.42	2
Indeno(1,2,3-cd)Pyrene	18.2	J	ug/kg	18.8	9.42	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.42	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.42	2
Cl2-BZ#8	ND		ug/kg	1.88	0.942	2
Cl3-BZ#18	ND		ug/kg	1.88	0.942	2
Cl3-BZ#28	ND		ug/kg	1.88	0.942	2
Cl4-BZ#44	ND		ug/kg	1.88	0.942	2
Cl4-BZ#49	ND		ug/kg	1.88	0.942	2
Cl4-BZ#52	1.10	J	ug/kg	1.88	0.942	2
Cl4-BZ#66	ND		ug/kg	1.88	0.942	2
Cl5-BZ#87	ND		ug/kg	1.88	0.942	2
Cl5-BZ#101	ND		ug/kg	1.88	0.942	2
Cl5-BZ#105	ND		ug/kg	1.88	0.942	2
Cl5-BZ#118	ND		ug/kg	1.88	0.942	2
Cl6-BZ#128	ND		ug/kg	1.88	0.942	2
Cl6-BZ#138	ND		ug/kg	1.88	0.942	2
Cl6-BZ#153	ND		ug/kg	1.88	0.942	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-22 D Date Collected: 09/29/17 08:30

Client ID: MN COMPOSITE 2 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.942	2
Cl7-BZ#180	ND		ug/kg	1.88	0.942	2
Cl7-BZ#183	ND		ug/kg	1.88	0.942	2
Cl7-BZ#184	ND		ug/kg	1.88	0.942	2
Cl7-BZ#187	ND		ug/kg	1.88	0.942	2
Cl8-BZ#195	ND		ug/kg	1.88	0.942	2
Cl9-BZ#206	ND		ug/kg	1.88	0.942	2
Cl10-BZ#209	ND		ug/kg	1.88	0.942	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	68		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-23 D
Client ID: MN COMPOSITE 2 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 19:25
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.4	8.71	2
Acenaphthylene	ND		ug/kg	17.4	8.71	2
Acenaphthene	ND		ug/kg	17.4	8.71	2
Fluorene	ND		ug/kg	17.4	8.71	2
Phenanthrene	ND		ug/kg	17.4	8.71	2
Anthracene	ND		ug/kg	17.4	8.71	2
Fluoranthene	16.8	J	ug/kg	17.4	8.71	2
Pyrene	17.5		ug/kg	17.4	8.71	2
Benz(a)anthracene	ND		ug/kg	17.4	8.71	2
Chrysene	ND		ug/kg	17.4	8.71	2
Benzo(b)fluoranthene	ND		ug/kg	17.4	8.71	2
Benzo(k)fluoranthene	ND		ug/kg	17.4	8.71	2
Benzo(a)pyrene	ND		ug/kg	17.4	8.71	2
Indeno(1,2,3-cd)Pyrene	17.1	J	ug/kg	17.4	8.71	2
Dibenz(a,h)anthracene	ND		ug/kg	17.4	8.71	2
Benzo(ghi)perylene	ND		ug/kg	17.4	8.71	2
Cl2-BZ#8	ND		ug/kg	1.74	0.871	2
Cl3-BZ#18	ND		ug/kg	1.74	0.871	2
Cl3-BZ#28	ND		ug/kg	1.74	0.871	2
Cl4-BZ#44	ND		ug/kg	1.74	0.871	2
Cl4-BZ#49	ND		ug/kg	1.74	0.871	2
Cl4-BZ#52	0.878	J	ug/kg	1.74	0.871	2
Cl4-BZ#66	ND		ug/kg	1.74	0.871	2
Cl5-BZ#87	ND		ug/kg	1.74	0.871	2
Cl5-BZ#101	1.62	J	ug/kg	1.74	0.871	2
Cl5-BZ#105	ND		ug/kg	1.74	0.871	2
Cl5-BZ#118	ND		ug/kg	1.74	0.871	2
Cl6-BZ#128	ND		ug/kg	1.74	0.871	2
Cl6-BZ#138	ND		ug/kg	1.74	0.871	2
Cl6-BZ#153	ND		ug/kg	1.74	0.871	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-23 D Date Collected: 09/29/17 08:30

Client ID: MN COMPOSITE 2 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.74	0.871	2
Cl7-BZ#180	ND		ug/kg	1.74	0.871	2
Cl7-BZ#183	ND		ug/kg	1.74	0.871	2
Cl7-BZ#184	ND		ug/kg	1.74	0.871	2
Cl7-BZ#187	ND		ug/kg	1.74	0.871	2
Cl8-BZ#195	ND		ug/kg	1.74	0.871	2
Cl9-BZ#206	ND		ug/kg	1.74	0.871	2
Cl10-BZ#209	ND		ug/kg	1.74	0.871	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	52		30-150
DBOB	55		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-24 D
Client ID: MN COMPOSITE 2 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 19:58
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.4	9.73	2
Acenaphthylene	ND		ug/kg	19.4	9.73	2
Acenaphthene	ND		ug/kg	19.4	9.73	2
Fluorene	ND		ug/kg	19.4	9.73	2
Phenanthrene	ND		ug/kg	19.4	9.73	2
Anthracene	ND		ug/kg	19.4	9.73	2
Fluoranthene	23.5		ug/kg	19.4	9.73	2
Pyrene	24.4		ug/kg	19.4	9.73	2
Benz(a)anthracene	10.2	J	ug/kg	19.4	9.73	2
Chrysene	10.1	J	ug/kg	19.4	9.73	2
Benzo(b)fluoranthene	ND		ug/kg	19.4	9.73	2
Benzo(k)fluoranthene	ND		ug/kg	19.4	9.73	2
Benzo(a)pyrene	ND		ug/kg	19.4	9.73	2
Indeno(1,2,3-cd)Pyrene	19.0	J	ug/kg	19.4	9.73	2
Dibenz(a,h)anthracene	ND		ug/kg	19.4	9.73	2
Benzo(ghi)perylene	ND		ug/kg	19.4	9.73	2
Cl2-BZ#8	ND		ug/kg	1.94	0.973	2
Cl3-BZ#18	ND		ug/kg	1.94	0.973	2
Cl3-BZ#28	ND		ug/kg	1.94	0.973	2
Cl4-BZ#44	ND		ug/kg	1.94	0.973	2
Cl4-BZ#49	ND		ug/kg	1.94	0.973	2
Cl4-BZ#52	ND		ug/kg	1.94	0.973	2
Cl4-BZ#66	ND		ug/kg	1.94	0.973	2
Cl5-BZ#87	ND		ug/kg	1.94	0.973	2
Cl5-BZ#101	1.96		ug/kg	1.94	0.973	2
Cl5-BZ#105	ND		ug/kg	1.94	0.973	2
Cl5-BZ#118	ND		ug/kg	1.94	0.973	2
Cl6-BZ#128	ND		ug/kg	1.94	0.973	2
Cl6-BZ#138	ND		ug/kg	1.94	0.973	2
Cl6-BZ#153	ND		ug/kg	1.94	0.973	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-24 D Date Collected: 09/29/17 08:30

Client ID: MN COMPOSITE 2 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.94	0.973	2
Cl7-BZ#180	ND		ug/kg	1.94	0.973	2
Cl7-BZ#183	ND		ug/kg	1.94	0.973	2
Cl7-BZ#184	ND		ug/kg	1.94	0.973	2
Cl7-BZ#187	ND		ug/kg	1.94	0.973	2
Cl8-BZ#195	ND		ug/kg	1.94	0.973	2
Cl9-BZ#206	ND		ug/kg	1.94	0.973	2
Cl10-BZ#209	ND		ug/kg	1.94	0.973	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	66		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-25 D
Client ID: MN COMPOSITE 2 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 20:30
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.6	8.79	2
Acenaphthylene	ND		ug/kg	17.6	8.79	2
Acenaphthene	ND		ug/kg	17.6	8.79	2
Fluorene	ND		ug/kg	17.6	8.79	2
Phenanthrene	13.1	J	ug/kg	17.6	8.79	2
Anthracene	ND		ug/kg	17.6	8.79	2
Fluoranthene	36.9		ug/kg	17.6	8.79	2
Pyrene	36.8		ug/kg	17.6	8.79	2
Benz(a)anthracene	28.3		ug/kg	17.6	8.79	2
Chrysene	16.9	J	ug/kg	17.6	8.79	2
Benzo(b)fluoranthene	15.4	J	ug/kg	17.6	8.79	2
Benzo(k)fluoranthene	9.21	J	ug/kg	17.6	8.79	2
Benzo(a)pyrene	9.64	J	ug/kg	17.6	8.79	2
Indeno(1,2,3-cd)Pyrene	20.0		ug/kg	17.6	8.79	2
Dibenz(a,h)anthracene	ND		ug/kg	17.6	8.79	2
Benzo(ghi)perylene	ND		ug/kg	17.6	8.79	2
Cl2-BZ#8	ND		ug/kg	1.76	0.879	2
Cl3-BZ#18	ND		ug/kg	1.76	0.879	2
Cl3-BZ#28	ND		ug/kg	1.76	0.879	2
Cl4-BZ#44	2.65		ug/kg	1.76	0.879	2
Cl4-BZ#49	ND		ug/kg	1.76	0.879	2
Cl4-BZ#52	1.06	J	ug/kg	1.76	0.879	2
Cl4-BZ#66	ND		ug/kg	1.76	0.879	2
Cl5-BZ#87	ND		ug/kg	1.76	0.879	2
Cl5-BZ#101	2.68		ug/kg	1.76	0.879	2
Cl5-BZ#105	ND		ug/kg	1.76	0.879	2
Cl5-BZ#118	ND		ug/kg	1.76	0.879	2
Cl6-BZ#128	ND		ug/kg	1.76	0.879	2
Cl6-BZ#138	ND		ug/kg	1.76	0.879	2
Cl6-BZ#153	ND		ug/kg	1.76	0.879	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-25 D Date Collected: 09/29/17 08:30

Client ID: MN COMPOSITE 2 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.76	0.879	2
Cl7-BZ#180	ND		ug/kg	1.76	0.879	2
Cl7-BZ#183	ND		ug/kg	1.76	0.879	2
Cl7-BZ#184	ND		ug/kg	1.76	0.879	2
Cl7-BZ#187	ND		ug/kg	1.76	0.879	2
Cl8-BZ#195	ND		ug/kg	1.76	0.879	2
Cl9-BZ#206	ND		ug/kg	1.76	0.879	2
Cl10-BZ#209	ND		ug/kg	1.76	0.879	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	73		30-150
DBOB	73		30-150
BZ 198	69		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-26 D
Client ID: MN COMPOSITE 3 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 21:01
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.42	2
Acenaphthylene	ND		ug/kg	18.8	9.42	2
Acenaphthene	ND		ug/kg	18.8	9.42	2
Fluorene	ND		ug/kg	18.8	9.42	2
Phenanthrene	ND		ug/kg	18.8	9.42	2
Anthracene	ND		ug/kg	18.8	9.42	2
Fluoranthene	ND		ug/kg	18.8	9.42	2
Pyrene	ND		ug/kg	18.8	9.42	2
Benz(a)anthracene	ND		ug/kg	18.8	9.42	2
Chrysene	ND		ug/kg	18.8	9.42	2
Benzo(b)fluoranthene	ND		ug/kg	18.8	9.42	2
Benzo(k)fluoranthene	ND		ug/kg	18.8	9.42	2
Benzo(a)pyrene	ND		ug/kg	18.8	9.42	2
Indeno(1,2,3-cd)Pyrene	16.8	J	ug/kg	18.8	9.42	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.42	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.42	2
Cl2-BZ#8	ND		ug/kg	1.88	0.942	2
Cl3-BZ#18	ND		ug/kg	1.88	0.942	2
Cl3-BZ#28	ND		ug/kg	1.88	0.942	2
Cl4-BZ#44	2.06		ug/kg	1.88	0.942	2
Cl4-BZ#49	ND		ug/kg	1.88	0.942	2
Cl4-BZ#52	ND		ug/kg	1.88	0.942	2
Cl4-BZ#66	ND		ug/kg	1.88	0.942	2
Cl5-BZ#87	ND		ug/kg	1.88	0.942	2
Cl5-BZ#101	1.80	J	ug/kg	1.88	0.942	2
Cl5-BZ#105	ND		ug/kg	1.88	0.942	2
Cl5-BZ#118	ND		ug/kg	1.88	0.942	2
Cl6-BZ#128	ND		ug/kg	1.88	0.942	2
Cl6-BZ#138	ND		ug/kg	1.88	0.942	2
Cl6-BZ#153	ND		ug/kg	1.88	0.942	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-26 D Date Collected: 09/29/17 08:45

Client ID: MN COMPOSITE 3 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.942	2
Cl7-BZ#180	ND		ug/kg	1.88	0.942	2
Cl7-BZ#183	ND		ug/kg	1.88	0.942	2
Cl7-BZ#184	ND		ug/kg	1.88	0.942	2
Cl7-BZ#187	ND		ug/kg	1.88	0.942	2
Cl8-BZ#195	ND		ug/kg	1.88	0.942	2
Cl9-BZ#206	ND		ug/kg	1.88	0.942	2
Cl10-BZ#209	ND		ug/kg	1.88	0.942	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	64		30-150
Pyrene-d10	74		30-150
Benzo(b)fluoranthene-d12	72		30-150
DBOB	72		30-150
BZ 198	70		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-27 D
Client ID: MN COMPOSITE 3 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 21:33
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.2	9.09	2
Acenaphthylene	ND		ug/kg	18.2	9.09	2
Acenaphthene	ND		ug/kg	18.2	9.09	2
Fluorene	ND		ug/kg	18.2	9.09	2
Phenanthrene	ND		ug/kg	18.2	9.09	2
Anthracene	ND		ug/kg	18.2	9.09	2
Fluoranthene	10.2	J	ug/kg	18.2	9.09	2
Pyrene	10.0	J	ug/kg	18.2	9.09	2
Benz(a)anthracene	12.0	J	ug/kg	18.2	9.09	2
Chrysene	ND		ug/kg	18.2	9.09	2
Benzo(b)fluoranthene	ND		ug/kg	18.2	9.09	2
Benzo(k)fluoranthene	ND		ug/kg	18.2	9.09	2
Benzo(a)pyrene	ND		ug/kg	18.2	9.09	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.2	9.09	2
Dibenz(a,h)anthracene	ND		ug/kg	18.2	9.09	2
Benzo(ghi)perylene	ND		ug/kg	18.2	9.09	2
Cl2-BZ#8	ND		ug/kg	1.82	0.909	2
Cl3-BZ#18	ND		ug/kg	1.82	0.909	2
Cl3-BZ#28	ND		ug/kg	1.82	0.909	2
Cl4-BZ#44	2.35		ug/kg	1.82	0.909	2
Cl4-BZ#49	ND		ug/kg	1.82	0.909	2
Cl4-BZ#52	ND		ug/kg	1.82	0.909	2
Cl4-BZ#66	ND		ug/kg	1.82	0.909	2
Cl5-BZ#87	ND		ug/kg	1.82	0.909	2
Cl5-BZ#101	2.23		ug/kg	1.82	0.909	2
Cl5-BZ#105	ND		ug/kg	1.82	0.909	2
Cl5-BZ#118	ND		ug/kg	1.82	0.909	2
Cl6-BZ#128	ND		ug/kg	1.82	0.909	2
Cl6-BZ#138	ND		ug/kg	1.82	0.909	2
Cl6-BZ#153	ND		ug/kg	1.82	0.909	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-27 D Date Collected: 09/29/17 08:45

Client ID: MN COMPOSITE 3 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.82	0.909	2
Cl7-BZ#180	ND		ug/kg	1.82	0.909	2
Cl7-BZ#183	ND		ug/kg	1.82	0.909	2
Cl7-BZ#184	ND		ug/kg	1.82	0.909	2
Cl7-BZ#187	ND		ug/kg	1.82	0.909	2
Cl8-BZ#195	ND		ug/kg	1.82	0.909	2
Cl9-BZ#206	ND		ug/kg	1.82	0.909	2
Cl10-BZ#209	ND		ug/kg	1.82	0.909	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	72		30-150
DBOB	76		30-150
BZ 198	73		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-28 D
Client ID: MN COMPOSITE 3 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 22:05
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.47	2
Acenaphthylene	ND		ug/kg	16.9	8.47	2
Acenaphthene	ND		ug/kg	16.9	8.47	2
Fluorene	ND		ug/kg	16.9	8.47	2
Phenanthrene	ND		ug/kg	16.9	8.47	2
Anthracene	ND		ug/kg	16.9	8.47	2
Fluoranthene	13.0	J	ug/kg	16.9	8.47	2
Pyrene	12.8	J	ug/kg	16.9	8.47	2
Benz(a)anthracene	9.55	J	ug/kg	16.9	8.47	2
Chrysene	ND		ug/kg	16.9	8.47	2
Benzo(b)fluoranthene	ND		ug/kg	16.9	8.47	2
Benzo(k)fluoranthene	ND		ug/kg	16.9	8.47	2
Benzo(a)pyrene	ND		ug/kg	16.9	8.47	2
Indeno(1,2,3-cd)Pyrene	16.2	J	ug/kg	16.9	8.47	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.47	2
Benzo(ghi)perylene	ND		ug/kg	16.9	8.47	2
Cl2-BZ#8	ND		ug/kg	1.69	0.847	2
Cl3-BZ#18	ND		ug/kg	1.69	0.847	2
Cl3-BZ#28	ND		ug/kg	1.69	0.847	2
Cl4-BZ#44	1.73		ug/kg	1.69	0.847	2
Cl4-BZ#49	ND		ug/kg	1.69	0.847	2
Cl4-BZ#52	ND		ug/kg	1.69	0.847	2
Cl4-BZ#66	ND		ug/kg	1.69	0.847	2
Cl5-BZ#87	ND		ug/kg	1.69	0.847	2
Cl5-BZ#101	1.93		ug/kg	1.69	0.847	2
Cl5-BZ#105	ND		ug/kg	1.69	0.847	2
Cl5-BZ#118	ND		ug/kg	1.69	0.847	2
Cl6-BZ#128	ND		ug/kg	1.69	0.847	2
Cl6-BZ#138	ND		ug/kg	1.69	0.847	2
Cl6-BZ#153	ND		ug/kg	1.69	0.847	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-28 D Date Collected: 09/29/17 08:45

Client ID: MN COMPOSITE 3 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.847	2
Cl7-BZ#180	ND		ug/kg	1.69	0.847	2
Cl7-BZ#183	ND		ug/kg	1.69	0.847	2
Cl7-BZ#184	ND		ug/kg	1.69	0.847	2
Cl7-BZ#187	ND		ug/kg	1.69	0.847	2
Cl8-BZ#195	ND		ug/kg	1.69	0.847	2
Cl9-BZ#206	ND		ug/kg	1.69	0.847	2
Cl10-BZ#209	ND		ug/kg	1.69	0.847	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	69		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-29 D
Client ID: MN COMPOSITE 3 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 22:37
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.8	9.92	2
Acenaphthylene	ND		ug/kg	19.8	9.92	2
Acenaphthene	ND		ug/kg	19.8	9.92	2
Fluorene	ND		ug/kg	19.8	9.92	2
Phenanthrene	ND		ug/kg	19.8	9.92	2
Anthracene	ND		ug/kg	19.8	9.92	2
Fluoranthene	12.7	J	ug/kg	19.8	9.92	2
Pyrene	12.6	J	ug/kg	19.8	9.92	2
Benz(a)anthracene	ND		ug/kg	19.8	9.92	2
Chrysene	ND		ug/kg	19.8	9.92	2
Benzo(b)fluoranthene	ND		ug/kg	19.8	9.92	2
Benzo(k)fluoranthene	ND		ug/kg	19.8	9.92	2
Benzo(a)pyrene	ND		ug/kg	19.8	9.92	2
Indeno(1,2,3-cd)Pyrene	18.0	J	ug/kg	19.8	9.92	2
Dibenz(a,h)anthracene	ND		ug/kg	19.8	9.92	2
Benzo(ghi)perylene	ND		ug/kg	19.8	9.92	2
Cl2-BZ#8	ND		ug/kg	1.98	0.992	2
Cl3-BZ#18	ND		ug/kg	1.98	0.992	2
Cl3-BZ#28	ND		ug/kg	1.98	0.992	2
Cl4-BZ#44	2.27		ug/kg	1.98	0.992	2
Cl4-BZ#49	ND		ug/kg	1.98	0.992	2
Cl4-BZ#52	ND		ug/kg	1.98	0.992	2
Cl4-BZ#66	ND		ug/kg	1.98	0.992	2
Cl5-BZ#87	ND		ug/kg	1.98	0.992	2
Cl5-BZ#101	2.16		ug/kg	1.98	0.992	2
Cl5-BZ#105	ND		ug/kg	1.98	0.992	2
Cl5-BZ#118	ND		ug/kg	1.98	0.992	2
Cl6-BZ#128	ND		ug/kg	1.98	0.992	2
Cl6-BZ#138	ND		ug/kg	1.98	0.992	2
Cl6-BZ#153	ND		ug/kg	1.98	0.992	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-29 D Date Collected: 09/29/17 08:45

Client ID: MN COMPOSITE 3 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.98	0.992	2
Cl7-BZ#180	ND		ug/kg	1.98	0.992	2
Cl7-BZ#183	ND		ug/kg	1.98	0.992	2
Cl7-BZ#184	ND		ug/kg	1.98	0.992	2
Cl7-BZ#187	ND		ug/kg	1.98	0.992	2
Cl8-BZ#195	ND		ug/kg	1.98	0.992	2
Cl9-BZ#206	ND		ug/kg	1.98	0.992	2
Cl10-BZ#209	ND		ug/kg	1.98	0.992	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	71		30-150
BZ 198	72		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-30 D
Client ID: MN COMPOSITE 3 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 23:08
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.38	2
Acenaphthylene	ND		ug/kg	18.8	9.38	2
Acenaphthene	ND		ug/kg	18.8	9.38	2
Fluorene	ND		ug/kg	18.8	9.38	2
Phenanthrene	ND		ug/kg	18.8	9.38	2
Anthracene	ND		ug/kg	18.8	9.38	2
Fluoranthene	13.5	J	ug/kg	18.8	9.38	2
Pyrene	11.4	J	ug/kg	18.8	9.38	2
Benz(a)anthracene	15.3	J	ug/kg	18.8	9.38	2
Chrysene	ND		ug/kg	18.8	9.38	2
Benzo(b)fluoranthene	ND		ug/kg	18.8	9.38	2
Benzo(k)fluoranthene	ND		ug/kg	18.8	9.38	2
Benzo(a)pyrene	ND		ug/kg	18.8	9.38	2
Indeno(1,2,3-cd)Pyrene	17.4	J	ug/kg	18.8	9.38	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.38	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.38	2
Cl2-BZ#8	ND		ug/kg	1.88	0.938	2
Cl3-BZ#18	ND		ug/kg	1.88	0.938	2
Cl3-BZ#28	ND		ug/kg	1.88	0.938	2
Cl4-BZ#44	2.41		ug/kg	1.88	0.938	2
Cl4-BZ#49	ND		ug/kg	1.88	0.938	2
Cl4-BZ#52	ND		ug/kg	1.88	0.938	2
Cl4-BZ#66	ND		ug/kg	1.88	0.938	2
Cl5-BZ#87	ND		ug/kg	1.88	0.938	2
Cl5-BZ#101	1.60	J	ug/kg	1.88	0.938	2
Cl5-BZ#105	ND		ug/kg	1.88	0.938	2
Cl5-BZ#118	ND		ug/kg	1.88	0.938	2
Cl6-BZ#128	ND		ug/kg	1.88	0.938	2
Cl6-BZ#138	ND		ug/kg	1.88	0.938	2
Cl6-BZ#153	ND		ug/kg	1.88	0.938	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-30 D Date Collected: 09/29/17 08:45

Client ID: MN COMPOSITE 3 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.938	2
Cl7-BZ#180	ND		ug/kg	1.88	0.938	2
Cl7-BZ#183	ND		ug/kg	1.88	0.938	2
Cl7-BZ#184	ND		ug/kg	1.88	0.938	2
Cl7-BZ#187	ND		ug/kg	1.88	0.938	2
Cl8-BZ#195	ND		ug/kg	1.88	0.938	2
Cl9-BZ#206	ND		ug/kg	1.88	0.938	2
Cl10-BZ#209	ND		ug/kg	1.88	0.938	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	68		30-150
BZ 198	66		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-31 D
Client ID: MN COMPOSITE 4 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 23:40
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.46	2
Acenaphthylene	ND		ug/kg	16.9	8.46	2
Acenaphthene	ND		ug/kg	16.9	8.46	2
Fluorene	ND		ug/kg	16.9	8.46	2
Phenanthrene	ND		ug/kg	16.9	8.46	2
Anthracene	ND		ug/kg	16.9	8.46	2
Fluoranthene	46.6		ug/kg	16.9	8.46	2
Pyrene	54.8		ug/kg	16.9	8.46	2
Benz(a)anthracene	31.7		ug/kg	16.9	8.46	2
Chrysene	24.8		ug/kg	16.9	8.46	2
Benzo(b)fluoranthene	21.3		ug/kg	16.9	8.46	2
Benzo(k)fluoranthene	12.3	J	ug/kg	16.9	8.46	2
Benzo(a)pyrene	13.5	J	ug/kg	16.9	8.46	2
Indeno(1,2,3-cd)Pyrene	19.9		ug/kg	16.9	8.46	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.46	2
Benzo(ghi)perylene	ND		ug/kg	16.9	8.46	2
Cl2-BZ#8	ND		ug/kg	1.69	0.846	2
Cl3-BZ#18	ND		ug/kg	1.69	0.846	2
Cl3-BZ#28	ND		ug/kg	1.69	0.846	2
Cl4-BZ#44	2.12		ug/kg	1.69	0.846	2
Cl4-BZ#49	ND		ug/kg	1.69	0.846	2
Cl4-BZ#52	0.865	J	ug/kg	1.69	0.846	2
Cl4-BZ#66	ND		ug/kg	1.69	0.846	2
Cl5-BZ#87	ND		ug/kg	1.69	0.846	2
Cl5-BZ#101	2.38		ug/kg	1.69	0.846	2
Cl5-BZ#105	ND		ug/kg	1.69	0.846	2
Cl5-BZ#118	ND		ug/kg	1.69	0.846	2
Cl6-BZ#128	ND		ug/kg	1.69	0.846	2
Cl6-BZ#138	ND		ug/kg	1.69	0.846	2
Cl6-BZ#153	0.897	J	ug/kg	1.69	0.846	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-31 D Date Collected: 09/29/17 09:00

Client ID: MN COMPOSITE 4 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.846	2
Cl7-BZ#180	ND		ug/kg	1.69	0.846	2
Cl7-BZ#183	ND		ug/kg	1.69	0.846	2
Cl7-BZ#184	ND		ug/kg	1.69	0.846	2
Cl7-BZ#187	ND		ug/kg	1.69	0.846	2
Cl8-BZ#195	ND		ug/kg	1.69	0.846	2
Cl9-BZ#206	ND		ug/kg	1.69	0.846	2
Cl10-BZ#209	ND		ug/kg	1.69	0.846	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	67		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-32 D
Client ID: MN COMPOSITE 4 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 00:12
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.5	8.74	2
Acenaphthylene	ND		ug/kg	17.5	8.74	2
Acenaphthene	ND		ug/kg	17.5	8.74	2
Fluorene	ND		ug/kg	17.5	8.74	2
Phenanthrene	9.23	J	ug/kg	17.5	8.74	2
Anthracene	ND		ug/kg	17.5	8.74	2
Fluoranthene	57.4		ug/kg	17.5	8.74	2
Pyrene	59.8		ug/kg	17.5	8.74	2
Benz(a)anthracene	36.8		ug/kg	17.5	8.74	2
Chrysene	29.6		ug/kg	17.5	8.74	2
Benzo(b)fluoranthene	25.9		ug/kg	17.5	8.74	2
Benzo(k)fluoranthene	16.1	J	ug/kg	17.5	8.74	2
Benzo(a)pyrene	16.4	J	ug/kg	17.5	8.74	2
Indeno(1,2,3-cd)Pyrene	21.7		ug/kg	17.5	8.74	2
Dibenz(a,h)anthracene	ND		ug/kg	17.5	8.74	2
Benzo(ghi)perylene	ND		ug/kg	17.5	8.74	2
Cl2-BZ#8	ND		ug/kg	1.75	0.874	2
Cl3-BZ#18	ND		ug/kg	1.75	0.874	2
Cl3-BZ#28	ND		ug/kg	1.75	0.874	2
Cl4-BZ#44	2.58		ug/kg	1.75	0.874	2
Cl4-BZ#49	ND		ug/kg	1.75	0.874	2
Cl4-BZ#52	ND		ug/kg	1.75	0.874	2
Cl4-BZ#66	ND		ug/kg	1.75	0.874	2
Cl5-BZ#87	ND		ug/kg	1.75	0.874	2
Cl5-BZ#101	2.98		ug/kg	1.75	0.874	2
Cl5-BZ#105	ND		ug/kg	1.75	0.874	2
Cl5-BZ#118	0.968	J	ug/kg	1.75	0.874	2
Cl6-BZ#128	ND		ug/kg	1.75	0.874	2
Cl6-BZ#138	1.22	J	ug/kg	1.75	0.874	2
Cl6-BZ#153	1.14	J	ug/kg	1.75	0.874	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-32 D Date Collected: 09/29/17 09:00

Client ID: MN COMPOSITE 4 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.75	0.874	2
Cl7-BZ#180	ND		ug/kg	1.75	0.874	2
Cl7-BZ#183	ND		ug/kg	1.75	0.874	2
Cl7-BZ#184	ND		ug/kg	1.75	0.874	2
Cl7-BZ#187	ND		ug/kg	1.75	0.874	2
Cl8-BZ#195	ND		ug/kg	1.75	0.874	2
Cl9-BZ#206	ND		ug/kg	1.75	0.874	2
Cl10-BZ#209	ND		ug/kg	1.75	0.874	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	72		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-33 D
Client ID: MN COMPOSITE 4 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 00:43
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.42	2
Acenaphthylene	ND		ug/kg	18.8	9.42	2
Acenaphthene	ND		ug/kg	18.8	9.42	2
Fluorene	ND		ug/kg	18.8	9.42	2
Phenanthrene	ND		ug/kg	18.8	9.42	2
Anthracene	ND		ug/kg	18.8	9.42	2
Fluoranthene	35.9		ug/kg	18.8	9.42	2
Pyrene	41.0		ug/kg	18.8	9.42	2
Benz(a)anthracene	26.7		ug/kg	18.8	9.42	2
Chrysene	17.2	J	ug/kg	18.8	9.42	2
Benzo(b)fluoranthene	15.1	J	ug/kg	18.8	9.42	2
Benzo(k)fluoranthene	9.69	J	ug/kg	18.8	9.42	2
Benzo(a)pyrene	ND		ug/kg	18.8	9.42	2
Indeno(1,2,3-cd)Pyrene	19.2		ug/kg	18.8	9.42	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.42	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.42	2
Cl2-BZ#8	ND		ug/kg	1.88	0.942	2
Cl3-BZ#18	ND		ug/kg	1.88	0.942	2
Cl3-BZ#28	ND		ug/kg	1.88	0.942	2
Cl4-BZ#44	2.89		ug/kg	1.88	0.942	2
Cl4-BZ#49	ND		ug/kg	1.88	0.942	2
Cl4-BZ#52	0.958	J	ug/kg	1.88	0.942	2
Cl4-BZ#66	0.970	J	ug/kg	1.88	0.942	2
Cl5-BZ#87	ND		ug/kg	1.88	0.942	2
Cl5-BZ#101	2.39		ug/kg	1.88	0.942	2
Cl5-BZ#105	ND		ug/kg	1.88	0.942	2
Cl5-BZ#118	ND		ug/kg	1.88	0.942	2
Cl6-BZ#128	ND		ug/kg	1.88	0.942	2
Cl6-BZ#138	ND		ug/kg	1.88	0.942	2
Cl6-BZ#153	ND		ug/kg	1.88	0.942	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-33 D Date Collected: 09/29/17 09:00

Client ID: MN COMPOSITE 4 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.942	2
Cl7-BZ#180	ND		ug/kg	1.88	0.942	2
Cl7-BZ#183	ND		ug/kg	1.88	0.942	2
Cl7-BZ#184	ND		ug/kg	1.88	0.942	2
Cl7-BZ#187	ND		ug/kg	1.88	0.942	2
Cl8-BZ#195	ND		ug/kg	1.88	0.942	2
Cl9-BZ#206	ND		ug/kg	1.88	0.942	2
Cl10-BZ#209	ND		ug/kg	1.88	0.942	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	70		30-150
DBOB	70		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-34 D
Client ID: MN COMPOSITE 4 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 01:15
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.46	2
Acenaphthylene	ND		ug/kg	16.9	8.46	2
Acenaphthene	ND		ug/kg	16.9	8.46	2
Fluorene	ND		ug/kg	16.9	8.46	2
Phenanthrene	13.0	J	ug/kg	16.9	8.46	2
Anthracene	ND		ug/kg	16.9	8.46	2
Fluoranthene	77.2		ug/kg	16.9	8.46	2
Pyrene	87.3		ug/kg	16.9	8.46	2
Benz(a)anthracene	42.2		ug/kg	16.9	8.46	2
Chrysene	35.2		ug/kg	16.9	8.46	2
Benzo(b)fluoranthene	30.4		ug/kg	16.9	8.46	2
Benzo(k)fluoranthene	17.3		ug/kg	16.9	8.46	2
Benzo(a)pyrene	20.0		ug/kg	16.9	8.46	2
Indeno(1,2,3-cd)Pyrene	23.1		ug/kg	16.9	8.46	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.46	2
Benzo(ghi)perylene	10.4	J	ug/kg	16.9	8.46	2
Cl2-BZ#8	ND		ug/kg	1.69	0.846	2
Cl3-BZ#18	ND		ug/kg	1.69	0.846	2
Cl3-BZ#28	ND		ug/kg	1.69	0.846	2
Cl4-BZ#44	3.48		ug/kg	1.69	0.846	2
Cl4-BZ#49	ND		ug/kg	1.69	0.846	2
Cl4-BZ#52	ND		ug/kg	1.69	0.846	2
Cl4-BZ#66	ND		ug/kg	1.69	0.846	2
Cl5-BZ#87	ND		ug/kg	1.69	0.846	2
Cl5-BZ#101	3.21		ug/kg	1.69	0.846	2
Cl5-BZ#105	ND		ug/kg	1.69	0.846	2
Cl5-BZ#118	0.997	J	ug/kg	1.69	0.846	2
Cl6-BZ#128	ND		ug/kg	1.69	0.846	2
Cl6-BZ#138	1.14	J	ug/kg	1.69	0.846	2
Cl6-BZ#153	1.21	J	ug/kg	1.69	0.846	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-34 D Date Collected: 09/29/17 09:00

Client ID: MN COMPOSITE 4 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.846	2
Cl7-BZ#180	ND		ug/kg	1.69	0.846	2
Cl7-BZ#183	ND		ug/kg	1.69	0.846	2
Cl7-BZ#184	ND		ug/kg	1.69	0.846	2
Cl7-BZ#187	ND		ug/kg	1.69	0.846	2
Cl8-BZ#195	ND		ug/kg	1.69	0.846	2
Cl9-BZ#206	ND		ug/kg	1.69	0.846	2
Cl10-BZ#209	ND		ug/kg	1.69	0.846	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	77		30-150
Benzo(b)fluoranthene-d12	74		30-150
DBOB	77		30-150
BZ 198	75		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-35 D
Client ID: MN COMPOSITE 4 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 01:47
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.7	9.86	2
Acenaphthylene	ND		ug/kg	19.7	9.86	2
Acenaphthene	ND		ug/kg	19.7	9.86	2
Fluorene	ND		ug/kg	19.7	9.86	2
Phenanthrene	ND		ug/kg	19.7	9.86	2
Anthracene	ND		ug/kg	19.7	9.86	2
Fluoranthene	64.5		ug/kg	19.7	9.86	2
Pyrene	73.3		ug/kg	19.7	9.86	2
Benz(a)anthracene	44.0		ug/kg	19.7	9.86	2
Chrysene	37.7		ug/kg	19.7	9.86	2
Benzo(b)fluoranthene	31.4		ug/kg	19.7	9.86	2
Benzo(k)fluoranthene	18.7	J	ug/kg	19.7	9.86	2
Benzo(a)pyrene	21.5		ug/kg	19.7	9.86	2
Indeno(1,2,3-cd)Pyrene	25.5		ug/kg	19.7	9.86	2
Dibenz(a,h)anthracene	ND		ug/kg	19.7	9.86	2
Benzo(ghi)perylene	10.5	J	ug/kg	19.7	9.86	2
Cl2-BZ#8	ND		ug/kg	1.97	0.986	2
Cl3-BZ#18	ND		ug/kg	1.97	0.986	2
Cl3-BZ#28	ND		ug/kg	1.97	0.986	2
Cl4-BZ#44	ND		ug/kg	1.97	0.986	2
Cl4-BZ#49	ND		ug/kg	1.97	0.986	2
Cl4-BZ#52	ND		ug/kg	1.97	0.986	2
Cl4-BZ#66	ND		ug/kg	1.97	0.986	2
Cl5-BZ#87	ND		ug/kg	1.97	0.986	2
Cl5-BZ#101	2.42		ug/kg	1.97	0.986	2
Cl5-BZ#105	ND		ug/kg	1.97	0.986	2
Cl5-BZ#118	ND		ug/kg	1.97	0.986	2
Cl6-BZ#128	ND		ug/kg	1.97	0.986	2
Cl6-BZ#138	ND		ug/kg	1.97	0.986	2
Cl6-BZ#153	ND		ug/kg	1.97	0.986	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-35 D Date Collected: 09/29/17 09:00

Client ID: MN COMPOSITE 4 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.97	0.986	2
Cl7-BZ#180	ND		ug/kg	1.97	0.986	2
Cl7-BZ#183	ND		ug/kg	1.97	0.986	2
Cl7-BZ#184	ND		ug/kg	1.97	0.986	2
Cl7-BZ#187	ND		ug/kg	1.97	0.986	2
Cl8-BZ#195	ND		ug/kg	1.97	0.986	2
Cl9-BZ#206	ND		ug/kg	1.97	0.986	2
Cl10-BZ#209	ND		ug/kg	1.97	0.986	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	70		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	70		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-36 D
Client ID: MN COMPOSITE 5 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 02:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.0	8.52	2
Acenaphthylene	ND		ug/kg	17.0	8.52	2
Acenaphthene	ND		ug/kg	17.0	8.52	2
Fluorene	ND		ug/kg	17.0	8.52	2
Phenanthrene	9.22	J	ug/kg	17.0	8.52	2
Anthracene	ND		ug/kg	17.0	8.52	2
Fluoranthene	37.2		ug/kg	17.0	8.52	2
Pyrene	33.9		ug/kg	17.0	8.52	2
Benz(a)anthracene	21.9		ug/kg	17.0	8.52	2
Chrysene	15.6	J	ug/kg	17.0	8.52	2
Benzo(b)fluoranthene	13.9	J	ug/kg	17.0	8.52	2
Benzo(k)fluoranthene	ND		ug/kg	17.0	8.52	2
Benzo(a)pyrene	ND		ug/kg	17.0	8.52	2
Indeno(1,2,3-cd)Pyrene	18.3		ug/kg	17.0	8.52	2
Dibenz(a,h)anthracene	ND		ug/kg	17.0	8.52	2
Benzo(ghi)perylene	ND		ug/kg	17.0	8.52	2
Cl2-BZ#8	ND		ug/kg	1.70	0.852	2
Cl3-BZ#18	ND		ug/kg	1.70	0.852	2
Cl3-BZ#28	ND		ug/kg	1.70	0.852	2
Cl4-BZ#44	2.41		ug/kg	1.70	0.852	2
Cl4-BZ#49	ND		ug/kg	1.70	0.852	2
Cl4-BZ#52	0.865	J	ug/kg	1.70	0.852	2
Cl4-BZ#66	ND		ug/kg	1.70	0.852	2
Cl5-BZ#87	ND		ug/kg	1.70	0.852	2
Cl5-BZ#101	2.64		ug/kg	1.70	0.852	2
Cl5-BZ#105	ND		ug/kg	1.70	0.852	2
Cl5-BZ#118	ND		ug/kg	1.70	0.852	2
Cl6-BZ#128	ND		ug/kg	1.70	0.852	2
Cl6-BZ#138	0.853	J	ug/kg	1.70	0.852	2
Cl6-BZ#153	ND		ug/kg	1.70	0.852	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-36 D Date Collected: 09/29/17 09:30

Client ID: MN COMPOSITE 5 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.70	0.852	2
Cl7-BZ#180	ND		ug/kg	1.70	0.852	2
Cl7-BZ#183	ND		ug/kg	1.70	0.852	2
Cl7-BZ#184	ND		ug/kg	1.70	0.852	2
Cl7-BZ#187	ND		ug/kg	1.70	0.852	2
Cl8-BZ#195	ND		ug/kg	1.70	0.852	2
Cl9-BZ#206	ND		ug/kg	1.70	0.852	2
Cl10-BZ#209	ND		ug/kg	1.70	0.852	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	62		30-150
DBOB	72		30-150
BZ 198	70		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-37 D
Client ID: MN COMPOSITE 5 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 02:50
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.43	2
Acenaphthylene	ND		ug/kg	16.9	8.43	2
Acenaphthene	ND		ug/kg	16.9	8.43	2
Fluorene	ND		ug/kg	16.9	8.43	2
Phenanthrene	9.83	J	ug/kg	16.9	8.43	2
Anthracene	ND		ug/kg	16.9	8.43	2
Fluoranthene	40.0		ug/kg	16.9	8.43	2
Pyrene	33.9		ug/kg	16.9	8.43	2
Benz(a)anthracene	25.8		ug/kg	16.9	8.43	2
Chrysene	17.3		ug/kg	16.9	8.43	2
Benzo(b)fluoranthene	14.4	J	ug/kg	16.9	8.43	2
Benzo(k)fluoranthene	9.06	J	ug/kg	16.9	8.43	2
Benzo(a)pyrene	ND		ug/kg	16.9	8.43	2
Indeno(1,2,3-cd)Pyrene	18.9		ug/kg	16.9	8.43	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.43	2
Benzo(ghi)perylene	ND		ug/kg	16.9	8.43	2
Cl2-BZ#8	ND		ug/kg	1.69	0.843	2
Cl3-BZ#18	ND		ug/kg	1.69	0.843	2
Cl3-BZ#28	ND		ug/kg	1.69	0.843	2
Cl4-BZ#44	3.62		ug/kg	1.69	0.843	2
Cl4-BZ#49	ND		ug/kg	1.69	0.843	2
Cl4-BZ#52	1.24	J	ug/kg	1.69	0.843	2
Cl4-BZ#66	ND		ug/kg	1.69	0.843	2
Cl5-BZ#87	ND		ug/kg	1.69	0.843	2
Cl5-BZ#101	2.56		ug/kg	1.69	0.843	2
Cl5-BZ#105	ND		ug/kg	1.69	0.843	2
Cl5-BZ#118	ND		ug/kg	1.69	0.843	2
Cl6-BZ#128	ND		ug/kg	1.69	0.843	2
Cl6-BZ#138	ND		ug/kg	1.69	0.843	2
Cl6-BZ#153	ND		ug/kg	1.69	0.843	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-37 D Date Collected: 09/29/17 09:30

Client ID: MN COMPOSITE 5 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.843	2
Cl7-BZ#180	ND		ug/kg	1.69	0.843	2
Cl7-BZ#183	ND		ug/kg	1.69	0.843	2
Cl7-BZ#184	ND		ug/kg	1.69	0.843	2
Cl7-BZ#187	ND		ug/kg	1.69	0.843	2
Cl8-BZ#195	ND		ug/kg	1.69	0.843	2
Cl9-BZ#206	ND		ug/kg	1.69	0.843	2
Cl10-BZ#209	ND		ug/kg	1.69	0.843	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	56		30-150
Pyrene-d10	66		30-150
Benzo(b)fluoranthene-d12	62		30-150
DBOB	67		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-38 D
Client ID: MN COMPOSITE 5 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 03:22
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.7	8.36	2
Acenaphthylene	ND		ug/kg	16.7	8.36	2
Acenaphthene	ND		ug/kg	16.7	8.36	2
Fluorene	ND		ug/kg	16.7	8.36	2
Phenanthrene	9.12	J	ug/kg	16.7	8.36	2
Anthracene	ND		ug/kg	16.7	8.36	2
Fluoranthene	41.7		ug/kg	16.7	8.36	2
Pyrene	37.5		ug/kg	16.7	8.36	2
Benz(a)anthracene	24.5		ug/kg	16.7	8.36	2
Chrysene	18.1		ug/kg	16.7	8.36	2
Benzo(b)fluoranthene	14.8	J	ug/kg	16.7	8.36	2
Benzo(k)fluoranthene	ND		ug/kg	16.7	8.36	2
Benzo(a)pyrene	8.54	J	ug/kg	16.7	8.36	2
Indeno(1,2,3-cd)Pyrene	18.7		ug/kg	16.7	8.36	2
Dibenz(a,h)anthracene	ND		ug/kg	16.7	8.36	2
Benzo(ghi)perylene	ND		ug/kg	16.7	8.36	2
Cl2-BZ#8	ND		ug/kg	1.67	0.836	2
Cl3-BZ#18	ND		ug/kg	1.67	0.836	2
Cl3-BZ#28	ND		ug/kg	1.67	0.836	2
Cl4-BZ#44	2.32		ug/kg	1.67	0.836	2
Cl4-BZ#49	ND		ug/kg	1.67	0.836	2
Cl4-BZ#52	1.05	J	ug/kg	1.67	0.836	2
Cl4-BZ#66	ND		ug/kg	1.67	0.836	2
Cl5-BZ#87	ND		ug/kg	1.67	0.836	2
Cl5-BZ#101	3.13		ug/kg	1.67	0.836	2
Cl5-BZ#105	ND		ug/kg	1.67	0.836	2
Cl5-BZ#118	ND		ug/kg	1.67	0.836	2
Cl6-BZ#128	ND		ug/kg	1.67	0.836	2
Cl6-BZ#138	0.993	J	ug/kg	1.67	0.836	2
Cl6-BZ#153	1.16	J	ug/kg	1.67	0.836	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-38 D Date Collected: 09/29/17 09:30

Client ID: MN COMPOSITE 5 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.67	0.836	2
Cl7-BZ#180	ND		ug/kg	1.67	0.836	2
Cl7-BZ#183	ND		ug/kg	1.67	0.836	2
Cl7-BZ#184	ND		ug/kg	1.67	0.836	2
Cl7-BZ#187	ND		ug/kg	1.67	0.836	2
Cl8-BZ#195	ND		ug/kg	1.67	0.836	2
Cl9-BZ#206	ND		ug/kg	1.67	0.836	2
Cl10-BZ#209	ND		ug/kg	1.67	0.836	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	68		30-150
BZ 198	64		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-39 D
Client ID: MN COMPOSITE 5 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 03:53
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.7	8.83	2
Acenaphthylene	ND		ug/kg	17.7	8.83	2
Acenaphthene	ND		ug/kg	17.7	8.83	2
Fluorene	ND		ug/kg	17.7	8.83	2
Phenanthrene	14.2	J	ug/kg	17.7	8.83	2
Anthracene	ND		ug/kg	17.7	8.83	2
Fluoranthene	53.6		ug/kg	17.7	8.83	2
Pyrene	50.2		ug/kg	17.7	8.83	2
Benz(a)anthracene	30.0		ug/kg	17.7	8.83	2
Chrysene	23.6		ug/kg	17.7	8.83	2
Benzo(b)fluoranthene	17.8		ug/kg	17.7	8.83	2
Benzo(k)fluoranthene	9.85	J	ug/kg	17.7	8.83	2
Benzo(a)pyrene	10.7	J	ug/kg	17.7	8.83	2
Indeno(1,2,3-cd)Pyrene	20.1		ug/kg	17.7	8.83	2
Dibenz(a,h)anthracene	ND		ug/kg	17.7	8.83	2
Benzo(ghi)perylene	ND		ug/kg	17.7	8.83	2
Cl2-BZ#8	ND		ug/kg	1.77	0.883	2
Cl3-BZ#18	ND		ug/kg	1.77	0.883	2
Cl3-BZ#28	ND		ug/kg	1.77	0.883	2
Cl4-BZ#44	2.66		ug/kg	1.77	0.883	2
Cl4-BZ#49	1.05	J	ug/kg	1.77	0.883	2
Cl4-BZ#52	1.42	J	ug/kg	1.77	0.883	2
Cl4-BZ#66	1.04	J	ug/kg	1.77	0.883	2
Cl5-BZ#87	ND		ug/kg	1.77	0.883	2
Cl5-BZ#101	3.01		ug/kg	1.77	0.883	2
Cl5-BZ#105	ND		ug/kg	1.77	0.883	2
Cl5-BZ#118	ND		ug/kg	1.77	0.883	2
Cl6-BZ#128	ND		ug/kg	1.77	0.883	2
Cl6-BZ#138	1.26	J	ug/kg	1.77	0.883	2
Cl6-BZ#153	1.49	J	ug/kg	1.77	0.883	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-39 D Date Collected: 09/29/17 09:30

Client ID: MN COMPOSITE 5 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.77	0.883	2
Cl7-BZ#180	ND		ug/kg	1.77	0.883	2
Cl7-BZ#183	ND		ug/kg	1.77	0.883	2
Cl7-BZ#184	ND		ug/kg	1.77	0.883	2
Cl7-BZ#187	ND		ug/kg	1.77	0.883	2
Cl8-BZ#195	ND		ug/kg	1.77	0.883	2
Cl9-BZ#206	ND		ug/kg	1.77	0.883	2
Cl10-BZ#209	ND		ug/kg	1.77	0.883	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	70		30-150
BZ 198	70		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-40 D
Client ID: MN COMPOSITE 5 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/04/17 04:25
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.7	8.36	2
Acenaphthylene	ND		ug/kg	16.7	8.36	2
Acenaphthene	ND		ug/kg	16.7	8.36	2
Fluorene	ND		ug/kg	16.7	8.36	2
Phenanthrene	ND		ug/kg	16.7	8.36	2
Anthracene	ND		ug/kg	16.7	8.36	2
Fluoranthene	35.7		ug/kg	16.7	8.36	2
Pyrene	32.0		ug/kg	16.7	8.36	2
Benz(a)anthracene	22.3		ug/kg	16.7	8.36	2
Chrysene	15.4	J	ug/kg	16.7	8.36	2
Benzo(b)fluoranthene	14.1	J	ug/kg	16.7	8.36	2
Benzo(k)fluoranthene	ND		ug/kg	16.7	8.36	2
Benzo(a)pyrene	ND		ug/kg	16.7	8.36	2
Indeno(1,2,3-cd)Pyrene	18.5		ug/kg	16.7	8.36	2
Dibenz(a,h)anthracene	ND		ug/kg	16.7	8.36	2
Benzo(ghi)perylene	ND		ug/kg	16.7	8.36	2
Cl2-BZ#8	ND		ug/kg	1.67	0.836	2
Cl3-BZ#18	ND		ug/kg	1.67	0.836	2
Cl3-BZ#28	ND		ug/kg	1.67	0.836	2
Cl4-BZ#44	2.34		ug/kg	1.67	0.836	2
Cl4-BZ#49	ND		ug/kg	1.67	0.836	2
Cl4-BZ#52	1.56	J	ug/kg	1.67	0.836	2
Cl4-BZ#66	0.970	J	ug/kg	1.67	0.836	2
Cl5-BZ#87	ND		ug/kg	1.67	0.836	2
Cl5-BZ#101	2.43		ug/kg	1.67	0.836	2
Cl5-BZ#105	ND		ug/kg	1.67	0.836	2
Cl5-BZ#118	ND		ug/kg	1.67	0.836	2
Cl6-BZ#128	ND		ug/kg	1.67	0.836	2
Cl6-BZ#138	1.30	J	ug/kg	1.67	0.836	2
Cl6-BZ#153	0.885	J	ug/kg	1.67	0.836	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-40 D Date Collected: 09/29/17 09:30

Client ID: MN COMPOSITE 5 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.67	0.836	2
Cl7-BZ#180	ND		ug/kg	1.67	0.836	2
Cl7-BZ#183	ND		ug/kg	1.67	0.836	2
Cl7-BZ#184	ND		ug/kg	1.67	0.836	2
Cl7-BZ#187	ND		ug/kg	1.67	0.836	2
Cl8-BZ#195	ND		ug/kg	1.67	0.836	2
Cl9-BZ#206	ND		ug/kg	1.67	0.836	2
Cl10-BZ#209	ND		ug/kg	1.67	0.836	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	71		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-41 D
Client ID: MN COMPOSITE 6 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 16:38
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.3	9.14	2
Acenaphthylene	ND		ug/kg	18.3	9.14	2
Acenaphthene	11.2	J	ug/kg	18.3	9.14	2
Fluorene	ND		ug/kg	18.3	9.14	2
Phenanthrene	23.1		ug/kg	18.3	9.14	2
Anthracene	ND		ug/kg	18.3	9.14	2
Fluoranthene	82.4		ug/kg	18.3	9.14	2
Pyrene	68.4		ug/kg	18.3	9.14	2
Benz(a)anthracene	41.5		ug/kg	18.3	9.14	2
Chrysene	39.3		ug/kg	18.3	9.14	2
Benzo(b)fluoranthene	27.5		ug/kg	18.3	9.14	2
Benzo(k)fluoranthene	13.1	J	ug/kg	18.3	9.14	2
Benzo(a)pyrene	17.6	J	ug/kg	18.3	9.14	2
Indeno(1,2,3-cd)Pyrene	15.6	J	ug/kg	18.3	9.14	2
Dibenz(a,h)anthracene	ND		ug/kg	18.3	9.14	2
Benzo(ghi)perylene	ND		ug/kg	18.3	9.14	2
Cl2-BZ#8	ND		ug/kg	1.83	0.914	2
Cl3-BZ#18	ND		ug/kg	1.83	0.914	2
Cl3-BZ#28	ND		ug/kg	1.83	0.914	2
Cl4-BZ#44	2.44		ug/kg	1.83	0.914	2
Cl4-BZ#49	1.52	J	ug/kg	1.83	0.914	2
Cl4-BZ#52	3.16		ug/kg	1.83	0.914	2
Cl4-BZ#66	1.59	J	ug/kg	1.83	0.914	2
Cl5-BZ#87	ND		ug/kg	1.83	0.914	2
Cl5-BZ#101	4.20		ug/kg	1.83	0.914	2
Cl5-BZ#105	1.32	J	ug/kg	1.83	0.914	2
Cl5-BZ#118	1.22	J	ug/kg	1.83	0.914	2
Cl6-BZ#128	ND		ug/kg	1.83	0.914	2
Cl6-BZ#138	1.65	J	ug/kg	1.83	0.914	2
Cl6-BZ#153	1.58	J	ug/kg	1.83	0.914	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-41 D Date Collected: 09/29/17 10:00

Client ID: MN COMPOSITE 6 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.83	0.914	2
Cl7-BZ#180	ND		ug/kg	1.83	0.914	2
Cl7-BZ#183	ND		ug/kg	1.83	0.914	2
Cl7-BZ#184	ND		ug/kg	1.83	0.914	2
Cl7-BZ#187	ND		ug/kg	1.83	0.914	2
Cl8-BZ#195	ND		ug/kg	1.83	0.914	2
Cl9-BZ#206	ND		ug/kg	1.83	0.914	2
Cl10-BZ#209	ND		ug/kg	1.83	0.914	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	47		30-150
Pyrene-d10	56		30-150
Benzo(b)fluoranthene-d12	50		30-150
DBOB	57		30-150
BZ 198	52		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-42 D
Client ID: MN COMPOSITE 6 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 18:47
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.1	9.06	2
Acenaphthylene	ND		ug/kg	18.1	9.06	2
Acenaphthene	ND		ug/kg	18.1	9.06	2
Fluorene	ND		ug/kg	18.1	9.06	2
Phenanthrene	16.4	J	ug/kg	18.1	9.06	2
Anthracene	ND		ug/kg	18.1	9.06	2
Fluoranthene	66.2		ug/kg	18.1	9.06	2
Pyrene	56.0		ug/kg	18.1	9.06	2
Benz(a)anthracene	34.9		ug/kg	18.1	9.06	2
Chrysene	31.8		ug/kg	18.1	9.06	2
Benzo(b)fluoranthene	22.5		ug/kg	18.1	9.06	2
Benzo(k)fluoranthene	11.5	J	ug/kg	18.1	9.06	2
Benzo(a)pyrene	12.7	J	ug/kg	18.1	9.06	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.1	9.06	2
Dibenz(a,h)anthracene	ND		ug/kg	18.1	9.06	2
Benzo(ghi)perylene	ND		ug/kg	18.1	9.06	2
Cl2-BZ#8	ND		ug/kg	1.81	0.906	2
Cl3-BZ#18	ND		ug/kg	1.81	0.906	2
Cl3-BZ#28	ND		ug/kg	1.81	0.906	2
Cl4-BZ#44	2.39		ug/kg	1.81	0.906	2
Cl4-BZ#49	1.32	J	ug/kg	1.81	0.906	2
Cl4-BZ#52	2.79		ug/kg	1.81	0.906	2
Cl4-BZ#66	1.43	J	ug/kg	1.81	0.906	2
Cl5-BZ#87	ND		ug/kg	1.81	0.906	2
Cl5-BZ#101	2.83		ug/kg	1.81	0.906	2
Cl5-BZ#105	ND		ug/kg	1.81	0.906	2
Cl5-BZ#118	1.28	J	ug/kg	1.81	0.906	2
Cl6-BZ#128	ND		ug/kg	1.81	0.906	2
Cl6-BZ#138	1.66	J	ug/kg	1.81	0.906	2
Cl6-BZ#153	1.30	J	ug/kg	1.81	0.906	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-42 D Date Collected: 09/29/17 10:00

Client ID: MN COMPOSITE 6 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.81	0.906	2
Cl7-BZ#180	ND		ug/kg	1.81	0.906	2
Cl7-BZ#183	ND		ug/kg	1.81	0.906	2
Cl7-BZ#184	ND		ug/kg	1.81	0.906	2
Cl7-BZ#187	ND		ug/kg	1.81	0.906	2
Cl8-BZ#195	ND		ug/kg	1.81	0.906	2
Cl9-BZ#206	ND		ug/kg	1.81	0.906	2
Cl10-BZ#209	ND		ug/kg	1.81	0.906	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	42		30-150
Pyrene-d10	50		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	51		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-43 D
Client ID: MN COMPOSITE 6 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 19:19
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.4	8.68	2
Acenaphthylene	ND		ug/kg	17.4	8.68	2
Acenaphthene	ND		ug/kg	17.4	8.68	2
Fluorene	ND		ug/kg	17.4	8.68	2
Phenanthrene	21.4		ug/kg	17.4	8.68	2
Anthracene	ND		ug/kg	17.4	8.68	2
Fluoranthene	78.8		ug/kg	17.4	8.68	2
Pyrene	67.3		ug/kg	17.4	8.68	2
Benz(a)anthracene	42.6		ug/kg	17.4	8.68	2
Chrysene	34.9		ug/kg	17.4	8.68	2
Benzo(b)fluoranthene	26.9		ug/kg	17.4	8.68	2
Benzo(k)fluoranthene	11.3	J	ug/kg	17.4	8.68	2
Benzo(a)pyrene	16.5	J	ug/kg	17.4	8.68	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.4	8.68	2
Dibenz(a,h)anthracene	ND		ug/kg	17.4	8.68	2
Benzo(ghi)perylene	9.38	J	ug/kg	17.4	8.68	2
Cl2-BZ#8	ND		ug/kg	1.74	0.868	2
Cl3-BZ#18	ND		ug/kg	1.74	0.868	2
Cl3-BZ#28	ND		ug/kg	1.74	0.868	2
Cl4-BZ#44	2.57		ug/kg	1.74	0.868	2
Cl4-BZ#49	1.32	J	ug/kg	1.74	0.868	2
Cl4-BZ#52	2.80		ug/kg	1.74	0.868	2
Cl4-BZ#66	1.56	J	ug/kg	1.74	0.868	2
Cl5-BZ#87	1.09	J	ug/kg	1.74	0.868	2
Cl5-BZ#101	3.23		ug/kg	1.74	0.868	2
Cl5-BZ#105	1.63	J	ug/kg	1.74	0.868	2
Cl5-BZ#118	1.48	J	ug/kg	1.74	0.868	2
Cl6-BZ#128	ND		ug/kg	1.74	0.868	2
Cl6-BZ#138	2.14		ug/kg	1.74	0.868	2
Cl6-BZ#153	1.34	J	ug/kg	1.74	0.868	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-43 D Date Collected: 09/29/17 10:00

Client ID: MN COMPOSITE 6 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.74	0.868	2
Cl7-BZ#180	ND		ug/kg	1.74	0.868	2
Cl7-BZ#183	ND		ug/kg	1.74	0.868	2
Cl7-BZ#184	ND		ug/kg	1.74	0.868	2
Cl7-BZ#187	ND		ug/kg	1.74	0.868	2
Cl8-BZ#195	ND		ug/kg	1.74	0.868	2
Cl9-BZ#206	ND		ug/kg	1.74	0.868	2
Cl10-BZ#209	ND		ug/kg	1.74	0.868	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	38		30-150
Pyrene-d10	44		30-150
Benzo(b)fluoranthene-d12	41		30-150
DBOB	46		30-150
BZ 198	46		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-44 D
Client ID: MN COMPOSITE 6 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 19:52
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.36	2
Acenaphthylene	ND		ug/kg	18.7	9.36	2
Acenaphthene	ND		ug/kg	18.7	9.36	2
Fluorene	ND		ug/kg	18.7	9.36	2
Phenanthrene	23.8		ug/kg	18.7	9.36	2
Anthracene	ND		ug/kg	18.7	9.36	2
Fluoranthene	92.6		ug/kg	18.7	9.36	2
Pyrene	80.5		ug/kg	18.7	9.36	2
Benz(a)anthracene	47.0		ug/kg	18.7	9.36	2
Chrysene	39.4		ug/kg	18.7	9.36	2
Benzo(b)fluoranthene	29.3		ug/kg	18.7	9.36	2
Benzo(k)fluoranthene	14.9	J	ug/kg	18.7	9.36	2
Benzo(a)pyrene	16.3	J	ug/kg	18.7	9.36	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.7	9.36	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.36	2
Benzo(ghi)perylene	10.9	J	ug/kg	18.7	9.36	2
Cl2-BZ#8	ND		ug/kg	1.87	0.936	2
Cl3-BZ#18	ND		ug/kg	1.87	0.936	2
Cl3-BZ#28	ND		ug/kg	1.87	0.936	2
Cl4-BZ#44	2.68		ug/kg	1.87	0.936	2
Cl4-BZ#49	1.31	J	ug/kg	1.87	0.936	2
Cl4-BZ#52	2.41		ug/kg	1.87	0.936	2
Cl4-BZ#66	1.42	J	ug/kg	1.87	0.936	2
Cl5-BZ#87	0.983	J	ug/kg	1.87	0.936	2
Cl5-BZ#101	3.08		ug/kg	1.87	0.936	2
Cl5-BZ#105	1.30	J	ug/kg	1.87	0.936	2
Cl5-BZ#118	1.28	J	ug/kg	1.87	0.936	2
Cl6-BZ#128	ND		ug/kg	1.87	0.936	2
Cl6-BZ#138	1.65	J	ug/kg	1.87	0.936	2
Cl6-BZ#153	1.49	J	ug/kg	1.87	0.936	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-44 D Date Collected: 09/29/17 10:00

Client ID: MN COMPOSITE 6 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.936	2
Cl7-BZ#180	ND		ug/kg	1.87	0.936	2
Cl7-BZ#183	ND		ug/kg	1.87	0.936	2
Cl7-BZ#184	ND		ug/kg	1.87	0.936	2
Cl7-BZ#187	ND		ug/kg	1.87	0.936	2
Cl8-BZ#195	ND		ug/kg	1.87	0.936	2
Cl9-BZ#206	ND		ug/kg	1.87	0.936	2
Cl10-BZ#209	ND		ug/kg	1.87	0.936	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	48		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	56		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-45 D
Client ID: MN COMPOSITE 6 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 20:24
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.4	9.21	2
Acenaphthylene	ND		ug/kg	18.4	9.21	2
Acenaphthene	ND		ug/kg	18.4	9.21	2
Fluorene	ND		ug/kg	18.4	9.21	2
Phenanthrene	15.6	J	ug/kg	18.4	9.21	2
Anthracene	ND		ug/kg	18.4	9.21	2
Fluoranthene	62.3		ug/kg	18.4	9.21	2
Pyrene	52.8		ug/kg	18.4	9.21	2
Benz(a)anthracene	33.0		ug/kg	18.4	9.21	2
Chrysene	25.8		ug/kg	18.4	9.21	2
Benzo(b)fluoranthene	22.1		ug/kg	18.4	9.21	2
Benzo(k)fluoranthene	9.34	J	ug/kg	18.4	9.21	2
Benzo(a)pyrene	11.6	J	ug/kg	18.4	9.21	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.4	9.21	2
Dibenz(a,h)anthracene	ND		ug/kg	18.4	9.21	2
Benzo(ghi)perylene	ND		ug/kg	18.4	9.21	2
Cl2-BZ#8	ND		ug/kg	1.84	0.921	2
Cl3-BZ#18	ND		ug/kg	1.84	0.921	2
Cl3-BZ#28	ND		ug/kg	1.84	0.921	2
Cl4-BZ#44	1.85		ug/kg	1.84	0.921	2
Cl4-BZ#49	1.23	J	ug/kg	1.84	0.921	2
Cl4-BZ#52	2.27		ug/kg	1.84	0.921	2
Cl4-BZ#66	1.18	J	ug/kg	1.84	0.921	2
Cl5-BZ#87	ND		ug/kg	1.84	0.921	2
Cl5-BZ#101	2.74		ug/kg	1.84	0.921	2
Cl5-BZ#105	ND		ug/kg	1.84	0.921	2
Cl5-BZ#118	1.03	J	ug/kg	1.84	0.921	2
Cl6-BZ#128	ND		ug/kg	1.84	0.921	2
Cl6-BZ#138	1.70	J	ug/kg	1.84	0.921	2
Cl6-BZ#153	1.41	J	ug/kg	1.84	0.921	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-45 D Date Collected: 09/29/17 10:00

Client ID: MN COMPOSITE 6 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.84	0.921	2
Cl7-BZ#180	ND		ug/kg	1.84	0.921	2
Cl7-BZ#183	ND		ug/kg	1.84	0.921	2
Cl7-BZ#184	ND		ug/kg	1.84	0.921	2
Cl7-BZ#187	ND		ug/kg	1.84	0.921	2
Cl8-BZ#195	ND		ug/kg	1.84	0.921	2
Cl9-BZ#206	ND		ug/kg	1.84	0.921	2
Cl10-BZ#209	ND		ug/kg	1.84	0.921	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	39		30-150
Pyrene-d10	45		30-150
Benzo(b)fluoranthene-d12	42		30-150
DBOB	48		30-150
BZ 198	49		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-46 D
Client ID: MN COMPOSITE 7 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 20:56
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.8	8.40	2
Acenaphthylene	ND		ug/kg	16.8	8.40	2
Acenaphthene	11.6	J	ug/kg	16.8	8.40	2
Fluorene	ND		ug/kg	16.8	8.40	2
Phenanthrene	18.7		ug/kg	16.8	8.40	2
Anthracene	ND		ug/kg	16.8	8.40	2
Fluoranthene	89.2		ug/kg	16.8	8.40	2
Pyrene	74.4		ug/kg	16.8	8.40	2
Benz(a)anthracene	46.7		ug/kg	16.8	8.40	2
Chrysene	36.2		ug/kg	16.8	8.40	2
Benzo(b)fluoranthene	30.1		ug/kg	16.8	8.40	2
Benzo(k)fluoranthene	11.8	J	ug/kg	16.8	8.40	2
Benzo(a)pyrene	15.5	J	ug/kg	16.8	8.40	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	16.8	8.40	2
Dibenz(a,h)anthracene	ND		ug/kg	16.8	8.40	2
Benzo(ghi)perylene	8.75	J	ug/kg	16.8	8.40	2
Cl2-BZ#8	2.66		ug/kg	1.68	0.840	2
Cl3-BZ#18	ND		ug/kg	1.68	0.840	2
Cl3-BZ#28	ND		ug/kg	1.68	0.840	2
Cl4-BZ#44	2.24		ug/kg	1.68	0.840	2
Cl4-BZ#49	1.99		ug/kg	1.68	0.840	2
Cl4-BZ#52	2.87		ug/kg	1.68	0.840	2
Cl4-BZ#66	1.46	J	ug/kg	1.68	0.840	2
Cl5-BZ#87	ND		ug/kg	1.68	0.840	2
Cl5-BZ#101	2.54		ug/kg	1.68	0.840	2
Cl5-BZ#105	ND		ug/kg	1.68	0.840	2
Cl5-BZ#118	1.17	J	ug/kg	1.68	0.840	2
Cl6-BZ#128	ND		ug/kg	1.68	0.840	2
Cl6-BZ#138	1.38	J	ug/kg	1.68	0.840	2
Cl6-BZ#153	1.32	J	ug/kg	1.68	0.840	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-46 D Date Collected: 09/29/17 10:15

Client ID: MN COMPOSITE 7 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.68	0.840	2
Cl7-BZ#180	ND		ug/kg	1.68	0.840	2
Cl7-BZ#183	ND		ug/kg	1.68	0.840	2
Cl7-BZ#184	ND		ug/kg	1.68	0.840	2
Cl7-BZ#187	ND		ug/kg	1.68	0.840	2
Cl8-BZ#195	ND		ug/kg	1.68	0.840	2
Cl9-BZ#206	ND		ug/kg	1.68	0.840	2
Cl10-BZ#209	ND		ug/kg	1.68	0.840	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	43		30-150
Pyrene-d10	53		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	52		30-150
BZ 198	52		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-47 D
Client ID: MN COMPOSITE 7 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 21:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.3	8.64	2
Acenaphthylene	ND		ug/kg	17.3	8.64	2
Acenaphthene	ND		ug/kg	17.3	8.64	2
Fluorene	ND		ug/kg	17.3	8.64	2
Phenanthrene	16.9	J	ug/kg	17.3	8.64	2
Anthracene	ND		ug/kg	17.3	8.64	2
Fluoranthene	71.1		ug/kg	17.3	8.64	2
Pyrene	60.1		ug/kg	17.3	8.64	2
Benz(a)anthracene	36.8		ug/kg	17.3	8.64	2
Chrysene	29.6		ug/kg	17.3	8.64	2
Benzo(b)fluoranthene	25.6		ug/kg	17.3	8.64	2
Benzo(k)fluoranthene	10.6	J	ug/kg	17.3	8.64	2
Benzo(a)pyrene	13.0	J	ug/kg	17.3	8.64	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.3	8.64	2
Dibenz(a,h)anthracene	ND		ug/kg	17.3	8.64	2
Benzo(ghi)perylene	ND		ug/kg	17.3	8.64	2
Cl2-BZ#8	ND		ug/kg	1.73	0.864	2
Cl3-BZ#18	ND		ug/kg	1.73	0.864	2
Cl3-BZ#28	ND		ug/kg	1.73	0.864	2
Cl4-BZ#44	2.93		ug/kg	1.73	0.864	2
Cl4-BZ#49	1.50	J	ug/kg	1.73	0.864	2
Cl4-BZ#52	3.14		ug/kg	1.73	0.864	2
Cl4-BZ#66	1.17	J	ug/kg	1.73	0.864	2
Cl5-BZ#87	ND		ug/kg	1.73	0.864	2
Cl5-BZ#101	2.47		ug/kg	1.73	0.864	2
Cl5-BZ#105	ND		ug/kg	1.73	0.864	2
Cl5-BZ#118	ND		ug/kg	1.73	0.864	2
Cl6-BZ#128	ND		ug/kg	1.73	0.864	2
Cl6-BZ#138	1.29	J	ug/kg	1.73	0.864	2
Cl6-BZ#153	1.60	J	ug/kg	1.73	0.864	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-47 D Date Collected: 09/29/17 10:15

Client ID: MN COMPOSITE 7 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.73	0.864	2
Cl7-BZ#180	ND		ug/kg	1.73	0.864	2
Cl7-BZ#183	ND		ug/kg	1.73	0.864	2
Cl7-BZ#184	ND		ug/kg	1.73	0.864	2
Cl7-BZ#187	ND		ug/kg	1.73	0.864	2
Cl8-BZ#195	ND		ug/kg	1.73	0.864	2
Cl9-BZ#206	ND		ug/kg	1.73	0.864	2
Cl10-BZ#209	ND		ug/kg	1.73	0.864	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		30-150
Pyrene-d10	49		30-150
Benzo(b)fluoranthene-d12	46		30-150
DBOB	49		30-150
BZ 198	51		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-48 D
Client ID: MN COMPOSITE 7 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 22:01
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.5	8.77	2
Acenaphthylene	ND		ug/kg	17.5	8.77	2
Acenaphthene	ND		ug/kg	17.5	8.77	2
Fluorene	ND		ug/kg	17.5	8.77	2
Phenanthrene	17.1	J	ug/kg	17.5	8.77	2
Anthracene	ND		ug/kg	17.5	8.77	2
Fluoranthene	68.8		ug/kg	17.5	8.77	2
Pyrene	58.6		ug/kg	17.5	8.77	2
Benz(a)anthracene	33.7		ug/kg	17.5	8.77	2
Chrysene	29.2		ug/kg	17.5	8.77	2
Benzo(b)fluoranthene	23.8		ug/kg	17.5	8.77	2
Benzo(k)fluoranthene	10.2	J	ug/kg	17.5	8.77	2
Benzo(a)pyrene	12.5	J	ug/kg	17.5	8.77	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.5	8.77	2
Dibenz(a,h)anthracene	ND		ug/kg	17.5	8.77	2
Benzo(ghi)perylene	ND		ug/kg	17.5	8.77	2
Cl2-BZ#8	ND		ug/kg	1.75	0.877	2
Cl3-BZ#18	ND		ug/kg	1.75	0.877	2
Cl3-BZ#28	ND		ug/kg	1.75	0.877	2
Cl4-BZ#44	2.76		ug/kg	1.75	0.877	2
Cl4-BZ#49	1.74	J	ug/kg	1.75	0.877	2
Cl4-BZ#52	3.45		ug/kg	1.75	0.877	2
Cl4-BZ#66	1.37	J	ug/kg	1.75	0.877	2
Cl5-BZ#87	ND		ug/kg	1.75	0.877	2
Cl5-BZ#101	2.52		ug/kg	1.75	0.877	2
Cl5-BZ#105	ND		ug/kg	1.75	0.877	2
Cl5-BZ#118	0.951	J	ug/kg	1.75	0.877	2
Cl6-BZ#128	ND		ug/kg	1.75	0.877	2
Cl6-BZ#138	1.27	J	ug/kg	1.75	0.877	2
Cl6-BZ#153	1.10	J	ug/kg	1.75	0.877	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-48 D Date Collected: 09/29/17 10:15

Client ID: MN COMPOSITE 7 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.75	0.877	2
Cl7-BZ#180	ND		ug/kg	1.75	0.877	2
Cl7-BZ#183	ND		ug/kg	1.75	0.877	2
Cl7-BZ#184	ND		ug/kg	1.75	0.877	2
Cl7-BZ#187	ND		ug/kg	1.75	0.877	2
Cl8-BZ#195	ND		ug/kg	1.75	0.877	2
Cl9-BZ#206	ND		ug/kg	1.75	0.877	2
Cl10-BZ#209	ND		ug/kg	1.75	0.877	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	45		30-150
Pyrene-d10	50		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	54		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-49 D
Client ID: MN COMPOSITE 7 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 22:33
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.9	9.47	2
Acenaphthylene	ND		ug/kg	18.9	9.47	2
Acenaphthene	ND		ug/kg	18.9	9.47	2
Fluorene	ND		ug/kg	18.9	9.47	2
Phenanthrene	14.4	J	ug/kg	18.9	9.47	2
Anthracene	ND		ug/kg	18.9	9.47	2
Fluoranthene	60.8		ug/kg	18.9	9.47	2
Pyrene	50.0		ug/kg	18.9	9.47	2
Benz(a)anthracene	34.3		ug/kg	18.9	9.47	2
Chrysene	25.5		ug/kg	18.9	9.47	2
Benzo(b)fluoranthene	21.6		ug/kg	18.9	9.47	2
Benzo(k)fluoranthene	9.77	J	ug/kg	18.9	9.47	2
Benzo(a)pyrene	10.0	J	ug/kg	18.9	9.47	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.9	9.47	2
Dibenz(a,h)anthracene	ND		ug/kg	18.9	9.47	2
Benzo(ghi)perylene	ND		ug/kg	18.9	9.47	2
Cl2-BZ#8	ND		ug/kg	1.89	0.947	2
Cl3-BZ#18	ND		ug/kg	1.89	0.947	2
Cl3-BZ#28	ND		ug/kg	1.89	0.947	2
Cl4-BZ#44	2.05		ug/kg	1.89	0.947	2
Cl4-BZ#49	1.49	J	ug/kg	1.89	0.947	2
Cl4-BZ#52	2.97		ug/kg	1.89	0.947	2
Cl4-BZ#66	1.25	J	ug/kg	1.89	0.947	2
Cl5-BZ#87	ND		ug/kg	1.89	0.947	2
Cl5-BZ#101	1.87	J	ug/kg	1.89	0.947	2
Cl5-BZ#105	ND		ug/kg	1.89	0.947	2
Cl5-BZ#118	ND		ug/kg	1.89	0.947	2
Cl6-BZ#128	ND		ug/kg	1.89	0.947	2
Cl6-BZ#138	1.21	J	ug/kg	1.89	0.947	2
Cl6-BZ#153	1.10	J	ug/kg	1.89	0.947	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-49 D Date Collected: 09/29/17 10:15

Client ID: MN COMPOSITE 7 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.89	0.947	2
Cl7-BZ#180	ND		ug/kg	1.89	0.947	2
Cl7-BZ#183	ND		ug/kg	1.89	0.947	2
Cl7-BZ#184	ND		ug/kg	1.89	0.947	2
Cl7-BZ#187	ND		ug/kg	1.89	0.947	2
Cl8-BZ#195	ND		ug/kg	1.89	0.947	2
Cl9-BZ#206	ND		ug/kg	1.89	0.947	2
Cl10-BZ#209	ND		ug/kg	1.89	0.947	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	40		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	49		30-150
DBOB	51		30-150
BZ 198	54		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-50 D
Client ID: MN COMPOSITE 7 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 23:05
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.34	2
Acenaphthylene	ND		ug/kg	18.7	9.34	2
Acenaphthene	ND		ug/kg	18.7	9.34	2
Fluorene	ND		ug/kg	18.7	9.34	2
Phenanthrene	14.5	J	ug/kg	18.7	9.34	2
Anthracene	ND		ug/kg	18.7	9.34	2
Fluoranthene	56.9		ug/kg	18.7	9.34	2
Pyrene	46.6		ug/kg	18.7	9.34	2
Benz(a)anthracene	30.0		ug/kg	18.7	9.34	2
Chrysene	22.7		ug/kg	18.7	9.34	2
Benzo(b)fluoranthene	15.8	J	ug/kg	18.7	9.34	2
Benzo(k)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(a)pyrene	ND		ug/kg	18.7	9.34	2
Indeno(1,2,3-cd)Pyrene	19.2		ug/kg	18.7	9.34	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.34	2
Benzo(ghi)perylene	ND		ug/kg	18.7	9.34	2
Cl2-BZ#8	ND		ug/kg	1.87	0.934	2
Cl3-BZ#18	ND		ug/kg	1.87	0.934	2
Cl3-BZ#28	ND		ug/kg	1.87	0.934	2
Cl4-BZ#44	0.970	J	ug/kg	1.87	0.934	2
Cl4-BZ#49	1.23	J	ug/kg	1.87	0.934	2
Cl4-BZ#52	2.30		ug/kg	1.87	0.934	2
Cl4-BZ#66	1.12	J	ug/kg	1.87	0.934	2
Cl5-BZ#87	ND		ug/kg	1.87	0.934	2
Cl5-BZ#101	2.10		ug/kg	1.87	0.934	2
Cl5-BZ#105	ND		ug/kg	1.87	0.934	2
Cl5-BZ#118	ND		ug/kg	1.87	0.934	2
Cl6-BZ#128	ND		ug/kg	1.87	0.934	2
Cl6-BZ#138	1.07	J	ug/kg	1.87	0.934	2
Cl6-BZ#153	ND		ug/kg	1.87	0.934	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-50 D Date Collected: 09/29/17 10:15

Client ID: MN COMPOSITE 7 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.934	2
Cl7-BZ#180	ND		ug/kg	1.87	0.934	2
Cl7-BZ#183	ND		ug/kg	1.87	0.934	2
Cl7-BZ#184	ND		ug/kg	1.87	0.934	2
Cl7-BZ#187	ND		ug/kg	1.87	0.934	2
Cl8-BZ#195	ND		ug/kg	1.87	0.934	2
Cl9-BZ#206	ND		ug/kg	1.87	0.934	2
Cl10-BZ#209	ND		ug/kg	1.87	0.934	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		30-150
Pyrene-d10	47		30-150
Benzo(b)fluoranthene-d12	43		30-150
DBOB	52		30-150
BZ 198	52		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-51 D
Client ID: MN COMPOSITE 8 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/02/17 23:37
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.8	8.88	2
Acenaphthylene	ND		ug/kg	17.8	8.88	2
Acenaphthene	ND		ug/kg	17.8	8.88	2
Fluorene	ND		ug/kg	17.8	8.88	2
Phenanthrene	20.8		ug/kg	17.8	8.88	2
Anthracene	ND		ug/kg	17.8	8.88	2
Fluoranthene	87.3		ug/kg	17.8	8.88	2
Pyrene	72.5		ug/kg	17.8	8.88	2
Benz(a)anthracene	37.6		ug/kg	17.8	8.88	2
Chrysene	26.8		ug/kg	17.8	8.88	2
Benzo(b)fluoranthene	21.9		ug/kg	17.8	8.88	2
Benzo(k)fluoranthene	11.1	J	ug/kg	17.8	8.88	2
Benzo(a)pyrene	10.9	J	ug/kg	17.8	8.88	2
Indeno(1,2,3-cd)Pyrene	19.7		ug/kg	17.8	8.88	2
Dibenz(a,h)anthracene	ND		ug/kg	17.8	8.88	2
Benzo(ghi)perylene	ND		ug/kg	17.8	8.88	2
Cl2-BZ#8	ND		ug/kg	1.78	0.888	2
Cl3-BZ#18	ND		ug/kg	1.78	0.888	2
Cl3-BZ#28	ND		ug/kg	1.78	0.888	2
Cl4-BZ#44	2.04		ug/kg	1.78	0.888	2
Cl4-BZ#49	1.06	J	ug/kg	1.78	0.888	2
Cl4-BZ#52	2.10		ug/kg	1.78	0.888	2
Cl4-BZ#66	0.940	J	ug/kg	1.78	0.888	2
Cl5-BZ#87	ND		ug/kg	1.78	0.888	2
Cl5-BZ#101	2.14		ug/kg	1.78	0.888	2
Cl5-BZ#105	ND		ug/kg	1.78	0.888	2
Cl5-BZ#118	ND		ug/kg	1.78	0.888	2
Cl6-BZ#128	ND		ug/kg	1.78	0.888	2
Cl6-BZ#138	1.50	J	ug/kg	1.78	0.888	2
Cl6-BZ#153	ND		ug/kg	1.78	0.888	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-51 D Date Collected: 09/29/17 11:00

Client ID: MN COMPOSITE 8 REP A Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.78	0.888	2
Cl7-BZ#180	ND		ug/kg	1.78	0.888	2
Cl7-BZ#183	ND		ug/kg	1.78	0.888	2
Cl7-BZ#184	ND		ug/kg	1.78	0.888	2
Cl7-BZ#187	ND		ug/kg	1.78	0.888	2
Cl8-BZ#195	ND		ug/kg	1.78	0.888	2
Cl9-BZ#206	ND		ug/kg	1.78	0.888	2
Cl10-BZ#209	ND		ug/kg	1.78	0.888	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	43		30-150
Pyrene-d10	49		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	53		30-150
BZ 198	52		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-52 D
Client ID: MN COMPOSITE 8 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 00:10
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.0	9.01	2
Acenaphthylene	ND		ug/kg	18.0	9.01	2
Acenaphthene	ND		ug/kg	18.0	9.01	2
Fluorene	ND		ug/kg	18.0	9.01	2
Phenanthrene	23.8		ug/kg	18.0	9.01	2
Anthracene	ND		ug/kg	18.0	9.01	2
Fluoranthene	99.7		ug/kg	18.0	9.01	2
Pyrene	79.3		ug/kg	18.0	9.01	2
Benz(a)anthracene	45.7		ug/kg	18.0	9.01	2
Chrysene	32.5		ug/kg	18.0	9.01	2
Benzo(b)fluoranthene	26.2		ug/kg	18.0	9.01	2
Benzo(k)fluoranthene	12.3	J	ug/kg	18.0	9.01	2
Benzo(a)pyrene	12.9	J	ug/kg	18.0	9.01	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.0	9.01	2
Dibenz(a,h)anthracene	ND		ug/kg	18.0	9.01	2
Benzo(ghi)perylene	ND		ug/kg	18.0	9.01	2
Cl2-BZ#8	ND		ug/kg	1.80	0.901	2
Cl3-BZ#18	ND		ug/kg	1.80	0.901	2
Cl3-BZ#28	ND		ug/kg	1.80	0.901	2
Cl4-BZ#44	3.16		ug/kg	1.80	0.901	2
Cl4-BZ#49	1.79	J	ug/kg	1.80	0.901	2
Cl4-BZ#52	3.31		ug/kg	1.80	0.901	2
Cl4-BZ#66	ND		ug/kg	1.80	0.901	2
Cl5-BZ#87	ND		ug/kg	1.80	0.901	2
Cl5-BZ#101	2.39		ug/kg	1.80	0.901	2
Cl5-BZ#105	ND		ug/kg	1.80	0.901	2
Cl5-BZ#118	ND		ug/kg	1.80	0.901	2
Cl6-BZ#128	ND		ug/kg	1.80	0.901	2
Cl6-BZ#138	1.50	J	ug/kg	1.80	0.901	2
Cl6-BZ#153	1.38	J	ug/kg	1.80	0.901	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-52 D Date Collected: 09/29/17 11:00

Client ID: MN COMPOSITE 8 REP B Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.80	0.901	2
Cl7-BZ#180	ND		ug/kg	1.80	0.901	2
Cl7-BZ#183	ND		ug/kg	1.80	0.901	2
Cl7-BZ#184	ND		ug/kg	1.80	0.901	2
Cl7-BZ#187	ND		ug/kg	1.80	0.901	2
Cl8-BZ#195	ND		ug/kg	1.80	0.901	2
Cl9-BZ#206	ND		ug/kg	1.80	0.901	2
Cl10-BZ#209	ND		ug/kg	1.80	0.901	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	45		30-150
Pyrene-d10	52		30-150
Benzo(b)fluoranthene-d12	49		30-150
DBOB	55		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-53 D
Client ID: MN COMPOSITE 8 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 00:42
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.8	9.38	2
Acenaphthylene	ND		ug/kg	18.8	9.38	2
Acenaphthene	ND		ug/kg	18.8	9.38	2
Fluorene	ND		ug/kg	18.8	9.38	2
Phenanthrene	19.9		ug/kg	18.8	9.38	2
Anthracene	ND		ug/kg	18.8	9.38	2
Fluoranthene	94.2		ug/kg	18.8	9.38	2
Pyrene	74.6		ug/kg	18.8	9.38	2
Benz(a)anthracene	36.4		ug/kg	18.8	9.38	2
Chrysene	29.8		ug/kg	18.8	9.38	2
Benzo(b)fluoranthene	18.5	J	ug/kg	18.8	9.38	2
Benzo(k)fluoranthene	12.4	J	ug/kg	18.8	9.38	2
Benzo(a)pyrene	10.7	J	ug/kg	18.8	9.38	2
Indeno(1,2,3-cd)Pyrene	19.9		ug/kg	18.8	9.38	2
Dibenz(a,h)anthracene	ND		ug/kg	18.8	9.38	2
Benzo(ghi)perylene	ND		ug/kg	18.8	9.38	2
Cl2-BZ#8	ND		ug/kg	1.88	0.938	2
Cl3-BZ#18	ND		ug/kg	1.88	0.938	2
Cl3-BZ#28	ND		ug/kg	1.88	0.938	2
Cl4-BZ#44	0.976	J	ug/kg	1.88	0.938	2
Cl4-BZ#49	1.34	J	ug/kg	1.88	0.938	2
Cl4-BZ#52	2.08		ug/kg	1.88	0.938	2
Cl4-BZ#66	1.11	J	ug/kg	1.88	0.938	2
Cl5-BZ#87	ND		ug/kg	1.88	0.938	2
Cl5-BZ#101	ND		ug/kg	1.88	0.938	2
Cl5-BZ#105	ND		ug/kg	1.88	0.938	2
Cl5-BZ#118	ND		ug/kg	1.88	0.938	2
Cl6-BZ#128	ND		ug/kg	1.88	0.938	2
Cl6-BZ#138	ND		ug/kg	1.88	0.938	2
Cl6-BZ#153	1.24	J	ug/kg	1.88	0.938	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-53 D Date Collected: 09/29/17 11:00

Client ID: MN COMPOSITE 8 REP C Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.88	0.938	2
Cl7-BZ#180	ND		ug/kg	1.88	0.938	2
Cl7-BZ#183	ND		ug/kg	1.88	0.938	2
Cl7-BZ#184	ND		ug/kg	1.88	0.938	2
Cl7-BZ#187	ND		ug/kg	1.88	0.938	2
Cl8-BZ#195	ND		ug/kg	1.88	0.938	2
Cl9-BZ#206	ND		ug/kg	1.88	0.938	2
Cl10-BZ#209	ND		ug/kg	1.88	0.938	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	44		30-150
Pyrene-d10	50		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	55		30-150
BZ 198	51		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-54 D
Client ID: MN COMPOSITE 8 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 01:14
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.9	8.43	2
Acenaphthylene	ND		ug/kg	16.9	8.43	2
Acenaphthene	ND		ug/kg	16.9	8.43	2
Fluorene	ND		ug/kg	16.9	8.43	2
Phenanthrene	20.6		ug/kg	16.9	8.43	2
Anthracene	ND		ug/kg	16.9	8.43	2
Fluoranthene	83.1		ug/kg	16.9	8.43	2
Pyrene	65.8		ug/kg	16.9	8.43	2
Benz(a)anthracene	32.6		ug/kg	16.9	8.43	2
Chrysene	27.0		ug/kg	16.9	8.43	2
Benzo(b)fluoranthene	18.3		ug/kg	16.9	8.43	2
Benzo(k)fluoranthene	9.01	J	ug/kg	16.9	8.43	2
Benzo(a)pyrene	10.6	J	ug/kg	16.9	8.43	2
Indeno(1,2,3-cd)Pyrene	18.4		ug/kg	16.9	8.43	2
Dibenz(a,h)anthracene	ND		ug/kg	16.9	8.43	2
Benzo(ghi)perylene	ND		ug/kg	16.9	8.43	2
Cl2-BZ#8	ND		ug/kg	1.69	0.843	2
Cl3-BZ#18	ND		ug/kg	1.69	0.843	2
Cl3-BZ#28	ND		ug/kg	1.69	0.843	2
Cl4-BZ#44	ND		ug/kg	1.69	0.843	2
Cl4-BZ#49	1.43	J	ug/kg	1.69	0.843	2
Cl4-BZ#52	2.66		ug/kg	1.69	0.843	2
Cl4-BZ#66	ND		ug/kg	1.69	0.843	2
Cl5-BZ#87	ND		ug/kg	1.69	0.843	2
Cl5-BZ#101	1.95		ug/kg	1.69	0.843	2
Cl5-BZ#105	ND		ug/kg	1.69	0.843	2
Cl5-BZ#118	ND		ug/kg	1.69	0.843	2
Cl6-BZ#128	ND		ug/kg	1.69	0.843	2
Cl6-BZ#138	ND		ug/kg	1.69	0.843	2
Cl6-BZ#153	ND		ug/kg	1.69	0.843	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-54 D Date Collected: 09/29/17 11:00

Client ID: MN COMPOSITE 8 REP D Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.69	0.843	2
Cl7-BZ#180	ND		ug/kg	1.69	0.843	2
Cl7-BZ#183	ND		ug/kg	1.69	0.843	2
Cl7-BZ#184	ND		ug/kg	1.69	0.843	2
Cl7-BZ#187	ND		ug/kg	1.69	0.843	2
Cl8-BZ#195	ND		ug/kg	1.69	0.843	2
Cl9-BZ#206	ND		ug/kg	1.69	0.843	2
Cl10-BZ#209	ND		ug/kg	1.69	0.843	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		30-150
Pyrene-d10	47		30-150
Benzo(b)fluoranthene-d12	44		30-150
DBOB	51		30-150
BZ 198	44		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-55 D
Client ID: MN COMPOSITE 8 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/03/17 01:46
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.3	9.17	2
Acenaphthylene	ND		ug/kg	18.3	9.17	2
Acenaphthene	ND		ug/kg	18.3	9.17	2
Fluorene	ND		ug/kg	18.3	9.17	2
Phenanthrene	25.8		ug/kg	18.3	9.17	2
Anthracene	ND		ug/kg	18.3	9.17	2
Fluoranthene	97.2		ug/kg	18.3	9.17	2
Pyrene	77.8		ug/kg	18.3	9.17	2
Benz(a)anthracene	41.0		ug/kg	18.3	9.17	2
Chrysene	25.7		ug/kg	18.3	9.17	2
Benzo(b)fluoranthene	23.9		ug/kg	18.3	9.17	2
Benzo(k)fluoranthene	9.94	J	ug/kg	18.3	9.17	2
Benzo(a)pyrene	11.0	J	ug/kg	18.3	9.17	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.3	9.17	2
Dibenz(a,h)anthracene	ND		ug/kg	18.3	9.17	2
Benzo(ghi)perylene	ND		ug/kg	18.3	9.17	2
Cl2-BZ#8	ND		ug/kg	1.83	0.917	2
Cl3-BZ#18	ND		ug/kg	1.83	0.917	2
Cl3-BZ#28	ND		ug/kg	1.83	0.917	2
Cl4-BZ#44	3.07		ug/kg	1.83	0.917	2
Cl4-BZ#49	1.20	J	ug/kg	1.83	0.917	2
Cl4-BZ#52	2.90		ug/kg	1.83	0.917	2
Cl4-BZ#66	ND		ug/kg	1.83	0.917	2
Cl5-BZ#87	ND		ug/kg	1.83	0.917	2
Cl5-BZ#101	2.78		ug/kg	1.83	0.917	2
Cl5-BZ#105	ND		ug/kg	1.83	0.917	2
Cl5-BZ#118	ND		ug/kg	1.83	0.917	2
Cl6-BZ#128	ND		ug/kg	1.83	0.917	2
Cl6-BZ#138	1.08	J	ug/kg	1.83	0.917	2
Cl6-BZ#153	0.928	J	ug/kg	1.83	0.917	2

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-55 D Date Collected: 09/29/17 11:00

Client ID: MN COMPOSITE 8 REP E Date Received: 09/29/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.83	0.917	2
Cl7-BZ#180	ND		ug/kg	1.83	0.917	2
Cl7-BZ#183	ND		ug/kg	1.83	0.917	2
Cl7-BZ#184	ND		ug/kg	1.83	0.917	2
Cl7-BZ#187	ND		ug/kg	1.83	0.917	2
Cl8-BZ#195	ND		ug/kg	1.83	0.917	2
Cl9-BZ#206	ND		ug/kg	1.83	0.917	2
Cl10-BZ#209	ND		ug/kg	1.83	0.917	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	42		30-150
Pyrene-d10	47		30-150
Benzo(b)fluoranthene-d12	45		30-150
DBOB	50		30-150
BZ 198	49		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 10/26/17 15:04
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-20 Batch: WG1055360-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 10/26/17 15:04
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-20 Batch: WG1055360-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	76		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	90		30-150
DBOB	80		30-150
BZ 198	83		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/07/17 17:07
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1055393-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/07/17 17:07
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1055393-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	74		30-150
BZ 198	75		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 10/27/17 13:19
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 41-55 Batch: WG1055419-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 10/27/17 13:19
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 41-55 Batch: WG1055419-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	79		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	75		30-150
BZ 198	81		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG1055360-2 WG1055360-3								
Naphthalene	71		81		50-120	13		30
Acenaphthylene	68		79		50-120	15		30
Acenaphthene	65		75		50-120	14		30
Fluorene	69		80		50-120	15		30
Phenanthrene	73		84		50-120	14		30
Anthracene	74		84		50-120	13		30
Fluoranthene	76		86		50-120	12		30
Pyrene	73		82		50-120	12		30
Benz(a)anthracene	82		93		50-120	13		30
Chrysene	79		88		50-120	11		30
Benzo(b)fluoranthene	83		96		50-120	15		30
Benzo(k)fluoranthene	83		90		50-120	8		30
Benzo(a)pyrene	80		89		50-120	11		30
Indeno(1,2,3-cd)Pyrene	74		85		50-120	14		30
Dibenz(a,h)anthracene	82		92		50-120	11		30
Benzo(ghi)perylene	86		96		50-120	11		30
Cl2-BZ#8	66		75		50-120	13		30
Cl3-BZ#18	68		77		50-120	12		30
Cl3-BZ#28	68		78		50-120	14		30
Cl4-BZ#44	72		81		50-120	12		30
Cl4-BZ#49	70		80		50-120	13		30
Cl4-BZ#52	69		80		50-120	15		30
Cl4-BZ#66	72		82		50-120	13		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG1055360-2 WG1055360-3								
Cl5-BZ#87	72		81		50-120	12		30
Cl5-BZ#101	73		82		50-120	12		30
Cl5-BZ#105	74		83		50-120	11		30
Cl5-BZ#118	72		80		50-120	11		30
Cl6-BZ#128	74		84		50-120	13		30
Cl6-BZ#138	75		84		50-120	11		30
Cl6-BZ#153	74		84		50-120	13		30
Cl7-BZ#170	75		85		50-120	13		30
Cl7-BZ#180	73		80		50-120	9		30
Cl7-BZ#183	70		77		50-120	10		30
Cl7-BZ#184	73		82		50-120	12		30
Cl7-BZ#187	71		81		50-120	13		30
Cl8-BZ#195	77		88		50-120	13		30
Cl9-BZ#206	78		90		50-120	14		30
Cl10-BZ#209	77		87		50-120	12		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	75		84		30-150
Pyrene-d10	85		92		30-150
Benzo(b)fluoranthene-d12	90		98		30-150
DBOB	76		84		30-150
BZ 198	79		85		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1055393-2 WG1055393-3								
Naphthalene	66		64		50-120	3		30
Acenaphthylene	64		62		50-120	3		30
Acenaphthene	62		60		50-120	3		30
Fluorene	65		62		50-120	5		30
Phenanthrene	70		66		50-120	6		30
Anthracene	70		68		50-120	3		30
Fluoranthene	70		67		50-120	4		30
Pyrene	70		68		50-120	3		30
Benz(a)anthracene	78		76		50-120	3		30
Chrysene	72		69		50-120	4		30
Benzo(b)fluoranthene	78		77		50-120	1		30
Benzo(k)fluoranthene	67		65		50-120	3		30
Benzo(a)pyrene	76		73		50-120	4		30
Indeno(1,2,3-cd)Pyrene	76		70		50-120	8		30
Dibenz(a,h)anthracene	76		74		50-120	3		30
Benzo(ghi)perylene	78		76		50-120	3		30
Cl2-BZ#8	63		63		50-120	0		30
Cl3-BZ#18	63		62		50-120	2		30
Cl3-BZ#28	65		65		50-120	0		30
Cl4-BZ#44	69		68		50-120	1		30
Cl4-BZ#49	67		65		50-120	3		30
Cl4-BZ#52	66		66		50-120	0		30
Cl4-BZ#66	69		67		50-120	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1055393-2 WG1055393-3								
Cl5-BZ#87	67		67		50-120	0		30
Cl5-BZ#101	68		67		50-120	1		30
Cl5-BZ#105	71		69		50-120	3		30
Cl5-BZ#118	67		66		50-120	2		30
Cl6-BZ#128	70		68		50-120	3		30
Cl6-BZ#138	70		69		50-120	1		30
Cl6-BZ#153	68		68		50-120	0		30
Cl7-BZ#170	72		71		50-120	1		30
Cl7-BZ#180	65		64		50-120	2		30
Cl7-BZ#183	64		63		50-120	2		30
Cl7-BZ#184	65		64		50-120	2		30
Cl7-BZ#187	66		65		50-120	2		30
Cl8-BZ#195	72		72		50-120	0		30
Cl9-BZ#206	74		73		50-120	1		30
Cl10-BZ#209	72		71		50-120	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	68		64		30-150
Pyrene-d10	79		75		30-150
Benzo(b)fluoranthene-d12	76		73		30-150
DBOB	73		70		30-150
BZ 198	74		69		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 Batch: WG1055419-2 WG1055419-3

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Naphthalene	68		69		50-120	1		30
Acenaphthylene	70		67		50-120	4		30
Acenaphthene	69		65		50-120	6		30
Fluorene	76		68		50-120	11		30
Phenanthrene	82		76		50-120	8		30
Anthracene	82		74		50-120	10		30
Fluoranthene	86		80		50-120	7		30
Pyrene	84		76		50-120	10		30
Benz(a)anthracene	97		88		50-120	10		30
Chrysene	88		82		50-120	7		30
Benzo(b)fluoranthene	92		86		50-120	7		30
Benzo(k)fluoranthene	90		84		50-120	7		30
Benzo(a)pyrene	92		86		50-120	7		30
Indeno(1,2,3-cd)Pyrene	93		88		50-120	6		30
Dibenz(a,h)anthracene	94		88		50-120	7		30
Benzo(ghi)perylene	98		91		50-120	7		30
Cl2-BZ#8	74		64		50-120	14		30
Cl3-BZ#18	74		65		50-120	13		30
Cl3-BZ#28	76		67		50-120	13		30
Cl4-BZ#44	80		70		50-120	13		30
Cl4-BZ#49	77		69		50-120	11		30
Cl4-BZ#52	80		70		50-120	13		30
Cl4-BZ#66	81		72		50-120	12		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 Batch: WG1055419-2 WG1055419-3								
Cl5-BZ#87	79		72		50-120	9		30
Cl5-BZ#101	81		72		50-120	12		30
Cl5-BZ#105	80		74		50-120	8		30
Cl5-BZ#118	80		72		50-120	11		30
Cl6-BZ#128	82		76		50-120	8		30
Cl6-BZ#138	82		76		50-120	8		30
Cl6-BZ#153	81		74		50-120	9		30
Cl7-BZ#170	85		80		50-120	6		30
Cl7-BZ#180	79		73		50-120	8		30
Cl7-BZ#183	78		71		50-120	9		30
Cl7-BZ#184	80		74		50-120	8		30
Cl7-BZ#187	80		74		50-120	8		30
Cl8-BZ#195	88		82		50-120	7		30
Cl9-BZ#206	91		84		50-120	8		30
Cl10-BZ#209	87		81		50-120	7		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	69		66		30-150
Pyrene-d10	90		80		30-150
Benzo(b)fluoranthene-d12	88		82		30-150
DBOB	88		75		30-150
BZ 198	86		79		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055360-6 WG1055360-7 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A												
Naphthalene	ND	494	304	62		360	74		50-120	17		30
Acenaphthylene	ND	494	308	62		353	72		50-120	14		30
Acenaphthene	ND	494	290	59		331	68		50-120	13		30
Fluorene	ND	494	305	62		347	71		50-120	13		30
Phenanthrene	ND	494	388	79		418	85		50-120	7		30
Anthracene	ND	494	265	54		306	63		50-120	14		30
Fluoranthene	ND	494	334	68		368	75		50-120	10		30
Pyrene	ND	494	318	64		348	71		50-120	9		30
Benz(a)anthracene	ND	494	423	86		470	96		50-120	11		30
Chrysene	ND	494	275	56		304	62		50-120	10		30
Benzo(b)fluoranthene	ND	494	404	82		458	94		50-120	13		30
Benzo(k)fluoranthene	ND	494	255	52		280	57		50-120	9		30
Benzo(a)pyrene	ND	494	295	60		339	69		50-120	14		30
Indeno(1,2,3-cd)Pyrene	ND	494	416	84		464	95		50-120	11		30
Dibenz(a,h)anthracene	ND	494	354	72		394	81		50-120	11		30
Benzo(ghi)perylene	ND	494	358	73		361	74		50-120	1		30
Cl2-BZ#8	ND	98.8	56.5	57		60.1	61		50-120	6		30
Cl3-BZ#18	ND	98.8	129	**131**	Q	122	**125**	Q	50-120	6		30
Cl3-BZ#28	ND	98.8	92.0	93		82.4	84		50-120	11		30
Cl4-BZ#44	ND	98.8	61.4	62		65.0	66		50-120	6		30
Cl4-BZ#49	ND	98.8	45.8	**46**	Q	49.5	51		50-120	8		30
Cl4-BZ#52	ND	98.8	68.0	69		72.0	74		50-120	6		30
Cl4-BZ#66	ND	98.8	60.9	62		65.1	67		50-120	7		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055360-6 WG1055360-7 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A												
Cl5-BZ#87	ND	98.8	59.2	60		63.2	65		50-120	7		30
Cl5-BZ#101	ND	98.8	61.4	62		65.7	67		50-120	7		30
Cl5-BZ#105	ND	98.8	51.7	52		54.2	55		50-120	5		30
Cl5-BZ#118	ND	98.8	57.8	59		62.9	64		50-120	8		30
Cl6-BZ#128	ND	98.8	63.9	65		68.8	70		50-120	7		30
Cl6-BZ#138	ND	98.8	62.3	63		66.5	68		50-120	7		30
Cl6-BZ#153	ND	98.8	64.3	65		68.9	70		50-120	7		30
Cl7-BZ#170	ND	98.8	65.3	66		70.1	72		50-120	7		30
Cl7-BZ#180	ND	98.8	59.8	61		64.2	66		50-120	7		30
Cl7-BZ#183	ND	98.8	45.5	**46**	Q	49.1	50		50-120	8		30
Cl7-BZ#184	ND	98.8	61.8	63		66.0	68		50-120	7		30
Cl7-BZ#187	ND	98.8	74.6	76		79.5	81		50-120	6		30
Cl8-BZ#195	ND	98.8	67.1	68		72.0	74		50-120	7		30
Cl9-BZ#206	ND	98.8	69.8	71		76.4	78		50-120	9		30
Cl10-BZ#209	ND	98.8	63.4	64		69.1	71		50-120	9		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		77		30-150
BZ 198	68		61		30-150
Benzo(b)fluoranthene-d12	74		82		30-150
DBOB	73		76		30-150
Pyrene-d10	73		80		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055393-6 WG1055393-7 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A												
Naphthalene	ND	464	291	63		268	60		50-120	8		30
Acenaphthylene	ND	464	304	66		277	62		50-120	9		30
Acenaphthene	ND	464	288	62		262	59		50-120	9		30
Fluorene	ND	464	302	65		272	61		50-120	10		30
Phenanthrene	ND	464	352	76		317	71		50-120	10		30
Anthracene	ND	464	297	64		274	62		50-120	8		30
Fluoranthene	20.2	464	348	71		316	67		50-120	10		30
Pyrene	19.5	464	331	67		295	62		50-120	12		30
Benz(a)anthracene	ND	464	396	85		353	80		50-120	11		30
Chrysene	ND	464	300	65		277	62		50-120	8		30
Benzo(b)fluoranthene	ND	464	393	85		347	78		50-120	12		30
Benzo(k)fluoranthene	ND	464	264	57		252	57		50-120	5		30
Benzo(a)pyrene	ND	464	317	68		332	75		50-120	5		30
Indeno(1,2,3-cd)Pyrene	17.1J	464	353	76		326	73		50-120	8		30
Dibenz(a,h)anthracene	ND	464	339	73		308	69		50-120	10		30
Benzo(ghi)perylene	ND	464	344	74		314	71		50-120	9		30
Cl2-BZ#8	ND	92.8	58.1	63		52.1	59		50-120	11		30
Cl3-BZ#18	ND	92.8	125	**135**	Q	110	**124**	Q	50-120	13		30
Cl3-BZ#28	ND	92.8	80.9	87		71.2	80		50-120	13		30
Cl4-BZ#44	ND	92.8	64.4	69		58.0	65		50-120	10		30
Cl4-BZ#49	ND	92.8	51.4	55		47.0	53		50-120	9		30
Cl4-BZ#52	ND	92.8	65.9	71		58.4	66		50-120	12		30
Cl4-BZ#66	ND	92.8	63.5	69		58.0	65		50-120	9		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055393-6 WG1055393-7 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A												
Cl5-BZ#87	ND	92.8	62.2	67		56.9	64		50-120	9		30
Cl5-BZ#101	2.01	92.8	67.1	70		61.0	66		50-120	10		30
Cl5-BZ#105	ND	92.8	58.9	64		53.5	60		50-120	10		30
Cl5-BZ#118	ND	92.8	63.4	68		56.2	63		50-120	12		30
Cl6-BZ#128	ND	92.8	63.8	69		56.9	64		50-120	11		30
Cl6-BZ#138	ND	92.8	64.7	70		58.0	65		50-120	11		30
Cl6-BZ#153	ND	92.8	68.4	74		62.3	70		50-120	9		30
Cl7-BZ#170	ND	92.8	65.9	71		59.7	67		50-120	10		30
Cl7-BZ#180	ND	92.8	61.1	66		54.6	62		50-120	11		30
Cl7-BZ#183	ND	92.8	54.0	58		48.4	55		50-120	11		30
Cl7-BZ#184	ND	92.8	64.5	70		58.5	66		50-120	10		30
Cl7-BZ#187	ND	92.8	66.7	72		60.9	69		50-120	9		30
Cl8-BZ#195	ND	92.8	66.4	72		60.1	68		50-120	10		30
Cl9-BZ#206	ND	92.8	67.5	73		59.8	67		50-120	12		30
Cl10-BZ#209	ND	92.8	63.6	69		57.6	65		50-120	10		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		64		30-150
BZ 198	74		71		30-150
Benzo(b)fluoranthene-d12	73		68		30-150
DBOB	76		68		30-150
Pyrene-d10	76		70		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055419-6 WG1055419-7 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A												
Naphthalene	ND	437	208	**48**	Q	178	**40**	Q	50-120	16		30
Acenaphthylene	ND	437	211	**48**	Q	182	**41**	Q	50-120	15		30
Acenaphthene	11.2J	437	203	**46**	Q	173	**39**	Q	50-120	16		30
Fluorene	ND	437	208	**48**	Q	183	**41**	Q	50-120	13		30
Phenanthrene	23.1	437	270	57		239	**49**	Q	50-120	12		30
Anthracene	ND	437	186	**43**	Q	169	**38**	Q	50-120	10		30
Fluoranthene	82.4	437	317	54		275	**43**	Q	50-120	14		30
Pyrene	68.4	437	293	51		248	**40**	Q	50-120	17		30
Benz(a)anthracene	41.5	437	334	67		278	53		50-120	18		30
Chrysene	39.3	437	222	**42**	Q	198	**36**	Q	50-120	11		30
Benzo(b)fluoranthene	27.5	437	296	61		253	51		50-120	16		30
Benzo(k)fluoranthene	13.1J	437	196	**45**	Q	166	**37**	Q	50-120	17		30
Benzo(a)pyrene	17.6J	437	287	66		198	**45**	Q	50-120	**37**	Q	30
Indeno(1,2,3-cd)Pyrene	15.6J	437	275	63		229	52		50-120	18		30
Dibenz(a,h)anthracene	ND	437	244	56		207	**47**	Q	50-120	16		30
Benzo(ghi)perylene	ND	437	253	58		215	**48**	Q	50-120	16		30
Cl2-BZ#8	ND	87.4	41.5	**48**	Q	38.8	**44**	Q	50-120	7		30
Cl3-BZ#18	ND	87.4	82.0	94		90.2	101		50-120	10		30
Cl3-BZ#28	ND	87.4	76.2	87		65.6	74		50-120	15		30
Cl4-BZ#44	2.44	87.4	47.2	51		43.2	**46**	Q	50-120	9		30
Cl4-BZ#49	1.52J	87.4	35.1	**40**	Q	33.5	**38**	Q	50-120	5		30
Cl4-BZ#52	3.16	87.4	54.2	58		49.2	52		50-120	10		30
Cl4-BZ#66	1.59J	87.4	48.0	55		44.5	50		50-120	8		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055419-6 WG1055419-7 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A												
Cl5-BZ#87	ND	87.4	44.8	51		42.0	**47**	Q	50-120	6		30
Cl5-BZ#101	4.20	87.4	50.3	53		46.5	**48**	Q	50-120	8		30
Cl5-BZ#105	1.32J	87.4	37.0	**42**	Q	35.8	**40**	Q	50-120	3		30
Cl5-BZ#118	1.22J	87.4	46.6	53		43.8	**49**	Q	50-120	6		30
Cl6-BZ#128	ND	87.4	45.1	52		42.1	**47**	Q	50-120	7		30
Cl6-BZ#138	1.65J	87.4	45.9	53		43.2	**49**	Q	50-120	6		30
Cl6-BZ#153	1.58J	87.4	49.6	57		46.7	53		50-120	6		30
Cl7-BZ#170	ND	87.4	46.5	53		43.6	**49**	Q	50-120	6		30
Cl7-BZ#180	ND	87.4	42.5	**49**	Q	39.3	**44**	Q	50-120	8		30
Cl7-BZ#183	ND	87.4	34.1	**39**	Q	33.1	**37**	Q	50-120	3		30
Cl7-BZ#184	ND	87.4	46.0	53		43.0	**48**	Q	50-120	7		30
Cl7-BZ#187	ND	87.4	50.7	58		46.1	52		50-120	10		30
Cl8-BZ#195	ND	87.4	47.0	54		43.8	**49**	Q	50-120	7		30
Cl9-BZ#206	ND	87.4	47.7	55		45.6	51		50-120	5		30
Cl10-BZ#209	ND	87.4	44.4	51		41.8	**47**	Q	50-120	6		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	49		40		30-150
BZ 198	56		53		30-150
Benzo(b)fluoranthene-d12	51		42		30-150
DBOB	58		53		30-150
Pyrene-d10	56		45		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055360-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	ND	ND	ug/kg	NC		30
Pyrene	ND	ND	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055360-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	ND	ND	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	ND	ND	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	79		76		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055360-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	82		80		30-150
Benzo(b)fluoranthene-d12	79		79		30-150
DBOB	83		79		30-150
BZ 198	77		74		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055393-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	20.2	26.2	ug/kg	26		30
Pyrene	19.5	25.8	ug/kg	28		30
Benz(a)anthracene	ND	12.0J	ug/kg	NC		30
Chrysene	ND	10.6J	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	17.1J	19.2J	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055393-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	2.01	2.20	ug/kg	9		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	ND	ND	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		66		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055393-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	83		72		30-150
Benzo(b)fluoranthene-d12	79		69		30-150
DBOB	86		76		30-150
BZ 198	83		76		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055419-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	11.2J	14.1J	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	23.1	26.6	ug/kg	14		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	82.4	96.7	ug/kg	16		30
Pyrene	68.4	80.9	ug/kg	17		30
Benz(a)anthracene	41.5	45.6	ug/kg	9		30
Chrysene	39.3	44.0	ug/kg	11		30
Benzo(b)fluoranthene	27.5	28.0	ug/kg	2		30
Benzo(k)fluoranthene	13.1J	14.1J	ug/kg	NC		30
Benzo(a)pyrene	17.6J	20.7	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	15.6J	15.8J	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	10.2J	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	2.44	1.88	ug/kg	26		30
Cl4-BZ#49	1.52J	1.78J	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055419-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						
Cl4-BZ#52	3.16	3.38	ug/kg	7		30
Cl4-BZ#66	1.59J	2.01	ug/kg	NC		30
Cl5-BZ#87	ND	1.20J	ug/kg	NC		30
Cl5-BZ#101	4.20	3.88	ug/kg	8		30
Cl5-BZ#105	1.32J	1.70J	ug/kg	NC		30
Cl5-BZ#118	1.22J	1.46J	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	1.65J	1.69J	ug/kg	NC		30
Cl6-BZ#153	1.58J	1.63J	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	47		49		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055419-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	56		56		30-150
Benzo(b)fluoranthene-d12	50		51		30-150
DBOB	57		59		30-150
BZ 198	52		54		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1055360-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	81		40-140
Fluoranthene	80		40-140
Pyrene	84		40-140
Chrysene	71		40-140
Cl3-BZ#28	54		40-140
Cl4-BZ#44	82		40-140
Cl4-BZ#49	51		40-140
Cl4-BZ#52	47		40-140
Cl4-BZ#66	84		40-140
Cl5-BZ#87	44		40-140
Cl5-BZ#101	58		40-140
Cl5-BZ#105	113		40-140
Cl5-BZ#118	88		40-140
Cl6-BZ#138	102		40-140
Cl6-BZ#153	72		40-140
Cl7-BZ#187	48		40-140
2-Methylnaphthalene-d10 (Surrogate)	75		75-125
Pyrene-d10 (Surrogate)	81		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	81		75-125
DBOB (Surrogate)	86		75-125
BZ 198 (Surrogate)	82		75-125

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1055393-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	72		40-140
Fluoranthene	78		40-140
Pyrene	70		40-140
Chrysene	51		40-140
Cl3-BZ#28	898	Q	40-140
Cl4-BZ#44	88		40-140
Cl4-BZ#49	65		40-140
Cl4-BZ#52	51		40-140
Cl4-BZ#66	48		40-140
Cl5-BZ#87	76		40-140
Cl5-BZ#101	86		40-140
Cl5-BZ#105	134		40-140
Cl5-BZ#118	46		40-140
Cl6-BZ#138	129		40-140
Cl6-BZ#153	63		40-140
Cl7-BZ#187	46		40-140
2-Methylnaphthalene-d10 (Surrogate)	73		75-125
Pyrene-d10 (Surrogate)	78		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	77		75-125
DBOB (Surrogate)	77		75-125
BZ 198 (Surrogate)	72		75-125

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1055419-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	78		40-140
Fluoranthene	86		40-140
Pyrene	85		40-140
Chrysene	86		40-140
Cl3-BZ#28	448	Q	40-140
Cl4-BZ#44	116		40-140
Cl4-BZ#49	64		40-140
Cl4-BZ#52	90		40-140
Cl4-BZ#66	99		40-140
Cl5-BZ#87	74		40-140
Cl5-BZ#101	64		40-140
Cl5-BZ#105	120		40-140
Cl5-BZ#118	81		40-140
Cl6-BZ#138	130		40-140
Cl6-BZ#153	80		40-140
Cl7-BZ#187	60		40-140
2-Methylnaphthalene-d10 (Surrogate)	72		75-125
Pyrene-d10 (Surrogate)	81		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	79		75-125
DBOB (Surrogate)	95		75-125
BZ 198 (Surrogate)	92		75-125

PESTICIDES

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-01
Client ID: MN NATIVE BACKGROUND REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/07/17 18:47
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.969	0.969	1	A
gamma-BHC	ND		ug/kg	0.484	0.484	1	A
Heptachlor	ND		ug/kg	0.484	0.484	1	A
Aldrin	ND		ug/kg	0.484	0.484	1	A
Heptachlor epoxide	ND		ug/kg	0.969	0.969	1	B
Oxychlordane	ND		ug/kg	0.969	0.969	1	B
trans-Chlordane	ND		ug/kg	0.484	0.484	1	A
Endosulfan I	ND		ug/kg	0.484	0.484	1	A
cis-Chlordane	ND		ug/kg	0.484	0.484	1	A
trans-Nonachlor	ND		ug/kg	0.484	0.484	1	A
4,4'-DDE	ND	P	ug/kg	0.484	0.484	1	B
Dieldrin	ND		ug/kg	0.484	0.484	1	A
Endrin	0.601	IP	ug/kg	0.484	0.484	1	A
Endosulfan II	ND		ug/kg	0.484	0.484	1	A
4,4'-DDD	ND		ug/kg	0.484	0.484	1	A
cis-Nonachlor	ND		ug/kg	0.484	0.484	1	A
4,4'-DDT	ND		ug/kg	0.484	0.484	1	A
Methoxychlor	ND		ug/kg	4.84	4.84	1	A
Toxaphene	ND		ug/kg	24.3	24.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	79		30-150	A
DBOB	56		30-150	B
BZ 198	76		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-02
Client ID: MN NATIVE BACKGROUND REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/07/17 22:46
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.965	0.965	1	A
gamma-BHC	ND		ug/kg	0.483	0.483	1	A
Heptachlor	ND		ug/kg	0.483	0.483	1	A
Aldrin	ND		ug/kg	0.483	0.483	1	A
Heptachlor epoxide	ND		ug/kg	0.965	0.965	1	B
Oxychlordane	ND		ug/kg	0.965	0.965	1	B
trans-Chlordane	ND		ug/kg	0.483	0.483	1	A
Endosulfan I	ND		ug/kg	0.483	0.483	1	A
cis-Chlordane	ND		ug/kg	0.483	0.483	1	A
trans-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDE	ND		ug/kg	0.483	0.483	1	A
Dieldrin	ND		ug/kg	0.483	0.483	1	A
Endrin	ND		ug/kg	0.483	0.483	1	A
Endosulfan II	ND		ug/kg	0.483	0.483	1	A
4,4'-DDD	ND		ug/kg	0.483	0.483	1	A
cis-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDT	ND		ug/kg	0.483	0.483	1	A
Methoxychlor	ND		ug/kg	4.83	4.83	1	A
Toxaphene	ND		ug/kg	24.2	24.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	A
BZ 198	66		30-150	A
DBOB	71		30-150	B
BZ 198	68		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-03
Client ID: MN NATIVE BACKGROUND REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/07/17 23:20
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.882	0.882	1	A
gamma-BHC	ND		ug/kg	0.441	0.441	1	A
Heptachlor	ND		ug/kg	0.441	0.441	1	A
Aldrin	ND		ug/kg	0.441	0.441	1	A
Heptachlor epoxide	ND		ug/kg	0.882	0.882	1	B
Oxychlordane	ND		ug/kg	0.882	0.882	1	B
trans-Chlordane	ND		ug/kg	0.441	0.441	1	A
Endosulfan I	ND		ug/kg	0.441	0.441	1	A
cis-Chlordane	ND		ug/kg	0.441	0.441	1	A
trans-Nonachlor	ND		ug/kg	0.441	0.441	1	A
4,4'-DDE	ND		ug/kg	0.441	0.441	1	A
Dieldrin	ND		ug/kg	0.441	0.441	1	A
Endrin	0.770	IP	ug/kg	0.441	0.441	1	A
Endosulfan II	ND		ug/kg	0.441	0.441	1	A
4,4'-DDD	ND		ug/kg	0.441	0.441	1	A
cis-Nonachlor	ND		ug/kg	0.441	0.441	1	A
4,4'-DDT	ND		ug/kg	0.441	0.441	1	A
Methoxychlor	ND		ug/kg	4.41	4.41	1	A
Toxaphene	ND		ug/kg	22.1	22.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	77		30-150	A
DBOB	70		30-150	B
BZ 198	79		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-04
Client ID: MN NATIVE BACKGROUND REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/07/17 23:54
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.926	0.926	1	A
gamma-BHC	ND		ug/kg	0.463	0.463	1	A
Heptachlor	ND		ug/kg	0.463	0.463	1	A
Aldrin	ND		ug/kg	0.463	0.463	1	A
Heptachlor epoxide	ND		ug/kg	0.926	0.926	1	B
Oxychlordane	ND		ug/kg	0.926	0.926	1	B
trans-Chlordane	ND		ug/kg	0.463	0.463	1	A
Endosulfan I	ND		ug/kg	0.463	0.463	1	A
cis-Chlordane	ND		ug/kg	0.463	0.463	1	A
trans-Nonachlor	ND		ug/kg	0.463	0.463	1	A
4,4'-DDE	ND		ug/kg	0.463	0.463	1	A
Dieldrin	ND		ug/kg	0.463	0.463	1	A
Endrin	0.467	IP	ug/kg	0.463	0.463	1	A
Endosulfan II	ND		ug/kg	0.463	0.463	1	A
4,4'-DDD	ND		ug/kg	0.463	0.463	1	A
cis-Nonachlor	ND		ug/kg	0.463	0.463	1	A
4,4'-DDT	ND		ug/kg	0.463	0.463	1	A
Methoxychlor	ND		ug/kg	4.63	4.63	1	A
Toxaphene	ND		ug/kg	23.2	23.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	78		30-150	A
DBOB	63		30-150	B
BZ 198	79		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-05
Client ID: MN NATIVE BACKGROUND REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 00:28
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.909	0.909	1	A
gamma-BHC	ND		ug/kg	0.454	0.454	1	A
Heptachlor	ND		ug/kg	0.454	0.454	1	A
Aldrin	ND		ug/kg	0.454	0.454	1	A
Heptachlor epoxide	ND		ug/kg	0.909	0.909	1	B
Oxychlordane	ND		ug/kg	0.909	0.909	1	B
trans-Chlordane	ND		ug/kg	0.454	0.454	1	A
Endosulfan I	ND		ug/kg	0.454	0.454	1	A
cis-Chlordane	ND		ug/kg	0.454	0.454	1	A
trans-Nonachlor	ND		ug/kg	0.454	0.454	1	A
4,4'-DDE	ND		ug/kg	0.454	0.454	1	B
Dieldrin	ND		ug/kg	0.454	0.454	1	A
Endrin	0.667	IP	ug/kg	0.454	0.454	1	A
Endosulfan II	ND		ug/kg	0.454	0.454	1	A
4,4'-DDD	ND		ug/kg	0.454	0.454	1	A
cis-Nonachlor	ND		ug/kg	0.454	0.454	1	A
4,4'-DDT	ND		ug/kg	0.454	0.454	1	A
Methoxychlor	ND		ug/kg	4.54	4.54	1	A
Toxaphene	ND		ug/kg	22.8	22.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	A
BZ 198	72		30-150	A
DBOB	67		30-150	B
BZ 198	76		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-06
Client ID: MN LABORATORY CONTROL REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 01:02
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.893	0.893	1	A
gamma-BHC	ND		ug/kg	0.446	0.446	1	A
Heptachlor	ND		ug/kg	0.446	0.446	1	A
Aldrin	ND		ug/kg	0.446	0.446	1	A
Heptachlor epoxide	ND		ug/kg	0.893	0.893	1	B
Oxychlordane	ND		ug/kg	0.893	0.893	1	B
trans-Chlordane	ND		ug/kg	0.446	0.446	1	A
Endosulfan I	ND		ug/kg	0.446	0.446	1	A
cis-Chlordane	ND		ug/kg	0.446	0.446	1	A
trans-Nonachlor	ND		ug/kg	0.446	0.446	1	A
4,4'-DDE	ND		ug/kg	0.446	0.446	1	B
Dieldrin	ND		ug/kg	0.446	0.446	1	A
Endrin	0.454	IP	ug/kg	0.446	0.446	1	A
Endosulfan II	ND		ug/kg	0.446	0.446	1	A
4,4'-DDD	ND		ug/kg	0.446	0.446	1	A
cis-Nonachlor	ND		ug/kg	0.446	0.446	1	A
4,4'-DDT	ND		ug/kg	0.446	0.446	1	A
Methoxychlor	ND		ug/kg	4.46	4.46	1	A
Toxaphene	ND		ug/kg	22.4	22.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	69		30-150	A
BZ 198	76		30-150	A
DBOB	59		30-150	B
BZ 198	75		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-07
Client ID: MN LABORATORY CONTROL REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 01:36
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.859	0.859	1	A
gamma-BHC	ND		ug/kg	0.430	0.430	1	A
Heptachlor	ND		ug/kg	0.430	0.430	1	A
Aldrin	ND		ug/kg	0.430	0.430	1	A
Heptachlor epoxide	ND		ug/kg	0.859	0.859	1	B
Oxychlordane	ND		ug/kg	0.859	0.859	1	B
trans-Chlordane	ND		ug/kg	0.430	0.430	1	A
Endosulfan I	ND		ug/kg	0.430	0.430	1	A
cis-Chlordane	ND		ug/kg	0.430	0.430	1	A
trans-Nonachlor	ND		ug/kg	0.430	0.430	1	A
4,4'-DDE	ND		ug/kg	0.430	0.430	1	B
Dieldrin	ND		ug/kg	0.430	0.430	1	A
Endrin	0.509	IP	ug/kg	0.430	0.430	1	A
Endosulfan II	ND		ug/kg	0.430	0.430	1	A
4,4'-DDD	ND		ug/kg	0.430	0.430	1	A
cis-Nonachlor	ND		ug/kg	0.430	0.430	1	A
4,4'-DDT	ND		ug/kg	0.430	0.430	1	A
Methoxychlor	ND		ug/kg	4.30	4.30	1	A
Toxaphene	ND		ug/kg	21.6	21.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	A
BZ 198	82		30-150	A
DBOB	62		30-150	B
BZ 198	83		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-08
Client ID: MN LABORATORY CONTROL REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 02:10
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.843	0.843	1	A
gamma-BHC	ND		ug/kg	0.422	0.422	1	A
Heptachlor	ND		ug/kg	0.422	0.422	1	A
Aldrin	ND		ug/kg	0.422	0.422	1	A
Heptachlor epoxide	ND		ug/kg	0.843	0.843	1	B
Oxychlordane	ND		ug/kg	0.843	0.843	1	B
trans-Chlordane	ND		ug/kg	0.422	0.422	1	A
Endosulfan I	ND		ug/kg	0.422	0.422	1	A
cis-Chlordane	ND		ug/kg	0.422	0.422	1	A
trans-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDE	ND		ug/kg	0.422	0.422	1	B
Dieldrin	ND		ug/kg	0.422	0.422	1	A
Endrin	0.454	IP	ug/kg	0.422	0.422	1	A
Endosulfan II	ND		ug/kg	0.422	0.422	1	A
4,4'-DDD	ND		ug/kg	0.422	0.422	1	A
cis-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDT	ND		ug/kg	0.422	0.422	1	A
Methoxychlor	ND		ug/kg	4.22	4.22	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	76		30-150	A
DBOB	52		30-150	B
BZ 198	76		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-09
Client ID: MN LABORATORY CONTROL REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 02:44
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.916	0.916	1	A
gamma-BHC	ND		ug/kg	0.458	0.458	1	A
Heptachlor	ND		ug/kg	0.458	0.458	1	A
Aldrin	ND		ug/kg	0.458	0.458	1	A
Heptachlor epoxide	ND		ug/kg	0.916	0.916	1	B
Oxychlordane	ND		ug/kg	0.916	0.916	1	B
trans-Chlordane	ND		ug/kg	0.458	0.458	1	A
Endosulfan I	ND		ug/kg	0.458	0.458	1	A
cis-Chlordane	ND		ug/kg	0.458	0.458	1	A
trans-Nonachlor	ND		ug/kg	0.458	0.458	1	A
4,4'-DDE	ND		ug/kg	0.458	0.458	1	B
Dieldrin	ND		ug/kg	0.458	0.458	1	A
Endrin	0.815	IP	ug/kg	0.458	0.458	1	A
Endosulfan II	ND		ug/kg	0.458	0.458	1	A
4,4'-DDD	ND		ug/kg	0.458	0.458	1	A
cis-Nonachlor	ND		ug/kg	0.458	0.458	1	A
4,4'-DDT	ND		ug/kg	0.458	0.458	1	A
Methoxychlor	ND		ug/kg	4.58	4.58	1	A
Toxaphene	ND		ug/kg	23.0	23.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	67		30-150	A
DBOB	49		30-150	B
BZ 198	71		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-10
Client ID: MN LABORATORY CONTROL REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 03:18
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.940	0.940	1	A
gamma-BHC	ND		ug/kg	0.470	0.470	1	A
Heptachlor	ND		ug/kg	0.470	0.470	1	A
Aldrin	ND		ug/kg	0.470	0.470	1	A
Heptachlor epoxide	ND		ug/kg	0.940	0.940	1	B
Oxychlordane	ND		ug/kg	0.940	0.940	1	B
trans-Chlordane	ND		ug/kg	0.470	0.470	1	A
Endosulfan I	ND		ug/kg	0.470	0.470	1	A
cis-Chlordane	ND		ug/kg	0.470	0.470	1	A
trans-Nonachlor	ND		ug/kg	0.470	0.470	1	A
4,4'-DDE	ND		ug/kg	0.470	0.470	1	B
Dieldrin	ND		ug/kg	0.470	0.470	1	A
Endrin	0.499	IP	ug/kg	0.470	0.470	1	A
Endosulfan II	ND		ug/kg	0.470	0.470	1	A
4,4'-DDD	ND		ug/kg	0.470	0.470	1	A
cis-Nonachlor	ND		ug/kg	0.470	0.470	1	A
4,4'-DDT	ND		ug/kg	0.470	0.470	1	A
Methoxychlor	ND		ug/kg	4.70	4.70	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	A
BZ 198	75		30-150	A
DBOB	62		30-150	B
BZ 198	78		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-11
Client ID: MN CLDS REFERENCE SEDIMENT REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 03:52
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.965	0.965	1	A
gamma-BHC	ND		ug/kg	0.483	0.483	1	A
Heptachlor	ND		ug/kg	0.483	0.483	1	A
Aldrin	ND		ug/kg	0.483	0.483	1	A
Heptachlor epoxide	ND		ug/kg	0.965	0.965	1	B
Oxychlordane	ND		ug/kg	0.965	0.965	1	B
trans-Chlordane	ND		ug/kg	0.483	0.483	1	A
Endosulfan I	ND		ug/kg	0.483	0.483	1	A
cis-Chlordane	ND		ug/kg	0.483	0.483	1	A
trans-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDE	ND		ug/kg	0.483	0.483	1	B
Dieldrin	ND		ug/kg	0.483	0.483	1	A
Endrin	1.97	I	ug/kg	0.483	0.483	1	A
Endosulfan II	ND		ug/kg	0.483	0.483	1	A
4,4'-DDD	ND		ug/kg	0.483	0.483	1	A
cis-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDT	ND		ug/kg	0.483	0.483	1	A
Methoxychlor	ND		ug/kg	4.83	4.83	1	A
Toxaphene	ND		ug/kg	24.2	24.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	A
BZ 198	73		30-150	A
DBOB	64		30-150	B
BZ 198	77		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-12
Client ID: MN CLDS REFERENCE SEDIMENT REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 04:26
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.901	0.901	1	A
gamma-BHC	ND		ug/kg	0.450	0.450	1	A
Heptachlor	ND		ug/kg	0.450	0.450	1	A
Aldrin	ND		ug/kg	0.450	0.450	1	A
Heptachlor epoxide	ND		ug/kg	0.901	0.901	1	B
Oxychlordane	ND		ug/kg	0.901	0.901	1	B
trans-Chlordane	ND		ug/kg	0.450	0.450	1	A
Endosulfan I	ND		ug/kg	0.450	0.450	1	A
cis-Chlordane	ND		ug/kg	0.450	0.450	1	A
trans-Nonachlor	ND		ug/kg	0.450	0.450	1	A
4,4'-DDE	0.458		ug/kg	0.450	0.450	1	B
Dieldrin	ND		ug/kg	0.450	0.450	1	A
Endrin	0.480	IP	ug/kg	0.450	0.450	1	A
Endosulfan II	ND		ug/kg	0.450	0.450	1	A
4,4'-DDD	ND		ug/kg	0.450	0.450	1	A
cis-Nonachlor	ND		ug/kg	0.450	0.450	1	A
4,4'-DDT	ND		ug/kg	0.450	0.450	1	A
Methoxychlor	ND		ug/kg	4.50	4.50	1	A
Toxaphene	ND		ug/kg	22.6	22.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	74		30-150	A
BZ 198	71		30-150	A
DBOB	63		30-150	B
BZ 198	76		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-13
Client ID: MN CLDS REFERENCE SEDIMENT REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 05:00
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.906	0.906	1	A
gamma-BHC	ND		ug/kg	0.453	0.453	1	A
Heptachlor	ND		ug/kg	0.453	0.453	1	A
Aldrin	ND		ug/kg	0.453	0.453	1	A
Heptachlor epoxide	ND		ug/kg	0.906	0.906	1	B
Oxychlordane	ND		ug/kg	0.906	0.906	1	B
trans-Chlordane	ND		ug/kg	0.453	0.453	1	A
Endosulfan I	ND		ug/kg	0.453	0.453	1	A
cis-Chlordane	ND		ug/kg	0.453	0.453	1	A
trans-Nonachlor	ND		ug/kg	0.453	0.453	1	A
4,4'-DDE	ND		ug/kg	0.453	0.453	1	A
Dieldrin	ND		ug/kg	0.453	0.453	1	A
Endrin	1.72	I	ug/kg	0.453	0.453	1	A
Endosulfan II	ND		ug/kg	0.453	0.453	1	A
4,4'-DDD	ND		ug/kg	0.453	0.453	1	A
cis-Nonachlor	ND		ug/kg	0.453	0.453	1	A
4,4'-DDT	ND		ug/kg	0.453	0.453	1	A
Methoxychlor	ND		ug/kg	4.53	4.53	1	A
Toxaphene	ND		ug/kg	22.7	22.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	72		30-150	A
DBOB	59		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-14
Client ID: MN CLDS REFERENCE SEDIMENT REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 05:34
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.865	0.865	1	A
gamma-BHC	ND		ug/kg	0.432	0.432	1	A
Heptachlor	ND		ug/kg	0.432	0.432	1	A
Aldrin	ND		ug/kg	0.432	0.432	1	A
Heptachlor epoxide	ND		ug/kg	0.865	0.865	1	B
Oxychlordane	ND		ug/kg	0.865	0.865	1	B
trans-Chlordane	ND		ug/kg	0.432	0.432	1	A
Endosulfan I	ND		ug/kg	0.432	0.432	1	A
cis-Chlordane	ND		ug/kg	0.432	0.432	1	A
trans-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDE	0.466		ug/kg	0.432	0.432	1	A
Dieldrin	ND		ug/kg	0.432	0.432	1	A
Endrin	0.503	IP	ug/kg	0.432	0.432	1	A
Endosulfan II	ND		ug/kg	0.432	0.432	1	A
4,4'-DDD	ND		ug/kg	0.432	0.432	1	A
cis-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDT	ND		ug/kg	0.432	0.432	1	A
Methoxychlor	ND		ug/kg	4.32	4.32	1	A
Toxaphene	ND		ug/kg	21.7	21.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	81		30-150	A
BZ 198	71		30-150	A
DBOB	66		30-150	B
BZ 198	75		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-15
Client ID: MN CLDS REFERENCE SEDIMENT REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 06:08
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.940	0.940	1	A
gamma-BHC	ND		ug/kg	0.470	0.470	1	A
Heptachlor	ND		ug/kg	0.470	0.470	1	A
Aldrin	ND		ug/kg	0.470	0.470	1	A
Heptachlor epoxide	ND		ug/kg	0.940	0.940	1	B
Oxychlordane	ND		ug/kg	0.940	0.940	1	B
trans-Chlordane	ND		ug/kg	0.470	0.470	1	A
Endosulfan I	ND		ug/kg	0.470	0.470	1	A
cis-Chlordane	ND		ug/kg	0.470	0.470	1	A
trans-Nonachlor	ND		ug/kg	0.470	0.470	1	A
4,4'-DDE	ND		ug/kg	0.470	0.470	1	B
Dieldrin	ND		ug/kg	0.470	0.470	1	A
Endrin	6.14	P	ug/kg	0.470	0.470	1	A
Endosulfan II	ND		ug/kg	0.470	0.470	1	A
4,4'-DDD	ND		ug/kg	0.470	0.470	1	A
cis-Nonachlor	ND		ug/kg	0.470	0.470	1	A
4,4'-DDT	ND		ug/kg	0.470	0.470	1	A
Methoxychlor	ND		ug/kg	4.70	4.70	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	A
BZ 198	71		30-150	A
DBOB	63		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-16
Client ID: MN COMPOSITE 1 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 06:42
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	0.888	1	A
gamma-BHC	ND		ug/kg	0.444	0.444	1	A
Heptachlor	ND		ug/kg	0.444	0.444	1	A
Aldrin	ND		ug/kg	0.444	0.444	1	A
Heptachlor epoxide	ND		ug/kg	0.888	0.888	1	B
Oxychlordane	ND		ug/kg	0.888	0.888	1	B
trans-Chlordane	ND		ug/kg	0.444	0.444	1	A
Endosulfan I	ND		ug/kg	0.444	0.444	1	A
cis-Chlordane	ND		ug/kg	0.444	0.444	1	A
trans-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDE	ND		ug/kg	0.444	0.444	1	A
Dieldrin	ND		ug/kg	0.444	0.444	1	A
Endrin	0.775	IP	ug/kg	0.444	0.444	1	A
Endosulfan II	ND		ug/kg	0.444	0.444	1	A
4,4'-DDD	ND		ug/kg	0.444	0.444	1	A
cis-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDT	ND		ug/kg	0.444	0.444	1	A
Methoxychlor	ND		ug/kg	4.44	4.44	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	48		30-150	A
BZ 198	57		30-150	A
DBOB	42		30-150	B
BZ 198	62		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-17
Client ID: MN COMPOSITE 1 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 07:16
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.846	0.846	1	A
gamma-BHC	ND		ug/kg	0.423	0.423	1	A
Heptachlor	ND		ug/kg	0.423	0.423	1	A
Aldrin	ND		ug/kg	0.423	0.423	1	A
Heptachlor epoxide	ND		ug/kg	0.846	0.846	1	B
Oxychlordane	ND		ug/kg	0.846	0.846	1	B
trans-Chlordane	ND		ug/kg	0.423	0.423	1	A
Endosulfan I	ND		ug/kg	0.423	0.423	1	A
cis-Chlordane	ND		ug/kg	0.423	0.423	1	A
trans-Nonachlor	ND		ug/kg	0.423	0.423	1	A
4,4'-DDE	ND		ug/kg	0.423	0.423	1	A
Dieldrin	ND		ug/kg	0.423	0.423	1	A
Endrin	0.677	IP	ug/kg	0.423	0.423	1	A
Endosulfan II	ND		ug/kg	0.423	0.423	1	A
4,4'-DDD	ND		ug/kg	0.423	0.423	1	A
cis-Nonachlor	ND		ug/kg	0.423	0.423	1	A
4,4'-DDT	ND		ug/kg	0.423	0.423	1	A
Methoxychlor	ND		ug/kg	4.23	4.23	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	76		30-150	A
BZ 198	74		30-150	A
DBOB	65		30-150	B
BZ 198	78		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-18
Client ID: MN COMPOSITE 1 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 07:50
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.874	0.874	1	A
gamma-BHC	ND		ug/kg	0.437	0.437	1	A
Heptachlor	ND		ug/kg	0.437	0.437	1	A
Aldrin	ND		ug/kg	0.437	0.437	1	A
Heptachlor epoxide	ND		ug/kg	0.874	0.874	1	B
Oxychlordane	ND		ug/kg	0.874	0.874	1	B
trans-Chlordane	ND		ug/kg	0.437	0.437	1	A
Endosulfan I	ND		ug/kg	0.437	0.437	1	A
cis-Chlordane	ND		ug/kg	0.437	0.437	1	A
trans-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDE	ND		ug/kg	0.437	0.437	1	A
Dieldrin	ND		ug/kg	0.437	0.437	1	A
Endrin	0.732	IP	ug/kg	0.437	0.437	1	A
Endosulfan II	ND		ug/kg	0.437	0.437	1	A
4,4'-DDD	ND		ug/kg	0.437	0.437	1	A
cis-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDT	ND		ug/kg	0.437	0.437	1	A
Methoxychlor	ND		ug/kg	4.37	4.37	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	84		30-150	A
BZ 198	82		30-150	A
DBOB	72		30-150	B
BZ 198	84		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-19
Client ID: MN COMPOSITE 1 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 08:24
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.952	0.952	1	A
gamma-BHC	ND		ug/kg	0.476	0.476	1	A
Heptachlor	ND		ug/kg	0.476	0.476	1	A
Aldrin	ND		ug/kg	0.476	0.476	1	A
Heptachlor epoxide	ND		ug/kg	0.952	0.952	1	B
Oxychlordane	ND		ug/kg	0.952	0.952	1	B
trans-Chlordane	ND		ug/kg	0.476	0.476	1	A
Endosulfan I	ND		ug/kg	0.476	0.476	1	A
cis-Chlordane	ND		ug/kg	0.476	0.476	1	A
trans-Nonachlor	ND		ug/kg	0.476	0.476	1	A
4,4'-DDE	ND		ug/kg	0.476	0.476	1	A
Dieldrin	ND		ug/kg	0.476	0.476	1	A
Endrin	6.86	IP	ug/kg	0.476	0.476	1	A
Endosulfan II	ND		ug/kg	0.476	0.476	1	A
4,4'-DDD	ND		ug/kg	0.476	0.476	1	A
cis-Nonachlor	ND		ug/kg	0.476	0.476	1	A
4,4'-DDT	ND		ug/kg	0.476	0.476	1	A
Methoxychlor	ND		ug/kg	4.76	4.76	1	A
Toxaphene	ND		ug/kg	23.9	23.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	A
BZ 198	69		30-150	A
DBOB	71		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-20
Client ID: MN COMPOSITE 1 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 08:58
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.934	0.934	1	A
gamma-BHC	ND		ug/kg	0.467	0.467	1	A
Heptachlor	ND		ug/kg	0.467	0.467	1	A
Aldrin	ND		ug/kg	0.467	0.467	1	A
Heptachlor epoxide	ND		ug/kg	0.934	0.934	1	B
Oxychlordane	ND		ug/kg	0.934	0.934	1	B
trans-Chlordane	ND		ug/kg	0.467	0.467	1	A
Endosulfan I	ND		ug/kg	0.467	0.467	1	A
cis-Chlordane	ND		ug/kg	0.467	0.467	1	A
trans-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDE	ND		ug/kg	0.467	0.467	1	A
Dieldrin	ND		ug/kg	0.467	0.467	1	A
Endrin	0.771	IP	ug/kg	0.467	0.467	1	A
Endosulfan II	ND		ug/kg	0.467	0.467	1	A
4,4'-DDD	ND		ug/kg	0.467	0.467	1	A
cis-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDT	ND		ug/kg	0.467	0.467	1	A
Methoxychlor	ND		ug/kg	4.67	4.67	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	69		30-150	A
DBOB	71		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-21
Client ID: MN COMPOSITE 2 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 18:05
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	0.888	1	A
gamma-BHC	ND		ug/kg	0.444	0.444	1	A
Heptachlor	ND		ug/kg	0.444	0.444	1	A
Aldrin	ND	I	ug/kg	0.444	0.444	1	B
Heptachlor epoxide	ND		ug/kg	0.888	0.888	1	B
Oxychlordane	ND		ug/kg	0.888	0.888	1	B
trans-Chlordane	ND		ug/kg	0.444	0.444	1	A
Endosulfan I	ND		ug/kg	0.444	0.444	1	A
cis-Chlordane	ND		ug/kg	0.444	0.444	1	A
trans-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDE	2.11		ug/kg	0.444	0.444	1	A
Dieldrin	1.26	I	ug/kg	0.444	0.444	1	A
Endrin	1.71	IP	ug/kg	0.444	0.444	1	A
Endosulfan II	ND		ug/kg	0.444	0.444	1	A
4,4'-DDD	1.96		ug/kg	0.444	0.444	1	A
cis-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDT	1.33		ug/kg	0.444	0.444	1	A
Methoxychlor	ND		ug/kg	4.44	4.44	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	76		30-150	A
DBOB	65		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-22
Client ID: MN COMPOSITE 2 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 22:03
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.942	0.942	1	A
gamma-BHC	ND		ug/kg	0.471	0.471	1	A
Heptachlor	ND		ug/kg	0.471	0.471	1	A
Aldrin	ND		ug/kg	0.471	0.471	1	A
Heptachlor epoxide	ND		ug/kg	0.942	0.942	1	B
Oxychlordane	ND		ug/kg	0.942	0.942	1	B
trans-Chlordane	ND		ug/kg	0.471	0.471	1	A
Endosulfan I	ND		ug/kg	0.471	0.471	1	A
cis-Chlordane	ND		ug/kg	0.471	0.471	1	A
trans-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDE	0.560		ug/kg	0.471	0.471	1	B
Dieldrin	ND		ug/kg	0.471	0.471	1	A
Endrin	0.610	IP	ug/kg	0.471	0.471	1	A
Endosulfan II	ND		ug/kg	0.471	0.471	1	A
4,4'-DDD	ND		ug/kg	0.471	0.471	1	B
cis-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDT	ND		ug/kg	0.471	0.471	1	A
Methoxychlor	ND		ug/kg	4.71	4.71	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	54		30-150	A
DBOB	51		30-150	B
BZ 198	55		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-23
Client ID: MN COMPOSITE 2 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 22:37
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.871	0.871	1	A
gamma-BHC	ND		ug/kg	0.436	0.436	1	A
Heptachlor	ND		ug/kg	0.436	0.436	1	A
Aldrin	ND		ug/kg	0.436	0.436	1	A
Heptachlor epoxide	ND		ug/kg	0.871	0.871	1	B
Oxychlordane	ND		ug/kg	0.871	0.871	1	B
trans-Chlordane	ND		ug/kg	0.436	0.436	1	A
Endosulfan I	ND		ug/kg	0.436	0.436	1	A
cis-Chlordane	ND		ug/kg	0.436	0.436	1	A
trans-Nonachlor	ND		ug/kg	0.436	0.436	1	A
4,4'-DDE	ND		ug/kg	0.436	0.436	1	B
Dieldrin	ND		ug/kg	0.436	0.436	1	A
Endrin	0.438	IP	ug/kg	0.436	0.436	1	A
Endosulfan II	ND		ug/kg	0.436	0.436	1	A
4,4'-DDD	ND		ug/kg	0.436	0.436	1	A
cis-Nonachlor	ND		ug/kg	0.436	0.436	1	A
4,4'-DDT	ND		ug/kg	0.436	0.436	1	A
Methoxychlor	ND		ug/kg	4.36	4.36	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	47		30-150	A
BZ 198	45		30-150	A
DBOB	46		30-150	B
BZ 198	47		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-24
Client ID: MN COMPOSITE 2 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 23:11
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.973	0.973	1	A
gamma-BHC	ND		ug/kg	0.486	0.486	1	A
Heptachlor	ND		ug/kg	0.486	0.486	1	A
Aldrin	ND		ug/kg	0.486	0.486	1	A
Heptachlor epoxide	ND		ug/kg	0.973	0.973	1	B
Oxychlordane	ND		ug/kg	0.973	0.973	1	B
trans-Chlordane	ND		ug/kg	0.486	0.486	1	A
Endosulfan I	ND		ug/kg	0.486	0.486	1	A
cis-Chlordane	ND		ug/kg	0.486	0.486	1	A
trans-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDE	ND		ug/kg	0.486	0.486	1	A
Dieldrin	ND		ug/kg	0.486	0.486	1	B
Endrin	1.90	P	ug/kg	0.486	0.486	1	B
Endosulfan II	ND		ug/kg	0.486	0.486	1	A
4,4'-DDD	ND		ug/kg	0.486	0.486	1	A
cis-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDT	ND		ug/kg	0.486	0.486	1	A
Methoxychlor	ND		ug/kg	4.86	4.86	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	50		30-150	A
BZ 198	47		30-150	A
DBOB	47		30-150	B
BZ 198	50		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-25
Client ID: MN COMPOSITE 2 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/08/17 23:45
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.879	0.879	1	A
gamma-BHC	ND		ug/kg	0.439	0.439	1	A
Heptachlor	ND		ug/kg	0.439	0.439	1	A
Aldrin	ND		ug/kg	0.439	0.439	1	A
Heptachlor epoxide	ND		ug/kg	0.879	0.879	1	B
Oxychlordane	ND		ug/kg	0.879	0.879	1	B
trans-Chlordane	ND		ug/kg	0.439	0.439	1	A
Endosulfan I	ND		ug/kg	0.439	0.439	1	A
cis-Chlordane	ND		ug/kg	0.439	0.439	1	A
trans-Nonachlor	ND		ug/kg	0.439	0.439	1	A
4,4'-DDE	0.729		ug/kg	0.439	0.439	1	B
Dieldrin	ND		ug/kg	0.439	0.439	1	A
Endrin	0.688	IP	ug/kg	0.439	0.439	1	A
Endosulfan II	ND		ug/kg	0.439	0.439	1	A
4,4'-DDD	ND		ug/kg	0.439	0.439	1	A
cis-Nonachlor	ND		ug/kg	0.439	0.439	1	A
4,4'-DDT	ND		ug/kg	0.439	0.439	1	A
Methoxychlor	ND		ug/kg	4.39	4.39	1	A
Toxaphene	ND		ug/kg	22.0	22.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	A
BZ 198	70		30-150	A
DBOB	60		30-150	B
BZ 198	72		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-26
Client ID: MN COMPOSITE 3 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 00:19
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.942	0.942	1	A
gamma-BHC	ND		ug/kg	0.471	0.471	1	A
Heptachlor	ND		ug/kg	0.471	0.471	1	A
Aldrin	ND		ug/kg	0.471	0.471	1	A
Heptachlor epoxide	ND		ug/kg	0.942	0.942	1	B
Oxychlordane	ND		ug/kg	0.942	0.942	1	B
trans-Chlordane	ND		ug/kg	0.471	0.471	1	A
Endosulfan I	ND		ug/kg	0.471	0.471	1	A
cis-Chlordane	ND		ug/kg	0.471	0.471	1	A
trans-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDE	ND		ug/kg	0.471	0.471	1	A
Dieldrin	ND		ug/kg	0.471	0.471	1	A
Endrin	0.761	IP	ug/kg	0.471	0.471	1	A
Endosulfan II	ND		ug/kg	0.471	0.471	1	A
4,4'-DDD	ND		ug/kg	0.471	0.471	1	A
cis-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDT	ND		ug/kg	0.471	0.471	1	A
Methoxychlor	ND		ug/kg	4.71	4.71	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	67		30-150	A
DBOB	95		30-150	B
BZ 198	70		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-27
Client ID: MN COMPOSITE 3 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 00:53
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.909	0.909	1	A
gamma-BHC	ND		ug/kg	0.454	0.454	1	A
Heptachlor	ND		ug/kg	0.454	0.454	1	A
Aldrin	ND		ug/kg	0.454	0.454	1	A
Heptachlor epoxide	ND		ug/kg	0.909	0.909	1	B
Oxychlordane	ND		ug/kg	0.909	0.909	1	B
trans-Chlordane	ND		ug/kg	0.454	0.454	1	A
Endosulfan I	ND		ug/kg	0.454	0.454	1	A
cis-Chlordane	ND		ug/kg	0.454	0.454	1	A
trans-Nonachlor	ND		ug/kg	0.454	0.454	1	A
4,4'-DDE	ND		ug/kg	0.454	0.454	1	A
Dieldrin	ND		ug/kg	0.454	0.454	1	A
Endrin	ND		ug/kg	0.454	0.454	1	A
Endosulfan II	ND		ug/kg	0.454	0.454	1	A
4,4'-DDD	ND		ug/kg	0.454	0.454	1	A
cis-Nonachlor	ND		ug/kg	0.454	0.454	1	A
4,4'-DDT	ND		ug/kg	0.454	0.454	1	A
Methoxychlor	ND		ug/kg	4.54	4.54	1	A
Toxaphene	ND		ug/kg	22.8	22.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	63		30-150	A
DBOB	90		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-28	Date Collected:	09/29/17 08:45
Client ID:	MN COMPOSITE 3 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
		Extraction Method:	EPA 3570
Matrix:	Tissue	Extraction Date:	10/23/17 19:00
Analytical Method:	1,8081B	Cleanup Method:	EPA 3630
Analytical Date:	11/09/17 01:27	Cleanup Date:	10/26/17
Analyst:	DP		
Percent Solids:	Results reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.847	0.847	1	A
gamma-BHC	ND		ug/kg	0.424	0.424	1	A
Heptachlor	ND		ug/kg	0.424	0.424	1	A
Aldrin	ND		ug/kg	0.424	0.424	1	A
Heptachlor epoxide	ND		ug/kg	0.847	0.847	1	B
Oxychlordane	ND		ug/kg	0.847	0.847	1	B
trans-Chlordane	ND		ug/kg	0.424	0.424	1	A
Endosulfan I	ND		ug/kg	0.424	0.424	1	A
cis-Chlordane	ND		ug/kg	0.424	0.424	1	A
trans-Nonachlor	ND		ug/kg	0.424	0.424	1	A
4,4'-DDE	0.512	P	ug/kg	0.424	0.424	1	A
Dieldrin	ND		ug/kg	0.424	0.424	1	A
Endrin	2.16	IP	ug/kg	0.424	0.424	1	A
Endosulfan II	ND		ug/kg	0.424	0.424	1	A
4,4'-DDD	ND		ug/kg	0.424	0.424	1	A
cis-Nonachlor	ND		ug/kg	0.424	0.424	1	A
4,4'-DDT	ND		ug/kg	0.424	0.424	1	A
Methoxychlor	ND		ug/kg	4.24	4.24	1	A
Toxaphene	ND		ug/kg	21.3	21.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	56		30-150	A
DBOB	49		30-150	B
BZ 198	58		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-29
Client ID: MN COMPOSITE 3 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 02:01
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.992	0.992	1	A
gamma-BHC	ND		ug/kg	0.496	0.496	1	A
Heptachlor	ND		ug/kg	0.496	0.496	1	A
Aldrin	ND		ug/kg	0.496	0.496	1	A
Heptachlor epoxide	ND		ug/kg	0.992	0.992	1	B
Oxychlordane	ND		ug/kg	0.992	0.992	1	B
trans-Chlordane	ND		ug/kg	0.496	0.496	1	A
Endosulfan I	ND		ug/kg	0.496	0.496	1	A
cis-Chlordane	ND		ug/kg	0.496	0.496	1	A
trans-Nonachlor	ND		ug/kg	0.496	0.496	1	A
4,4'-DDE	0.688		ug/kg	0.496	0.496	1	A
Dieldrin	ND		ug/kg	0.496	0.496	1	A
Endrin	1.78	IP	ug/kg	0.496	0.496	1	A
Endosulfan II	ND		ug/kg	0.496	0.496	1	A
4,4'-DDD	ND		ug/kg	0.496	0.496	1	A
cis-Nonachlor	ND		ug/kg	0.496	0.496	1	A
4,4'-DDT	ND		ug/kg	0.496	0.496	1	A
Methoxychlor	ND		ug/kg	4.96	4.96	1	A
Toxaphene	ND		ug/kg	24.9	24.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	60		30-150	A
DBOB	59		30-150	B
BZ 198	69		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-30
Client ID: MN COMPOSITE 3 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 02:35
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.938	0.938	1	A
gamma-BHC	ND		ug/kg	0.469	0.469	1	A
Heptachlor	ND		ug/kg	0.469	0.469	1	A
Aldrin	ND		ug/kg	0.469	0.469	1	A
Heptachlor epoxide	ND		ug/kg	0.938	0.938	1	B
Oxychlordane	ND		ug/kg	0.938	0.938	1	B
trans-Chlordane	ND		ug/kg	0.469	0.469	1	A
Endosulfan I	ND		ug/kg	0.469	0.469	1	A
cis-Chlordane	ND		ug/kg	0.469	0.469	1	A
trans-Nonachlor	ND		ug/kg	0.469	0.469	1	A
4,4'-DDE	ND		ug/kg	0.469	0.469	1	A
Dieldrin	ND		ug/kg	0.469	0.469	1	A
Endrin	21.5	P	ug/kg	0.469	0.469	1	A
Endosulfan II	ND		ug/kg	0.469	0.469	1	A
4,4'-DDD	ND		ug/kg	0.469	0.469	1	A
cis-Nonachlor	ND		ug/kg	0.469	0.469	1	A
4,4'-DDT	ND		ug/kg	0.469	0.469	1	A
Methoxychlor	ND		ug/kg	4.69	4.69	1	A
Toxaphene	ND		ug/kg	23.5	23.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	51		30-150	A
DBOB	73		30-150	B
BZ 198	60		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-31
Client ID: MN COMPOSITE 4 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 03:09
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.846	0.846	1	A
gamma-BHC	ND		ug/kg	0.423	0.423	1	A
Heptachlor	ND		ug/kg	0.423	0.423	1	A
Aldrin	ND		ug/kg	0.423	0.423	1	A
Heptachlor epoxide	ND		ug/kg	0.846	0.846	1	B
Oxychlordane	ND		ug/kg	0.846	0.846	1	B
trans-Chlordane	ND		ug/kg	0.423	0.423	1	A
Endosulfan I	ND		ug/kg	0.423	0.423	1	A
cis-Chlordane	ND		ug/kg	0.423	0.423	1	A
trans-Nonachlor	ND		ug/kg	0.423	0.423	1	A
4,4'-DDE	0.494		ug/kg	0.423	0.423	1	A
Dieldrin	ND		ug/kg	0.423	0.423	1	A
Endrin	0.678	IP	ug/kg	0.423	0.423	1	A
Endosulfan II	ND		ug/kg	0.423	0.423	1	A
4,4'-DDD	ND		ug/kg	0.423	0.423	1	A
cis-Nonachlor	ND		ug/kg	0.423	0.423	1	A
4,4'-DDT	ND		ug/kg	0.423	0.423	1	A
Methoxychlor	ND		ug/kg	4.23	4.23	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	54		30-150	A
DBOB	47		30-150	B
BZ 198	55		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-32
Client ID: MN COMPOSITE 4 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 03:43
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.874	0.874	1	A
gamma-BHC	ND		ug/kg	0.437	0.437	1	A
Heptachlor	ND		ug/kg	0.437	0.437	1	A
Aldrin	ND		ug/kg	0.437	0.437	1	A
Heptachlor epoxide	ND		ug/kg	0.874	0.874	1	B
Oxychlordane	ND		ug/kg	0.874	0.874	1	B
trans-Chlordane	ND		ug/kg	0.437	0.437	1	A
Endosulfan I	ND		ug/kg	0.437	0.437	1	A
cis-Chlordane	ND		ug/kg	0.437	0.437	1	A
trans-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDE	ND		ug/kg	0.437	0.437	1	A
Dieldrin	ND		ug/kg	0.437	0.437	1	A
Endrin	5.60		ug/kg	0.437	0.437	1	A
Endosulfan II	ND		ug/kg	0.437	0.437	1	A
4,4'-DDD	ND		ug/kg	0.437	0.437	1	A
cis-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDT	ND		ug/kg	0.437	0.437	1	A
Methoxychlor	ND		ug/kg	4.37	4.37	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	51		30-150	A
BZ 198	50		30-150	A
DBOB	50		30-150	B
BZ 198	55		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-33
Client ID: MN COMPOSITE 4 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 04:17
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.942	0.942	1	A
gamma-BHC	ND		ug/kg	0.471	0.471	1	A
Heptachlor	ND		ug/kg	0.471	0.471	1	A
Aldrin	ND		ug/kg	0.471	0.471	1	A
Heptachlor epoxide	ND		ug/kg	0.942	0.942	1	B
Oxychlordane	ND		ug/kg	0.942	0.942	1	B
trans-Chlordane	ND		ug/kg	0.471	0.471	1	A
Endosulfan I	ND		ug/kg	0.471	0.471	1	A
cis-Chlordane	ND		ug/kg	0.471	0.471	1	A
trans-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDE	0.565		ug/kg	0.471	0.471	1	A
Dieldrin	ND		ug/kg	0.471	0.471	1	A
Endrin	ND		ug/kg	0.471	0.471	1	A
Endosulfan II	ND		ug/kg	0.471	0.471	1	A
4,4'-DDD	ND		ug/kg	0.471	0.471	1	A
cis-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDT	ND		ug/kg	0.471	0.471	1	A
Methoxychlor	ND		ug/kg	4.71	4.71	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	72		30-150	A
DBOB	56		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-34
Client ID: MN COMPOSITE 4 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 04:51
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.846	0.846	1	A
gamma-BHC	ND		ug/kg	0.423	0.423	1	A
Heptachlor	ND		ug/kg	0.423	0.423	1	A
Aldrin	ND		ug/kg	0.423	0.423	1	A
Heptachlor epoxide	ND		ug/kg	0.846	0.846	1	B
Oxychlordane	ND		ug/kg	0.846	0.846	1	B
trans-Chlordane	ND		ug/kg	0.423	0.423	1	A
Endosulfan I	ND		ug/kg	0.423	0.423	1	A
cis-Chlordane	ND		ug/kg	0.423	0.423	1	A
trans-Nonachlor	ND		ug/kg	0.423	0.423	1	A
4,4'-DDE	0.700		ug/kg	0.423	0.423	1	A
Dieldrin	ND		ug/kg	0.423	0.423	1	A
Endrin	6.34	P	ug/kg	0.423	0.423	1	A
Endosulfan II	ND		ug/kg	0.423	0.423	1	A
4,4'-DDD	ND		ug/kg	0.423	0.423	1	A
cis-Nonachlor	ND		ug/kg	0.423	0.423	1	A
4,4'-DDT	ND		ug/kg	0.423	0.423	1	A
Methoxychlor	ND		ug/kg	4.23	4.23	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	60		30-150	A
DBOB	62		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-35
Client ID: MN COMPOSITE 4 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 05:25
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.986	0.986	1	A
gamma-BHC	ND		ug/kg	0.493	0.493	1	A
Heptachlor	ND		ug/kg	0.493	0.493	1	A
Aldrin	ND		ug/kg	0.493	0.493	1	A
Heptachlor epoxide	ND		ug/kg	0.986	0.986	1	B
Oxychlordane	ND		ug/kg	0.986	0.986	1	B
trans-Chlordane	ND		ug/kg	0.493	0.493	1	A
Endosulfan I	ND		ug/kg	0.493	0.493	1	A
cis-Chlordane	ND		ug/kg	0.493	0.493	1	A
trans-Nonachlor	ND		ug/kg	0.493	0.493	1	A
4,4'-DDE	ND		ug/kg	0.493	0.493	1	A
Dieldrin	ND		ug/kg	0.493	0.493	1	A
Endrin	0.993	IP	ug/kg	0.493	0.493	1	A
Endosulfan II	ND		ug/kg	0.493	0.493	1	A
4,4'-DDD	ND		ug/kg	0.493	0.493	1	A
cis-Nonachlor	ND		ug/kg	0.493	0.493	1	A
4,4'-DDT	ND		ug/kg	0.493	0.493	1	A
Methoxychlor	ND		ug/kg	4.93	4.93	1	A
Toxaphene	ND		ug/kg	24.8	24.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	62		30-150	A
DBOB	54		30-150	B
BZ 198	60		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-36	Date Collected:	09/29/17 09:30
Client ID:	MN COMPOSITE 5 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
		Extraction Method:	EPA 3570
Matrix:	Tissue	Extraction Date:	10/23/17 19:00
Analytical Method:	1,8081B	Cleanup Method:	EPA 3630
Analytical Date:	11/09/17 05:59	Cleanup Date:	10/26/17
Analyst:	DP		
Percent Solids:	Results reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.852	0.852	1	A
gamma-BHC	ND		ug/kg	0.426	0.426	1	A
Heptachlor	ND		ug/kg	0.426	0.426	1	A
Aldrin	ND		ug/kg	0.426	0.426	1	A
Heptachlor epoxide	ND		ug/kg	0.852	0.852	1	B
Oxychlordane	ND		ug/kg	0.852	0.852	1	B
trans-Chlordane	ND		ug/kg	0.426	0.426	1	A
Endosulfan I	ND		ug/kg	0.426	0.426	1	A
cis-Chlordane	ND		ug/kg	0.426	0.426	1	A
trans-Nonachlor	ND		ug/kg	0.426	0.426	1	A
4,4'-DDE	0.620		ug/kg	0.426	0.426	1	B
Dieldrin	ND		ug/kg	0.426	0.426	1	A
Endrin	0.536	IP	ug/kg	0.426	0.426	1	A
Endosulfan II	ND		ug/kg	0.426	0.426	1	A
4,4'-DDD	ND		ug/kg	0.426	0.426	1	A
cis-Nonachlor	ND		ug/kg	0.426	0.426	1	A
4,4'-DDT	ND		ug/kg	0.426	0.426	1	A
Methoxychlor	ND		ug/kg	4.26	4.26	1	A
Toxaphene	ND		ug/kg	21.4	21.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	69		30-150	A
DBOB	70		30-150	B
BZ 198	71		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-37
Client ID: MN COMPOSITE 5 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 06:33
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.843	0.843	1	A
gamma-BHC	ND		ug/kg	0.422	0.422	1	A
Heptachlor	ND		ug/kg	0.422	0.422	1	A
Aldrin	ND		ug/kg	0.422	0.422	1	A
Heptachlor epoxide	ND		ug/kg	0.843	0.843	1	B
Oxychlordane	ND		ug/kg	0.843	0.843	1	B
trans-Chlordane	ND		ug/kg	0.422	0.422	1	A
Endosulfan I	ND		ug/kg	0.422	0.422	1	A
cis-Chlordane	ND		ug/kg	0.422	0.422	1	A
trans-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDE	0.659		ug/kg	0.422	0.422	1	A
Dieldrin	ND		ug/kg	0.422	0.422	1	A
Endrin	0.957	IP	ug/kg	0.422	0.422	1	A
Endosulfan II	ND		ug/kg	0.422	0.422	1	A
4,4'-DDD	ND		ug/kg	0.422	0.422	1	A
cis-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDT	ND		ug/kg	0.422	0.422	1	A
Methoxychlor	ND		ug/kg	4.22	4.22	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	55		30-150	A
DBOB	49		30-150	B
BZ 198	56		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-38
Client ID: MN COMPOSITE 5 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 07:07
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.836	0.836	1	A
gamma-BHC	ND		ug/kg	0.418	0.418	1	A
Heptachlor	ND		ug/kg	0.418	0.418	1	A
Aldrin	ND		ug/kg	0.418	0.418	1	A
Heptachlor epoxide	ND		ug/kg	0.836	0.836	1	B
Oxychlordane	ND		ug/kg	0.836	0.836	1	B
trans-Chlordane	ND		ug/kg	0.418	0.418	1	A
Endosulfan I	ND		ug/kg	0.418	0.418	1	A
cis-Chlordane	ND		ug/kg	0.418	0.418	1	A
trans-Nonachlor	ND		ug/kg	0.418	0.418	1	A
4,4'-DDE	0.718	I	ug/kg	0.418	0.418	1	A
Dieldrin	ND		ug/kg	0.418	0.418	1	A
Endrin	0.818	IP	ug/kg	0.418	0.418	1	A
Endosulfan II	ND		ug/kg	0.418	0.418	1	A
4,4'-DDD	ND		ug/kg	0.418	0.418	1	A
cis-Nonachlor	ND		ug/kg	0.418	0.418	1	A
4,4'-DDT	ND		ug/kg	0.418	0.418	1	A
Methoxychlor	ND		ug/kg	4.18	4.18	1	A
Toxaphene	ND		ug/kg	21.0	21.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	61		30-150	A
DBOB	60		30-150	B
BZ 198	63		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-39
Client ID: MN COMPOSITE 5 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 07:41
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.883	0.883	1	A
gamma-BHC	ND		ug/kg	0.442	0.442	1	A
Heptachlor	ND		ug/kg	0.442	0.442	1	A
Aldrin	ND		ug/kg	0.442	0.442	1	A
Heptachlor epoxide	ND		ug/kg	0.883	0.883	1	B
Oxychlordane	ND		ug/kg	0.883	0.883	1	B
trans-Chlordane	ND		ug/kg	0.442	0.442	1	A
Endosulfan I	ND		ug/kg	0.442	0.442	1	A
cis-Chlordane	ND		ug/kg	0.442	0.442	1	A
trans-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDE	1.18		ug/kg	0.442	0.442	1	B
Dieldrin	ND		ug/kg	0.442	0.442	1	A
Endrin	0.670	IP	ug/kg	0.442	0.442	1	A
Endosulfan II	ND		ug/kg	0.442	0.442	1	A
4,4'-DDD	ND		ug/kg	0.442	0.442	1	A
cis-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDT	ND		ug/kg	0.442	0.442	1	A
Methoxychlor	ND		ug/kg	4.42	4.42	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	66		30-150	A
DBOB	66		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-40
Client ID: MN COMPOSITE 5 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 08:15
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.836	0.836	1	A
gamma-BHC	ND		ug/kg	0.418	0.418	1	A
Heptachlor	ND		ug/kg	0.418	0.418	1	A
Aldrin	ND		ug/kg	0.418	0.418	1	A
Heptachlor epoxide	ND		ug/kg	0.836	0.836	1	B
Oxychlordane	ND		ug/kg	0.836	0.836	1	B
trans-Chlordane	ND		ug/kg	0.418	0.418	1	A
Endosulfan I	ND		ug/kg	0.418	0.418	1	A
cis-Chlordane	ND		ug/kg	0.418	0.418	1	A
trans-Nonachlor	ND		ug/kg	0.418	0.418	1	A
4,4'-DDE	0.732		ug/kg	0.418	0.418	1	A
Dieldrin	ND		ug/kg	0.418	0.418	1	A
Endrin	0.561	IP	ug/kg	0.418	0.418	1	A
Endosulfan II	ND		ug/kg	0.418	0.418	1	A
4,4'-DDD	ND		ug/kg	0.418	0.418	1	A
cis-Nonachlor	ND		ug/kg	0.418	0.418	1	A
4,4'-DDT	ND		ug/kg	0.418	0.418	1	A
Methoxychlor	ND		ug/kg	4.18	4.18	1	A
Toxaphene	ND		ug/kg	21.0	21.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	61		30-150	A
DBOB	60		30-150	B
BZ 198	62		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-41
Client ID: MN COMPOSITE 6 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 18:47
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.914	0.914	1	A
gamma-BHC	ND		ug/kg	0.457	0.457	1	A
Heptachlor	ND		ug/kg	0.457	0.457	1	A
Aldrin	ND		ug/kg	0.457	0.457	1	A
Heptachlor epoxide	ND		ug/kg	0.914	0.914	1	B
Oxychlordane	ND		ug/kg	0.914	0.914	1	B
trans-Chlordane	ND		ug/kg	0.457	0.457	1	A
Endosulfan I	ND		ug/kg	0.457	0.457	1	A
cis-Chlordane	0.492		ug/kg	0.457	0.457	1	B
trans-Nonachlor	ND		ug/kg	0.457	0.457	1	B
4,4'-DDE	1.50		ug/kg	0.457	0.457	1	A
Dieldrin	0.743	IP	ug/kg	0.457	0.457	1	A
Endrin	0.847	IP	ug/kg	0.457	0.457	1	A
Endosulfan II	1.58	P	ug/kg	0.457	0.457	1	A
4,4'-DDD	0.553		ug/kg	0.457	0.457	1	B
cis-Nonachlor	ND		ug/kg	0.457	0.457	1	A
4,4'-DDT	0.848	IP	ug/kg	0.457	0.457	1	A
Methoxychlor	ND		ug/kg	4.57	4.57	1	A
Toxaphene	ND		ug/kg	22.9	22.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		30-150	A
BZ 198	76		30-150	A
DBOB	79		30-150	B
BZ 198	79		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-42
Client ID: MN COMPOSITE 6 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 19:22
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.906	0.906	1	A
gamma-BHC	ND		ug/kg	0.453	0.453	1	A
Heptachlor	ND		ug/kg	0.453	0.453	1	A
Aldrin	ND		ug/kg	0.453	0.453	1	A
Heptachlor epoxide	ND		ug/kg	0.906	0.906	1	B
Oxychlordane	ND		ug/kg	0.906	0.906	1	B
trans-Chlordane	ND		ug/kg	0.453	0.453	1	A
Endosulfan I	ND		ug/kg	0.453	0.453	1	A
cis-Chlordane	0.458		ug/kg	0.453	0.453	1	B
trans-Nonachlor	ND		ug/kg	0.453	0.453	1	A
4,4'-DDE	1.30		ug/kg	0.453	0.453	1	A
Dieldrin	0.666	IP	ug/kg	0.453	0.453	1	A
Endrin	0.907	IP	ug/kg	0.453	0.453	1	A
Endosulfan II	ND		ug/kg	0.453	0.453	1	A
4,4'-DDD	ND		ug/kg	0.453	0.453	1	A
cis-Nonachlor	ND		ug/kg	0.453	0.453	1	A
4,4'-DDT	0.478	IP	ug/kg	0.453	0.453	1	A
Methoxychlor	ND		ug/kg	4.53	4.53	1	A
Toxaphene	ND		ug/kg	22.7	22.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	69		30-150	A
DBOB	60		30-150	B
BZ 198	70		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-43
Client ID: MN COMPOSITE 6 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 19:56
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.868	0.868	1	A
gamma-BHC	ND		ug/kg	0.434	0.434	1	A
Heptachlor	ND		ug/kg	0.434	0.434	1	A
Aldrin	ND		ug/kg	0.434	0.434	1	A
Heptachlor epoxide	ND		ug/kg	0.868	0.868	1	B
Oxychlordane	ND		ug/kg	0.868	0.868	1	B
trans-Chlordane	ND		ug/kg	0.434	0.434	1	A
Endosulfan I	ND		ug/kg	0.434	0.434	1	A
cis-Chlordane	0.835	P	ug/kg	0.434	0.434	1	A
trans-Nonachlor	ND		ug/kg	0.434	0.434	1	A
4,4'-DDE	1.69		ug/kg	0.434	0.434	1	A
Dieldrin	0.853	IP	ug/kg	0.434	0.434	1	A
Endrin	1.71	IP	ug/kg	0.434	0.434	1	A
Endosulfan II	ND		ug/kg	0.434	0.434	1	A
4,4'-DDD	0.492		ug/kg	0.434	0.434	1	A
cis-Nonachlor	ND		ug/kg	0.434	0.434	1	A
4,4'-DDT	0.547	IP	ug/kg	0.434	0.434	1	A
Methoxychlor	ND		ug/kg	4.34	4.34	1	A
Toxaphene	ND		ug/kg	21.8	21.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	63		30-150	A
DBOB	64		30-150	B
BZ 198	68		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-44
Client ID: MN COMPOSITE 6 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 20:30
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.936	0.936	1	A
gamma-BHC	ND		ug/kg	0.468	0.468	1	A
Heptachlor	ND		ug/kg	0.468	0.468	1	A
Aldrin	ND		ug/kg	0.468	0.468	1	A
Heptachlor epoxide	ND		ug/kg	0.936	0.936	1	B
Oxychlordane	ND		ug/kg	0.936	0.936	1	B
trans-Chlordane	ND		ug/kg	0.468	0.468	1	A
Endosulfan I	ND		ug/kg	0.468	0.468	1	A
cis-Chlordane	ND		ug/kg	0.468	0.468	1	A
trans-Nonachlor	ND		ug/kg	0.468	0.468	1	A
4,4'-DDE	1.79		ug/kg	0.468	0.468	1	A
Dieldrin	0.772	IP	ug/kg	0.468	0.468	1	A
Endrin	0.781	IP	ug/kg	0.468	0.468	1	A
Endosulfan II	ND		ug/kg	0.468	0.468	1	A
4,4'-DDD	ND		ug/kg	0.468	0.468	1	A
cis-Nonachlor	ND		ug/kg	0.468	0.468	1	A
4,4'-DDT	1.52	P	ug/kg	0.468	0.468	1	B
Methoxychlor	ND		ug/kg	4.68	4.68	1	A
Toxaphene	ND		ug/kg	23.5	23.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	75		30-150	A
DBOB	65		30-150	B
BZ 198	79		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-45
Client ID: MN COMPOSITE 6 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 21:04
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.921	0.921	1	A
gamma-BHC	ND		ug/kg	0.460	0.460	1	A
Heptachlor	ND		ug/kg	0.460	0.460	1	A
Aldrin	ND		ug/kg	0.460	0.460	1	A
Heptachlor epoxide	ND		ug/kg	0.921	0.921	1	B
Oxychlordane	ND		ug/kg	0.921	0.921	1	B
trans-Chlordane	ND		ug/kg	0.460	0.460	1	A
Endosulfan I	ND		ug/kg	0.460	0.460	1	A
cis-Chlordane	0.792	P	ug/kg	0.460	0.460	1	A
trans-Nonachlor	0.865	P	ug/kg	0.460	0.460	1	B
4,4'-DDE	1.45		ug/kg	0.460	0.460	1	A
Dieldrin	0.536	IP	ug/kg	0.460	0.460	1	A
Endrin	0.544	IP	ug/kg	0.460	0.460	1	A
Endosulfan II	1.28	P	ug/kg	0.460	0.460	1	A
4,4'-DDD	ND		ug/kg	0.460	0.460	1	B
cis-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDT	0.987		ug/kg	0.460	0.460	1	A
Methoxychlor	ND		ug/kg	4.60	4.60	1	A
Toxaphene	ND		ug/kg	23.1	23.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	71		30-150	A
DBOB	64		30-150	B
BZ 198	69		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-46
Client ID: MN COMPOSITE 7 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 21:38
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.840	0.840	1	A
gamma-BHC	ND		ug/kg	0.420	0.420	1	A
Heptachlor	ND		ug/kg	0.420	0.420	1	A
Aldrin	ND		ug/kg	0.420	0.420	1	A
Heptachlor epoxide	ND		ug/kg	0.840	0.840	1	B
Oxychlordane	ND		ug/kg	0.840	0.840	1	B
trans-Chlordane	ND		ug/kg	0.420	0.420	1	A
Endosulfan I	ND		ug/kg	0.420	0.420	1	A
cis-Chlordane	0.586		ug/kg	0.420	0.420	1	B
trans-Nonachlor	0.625	P	ug/kg	0.420	0.420	1	A
4,4'-DDE	1.57		ug/kg	0.420	0.420	1	A
Dieldrin	0.865	IP	ug/kg	0.420	0.420	1	A
Endrin	0.529	IP	ug/kg	0.420	0.420	1	A
Endosulfan II	1.48	P	ug/kg	0.420	0.420	1	A
4,4'-DDD	0.484		ug/kg	0.420	0.420	1	A
cis-Nonachlor	ND		ug/kg	0.420	0.420	1	A
4,4'-DDT	0.950	I	ug/kg	0.420	0.420	1	A
Methoxychlor	ND		ug/kg	4.20	4.20	1	A
Toxaphene	ND		ug/kg	21.1	21.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	65		30-150	A
DBOB	63		30-150	B
BZ 198	72		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-47
Client ID: MN COMPOSITE 7 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 22:12
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.864	0.864	1	A
gamma-BHC	ND		ug/kg	0.432	0.432	1	A
Heptachlor	ND		ug/kg	0.432	0.432	1	A
Aldrin	ND		ug/kg	0.432	0.432	1	A
Heptachlor epoxide	ND		ug/kg	0.864	0.864	1	B
Oxychlordane	ND		ug/kg	0.864	0.864	1	B
trans-Chlordane	ND		ug/kg	0.432	0.432	1	A
Endosulfan I	ND		ug/kg	0.432	0.432	1	A
cis-Chlordane	ND		ug/kg	0.432	0.432	1	A
trans-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDE	1.18		ug/kg	0.432	0.432	1	A
Dieldrin	0.568	IP	ug/kg	0.432	0.432	1	A
Endrin	0.522	IP	ug/kg	0.432	0.432	1	A
Endosulfan II	ND		ug/kg	0.432	0.432	1	A
4,4'-DDD	ND		ug/kg	0.432	0.432	1	A
cis-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDT	0.820	I	ug/kg	0.432	0.432	1	A
Methoxychlor	ND		ug/kg	4.32	4.32	1	A
Toxaphene	ND		ug/kg	21.7	21.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	71		30-150	A
DBOB	63		30-150	B
BZ 198	70		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-48	Date Collected:	09/29/17 10:15
Client ID:	MN COMPOSITE 7 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
		Extraction Method:	EPA 3570
Matrix:	Tissue	Extraction Date:	10/23/17 21:30
Analytical Method:	1,8081B	Cleanup Method:	EPA 3630
Analytical Date:	11/09/17 22:46	Cleanup Date:	10/26/17
Analyst:	DP		
Percent Solids:	Results reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.877	0.877	1	A
gamma-BHC	ND		ug/kg	0.438	0.438	1	A
Heptachlor	ND		ug/kg	0.438	0.438	1	A
Aldrin	ND		ug/kg	0.438	0.438	1	A
Heptachlor epoxide	ND		ug/kg	0.877	0.877	1	B
Oxychlordane	ND		ug/kg	0.877	0.877	1	B
trans-Chlordane	ND		ug/kg	0.438	0.438	1	A
Endosulfan I	ND		ug/kg	0.438	0.438	1	A
cis-Chlordane	1.16	P	ug/kg	0.438	0.438	1	A
trans-Nonachlor	ND		ug/kg	0.438	0.438	1	A
4,4'-DDE	1.19		ug/kg	0.438	0.438	1	A
Dieldrin	ND		ug/kg	0.438	0.438	1	A
Endrin	1.12	IP	ug/kg	0.438	0.438	1	A
Endosulfan II	1.84		ug/kg	0.438	0.438	1	A
4,4'-DDD	ND		ug/kg	0.438	0.438	1	A
cis-Nonachlor	ND		ug/kg	0.438	0.438	1	A
4,4'-DDT	0.597	I	ug/kg	0.438	0.438	1	A
Methoxychlor	ND		ug/kg	4.38	4.38	1	A
Toxaphene	ND		ug/kg	22.0	22.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	69		30-150	A
DBOB	61		30-150	B
BZ 198	72		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-49
Client ID: MN COMPOSITE 7 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 23:20
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.947	0.947	1	A
gamma-BHC	ND		ug/kg	0.473	0.473	1	A
Heptachlor	ND		ug/kg	0.473	0.473	1	A
Aldrin	ND		ug/kg	0.473	0.473	1	A
Heptachlor epoxide	ND		ug/kg	0.947	0.947	1	B
Oxychlordane	ND		ug/kg	0.947	0.947	1	B
trans-Chlordane	ND		ug/kg	0.473	0.473	1	A
Endosulfan I	ND		ug/kg	0.473	0.473	1	A
cis-Chlordane	ND		ug/kg	0.473	0.473	1	A
trans-Nonachlor	1.58		ug/kg	0.473	0.473	1	B
4,4'-DDE	1.36		ug/kg	0.473	0.473	1	A
Dieldrin	0.722	IP	ug/kg	0.473	0.473	1	A
Endrin	12.1		ug/kg	0.473	0.473	1	A
Endosulfan II	2.18	P	ug/kg	0.473	0.473	1	A
4,4'-DDD	ND		ug/kg	0.473	0.473	1	A
cis-Nonachlor	ND		ug/kg	0.473	0.473	1	A
4,4'-DDT	1.34		ug/kg	0.473	0.473	1	A
Methoxychlor	ND		ug/kg	4.73	4.73	1	A
Toxaphene	ND		ug/kg	23.8	23.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	74		30-150	A
BZ 198	77		30-150	A
DBOB	113		30-150	B
BZ 198	87		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-50
Client ID: MN COMPOSITE 7 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/09/17 23:54
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.934	0.934	1	A
gamma-BHC	ND		ug/kg	0.467	0.467	1	A
Heptachlor	ND		ug/kg	0.467	0.467	1	A
Aldrin	ND		ug/kg	0.467	0.467	1	A
Heptachlor epoxide	ND		ug/kg	0.934	0.934	1	B
Oxychlordane	ND		ug/kg	0.934	0.934	1	B
trans-Chlordane	ND		ug/kg	0.467	0.467	1	A
Endosulfan I	ND		ug/kg	0.467	0.467	1	A
cis-Chlordane	ND		ug/kg	0.467	0.467	1	B
trans-Nonachlor	0.674	P	ug/kg	0.467	0.467	1	A
4,4'-DDE	1.17		ug/kg	0.467	0.467	1	A
Dieldrin	0.552	IP	ug/kg	0.467	0.467	1	A
Endrin	3.74	IP	ug/kg	0.467	0.467	1	A
Endosulfan II	ND		ug/kg	0.467	0.467	1	A
4,4'-DDD	ND		ug/kg	0.467	0.467	1	A
cis-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDT	0.848	IP	ug/kg	0.467	0.467	1	A
Methoxychlor	ND		ug/kg	4.67	4.67	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	A
BZ 198	82		30-150	A
DBOB	66		30-150	B
BZ 198	80		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-51
Client ID: MN COMPOSITE 8 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 00:28
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	0.888	1	A
gamma-BHC	ND		ug/kg	0.444	0.444	1	A
Heptachlor	ND		ug/kg	0.444	0.444	1	A
Aldrin	ND		ug/kg	0.444	0.444	1	A
Heptachlor epoxide	ND		ug/kg	0.888	0.888	1	B
Oxychlordane	ND		ug/kg	0.888	0.888	1	B
trans-Chlordane	ND		ug/kg	0.444	0.444	1	A
Endosulfan I	ND		ug/kg	0.444	0.444	1	A
cis-Chlordane	0.500	P	ug/kg	0.444	0.444	1	B
trans-Nonachlor	1.31	IP	ug/kg	0.444	0.444	1	A
4,4'-DDE	1.22		ug/kg	0.444	0.444	1	A
Dieldrin	0.446	I	ug/kg	0.444	0.444	1	A
Endrin	7.81	I	ug/kg	0.444	0.444	1	A
Endosulfan II	ND		ug/kg	0.444	0.444	1	A
4,4'-DDD	ND		ug/kg	0.444	0.444	1	A
cis-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDT	1.09	P	ug/kg	0.444	0.444	1	A
Methoxychlor	ND		ug/kg	4.44	4.44	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	75		30-150	A
DBOB	105		30-150	B
BZ 198	80		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-52
Client ID: MN COMPOSITE 8 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 01:02
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.901	0.901	1	A
gamma-BHC	ND		ug/kg	0.450	0.450	1	A
Heptachlor	ND		ug/kg	0.450	0.450	1	A
Aldrin	ND		ug/kg	0.450	0.450	1	A
Heptachlor epoxide	ND		ug/kg	0.901	0.901	1	B
Oxychlordane	ND		ug/kg	0.901	0.901	1	B
trans-Chlordane	ND		ug/kg	0.450	0.450	1	A
Endosulfan I	ND		ug/kg	0.450	0.450	1	A
cis-Chlordane	ND		ug/kg	0.450	0.450	1	A
trans-Nonachlor	1.62		ug/kg	0.450	0.450	1	A
4,4'-DDE	1.41		ug/kg	0.450	0.450	1	A
Dieldrin	0.487	IP	ug/kg	0.450	0.450	1	A
Endrin	2.52	IP	ug/kg	0.450	0.450	1	A
Endosulfan II	1.40	P	ug/kg	0.450	0.450	1	A
4,4'-DDD	3.27	P	ug/kg	0.450	0.450	1	B
cis-Nonachlor	ND		ug/kg	0.450	0.450	1	A
4,4'-DDT	ND		ug/kg	0.450	0.450	1	A
Methoxychlor	ND		ug/kg	4.50	4.50	1	A
Toxaphene	ND		ug/kg	22.6	22.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	92		30-150	A
BZ 198	77		30-150	A
DBOB	96		30-150	B
BZ 198	88		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-53
Client ID: MN COMPOSITE 8 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 01:36
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.938	0.938	1	A
gamma-BHC	ND		ug/kg	0.469	0.469	1	A
Heptachlor	ND		ug/kg	0.469	0.469	1	A
Aldrin	ND		ug/kg	0.469	0.469	1	A
Heptachlor epoxide	ND		ug/kg	0.938	0.938	1	B
Oxychlordane	ND		ug/kg	0.938	0.938	1	B
trans-Chlordane	ND		ug/kg	0.469	0.469	1	A
Endosulfan I	ND		ug/kg	0.469	0.469	1	A
cis-Chlordane	0.542		ug/kg	0.469	0.469	1	B
trans-Nonachlor	1.60		ug/kg	0.469	0.469	1	A
4,4'-DDE	0.916		ug/kg	0.469	0.469	1	A
Dieldrin	0.498	IP	ug/kg	0.469	0.469	1	A
Endrin	1.26	IP	ug/kg	0.469	0.469	1	A
Endosulfan II	ND		ug/kg	0.469	0.469	1	A
4,4'-DDD	ND		ug/kg	0.469	0.469	1	A
cis-Nonachlor	ND		ug/kg	0.469	0.469	1	A
4,4'-DDT	1.32	P	ug/kg	0.469	0.469	1	A
Methoxychlor	ND		ug/kg	4.69	4.69	1	A
Toxaphene	ND		ug/kg	23.5	23.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	76		30-150	A
BZ 198	76		30-150	A
DBOB	104		30-150	B
BZ 198	74		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-54
Client ID: MN COMPOSITE 8 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 02:10
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.843	0.843	1	A
gamma-BHC	ND		ug/kg	0.422	0.422	1	A
Heptachlor	ND		ug/kg	0.422	0.422	1	A
Aldrin	ND		ug/kg	0.422	0.422	1	A
Heptachlor epoxide	ND		ug/kg	0.843	0.843	1	B
Oxychlordane	ND		ug/kg	0.843	0.843	1	B
trans-Chlordane	ND		ug/kg	0.422	0.422	1	A
Endosulfan I	ND		ug/kg	0.422	0.422	1	A
cis-Chlordane	ND		ug/kg	0.422	0.422	1	A
trans-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDE	0.852		ug/kg	0.422	0.422	1	A
Dieldrin	0.435	IP	ug/kg	0.422	0.422	1	A
Endrin	4.62	IP	ug/kg	0.422	0.422	1	A
Endosulfan II	ND		ug/kg	0.422	0.422	1	A
4,4'-DDD	1.38	P	ug/kg	0.422	0.422	1	B
cis-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDT	0.746		ug/kg	0.422	0.422	1	A
Methoxychlor	ND		ug/kg	4.22	4.22	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	67		30-150	A
DBOB	56		30-150	B
BZ 198	78		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-55
Client ID: MN COMPOSITE 8 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 02:44
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.917	0.917	1	A
gamma-BHC	ND		ug/kg	0.459	0.459	1	A
Heptachlor	ND		ug/kg	0.459	0.459	1	A
Aldrin	ND		ug/kg	0.459	0.459	1	A
Heptachlor epoxide	ND		ug/kg	0.917	0.917	1	B
Oxychlordane	ND		ug/kg	0.917	0.917	1	B
trans-Chlordane	ND		ug/kg	0.459	0.459	1	A
Endosulfan I	ND		ug/kg	0.459	0.459	1	A
cis-Chlordane	ND		ug/kg	0.459	0.459	1	A
trans-Nonachlor	ND		ug/kg	0.459	0.459	1	A
4,4'-DDE	0.767	I	ug/kg	0.459	0.459	1	A
Dieldrin	0.651	IP	ug/kg	0.459	0.459	1	A
Endrin	12.4	P	ug/kg	0.459	0.459	1	A
Endosulfan II	ND		ug/kg	0.459	0.459	1	A
4,4'-DDD	ND		ug/kg	0.459	0.459	1	A
cis-Nonachlor	ND		ug/kg	0.459	0.459	1	A
4,4'-DDT	0.908	P	ug/kg	0.459	0.459	1	A
Methoxychlor	ND		ug/kg	4.59	4.59	1	A
Toxaphene	ND		ug/kg	23.0	23.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	A
BZ 198	74		30-150	A
DBOB	59		30-150	B
BZ 198	77		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/07/17 16:31
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 17:45
Cleanup Method: EPA 3630
Cleanup Date: 10/25/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-20 Batch: WG1055361-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	5.00	5.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	79		30-150	A
DBOB	67		30-150	B
BZ 198	75		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/08/17 15:49
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 19:00
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 21-40 Batch: WG1055392-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	5.00	5.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B
cis-Chlordane	ND		ug/kg	0.500	0.500	B
4,4'-DDE	ND		ug/kg	0.500	0.500	B
Dieldrin	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	65		30-150	A
DBOB	60		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/09/17 14:49
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/23/17 21:30
Cleanup Method: EPA 3630
Cleanup Date: 10/26/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 41-55 Batch: WG1055417-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	5.00	5.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	72		30-150	A
DBOB	54		30-150	B
BZ 198	70		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG1055361-2 WG1055361-3									
Hexachlorobenzene	52		63		50-120	19		30	A
gamma-BHC	53		67		50-120	23		30	A
Heptachlor	56		67		50-120	18		30	A
Aldrin	57		68		50-120	18		30	A
trans-Chlordane	63		76		50-120	19		30	A
Endosulfan I	62		74		50-120	18		30	A
cis-Chlordane	60		72		50-120	18		30	A
trans-Nonachlor	60		72		50-120	18		30	A
4,4'-DDE	67		81		50-120	19		30	A
Dieldrin	66		80		50-120	19		30	A
Endrin	59		72		50-120	20		30	A
4,4'-DDD	63		75		50-120	17		30	A
cis-Nonachlor	66		78		50-120	17		30	A
4,4'-DDT	63		75		50-120	17		30	A
Methoxychlor	54		64		50-120	17		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	60		70		30-150	A
BZ 198	66		80		30-150	A
DBOB	59		68		30-150	B
BZ 198	65		74		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG1055361-2 WG1055361-3									
Heptachlor epoxide	62		74		50-120	18		30	B
Oxychlordane	61		75		50-120	21		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	60		70		30-150	A
BZ 198	66		80		30-150	A
DBOB	59		68		30-150	B
BZ 198	65		74		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1055392-2 WG1055392-3									
Hexachlorobenzene	54		**49**	Q	50-120	10		30	A
gamma-BHC	58		52		50-120	11		30	A
Heptachlor	58		51		50-120	13		30	A
Aldrin	57		50		50-120	13		30	A
trans-Chlordane	64		58		50-120	10		30	A
Endosulfan I	64		58		50-120	10		30	A
cis-Chlordane	60		55		50-120	9		30	A
trans-Nonachlor	61		56		50-120	9		30	A
4,4'-DDE	67		62		50-120	8		30	A
Dieldrin	69		63		50-120	9		30	A
Endrin	63		57		50-120	10		30	A
4,4'-DDD	62		58		50-120	7		30	A
cis-Nonachlor	65		61		50-120	6		30	A
4,4'-DDT	58		55		50-120	5		30	A
Methoxychlor	**49**	Q	**45**	Q	50-120	9		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	61		52		30-150	A
BZ 198	63		57		30-150	A
DBOB	63		53		30-150	B
BZ 198	63		56		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1055392-2 WG1055392-3									
Heptachlor epoxide	67		58		50-120	14		30	B
Oxychlordane	66		57		50-120	15		30	B
Endosulfan II	66		59		50-120	11		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	61		52		30-150	A
BZ 198	63		57		30-150	A
DBOB	63		53		30-150	B
BZ 198	63		56		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 Batch: WG1055417-2 WG1055417-3									
Hexachlorobenzene	69		54		50-120	24		30	A
gamma-BHC	77		62		50-120	22		30	A
Heptachlor	76		61		50-120	22		30	A
Aldrin	72		60		50-120	18		30	A
trans-Chlordane	84		75		50-120	11		30	A
Endosulfan I	84		75		50-120	11		30	A
cis-Chlordane	79		71		50-120	11		30	A
trans-Nonachlor	80		72		50-120	11		30	A
4,4'-DDE	90		82		50-120	9		30	A
Dieldrin	91		82		50-120	10		30	A
Endrin	83		73		50-120	13		30	A
4,4'-DDD	85		77		50-120	10		30	A
cis-Nonachlor	88		80		50-120	10		30	A
4,4'-DDT	82		74		50-120	10		30	A
Methoxychlor	72		67		50-120	7		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	78		60		30-150	A
BZ 198	84		79		30-150	A
DBOB	76		57		30-150	B
BZ 198	84		75		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 Batch: WG1055417-2 WG1055417-3									
Heptachlor epoxide	84		73		50-120	14		30	B
Oxychlordane	84		72		50-120	15		30	B
Endosulfan II	85		78		50-120	9		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	78		60		30-150	A
BZ 198	84		79		30-150	A
DBOB	76		57		30-150	B
BZ 198	84		75		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055361-6 WG1055361-7 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A													
Hexachlorobenzene	ND	98.8	55.7	56		50.7	52		50-120	9		30	A
gamma-BHC	ND	98.8	66.0	67		58.4	60		50-120	12		30	A
Heptachlor	ND	98.8	60.2	61		57.1	58		50-120	5		30	A
Aldrin	ND	98.8	59.8	61		56.8	58		50-120	5		30	A
Heptachlor epoxide	ND	98.8	53.4	54		49.8	51		50-120	7		30	B
Oxychlordane	ND	98.8	48.8	**49**	Q	46.4	**47**	Q	50-120	5		30	B
trans-Chlordane	ND	98.8	61.2	62		57.1	58		50-120	7		30	A
Endosulfan I	ND	98.8	60.8	62		55.6	57		50-120	9		30	A
cis-Chlordane	ND	98.8	56.8	58		53.0	54		50-120	7		30	A
trans-Nonachlor	ND	98.8	58.1	59		54.4	56		50-120	7		30	A
4,4'-DDE	ND	98.8	65.4	66		60.7	62		50-120	7		30	A
Dieldrin	ND	98.8	62.6	63		56.8	58		50-120	10		30	A
Endrin	0.601	98.8	58.1	58		50.8	51		50-120	13		30	A
Endosulfan II	ND	98.8	56.9	58		51.6	53		50-120	10		30	B
4,4'-DDD	ND	98.8	68.8	70		62.5	64		50-120	10		30	A
cis-Nonachlor	ND	98.8	64.2	65		59.0	60		50-120	8		30	A
4,4'-DDT	ND	98.8	54.7	55		49.8	51		50-120	9		30	A
Methoxychlor	ND	98.8	54.8	56		46.0	**47**	Q	50-120	17		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	68		64		30-150	A
DBOB	67		59		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055361-6 WG1055361-7 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	73		65		30-150	B
DBOB	62		55		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055392-6 WG1055392-7 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A													
Hexachlorobenzene	ND	92.8	58.2	63		49.8	56		50-120	16		30	A
gamma-BHC	ND	92.8	58.3	63		55.6	63		50-120	5		30	A
Heptachlor	ND	92.8	54.9	59		51.2	58		50-120	7		30	A
Aldrin	ND	92.8	53.8	56		50.7	55		50-120	6		30	A
Heptachlor epoxide	ND	92.8	45.0	**49**	Q	43.3	**49**	Q	50-120	4		30	B
Oxychlordane	ND	92.8	44.8	**48**	Q	42.4	**48**	Q	50-120	6		30	B
trans-Chlordane	ND	92.8	54.2	58		51.5	58		50-120	5		30	A
Endosulfan I	ND	92.8	53.5	58		51.1	58		50-120	5		30	A
cis-Chlordane	ND	92.8	47.1	51		44.9	51		50-120	5		30	A
trans-Nonachlor	ND	92.8	51.1	55		48.4	55		50-120	5		30	A
4,4'-DDE	2.11	92.8	57.2	59		53.8	58		50-120	6		30	A
Dieldrin	1.26	92.8	57.2	60		54.3	60		50-120	5		30	A
Endrin	1.71	92.8	52.2	54		49.3	54		50-120	6		30	A
Endosulfan II	ND	92.8	51.7	56		49.3	56		50-120	5		30	B
4,4'-DDD	1.96	92.8	56.2	59		55.1	60		50-120	2		30	A
cis-Nonachlor	ND	92.8	55.1	59		53.0	60		50-120	4		30	A
4,4'-DDT	1.33	92.8	53.0	56		50.8	56		50-120	4		30	A
Methoxychlor	ND	92.8	52.1	56		49.2	55		50-120	6		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	66		67		30-150	A
DBOB	63		60		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055392-6 WG1055392-7 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	67		64		30-150	B
DBOB	59		59		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055417-6 WG1055417-7 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A													
Hexachlorobenzene	ND	87.4	64.1	73		57.0	64		50-120	12		30	A
gamma-BHC	ND	87.4	73.7	84		65.4	74		50-120	12		30	A
Heptachlor	ND	87.4	66.1	76		60.0	67		50-120	10		30	A
Aldrin	ND	87.4	66.2	76		60.9	69		50-120	8		30	A
Heptachlor epoxide	ND	87.4	58.5	67		56.6	64		50-120	3		30	B
Oxychlordane	ND	87.4	59.2	68		55.8	63		50-120	6		30	B
trans-Chlordane	ND	87.4	71.2	82		66.2	74		50-120	7		30	A
Endosulfan I	ND	87.4	68.1	78		62.2	70		50-120	9		30	A
cis-Chlordane	ND	87.4	60.8	69		59.3	66		50-120	2		30	A
trans-Nonachlor	ND	87.4	65.2	75		59.8	67		50-120	9		30	A
4,4'-DDE	1.50	87.4	38.4	**42**	Q	32.4	**35**	Q	50-120	17		30	A
Dieldrin	0.743	87.4	72.7	82		64.6	72		50-120	12		30	A
Endrin	0.847	87.4	67.5	76		60.8	67		50-120	10		30	A
Endosulfan II	ND	87.4	64.7	73		60.3	67		50-120	7		30	B
4,4'-DDD	ND	87.4	77.2	88		70.8	79		50-120	9		30	A
cis-Nonachlor	ND	87.4	43.9	50		39.8	**45**	Q	50-120	10		30	A
4,4'-DDT	0.848	87.4	61.4	69		55.0	61		50-120	11		30	A
Methoxychlor	ND	87.4	60.5	69		52.2	59		50-120	15		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	83		**229**	Q	30-150	A
DBOB	84		72		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735126

Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055417-6 WG1055417-7 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	86		81		30-150	B
DBOB	67		67		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055361-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	B
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	0.601	0.790IP	ug/kg	27		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1055361-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		70		30-150	A
BZ 198	79		70		30-150	A
DBOB	56		67		30-150	B
BZ 198	76		73		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055392-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	2.11	1.16	ug/kg	**58**	Q	30	A
Endrin	1.71	1.04IP	ug/kg	**49**	Q	30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	1.33	NDP	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		56		30-150	A
BZ 198	76		55		30-150	A
DBOB	65		51		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1055392-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
BZ 198	74		57		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055417-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
4,4'-DDE	1.50	0.745IP	ug/kg	**67**	Q	30	A
Dieldrin	0.743	0.685IP	ug/kg	8		30	A
Endrin	0.847	0.623IP	ug/kg	30		30	A
Endosulfan II	1.58	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	0.848	0.895IP	ug/kg	5		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		76		30-150	A
BZ 198	76		76		30-150	A
DBOB	79		73		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1055417-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
BZ 198	79		76		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1055361-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	44		40-140
4,4'-DDE	74		40-140
4,4'-DDD	105		40-140
DBOB (Surrogate)	70		30-150
DBOB (Surrogate)	76		30-150
BZ 198 (Surrogate)	75		30-150
BZ 198 (Surrogate)	77		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1055392-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	50		40-140
4,4'-DDE	58		40-140
4,4'-DDD	78		40-140
DBOB (Surrogate)	63		30-150
DBOB (Surrogate)	92		30-150
BZ 198 (Surrogate)	62		30-150
BZ 198 (Surrogate)	65		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1055417-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	64		40-140
4,4'-DDE	63		40-140
4,4'-DDD	125		40-140
DBOB (Surrogate)	70		30-150
DBOB (Surrogate)	74		30-150
BZ 198 (Surrogate)	79		30-150
BZ 198 (Surrogate)	80		30-150

METALS

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-01	Date Collected:	09/28/17 16:00
Client ID:	MN NATIVE BACKGROUND REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.30		mg/kg	0.097	0.033	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV
Cadmium, Total	0.029	J	mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV
Chromium, Total	0.063	J	mg/kg	0.388	0.035	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV
Copper, Total	1.43		mg/kg	0.097	0.032	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV
Lead, Total	0.135		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/13/17 09:00	10/21/17 12:25	EPA 7474	1,7474	BV
Nickel, Total	0.185		mg/kg	0.097	0.036	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV
Zinc, Total	10.8		mg/kg	0.971	0.145	2	10/13/17 09:01	10/21/17 15:13	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-02	Date Collected:	09/28/17 16:00
Client ID:	MN NATIVE BACKGROUND REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.28		mg/kg	0.093	0.032	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV
Cadmium, Total	0.034	J	mg/kg	0.037	0.010	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV
Chromium, Total	0.042	J	mg/kg	0.370	0.033	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV
Copper, Total	1.30		mg/kg	0.093	0.031	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV
Lead, Total	0.111		mg/kg	0.037	0.005	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 12:38	EPA 7474	1,7474	BV
Nickel, Total	0.181		mg/kg	0.093	0.034	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV
Zinc, Total	9.72		mg/kg	0.926	0.138	2	10/13/17 09:01	10/21/17 15:33	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-03	Date Collected:	09/28/17 16:00
Client ID:	MN NATIVE BACKGROUND REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.36		mg/kg	0.096	0.033	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV
Cadmium, Total	0.067		mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV
Chromium, Total	0.091	J	mg/kg	0.385	0.035	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV
Copper, Total	1.61		mg/kg	0.096	0.032	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV
Lead, Total	0.231		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 12:40	EPA 7474	1,7474	BV
Nickel, Total	0.186		mg/kg	0.096	0.036	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV
Zinc, Total	16.2		mg/kg	0.962	0.143	2	10/13/17 09:01	10/21/17 15:37	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-04	Date Collected:	09/28/17 16:00
Client ID:	MN NATIVE BACKGROUND REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.04		mg/kg	0.096	0.033	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV
Cadmium, Total	0.033	J	mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV
Chromium, Total	0.057	J	mg/kg	0.385	0.035	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV
Copper, Total	1.12		mg/kg	0.096	0.032	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV
Lead, Total	0.113		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 12:43	EPA 7474	1,7474	BV
Nickel, Total	0.134		mg/kg	0.096	0.036	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV
Zinc, Total	11.0		mg/kg	0.962	0.143	2	10/13/17 09:01	10/21/17 15:41	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-05	Date Collected:	09/28/17 16:00
Client ID:	MN NATIVE BACKGROUND REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.25		mg/kg	0.098	0.034	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV
Cadmium, Total	0.035	J	mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV
Chromium, Total	0.092	J	mg/kg	0.392	0.035	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV
Copper, Total	1.41		mg/kg	0.098	0.033	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV
Lead, Total	0.136		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/13/17 09:00	10/21/17 14:36	EPA 7474	1,7474	BV
Nickel, Total	0.219		mg/kg	0.098	0.037	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV
Zinc, Total	12.4		mg/kg	0.980	0.146	2	10/13/17 09:01	10/21/17 15:45	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-06	Date Collected:	09/28/17 16:30
Client ID:	MN LABORATORY CONTROL REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.51		mg/kg	0.089	0.031	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV
Cadmium, Total	0.022	J	mg/kg	0.036	0.009	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV
Chromium, Total	0.074	J	mg/kg	0.357	0.032	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV
Copper, Total	0.869		mg/kg	0.089	0.030	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV
Lead, Total	0.154		mg/kg	0.036	0.005	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.011	0.003	5	10/13/17 09:00	10/21/17 14:39	EPA 7474	1,7474	BV
Nickel, Total	0.244		mg/kg	0.089	0.033	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV
Zinc, Total	5.92		mg/kg	0.893	0.133	2	10/13/17 09:01	10/21/17 15:49	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-07	Date Collected:	09/28/17 16:30
Client ID:	MN LABORATORY CONTROL REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.83		mg/kg	0.095	0.033	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV
Cadmium, Total	0.022	J	mg/kg	0.038	0.010	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV
Chromium, Total	0.107	J	mg/kg	0.381	0.034	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV
Copper, Total	1.08		mg/kg	0.095	0.032	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV
Lead, Total	0.156		mg/kg	0.038	0.006	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 14:41	EPA 7474	1,7474	BV
Nickel, Total	0.254		mg/kg	0.095	0.035	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV
Zinc, Total	7.08		mg/kg	0.952	0.142	2	10/13/17 09:01	10/21/17 16:06	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-08	Date Collected:	09/28/17 16:30
Client ID:	MN LABORATORY CONTROL REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.69		mg/kg	0.092	0.032	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV
Cadmium, Total	0.085		mg/kg	0.037	0.010	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV
Chromium, Total	0.203	J	mg/kg	0.367	0.033	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV
Copper, Total	1.30		mg/kg	0.092	0.031	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV
Lead, Total	0.356		mg/kg	0.037	0.005	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV
Mercury, Total	0.005	J	mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 14:44	EPA 7474	1,7474	BV
Nickel, Total	0.454		mg/kg	0.092	0.034	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV
Zinc, Total	16.5		mg/kg	0.917	0.137	2	10/13/17 09:01	10/21/17 16:10	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-09	Date Collected:	09/28/17 16:30
Client ID:	MN LABORATORY CONTROL REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.85		mg/kg	0.096	0.033	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV
Cadmium, Total	0.015	J	mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV
Chromium, Total	0.095	J	mg/kg	0.385	0.035	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV
Copper, Total	1.16		mg/kg	0.096	0.032	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV
Lead, Total	0.162		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 14:46	EPA 7474	1,7474	BV
Nickel, Total	0.239		mg/kg	0.096	0.036	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV
Zinc, Total	6.76		mg/kg	0.962	0.143	2	10/13/17 09:01	10/21/17 16:14	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-10	Date Collected:	09/28/17 16:30
Client ID:	MN LABORATORY CONTROL REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.61		mg/kg	0.096	0.033	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV
Cadmium, Total	0.017	J	mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV
Chromium, Total	0.074	J	mg/kg	0.385	0.035	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV
Copper, Total	0.893		mg/kg	0.096	0.032	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV
Lead, Total	0.148		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 14:53	EPA 7474	1,7474	BV
Nickel, Total	0.186		mg/kg	0.096	0.036	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV
Zinc, Total	7.77		mg/kg	0.962	0.143	2	10/13/17 09:01	10/21/17 16:18	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-11	Date Collected:	09/29/17 08:00
Client ID:	MN CLDS REFERENCE SEDIMENT REP	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.53		mg/kg	0.098	0.034	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV
Cadmium, Total	0.023	J	mg/kg	0.039	0.010	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV
Chromium, Total	0.165	J	mg/kg	0.392	0.035	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV
Copper, Total	2.27		mg/kg	0.098	0.033	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV
Lead, Total	0.290		mg/kg	0.039	0.006	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/13/17 09:00	10/21/17 14:56	EPA 7474	1,7474	BV
Nickel, Total	0.459		mg/kg	0.098	0.037	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV
Zinc, Total	9.66		mg/kg	0.980	0.146	2	10/13/17 09:01	10/21/17 16:22	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-12	Date Collected:	09/29/17 08:00
Client ID:	MN CLDS REFERENCE SEDIMENT REP	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.07		mg/kg	0.099	0.034	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV
Cadmium, Total	0.029	J	mg/kg	0.040	0.010	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV
Chromium, Total	0.470		mg/kg	0.396	0.036	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV
Copper, Total	1.70		mg/kg	0.099	0.033	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV
Lead, Total	0.494		mg/kg	0.040	0.006	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV
Mercury, Total	0.004	J	mg/kg	0.012	0.004	5	10/13/17 09:00	10/21/17 14:58	EPA 7474	1,7474	BV
Nickel, Total	0.508		mg/kg	0.099	0.037	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV
Zinc, Total	12.3		mg/kg	0.990	0.148	2	10/13/17 09:01	10/21/17 16:26	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-13	Date Collected:	09/29/17 08:00
Client ID:	MN CLDS REFERENCE SEDIMENT REP	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.54		mg/kg	0.095	0.033	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV
Cadmium, Total	0.033	J	mg/kg	0.038	0.010	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV
Chromium, Total	0.182	J	mg/kg	0.381	0.034	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV
Copper, Total	1.75		mg/kg	0.095	0.032	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV
Lead, Total	0.323		mg/kg	0.038	0.006	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 15:01	EPA 7474	1,7474	BV
Nickel, Total	0.324		mg/kg	0.095	0.035	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV
Zinc, Total	11.0		mg/kg	0.952	0.142	2	10/13/17 09:01	10/21/17 16:30	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-14	Date Collected:	09/29/17 08:00
Client ID:	MN CLDS REFERENCE SEDIMENT REP	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.70		mg/kg	0.094	0.032	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV
Cadmium, Total	0.035	J	mg/kg	0.038	0.010	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV
Chromium, Total	0.314	J	mg/kg	0.377	0.034	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV
Copper, Total	2.38		mg/kg	0.094	0.032	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV
Lead, Total	0.448		mg/kg	0.038	0.005	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 15:03	EPA 7474	1,7474	BV
Nickel, Total	0.429		mg/kg	0.094	0.035	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV
Zinc, Total	13.7		mg/kg	0.943	0.140	2	10/13/17 09:01	10/21/17 16:35	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-15	Date Collected:	09/29/17 08:00
Client ID:	MN CLDS REFERENCE SEDIMENT REP	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.16		mg/kg	0.098	0.034	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV
Cadmium, Total	0.019	J	mg/kg	0.039	0.010	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV
Chromium, Total	0.094	J	mg/kg	0.392	0.035	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV
Copper, Total	1.24		mg/kg	0.098	0.033	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV
Lead, Total	0.185		mg/kg	0.039	0.006	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/17/17 08:36	10/21/17 15:41	EPA 7474	1,7474	BV
Nickel, Total	0.215		mg/kg	0.098	0.037	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV
Zinc, Total	9.30		mg/kg	0.980	0.146	2	10/17/17 08:36	10/21/17 16:59	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-16	Date Collected:	09/29/17 08:15
Client ID:	MN COMPOSITE 1 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.36		mg/kg	0.091	0.031	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV
Cadmium, Total	0.012	J	mg/kg	0.036	0.010	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV
Chromium, Total	0.067	J	mg/kg	0.364	0.033	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV
Copper, Total	0.699		mg/kg	0.091	0.030	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV
Lead, Total	0.095		mg/kg	0.036	0.005	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.011	0.003	5	10/17/17 08:36	10/21/17 15:43	EPA 7474	1,7474	BV
Nickel, Total	0.141		mg/kg	0.091	0.034	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV
Zinc, Total	5.64		mg/kg	0.909	0.135	2	10/17/17 08:36	10/21/17 17:03	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-17	Date Collected:	09/29/17 08:15
Client ID:	MN COMPOSITE 1 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.73		mg/kg	0.097	0.033	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV
Cadmium, Total	0.042		mg/kg	0.039	0.010	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV
Chromium, Total	0.255	J	mg/kg	0.388	0.035	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV
Copper, Total	2.17		mg/kg	0.097	0.032	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV
Lead, Total	0.339		mg/kg	0.039	0.006	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/17/17 08:36	10/21/17 15:46	EPA 7474	1,7474	BV
Nickel, Total	0.326		mg/kg	0.097	0.036	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV
Zinc, Total	14.6		mg/kg	0.971	0.145	2	10/17/17 08:36	10/21/17 17:57	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-18	Date Collected:	09/29/17 08:15
Client ID:	MN COMPOSITE 1 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.89		mg/kg	0.099	0.034	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV
Cadmium, Total	0.016	J	mg/kg	0.040	0.010	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV
Chromium, Total	0.208	J	mg/kg	0.396	0.036	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV
Copper, Total	1.62		mg/kg	0.099	0.033	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV
Lead, Total	0.231		mg/kg	0.040	0.006	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/17/17 08:36	10/21/17 15:48	EPA 7474	1,7474	BV
Nickel, Total	0.273		mg/kg	0.099	0.037	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV
Zinc, Total	9.80		mg/kg	0.990	0.148	2	10/17/17 08:36	10/21/17 18:01	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-19	Date Collected:	09/29/17 08:15
Client ID:	MN COMPOSITE 1 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.12		mg/kg	0.095	0.033	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV
Cadmium, Total	0.016	J	mg/kg	0.038	0.010	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV
Chromium, Total	0.116	J	mg/kg	0.381	0.034	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV
Copper, Total	0.907		mg/kg	0.095	0.032	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV
Lead, Total	0.174		mg/kg	0.038	0.006	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/17/17 08:36	10/21/17 15:51	EPA 7474	1,7474	BV
Nickel, Total	0.222		mg/kg	0.095	0.035	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV
Zinc, Total	6.24		mg/kg	0.952	0.142	2	10/17/17 08:36	10/21/17 18:05	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-20	Date Collected:	09/29/17 08:15
Client ID:	MN COMPOSITE 1 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.07		mg/kg	0.100	0.034	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV
Cadmium, Total	0.016	J	mg/kg	0.040	0.011	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV
Chromium, Total	0.085	J	mg/kg	0.400	0.036	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV
Copper, Total	1.01		mg/kg	0.100	0.033	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV
Lead, Total	0.123		mg/kg	0.040	0.006	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/17/17 08:36	10/21/17 15:53	EPA 7474	1,7474	BV
Nickel, Total	0.174		mg/kg	0.100	0.037	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV
Zinc, Total	5.68		mg/kg	1.00	0.149	2	10/17/17 08:36	10/21/17 18:09	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-21	Date Collected:	09/29/17 08:30
Client ID:	MN COMPOSITE 2 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.36		mg/kg	0.100	0.034	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV
Cadmium, Total	0.034	J	mg/kg	0.040	0.011	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV
Chromium, Total	0.218	J	mg/kg	0.400	0.036	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV
Copper, Total	1.35		mg/kg	0.100	0.033	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV
Lead, Total	0.290		mg/kg	0.040	0.006	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/17/17 08:36	10/21/17 15:23	EPA 7474	1,7474	BV
Nickel, Total	0.347		mg/kg	0.100	0.037	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV
Zinc, Total	8.64		mg/kg	1.00	0.149	2	10/17/17 08:36	10/21/17 17:07	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-22	Date Collected:	09/29/17 08:30
Client ID:	MN COMPOSITE 2 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.48		mg/kg	0.097	0.033	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV
Cadmium, Total	0.023	J	mg/kg	0.039	0.010	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV
Chromium, Total	0.178	J	mg/kg	0.388	0.035	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV
Copper, Total	1.72		mg/kg	0.097	0.032	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV
Lead, Total	0.194		mg/kg	0.039	0.006	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/17/17 08:36	10/21/17 15:56	EPA 7474	1,7474	BV
Nickel, Total	0.245		mg/kg	0.097	0.036	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV
Zinc, Total	6.90		mg/kg	0.971	0.145	2	10/17/17 08:36	10/21/17 18:13	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-23	Date Collected:	09/29/17 08:30
Client ID:	MN COMPOSITE 2 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.05		mg/kg	0.100	0.034	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV
Cadmium, Total	0.016	J	mg/kg	0.040	0.011	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV
Chromium, Total	0.131	J	mg/kg	0.400	0.036	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV
Copper, Total	0.993		mg/kg	0.100	0.033	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV
Lead, Total	0.154		mg/kg	0.040	0.006	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/17/17 08:36	10/21/17 15:58	EPA 7474	1,7474	BV
Nickel, Total	0.154		mg/kg	0.100	0.037	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV
Zinc, Total	4.72		mg/kg	1.00	0.149	2	10/17/17 08:36	10/21/17 18:17	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-24	Date Collected:	09/29/17 08:30
Client ID:	MN COMPOSITE 2 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.91		mg/kg	0.099	0.034	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV
Cadmium, Total	0.021	J	mg/kg	0.040	0.010	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV
Chromium, Total	0.214	J	mg/kg	0.396	0.036	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV
Copper, Total	1.79		mg/kg	0.099	0.033	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV
Lead, Total	0.215		mg/kg	0.040	0.006	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/17/17 08:36	10/21/17 16:01	EPA 7474	1,7474	BV
Nickel, Total	0.277		mg/kg	0.099	0.037	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV
Zinc, Total	6.95		mg/kg	0.990	0.148	2	10/17/17 08:36	10/21/17 18:30	EPA 3051A	1,6020A	BV

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-25	Date Collected:	09/29/17 08:30
Client ID:	MN COMPOSITE 2 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.53		mg/kg	0.090	0.031	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM
Cadmium, Total	0.023	J	mg/kg	0.036	0.009	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM
Chromium, Total	0.401		mg/kg	0.360	0.032	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM
Copper, Total	2.45		mg/kg	0.090	0.030	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM
Lead, Total	0.649		mg/kg	0.036	0.005	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.011	0.003	5	10/09/17 10:14	10/24/17 13:21	EPA 7474	1,7474	BV
Nickel, Total	0.366		mg/kg	0.090	0.034	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM
Zinc, Total	9.93		mg/kg	0.901	0.134	2	10/09/17 10:30	10/10/17 16:50	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-26	Date Collected:	09/29/17 08:45
Client ID:	MN COMPOSITE 3 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.63		mg/kg	0.096	0.033	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM
Cadmium, Total	0.030	J	mg/kg	0.039	0.010	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM
Chromium, Total	0.115	J	mg/kg	0.385	0.035	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM
Copper, Total	1.39		mg/kg	0.096	0.032	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM
Lead, Total	0.243		mg/kg	0.039	0.006	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/09/17 10:14	10/24/17 13:24	EPA 7474	1,7474	BV
Nickel, Total	0.168		mg/kg	0.096	0.036	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM
Zinc, Total	6.50		mg/kg	0.962	0.143	2	10/09/17 10:30	10/10/17 16:54	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-27	Date Collected:	09/29/17 08:45
Client ID:	MN COMPOSITE 3 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.20		mg/kg	0.100	0.034	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM
Cadmium, Total	0.013	J	mg/kg	0.040	0.011	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM
Chromium, Total	0.084	J	mg/kg	0.400	0.036	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM
Copper, Total	0.920		mg/kg	0.100	0.033	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM
Lead, Total	0.171		mg/kg	0.040	0.006	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/09/17 10:14	10/24/17 13:26	EPA 7474	1,7474	BV
Nickel, Total	0.159		mg/kg	0.100	0.037	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM
Zinc, Total	4.85		mg/kg	1.00	0.149	2	10/09/17 10:30	10/10/17 16:58	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-28	Date Collected:	09/29/17 08:45
Client ID:	MN COMPOSITE 3 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.11		mg/kg	0.100	0.034	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM
Cadmium, Total	0.029	J	mg/kg	0.040	0.011	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM
Chromium, Total	0.160	J	mg/kg	0.400	0.036	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM
Copper, Total	1.06		mg/kg	0.100	0.033	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM
Lead, Total	0.231		mg/kg	0.040	0.006	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/09/17 10:14	10/24/17 13:29	EPA 7474	1,7474	BV
Nickel, Total	0.261		mg/kg	0.100	0.037	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM
Zinc, Total	7.67		mg/kg	1.00	0.149	2	10/09/17 10:30	10/10/17 17:01	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-29	Date Collected:	09/29/17 08:45
Client ID:	MN COMPOSITE 3 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.05		mg/kg	0.097	0.033	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM
Cadmium, Total	0.027	J	mg/kg	0.039	0.010	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM
Chromium, Total	0.544		mg/kg	0.388	0.035	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM
Copper, Total	2.40		mg/kg	0.097	0.032	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM
Lead, Total	0.514		mg/kg	0.039	0.006	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM
Mercury, Total	0.004	J	mg/kg	0.012	0.004	5	10/09/17 10:14	10/24/17 13:31	EPA 7474	1,7474	BV
Nickel, Total	0.408		mg/kg	0.097	0.036	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM
Zinc, Total	11.5		mg/kg	0.971	0.145	2	10/09/17 10:30	10/10/17 17:05	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-30	Date Collected:	09/29/17 08:45
Client ID:	MN COMPOSITE 3 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.78		mg/kg	0.093	0.032	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM
Cadmium, Total	0.025	J	mg/kg	0.037	0.010	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM
Chromium, Total	0.230	J	mg/kg	0.370	0.033	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM
Copper, Total	1.62		mg/kg	0.093	0.031	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM
Lead, Total	0.265		mg/kg	0.037	0.005	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM
Mercury, Total	0.004	J	mg/kg	0.012	0.003	5	10/09/17 10:14	10/24/17 13:39	EPA 7474	1,7474	BV
Nickel, Total	0.285		mg/kg	0.093	0.034	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM
Zinc, Total	10.6		mg/kg	0.926	0.138	2	10/09/17 10:30	10/10/17 17:21	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-31	Date Collected:	09/29/17 09:00
Client ID:	MN COMPOSITE 4 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.88		mg/kg	0.100	0.034	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM
Cadmium, Total	0.046		mg/kg	0.040	0.011	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM
Chromium, Total	0.701		mg/kg	0.400	0.036	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM
Copper, Total	3.13		mg/kg	0.100	0.033	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM
Lead, Total	0.790		mg/kg	0.040	0.006	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM
Mercury, Total	0.009	J	mg/kg	0.013	0.004	5	10/09/17 10:14	10/24/17 13:41	EPA 7474	1,7474	BV
Nickel, Total	0.480		mg/kg	0.100	0.037	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM
Zinc, Total	12.1		mg/kg	1.00	0.149	2	10/09/17 10:30	10/10/17 17:24	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-32	Date Collected:	09/29/17 09:00
Client ID:	MN COMPOSITE 4 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.06		mg/kg	0.097	0.033	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM
Cadmium, Total	0.041		mg/kg	0.039	0.010	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM
Chromium, Total	0.487		mg/kg	0.388	0.035	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM
Copper, Total	2.44		mg/kg	0.097	0.032	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM
Lead, Total	0.643		mg/kg	0.039	0.006	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM
Mercury, Total	0.005	J	mg/kg	0.012	0.004	5	10/09/17 10:14	10/24/17 13:44	EPA 7474	1,7474	BV
Nickel, Total	0.422		mg/kg	0.097	0.036	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM
Zinc, Total	11.3		mg/kg	0.971	0.145	2	10/09/17 10:30	10/10/17 17:28	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-33	Date Collected:	09/29/17 09:00
Client ID:	MN COMPOSITE 4 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.92		mg/kg	0.093	0.032	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM
Cadmium, Total	0.018	J	mg/kg	0.037	0.010	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM
Chromium, Total	0.168	J	mg/kg	0.370	0.033	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM
Copper, Total	1.08		mg/kg	0.093	0.031	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM
Lead, Total	0.291		mg/kg	0.037	0.005	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/09/17 10:14	10/24/17 13:46	EPA 7474	1,7474	BV
Nickel, Total	0.238		mg/kg	0.093	0.034	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM
Zinc, Total	6.54		mg/kg	0.926	0.138	2	10/09/17 10:30	10/10/17 17:32	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-34	Date Collected:	09/29/17 09:00
Client ID:	MN COMPOSITE 4 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.87		mg/kg	0.093	0.032	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM
Cadmium, Total	0.069		mg/kg	0.037	0.010	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM
Chromium, Total	0.424		mg/kg	0.370	0.033	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM
Copper, Total	3.36		mg/kg	0.093	0.031	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM
Lead, Total	0.663		mg/kg	0.037	0.005	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/05/17 14:00	10/20/17 12:56	EPA 7474	1,7474	BV
Nickel, Total	0.301		mg/kg	0.093	0.034	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM
Zinc, Total	14.4		mg/kg	0.926	0.138	2	10/05/17 11:23	10/10/17 15:03	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-35	Date Collected:	09/29/17 09:00
Client ID:	MN COMPOSITE 4 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.28		mg/kg	0.099	0.034	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM
Cadmium, Total	0.050		mg/kg	0.040	0.010	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM
Chromium, Total	0.299	J	mg/kg	0.396	0.036	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM
Copper, Total	2.30		mg/kg	0.099	0.033	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM
Lead, Total	0.560		mg/kg	0.040	0.006	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 12:59	EPA 7474	1,7474	BV
Nickel, Total	0.320		mg/kg	0.099	0.037	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM
Zinc, Total	16.8		mg/kg	0.990	0.148	2	10/05/17 11:23	10/10/17 15:07	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-36	Date Collected:	09/29/17 09:30
Client ID:	MN COMPOSITE 5 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.90		mg/kg	0.098	0.034	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM
Cadmium, Total	0.038	J	mg/kg	0.039	0.010	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM
Chromium, Total	0.268	J	mg/kg	0.392	0.035	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM
Copper, Total	11.3		mg/kg	0.098	0.033	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM
Lead, Total	0.469		mg/kg	0.039	0.006	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 13:01	EPA 7474	1,7474	BV
Nickel, Total	0.320		mg/kg	0.098	0.037	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM
Zinc, Total	9.88		mg/kg	0.980	0.146	2	10/05/17 11:23	10/10/17 15:11	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-37	Date Collected:	09/29/17 09:30
Client ID:	MN COMPOSITE 5 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.42		mg/kg	0.093	0.032	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM
Cadmium, Total	0.028	J	mg/kg	0.037	0.010	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM
Chromium, Total	0.222	J	mg/kg	0.370	0.033	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM
Copper, Total	1.76		mg/kg	0.093	0.031	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM
Lead, Total	0.292		mg/kg	0.037	0.005	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/05/17 14:00	10/20/17 13:04	EPA 7474	1,7474	BV
Nickel, Total	0.351		mg/kg	0.093	0.034	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM
Zinc, Total	9.46		mg/kg	0.926	0.138	2	10/05/17 11:23	10/10/17 15:15	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-38	Date Collected:	09/29/17 09:30
Client ID:	MN COMPOSITE 5 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.03		mg/kg	0.097	0.033	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM
Cadmium, Total	0.029	J	mg/kg	0.039	0.010	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM
Chromium, Total	0.228	J	mg/kg	0.388	0.035	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM
Copper, Total	1.72		mg/kg	0.097	0.032	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM
Lead, Total	0.281		mg/kg	0.039	0.006	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 13:06	EPA 7474	1,7474	BV
Nickel, Total	0.274		mg/kg	0.097	0.036	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM
Zinc, Total	10.9		mg/kg	0.971	0.145	2	10/05/17 11:23	10/10/17 15:18	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-39	Date Collected:	09/29/17 09:30
Client ID:	MN COMPOSITE 5 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.39		mg/kg	0.100	0.034	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM
Cadmium, Total	0.031	J	mg/kg	0.040	0.011	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM
Chromium, Total	0.207	J	mg/kg	0.400	0.036	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM
Copper, Total	2.25		mg/kg	0.100	0.033	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM
Lead, Total	0.360		mg/kg	0.040	0.006	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/05/17 14:00	10/20/17 13:09	EPA 7474	1,7474	BV
Nickel, Total	0.303		mg/kg	0.100	0.037	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM
Zinc, Total	11.7		mg/kg	1.00	0.149	2	10/05/17 11:23	10/10/17 15:22	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-40	Date Collected:	09/29/17 09:30
Client ID:	MN COMPOSITE 5 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.17		mg/kg	0.100	0.034	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM
Cadmium, Total	0.060		mg/kg	0.040	0.011	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM
Chromium, Total	0.390	J	mg/kg	0.400	0.036	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM
Copper, Total	2.34		mg/kg	0.100	0.033	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM
Lead, Total	0.541		mg/kg	0.040	0.006	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/05/17 14:00	10/20/17 13:11	EPA 7474	1,7474	BV
Nickel, Total	0.417		mg/kg	0.100	0.037	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM
Zinc, Total	12.9		mg/kg	1.00	0.149	2	10/05/17 11:23	10/10/17 15:26	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-41	Date Collected:	09/29/17 10:00
Client ID:	MN COMPOSITE 6 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.16		mg/kg	0.097	0.033	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM
Cadmium, Total	0.070		mg/kg	0.039	0.010	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM
Chromium, Total	0.973		mg/kg	0.388	0.035	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM
Copper, Total	3.42		mg/kg	0.097	0.032	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM
Lead, Total	1.04		mg/kg	0.039	0.006	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 12:38	EPA 7474	1,7474	BV
Nickel, Total	0.502		mg/kg	0.097	0.036	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM
Zinc, Total	13.7		mg/kg	0.971	0.145	2	10/05/17 11:23	10/10/17 14:31	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-42	Date Collected:	09/29/17 10:00
Client ID:	MN COMPOSITE 6 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.43		mg/kg	0.097	0.033	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM
Cadmium, Total	0.056		mg/kg	0.039	0.010	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM
Chromium, Total	0.614		mg/kg	0.388	0.035	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM
Copper, Total	2.57		mg/kg	0.097	0.032	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM
Lead, Total	0.685		mg/kg	0.039	0.006	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 13:14	EPA 7474	1,7474	BV
Nickel, Total	0.326		mg/kg	0.097	0.036	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM
Zinc, Total	11.3		mg/kg	0.971	0.145	2	10/05/17 11:23	10/10/17 15:30	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-43	Date Collected:	09/29/17 10:00
Client ID:	MN COMPOSITE 6 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.19		mg/kg	0.098	0.034	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM
Cadmium, Total	0.050		mg/kg	0.039	0.010	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM
Chromium, Total	0.720		mg/kg	0.392	0.035	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM
Copper, Total	3.27		mg/kg	0.098	0.033	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM
Lead, Total	0.911		mg/kg	0.039	0.006	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 13:16	EPA 7474	1,7474	BV
Nickel, Total	0.395		mg/kg	0.098	0.037	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM
Zinc, Total	12.1		mg/kg	0.980	0.146	2	10/05/17 11:23	10/10/17 15:34	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-44	Date Collected:	09/29/17 10:00
Client ID:	MN COMPOSITE 6 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.71		mg/kg	0.097	0.033	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM
Cadmium, Total	0.079		mg/kg	0.039	0.010	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM
Chromium, Total	0.660		mg/kg	0.388	0.035	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM
Copper, Total	2.96		mg/kg	0.097	0.032	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM
Lead, Total	0.795		mg/kg	0.039	0.006	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	10/05/17 14:00	10/20/17 13:19	EPA 7474	1,7474	BV
Nickel, Total	0.448		mg/kg	0.097	0.036	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM
Zinc, Total	12.4		mg/kg	0.971	0.145	2	10/05/17 11:23	10/10/17 15:37	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-45	Date Collected:	09/29/17 10:00
Client ID:	MN COMPOSITE 6 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.77		mg/kg	0.094	0.032	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM
Cadmium, Total	0.058		mg/kg	0.038	0.010	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM
Chromium, Total	0.606		mg/kg	0.377	0.034	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM
Copper, Total	2.73		mg/kg	0.094	0.032	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM
Lead, Total	0.691		mg/kg	0.038	0.005	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/05/17 14:00	10/20/17 13:26	EPA 7474	1,7474	BV
Nickel, Total	0.368		mg/kg	0.094	0.035	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM
Zinc, Total	14.2		mg/kg	0.943	0.140	2	10/05/17 11:23	10/10/17 16:04	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-46	Date Collected:	09/29/17 10:15
Client ID:	MN COMPOSITE 7 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.28		mg/kg	0.100	0.034	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM
Cadmium, Total	0.054		mg/kg	0.040	0.011	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM
Chromium, Total	0.789		mg/kg	0.400	0.036	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM
Copper, Total	3.22		mg/kg	0.100	0.033	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM
Lead, Total	0.964		mg/kg	0.040	0.006	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/05/17 14:00	10/20/17 13:29	EPA 7474	1,7474	BV
Nickel, Total	0.431		mg/kg	0.100	0.037	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM
Zinc, Total	11.5		mg/kg	1.00	0.149	2	10/05/17 11:23	10/10/17 16:08	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-47	Date Collected:	09/29/17 10:15
Client ID:	MN COMPOSITE 7 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.53		mg/kg	0.100	0.034	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM
Cadmium, Total	0.069		mg/kg	0.040	0.011	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM
Chromium, Total	0.461		mg/kg	0.400	0.036	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM
Copper, Total	2.38		mg/kg	0.100	0.033	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM
Lead, Total	0.725		mg/kg	0.040	0.006	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/05/17 14:00	10/20/17 13:31	EPA 7474	1,7474	BV
Nickel, Total	0.457		mg/kg	0.100	0.037	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM
Zinc, Total	11.6		mg/kg	1.00	0.149	2	10/05/17 11:23	10/10/17 16:12	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-48	Date Collected:	09/29/17 10:15
Client ID:	MN COMPOSITE 7 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.63		mg/kg	0.093	0.032	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM
Cadmium, Total	0.038		mg/kg	0.037	0.010	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM
Chromium, Total	0.254	J	mg/kg	0.374	0.034	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM
Copper, Total	1.71		mg/kg	0.093	0.031	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM
Lead, Total	0.378		mg/kg	0.037	0.005	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/05/17 14:00	10/20/17 13:34	EPA 7474	1,7474	BV
Nickel, Total	0.269		mg/kg	0.093	0.035	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM
Zinc, Total	7.00		mg/kg	0.934	0.139	2	10/05/17 11:23	10/10/17 16:16	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-49	Date Collected:	09/29/17 10:15
Client ID:	MN COMPOSITE 7 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.13		mg/kg	0.096	0.033	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM
Cadmium, Total	0.040		mg/kg	0.039	0.010	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM
Chromium, Total	0.622		mg/kg	0.385	0.035	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM
Copper, Total	2.18		mg/kg	0.096	0.032	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM
Lead, Total	0.902		mg/kg	0.039	0.006	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/09/17 10:14	10/24/17 13:04	EPA 7474	1,7474	BV
Nickel, Total	0.324		mg/kg	0.096	0.036	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM
Zinc, Total	13.3		mg/kg	0.962	0.143	2	10/09/17 10:30	10/10/17 16:20	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-50	Date Collected:	09/29/17 10:15
Client ID:	MN COMPOSITE 7 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.94		mg/kg	0.098	0.034	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM
Cadmium, Total	0.026	J	mg/kg	0.039	0.010	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM
Chromium, Total	0.342	J	mg/kg	0.392	0.035	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM
Copper, Total	3.60		mg/kg	0.098	0.033	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM
Lead, Total	0.534		mg/kg	0.039	0.006	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM
Mercury, Total	0.005	J	mg/kg	0.012	0.004	5	10/09/17 10:14	10/24/17 13:49	EPA 7474	1,7474	BV
Nickel, Total	0.342		mg/kg	0.098	0.037	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM
Zinc, Total	9.53		mg/kg	0.980	0.146	2	10/09/17 10:30	10/10/17 17:36	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-51	Date Collected:	09/29/17 11:00
Client ID:	MN COMPOSITE 8 REP A	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.06		mg/kg	0.098	0.034	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM
Cadmium, Total	0.034	J	mg/kg	0.039	0.010	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM
Chromium, Total	0.743		mg/kg	0.392	0.035	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM
Copper, Total	2.38		mg/kg	0.098	0.033	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM
Lead, Total	0.828		mg/kg	0.039	0.006	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM
Mercury, Total	0.004	J	mg/kg	0.012	0.004	5	10/09/17 10:14	10/24/17 13:51	EPA 7474	1,7474	BV
Nickel, Total	0.404		mg/kg	0.098	0.037	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM
Zinc, Total	8.95		mg/kg	0.980	0.146	2	10/09/17 10:30	10/10/17 17:39	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-52	Date Collected:	09/29/17 11:00
Client ID:	MN COMPOSITE 8 REP B	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.53		mg/kg	0.100	0.034	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM
Cadmium, Total	0.074		mg/kg	0.040	0.011	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM
Chromium, Total	0.618		mg/kg	0.400	0.036	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM
Copper, Total	3.11		mg/kg	0.100	0.033	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM
Lead, Total	0.891		mg/kg	0.040	0.006	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM
Mercury, Total	0.005	J	mg/kg	0.013	0.004	5	10/09/17 10:14	10/24/17 13:54	EPA 7474	1,7474	BV
Nickel, Total	0.411		mg/kg	0.100	0.037	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM
Zinc, Total	12.0		mg/kg	1.00	0.149	2	10/09/17 10:30	10/10/17 17:43	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-53	Date Collected:	09/29/17 11:00
Client ID:	MN COMPOSITE 8 REP C	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.02		mg/kg	0.092	0.032	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM
Cadmium, Total	0.026	J	mg/kg	0.037	0.010	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM
Chromium, Total	0.452		mg/kg	0.367	0.033	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM
Copper, Total	2.22		mg/kg	0.092	0.031	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM
Lead, Total	0.564		mg/kg	0.037	0.005	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	10/09/17 10:14	10/24/17 13:56	EPA 7474	1,7474	BV
Nickel, Total	0.288		mg/kg	0.092	0.034	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM
Zinc, Total	8.72		mg/kg	0.917	0.137	2	10/09/17 10:30	10/10/17 17:47	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-54	Date Collected:	09/29/17 11:00
Client ID:	MN COMPOSITE 8 REP D	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.90		mg/kg	0.089	0.031	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM
Cadmium, Total	0.039		mg/kg	0.036	0.009	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM
Chromium, Total	0.330	J	mg/kg	0.357	0.032	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM
Copper, Total	2.52		mg/kg	0.089	0.030	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM
Lead, Total	0.588		mg/kg	0.036	0.005	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	10/09/17 10:14	10/24/17 13:59	EPA 7474	1,7474	BV
Nickel, Total	0.332		mg/kg	0.089	0.033	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM
Zinc, Total	13.7		mg/kg	0.893	0.133	2	10/09/17 10:30	10/10/17 17:51	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

SAMPLE RESULTS

Lab ID:	L1735126-55	Date Collected:	09/29/17 11:00
Client ID:	MN COMPOSITE 8 REP E	Date Received:	09/29/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.15		mg/kg	0.094	0.032	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV
Cadmium, Total	0.036	J	mg/kg	0.038	0.010	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV
Chromium, Total	0.527		mg/kg	0.377	0.034	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV
Copper, Total	2.45		mg/kg	0.094	0.032	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV
Lead, Total	0.546		mg/kg	0.038	0.005	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV
Mercury, Total	0.005	J	mg/kg	0.012	0.003	5	10/13/17 09:00	10/21/17 15:06	EPA 7474	1,7474	BV
Nickel, Total	0.523		mg/kg	0.094	0.035	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV
Zinc, Total	12.5		mg/kg	0.943	0.140	2	10/13/17 09:01	10/21/17 16:39	EPA 3051A	1,6020A	BV

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 34-48 Batch: WG1049111-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/05/17 11:23	10/10/17 14:16	1,6020A	AM

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 34-48 Batch: WG1049114-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/05/17 14:00	10/20/17 12:33	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 25-33,49-54 Batch: WG1050284-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/09/17 10:30	10/10/17 15:49	1,6020A	AM

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 25-33,49-54 Batch: WG1050285-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/09/17 10:14	10/24/17 12:59	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-14,55 Batch: WG1051696-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV
Copper, Total	ND		mg/kg	0.100	0.033	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV
Lead, Total	ND		mg/kg	0.040	0.006	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/13/17 09:01	10/21/17 14:18	1,6020A	BV

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-14,55 Batch: WG1051698-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/13/17 09:00	10/21/17 12:20	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 15-24 Batch: WG1052852-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV
Copper, Total	ND		mg/kg	0.100	0.033	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV
Lead, Total	ND		mg/kg	0.040	0.006	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV
Zinc, Total	0.414	J	mg/kg	1.00	0.149	2	10/17/17 08:36	10/21/17 16:02	1,6020A	BV

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 15-24 Batch: WG1052853-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/17/17 08:36	10/21/17 15:18	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 34-48 Batch: WG1049111-2								
Arsenic, Total	97		-		75-125	-		20
Cadmium, Total	102		-		75-125	-		20
Chromium, Total	97		-		75-125	-		20
Copper, Total	98		-		75-125	-		20
Lead, Total	99		-		75-125	-		20
Nickel, Total	96		-		75-125	-		20
Zinc, Total	92		-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 34-48 Batch: WG1049114-2 SRM Lot Number: HPHGAF								
Mercury, Total	95		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 25-33,49-54 Batch: WG1050284-2								
Arsenic, Total	101		-		75-125	-		20
Cadmium, Total	109		-		75-125	-		20
Chromium, Total	103		-		75-125	-		20
Copper, Total	103		-		75-125	-		20
Lead, Total	106		-		75-125	-		20
Nickel, Total	102		-		75-125	-		20
Zinc, Total	98		-		75-125	-		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 25-33,49-54 Batch: WG1050285-2 SRM Lot Number: HPHGAF					
Mercury, Total	101	-	80-120	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-14,55 Batch: WG1051696-2					
Arsenic, Total	101	-	75-125	-	20
Cadmium, Total	99	-	75-125	-	20
Chromium, Total	94	-	75-125	-	20
Copper, Total	98	-	75-125	-	20
Lead, Total	102	-	75-125	-	20
Nickel, Total	94	-	75-125	-	20
Zinc, Total	96	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-14,55 Batch: WG1051698-2 SRM Lot Number: HPHGAF					
Mercury, Total	99	-	80-120	-	20

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 15-24 Batch: WG1052852-2					
Arsenic, Total	100	-	75-125	-	20
Cadmium, Total	104	-	75-125	-	20
Chromium, Total	96	-	75-125	-	20
Copper, Total	100	-	75-125	-	20
Lead, Total	101	-	75-125	-	20
Nickel, Total	95	-	75-125	-	20
Zinc, Total	100	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 15-24 Batch: WG1052853-2 SRM Lot Number: HPHGAF					
Mercury, Total	86	-	80-120	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 34-48 QC Batch ID: WG1049111-3 WG1049111-4 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A												
Arsenic, Total	2.16	11.8	13.6	97		13.7	104		75-125	1		20
Cadmium, Total	0.070	5	5.24	103		5.04	105		75-125	4		20
Chromium, Total	0.973	19.6	19.5	94		19.7	101		75-125	1		20
Copper, Total	3.42	24.5	27.4	98		26.9	101		75-125	2		20
Lead, Total	1.04	50	50.7	99		50.2	104		75-125	1		20
Nickel, Total	0.502	49	47.0	95		47.0	100		75-125	0		20
Zinc, Total	13.7	49	59.9	94		59.9	100		75-125	0		20
Total Metals - Mansfield Lab Associated sample(s): 34-48 QC Batch ID: WG1049114-3 WG1049114-4 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A												
Mercury, Total	ND	0.584	0.559	96		0.627	101		80-120	11		20
Total Metals - Mansfield Lab Associated sample(s): 25-33,49-54 QC Batch ID: WG1050284-3 WG1050284-4 QC Sample: L1735126-49 Client ID: MN COMPOSITE 7 REP D												
Arsenic, Total	2.13	10.9	11.8	89		13.3	96		75-125	12		20
Cadmium, Total	0.040	4.64	4.50	96		5.16	103		75-125	14		20
Chromium, Total	0.622	18.2	16.8	89		19.2	96		75-125	13		20
Copper, Total	2.18	22.7	23.2	92		25.6	96		75-125	10		20
Lead, Total	0.902	46.4	44.6	94		49.8	99		75-125	11		20
Nickel, Total	0.324	45.4	41.6	91		47.7	98		75-125	14		20
Zinc, Total	13.3	45.4	49.7	80		54.5	85		75-125	9		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 25-33,49-54 QC Batch ID: WG1050285-3 WG1050285-4 QC Sample: L1735126-49 Client ID: MN COMPOSITE 7 REP D									
Mercury, Total	ND	0.568	0.568	100	0.606	98	80-120	6	20
Total Metals - Mansfield Lab Associated sample(s): 01-14,55 QC Batch ID: WG1051696-3 WG1051696-4 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A									
Arsenic, Total	1.30	11.4	12.6	99	12.7	98	75-125	1	20
Cadmium, Total	0.029J	4.86	5.01	103	5.11	103	75-125	2	20
Chromium, Total	0.063J	19	18.9	99	18.9	97	75-125	0	20
Copper, Total	1.43	23.8	24.8	98	25.1	98	75-125	1	20
Lead, Total	0.135	48.6	49.2	101	49.4	99	75-125	0	20
Nickel, Total	0.185	47.6	46.4	97	46.5	95	75-125	0	20
Zinc, Total	10.8	47.6	62.5	108	62.6	107	75-125	0	20
Total Metals - Mansfield Lab Associated sample(s): 01-14,55 QC Batch ID: WG1051698-3 WG1051698-4 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A									
Mercury, Total	ND	0.625	0.575	92	0.550	92	80-120	4	20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery		MSD Found	MSD %Recovery		Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 15-24 QC Batch ID: WG1052852-3 WG1052852-4 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A											
Arsenic, Total	2.36	11.2	12.7	92		13.7	98		75-125	8	20
Cadmium, Total	0.034J	4.77	4.73	99		5.03	102		75-125	6	20
Chromium, Total	0.218J	18.7	17.4	93		18.3	95		75-125	5	20
Copper, Total	1.35	23.4	23.5	95		24.6	97		75-125	5	20
Lead, Total	0.290	47.7	47.0	98		49.6	100		75-125	5	20
Nickel, Total	0.347	46.7	43.2	92		45.2	93		75-125	5	20
Zinc, Total	8.64	46.7	51.2	91		54.9	96		75-125	7	20
Total Metals - Mansfield Lab Associated sample(s): 15-24 QC Batch ID: WG1052853-3 WG1052853-4 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A											
Mercury, Total	ND	0.619	0.475	**77**	Q	0.462	**78**	Q	80-120	3	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 34-48 QC Batch ID: WG1049111-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						
Arsenic, Total	2.16	2.21	mg/kg	2		20
Cadmium, Total	0.070	0.061	mg/kg	13		20
Chromium, Total	0.973	0.778	mg/kg	**22**	Q	20
Copper, Total	3.42	3.31	mg/kg	3		20
Lead, Total	1.04	0.883	mg/kg	16		20
Nickel, Total	0.502	0.470	mg/kg	7		20
Zinc, Total	13.7	12.9	mg/kg	6		20
Total Metals - Mansfield Lab Associated sample(s): 34-48 QC Batch ID: WG1049114-5 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						
Mercury, Total	ND	ND	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 25-33,49-54 QC Batch ID: WG1050284-5 QC Sample: L1735126-49 Client ID: MN COMPOSITE 7 REP D						
Arsenic, Total	2.13	1.77	mg/kg	18		20
Cadmium, Total	0.040	0.037J	mg/kg	NC		20
Chromium, Total	0.622	0.406	mg/kg	**42**	Q	20
Copper, Total	2.18	1.71	mg/kg	**24**	Q	20
Lead, Total	0.902	0.518	mg/kg	**54**	Q	20
Nickel, Total	0.324	0.290	mg/kg	11		20
Zinc, Total	13.3	8.03	mg/kg	**49**	Q	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 25-33,49-54 QC Batch ID: WG1050285-5 QC Sample: L1735126-49 Client ID: MN COMPOSITE 7 REP D						
Mercury, Total	ND	ND	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-14,55 QC Batch ID: WG1051696-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						
Arsenic, Total	1.30	1.31	mg/kg	1		20
Cadmium, Total	0.029J	0.042	mg/kg	NC		20
Chromium, Total	0.063J	0.061J	mg/kg	NC		20
Copper, Total	1.43	1.42	mg/kg	1		20
Lead, Total	0.135	0.204	mg/kg	**41**	Q	20
Nickel, Total	0.185	0.159	mg/kg	15		20
Zinc, Total	10.8	16.0	mg/kg	**39**	Q	20
Total Metals - Mansfield Lab Associated sample(s): 01-14,55 QC Batch ID: WG1051698-5 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						
Mercury, Total	ND	ND	mg/kg	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 15-24 QC Batch ID: WG1052852-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						
Arsenic, Total	2.36	2.51	mg/kg	6		20
Cadmium, Total	0.034J	0.027J	mg/kg	NC		20
Chromium, Total	0.218J	0.177J	mg/kg	NC		20
Copper, Total	1.35	1.35	mg/kg	0		20
Lead, Total	0.290	0.236	mg/kg	**21**	Q	20
Nickel, Total	0.347	0.203	mg/kg	**52**	Q	20
Zinc, Total	8.64	9.33	mg/kg	8		20
Total Metals - Mansfield Lab Associated sample(s): 15-24 QC Batch ID: WG1052853-5 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						
Mercury, Total	ND	ND	mg/kg	NC		20

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1049111-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	71		65-139
Cadmium, Total	78		67-135
Copper, Total	92		65-138
Lead, Total	101		56-155
Zinc, Total	68		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1049114-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	70		41-183

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1050284-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	74		65-139
Cadmium, Total	81		67-135
Copper, Total	92		65-138
Lead, Total	94		56-155
Zinc, Total	70		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1050285-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	118		41-183

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1051696-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	92		65-139
Cadmium, Total	94		67-135
Copper, Total	98		65-138
Lead, Total	95		56-155
Zinc, Total	97		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1051698-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	64		41-183

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1052852-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	91		65-139
Cadmium, Total	94		67-135
Copper, Total	96		65-138
Lead, Total	96		56-155
Vanadium, Total	95		62-145
Zinc, Total	97		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1052853-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	74		41-183

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-01
Client ID: MN NATIVE BACKGROUND REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.659		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-02
Client ID: MN NATIVE BACKGROUND REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.811		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-03
Client ID: MN NATIVE BACKGROUND REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.529		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-04
Client ID: MN NATIVE BACKGROUND REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.519		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-05
Client ID: MN NATIVE BACKGROUND REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.509		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-06
Client ID: MN LABORATORY CONTROL REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.321		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-07
Client ID: MN LABORATORY CONTROL REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.412		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-08
Client ID: MN LABORATORY CONTROL REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.506		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-09
Client ID: MN LABORATORY CONTROL REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.330		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-10
Client ID: MN LABORATORY CONTROL REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/28/17 16:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	94.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.451		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-11
Client ID: MN CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.463		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-12
Client ID: MN CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.505		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-13
Client ID: MN CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.507		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-14
Client ID: MN CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.657		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-15
Client ID: MN CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.451		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-16
Client ID: MN COMPOSITE 1 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	95.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.497		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-17
Client ID: MN COMPOSITE 1 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.643		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-18
Client ID: MN COMPOSITE 1 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.629		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-19
Client ID: MN COMPOSITE 1 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.343		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-20
Client ID: MN COMPOSITE 1 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	94.0		%	0.100	0.100	1	-	10/25/17 16:00	121,2540G	SP
Percent Lipids	0.486		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-21
Client ID: MN COMPOSITE 2 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.462		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-22
Client ID: MN COMPOSITE 2 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.414		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-23
Client ID: MN COMPOSITE 2 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.453		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-24
Client ID: MN COMPOSITE 2 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.428		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-25
Client ID: MN COMPOSITE 2 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.773		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-26
Client ID: MN COMPOSITE 3 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.412		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-27
Client ID: MN COMPOSITE 3 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	94.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.473		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-28
Client ID: MN COMPOSITE 3 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.441		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-29
Client ID: MN COMPOSITE 3 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.516		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-30
Client ID: MN COMPOSITE 3 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 08:45
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.450		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-31
Client ID: MN COMPOSITE 4 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.406		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-32
Client ID: MN COMPOSITE 4 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.699		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-33
Client ID: MN COMPOSITE 4 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	93.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.414		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-34
Client ID: MN COMPOSITE 4 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.575		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-35
Client ID: MN COMPOSITE 4 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.473		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-36
Client ID: MN COMPOSITE 5 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.443		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-37
Client ID: MN COMPOSITE 5 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.641		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-38
Client ID: MN COMPOSITE 5 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.769		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-39
Client ID: MN COMPOSITE 5 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	85.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.883		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-40
Client ID: MN COMPOSITE 5 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 09:30
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 16:30	121,2540G	SP
Percent Lipids	0.669		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-41
Client ID: MN COMPOSITE 6 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.804		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-42
Client ID: MN COMPOSITE 6 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	92.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.580		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-43
Client ID: MN COMPOSITE 6 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.694		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-44
Client ID: MN COMPOSITE 6 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.787		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-45
Client ID: MN COMPOSITE 6 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.626		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-46
Client ID: MN COMPOSITE 7 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.908		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-47
Client ID: MN COMPOSITE 7 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.622		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-48
Client ID: MN COMPOSITE 7 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	94.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.632		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-49
Client ID: MN COMPOSITE 7 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.417		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-50
Client ID: MN COMPOSITE 7 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 10:15
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.598		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-51
Client ID: MN COMPOSITE 8 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.568		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-52
Client ID: MN COMPOSITE 8 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.757		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-53
Client ID: MN COMPOSITE 8 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	95.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.750		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-54
Client ID: MN COMPOSITE 8 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.540		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

SAMPLE RESULTS

Lab ID: L1735126-55
Client ID: MN COMPOSITE 8 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 11:00
Date Received: 09/29/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	85.0		%	0.100	0.100	1	-	10/25/17 17:30	121,2540G	SP
Percent Lipids	0.734		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO

Project Name: USACE/NHH FNP **Lab Number:** L1735126

Project Number: 60543021 **Report Date:** 11/10/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab for sample(s): 01-20 Batch: WG1056543-1										
Percent Lipids	ND		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO
General Chemistry - Mansfield Lab for sample(s): 41-55 Batch: WG1056545-1										
Percent Lipids	ND		%	0.100	NA	1	-	10/27/17 00:00	111,-	KO
General Chemistry - Mansfield Lab for sample(s): 21-40 Batch: WG1056950-1										
Percent Lipids	ND		%	0.100	NA	1	-	10/30/17 00:00	111,-	KO

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1056069-1 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						
Moisture	92.0	92.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1056073-1 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						
Moisture	93.0	94.0	%	1		10
General Chemistry - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1056075-1 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						
Moisture	86.0	85.0	%	1		10
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1056543-2 QC Sample: L1735126-01 Client ID: MN NATIVE BACKGROUND REP A						
Percent Lipids	0.659	0.620	%	6		20
General Chemistry - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1056545-2 QC Sample: L1735126-41 Client ID: MN COMPOSITE 6 REP A						
Percent Lipids	0.804	0.731	%	10		20
General Chemistry - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1056950-2 QC Sample: L1735126-21 Client ID: MN COMPOSITE 2 REP A						
Percent Lipids	0.462	0.391	%	17		20

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-01A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-02A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-03A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-04A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-05A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-06A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-07A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-08A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-09A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-10A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-11A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-12A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-13A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-14A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-15A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-16A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-17A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-18A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-19A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-20A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-21A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-22A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-23A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-24A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-25A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-26A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-27A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-28A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-29A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-30A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-31A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-32A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-33A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-34A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-35A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-36A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-37A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-38A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-39A	Glass 250ml/8oz unpreserved	A	NA		5.3	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-40A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-41A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-42A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-43A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-44A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-45A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-46A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-47A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-48A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-49A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-50A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-51A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-52A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-53A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735126
Report Date: 11/10/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735126-54A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735126-55A	Glass 250ml/8oz unpreserved	B	NA		5.9	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735126
Project Number:	60543021	**Report Date:**	11/10/17

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

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REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

111 NOAA Technical Memorandum NOS ORCA 130: Sampling and Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993-196 Update. March 1998.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No – PCB RLs slightly elevated; Methoxychlor
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – See Narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – See Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	N/A
19. Were surrogate recoveries within the required acceptance criteria?	No – See Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	No	CCV- opening for method blank, LCS,LCSD: Benzo(b)fluoranthene @ 20% CCV- opening for SRM: Benzo(b)fluoranthene @20% CCV- opening for L1735126-01,01D, 01MS, 01MSD: Benzo(k)fluoranthene @ 17%, dibenz(a,h)anthracene @ 20CCV – opening for L1735126-02 through-20: Benz(a)anthracene @ 17%, Dibenz(a,h)anthracene @20%, Benzo(g,h,i)perylene @ 17%, CCV – opening for L1735126-41, 41D, 41MS, 41MSD through -55: Benzo(b)fluoranthene @ 18%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes.	No	L1735126-41 MS: Naphthalene @ 48%, Acenaphthylene @ 48%, Acenaphthene @ 46%, Fluorene	In Data Package

	(Recovery Limits 50 to 120%; RPD <30%)		@ 48%, Anthracene @ 43%, Chrysene @ 42%, Benzo(k)fluoranthene @ 45% MSD: Naphthalene @ 40%, Acenaphthylene @ 41%, Acenaphthene @ 39%, Fluorene @ 41%, Phenanthrene @ 49%, Anthracene @ 38%, Fluoranthene @43%, Pyrene @ 40%,Chrysene @ 36%, Benzo(k)fluoranthene @ 37%, Benzo(a)pyrene @ 45%, Dibenz(a,h)anthracene @ 47%, Benzo(g,h,i)perylene @ 48% RPD: Benzo(a)pyrene @ 37%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV1: opening for Blank,LCS,LCSD L1735126-01, 01D, 01MS, 01MSD: Column a: gamma-BHC @ 18% Column b: gamma-BHC @ 23%, Aldrin @ 19%, Dieldrin @ 16% CCV2:opening for L1735126-02 through 20: Column a: gamma-BHC @ 19%, Aldrin @ 18%, Methoxychlor @ 20% Column b : gamma-BHC @ 22%, Heptachlor @ 16%, Aldrin @ 20%, Dieldrin @ 16%, 4,4-DDD @ 18% CCV3: opening for Blank2, LCS2, LCSD2, L1735126-21, 21D, 21MS, 21MSD: Column a : gamma-BHC @ 18%, Aldrin @ 17% Column b : gamma-BHC @ 25%, Aldrin @ 21%, heptachlor epoxide b @ 16%, Endosulfan I @ 16%, Dieldrin @ 18% CCV4: opening for L1735126-22 through -40	Retained at Lab

			Column a: gamma-BHC @ 22%, heptachlor @ 16%, Aldrin @ 20%, Dieldrin @ 16% Column b: gamma-BHC @ 20%, Aldrin @ 16% CCV5: opening for Blank3, LCS3, LCSD3, SRM: Column a : gamma-BHC @ 18%, Aldrin @ 16% CCV6: opening for L1735126-41, 41D, 41MS, 41MSD, 42-55: Column a: gamma-BHC @ 17%, Aldrin @ 16%	
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735126-01: MS: Oxychlordane @ 49% MSD: Methoxychlor @ 47%, Oxychlordane @ 47% L1735126-21: MS: Heptachlor epoxide @ 49%, Oxychlordance @ 48% MSD: Heptachlor @ 49%, Oxychlordane @ 48% L1735126-55: 4,4'-DDE (42%/35%) and cis-Nonachlor (45%-MSD only)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1735126-21D: 4,4-DDE @ 58%, endrin @ 49% L1735126-41D: 4,4-DDE @ 67%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1735126-41MSD: BZ198 @ 229% on column a	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV- opening for L1735126-01,01D, 01MS, 01MSD: Cl8-BZ#195 @ 17%, Cl9-BZ#206 @ 21%, Cl10-BZ#209 @ 16% CCV – opening for L1735126-02 through-20: Cl7-BZ#170 @ 18%, Cl8-BZ#195 @ 20%, Cl9-BZ#206 @ 21%,	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM2: Cl3-BZ#28 @ 898% SRM3: Cl3-BZ#28 @ 448%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735126-01: MS: Cl3-BZ#18 @ 131%, Cl4-BZ#49 @ 46%, Cl7-BZ#183 @ 46% MSD: Cl3-BZ#18 @ 125% L1735126-21: MS: Cl3-BZ#18 @ 135% MSD: Cl3-BZ#18 @ 124% L1735126-41: MS: Cl2-BZ#8 @ 48%, Cl4-BZ#49 @ 40%, Cl5-BZ#105 @ 42%, Cl7-BZ#180	In Data Package

			@ 49%, Cl7-BZ#183 @ 39% MSD: Cl2-BZ#8 @ 44%, Cl4-BZ#44 @ 46%, Cl4-BZ#49 @ 38%, Cl5-BZ#87 @ 47%, Cl5-BZ#101 @ 48%, Cl5-BZ#105 @ 40%, Cl5-BZ#118 @ 49%, Cl6-BZ#128 @ 47%, Cl6-BZ#138 @ 49%, Cl7-BZ#170 @ 49%, Cl7-BZ#180 @ 44%, Cl7-BZ#183 @ 37%, Cl7-BZ#184 @ 48%, Cl8-BZ#195 @ 49%, Cl10-BZ#209 @ 47%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A	Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	L1735126-21: (Hg 77%/78%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1735126-41: (Cr 22%), L1735126-49: (Cr 42%, Cu 24%, Pb 54%, Zn 49%), L1735126-01: (Pb 41%, Zn 39%), L1735126-21: (Pb 21%, Ni 52%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1735126

CHAIN OF CUSTODY DOCUMENTATION

Client: Alpha Analytical Labs	Contact: Liz Porta	Project Name: New Haven Harbor Federal Navigation Project	
Report to: Liz Porta	Address: 320 Forbes Blvd	Project Number: P0718	Task: 0001
Invoice to:	Address: Mansfield , MA 02048	Project Manager: Liz Porta	
Voice: 0	Fax: 0	email:	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	Mn Native Background Rep A	09/28/17	1600	ESI		1	9 oz	G	Frozen	Solid	N	0
002	Mn Native Background Rep B					1	9 oz	G	Frozen	Solid	N	0
003	Mn Native Background Rep C					1	9 oz	G	Frozen	Solid	N	0
004	Mn Native Background Rep D					1	9 oz	G	Frozen	Solid	N	0
005	Mn Native Background Rep E					1	9 oz	G	Frozen	Solid	N	0
006	Mn Laboratory Control Rep A		1630			1	9 oz	G	Frozen	Solid	N	0
007	Mn Laboratory Control Rep B					1	9 oz	G	Frozen	Solid	N	0
008	Mn Laboratory Control Rep C					1	9 oz	G	Frozen	Solid	N	0
009	Mn Laboratory Control Rep D					1	9 oz	G	Frozen	Solid	N	0
010	Mn Laboratory Control Rep E					1	9 oz	G	Frozen	Solid	N	0
011	Mn CLDS Reference Sediment Rep A	09/29/17	0800			1	9 oz	G	Frozen	Solid	N	0
012	Mn CLDS Reference Sediment Rep B					1	9 oz	G	Frozen	Solid	N	0

Relinquished By:	Date: 09/29/17 Time: 1620	Received By: AAL	Date: 9/29/17 Time: 16:20
Relinquished By: AAL	Date: 9/29/17 Time: 18:30	Received at Lab By:	Date: 9/29/17 Time: 1830

Comments:

ERR 09/30/17 0725 9/30/17 0725

COC Number: A1015431

Sample Delivery Group No: September 2017 | Page of

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Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
013	Mn CLDS Reference Sediment Rep C	09/29/17	0800	ESI		1	9 oz	G	Frozen	Solid	N	*
014	Mn CLDS Reference Sediment Rep D					1	9 oz	G	Frozen	Solid	N	*
015	Mn CLDS Reference Sediment Rep E					1	9 oz	G	Frozen	Solid	N	*
016	Mn Composite 1 Rep A		0815			1	9 oz	G	Frozen	Solid	N	*
017	Mn Composite 1 Rep B					1	9 oz	G	Frozen	Solid	N	*
018	Mn Composite 1 Rep C					1	9 oz	G	Frozen	Solid	N	*
019	Mn Composite 1 Rep D					1	9 oz	G	Frozen	Solid	N	*
020	Mn Composite 1 Rep E					1	9 oz	G	Frozen	Solid	N	*
021	Mn Composite 2 Rep A		0830			1	9 oz	G	Frozen	Solid	N	*
022	Mn Composite 2 Rep B					1	9 oz	G	Frozen	Solid	N	*
023	Mn Composite 2 Rep C					1	9 oz	G	Frozen	Solid	N	*
024	Mn Composite 2 Rep D					1	9 oz	G	Frozen	Solid	N	*

Relinquished By: [signature] Date: 09/29/17 Time: 1620	Received By: [signature] AAL Date: 9/29/17 Time: 16:20
Relinquished By: [signature] AAL Date: 9/29/17 Time: 18:30	Received at Lab By: [signature] Date: 9/29/17 Time: 1832

Comments:

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COC Number: A1015431

Sample Delivery Group No: September 2017	Page of

ESI EnviroSystems, Inc.
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CHAIN OF CUSTODY DOCUMENTATION

Client: Alpha Analytical Labs	Contact: Liz Porta	Project Name: New Haven Harbor Federal Navigation Project	
Report to: Liz Porta	Address: 320 Forbes Blvd	Project Number: P0718	Task: 0001
Invoice to:	Address: Mansfield , MA 02048	Project Manager: Liz Porta	
Voice: 0	Fax: 0	email:	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
025	Mn Composite 2 Rep E	09/29/17	0830	ESI		1	9 oz	G	Frozen	Solid	N	*
026	Mn Composite 3 Rep A		0845			1	9 oz	G	Frozen	Solid	N	*
027	Mn Composite 3 Rep B					1	9 oz	G	Frozen	Solid	N	*
028	Mn Composite 3 Rep C					1	9 oz	G	Frozen	Solid	N	*
029	Mn Composite 3 Rep D					1	9 oz	G	Frozen	Solid	N	*
030	Mn Composite 3 Rep E					1	9 oz	G	Frozen	Solid	N	*
031	Mn Composite 4 Rep A		0900			1	9 oz	G	Frozen	Solid	N	*
032	Mn Composite 4 Rep B					1	9 oz	G	Frozen	Solid	N	*
033	Mn Composite 4 Rep C					1	9 oz	G	Frozen	Solid	N	*
034	Mn Composite 4 Rep D					1	9 oz	G	Frozen	Solid	N	*
035	Mn Composite 4 Rep E					1	9 oz	G	Frozen	Solid	N	*
036	Mn Composite 5 Rep A		0930			1	9 oz	G	Frozen	Solid	N	*

Relinquished By:	Date: 09/29/17 Time: 1620	Received By: AAL	Date: 9/29/17 Time: 16:20
Relinquished By: AAL	Date: 9/29/17 Time: 18:30	Received at Lab By:	Date: 9/29/17 Time: 1830

Comments:

ERR 09/30/17 0725 9/30/17 0725

COC Number: A1015431

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Report to: Liz Porta	Address: 320 Forbes Blvd	Project Number: P0718	Task: 0001
Invoice to:	Address: Mansfield , MA 02048	Project Manager: Liz Porta	
Voice: 0	Fax: 0	email:	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
037	Mn Composite 5 Rep B	09/29/17	0930	ESI		1	9 oz	G	Frozen	Solid	N	*
038	Mn Composite 5 Rep C	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
039	Mn Composite 5 Rep D	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
040	Mn Composite 5 Rep E	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
041	Mn Composite 6 Rep A	↓	1000	↓		1	9 oz	G	Frozen	Solid	N	*
042	Mn Composite 6 Rep B	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
043	Mn Composite 6 Rep C	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
044	Mn Composite 6 Rep D	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
045	Mn Composite 6 Rep E	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
046	Mn Composite 7 Rep A	↓	1015	↓		1	9 oz	G	Frozen	Solid	N	*
047	Mn Composite 7 Rep B	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*
048	Mn Composite 7 Rep C	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	*

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Relinquished By: [signature] AAL 9/29/17	Date: 9/29/17 Time: 18:30	Received at Lab By: [signature]	Date: 9/29/17 Time: 1830

Comments:

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COC Number: A1015431

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CHAIN OF CUSTODY DOCUMENTATION

Client: Alpha Analytical Labs	Contact: Liz Porta	Project Name: New Haven Harbor Federal Navigation Project	
Report to: Liz Porta	Address: 320 Forbes Blvd	Project Number: P0718	Task: 0001
Invoice to:	Address: Mansfield , MA 02048	Project Manager: Liz Porta	
Voice: 0	Fax: 0	email:	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
049	Mn Composite 7 Rep D	09/29/17	1015	ESI		1	9 oz	G	Frozen	Solid	N	*
050	Mn Composite 7 Rep E		↓			1	9 oz	G	Frozen	Solid	N	*
051	Mn Composite 8 Rep A		1100			1	9 oz	G	Frozen	Solid	N	*
052	Mn Composite 8 Rep B					1	9 oz	G	Frozen	Solid	N	*
053	Mn Composite 8 Rep C					1	9 oz	G	Frozen	Solid	N	*
054	Mn Composite 8 Rep D					1	9 oz	G	Frozen	Solid	N	*
055	Mn Composite 8 Rep E					1	9 oz	G	Frozen	Solid	N	*

Relinquished By: [signature]	Date: 09/29/17 Time: 1620	Received By: [signature] AAL	Date: 9/29/17 Time: 18:20
Relinquished By: [signature] AAL	Date: 9/29/17 Time: 18:30	Received at Lab By [signature]	Date: 9/29/17 Time: 1830

Comments:

ERR [signature] 09/30/17 0725 [signature] 9/30/17 0725

COC Number: A1015431

Sample Delivery Group No:	September 2017	Page of

ANALYTICAL REPORT

Lab Number:	L1735250
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Ryan McCarthy
Phone:	(978) 833-6950
Project Name:	USACE/NHH FNP
Project Number:	60543021
Report Date:	11/20/17

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), NJ NELAP (MA015), CT (PH-0141), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-13-00067), USFWS (Permit #LE2069641).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1735250-01	NV NATIVE BACKGROUND REP A	TISSUE	NEW HAVEN, CT	10/04/17 16:20	10/05/17
L1735250-02	NV NATIVE BACKGROUND REP B	TISSUE	NEW HAVEN, CT	10/04/17 16:20	10/05/17
L1735250-03	NV NATIVE BACKGROUND REP C	TISSUE	NEW HAVEN, CT	10/04/17 16:20	10/05/17
L1735250-04	NV NATIVE BACKGROUND REP D	TISSUE	NEW HAVEN, CT	10/04/17 16:20	10/05/17
L1735250-05	NV NATIVE BACKGROUND REP E	TISSUE	NEW HAVEN, CT	10/04/17 16:20	10/05/17
L1735250-06	NV LABORATORY CONTROL REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-07	NV LABORATORY CONTROL REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-08	NV LABORATORY CONTROL REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-09	NV LABORATORY CONTROL REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-10	NV LABORATORY CONTROL REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-11	NV CLDS REFERENCE SEDIMENT REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-12	NV CLDS REFERENCE SEDIMENT REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-13	NV CLDS REFERENCE SEDIMENT REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-14	NV CLDS REFERENCE SEDIMENT REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-15	NV CLDS REFERENCE SEDIMENT REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-16	NV COMPOSITE 1 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-17	NV COMPOSITE 1 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-18	NV COMPOSITE 1 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1735250-19	NV COMPOSITE 1 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-20	NV COMPOSITE 1 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-21	NV COMPOSITE 2 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-22	NV COMPOSITE 2 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-23	NV COMPOSITE 2 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-24	NV COMPOSITE 2 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-25	NV COMPOSITE 2 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-26	NV COMPOSITE 3 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-27	NV COMPOSITE 3 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-28	NV COMPOSITE 3 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-29	NV COMPOSITE 3 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-30	NV COMPOSITE 3 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-31	NV COMPOSITE 4 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-32	NV COMPOSITE 4 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-33	NV COMPOSITE 4 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-34	NV COMPOSITE 4 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-35	NV COMPOSITE 4 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-36	NV COMPOSITE 5 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-37	NV COMPOSITE 5 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-38	NV COMPOSITE 5 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-39	NV COMPOSITE 5 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-40	NV COMPOSITE 5 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-41	NV COMPOSITE 6 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-42	NV COMPOSITE 6 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-43	NV COMPOSITE 6 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-44	NV COMPOSITE 6 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-45	NV COMPOSITE 6 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-46	NV COMPOSITE 7 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1735250-47	NV COMPOSITE 7 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-48	NV COMPOSITE 7 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-49	NV COMPOSITE 7 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-50	NV COMPOSITE 7 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-51	NV COMPOSITE 8 REP A	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-52	NV COMPOSITE 8 REP B	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-53	NV COMPOSITE 8 REP C	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-54	NV COMPOSITE 8 REP D	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17
L1735250-55	NV COMPOSITE 8 REP E	TISSUE	NEW HAVEN, CT	09/29/17 16:00	10/02/17

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: USACE/NHH FNP **Lab Number:** L1735250
Project Number: 60543021 **Report Date:** 11/20/17

Case Narrative (continued)

Report Submission
All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt
L1735250: Tissue samples were frozen upon receipt in order to arrest the holding time.

Semivolatile Organics
PCB samples L1735250-21 through -55 have elevated detection limits due to the dilution required due to matrix interferences.

The WG1057021-1 Method Blank, associated with L1735250-21 through -40, has concentrations above the reporting limits for Cl3-BZ#18. Since the sample(s) were non-detect to the RL for these target analytes, no further actions were taken. The results of the original analysis are reported.

The WG1057014-6/-7 MS/MSD recoveries, performed on L1735250-01, are outside the acceptance criteria for Cl3-MZ#18 (167%/144%) and Cl4-BZ#49 (50%/50%).

The WG1057021-6/-7 MS/MSD recoveries/RPDs, performed on L1735250-21, are outside the acceptance criteria for several compounds. See the enclosed MS/MSD recovery and QC summary form for sepcific details.

The WG1057028-6/-7 MS/MSD recoveries, performed on L1735250-41, are outside the acceptance criteria for Naphthalene (50%-MS only), Acenaphthene (50%-MS only), Anthracene (49%-MS only), Chrysene (50%-MS only), Benzo(k)fluoranthene (49%-MS only), Cl2-BZ#8 (50%-MS only), Cl4-BZ#49 (46%/49%) and Cl7-BZ#183 (46%-MS only).

Pesticides
L1735250-38: The surrogate recovery is outside the acceptance criteria for DBOB (175%); however, the

Case Narrative (continued)

sample was not re-extracted due to obvious matrix interference.

L1735250-42: The surrogate recovery is outside the acceptance criteria for BZ198 (191%); however, the sample was not re-extracted due to obvious matrix interference.

The WG1057025-2/-3 LCS/LCSD recoveries, associated with L1735250-41 through -55, are outside the acceptance criteria for individual target compounds, but within the overall method allowances. The results of the associated samples are reported; however, all results are considered to have a potential bias for Hexachlorobenzene (40%/43%), gamma-BHC (40%/45%), Heptachlor (41%/44%), Aldrin (40%/43%), trans-Chlordane (48%-LCS only), Endosulfan I (48%-LCS only), cis-Chlordane (48%/49%). All recoveries for the LCS/LCSD, WG1057025-2/-3, are within SOP criteria (40-140%); therefore no further action was taken.

The WG1057016-6/-7 MS/MSD recoveries, performed on sample L1735250-21, are outside the acceptance criteria for several compounds; however, the associated LCS/LCSD are within overall method allowances.

The WG1057025-6/-7 MS/MSD recoveries, performed on L1735250-41, are within SOP criteria (40-140%); therefore no further action was taken. The WG1057025-7 MSD surrogate recovery is outside the acceptance criteria for BZ 198 (206%); however, the sample was not re-extracted due to obvious matrix interference.

The Dulpicate WG1057025-5, surrogate DBOB (23% B channel), performed on L1735250-41, is below the acceptable criteria. However, all other surrogate recoveries are within overall method allowances therefore no further action was taken.

The WG1057025-4 SRM recovery for cis-Chlordane (32%) is below the acceptable criteria.

Total Metals
The WG1056489-5 Laboratory Duplicate RPD for Arsenic (142%), Copper (142%) and Zinc (141%), performed on L1735250-53, is outside the acceptance criteria. The elevated RPD has been attributed to the non-

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

Case Narrative (continued)

homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 11/20/17

ORGANICS

SEMIVOLATILES

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-01
Client ID: NV NATIVE BACKGROUND REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 17:56
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	5.46	J	ug/kg	9.31	4.66	1
Acenaphthylene	ND		ug/kg	9.31	4.66	1
Acenaphthene	ND		ug/kg	9.31	4.66	1
Fluorene	ND		ug/kg	9.31	4.66	1
Phenanthrene	7.86	J	ug/kg	9.31	4.66	1
Anthracene	ND		ug/kg	9.31	4.66	1
Fluoranthene	ND		ug/kg	9.31	4.66	1
Pyrene	ND		ug/kg	9.31	4.66	1
Benz(a)anthracene	ND		ug/kg	9.31	4.66	1
Chrysene	ND		ug/kg	9.31	4.66	1
Benzo(b)fluoranthene	ND		ug/kg	9.31	4.66	1
Benzo(k)fluoranthene	ND		ug/kg	9.31	4.66	1
Benzo(a)pyrene	ND		ug/kg	9.31	4.66	1
Indeno(1,2,3-cd)Pyrene	8.89	J	ug/kg	9.31	4.66	1
Dibenz(a,h)anthracene	ND		ug/kg	9.31	4.66	1
Benzo(ghi)perylene	ND		ug/kg	9.31	4.66	1
Cl2-BZ#8	ND		ug/kg	0.931	0.466	1
Cl3-BZ#18	ND		ug/kg	0.931	0.466	1
Cl3-BZ#28	ND		ug/kg	0.931	0.466	1
Cl4-BZ#44	ND		ug/kg	0.931	0.466	1
Cl4-BZ#49	ND		ug/kg	0.931	0.466	1
Cl4-BZ#52	ND		ug/kg	0.931	0.466	1
Cl4-BZ#66	ND		ug/kg	0.931	0.466	1
Cl5-BZ#87	ND		ug/kg	0.931	0.466	1
Cl5-BZ#101	0.812	J	ug/kg	0.931	0.466	1
Cl5-BZ#105	ND		ug/kg	0.931	0.466	1
Cl5-BZ#118	0.506	J	ug/kg	0.931	0.466	1
Cl6-BZ#128	ND		ug/kg	0.931	0.466	1
Cl6-BZ#138	0.585	J	ug/kg	0.931	0.466	1
Cl6-BZ#153	0.812	J	ug/kg	0.931	0.466	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-01 Date Collected: 10/04/17 16:20

Client ID: NV NATIVE BACKGROUND REP A Date Received: 10/05/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.931	0.466	1
Cl7-BZ#180	ND		ug/kg	0.931	0.466	1
Cl7-BZ#183	ND		ug/kg	0.931	0.466	1
Cl7-BZ#184	ND		ug/kg	0.931	0.466	1
Cl7-BZ#187	ND		ug/kg	0.931	0.466	1
Cl8-BZ#195	ND		ug/kg	0.931	0.466	1
Cl9-BZ#206	ND		ug/kg	0.931	0.466	1
Cl10-BZ#209	ND		ug/kg	0.931	0.466	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	50		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	49		30-150
DBOB	54		30-150
BZ 198	49		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-02
Client ID: NV NATIVE BACKGROUND REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 21:00
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	6.34	J	ug/kg	9.96	4.98	1
Acenaphthylene	ND		ug/kg	9.96	4.98	1
Acenaphthene	ND		ug/kg	9.96	4.98	1
Fluorene	ND		ug/kg	9.96	4.98	1
Phenanthrene	ND		ug/kg	9.96	4.98	1
Anthracene	ND		ug/kg	9.96	4.98	1
Fluoranthene	ND		ug/kg	9.96	4.98	1
Pyrene	ND		ug/kg	9.96	4.98	1
Benz(a)anthracene	ND		ug/kg	9.96	4.98	1
Chrysene	ND		ug/kg	9.96	4.98	1
Benzo(b)fluoranthene	ND		ug/kg	9.96	4.98	1
Benzo(k)fluoranthene	ND		ug/kg	9.96	4.98	1
Benzo(a)pyrene	ND		ug/kg	9.96	4.98	1
Indeno(1,2,3-cd)Pyrene	9.42	J	ug/kg	9.96	4.98	1
Dibenz(a,h)anthracene	ND		ug/kg	9.96	4.98	1
Benzo(ghi)perylene	ND		ug/kg	9.96	4.98	1
Cl2-BZ#8	ND		ug/kg	0.996	0.498	1
Cl3-BZ#18	ND		ug/kg	0.996	0.498	1
Cl3-BZ#28	ND		ug/kg	0.996	0.498	1
Cl4-BZ#44	ND		ug/kg	0.996	0.498	1
Cl4-BZ#49	ND		ug/kg	0.996	0.498	1
Cl4-BZ#52	ND		ug/kg	0.996	0.498	1
Cl4-BZ#66	ND		ug/kg	0.996	0.498	1
Cl5-BZ#87	ND		ug/kg	0.996	0.498	1
Cl5-BZ#101	ND		ug/kg	0.996	0.498	1
Cl5-BZ#105	ND		ug/kg	0.996	0.498	1
Cl5-BZ#118	0.633	J	ug/kg	0.996	0.498	1
Cl6-BZ#128	ND		ug/kg	0.996	0.498	1
Cl6-BZ#138	ND		ug/kg	0.996	0.498	1
Cl6-BZ#153	0.754	J	ug/kg	0.996	0.498	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-02 Date Collected: 10/04/17 16:20

Client ID: NV NATIVE BACKGROUND REP B Date Received: 10/05/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.996	0.498	1
Cl7-BZ#180	ND		ug/kg	0.996	0.498	1
Cl7-BZ#183	ND		ug/kg	0.996	0.498	1
Cl7-BZ#184	ND		ug/kg	0.996	0.498	1
Cl7-BZ#187	ND		ug/kg	0.996	0.498	1
Cl8-BZ#195	ND		ug/kg	0.996	0.498	1
Cl9-BZ#206	ND		ug/kg	0.996	0.498	1
Cl10-BZ#209	ND		ug/kg	0.996	0.498	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	54		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	65		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-03
Client ID: NV NATIVE BACKGROUND REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 21:32
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	6.49	J	ug/kg	8.83	4.42	1
Acenaphthylene	ND		ug/kg	8.83	4.42	1
Acenaphthene	4.78	J	ug/kg	8.83	4.42	1
Fluorene	ND		ug/kg	8.83	4.42	1
Phenanthrene	ND		ug/kg	8.83	4.42	1
Anthracene	ND		ug/kg	8.83	4.42	1
Fluoranthene	ND		ug/kg	8.83	4.42	1
Pyrene	ND		ug/kg	8.83	4.42	1
Benz(a)anthracene	ND		ug/kg	8.83	4.42	1
Chrysene	ND		ug/kg	8.83	4.42	1
Benzo(b)fluoranthene	ND		ug/kg	8.83	4.42	1
Benzo(k)fluoranthene	ND		ug/kg	8.83	4.42	1
Benzo(a)pyrene	ND		ug/kg	8.83	4.42	1
Indeno(1,2,3-cd)Pyrene	8.12	J	ug/kg	8.83	4.42	1
Dibenz(a,h)anthracene	ND		ug/kg	8.83	4.42	1
Benzo(ghi)perylene	ND		ug/kg	8.83	4.42	1
Cl2-BZ#8	ND		ug/kg	0.883	0.442	1
Cl3-BZ#18	ND		ug/kg	0.883	0.442	1
Cl3-BZ#28	ND		ug/kg	0.883	0.442	1
Cl4-BZ#44	ND		ug/kg	0.883	0.442	1
Cl4-BZ#49	ND		ug/kg	0.883	0.442	1
Cl4-BZ#52	ND		ug/kg	0.883	0.442	1
Cl4-BZ#66	ND		ug/kg	0.883	0.442	1
Cl5-BZ#87	ND		ug/kg	0.883	0.442	1
Cl5-BZ#101	ND		ug/kg	0.883	0.442	1
Cl5-BZ#105	ND		ug/kg	0.883	0.442	1
Cl5-BZ#118	0.746	J	ug/kg	0.883	0.442	1
Cl6-BZ#128	ND		ug/kg	0.883	0.442	1
Cl6-BZ#138	0.699	J	ug/kg	0.883	0.442	1
Cl6-BZ#153	1.15		ug/kg	0.883	0.442	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-03 Date Collected: 10/04/17 16:20

Client ID: NV NATIVE BACKGROUND REP C Date Received: 10/05/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.883	0.442	1
Cl7-BZ#180	ND		ug/kg	0.883	0.442	1
Cl7-BZ#183	ND		ug/kg	0.883	0.442	1
Cl7-BZ#184	ND		ug/kg	0.883	0.442	1
Cl7-BZ#187	ND		ug/kg	0.883	0.442	1
Cl8-BZ#195	ND		ug/kg	0.883	0.442	1
Cl9-BZ#206	ND		ug/kg	0.883	0.442	1
Cl10-BZ#209	ND		ug/kg	0.883	0.442	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	68		30-150
BZ 198	64		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-04
Client ID: NV NATIVE BACKGROUND REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 22:05
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	6.21	J	ug/kg	8.74	4.37	1
Acenaphthylene	ND		ug/kg	8.74	4.37	1
Acenaphthene	ND		ug/kg	8.74	4.37	1
Fluorene	ND		ug/kg	8.74	4.37	1
Phenanthrene	ND		ug/kg	8.74	4.37	1
Anthracene	ND		ug/kg	8.74	4.37	1
Fluoranthene	ND		ug/kg	8.74	4.37	1
Pyrene	ND		ug/kg	8.74	4.37	1
Benz(a)anthracene	ND		ug/kg	8.74	4.37	1
Chrysene	ND		ug/kg	8.74	4.37	1
Benzo(b)fluoranthene	ND		ug/kg	8.74	4.37	1
Benzo(k)fluoranthene	ND		ug/kg	8.74	4.37	1
Benzo(a)pyrene	ND		ug/kg	8.74	4.37	1
Indeno(1,2,3-cd)Pyrene	7.76	J	ug/kg	8.74	4.37	1
Dibenz(a,h)anthracene	ND		ug/kg	8.74	4.37	1
Benzo(ghi)perylene	ND		ug/kg	8.74	4.37	1
Cl2-BZ#8	ND		ug/kg	0.874	0.437	1
Cl3-BZ#18	ND		ug/kg	0.874	0.437	1
Cl3-BZ#28	ND		ug/kg	0.874	0.437	1
Cl4-BZ#44	ND		ug/kg	0.874	0.437	1
Cl4-BZ#49	ND		ug/kg	0.874	0.437	1
Cl4-BZ#52	ND		ug/kg	0.874	0.437	1
Cl4-BZ#66	ND		ug/kg	0.874	0.437	1
Cl5-BZ#87	ND		ug/kg	0.874	0.437	1
Cl5-BZ#101	ND		ug/kg	0.874	0.437	1
Cl5-BZ#105	ND		ug/kg	0.874	0.437	1
Cl5-BZ#118	1.10		ug/kg	0.874	0.437	1
Cl6-BZ#128	ND		ug/kg	0.874	0.437	1
Cl6-BZ#138	0.523	J	ug/kg	0.874	0.437	1
Cl6-BZ#153	0.947		ug/kg	0.874	0.437	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-04 Date Collected: 10/04/17 16:20

Client ID: NV NATIVE BACKGROUND REP D Date Received: 10/05/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.874	0.437	1
Cl7-BZ#180	ND		ug/kg	0.874	0.437	1
Cl7-BZ#183	ND		ug/kg	0.874	0.437	1
Cl7-BZ#184	ND		ug/kg	0.874	0.437	1
Cl7-BZ#187	ND		ug/kg	0.874	0.437	1
Cl8-BZ#195	ND		ug/kg	0.874	0.437	1
Cl9-BZ#206	ND		ug/kg	0.874	0.437	1
Cl10-BZ#209	ND		ug/kg	0.874	0.437	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	52		30-150
DBOB	71		30-150
BZ 198	69		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-05
Client ID: NV NATIVE BACKGROUND REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 22:37
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	6.60	J	ug/kg	9.78	4.89	1
Acenaphthylene	ND		ug/kg	9.78	4.89	1
Acenaphthene	ND		ug/kg	9.78	4.89	1
Fluorene	ND		ug/kg	9.78	4.89	1
Phenanthrene	ND		ug/kg	9.78	4.89	1
Anthracene	ND		ug/kg	9.78	4.89	1
Fluoranthene	ND		ug/kg	9.78	4.89	1
Pyrene	ND		ug/kg	9.78	4.89	1
Benz(a)anthracene	ND		ug/kg	9.78	4.89	1
Chrysene	ND		ug/kg	9.78	4.89	1
Benzo(b)fluoranthene	ND		ug/kg	9.78	4.89	1
Benzo(k)fluoranthene	ND		ug/kg	9.78	4.89	1
Benzo(a)pyrene	ND		ug/kg	9.78	4.89	1
Indeno(1,2,3-cd)Pyrene	8.86	J	ug/kg	9.78	4.89	1
Dibenz(a,h)anthracene	ND		ug/kg	9.78	4.89	1
Benzo(ghi)perylene	ND		ug/kg	9.78	4.89	1
Cl2-BZ#8	ND		ug/kg	0.978	0.489	1
Cl3-BZ#18	ND		ug/kg	0.978	0.489	1
Cl3-BZ#28	ND		ug/kg	0.978	0.489	1
Cl4-BZ#44	ND		ug/kg	0.978	0.489	1
Cl4-BZ#49	ND		ug/kg	0.978	0.489	1
Cl4-BZ#52	ND		ug/kg	0.978	0.489	1
Cl4-BZ#66	ND		ug/kg	0.978	0.489	1
Cl5-BZ#87	ND		ug/kg	0.978	0.489	1
Cl5-BZ#101	ND		ug/kg	0.978	0.489	1
Cl5-BZ#105	ND		ug/kg	0.978	0.489	1
Cl5-BZ#118	0.850	J	ug/kg	0.978	0.489	1
Cl6-BZ#128	ND		ug/kg	0.978	0.489	1
Cl6-BZ#138	0.512	J	ug/kg	0.978	0.489	1
Cl6-BZ#153	0.626	J	ug/kg	0.978	0.489	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-05 Date Collected: 10/04/17 16:20

Client ID: NV NATIVE BACKGROUND REP E Date Received: 10/05/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.978	0.489	1
Cl7-BZ#180	ND		ug/kg	0.978	0.489	1
Cl7-BZ#183	ND		ug/kg	0.978	0.489	1
Cl7-BZ#184	ND		ug/kg	0.978	0.489	1
Cl7-BZ#187	ND		ug/kg	0.978	0.489	1
Cl8-BZ#195	ND		ug/kg	0.978	0.489	1
Cl9-BZ#206	ND		ug/kg	0.978	0.489	1
Cl10-BZ#209	ND		ug/kg	0.978	0.489	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	63		30-150
Pyrene-d10	66		30-150
Benzo(b)fluoranthene-d12	62		30-150
DBOB	72		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-06
Client ID: NV LABORATORY CONTROL REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 23:10
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.47	4.73	1
Acenaphthylene	ND		ug/kg	9.47	4.73	1
Acenaphthene	ND		ug/kg	9.47	4.73	1
Fluorene	ND		ug/kg	9.47	4.73	1
Phenanthrene	ND		ug/kg	9.47	4.73	1
Anthracene	ND		ug/kg	9.47	4.73	1
Fluoranthene	ND		ug/kg	9.47	4.73	1
Pyrene	ND		ug/kg	9.47	4.73	1
Benz(a)anthracene	ND		ug/kg	9.47	4.73	1
Chrysene	ND		ug/kg	9.47	4.73	1
Benzo(b)fluoranthene	ND		ug/kg	9.47	4.73	1
Benzo(k)fluoranthene	ND		ug/kg	9.47	4.73	1
Benzo(a)pyrene	ND		ug/kg	9.47	4.73	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.47	4.73	1
Dibenz(a,h)anthracene	ND		ug/kg	9.47	4.73	1
Benzo(ghi)perylene	ND		ug/kg	9.47	4.73	1
Cl2-BZ#8	ND		ug/kg	0.947	0.473	1
Cl3-BZ#18	ND		ug/kg	0.947	0.473	1
Cl3-BZ#28	ND		ug/kg	0.947	0.473	1
Cl4-BZ#44	ND		ug/kg	0.947	0.473	1
Cl4-BZ#49	ND		ug/kg	0.947	0.473	1
Cl4-BZ#52	ND		ug/kg	0.947	0.473	1
Cl4-BZ#66	ND		ug/kg	0.947	0.473	1
Cl5-BZ#87	ND		ug/kg	0.947	0.473	1
Cl5-BZ#101	ND		ug/kg	0.947	0.473	1
Cl5-BZ#105	ND		ug/kg	0.947	0.473	1
Cl5-BZ#118	0.545	J	ug/kg	0.947	0.473	1
Cl6-BZ#128	ND		ug/kg	0.947	0.473	1
Cl6-BZ#138	0.710	J	ug/kg	0.947	0.473	1
Cl6-BZ#153	1.02		ug/kg	0.947	0.473	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-06 Date Collected: 09/29/17 16:00

Client ID: NV LABORATORY CONTROL REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.947	0.473	1
Cl7-BZ#180	ND		ug/kg	0.947	0.473	1
Cl7-BZ#183	ND		ug/kg	0.947	0.473	1
Cl7-BZ#184	ND		ug/kg	0.947	0.473	1
Cl7-BZ#187	ND		ug/kg	0.947	0.473	1
Cl8-BZ#195	ND		ug/kg	0.947	0.473	1
Cl9-BZ#206	ND		ug/kg	0.947	0.473	1
Cl10-BZ#209	ND		ug/kg	0.947	0.473	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	58		30-150
Benzo(b)fluoranthene-d12	56		30-150
DBOB	67		30-150
BZ 198	63		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-07
Client ID: NV LABORATORY CONTROL REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/08/17 23:42
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.17	4.59	1
Acenaphthylene	ND		ug/kg	9.17	4.59	1
Acenaphthene	ND		ug/kg	9.17	4.59	1
Fluorene	ND		ug/kg	9.17	4.59	1
Phenanthrene	ND		ug/kg	9.17	4.59	1
Anthracene	ND		ug/kg	9.17	4.59	1
Fluoranthene	ND		ug/kg	9.17	4.59	1
Pyrene	ND		ug/kg	9.17	4.59	1
Benz(a)anthracene	ND		ug/kg	9.17	4.59	1
Chrysene	ND		ug/kg	9.17	4.59	1
Benzo(b)fluoranthene	ND		ug/kg	9.17	4.59	1
Benzo(k)fluoranthene	ND		ug/kg	9.17	4.59	1
Benzo(a)pyrene	ND		ug/kg	9.17	4.59	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.17	4.59	1
Dibenz(a,h)anthracene	ND		ug/kg	9.17	4.59	1
Benzo(ghi)perylene	ND		ug/kg	9.17	4.59	1
Cl2-BZ#8	ND		ug/kg	0.917	0.459	1
Cl3-BZ#18	ND		ug/kg	0.917	0.459	1
Cl3-BZ#28	ND		ug/kg	0.917	0.459	1
Cl4-BZ#44	ND		ug/kg	0.917	0.459	1
Cl4-BZ#49	ND		ug/kg	0.917	0.459	1
Cl4-BZ#52	ND		ug/kg	0.917	0.459	1
Cl4-BZ#66	ND		ug/kg	0.917	0.459	1
Cl5-BZ#87	ND		ug/kg	0.917	0.459	1
Cl5-BZ#101	0.984		ug/kg	0.917	0.459	1
Cl5-BZ#105	ND		ug/kg	0.917	0.459	1
Cl5-BZ#118	ND		ug/kg	0.917	0.459	1
Cl6-BZ#128	ND		ug/kg	0.917	0.459	1
Cl6-BZ#138	1.11		ug/kg	0.917	0.459	1
Cl6-BZ#153	1.94		ug/kg	0.917	0.459	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-07 Date Collected: 09/29/17 16:00

Client ID: NV LABORATORY CONTROL REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.917	0.459	1
Cl7-BZ#180	0.828	J	ug/kg	0.917	0.459	1
Cl7-BZ#183	ND		ug/kg	0.917	0.459	1
Cl7-BZ#184	ND		ug/kg	0.917	0.459	1
Cl7-BZ#187	0.804	J	ug/kg	0.917	0.459	1
Cl8-BZ#195	ND		ug/kg	0.917	0.459	1
Cl9-BZ#206	ND		ug/kg	0.917	0.459	1
Cl10-BZ#209	ND		ug/kg	0.917	0.459	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	61		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	70		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-08
Client ID: NV LABORATORY CONTROL REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 00:14
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.07	4.54	1
Acenaphthylene	ND		ug/kg	9.07	4.54	1
Acenaphthene	ND		ug/kg	9.07	4.54	1
Fluorene	ND		ug/kg	9.07	4.54	1
Phenanthrene	4.86	J	ug/kg	9.07	4.54	1
Anthracene	ND		ug/kg	9.07	4.54	1
Fluoranthene	ND		ug/kg	9.07	4.54	1
Pyrene	ND		ug/kg	9.07	4.54	1
Benz(a)anthracene	ND		ug/kg	9.07	4.54	1
Chrysene	ND		ug/kg	9.07	4.54	1
Benzo(b)fluoranthene	ND		ug/kg	9.07	4.54	1
Benzo(k)fluoranthene	ND		ug/kg	9.07	4.54	1
Benzo(a)pyrene	ND		ug/kg	9.07	4.54	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.07	4.54	1
Dibenz(a,h)anthracene	ND		ug/kg	9.07	4.54	1
Benzo(ghi)perylene	ND		ug/kg	9.07	4.54	1
Cl2-BZ#8	ND		ug/kg	0.907	0.454	1
Cl3-BZ#18	ND		ug/kg	0.907	0.454	1
Cl3-BZ#28	ND		ug/kg	0.907	0.454	1
Cl4-BZ#44	ND		ug/kg	0.907	0.454	1
Cl4-BZ#49	ND		ug/kg	0.907	0.454	1
Cl4-BZ#52	ND		ug/kg	0.907	0.454	1
Cl4-BZ#66	ND		ug/kg	0.907	0.454	1
Cl5-BZ#87	ND		ug/kg	0.907	0.454	1
Cl5-BZ#101	ND		ug/kg	0.907	0.454	1
Cl5-BZ#105	ND		ug/kg	0.907	0.454	1
Cl5-BZ#118	ND		ug/kg	0.907	0.454	1
Cl6-BZ#128	ND		ug/kg	0.907	0.454	1
Cl6-BZ#138	0.532	J	ug/kg	0.907	0.454	1
Cl6-BZ#153	0.581	J	ug/kg	0.907	0.454	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-08 Date Collected: 09/29/17 16:00

Client ID: NV LABORATORY CONTROL REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.907	0.454	1
Cl7-BZ#180	ND		ug/kg	0.907	0.454	1
Cl7-BZ#183	ND		ug/kg	0.907	0.454	1
Cl7-BZ#184	ND		ug/kg	0.907	0.454	1
Cl7-BZ#187	ND		ug/kg	0.907	0.454	1
Cl8-BZ#195	ND		ug/kg	0.907	0.454	1
Cl9-BZ#206	ND		ug/kg	0.907	0.454	1
Cl10-BZ#209	ND		ug/kg	0.907	0.454	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	61		30-150
DBOB	70		30-150
BZ 198	65		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-09
Client ID: NV LABORATORY CONTROL REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 00:47
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.93	4.46	1
Acenaphthylene	ND		ug/kg	8.93	4.46	1
Acenaphthene	ND		ug/kg	8.93	4.46	1
Fluorene	ND		ug/kg	8.93	4.46	1
Phenanthrene	ND		ug/kg	8.93	4.46	1
Anthracene	ND		ug/kg	8.93	4.46	1
Fluoranthene	ND		ug/kg	8.93	4.46	1
Pyrene	ND		ug/kg	8.93	4.46	1
Benz(a)anthracene	ND		ug/kg	8.93	4.46	1
Chrysene	ND		ug/kg	8.93	4.46	1
Benzo(b)fluoranthene	ND		ug/kg	8.93	4.46	1
Benzo(k)fluoranthene	ND		ug/kg	8.93	4.46	1
Benzo(a)pyrene	ND		ug/kg	8.93	4.46	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.93	4.46	1
Dibenz(a,h)anthracene	ND		ug/kg	8.93	4.46	1
Benzo(ghi)perylene	ND		ug/kg	8.93	4.46	1
Cl2-BZ#8	ND		ug/kg	0.893	0.446	1
Cl3-BZ#18	ND		ug/kg	0.893	0.446	1
Cl3-BZ#28	ND		ug/kg	0.893	0.446	1
Cl4-BZ#44	ND		ug/kg	0.893	0.446	1
Cl4-BZ#49	ND		ug/kg	0.893	0.446	1
Cl4-BZ#52	ND		ug/kg	0.893	0.446	1
Cl4-BZ#66	ND		ug/kg	0.893	0.446	1
Cl5-BZ#87	ND		ug/kg	0.893	0.446	1
Cl5-BZ#101	ND		ug/kg	0.893	0.446	1
Cl5-BZ#105	ND		ug/kg	0.893	0.446	1
Cl5-BZ#118	ND		ug/kg	0.893	0.446	1
Cl6-BZ#128	ND		ug/kg	0.893	0.446	1
Cl6-BZ#138	0.755	J	ug/kg	0.893	0.446	1
Cl6-BZ#153	1.05		ug/kg	0.893	0.446	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-09 Date Collected: 09/29/17 16:00

Client ID: NV LABORATORY CONTROL REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.893	0.446	1
Cl7-BZ#180	ND		ug/kg	0.893	0.446	1
Cl7-BZ#183	ND		ug/kg	0.893	0.446	1
Cl7-BZ#184	ND		ug/kg	0.893	0.446	1
Cl7-BZ#187	ND		ug/kg	0.893	0.446	1
Cl8-BZ#195	ND		ug/kg	0.893	0.446	1
Cl9-BZ#206	ND		ug/kg	0.893	0.446	1
Cl10-BZ#209	ND		ug/kg	0.893	0.446	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	64		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	66		30-150
DBOB	75		30-150
BZ 198	71		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-10
Client ID: NV LABORATORY CONTROL REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 01:19
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.96	4.48	1
Acenaphthylene	ND		ug/kg	8.96	4.48	1
Acenaphthene	ND		ug/kg	8.96	4.48	1
Fluorene	ND		ug/kg	8.96	4.48	1
Phenanthrene	ND		ug/kg	8.96	4.48	1
Anthracene	ND		ug/kg	8.96	4.48	1
Fluoranthene	ND		ug/kg	8.96	4.48	1
Pyrene	ND		ug/kg	8.96	4.48	1
Benz(a)anthracene	ND		ug/kg	8.96	4.48	1
Chrysene	ND		ug/kg	8.96	4.48	1
Benzo(b)fluoranthene	ND		ug/kg	8.96	4.48	1
Benzo(k)fluoranthene	ND		ug/kg	8.96	4.48	1
Benzo(a)pyrene	ND		ug/kg	8.96	4.48	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.96	4.48	1
Dibenz(a,h)anthracene	ND		ug/kg	8.96	4.48	1
Benzo(ghi)perylene	ND		ug/kg	8.96	4.48	1
Cl2-BZ#8	ND		ug/kg	0.896	0.448	1
Cl3-BZ#18	ND		ug/kg	0.896	0.448	1
Cl3-BZ#28	ND		ug/kg	0.896	0.448	1
Cl4-BZ#44	ND		ug/kg	0.896	0.448	1
Cl4-BZ#49	ND		ug/kg	0.896	0.448	1
Cl4-BZ#52	ND		ug/kg	0.896	0.448	1
Cl4-BZ#66	ND		ug/kg	0.896	0.448	1
Cl5-BZ#87	ND		ug/kg	0.896	0.448	1
Cl5-BZ#101	ND		ug/kg	0.896	0.448	1
Cl5-BZ#105	ND		ug/kg	0.896	0.448	1
Cl5-BZ#118	ND		ug/kg	0.896	0.448	1
Cl6-BZ#128	ND		ug/kg	0.896	0.448	1
Cl6-BZ#138	0.572	J	ug/kg	0.896	0.448	1
Cl6-BZ#153	ND		ug/kg	0.896	0.448	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-10 Date Collected: 09/29/17 16:00

Client ID: NV LABORATORY CONTROL REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.896	0.448	1
Cl7-BZ#180	ND		ug/kg	0.896	0.448	1
Cl7-BZ#183	ND		ug/kg	0.896	0.448	1
Cl7-BZ#184	ND		ug/kg	0.896	0.448	1
Cl7-BZ#187	ND		ug/kg	0.896	0.448	1
Cl8-BZ#195	ND		ug/kg	0.896	0.448	1
Cl9-BZ#206	ND		ug/kg	0.896	0.448	1
Cl10-BZ#209	ND		ug/kg	0.896	0.448	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	63		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	72		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-11
Client ID: NV CLDS REFERENCE SEDIMENT REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 01:51
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	5.12	J	ug/kg	8.77	4.38	1
Acenaphthylene	ND		ug/kg	8.77	4.38	1
Acenaphthene	7.31	J	ug/kg	8.77	4.38	1
Fluorene	ND		ug/kg	8.77	4.38	1
Phenanthrene	ND		ug/kg	8.77	4.38	1
Anthracene	ND		ug/kg	8.77	4.38	1
Fluoranthene	ND		ug/kg	8.77	4.38	1
Pyrene	ND		ug/kg	8.77	4.38	1
Benz(a)anthracene	ND		ug/kg	8.77	4.38	1
Chrysene	ND		ug/kg	8.77	4.38	1
Benzo(b)fluoranthene	ND		ug/kg	8.77	4.38	1
Benzo(k)fluoranthene	ND		ug/kg	8.77	4.38	1
Benzo(a)pyrene	ND		ug/kg	8.77	4.38	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.77	4.38	1
Dibenz(a,h)anthracene	ND		ug/kg	8.77	4.38	1
Benzo(ghi)perylene	ND		ug/kg	8.77	4.38	1
Cl2-BZ#8	ND		ug/kg	0.877	0.438	1
Cl3-BZ#18	ND		ug/kg	0.877	0.438	1
Cl3-BZ#28	ND		ug/kg	0.877	0.438	1
Cl4-BZ#44	ND		ug/kg	0.877	0.438	1
Cl4-BZ#49	ND		ug/kg	0.877	0.438	1
Cl4-BZ#52	ND		ug/kg	0.877	0.438	1
Cl4-BZ#66	ND		ug/kg	0.877	0.438	1
Cl5-BZ#87	ND		ug/kg	0.877	0.438	1
Cl5-BZ#101	ND		ug/kg	0.877	0.438	1
Cl5-BZ#105	ND		ug/kg	0.877	0.438	1
Cl5-BZ#118	ND		ug/kg	0.877	0.438	1
Cl6-BZ#128	ND		ug/kg	0.877	0.438	1
Cl6-BZ#138	ND		ug/kg	0.877	0.438	1
Cl6-BZ#153	0.534	J	ug/kg	0.877	0.438	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-11 Date Collected: 09/29/17 16:00

Client ID: NV CLDS REFERENCE SEDIMENT REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.877	0.438	1
Cl7-BZ#180	ND		ug/kg	0.877	0.438	1
Cl7-BZ#183	ND		ug/kg	0.877	0.438	1
Cl7-BZ#184	ND		ug/kg	0.877	0.438	1
Cl7-BZ#187	ND		ug/kg	0.877	0.438	1
Cl8-BZ#195	ND		ug/kg	0.877	0.438	1
Cl9-BZ#206	ND		ug/kg	0.877	0.438	1
Cl10-BZ#209	ND		ug/kg	0.877	0.438	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	52		30-150
DBOB	57		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-12
Client ID: NV CLDS REFERENCE SEDIMENT REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 02:23
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.31	4.66	1
Acenaphthylene	ND		ug/kg	9.31	4.66	1
Acenaphthene	ND		ug/kg	9.31	4.66	1
Fluorene	ND		ug/kg	9.31	4.66	1
Phenanthrene	ND		ug/kg	9.31	4.66	1
Anthracene	ND		ug/kg	9.31	4.66	1
Fluoranthene	ND		ug/kg	9.31	4.66	1
Pyrene	ND		ug/kg	9.31	4.66	1
Benz(a)anthracene	ND		ug/kg	9.31	4.66	1
Chrysene	ND		ug/kg	9.31	4.66	1
Benzo(b)fluoranthene	ND		ug/kg	9.31	4.66	1
Benzo(k)fluoranthene	ND		ug/kg	9.31	4.66	1
Benzo(a)pyrene	ND		ug/kg	9.31	4.66	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.31	4.66	1
Dibenz(a,h)anthracene	ND		ug/kg	9.31	4.66	1
Benzo(ghi)perylene	ND		ug/kg	9.31	4.66	1
Cl2-BZ#8	ND		ug/kg	0.931	0.466	1
Cl3-BZ#18	ND		ug/kg	0.931	0.466	1
Cl3-BZ#28	ND		ug/kg	0.931	0.466	1
Cl4-BZ#44	ND		ug/kg	0.931	0.466	1
Cl4-BZ#49	ND		ug/kg	0.931	0.466	1
Cl4-BZ#52	ND		ug/kg	0.931	0.466	1
Cl4-BZ#66	ND		ug/kg	0.931	0.466	1
Cl5-BZ#87	ND		ug/kg	0.931	0.466	1
Cl5-BZ#101	ND		ug/kg	0.931	0.466	1
Cl5-BZ#105	ND		ug/kg	0.931	0.466	1
Cl5-BZ#118	ND		ug/kg	0.931	0.466	1
Cl6-BZ#128	ND		ug/kg	0.931	0.466	1
Cl6-BZ#138	0.499	J	ug/kg	0.931	0.466	1
Cl6-BZ#153	0.594	J	ug/kg	0.931	0.466	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-12 Date Collected: 09/29/17 16:00

Client ID: NV CLDS REFERENCE SEDIMENT REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.931	0.466	1
Cl7-BZ#180	ND		ug/kg	0.931	0.466	1
Cl7-BZ#183	ND		ug/kg	0.931	0.466	1
Cl7-BZ#184	ND		ug/kg	0.931	0.466	1
Cl7-BZ#187	ND		ug/kg	0.931	0.466	1
Cl8-BZ#195	ND		ug/kg	0.931	0.466	1
Cl9-BZ#206	ND		ug/kg	0.931	0.466	1
Cl10-BZ#209	ND		ug/kg	0.931	0.466	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	55		30-150
Pyrene-d10	56		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	62		30-150
BZ 198	58		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-13
Client ID: NV CLDS REFERENCE SEDIMENT REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 02:55
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.88	4.44	1
Acenaphthylene	41.2		ug/kg	8.88	4.44	1
Acenaphthene	14.9		ug/kg	8.88	4.44	1
Fluorene	ND		ug/kg	8.88	4.44	1
Phenanthrene	8.38	J	ug/kg	8.88	4.44	1
Anthracene	ND		ug/kg	8.88	4.44	1
Fluoranthene	ND		ug/kg	8.88	4.44	1
Pyrene	ND		ug/kg	8.88	4.44	1
Benz(a)anthracene	ND		ug/kg	8.88	4.44	1
Chrysene	ND		ug/kg	8.88	4.44	1
Benzo(b)fluoranthene	ND		ug/kg	8.88	4.44	1
Benzo(k)fluoranthene	ND		ug/kg	8.88	4.44	1
Benzo(a)pyrene	ND		ug/kg	8.88	4.44	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.88	4.44	1
Dibenz(a,h)anthracene	ND		ug/kg	8.88	4.44	1
Benzo(ghi)perylene	ND		ug/kg	8.88	4.44	1
Cl2-BZ#8	ND		ug/kg	0.888	0.444	1
Cl3-BZ#18	ND		ug/kg	0.888	0.444	1
Cl3-BZ#28	ND		ug/kg	0.888	0.444	1
Cl4-BZ#44	ND		ug/kg	0.888	0.444	1
Cl4-BZ#49	ND		ug/kg	0.888	0.444	1
Cl4-BZ#52	ND		ug/kg	0.888	0.444	1
Cl4-BZ#66	ND		ug/kg	0.888	0.444	1
Cl5-BZ#87	ND		ug/kg	0.888	0.444	1
Cl5-BZ#101	ND		ug/kg	0.888	0.444	1
Cl5-BZ#105	ND		ug/kg	0.888	0.444	1
Cl5-BZ#118	ND		ug/kg	0.888	0.444	1
Cl6-BZ#128	ND		ug/kg	0.888	0.444	1
Cl6-BZ#138	0.507	J	ug/kg	0.888	0.444	1
Cl6-BZ#153	0.972		ug/kg	0.888	0.444	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-13 Date Collected: 09/29/17 16:00

Client ID: NV CLDS REFERENCE SEDIMENT REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.888	0.444	1
Cl7-BZ#180	ND		ug/kg	0.888	0.444	1
Cl7-BZ#183	ND		ug/kg	0.888	0.444	1
Cl7-BZ#184	ND		ug/kg	0.888	0.444	1
Cl7-BZ#187	ND		ug/kg	0.888	0.444	1
Cl8-BZ#195	ND		ug/kg	0.888	0.444	1
Cl9-BZ#206	ND		ug/kg	0.888	0.444	1
Cl10-BZ#209	ND		ug/kg	0.888	0.444	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	63		30-150
DBOB	69		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-14
Client ID: NV CLDS REFERENCE SEDIMENT REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 03:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.01	4.50	1
Acenaphthylene	ND		ug/kg	9.01	4.50	1
Acenaphthene	ND		ug/kg	9.01	4.50	1
Fluorene	ND		ug/kg	9.01	4.50	1
Phenanthrene	7.10	J	ug/kg	9.01	4.50	1
Anthracene	ND		ug/kg	9.01	4.50	1
Fluoranthene	ND		ug/kg	9.01	4.50	1
Pyrene	ND		ug/kg	9.01	4.50	1
Benz(a)anthracene	ND		ug/kg	9.01	4.50	1
Chrysene	ND		ug/kg	9.01	4.50	1
Benzo(b)fluoranthene	ND		ug/kg	9.01	4.50	1
Benzo(k)fluoranthene	ND		ug/kg	9.01	4.50	1
Benzo(a)pyrene	ND		ug/kg	9.01	4.50	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.01	4.50	1
Dibenz(a,h)anthracene	ND		ug/kg	9.01	4.50	1
Benzo(ghi)perylene	ND		ug/kg	9.01	4.50	1
Cl2-BZ#8	ND		ug/kg	0.901	0.450	1
Cl3-BZ#18	ND		ug/kg	0.901	0.450	1
Cl3-BZ#28	ND		ug/kg	0.901	0.450	1
Cl4-BZ#44	ND		ug/kg	0.901	0.450	1
Cl4-BZ#49	ND		ug/kg	0.901	0.450	1
Cl4-BZ#52	ND		ug/kg	0.901	0.450	1
Cl4-BZ#66	ND		ug/kg	0.901	0.450	1
Cl5-BZ#87	ND		ug/kg	0.901	0.450	1
Cl5-BZ#101	ND		ug/kg	0.901	0.450	1
Cl5-BZ#105	ND		ug/kg	0.901	0.450	1
Cl5-BZ#118	ND		ug/kg	0.901	0.450	1
Cl6-BZ#128	ND		ug/kg	0.901	0.450	1
Cl6-BZ#138	0.793	J	ug/kg	0.901	0.450	1
Cl6-BZ#153	1.12		ug/kg	0.901	0.450	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-14 Date Collected: 09/29/17 16:00

Client ID: NV CLDS REFERENCE SEDIMENT REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.901	0.450	1
Cl7-BZ#180	ND		ug/kg	0.901	0.450	1
Cl7-BZ#183	ND		ug/kg	0.901	0.450	1
Cl7-BZ#184	ND		ug/kg	0.901	0.450	1
Cl7-BZ#187	ND		ug/kg	0.901	0.450	1
Cl8-BZ#195	ND		ug/kg	0.901	0.450	1
Cl9-BZ#206	ND		ug/kg	0.901	0.450	1
Cl10-BZ#209	ND		ug/kg	0.901	0.450	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	65		30-150
Benzo(b)fluoranthene-d12	60		30-150
DBOB	69		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-15
Client ID: NV CLDS REFERENCE SEDIMENT REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 04:00
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.88	4.94	1
Acenaphthylene	ND		ug/kg	9.88	4.94	1
Acenaphthene	ND		ug/kg	9.88	4.94	1
Fluorene	ND		ug/kg	9.88	4.94	1
Phenanthrene	ND		ug/kg	9.88	4.94	1
Anthracene	ND		ug/kg	9.88	4.94	1
Fluoranthene	ND		ug/kg	9.88	4.94	1
Pyrene	ND		ug/kg	9.88	4.94	1
Benz(a)anthracene	ND		ug/kg	9.88	4.94	1
Chrysene	ND		ug/kg	9.88	4.94	1
Benzo(b)fluoranthene	ND		ug/kg	9.88	4.94	1
Benzo(k)fluoranthene	ND		ug/kg	9.88	4.94	1
Benzo(a)pyrene	ND		ug/kg	9.88	4.94	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.88	4.94	1
Dibenz(a,h)anthracene	ND		ug/kg	9.88	4.94	1
Benzo(ghi)perylene	ND		ug/kg	9.88	4.94	1
Cl2-BZ#8	ND		ug/kg	0.988	0.494	1
Cl3-BZ#18	ND		ug/kg	0.988	0.494	1
Cl3-BZ#28	ND		ug/kg	0.988	0.494	1
Cl4-BZ#44	ND		ug/kg	0.988	0.494	1
Cl4-BZ#49	ND		ug/kg	0.988	0.494	1
Cl4-BZ#52	ND		ug/kg	0.988	0.494	1
Cl4-BZ#66	ND		ug/kg	0.988	0.494	1
Cl5-BZ#87	ND		ug/kg	0.988	0.494	1
Cl5-BZ#101	ND		ug/kg	0.988	0.494	1
Cl5-BZ#105	ND		ug/kg	0.988	0.494	1
Cl5-BZ#118	ND		ug/kg	0.988	0.494	1
Cl6-BZ#128	ND		ug/kg	0.988	0.494	1
Cl6-BZ#138	0.805	J	ug/kg	0.988	0.494	1
Cl6-BZ#153	1.14		ug/kg	0.988	0.494	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-15 Date Collected: 09/29/17 16:00

Client ID: NV CLDS REFERENCE SEDIMENT REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.988	0.494	1
Cl7-BZ#180	ND		ug/kg	0.988	0.494	1
Cl7-BZ#183	ND		ug/kg	0.988	0.494	1
Cl7-BZ#184	ND		ug/kg	0.988	0.494	1
Cl7-BZ#187	ND		ug/kg	0.988	0.494	1
Cl8-BZ#195	ND		ug/kg	0.988	0.494	1
Cl9-BZ#206	ND		ug/kg	0.988	0.494	1
Cl10-BZ#209	ND		ug/kg	0.988	0.494	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	57		30-150
DBOB	67		30-150
BZ 198	64		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-16
Client ID: NV COMPOSITE 1 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 04:32
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.49	4.74	1
Acenaphthylene	5.28	J	ug/kg	9.49	4.74	1
Acenaphthene	14.2		ug/kg	9.49	4.74	1
Fluorene	16.4		ug/kg	9.49	4.74	1
Phenanthrene	28.2		ug/kg	9.49	4.74	1
Anthracene	4.92	J	ug/kg	9.49	4.74	1
Fluoranthene	5.55	J	ug/kg	9.49	4.74	1
Pyrene	ND		ug/kg	9.49	4.74	1
Benz(a)anthracene	ND		ug/kg	9.49	4.74	1
Chrysene	ND		ug/kg	9.49	4.74	1
Benzo(b)fluoranthene	ND		ug/kg	9.49	4.74	1
Benzo(k)fluoranthene	ND		ug/kg	9.49	4.74	1
Benzo(a)pyrene	ND		ug/kg	9.49	4.74	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.49	4.74	1
Dibenz(a,h)anthracene	ND		ug/kg	9.49	4.74	1
Benzo(ghi)perylene	ND		ug/kg	9.49	4.74	1
Cl2-BZ#8	ND		ug/kg	0.949	0.474	1
Cl3-BZ#18	ND		ug/kg	0.949	0.474	1
Cl3-BZ#28	ND		ug/kg	0.949	0.474	1
Cl4-BZ#44	ND		ug/kg	0.949	0.474	1
Cl4-BZ#49	ND		ug/kg	0.949	0.474	1
Cl4-BZ#52	ND		ug/kg	0.949	0.474	1
Cl4-BZ#66	ND		ug/kg	0.949	0.474	1
Cl5-BZ#87	ND		ug/kg	0.949	0.474	1
Cl5-BZ#101	ND		ug/kg	0.949	0.474	1
Cl5-BZ#105	ND		ug/kg	0.949	0.474	1
Cl5-BZ#118	ND		ug/kg	0.949	0.474	1
Cl6-BZ#128	ND		ug/kg	0.949	0.474	1
Cl6-BZ#138	0.720	J	ug/kg	0.949	0.474	1
Cl6-BZ#153	1.08		ug/kg	0.949	0.474	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-16 Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 1 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.949	0.474	1
Cl7-BZ#180	ND		ug/kg	0.949	0.474	1
Cl7-BZ#183	ND		ug/kg	0.949	0.474	1
Cl7-BZ#184	ND		ug/kg	0.949	0.474	1
Cl7-BZ#187	ND		ug/kg	0.949	0.474	1
Cl8-BZ#195	ND		ug/kg	0.949	0.474	1
Cl9-BZ#206	ND		ug/kg	0.949	0.474	1
Cl10-BZ#209	ND		ug/kg	0.949	0.474	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	63		30-150
DBOB	70		30-150
BZ 198	66		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-17
Client ID: NV COMPOSITE 1 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 05:04
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.14	4.57	1
Acenaphthylene	ND		ug/kg	9.14	4.57	1
Acenaphthene	5.40	J	ug/kg	9.14	4.57	1
Fluorene	ND		ug/kg	9.14	4.57	1
Phenanthrene	ND		ug/kg	9.14	4.57	1
Anthracene	ND		ug/kg	9.14	4.57	1
Fluoranthene	ND		ug/kg	9.14	4.57	1
Pyrene	ND		ug/kg	9.14	4.57	1
Benz(a)anthracene	ND		ug/kg	9.14	4.57	1
Chrysene	ND		ug/kg	9.14	4.57	1
Benzo(b)fluoranthene	ND		ug/kg	9.14	4.57	1
Benzo(k)fluoranthene	ND		ug/kg	9.14	4.57	1
Benzo(a)pyrene	ND		ug/kg	9.14	4.57	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.14	4.57	1
Dibenz(a,h)anthracene	ND		ug/kg	9.14	4.57	1
Benzo(ghi)perylene	ND		ug/kg	9.14	4.57	1
Cl2-BZ#8	ND		ug/kg	0.914	0.457	1
Cl3-BZ#18	ND		ug/kg	0.914	0.457	1
Cl3-BZ#28	ND		ug/kg	0.914	0.457	1
Cl4-BZ#44	ND		ug/kg	0.914	0.457	1
Cl4-BZ#49	ND		ug/kg	0.914	0.457	1
Cl4-BZ#52	ND		ug/kg	0.914	0.457	1
Cl4-BZ#66	ND		ug/kg	0.914	0.457	1
Cl5-BZ#87	ND		ug/kg	0.914	0.457	1
Cl5-BZ#101	ND		ug/kg	0.914	0.457	1
Cl5-BZ#105	ND		ug/kg	0.914	0.457	1
Cl5-BZ#118	ND		ug/kg	0.914	0.457	1
Cl6-BZ#128	ND		ug/kg	0.914	0.457	1
Cl6-BZ#138	0.540	J	ug/kg	0.914	0.457	1
Cl6-BZ#153	0.650	J	ug/kg	0.914	0.457	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-17 Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 1 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.914	0.457	1
Cl7-BZ#180	ND		ug/kg	0.914	0.457	1
Cl7-BZ#183	ND		ug/kg	0.914	0.457	1
Cl7-BZ#184	ND		ug/kg	0.914	0.457	1
Cl7-BZ#187	ND		ug/kg	0.914	0.457	1
Cl8-BZ#195	ND		ug/kg	0.914	0.457	1
Cl9-BZ#206	ND		ug/kg	0.914	0.457	1
Cl10-BZ#209	ND		ug/kg	0.914	0.457	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	49		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	52		30-150
DBOB	59		30-150
BZ 198	56		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-18
Client ID: NV COMPOSITE 1 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 05:36
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.73	4.86	1
Acenaphthylene	ND		ug/kg	9.73	4.86	1
Acenaphthene	8.27	J	ug/kg	9.73	4.86	1
Fluorene	ND		ug/kg	9.73	4.86	1
Phenanthrene	5.82	J	ug/kg	9.73	4.86	1
Anthracene	ND		ug/kg	9.73	4.86	1
Fluoranthene	ND		ug/kg	9.73	4.86	1
Pyrene	ND		ug/kg	9.73	4.86	1
Benz(a)anthracene	ND		ug/kg	9.73	4.86	1
Chrysene	ND		ug/kg	9.73	4.86	1
Benzo(b)fluoranthene	ND		ug/kg	9.73	4.86	1
Benzo(k)fluoranthene	ND		ug/kg	9.73	4.86	1
Benzo(a)pyrene	ND		ug/kg	9.73	4.86	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.73	4.86	1
Dibenz(a,h)anthracene	ND		ug/kg	9.73	4.86	1
Benzo(ghi)perylene	ND		ug/kg	9.73	4.86	1
Cl2-BZ#8	ND		ug/kg	0.973	0.486	1
Cl3-BZ#18	ND		ug/kg	0.973	0.486	1
Cl3-BZ#28	ND		ug/kg	0.973	0.486	1
Cl4-BZ#44	ND		ug/kg	0.973	0.486	1
Cl4-BZ#49	ND		ug/kg	0.973	0.486	1
Cl4-BZ#52	ND		ug/kg	0.973	0.486	1
Cl4-BZ#66	ND		ug/kg	0.973	0.486	1
Cl5-BZ#87	ND		ug/kg	0.973	0.486	1
Cl5-BZ#101	ND		ug/kg	0.973	0.486	1
Cl5-BZ#105	ND		ug/kg	0.973	0.486	1
Cl5-BZ#118	ND		ug/kg	0.973	0.486	1
Cl6-BZ#128	ND		ug/kg	0.973	0.486	1
Cl6-BZ#138	0.732	J	ug/kg	0.973	0.486	1
Cl6-BZ#153	1.05		ug/kg	0.973	0.486	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-18 Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 1 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.973	0.486	1
Cl7-BZ#180	ND		ug/kg	0.973	0.486	1
Cl7-BZ#183	ND		ug/kg	0.973	0.486	1
Cl7-BZ#184	ND		ug/kg	0.973	0.486	1
Cl7-BZ#187	ND		ug/kg	0.973	0.486	1
Cl8-BZ#195	ND		ug/kg	0.973	0.486	1
Cl9-BZ#206	ND		ug/kg	0.973	0.486	1
Cl10-BZ#209	ND		ug/kg	0.973	0.486	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	64		30-150
Pyrene-d10	69		30-150
Benzo(b)fluoranthene-d12	64		30-150
DBOB	73		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-19
Client ID: NV COMPOSITE 1 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 06:08
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	5.09	J	ug/kg	9.52	4.76	1
Acenaphthylene	ND		ug/kg	9.52	4.76	1
Acenaphthene	ND		ug/kg	9.52	4.76	1
Fluorene	ND		ug/kg	9.52	4.76	1
Phenanthrene	6.01	J	ug/kg	9.52	4.76	1
Anthracene	ND		ug/kg	9.52	4.76	1
Fluoranthene	ND		ug/kg	9.52	4.76	1
Pyrene	ND		ug/kg	9.52	4.76	1
Benz(a)anthracene	ND		ug/kg	9.52	4.76	1
Chrysene	ND		ug/kg	9.52	4.76	1
Benzo(b)fluoranthene	ND		ug/kg	9.52	4.76	1
Benzo(k)fluoranthene	ND		ug/kg	9.52	4.76	1
Benzo(a)pyrene	ND		ug/kg	9.52	4.76	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.52	4.76	1
Dibenz(a,h)anthracene	ND		ug/kg	9.52	4.76	1
Benzo(ghi)perylene	ND		ug/kg	9.52	4.76	1
Cl2-BZ#8	ND		ug/kg	0.952	0.476	1
Cl3-BZ#18	ND		ug/kg	0.952	0.476	1
Cl3-BZ#28	ND		ug/kg	0.952	0.476	1
Cl4-BZ#44	ND		ug/kg	0.952	0.476	1
Cl4-BZ#49	ND		ug/kg	0.952	0.476	1
Cl4-BZ#52	ND		ug/kg	0.952	0.476	1
Cl4-BZ#66	ND		ug/kg	0.952	0.476	1
Cl5-BZ#87	ND		ug/kg	0.952	0.476	1
Cl5-BZ#101	ND		ug/kg	0.952	0.476	1
Cl5-BZ#105	ND		ug/kg	0.952	0.476	1
Cl5-BZ#118	ND		ug/kg	0.952	0.476	1
Cl6-BZ#128	ND		ug/kg	0.952	0.476	1
Cl6-BZ#138	0.795	J	ug/kg	0.952	0.476	1
Cl6-BZ#153	1.48		ug/kg	0.952	0.476	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-19 Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 1 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.952	0.476	1
Cl7-BZ#180	0.632	J	ug/kg	0.952	0.476	1
Cl7-BZ#183	ND		ug/kg	0.952	0.476	1
Cl7-BZ#184	ND		ug/kg	0.952	0.476	1
Cl7-BZ#187	0.541	J	ug/kg	0.952	0.476	1
Cl8-BZ#195	ND		ug/kg	0.952	0.476	1
Cl9-BZ#206	ND		ug/kg	0.952	0.476	1
Cl10-BZ#209	ND		ug/kg	0.952	0.476	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	60		30-150
Pyrene-d10	63		30-150
Benzo(b)fluoranthene-d12	59		30-150
DBOB	70		30-150
BZ 198	63		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-20
Client ID: NV COMPOSITE 1 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/09/17 06:40
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	6.04	J	ug/kg	9.45	4.72	1
Acenaphthylene	ND		ug/kg	9.45	4.72	1
Acenaphthene	6.82	J	ug/kg	9.45	4.72	1
Fluorene	ND		ug/kg	9.45	4.72	1
Phenanthrene	7.90	J	ug/kg	9.45	4.72	1
Anthracene	ND		ug/kg	9.45	4.72	1
Fluoranthene	ND		ug/kg	9.45	4.72	1
Pyrene	ND		ug/kg	9.45	4.72	1
Benz(a)anthracene	ND		ug/kg	9.45	4.72	1
Chrysene	ND		ug/kg	9.45	4.72	1
Benzo(b)fluoranthene	ND		ug/kg	9.45	4.72	1
Benzo(k)fluoranthene	ND		ug/kg	9.45	4.72	1
Benzo(a)pyrene	ND		ug/kg	9.45	4.72	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.45	4.72	1
Dibenz(a,h)anthracene	ND		ug/kg	9.45	4.72	1
Benzo(ghi)perylene	ND		ug/kg	9.45	4.72	1
Cl2-BZ#8	ND		ug/kg	0.945	0.472	1
Cl3-BZ#18	ND		ug/kg	0.945	0.472	1
Cl3-BZ#28	ND		ug/kg	0.945	0.472	1
Cl4-BZ#44	ND		ug/kg	0.945	0.472	1
Cl4-BZ#49	ND		ug/kg	0.945	0.472	1
Cl4-BZ#52	ND		ug/kg	0.945	0.472	1
Cl4-BZ#66	ND		ug/kg	0.945	0.472	1
Cl5-BZ#87	ND		ug/kg	0.945	0.472	1
Cl5-BZ#101	0.784	J	ug/kg	0.945	0.472	1
Cl5-BZ#105	ND		ug/kg	0.945	0.472	1
Cl5-BZ#118	ND		ug/kg	0.945	0.472	1
Cl6-BZ#128	ND		ug/kg	0.945	0.472	1
Cl6-BZ#138	1.00		ug/kg	0.945	0.472	1
Cl6-BZ#153	1.53		ug/kg	0.945	0.472	1

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-20 Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 1 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	0.945	0.472	1
Cl7-BZ#180	0.745	J	ug/kg	0.945	0.472	1
Cl7-BZ#183	ND		ug/kg	0.945	0.472	1
Cl7-BZ#184	ND		ug/kg	0.945	0.472	1
Cl7-BZ#187	0.669	J	ug/kg	0.945	0.472	1
Cl8-BZ#195	ND		ug/kg	0.945	0.472	1
Cl9-BZ#206	ND		ug/kg	0.945	0.472	1
Cl10-BZ#209	ND		ug/kg	0.945	0.472	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	64		30-150
Pyrene-d10	70		30-150
Benzo(b)fluoranthene-d12	65		30-150
DBOB	75		30-150
BZ 198	66		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-21 D
Client ID: NV COMPOSITE 2 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 17:53
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.4	9.71	2
Acenaphthylene	ND		ug/kg	19.4	9.71	2
Acenaphthene	ND		ug/kg	19.4	9.71	2
Fluorene	ND		ug/kg	19.4	9.71	2
Phenanthrene	ND		ug/kg	19.4	9.71	2
Anthracene	ND		ug/kg	19.4	9.71	2
Fluoranthene	ND		ug/kg	19.4	9.71	2
Pyrene	ND		ug/kg	19.4	9.71	2
Benz(a)anthracene	ND		ug/kg	19.4	9.71	2
Chrysene	ND		ug/kg	19.4	9.71	2
Benzo(b)fluoranthene	ND		ug/kg	19.4	9.71	2
Benzo(k)fluoranthene	ND		ug/kg	19.4	9.71	2
Benzo(a)pyrene	ND		ug/kg	19.4	9.71	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.4	9.71	2
Dibenz(a,h)anthracene	ND		ug/kg	19.4	9.71	2
Benzo(ghi)perylene	ND		ug/kg	19.4	9.71	2
Cl2-BZ#8	ND		ug/kg	1.94	0.971	2
Cl3-BZ#18	ND		ug/kg	1.94	0.971	2
Cl3-BZ#28	ND		ug/kg	1.94	0.971	2
Cl4-BZ#44	ND		ug/kg	1.94	0.971	2
Cl4-BZ#49	ND		ug/kg	1.94	0.971	2
Cl4-BZ#52	ND		ug/kg	1.94	0.971	2
Cl4-BZ#66	ND		ug/kg	1.94	0.971	2
Cl5-BZ#87	ND		ug/kg	1.94	0.971	2
Cl5-BZ#101	ND		ug/kg	1.94	0.971	2
Cl5-BZ#105	ND		ug/kg	1.94	0.971	2
Cl5-BZ#118	ND		ug/kg	1.94	0.971	2
Cl6-BZ#128	ND		ug/kg	1.94	0.971	2
Cl6-BZ#138	ND		ug/kg	1.94	0.971	2
Cl6-BZ#153	ND		ug/kg	1.94	0.971	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-21 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 2 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.94	0.971	2
Cl7-BZ#180	ND		ug/kg	1.94	0.971	2
Cl7-BZ#183	ND		ug/kg	1.94	0.971	2
Cl7-BZ#184	ND		ug/kg	1.94	0.971	2
Cl7-BZ#187	ND		ug/kg	1.94	0.971	2
Cl8-BZ#195	ND		ug/kg	1.94	0.971	2
Cl9-BZ#206	ND		ug/kg	1.94	0.971	2
Cl10-BZ#209	ND		ug/kg	1.94	0.971	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	44		30-150
DBOB	58		30-150
BZ 198	52		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-22 D
Client ID: NV COMPOSITE 2 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 20:47
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.4	9.19	2
Acenaphthylene	ND		ug/kg	18.4	9.19	2
Acenaphthene	ND		ug/kg	18.4	9.19	2
Fluorene	ND		ug/kg	18.4	9.19	2
Phenanthrene	ND		ug/kg	18.4	9.19	2
Anthracene	ND		ug/kg	18.4	9.19	2
Fluoranthene	ND		ug/kg	18.4	9.19	2
Pyrene	ND		ug/kg	18.4	9.19	2
Benz(a)anthracene	ND		ug/kg	18.4	9.19	2
Chrysene	ND		ug/kg	18.4	9.19	2
Benzo(b)fluoranthene	ND		ug/kg	18.4	9.19	2
Benzo(k)fluoranthene	ND		ug/kg	18.4	9.19	2
Benzo(a)pyrene	ND		ug/kg	18.4	9.19	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.4	9.19	2
Dibenz(a,h)anthracene	ND		ug/kg	18.4	9.19	2
Benzo(ghi)perylene	ND		ug/kg	18.4	9.19	2
Cl2-BZ#8	ND		ug/kg	1.84	0.919	2
Cl3-BZ#18	ND		ug/kg	1.84	0.919	2
Cl3-BZ#28	ND		ug/kg	1.84	0.919	2
Cl4-BZ#44	ND		ug/kg	1.84	0.919	2
Cl4-BZ#49	ND		ug/kg	1.84	0.919	2
Cl4-BZ#52	ND		ug/kg	1.84	0.919	2
Cl4-BZ#66	ND		ug/kg	1.84	0.919	2
Cl5-BZ#87	ND		ug/kg	1.84	0.919	2
Cl5-BZ#101	ND		ug/kg	1.84	0.919	2
Cl5-BZ#105	ND		ug/kg	1.84	0.919	2
Cl5-BZ#118	ND		ug/kg	1.84	0.919	2
Cl6-BZ#128	ND		ug/kg	1.84	0.919	2
Cl6-BZ#138	ND		ug/kg	1.84	0.919	2
Cl6-BZ#153	ND		ug/kg	1.84	0.919	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-22 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 2 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.84	0.919	2
Cl7-BZ#180	ND		ug/kg	1.84	0.919	2
Cl7-BZ#183	ND		ug/kg	1.84	0.919	2
Cl7-BZ#184	ND		ug/kg	1.84	0.919	2
Cl7-BZ#187	ND		ug/kg	1.84	0.919	2
Cl8-BZ#195	ND		ug/kg	1.84	0.919	2
Cl9-BZ#206	ND		ug/kg	1.84	0.919	2
Cl10-BZ#209	ND		ug/kg	1.84	0.919	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	44		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	45		30-150
DBOB	65		30-150
BZ 198	57		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-23 D
Client ID: NV COMPOSITE 2 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 21:17
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.8	8.42	2
Acenaphthylene	ND		ug/kg	16.8	8.42	2
Acenaphthene	ND		ug/kg	16.8	8.42	2
Fluorene	ND		ug/kg	16.8	8.42	2
Phenanthrene	ND		ug/kg	16.8	8.42	2
Anthracene	ND		ug/kg	16.8	8.42	2
Fluoranthene	8.93	J	ug/kg	16.8	8.42	2
Pyrene	ND		ug/kg	16.8	8.42	2
Benz(a)anthracene	ND		ug/kg	16.8	8.42	2
Chrysene	ND		ug/kg	16.8	8.42	2
Benzo(b)fluoranthene	ND		ug/kg	16.8	8.42	2
Benzo(k)fluoranthene	ND		ug/kg	16.8	8.42	2
Benzo(a)pyrene	ND		ug/kg	16.8	8.42	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	16.8	8.42	2
Dibenz(a,h)anthracene	ND		ug/kg	16.8	8.42	2
Benzo(ghi)perylene	ND		ug/kg	16.8	8.42	2
Cl2-BZ#8	ND		ug/kg	1.68	0.842	2
Cl3-BZ#18	ND		ug/kg	1.68	0.842	2
Cl3-BZ#28	ND		ug/kg	1.68	0.842	2
Cl4-BZ#44	ND		ug/kg	1.68	0.842	2
Cl4-BZ#49	ND		ug/kg	1.68	0.842	2
Cl4-BZ#52	0.858	J	ug/kg	1.68	0.842	2
Cl4-BZ#66	ND		ug/kg	1.68	0.842	2
Cl5-BZ#87	ND		ug/kg	1.68	0.842	2
Cl5-BZ#101	ND		ug/kg	1.68	0.842	2
Cl5-BZ#105	ND		ug/kg	1.68	0.842	2
Cl5-BZ#118	ND		ug/kg	1.68	0.842	2
Cl6-BZ#128	ND		ug/kg	1.68	0.842	2
Cl6-BZ#138	ND		ug/kg	1.68	0.842	2
Cl6-BZ#153	0.914	J	ug/kg	1.68	0.842	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-23 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 2 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.68	0.842	2
Cl7-BZ#180	ND		ug/kg	1.68	0.842	2
Cl7-BZ#183	ND		ug/kg	1.68	0.842	2
Cl7-BZ#184	ND		ug/kg	1.68	0.842	2
Cl7-BZ#187	ND		ug/kg	1.68	0.842	2
Cl8-BZ#195	ND		ug/kg	1.68	0.842	2
Cl9-BZ#206	ND		ug/kg	1.68	0.842	2
Cl10-BZ#209	ND		ug/kg	1.68	0.842	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	46		30-150
Pyrene-d10	56		30-150
Benzo(b)fluoranthene-d12	49		30-150
DBOB	68		30-150
BZ 198	63		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-24 D
Client ID: NV COMPOSITE 2 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 21:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.5	9.76	2
Acenaphthylene	ND		ug/kg	19.5	9.76	2
Acenaphthene	ND		ug/kg	19.5	9.76	2
Fluorene	ND		ug/kg	19.5	9.76	2
Phenanthrene	ND		ug/kg	19.5	9.76	2
Anthracene	ND		ug/kg	19.5	9.76	2
Fluoranthene	ND		ug/kg	19.5	9.76	2
Pyrene	ND		ug/kg	19.5	9.76	2
Benz(a)anthracene	ND		ug/kg	19.5	9.76	2
Chrysene	ND		ug/kg	19.5	9.76	2
Benzo(b)fluoranthene	ND		ug/kg	19.5	9.76	2
Benzo(k)fluoranthene	ND		ug/kg	19.5	9.76	2
Benzo(a)pyrene	ND		ug/kg	19.5	9.76	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.5	9.76	2
Dibenz(a,h)anthracene	ND		ug/kg	19.5	9.76	2
Benzo(ghi)perylene	ND		ug/kg	19.5	9.76	2
Cl2-BZ#8	ND		ug/kg	1.95	0.976	2
Cl3-BZ#18	ND		ug/kg	1.95	0.976	2
Cl3-BZ#28	ND		ug/kg	1.95	0.976	2
Cl4-BZ#44	ND		ug/kg	1.95	0.976	2
Cl4-BZ#49	ND		ug/kg	1.95	0.976	2
Cl4-BZ#52	ND		ug/kg	1.95	0.976	2
Cl4-BZ#66	ND		ug/kg	1.95	0.976	2
Cl5-BZ#87	ND		ug/kg	1.95	0.976	2
Cl5-BZ#101	ND		ug/kg	1.95	0.976	2
Cl5-BZ#105	ND		ug/kg	1.95	0.976	2
Cl5-BZ#118	ND		ug/kg	1.95	0.976	2
Cl6-BZ#128	ND		ug/kg	1.95	0.976	2
Cl6-BZ#138	ND		ug/kg	1.95	0.976	2
Cl6-BZ#153	ND		ug/kg	1.95	0.976	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-24 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 2 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.95	0.976	2
Cl7-BZ#180	ND		ug/kg	1.95	0.976	2
Cl7-BZ#183	ND		ug/kg	1.95	0.976	2
Cl7-BZ#184	ND		ug/kg	1.95	0.976	2
Cl7-BZ#187	ND		ug/kg	1.95	0.976	2
Cl8-BZ#195	ND		ug/kg	1.95	0.976	2
Cl9-BZ#206	ND		ug/kg	1.95	0.976	2
Cl10-BZ#209	ND		ug/kg	1.95	0.976	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	62		30-150
Benzo(b)fluoranthene-d12	53		30-150
DBOB	68		30-150
BZ 198	62		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-25 D
Client ID: NV COMPOSITE 2 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 22:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.4	8.71	2
Acenaphthylene	ND		ug/kg	17.4	8.71	2
Acenaphthene	ND		ug/kg	17.4	8.71	2
Fluorene	ND		ug/kg	17.4	8.71	2
Phenanthrene	ND		ug/kg	17.4	8.71	2
Anthracene	ND		ug/kg	17.4	8.71	2
Fluoranthene	9.87	J	ug/kg	17.4	8.71	2
Pyrene	9.30	J	ug/kg	17.4	8.71	2
Benz(a)anthracene	ND		ug/kg	17.4	8.71	2
Chrysene	ND		ug/kg	17.4	8.71	2
Benzo(b)fluoranthene	ND		ug/kg	17.4	8.71	2
Benzo(k)fluoranthene	ND		ug/kg	17.4	8.71	2
Benzo(a)pyrene	ND		ug/kg	17.4	8.71	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.4	8.71	2
Dibenz(a,h)anthracene	ND		ug/kg	17.4	8.71	2
Benzo(ghi)perylene	ND		ug/kg	17.4	8.71	2
Cl2-BZ#8	ND		ug/kg	1.74	0.871	2
Cl3-BZ#18	ND		ug/kg	1.74	0.871	2
Cl3-BZ#28	ND		ug/kg	1.74	0.871	2
Cl4-BZ#44	ND		ug/kg	1.74	0.871	2
Cl4-BZ#49	ND		ug/kg	1.74	0.871	2
Cl4-BZ#52	ND		ug/kg	1.74	0.871	2
Cl4-BZ#66	ND		ug/kg	1.74	0.871	2
Cl5-BZ#87	ND		ug/kg	1.74	0.871	2
Cl5-BZ#101	1.04	J	ug/kg	1.74	0.871	2
Cl5-BZ#105	ND		ug/kg	1.74	0.871	2
Cl5-BZ#118	ND		ug/kg	1.74	0.871	2
Cl6-BZ#128	ND		ug/kg	1.74	0.871	2
Cl6-BZ#138	ND		ug/kg	1.74	0.871	2
Cl6-BZ#153	1.05	J	ug/kg	1.74	0.871	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-25 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 2 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.74	0.871	2
Cl7-BZ#180	ND		ug/kg	1.74	0.871	2
Cl7-BZ#183	ND		ug/kg	1.74	0.871	2
Cl7-BZ#184	ND		ug/kg	1.74	0.871	2
Cl7-BZ#187	ND		ug/kg	1.74	0.871	2
Cl8-BZ#195	ND		ug/kg	1.74	0.871	2
Cl9-BZ#206	ND		ug/kg	1.74	0.871	2
Cl10-BZ#209	ND		ug/kg	1.74	0.871	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	45		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	71		30-150
BZ 198	56		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-26 D
Client ID: NV COMPOSITE 3 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 22:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.9	8.96	2
Acenaphthylene	ND		ug/kg	17.9	8.96	2
Acenaphthene	ND		ug/kg	17.9	8.96	2
Fluorene	ND		ug/kg	17.9	8.96	2
Phenanthrene	ND		ug/kg	17.9	8.96	2
Anthracene	ND		ug/kg	17.9	8.96	2
Fluoranthene	ND		ug/kg	17.9	8.96	2
Pyrene	ND		ug/kg	17.9	8.96	2
Benz(a)anthracene	ND		ug/kg	17.9	8.96	2
Chrysene	ND		ug/kg	17.9	8.96	2
Benzo(b)fluoranthene	ND		ug/kg	17.9	8.96	2
Benzo(k)fluoranthene	ND		ug/kg	17.9	8.96	2
Benzo(a)pyrene	ND		ug/kg	17.9	8.96	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.9	8.96	2
Dibenz(a,h)anthracene	ND		ug/kg	17.9	8.96	2
Benzo(ghi)perylene	ND		ug/kg	17.9	8.96	2
Cl2-BZ#8	ND		ug/kg	1.79	0.896	2
Cl3-BZ#18	ND		ug/kg	1.79	0.896	2
Cl3-BZ#28	ND		ug/kg	1.79	0.896	2
Cl4-BZ#44	ND		ug/kg	1.79	0.896	2
Cl4-BZ#49	ND		ug/kg	1.79	0.896	2
Cl4-BZ#52	ND		ug/kg	1.79	0.896	2
Cl4-BZ#66	ND		ug/kg	1.79	0.896	2
Cl5-BZ#87	ND		ug/kg	1.79	0.896	2
Cl5-BZ#101	ND		ug/kg	1.79	0.896	2
Cl5-BZ#105	ND		ug/kg	1.79	0.896	2
Cl5-BZ#118	ND		ug/kg	1.79	0.896	2
Cl6-BZ#128	ND		ug/kg	1.79	0.896	2
Cl6-BZ#138	ND		ug/kg	1.79	0.896	2
Cl6-BZ#153	0.953	J	ug/kg	1.79	0.896	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-26 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 3 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.79	0.896	2
Cl7-BZ#180	ND		ug/kg	1.79	0.896	2
Cl7-BZ#183	ND		ug/kg	1.79	0.896	2
Cl7-BZ#184	ND		ug/kg	1.79	0.896	2
Cl7-BZ#187	ND		ug/kg	1.79	0.896	2
Cl8-BZ#195	ND		ug/kg	1.79	0.896	2
Cl9-BZ#206	ND		ug/kg	1.79	0.896	2
Cl10-BZ#209	ND		ug/kg	1.79	0.896	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	42		30-150
Pyrene-d10	50		30-150
Benzo(b)fluoranthene-d12	43		30-150
DBOB	60		30-150
BZ 198	52		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-27 D
Client ID: NV COMPOSITE 3 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 23:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.5	8.74	2
Acenaphthylene	ND		ug/kg	17.5	8.74	2
Acenaphthene	ND		ug/kg	17.5	8.74	2
Fluorene	ND		ug/kg	17.5	8.74	2
Phenanthrene	ND		ug/kg	17.5	8.74	2
Anthracene	ND		ug/kg	17.5	8.74	2
Fluoranthene	ND		ug/kg	17.5	8.74	2
Pyrene	ND		ug/kg	17.5	8.74	2
Benz(a)anthracene	ND		ug/kg	17.5	8.74	2
Chrysene	ND		ug/kg	17.5	8.74	2
Benzo(b)fluoranthene	ND		ug/kg	17.5	8.74	2
Benzo(k)fluoranthene	ND		ug/kg	17.5	8.74	2
Benzo(a)pyrene	ND		ug/kg	17.5	8.74	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.5	8.74	2
Dibenz(a,h)anthracene	ND		ug/kg	17.5	8.74	2
Benzo(ghi)perylene	ND		ug/kg	17.5	8.74	2
Cl2-BZ#8	ND		ug/kg	1.75	0.874	2
Cl3-BZ#18	ND		ug/kg	1.75	0.874	2
Cl3-BZ#28	ND		ug/kg	1.75	0.874	2
Cl4-BZ#44	ND		ug/kg	1.75	0.874	2
Cl4-BZ#49	ND		ug/kg	1.75	0.874	2
Cl4-BZ#52	ND		ug/kg	1.75	0.874	2
Cl4-BZ#66	ND		ug/kg	1.75	0.874	2
Cl5-BZ#87	ND		ug/kg	1.75	0.874	2
Cl5-BZ#101	0.904	J	ug/kg	1.75	0.874	2
Cl5-BZ#105	ND		ug/kg	1.75	0.874	2
Cl5-BZ#118	ND		ug/kg	1.75	0.874	2
Cl6-BZ#128	ND		ug/kg	1.75	0.874	2
Cl6-BZ#138	0.912	J	ug/kg	1.75	0.874	2
Cl6-BZ#153	1.33	J	ug/kg	1.75	0.874	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-27 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 3 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.75	0.874	2
Cl7-BZ#180	ND		ug/kg	1.75	0.874	2
Cl7-BZ#183	ND		ug/kg	1.75	0.874	2
Cl7-BZ#184	ND		ug/kg	1.75	0.874	2
Cl7-BZ#187	ND		ug/kg	1.75	0.874	2
Cl8-BZ#195	ND		ug/kg	1.75	0.874	2
Cl9-BZ#206	ND		ug/kg	1.75	0.874	2
Cl10-BZ#209	ND		ug/kg	1.75	0.874	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	44		30-150
Pyrene-d10	52		30-150
Benzo(b)fluoranthene-d12	42		30-150
DBOB	57		30-150
BZ 198	53		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-28 D
Client ID: NV COMPOSITE 3 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 23:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.8	9.92	2
Acenaphthylene	ND		ug/kg	19.8	9.92	2
Acenaphthene	ND		ug/kg	19.8	9.92	2
Fluorene	ND		ug/kg	19.8	9.92	2
Phenanthrene	ND		ug/kg	19.8	9.92	2
Anthracene	ND		ug/kg	19.8	9.92	2
Fluoranthene	ND		ug/kg	19.8	9.92	2
Pyrene	ND		ug/kg	19.8	9.92	2
Benz(a)anthracene	ND		ug/kg	19.8	9.92	2
Chrysene	ND		ug/kg	19.8	9.92	2
Benzo(b)fluoranthene	ND		ug/kg	19.8	9.92	2
Benzo(k)fluoranthene	ND		ug/kg	19.8	9.92	2
Benzo(a)pyrene	ND		ug/kg	19.8	9.92	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.8	9.92	2
Dibenz(a,h)anthracene	ND		ug/kg	19.8	9.92	2
Benzo(ghi)perylene	ND		ug/kg	19.8	9.92	2
Cl2-BZ#8	ND		ug/kg	1.98	0.992	2
Cl3-BZ#18	ND		ug/kg	1.98	0.992	2
Cl3-BZ#28	ND		ug/kg	1.98	0.992	2
Cl4-BZ#44	ND		ug/kg	1.98	0.992	2
Cl4-BZ#49	ND		ug/kg	1.98	0.992	2
Cl4-BZ#52	ND		ug/kg	1.98	0.992	2
Cl4-BZ#66	ND		ug/kg	1.98	0.992	2
Cl5-BZ#87	ND		ug/kg	1.98	0.992	2
Cl5-BZ#101	ND		ug/kg	1.98	0.992	2
Cl5-BZ#105	ND		ug/kg	1.98	0.992	2
Cl5-BZ#118	ND		ug/kg	1.98	0.992	2
Cl6-BZ#128	ND		ug/kg	1.98	0.992	2
Cl6-BZ#138	ND		ug/kg	1.98	0.992	2
Cl6-BZ#153	ND		ug/kg	1.98	0.992	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-28 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 3 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.98	0.992	2
Cl7-BZ#180	ND		ug/kg	1.98	0.992	2
Cl7-BZ#183	ND		ug/kg	1.98	0.992	2
Cl7-BZ#184	ND		ug/kg	1.98	0.992	2
Cl7-BZ#187	ND		ug/kg	1.98	0.992	2
Cl8-BZ#195	ND		ug/kg	1.98	0.992	2
Cl9-BZ#206	ND		ug/kg	1.98	0.992	2
Cl10-BZ#209	ND		ug/kg	1.98	0.992	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	37		30-150
Pyrene-d10	44		30-150
Benzo(b)fluoranthene-d12	37		30-150
DBOB	51		30-150
BZ 198	46		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-29 D
Client ID: NV COMPOSITE 3 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 00:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.2	9.58	2
Acenaphthylene	ND		ug/kg	19.2	9.58	2
Acenaphthene	ND		ug/kg	19.2	9.58	2
Fluorene	ND		ug/kg	19.2	9.58	2
Phenanthrene	ND		ug/kg	19.2	9.58	2
Anthracene	ND		ug/kg	19.2	9.58	2
Fluoranthene	ND		ug/kg	19.2	9.58	2
Pyrene	ND		ug/kg	19.2	9.58	2
Benz(a)anthracene	ND		ug/kg	19.2	9.58	2
Chrysene	ND		ug/kg	19.2	9.58	2
Benzo(b)fluoranthene	ND		ug/kg	19.2	9.58	2
Benzo(k)fluoranthene	ND		ug/kg	19.2	9.58	2
Benzo(a)pyrene	ND		ug/kg	19.2	9.58	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.2	9.58	2
Dibenz(a,h)anthracene	ND		ug/kg	19.2	9.58	2
Benzo(ghi)perylene	ND		ug/kg	19.2	9.58	2
Cl2-BZ#8	ND		ug/kg	1.92	0.958	2
Cl3-BZ#18	ND		ug/kg	1.92	0.958	2
Cl3-BZ#28	ND		ug/kg	1.92	0.958	2
Cl4-BZ#44	ND		ug/kg	1.92	0.958	2
Cl4-BZ#49	ND		ug/kg	1.92	0.958	2
Cl4-BZ#52	ND		ug/kg	1.92	0.958	2
Cl4-BZ#66	ND		ug/kg	1.92	0.958	2
Cl5-BZ#87	ND		ug/kg	1.92	0.958	2
Cl5-BZ#101	ND		ug/kg	1.92	0.958	2
Cl5-BZ#105	ND		ug/kg	1.92	0.958	2
Cl5-BZ#118	ND		ug/kg	1.92	0.958	2
Cl6-BZ#128	ND		ug/kg	1.92	0.958	2
Cl6-BZ#138	ND		ug/kg	1.92	0.958	2
Cl6-BZ#153	ND		ug/kg	1.92	0.958	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-29 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 3 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.92	0.958	2
Cl7-BZ#180	ND		ug/kg	1.92	0.958	2
Cl7-BZ#183	ND		ug/kg	1.92	0.958	2
Cl7-BZ#184	ND		ug/kg	1.92	0.958	2
Cl7-BZ#187	ND		ug/kg	1.92	0.958	2
Cl8-BZ#195	ND		ug/kg	1.92	0.958	2
Cl9-BZ#206	ND		ug/kg	1.92	0.958	2
Cl10-BZ#209	ND		ug/kg	1.92	0.958	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	48		30-150
Pyrene-d10	61		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	72		30-150
BZ 198	64		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-30 D
Client ID: NV COMPOSITE 3 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 00:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.4	9.73	2
Acenaphthylene	ND		ug/kg	19.4	9.73	2
Acenaphthene	ND		ug/kg	19.4	9.73	2
Fluorene	ND		ug/kg	19.4	9.73	2
Phenanthrene	ND		ug/kg	19.4	9.73	2
Anthracene	ND		ug/kg	19.4	9.73	2
Fluoranthene	ND		ug/kg	19.4	9.73	2
Pyrene	ND		ug/kg	19.4	9.73	2
Benz(a)anthracene	ND		ug/kg	19.4	9.73	2
Chrysene	ND		ug/kg	19.4	9.73	2
Benzo(b)fluoranthene	ND		ug/kg	19.4	9.73	2
Benzo(k)fluoranthene	ND		ug/kg	19.4	9.73	2
Benzo(a)pyrene	ND		ug/kg	19.4	9.73	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.4	9.73	2
Dibenz(a,h)anthracene	ND		ug/kg	19.4	9.73	2
Benzo(ghi)perylene	ND		ug/kg	19.4	9.73	2
Cl2-BZ#8	ND		ug/kg	1.94	0.973	2
Cl3-BZ#18	ND		ug/kg	1.94	0.973	2
Cl3-BZ#28	ND		ug/kg	1.94	0.973	2
Cl4-BZ#44	ND		ug/kg	1.94	0.973	2
Cl4-BZ#49	ND		ug/kg	1.94	0.973	2
Cl4-BZ#52	ND		ug/kg	1.94	0.973	2
Cl4-BZ#66	ND		ug/kg	1.94	0.973	2
Cl5-BZ#87	ND		ug/kg	1.94	0.973	2
Cl5-BZ#101	ND		ug/kg	1.94	0.973	2
Cl5-BZ#105	ND		ug/kg	1.94	0.973	2
Cl5-BZ#118	ND		ug/kg	1.94	0.973	2
Cl6-BZ#128	ND		ug/kg	1.94	0.973	2
Cl6-BZ#138	ND		ug/kg	1.94	0.973	2
Cl6-BZ#153	1.23	J	ug/kg	1.94	0.973	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-30 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 3 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.94	0.973	2
Cl7-BZ#180	ND		ug/kg	1.94	0.973	2
Cl7-BZ#183	ND		ug/kg	1.94	0.973	2
Cl7-BZ#184	ND		ug/kg	1.94	0.973	2
Cl7-BZ#187	ND		ug/kg	1.94	0.973	2
Cl8-BZ#195	ND		ug/kg	1.94	0.973	2
Cl9-BZ#206	ND		ug/kg	1.94	0.973	2
Cl10-BZ#209	ND		ug/kg	1.94	0.973	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	50		30-150
DBOB	76		30-150
BZ 198	63		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-31 D
Client ID: NV COMPOSITE 4 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 01:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.1	9.56	2
Acenaphthylene	ND		ug/kg	19.1	9.56	2
Acenaphthene	ND		ug/kg	19.1	9.56	2
Fluorene	ND		ug/kg	19.1	9.56	2
Phenanthrene	ND		ug/kg	19.1	9.56	2
Anthracene	ND		ug/kg	19.1	9.56	2
Fluoranthene	11.4	J	ug/kg	19.1	9.56	2
Pyrene	12.8	J	ug/kg	19.1	9.56	2
Benz(a)anthracene	ND		ug/kg	19.1	9.56	2
Chrysene	ND		ug/kg	19.1	9.56	2
Benzo(b)fluoranthene	ND		ug/kg	19.1	9.56	2
Benzo(k)fluoranthene	ND		ug/kg	19.1	9.56	2
Benzo(a)pyrene	ND		ug/kg	19.1	9.56	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.1	9.56	2
Dibenz(a,h)anthracene	ND		ug/kg	19.1	9.56	2
Benzo(ghi)perylene	ND		ug/kg	19.1	9.56	2
Cl2-BZ#8	ND		ug/kg	1.91	0.956	2
Cl3-BZ#18	ND		ug/kg	1.91	0.956	2
Cl3-BZ#28	ND		ug/kg	1.91	0.956	2
Cl4-BZ#44	ND		ug/kg	1.91	0.956	2
Cl4-BZ#49	ND		ug/kg	1.91	0.956	2
Cl4-BZ#52	ND		ug/kg	1.91	0.956	2
Cl4-BZ#66	ND		ug/kg	1.91	0.956	2
Cl5-BZ#87	ND		ug/kg	1.91	0.956	2
Cl5-BZ#101	ND		ug/kg	1.91	0.956	2
Cl5-BZ#105	ND		ug/kg	1.91	0.956	2
Cl5-BZ#118	ND		ug/kg	1.91	0.956	2
Cl6-BZ#128	ND		ug/kg	1.91	0.956	2
Cl6-BZ#138	ND		ug/kg	1.91	0.956	2
Cl6-BZ#153	1.23	J	ug/kg	1.91	0.956	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-31 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 4 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.91	0.956	2
Cl7-BZ#180	ND		ug/kg	1.91	0.956	2
Cl7-BZ#183	ND		ug/kg	1.91	0.956	2
Cl7-BZ#184	ND		ug/kg	1.91	0.956	2
Cl7-BZ#187	ND		ug/kg	1.91	0.956	2
Cl8-BZ#195	ND		ug/kg	1.91	0.956	2
Cl9-BZ#206	ND		ug/kg	1.91	0.956	2
Cl10-BZ#209	ND		ug/kg	1.91	0.956	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	39		30-150
Pyrene-d10	50		30-150
Benzo(b)fluoranthene-d12	40		30-150
DBOB	59		30-150
BZ 198	51		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-32 D
Client ID: NV COMPOSITE 4 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 01:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.2	8.58	2
Acenaphthylene	ND		ug/kg	17.2	8.58	2
Acenaphthene	ND		ug/kg	17.2	8.58	2
Fluorene	ND		ug/kg	17.2	8.58	2
Phenanthrene	ND		ug/kg	17.2	8.58	2
Anthracene	ND		ug/kg	17.2	8.58	2
Fluoranthene	ND		ug/kg	17.2	8.58	2
Pyrene	ND		ug/kg	17.2	8.58	2
Benz(a)anthracene	ND		ug/kg	17.2	8.58	2
Chrysene	ND		ug/kg	17.2	8.58	2
Benzo(b)fluoranthene	ND		ug/kg	17.2	8.58	2
Benzo(k)fluoranthene	ND		ug/kg	17.2	8.58	2
Benzo(a)pyrene	ND		ug/kg	17.2	8.58	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.2	8.58	2
Dibenz(a,h)anthracene	ND		ug/kg	17.2	8.58	2
Benzo(ghi)perylene	ND		ug/kg	17.2	8.58	2
Cl2-BZ#8	ND		ug/kg	1.72	0.858	2
Cl3-BZ#18	ND		ug/kg	1.72	0.858	2
Cl3-BZ#28	ND		ug/kg	1.72	0.858	2
Cl4-BZ#44	ND		ug/kg	1.72	0.858	2
Cl4-BZ#49	ND		ug/kg	1.72	0.858	2
Cl4-BZ#52	ND		ug/kg	1.72	0.858	2
Cl4-BZ#66	ND		ug/kg	1.72	0.858	2
Cl5-BZ#87	ND		ug/kg	1.72	0.858	2
Cl5-BZ#101	ND		ug/kg	1.72	0.858	2
Cl5-BZ#105	ND		ug/kg	1.72	0.858	2
Cl5-BZ#118	ND		ug/kg	1.72	0.858	2
Cl6-BZ#128	ND		ug/kg	1.72	0.858	2
Cl6-BZ#138	1.06	J	ug/kg	1.72	0.858	2
Cl6-BZ#153	1.42	J	ug/kg	1.72	0.858	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-32 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 4 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.72	0.858	2
Cl7-BZ#180	ND		ug/kg	1.72	0.858	2
Cl7-BZ#183	ND		ug/kg	1.72	0.858	2
Cl7-BZ#184	ND		ug/kg	1.72	0.858	2
Cl7-BZ#187	ND		ug/kg	1.72	0.858	2
Cl8-BZ#195	ND		ug/kg	1.72	0.858	2
Cl9-BZ#206	ND		ug/kg	1.72	0.858	2
Cl10-BZ#209	ND		ug/kg	1.72	0.858	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	46		30-150
Pyrene-d10	53		30-150
Benzo(b)fluoranthene-d12	45		30-150
DBOB	67		30-150
BZ 198	57		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-33 D
Client ID: NV COMPOSITE 4 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 02:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.4	8.68	2
Acenaphthylene	ND		ug/kg	17.4	8.68	2
Acenaphthene	ND		ug/kg	17.4	8.68	2
Fluorene	ND		ug/kg	17.4	8.68	2
Phenanthrene	ND		ug/kg	17.4	8.68	2
Anthracene	ND		ug/kg	17.4	8.68	2
Fluoranthene	23.5		ug/kg	17.4	8.68	2
Pyrene	25.2		ug/kg	17.4	8.68	2
Benz(a)anthracene	ND		ug/kg	17.4	8.68	2
Chrysene	ND		ug/kg	17.4	8.68	2
Benzo(b)fluoranthene	ND		ug/kg	17.4	8.68	2
Benzo(k)fluoranthene	ND		ug/kg	17.4	8.68	2
Benzo(a)pyrene	ND		ug/kg	17.4	8.68	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.4	8.68	2
Dibenz(a,h)anthracene	ND		ug/kg	17.4	8.68	2
Benzo(ghi)perylene	ND		ug/kg	17.4	8.68	2
Cl2-BZ#8	ND		ug/kg	1.74	0.868	2
Cl3-BZ#18	ND		ug/kg	1.74	0.868	2
Cl3-BZ#28	ND		ug/kg	1.74	0.868	2
Cl4-BZ#44	ND		ug/kg	1.74	0.868	2
Cl4-BZ#49	ND		ug/kg	1.74	0.868	2
Cl4-BZ#52	ND		ug/kg	1.74	0.868	2
Cl4-BZ#66	ND		ug/kg	1.74	0.868	2
Cl5-BZ#87	ND		ug/kg	1.74	0.868	2
Cl5-BZ#101	ND		ug/kg	1.74	0.868	2
Cl5-BZ#105	ND		ug/kg	1.74	0.868	2
Cl5-BZ#118	ND		ug/kg	1.74	0.868	2
Cl6-BZ#128	ND		ug/kg	1.74	0.868	2
Cl6-BZ#138	ND		ug/kg	1.74	0.868	2
Cl6-BZ#153	ND		ug/kg	1.74	0.868	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-33 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 4 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.74	0.868	2
Cl7-BZ#180	ND		ug/kg	1.74	0.868	2
Cl7-BZ#183	ND		ug/kg	1.74	0.868	2
Cl7-BZ#184	ND		ug/kg	1.74	0.868	2
Cl7-BZ#187	ND		ug/kg	1.74	0.868	2
Cl8-BZ#195	ND		ug/kg	1.74	0.868	2
Cl9-BZ#206	ND		ug/kg	1.74	0.868	2
Cl10-BZ#209	ND		ug/kg	1.74	0.868	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	44		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	45		30-150
DBOB	69		30-150
BZ 198	53		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-34 D
Client ID: NV COMPOSITE 4 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 02:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.34	2
Acenaphthylene	ND		ug/kg	18.7	9.34	2
Acenaphthene	ND		ug/kg	18.7	9.34	2
Fluorene	ND		ug/kg	18.7	9.34	2
Phenanthrene	ND		ug/kg	18.7	9.34	2
Anthracene	ND		ug/kg	18.7	9.34	2
Fluoranthene	ND		ug/kg	18.7	9.34	2
Pyrene	ND		ug/kg	18.7	9.34	2
Benz(a)anthracene	ND		ug/kg	18.7	9.34	2
Chrysene	ND		ug/kg	18.7	9.34	2
Benzo(b)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(k)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(a)pyrene	ND		ug/kg	18.7	9.34	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.7	9.34	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.34	2
Benzo(ghi)perylene	ND		ug/kg	18.7	9.34	2
Cl2-BZ#8	ND		ug/kg	1.87	0.934	2
Cl3-BZ#18	ND		ug/kg	1.87	0.934	2
Cl3-BZ#28	ND		ug/kg	1.87	0.934	2
Cl4-BZ#44	ND		ug/kg	1.87	0.934	2
Cl4-BZ#49	ND		ug/kg	1.87	0.934	2
Cl4-BZ#52	ND		ug/kg	1.87	0.934	2
Cl4-BZ#66	ND		ug/kg	1.87	0.934	2
Cl5-BZ#87	ND		ug/kg	1.87	0.934	2
Cl5-BZ#101	ND		ug/kg	1.87	0.934	2
Cl5-BZ#105	ND		ug/kg	1.87	0.934	2
Cl5-BZ#118	ND		ug/kg	1.87	0.934	2
Cl6-BZ#128	ND		ug/kg	1.87	0.934	2
Cl6-BZ#138	1.15	J	ug/kg	1.87	0.934	2
Cl6-BZ#153	1.48	J	ug/kg	1.87	0.934	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-34 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 4 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.934	2
Cl7-BZ#180	ND		ug/kg	1.87	0.934	2
Cl7-BZ#183	ND		ug/kg	1.87	0.934	2
Cl7-BZ#184	ND		ug/kg	1.87	0.934	2
Cl7-BZ#187	ND		ug/kg	1.87	0.934	2
Cl8-BZ#195	ND		ug/kg	1.87	0.934	2
Cl9-BZ#206	ND		ug/kg	1.87	0.934	2
Cl10-BZ#209	ND		ug/kg	1.87	0.934	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	45		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	46		30-150
DBOB	70		30-150
BZ 198	57		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-35 D
Client ID: NV COMPOSITE 4 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 03:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.4	9.22	2
Acenaphthylene	ND		ug/kg	18.4	9.22	2
Acenaphthene	ND		ug/kg	18.4	9.22	2
Fluorene	ND		ug/kg	18.4	9.22	2
Phenanthrene	ND		ug/kg	18.4	9.22	2
Anthracene	ND		ug/kg	18.4	9.22	2
Fluoranthene	12.2	J	ug/kg	18.4	9.22	2
Pyrene	15.0	J	ug/kg	18.4	9.22	2
Benz(a)anthracene	ND		ug/kg	18.4	9.22	2
Chrysene	ND		ug/kg	18.4	9.22	2
Benzo(b)fluoranthene	ND		ug/kg	18.4	9.22	2
Benzo(k)fluoranthene	ND		ug/kg	18.4	9.22	2
Benzo(a)pyrene	ND		ug/kg	18.4	9.22	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.4	9.22	2
Dibenz(a,h)anthracene	ND		ug/kg	18.4	9.22	2
Benzo(ghi)perylene	ND		ug/kg	18.4	9.22	2
Cl2-BZ#8	ND		ug/kg	1.84	0.922	2
Cl3-BZ#18	ND		ug/kg	1.84	0.922	2
Cl3-BZ#28	ND		ug/kg	1.84	0.922	2
Cl4-BZ#44	ND		ug/kg	1.84	0.922	2
Cl4-BZ#49	ND		ug/kg	1.84	0.922	2
Cl4-BZ#52	ND		ug/kg	1.84	0.922	2
Cl4-BZ#66	ND		ug/kg	1.84	0.922	2
Cl5-BZ#87	ND		ug/kg	1.84	0.922	2
Cl5-BZ#101	ND		ug/kg	1.84	0.922	2
Cl5-BZ#105	ND		ug/kg	1.84	0.922	2
Cl5-BZ#118	ND		ug/kg	1.84	0.922	2
Cl6-BZ#128	ND		ug/kg	1.84	0.922	2
Cl6-BZ#138	ND		ug/kg	1.84	0.922	2
Cl6-BZ#153	ND		ug/kg	1.84	0.922	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-35 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 4 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.84	0.922	2
Cl7-BZ#180	ND		ug/kg	1.84	0.922	2
Cl7-BZ#183	ND		ug/kg	1.84	0.922	2
Cl7-BZ#184	ND		ug/kg	1.84	0.922	2
Cl7-BZ#187	ND		ug/kg	1.84	0.922	2
Cl8-BZ#195	ND		ug/kg	1.84	0.922	2
Cl9-BZ#206	ND		ug/kg	1.84	0.922	2
Cl10-BZ#209	ND		ug/kg	1.84	0.922	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	42		30-150
Pyrene-d10	48		30-150
Benzo(b)fluoranthene-d12	41		30-150
DBOB	58		30-150
BZ 198	51		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-36 D
Client ID: NV COMPOSITE 5 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 12:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.6	9.29	2
Acenaphthylene	ND		ug/kg	18.6	9.29	2
Acenaphthene	ND		ug/kg	18.6	9.29	2
Fluorene	ND		ug/kg	18.6	9.29	2
Phenanthrene	ND		ug/kg	18.6	9.29	2
Anthracene	ND		ug/kg	18.6	9.29	2
Fluoranthene	15.8	J	ug/kg	18.6	9.29	2
Pyrene	14.0	J	ug/kg	18.6	9.29	2
Benz(a)anthracene	ND		ug/kg	18.6	9.29	2
Chrysene	ND		ug/kg	18.6	9.29	2
Benzo(b)fluoranthene	ND		ug/kg	18.6	9.29	2
Benzo(k)fluoranthene	ND		ug/kg	18.6	9.29	2
Benzo(a)pyrene	ND		ug/kg	18.6	9.29	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.6	9.29	2
Dibenz(a,h)anthracene	ND		ug/kg	18.6	9.29	2
Benzo(ghi)perylene	ND		ug/kg	18.6	9.29	2
Cl2-BZ#8	ND		ug/kg	1.86	0.929	2
Cl3-BZ#18	ND		ug/kg	1.86	0.929	2
Cl3-BZ#28	ND		ug/kg	1.86	0.929	2
Cl4-BZ#44	ND		ug/kg	1.86	0.929	2
Cl4-BZ#49	ND		ug/kg	1.86	0.929	2
Cl4-BZ#52	ND		ug/kg	1.86	0.929	2
Cl4-BZ#66	ND		ug/kg	1.86	0.929	2
Cl5-BZ#87	ND		ug/kg	1.86	0.929	2
Cl5-BZ#101	ND		ug/kg	1.86	0.929	2
Cl5-BZ#105	ND		ug/kg	1.86	0.929	2
Cl5-BZ#118	ND		ug/kg	1.86	0.929	2
Cl6-BZ#128	ND		ug/kg	1.86	0.929	2
Cl6-BZ#138	ND		ug/kg	1.86	0.929	2
Cl6-BZ#153	ND		ug/kg	1.86	0.929	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-36 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 5 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.86	0.929	2
Cl7-BZ#180	ND		ug/kg	1.86	0.929	2
Cl7-BZ#183	ND		ug/kg	1.86	0.929	2
Cl7-BZ#184	ND		ug/kg	1.86	0.929	2
Cl7-BZ#187	ND		ug/kg	1.86	0.929	2
Cl8-BZ#195	ND		ug/kg	1.86	0.929	2
Cl9-BZ#206	ND		ug/kg	1.86	0.929	2
Cl10-BZ#209	ND		ug/kg	1.86	0.929	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	48		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	47		30-150
DBOB	64		30-150
BZ 198	57		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-37 D
Client ID: NV COMPOSITE 5 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 13:18
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.36	2
Acenaphthylene	ND		ug/kg	18.7	9.36	2
Acenaphthene	ND		ug/kg	18.7	9.36	2
Fluorene	ND		ug/kg	18.7	9.36	2
Phenanthrene	ND		ug/kg	18.7	9.36	2
Anthracene	ND		ug/kg	18.7	9.36	2
Fluoranthene	ND		ug/kg	18.7	9.36	2
Pyrene	ND		ug/kg	18.7	9.36	2
Benz(a)anthracene	ND		ug/kg	18.7	9.36	2
Chrysene	ND		ug/kg	18.7	9.36	2
Benzo(b)fluoranthene	ND		ug/kg	18.7	9.36	2
Benzo(k)fluoranthene	ND		ug/kg	18.7	9.36	2
Benzo(a)pyrene	ND		ug/kg	18.7	9.36	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.7	9.36	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.36	2
Benzo(ghi)perylene	ND		ug/kg	18.7	9.36	2
Cl2-BZ#8	ND		ug/kg	1.87	0.936	2
Cl3-BZ#18	ND		ug/kg	1.87	0.936	2
Cl3-BZ#28	ND		ug/kg	1.87	0.936	2
Cl4-BZ#44	ND		ug/kg	1.87	0.936	2
Cl4-BZ#49	ND		ug/kg	1.87	0.936	2
Cl4-BZ#52	ND		ug/kg	1.87	0.936	2
Cl4-BZ#66	ND		ug/kg	1.87	0.936	2
Cl5-BZ#87	ND		ug/kg	1.87	0.936	2
Cl5-BZ#101	ND		ug/kg	1.87	0.936	2
Cl5-BZ#105	ND		ug/kg	1.87	0.936	2
Cl5-BZ#118	ND		ug/kg	1.87	0.936	2
Cl6-BZ#128	ND		ug/kg	1.87	0.936	2
Cl6-BZ#138	0.936	J	ug/kg	1.87	0.936	2
Cl6-BZ#153	1.54	J	ug/kg	1.87	0.936	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-37 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 5 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.936	2
Cl7-BZ#180	ND		ug/kg	1.87	0.936	2
Cl7-BZ#183	ND		ug/kg	1.87	0.936	2
Cl7-BZ#184	ND		ug/kg	1.87	0.936	2
Cl7-BZ#187	ND		ug/kg	1.87	0.936	2
Cl8-BZ#195	ND		ug/kg	1.87	0.936	2
Cl9-BZ#206	ND		ug/kg	1.87	0.936	2
Cl10-BZ#209	ND		ug/kg	1.87	0.936	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	52		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	63		30-150
BZ 198	58		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-38 D
Client ID: NV COMPOSITE 5 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 13:49
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.4	9.19	2
Acenaphthylene	ND		ug/kg	18.4	9.19	2
Acenaphthene	ND		ug/kg	18.4	9.19	2
Fluorene	ND		ug/kg	18.4	9.19	2
Phenanthrene	ND		ug/kg	18.4	9.19	2
Anthracene	ND		ug/kg	18.4	9.19	2
Fluoranthene	9.96	J	ug/kg	18.4	9.19	2
Pyrene	ND		ug/kg	18.4	9.19	2
Benz(a)anthracene	ND		ug/kg	18.4	9.19	2
Chrysene	ND		ug/kg	18.4	9.19	2
Benzo(b)fluoranthene	ND		ug/kg	18.4	9.19	2
Benzo(k)fluoranthene	ND		ug/kg	18.4	9.19	2
Benzo(a)pyrene	ND		ug/kg	18.4	9.19	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.4	9.19	2
Dibenz(a,h)anthracene	ND		ug/kg	18.4	9.19	2
Benzo(ghi)perylene	ND		ug/kg	18.4	9.19	2
Cl2-BZ#8	ND		ug/kg	1.84	0.919	2
Cl3-BZ#18	ND		ug/kg	1.84	0.919	2
Cl3-BZ#28	ND		ug/kg	1.84	0.919	2
Cl4-BZ#44	ND		ug/kg	1.84	0.919	2
Cl4-BZ#49	ND		ug/kg	1.84	0.919	2
Cl4-BZ#52	ND		ug/kg	1.84	0.919	2
Cl4-BZ#66	ND		ug/kg	1.84	0.919	2
Cl5-BZ#87	ND		ug/kg	1.84	0.919	2
Cl5-BZ#101	ND		ug/kg	1.84	0.919	2
Cl5-BZ#105	ND		ug/kg	1.84	0.919	2
Cl5-BZ#118	ND		ug/kg	1.84	0.919	2
Cl6-BZ#128	ND		ug/kg	1.84	0.919	2
Cl6-BZ#138	ND		ug/kg	1.84	0.919	2
Cl6-BZ#153	1.36	J	ug/kg	1.84	0.919	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-38 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 5 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.84	0.919	2
Cl7-BZ#180	ND		ug/kg	1.84	0.919	2
Cl7-BZ#183	ND		ug/kg	1.84	0.919	2
Cl7-BZ#184	ND		ug/kg	1.84	0.919	2
Cl7-BZ#187	ND		ug/kg	1.84	0.919	2
Cl8-BZ#195	ND		ug/kg	1.84	0.919	2
Cl9-BZ#206	ND		ug/kg	1.84	0.919	2
Cl10-BZ#209	ND		ug/kg	1.84	0.919	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	54		30-150
Pyrene-d10	54		30-150
Benzo(b)fluoranthene-d12	51		30-150
DBOB	70		30-150
BZ 198	58		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-39 D
Client ID: NV COMPOSITE 5 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 14:19
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.7	8.86	2
Acenaphthylene	ND		ug/kg	17.7	8.86	2
Acenaphthene	ND		ug/kg	17.7	8.86	2
Fluorene	ND		ug/kg	17.7	8.86	2
Phenanthrene	ND		ug/kg	17.7	8.86	2
Anthracene	ND		ug/kg	17.7	8.86	2
Fluoranthene	ND		ug/kg	17.7	8.86	2
Pyrene	ND		ug/kg	17.7	8.86	2
Benz(a)anthracene	ND		ug/kg	17.7	8.86	2
Chrysene	ND		ug/kg	17.7	8.86	2
Benzo(b)fluoranthene	ND		ug/kg	17.7	8.86	2
Benzo(k)fluoranthene	ND		ug/kg	17.7	8.86	2
Benzo(a)pyrene	ND		ug/kg	17.7	8.86	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.7	8.86	2
Dibenz(a,h)anthracene	ND		ug/kg	17.7	8.86	2
Benzo(ghi)perylene	ND		ug/kg	17.7	8.86	2
Cl2-BZ#8	ND		ug/kg	1.77	0.886	2
Cl3-BZ#18	ND		ug/kg	1.77	0.886	2
Cl3-BZ#28	ND		ug/kg	1.77	0.886	2
Cl4-BZ#44	ND		ug/kg	1.77	0.886	2
Cl4-BZ#49	ND		ug/kg	1.77	0.886	2
Cl4-BZ#52	ND		ug/kg	1.77	0.886	2
Cl4-BZ#66	ND		ug/kg	1.77	0.886	2
Cl5-BZ#87	ND		ug/kg	1.77	0.886	2
Cl5-BZ#101	ND		ug/kg	1.77	0.886	2
Cl5-BZ#105	ND		ug/kg	1.77	0.886	2
Cl5-BZ#118	ND		ug/kg	1.77	0.886	2
Cl6-BZ#128	ND		ug/kg	1.77	0.886	2
Cl6-BZ#138	ND		ug/kg	1.77	0.886	2
Cl6-BZ#153	1.09	J	ug/kg	1.77	0.886	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-39 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 5 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.77	0.886	2
Cl7-BZ#180	ND		ug/kg	1.77	0.886	2
Cl7-BZ#183	ND		ug/kg	1.77	0.886	2
Cl7-BZ#184	ND		ug/kg	1.77	0.886	2
Cl7-BZ#187	ND		ug/kg	1.77	0.886	2
Cl8-BZ#195	ND		ug/kg	1.77	0.886	2
Cl9-BZ#206	ND		ug/kg	1.77	0.886	2
Cl10-BZ#209	ND		ug/kg	1.77	0.886	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	53		30-150
Benzo(b)fluoranthene-d12	49		30-150
DBOB	63		30-150
BZ 198	56		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-40 D
Client ID: NV COMPOSITE 5 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 14:50
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.4	9.73	2
Acenaphthylene	ND		ug/kg	19.4	9.73	2
Acenaphthene	ND		ug/kg	19.4	9.73	2
Fluorene	ND		ug/kg	19.4	9.73	2
Phenanthrene	ND		ug/kg	19.4	9.73	2
Anthracene	ND		ug/kg	19.4	9.73	2
Fluoranthene	ND		ug/kg	19.4	9.73	2
Pyrene	ND		ug/kg	19.4	9.73	2
Benz(a)anthracene	ND		ug/kg	19.4	9.73	2
Chrysene	ND		ug/kg	19.4	9.73	2
Benzo(b)fluoranthene	ND		ug/kg	19.4	9.73	2
Benzo(k)fluoranthene	ND		ug/kg	19.4	9.73	2
Benzo(a)pyrene	ND		ug/kg	19.4	9.73	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.4	9.73	2
Dibenz(a,h)anthracene	ND		ug/kg	19.4	9.73	2
Benzo(ghi)perylene	ND		ug/kg	19.4	9.73	2
Cl2-BZ#8	ND		ug/kg	1.94	0.973	2
Cl3-BZ#18	ND		ug/kg	1.94	0.973	2
Cl3-BZ#28	ND		ug/kg	1.94	0.973	2
Cl4-BZ#44	ND		ug/kg	1.94	0.973	2
Cl4-BZ#49	ND		ug/kg	1.94	0.973	2
Cl4-BZ#52	ND		ug/kg	1.94	0.973	2
Cl4-BZ#66	ND		ug/kg	1.94	0.973	2
Cl5-BZ#87	ND		ug/kg	1.94	0.973	2
Cl5-BZ#101	ND		ug/kg	1.94	0.973	2
Cl5-BZ#105	ND		ug/kg	1.94	0.973	2
Cl5-BZ#118	ND		ug/kg	1.94	0.973	2
Cl6-BZ#128	ND		ug/kg	1.94	0.973	2
Cl6-BZ#138	ND		ug/kg	1.94	0.973	2
Cl6-BZ#153	0.992	J	ug/kg	1.94	0.973	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-40 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 5 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.94	0.973	2
Cl7-BZ#180	ND		ug/kg	1.94	0.973	2
Cl7-BZ#183	ND		ug/kg	1.94	0.973	2
Cl7-BZ#184	ND		ug/kg	1.94	0.973	2
Cl7-BZ#187	ND		ug/kg	1.94	0.973	2
Cl8-BZ#195	ND		ug/kg	1.94	0.973	2
Cl9-BZ#206	ND		ug/kg	1.94	0.973	2
Cl10-BZ#209	ND		ug/kg	1.94	0.973	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	51		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	68		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-41 D
Client ID: NV COMPOSITE 6 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 21:26
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.1	8.53	2
Acenaphthylene	ND		ug/kg	17.1	8.53	2
Acenaphthene	ND		ug/kg	17.1	8.53	2
Fluorene	ND		ug/kg	17.1	8.53	2
Phenanthrene	ND		ug/kg	17.1	8.53	2
Anthracene	ND		ug/kg	17.1	8.53	2
Fluoranthene	20.3		ug/kg	17.1	8.53	2
Pyrene	15.2	J	ug/kg	17.1	8.53	2
Benz(a)anthracene	ND		ug/kg	17.1	8.53	2
Chrysene	ND		ug/kg	17.1	8.53	2
Benzo(b)fluoranthene	ND		ug/kg	17.1	8.53	2
Benzo(k)fluoranthene	ND		ug/kg	17.1	8.53	2
Benzo(a)pyrene	ND		ug/kg	17.1	8.53	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.1	8.53	2
Dibenz(a,h)anthracene	ND		ug/kg	17.1	8.53	2
Benzo(ghi)perylene	ND		ug/kg	17.1	8.53	2
Cl2-BZ#8	ND		ug/kg	1.71	0.853	2
Cl3-BZ#18	ND		ug/kg	1.71	0.853	2
Cl3-BZ#28	ND		ug/kg	1.71	0.853	2
Cl4-BZ#44	ND		ug/kg	1.71	0.853	2
Cl4-BZ#49	ND		ug/kg	1.71	0.853	2
Cl4-BZ#52	2.20		ug/kg	1.71	0.853	2
Cl4-BZ#66	ND		ug/kg	1.71	0.853	2
Cl5-BZ#87	ND		ug/kg	1.71	0.853	2
Cl5-BZ#101	1.47	J	ug/kg	1.71	0.853	2
Cl5-BZ#105	ND		ug/kg	1.71	0.853	2
Cl5-BZ#118	ND		ug/kg	1.71	0.853	2
Cl6-BZ#128	ND		ug/kg	1.71	0.853	2
Cl6-BZ#138	ND		ug/kg	1.71	0.853	2
Cl6-BZ#153	0.923	J	ug/kg	1.71	0.853	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-41 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 6 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.71	0.853	2
Cl7-BZ#180	ND		ug/kg	1.71	0.853	2
Cl7-BZ#183	ND		ug/kg	1.71	0.853	2
Cl7-BZ#184	ND		ug/kg	1.71	0.853	2
Cl7-BZ#187	ND		ug/kg	1.71	0.853	2
Cl8-BZ#195	ND		ug/kg	1.71	0.853	2
Cl9-BZ#206	ND		ug/kg	1.71	0.853	2
Cl10-BZ#209	ND		ug/kg	1.71	0.853	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	40		30-150
Pyrene-d10	42		30-150
Benzo(b)fluoranthene-d12	37		30-150
DBOB	49		30-150
BZ 198	46		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-42 D
Client ID: NV COMPOSITE 6 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 23:37
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.6	9.80	2
Acenaphthylene	ND		ug/kg	19.6	9.80	2
Acenaphthene	ND		ug/kg	19.6	9.80	2
Fluorene	ND		ug/kg	19.6	9.80	2
Phenanthrene	ND		ug/kg	19.6	9.80	2
Anthracene	ND		ug/kg	19.6	9.80	2
Fluoranthene	10.6	J	ug/kg	19.6	9.80	2
Pyrene	ND		ug/kg	19.6	9.80	2
Benz(a)anthracene	ND		ug/kg	19.6	9.80	2
Chrysene	ND		ug/kg	19.6	9.80	2
Benzo(b)fluoranthene	ND		ug/kg	19.6	9.80	2
Benzo(k)fluoranthene	ND		ug/kg	19.6	9.80	2
Benzo(a)pyrene	ND		ug/kg	19.6	9.80	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.6	9.80	2
Dibenz(a,h)anthracene	ND		ug/kg	19.6	9.80	2
Benzo(ghi)perylene	ND		ug/kg	19.6	9.80	2
Cl2-BZ#8	ND		ug/kg	1.96	0.980	2
Cl3-BZ#18	ND		ug/kg	1.96	0.980	2
Cl3-BZ#28	ND		ug/kg	1.96	0.980	2
Cl4-BZ#44	ND		ug/kg	1.96	0.980	2
Cl4-BZ#49	ND		ug/kg	1.96	0.980	2
Cl4-BZ#52	1.51	J	ug/kg	1.96	0.980	2
Cl4-BZ#66	ND		ug/kg	1.96	0.980	2
Cl5-BZ#87	ND		ug/kg	1.96	0.980	2
Cl5-BZ#101	ND		ug/kg	1.96	0.980	2
Cl5-BZ#105	ND		ug/kg	1.96	0.980	2
Cl5-BZ#118	ND		ug/kg	1.96	0.980	2
Cl6-BZ#128	ND		ug/kg	1.96	0.980	2
Cl6-BZ#138	1.46	J	ug/kg	1.96	0.980	2
Cl6-BZ#153	2.45		ug/kg	1.96	0.980	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-42 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 6 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.96	0.980	2
Cl7-BZ#180	ND		ug/kg	1.96	0.980	2
Cl7-BZ#183	ND		ug/kg	1.96	0.980	2
Cl7-BZ#184	ND		ug/kg	1.96	0.980	2
Cl7-BZ#187	ND		ug/kg	1.96	0.980	2
Cl8-BZ#195	ND		ug/kg	1.96	0.980	2
Cl9-BZ#206	ND		ug/kg	1.96	0.980	2
Cl10-BZ#209	ND		ug/kg	1.96	0.980	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	53		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	49		30-150
DBOB	70		30-150
BZ 198	63		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-43 D
Client ID: NV COMPOSITE 6 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 00:10
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.5	9.76	2
Acenaphthylene	ND		ug/kg	19.5	9.76	2
Acenaphthene	12.2	J	ug/kg	19.5	9.76	2
Fluorene	ND		ug/kg	19.5	9.76	2
Phenanthrene	ND		ug/kg	19.5	9.76	2
Anthracene	ND		ug/kg	19.5	9.76	2
Fluoranthene	26.9		ug/kg	19.5	9.76	2
Pyrene	20.3		ug/kg	19.5	9.76	2
Benz(a)anthracene	ND		ug/kg	19.5	9.76	2
Chrysene	ND		ug/kg	19.5	9.76	2
Benzo(b)fluoranthene	ND		ug/kg	19.5	9.76	2
Benzo(k)fluoranthene	ND		ug/kg	19.5	9.76	2
Benzo(a)pyrene	ND		ug/kg	19.5	9.76	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.5	9.76	2
Dibenz(a,h)anthracene	ND		ug/kg	19.5	9.76	2
Benzo(ghi)perylene	ND		ug/kg	19.5	9.76	2
Cl2-BZ#8	ND		ug/kg	1.95	0.976	2
Cl3-BZ#18	ND		ug/kg	1.95	0.976	2
Cl3-BZ#28	ND		ug/kg	1.95	0.976	2
Cl4-BZ#44	ND		ug/kg	1.95	0.976	2
Cl4-BZ#49	ND		ug/kg	1.95	0.976	2
Cl4-BZ#52	2.66		ug/kg	1.95	0.976	2
Cl4-BZ#66	ND		ug/kg	1.95	0.976	2
Cl5-BZ#87	ND		ug/kg	1.95	0.976	2
Cl5-BZ#101	2.18		ug/kg	1.95	0.976	2
Cl5-BZ#105	ND		ug/kg	1.95	0.976	2
Cl5-BZ#118	ND		ug/kg	1.95	0.976	2
Cl6-BZ#128	ND		ug/kg	1.95	0.976	2
Cl6-BZ#138	1.52	J	ug/kg	1.95	0.976	2
Cl6-BZ#153	2.01		ug/kg	1.95	0.976	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-43 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 6 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.95	0.976	2
Cl7-BZ#180	ND		ug/kg	1.95	0.976	2
Cl7-BZ#183	ND		ug/kg	1.95	0.976	2
Cl7-BZ#184	ND		ug/kg	1.95	0.976	2
Cl7-BZ#187	ND		ug/kg	1.95	0.976	2
Cl8-BZ#195	ND		ug/kg	1.95	0.976	2
Cl9-BZ#206	ND		ug/kg	1.95	0.976	2
Cl10-BZ#209	ND		ug/kg	1.95	0.976	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	58		30-150
Pyrene-d10	62		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	78		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-44 D
Client ID: NV COMPOSITE 6 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 00:43
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.34	2
Acenaphthylene	ND		ug/kg	18.7	9.34	2
Acenaphthene	ND		ug/kg	18.7	9.34	2
Fluorene	ND		ug/kg	18.7	9.34	2
Phenanthrene	ND		ug/kg	18.7	9.34	2
Anthracene	ND		ug/kg	18.7	9.34	2
Fluoranthene	14.2	J	ug/kg	18.7	9.34	2
Pyrene	10.2	J	ug/kg	18.7	9.34	2
Benz(a)anthracene	ND		ug/kg	18.7	9.34	2
Chrysene	ND		ug/kg	18.7	9.34	2
Benzo(b)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(k)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(a)pyrene	ND		ug/kg	18.7	9.34	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.7	9.34	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.34	2
Benzo(ghi)perylene	ND		ug/kg	18.7	9.34	2
Cl2-BZ#8	ND		ug/kg	1.87	0.934	2
Cl3-BZ#18	ND		ug/kg	1.87	0.934	2
Cl3-BZ#28	ND		ug/kg	1.87	0.934	2
Cl4-BZ#44	ND		ug/kg	1.87	0.934	2
Cl4-BZ#49	ND		ug/kg	1.87	0.934	2
Cl4-BZ#52	1.85	J	ug/kg	1.87	0.934	2
Cl4-BZ#66	ND		ug/kg	1.87	0.934	2
Cl5-BZ#87	ND		ug/kg	1.87	0.934	2
Cl5-BZ#101	ND		ug/kg	1.87	0.934	2
Cl5-BZ#105	ND		ug/kg	1.87	0.934	2
Cl5-BZ#118	ND		ug/kg	1.87	0.934	2
Cl6-BZ#128	ND		ug/kg	1.87	0.934	2
Cl6-BZ#138	2.06		ug/kg	1.87	0.934	2
Cl6-BZ#153	2.92		ug/kg	1.87	0.934	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-44 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 6 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.934	2
Cl7-BZ#180	ND		ug/kg	1.87	0.934	2
Cl7-BZ#183	ND		ug/kg	1.87	0.934	2
Cl7-BZ#184	ND		ug/kg	1.87	0.934	2
Cl7-BZ#187	ND		ug/kg	1.87	0.934	2
Cl8-BZ#195	ND		ug/kg	1.87	0.934	2
Cl9-BZ#206	ND		ug/kg	1.87	0.934	2
Cl10-BZ#209	ND		ug/kg	1.87	0.934	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	93		30-150
BZ 198	85		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-45 D
Client ID: NV COMPOSITE 6 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 01:16
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.9	9.94	2
Acenaphthylene	ND		ug/kg	19.9	9.94	2
Acenaphthene	ND		ug/kg	19.9	9.94	2
Fluorene	ND		ug/kg	19.9	9.94	2
Phenanthrene	ND		ug/kg	19.9	9.94	2
Anthracene	ND		ug/kg	19.9	9.94	2
Fluoranthene	12.8	J	ug/kg	19.9	9.94	2
Pyrene	ND		ug/kg	19.9	9.94	2
Benz(a)anthracene	ND		ug/kg	19.9	9.94	2
Chrysene	ND		ug/kg	19.9	9.94	2
Benzo(b)fluoranthene	ND		ug/kg	19.9	9.94	2
Benzo(k)fluoranthene	ND		ug/kg	19.9	9.94	2
Benzo(a)pyrene	ND		ug/kg	19.9	9.94	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.9	9.94	2
Dibenz(a,h)anthracene	ND		ug/kg	19.9	9.94	2
Benzo(ghi)perylene	ND		ug/kg	19.9	9.94	2
Cl2-BZ#8	ND		ug/kg	1.99	0.994	2
Cl3-BZ#18	ND		ug/kg	1.99	0.994	2
Cl3-BZ#28	ND		ug/kg	1.99	0.994	2
Cl4-BZ#44	ND		ug/kg	1.99	0.994	2
Cl4-BZ#49	ND		ug/kg	1.99	0.994	2
Cl4-BZ#52	2.04		ug/kg	1.99	0.994	2
Cl4-BZ#66	ND		ug/kg	1.99	0.994	2
Cl5-BZ#87	ND		ug/kg	1.99	0.994	2
Cl5-BZ#101	ND		ug/kg	1.99	0.994	2
Cl5-BZ#105	ND		ug/kg	1.99	0.994	2
Cl5-BZ#118	ND		ug/kg	1.99	0.994	2
Cl6-BZ#128	ND		ug/kg	1.99	0.994	2
Cl6-BZ#138	ND		ug/kg	1.99	0.994	2
Cl6-BZ#153	2.07		ug/kg	1.99	0.994	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-45 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 6 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.99	0.994	2
Cl7-BZ#180	ND		ug/kg	1.99	0.994	2
Cl7-BZ#183	ND		ug/kg	1.99	0.994	2
Cl7-BZ#184	ND		ug/kg	1.99	0.994	2
Cl7-BZ#187	ND		ug/kg	1.99	0.994	2
Cl8-BZ#195	ND		ug/kg	1.99	0.994	2
Cl9-BZ#206	ND		ug/kg	1.99	0.994	2
Cl10-BZ#209	ND		ug/kg	1.99	0.994	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	53		30-150
Pyrene-d10	58		30-150
Benzo(b)fluoranthene-d12	50		30-150
DBOB	70		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-46 D
Client ID: NV COMPOSITE 7 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 01:49
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.1	9.54	2
Acenaphthylene	ND		ug/kg	19.1	9.54	2
Acenaphthene	12.6	J	ug/kg	19.1	9.54	2
Fluorene	ND		ug/kg	19.1	9.54	2
Phenanthrene	ND		ug/kg	19.1	9.54	2
Anthracene	ND		ug/kg	19.1	9.54	2
Fluoranthene	24.0		ug/kg	19.1	9.54	2
Pyrene	15.7	J	ug/kg	19.1	9.54	2
Benz(a)anthracene	ND		ug/kg	19.1	9.54	2
Chrysene	ND		ug/kg	19.1	9.54	2
Benzo(b)fluoranthene	ND		ug/kg	19.1	9.54	2
Benzo(k)fluoranthene	ND		ug/kg	19.1	9.54	2
Benzo(a)pyrene	ND		ug/kg	19.1	9.54	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.1	9.54	2
Dibenz(a,h)anthracene	ND		ug/kg	19.1	9.54	2
Benzo(ghi)perylene	ND		ug/kg	19.1	9.54	2
Cl2-BZ#8	ND		ug/kg	1.91	0.954	2
Cl3-BZ#18	ND		ug/kg	1.91	0.954	2
Cl3-BZ#28	ND		ug/kg	1.91	0.954	2
Cl4-BZ#44	ND		ug/kg	1.91	0.954	2
Cl4-BZ#49	ND		ug/kg	1.91	0.954	2
Cl4-BZ#52	2.63		ug/kg	1.91	0.954	2
Cl4-BZ#66	ND		ug/kg	1.91	0.954	2
Cl5-BZ#87	ND		ug/kg	1.91	0.954	2
Cl5-BZ#101	ND		ug/kg	1.91	0.954	2
Cl5-BZ#105	ND		ug/kg	1.91	0.954	2
Cl5-BZ#118	ND		ug/kg	1.91	0.954	2
Cl6-BZ#128	ND		ug/kg	1.91	0.954	2
Cl6-BZ#138	1.99		ug/kg	1.91	0.954	2
Cl6-BZ#153	2.43		ug/kg	1.91	0.954	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-46 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 7 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.91	0.954	2
Cl7-BZ#180	ND		ug/kg	1.91	0.954	2
Cl7-BZ#183	ND		ug/kg	1.91	0.954	2
Cl7-BZ#184	ND		ug/kg	1.91	0.954	2
Cl7-BZ#187	ND		ug/kg	1.91	0.954	2
Cl8-BZ#195	ND		ug/kg	1.91	0.954	2
Cl9-BZ#206	ND		ug/kg	1.91	0.954	2
Cl10-BZ#209	ND		ug/kg	1.91	0.954	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	50		30-150
DBOB	74		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-47 D
Client ID: NV COMPOSITE 7 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 02:22
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.4	9.19	2
Acenaphthylene	ND		ug/kg	18.4	9.19	2
Acenaphthene	11.5	J	ug/kg	18.4	9.19	2
Fluorene	ND		ug/kg	18.4	9.19	2
Phenanthrene	ND		ug/kg	18.4	9.19	2
Anthracene	ND		ug/kg	18.4	9.19	2
Fluoranthene	31.2		ug/kg	18.4	9.19	2
Pyrene	21.5		ug/kg	18.4	9.19	2
Benz(a)anthracene	ND		ug/kg	18.4	9.19	2
Chrysene	ND		ug/kg	18.4	9.19	2
Benzo(b)fluoranthene	ND		ug/kg	18.4	9.19	2
Benzo(k)fluoranthene	ND		ug/kg	18.4	9.19	2
Benzo(a)pyrene	ND		ug/kg	18.4	9.19	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.4	9.19	2
Dibenz(a,h)anthracene	ND		ug/kg	18.4	9.19	2
Benzo(ghi)perylene	ND		ug/kg	18.4	9.19	2
Cl2-BZ#8	ND		ug/kg	1.84	0.919	2
Cl3-BZ#18	ND		ug/kg	1.84	0.919	2
Cl3-BZ#28	ND		ug/kg	1.84	0.919	2
Cl4-BZ#44	ND		ug/kg	1.84	0.919	2
Cl4-BZ#49	ND		ug/kg	1.84	0.919	2
Cl4-BZ#52	3.05		ug/kg	1.84	0.919	2
Cl4-BZ#66	ND		ug/kg	1.84	0.919	2
Cl5-BZ#87	ND		ug/kg	1.84	0.919	2
Cl5-BZ#101	ND		ug/kg	1.84	0.919	2
Cl5-BZ#105	ND		ug/kg	1.84	0.919	2
Cl5-BZ#118	ND		ug/kg	1.84	0.919	2
Cl6-BZ#128	ND		ug/kg	1.84	0.919	2
Cl6-BZ#138	1.05	J	ug/kg	1.84	0.919	2
Cl6-BZ#153	2.23		ug/kg	1.84	0.919	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-47 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 7 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.84	0.919	2
Cl7-BZ#180	ND		ug/kg	1.84	0.919	2
Cl7-BZ#183	ND		ug/kg	1.84	0.919	2
Cl7-BZ#184	ND		ug/kg	1.84	0.919	2
Cl7-BZ#187	ND		ug/kg	1.84	0.919	2
Cl8-BZ#195	ND		ug/kg	1.84	0.919	2
Cl9-BZ#206	ND		ug/kg	1.84	0.919	2
Cl10-BZ#209	ND		ug/kg	1.84	0.919	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	57		30-150
Benzo(b)fluoranthene-d12	50		30-150
DBOB	73		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-48 D
Client ID: NV COMPOSITE 7 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 02:54
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.3	8.66	2
Acenaphthylene	ND		ug/kg	17.3	8.66	2
Acenaphthene	11.1	J	ug/kg	17.3	8.66	2
Fluorene	ND		ug/kg	17.3	8.66	2
Phenanthrene	ND		ug/kg	17.3	8.66	2
Anthracene	ND		ug/kg	17.3	8.66	2
Fluoranthene	14.5	J	ug/kg	17.3	8.66	2
Pyrene	10.6	J	ug/kg	17.3	8.66	2
Benz(a)anthracene	ND		ug/kg	17.3	8.66	2
Chrysene	ND		ug/kg	17.3	8.66	2
Benzo(b)fluoranthene	ND		ug/kg	17.3	8.66	2
Benzo(k)fluoranthene	ND		ug/kg	17.3	8.66	2
Benzo(a)pyrene	ND		ug/kg	17.3	8.66	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.3	8.66	2
Dibenz(a,h)anthracene	ND		ug/kg	17.3	8.66	2
Benzo(ghi)perylene	ND		ug/kg	17.3	8.66	2
Cl2-BZ#8	ND		ug/kg	1.73	0.866	2
Cl3-BZ#18	ND		ug/kg	1.73	0.866	2
Cl3-BZ#28	ND		ug/kg	1.73	0.866	2
Cl4-BZ#44	ND		ug/kg	1.73	0.866	2
Cl4-BZ#49	ND		ug/kg	1.73	0.866	2
Cl4-BZ#52	ND		ug/kg	1.73	0.866	2
Cl4-BZ#66	ND		ug/kg	1.73	0.866	2
Cl5-BZ#87	ND		ug/kg	1.73	0.866	2
Cl5-BZ#101	ND		ug/kg	1.73	0.866	2
Cl5-BZ#105	ND		ug/kg	1.73	0.866	2
Cl5-BZ#118	ND		ug/kg	1.73	0.866	2
Cl6-BZ#128	ND		ug/kg	1.73	0.866	2
Cl6-BZ#138	1.16	J	ug/kg	1.73	0.866	2
Cl6-BZ#153	1.87		ug/kg	1.73	0.866	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-48 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 7 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.73	0.866	2
Cl7-BZ#180	ND		ug/kg	1.73	0.866	2
Cl7-BZ#183	ND		ug/kg	1.73	0.866	2
Cl7-BZ#184	ND		ug/kg	1.73	0.866	2
Cl7-BZ#187	ND		ug/kg	1.73	0.866	2
Cl8-BZ#195	ND		ug/kg	1.73	0.866	2
Cl9-BZ#206	ND		ug/kg	1.73	0.866	2
Cl10-BZ#209	ND		ug/kg	1.73	0.866	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	47		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	44		30-150
DBOB	61		30-150
BZ 198	55		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-49 D
Client ID: NV COMPOSITE 7 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 03:27
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.6	9.29	2
Acenaphthylene	ND		ug/kg	18.6	9.29	2
Acenaphthene	ND		ug/kg	18.6	9.29	2
Fluorene	ND		ug/kg	18.6	9.29	2
Phenanthrene	ND		ug/kg	18.6	9.29	2
Anthracene	ND		ug/kg	18.6	9.29	2
Fluoranthene	14.8	J	ug/kg	18.6	9.29	2
Pyrene	10.9	J	ug/kg	18.6	9.29	2
Benz(a)anthracene	ND		ug/kg	18.6	9.29	2
Chrysene	ND		ug/kg	18.6	9.29	2
Benzo(b)fluoranthene	ND		ug/kg	18.6	9.29	2
Benzo(k)fluoranthene	ND		ug/kg	18.6	9.29	2
Benzo(a)pyrene	ND		ug/kg	18.6	9.29	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.6	9.29	2
Dibenz(a,h)anthracene	ND		ug/kg	18.6	9.29	2
Benzo(ghi)perylene	ND		ug/kg	18.6	9.29	2
Cl2-BZ#8	ND		ug/kg	1.86	0.929	2
Cl3-BZ#18	ND		ug/kg	1.86	0.929	2
Cl3-BZ#28	ND		ug/kg	1.86	0.929	2
Cl4-BZ#44	ND		ug/kg	1.86	0.929	2
Cl4-BZ#49	ND		ug/kg	1.86	0.929	2
Cl4-BZ#52	ND		ug/kg	1.86	0.929	2
Cl4-BZ#66	ND		ug/kg	1.86	0.929	2
Cl5-BZ#87	ND		ug/kg	1.86	0.929	2
Cl5-BZ#101	ND		ug/kg	1.86	0.929	2
Cl5-BZ#105	ND		ug/kg	1.86	0.929	2
Cl5-BZ#118	ND		ug/kg	1.86	0.929	2
Cl6-BZ#128	ND		ug/kg	1.86	0.929	2
Cl6-BZ#138	1.79	J	ug/kg	1.86	0.929	2
Cl6-BZ#153	2.42		ug/kg	1.86	0.929	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-49 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 7 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.86	0.929	2
Cl7-BZ#180	ND		ug/kg	1.86	0.929	2
Cl7-BZ#183	ND		ug/kg	1.86	0.929	2
Cl7-BZ#184	ND		ug/kg	1.86	0.929	2
Cl7-BZ#187	ND		ug/kg	1.86	0.929	2
Cl8-BZ#195	ND		ug/kg	1.86	0.929	2
Cl9-BZ#206	ND		ug/kg	1.86	0.929	2
Cl10-BZ#209	ND		ug/kg	1.86	0.929	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	53		30-150
Pyrene-d10	59		30-150
Benzo(b)fluoranthene-d12	51		30-150
DBOB	72		30-150
BZ 198	68		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-50 D
Client ID: NV COMPOSITE 7 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 04:00
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.7	9.34	2
Acenaphthylene	ND		ug/kg	18.7	9.34	2
Acenaphthene	10.8	J	ug/kg	18.7	9.34	2
Fluorene	ND		ug/kg	18.7	9.34	2
Phenanthrene	ND		ug/kg	18.7	9.34	2
Anthracene	ND		ug/kg	18.7	9.34	2
Fluoranthene	23.9		ug/kg	18.7	9.34	2
Pyrene	19.4		ug/kg	18.7	9.34	2
Benz(a)anthracene	ND		ug/kg	18.7	9.34	2
Chrysene	ND		ug/kg	18.7	9.34	2
Benzo(b)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(k)fluoranthene	ND		ug/kg	18.7	9.34	2
Benzo(a)pyrene	ND		ug/kg	18.7	9.34	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.7	9.34	2
Dibenz(a,h)anthracene	ND		ug/kg	18.7	9.34	2
Benzo(ghi)perylene	ND		ug/kg	18.7	9.34	2
Cl2-BZ#8	ND		ug/kg	1.87	0.934	2
Cl3-BZ#18	ND		ug/kg	1.87	0.934	2
Cl3-BZ#28	ND		ug/kg	1.87	0.934	2
Cl4-BZ#44	ND		ug/kg	1.87	0.934	2
Cl4-BZ#49	ND		ug/kg	1.87	0.934	2
Cl4-BZ#52	3.42		ug/kg	1.87	0.934	2
Cl4-BZ#66	ND		ug/kg	1.87	0.934	2
Cl5-BZ#87	ND		ug/kg	1.87	0.934	2
Cl5-BZ#101	ND		ug/kg	1.87	0.934	2
Cl5-BZ#105	ND		ug/kg	1.87	0.934	2
Cl5-BZ#118	ND		ug/kg	1.87	0.934	2
Cl6-BZ#128	ND		ug/kg	1.87	0.934	2
Cl6-BZ#138	1.16	J	ug/kg	1.87	0.934	2
Cl6-BZ#153	1.98		ug/kg	1.87	0.934	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-50 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 7 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.87	0.934	2
Cl7-BZ#180	ND		ug/kg	1.87	0.934	2
Cl7-BZ#183	ND		ug/kg	1.87	0.934	2
Cl7-BZ#184	ND		ug/kg	1.87	0.934	2
Cl7-BZ#187	ND		ug/kg	1.87	0.934	2
Cl8-BZ#195	ND		ug/kg	1.87	0.934	2
Cl9-BZ#206	ND		ug/kg	1.87	0.934	2
Cl10-BZ#209	ND		ug/kg	1.87	0.934	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	63		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	77		30-150
BZ 198	67		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-51 D
Client ID: NV COMPOSITE 8 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 04:33
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	18.3	9.14	2
Acenaphthylene	ND		ug/kg	18.3	9.14	2
Acenaphthene	11.9	J	ug/kg	18.3	9.14	2
Fluorene	ND		ug/kg	18.3	9.14	2
Phenanthrene	ND		ug/kg	18.3	9.14	2
Anthracene	ND		ug/kg	18.3	9.14	2
Fluoranthene	32.6		ug/kg	18.3	9.14	2
Pyrene	24.1		ug/kg	18.3	9.14	2
Benz(a)anthracene	ND		ug/kg	18.3	9.14	2
Chrysene	ND		ug/kg	18.3	9.14	2
Benzo(b)fluoranthene	ND		ug/kg	18.3	9.14	2
Benzo(k)fluoranthene	ND		ug/kg	18.3	9.14	2
Benzo(a)pyrene	ND		ug/kg	18.3	9.14	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	18.3	9.14	2
Dibenz(a,h)anthracene	ND		ug/kg	18.3	9.14	2
Benzo(ghi)perylene	ND		ug/kg	18.3	9.14	2
Cl2-BZ#8	ND		ug/kg	1.83	0.914	2
Cl3-BZ#18	ND		ug/kg	1.83	0.914	2
Cl3-BZ#28	ND		ug/kg	1.83	0.914	2
Cl4-BZ#44	ND		ug/kg	1.83	0.914	2
Cl4-BZ#49	ND		ug/kg	1.83	0.914	2
Cl4-BZ#52	ND		ug/kg	1.83	0.914	2
Cl4-BZ#66	ND		ug/kg	1.83	0.914	2
Cl5-BZ#87	ND		ug/kg	1.83	0.914	2
Cl5-BZ#101	ND		ug/kg	1.83	0.914	2
Cl5-BZ#105	ND		ug/kg	1.83	0.914	2
Cl5-BZ#118	ND		ug/kg	1.83	0.914	2
Cl6-BZ#128	ND		ug/kg	1.83	0.914	2
Cl6-BZ#138	ND		ug/kg	1.83	0.914	2
Cl6-BZ#153	1.80	J	ug/kg	1.83	0.914	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-51 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 8 REP A Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.83	0.914	2
Cl7-BZ#180	ND		ug/kg	1.83	0.914	2
Cl7-BZ#183	ND		ug/kg	1.83	0.914	2
Cl7-BZ#184	ND		ug/kg	1.83	0.914	2
Cl7-BZ#187	ND		ug/kg	1.83	0.914	2
Cl8-BZ#195	ND		ug/kg	1.83	0.914	2
Cl9-BZ#206	ND		ug/kg	1.83	0.914	2
Cl10-BZ#209	ND		ug/kg	1.83	0.914	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	55		30-150
Pyrene-d10	62		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	78		30-150
BZ 198	66		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-52 D
Client ID: NV COMPOSITE 8 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 05:06
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	19.6	9.78	2
Acenaphthylene	ND		ug/kg	19.6	9.78	2
Acenaphthene	9.81	J	ug/kg	19.6	9.78	2
Fluorene	ND		ug/kg	19.6	9.78	2
Phenanthrene	ND		ug/kg	19.6	9.78	2
Anthracene	ND		ug/kg	19.6	9.78	2
Fluoranthene	33.2		ug/kg	19.6	9.78	2
Pyrene	26.1		ug/kg	19.6	9.78	2
Benz(a)anthracene	ND		ug/kg	19.6	9.78	2
Chrysene	ND		ug/kg	19.6	9.78	2
Benzo(b)fluoranthene	ND		ug/kg	19.6	9.78	2
Benzo(k)fluoranthene	ND		ug/kg	19.6	9.78	2
Benzo(a)pyrene	ND		ug/kg	19.6	9.78	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	19.6	9.78	2
Dibenz(a,h)anthracene	ND		ug/kg	19.6	9.78	2
Benzo(ghi)perylene	ND		ug/kg	19.6	9.78	2
Cl2-BZ#8	ND		ug/kg	1.96	0.978	2
Cl3-BZ#18	ND		ug/kg	1.96	0.978	2
Cl3-BZ#28	ND		ug/kg	1.96	0.978	2
Cl4-BZ#44	ND		ug/kg	1.96	0.978	2
Cl4-BZ#49	ND		ug/kg	1.96	0.978	2
Cl4-BZ#52	ND		ug/kg	1.96	0.978	2
Cl4-BZ#66	ND		ug/kg	1.96	0.978	2
Cl5-BZ#87	2.29		ug/kg	1.96	0.978	2
Cl5-BZ#101	ND		ug/kg	1.96	0.978	2
Cl5-BZ#105	ND		ug/kg	1.96	0.978	2
Cl5-BZ#118	ND		ug/kg	1.96	0.978	2
Cl6-BZ#128	ND		ug/kg	1.96	0.978	2
Cl6-BZ#138	1.44	J	ug/kg	1.96	0.978	2
Cl6-BZ#153	1.76	J	ug/kg	1.96	0.978	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-52 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 8 REP B Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.96	0.978	2
Cl7-BZ#180	ND		ug/kg	1.96	0.978	2
Cl7-BZ#183	ND		ug/kg	1.96	0.978	2
Cl7-BZ#184	ND		ug/kg	1.96	0.978	2
Cl7-BZ#187	ND		ug/kg	1.96	0.978	2
Cl8-BZ#195	ND		ug/kg	1.96	0.978	2
Cl9-BZ#206	ND		ug/kg	1.96	0.978	2
Cl10-BZ#209	ND		ug/kg	1.96	0.978	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	54		30-150
Pyrene-d10	59		30-150
Benzo(b)fluoranthene-d12	51		30-150
DBOB	72		30-150
BZ 198	64		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-53 D
Client ID: NV COMPOSITE 8 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 05:38
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	16.8	8.38	2
Acenaphthylene	ND		ug/kg	16.8	8.38	2
Acenaphthene	14.1	J	ug/kg	16.8	8.38	2
Fluorene	ND		ug/kg	16.8	8.38	2
Phenanthrene	ND		ug/kg	16.8	8.38	2
Anthracene	ND		ug/kg	16.8	8.38	2
Fluoranthene	25.5		ug/kg	16.8	8.38	2
Pyrene	18.0		ug/kg	16.8	8.38	2
Benz(a)anthracene	ND		ug/kg	16.8	8.38	2
Chrysene	ND		ug/kg	16.8	8.38	2
Benzo(b)fluoranthene	ND		ug/kg	16.8	8.38	2
Benzo(k)fluoranthene	ND		ug/kg	16.8	8.38	2
Benzo(a)pyrene	ND		ug/kg	16.8	8.38	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	16.8	8.38	2
Dibenz(a,h)anthracene	ND		ug/kg	16.8	8.38	2
Benzo(ghi)perylene	ND		ug/kg	16.8	8.38	2
Cl2-BZ#8	ND		ug/kg	1.68	0.838	2
Cl3-BZ#18	ND		ug/kg	1.68	0.838	2
Cl3-BZ#28	ND		ug/kg	1.68	0.838	2
Cl4-BZ#44	ND		ug/kg	1.68	0.838	2
Cl4-BZ#49	ND		ug/kg	1.68	0.838	2
Cl4-BZ#52	ND		ug/kg	1.68	0.838	2
Cl4-BZ#66	ND		ug/kg	1.68	0.838	2
Cl5-BZ#87	ND		ug/kg	1.68	0.838	2
Cl5-BZ#101	ND		ug/kg	1.68	0.838	2
Cl5-BZ#105	ND		ug/kg	1.68	0.838	2
Cl5-BZ#118	ND		ug/kg	1.68	0.838	2
Cl6-BZ#128	ND		ug/kg	1.68	0.838	2
Cl6-BZ#138	1.34	J	ug/kg	1.68	0.838	2
Cl6-BZ#153	1.48	J	ug/kg	1.68	0.838	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-53 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 8 REP C Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.68	0.838	2
Cl7-BZ#180	ND		ug/kg	1.68	0.838	2
Cl7-BZ#183	ND		ug/kg	1.68	0.838	2
Cl7-BZ#184	ND		ug/kg	1.68	0.838	2
Cl7-BZ#187	ND		ug/kg	1.68	0.838	2
Cl8-BZ#195	ND		ug/kg	1.68	0.838	2
Cl9-BZ#206	ND		ug/kg	1.68	0.838	2
Cl10-BZ#209	ND		ug/kg	1.68	0.838	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	45		30-150
Pyrene-d10	51		30-150
Benzo(b)fluoranthene-d12	44		30-150
DBOB	61		30-150
BZ 198	57		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-54 D
Client ID: NV COMPOSITE 8 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 06:11
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.1	8.53	2
Acenaphthylene	ND		ug/kg	17.1	8.53	2
Acenaphthene	14.6	J	ug/kg	17.1	8.53	2
Fluorene	ND		ug/kg	17.1	8.53	2
Phenanthrene	ND		ug/kg	17.1	8.53	2
Anthracene	ND		ug/kg	17.1	8.53	2
Fluoranthene	27.1		ug/kg	17.1	8.53	2
Pyrene	16.7	J	ug/kg	17.1	8.53	2
Benz(a)anthracene	ND		ug/kg	17.1	8.53	2
Chrysene	ND		ug/kg	17.1	8.53	2
Benzo(b)fluoranthene	ND		ug/kg	17.1	8.53	2
Benzo(k)fluoranthene	ND		ug/kg	17.1	8.53	2
Benzo(a)pyrene	ND		ug/kg	17.1	8.53	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.1	8.53	2
Dibenz(a,h)anthracene	ND		ug/kg	17.1	8.53	2
Benzo(ghi)perylene	ND		ug/kg	17.1	8.53	2
Cl2-BZ#8	ND		ug/kg	1.71	0.853	2
Cl3-BZ#18	ND		ug/kg	1.71	0.853	2
Cl3-BZ#28	ND		ug/kg	1.71	0.853	2
Cl4-BZ#44	ND		ug/kg	1.71	0.853	2
Cl4-BZ#49	ND		ug/kg	1.71	0.853	2
Cl4-BZ#52	ND		ug/kg	1.71	0.853	2
Cl4-BZ#66	ND		ug/kg	1.71	0.853	2
Cl5-BZ#87	ND		ug/kg	1.71	0.853	2
Cl5-BZ#101	ND		ug/kg	1.71	0.853	2
Cl5-BZ#105	ND		ug/kg	1.71	0.853	2
Cl5-BZ#118	ND		ug/kg	1.71	0.853	2
Cl6-BZ#128	ND		ug/kg	1.71	0.853	2
Cl6-BZ#138	1.27	J	ug/kg	1.71	0.853	2
Cl6-BZ#153	1.70	J	ug/kg	1.71	0.853	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-54 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 8 REP D Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.71	0.853	2
Cl7-BZ#180	ND		ug/kg	1.71	0.853	2
Cl7-BZ#183	ND		ug/kg	1.71	0.853	2
Cl7-BZ#184	ND		ug/kg	1.71	0.853	2
Cl7-BZ#187	ND		ug/kg	1.71	0.853	2
Cl8-BZ#195	ND		ug/kg	1.71	0.853	2
Cl9-BZ#206	ND		ug/kg	1.71	0.853	2
Cl10-BZ#209	ND		ug/kg	1.71	0.853	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	52		30-150
Pyrene-d10	55		30-150
Benzo(b)fluoranthene-d12	48		30-150
DBOB	75		30-150
BZ 198	64		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-55 D
Client ID: NV COMPOSITE 8 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/17 06:44
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	17.7	8.83	2
Acenaphthylene	ND		ug/kg	17.7	8.83	2
Acenaphthene	16.2	J	ug/kg	17.7	8.83	2
Fluorene	ND		ug/kg	17.7	8.83	2
Phenanthrene	ND		ug/kg	17.7	8.83	2
Anthracene	ND		ug/kg	17.7	8.83	2
Fluoranthene	49.1		ug/kg	17.7	8.83	2
Pyrene	36.2		ug/kg	17.7	8.83	2
Benz(a)anthracene	ND		ug/kg	17.7	8.83	2
Chrysene	ND		ug/kg	17.7	8.83	2
Benzo(b)fluoranthene	ND		ug/kg	17.7	8.83	2
Benzo(k)fluoranthene	ND		ug/kg	17.7	8.83	2
Benzo(a)pyrene	ND		ug/kg	17.7	8.83	2
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	17.7	8.83	2
Dibenz(a,h)anthracene	ND		ug/kg	17.7	8.83	2
Benzo(ghi)perylene	ND		ug/kg	17.7	8.83	2
Cl2-BZ#8	ND		ug/kg	1.77	0.883	2
Cl3-BZ#18	ND		ug/kg	1.77	0.883	2
Cl3-BZ#28	ND		ug/kg	1.77	0.883	2
Cl4-BZ#44	ND		ug/kg	1.77	0.883	2
Cl4-BZ#49	ND		ug/kg	1.77	0.883	2
Cl4-BZ#52	4.30		ug/kg	1.77	0.883	2
Cl4-BZ#66	ND		ug/kg	1.77	0.883	2
Cl5-BZ#87	ND		ug/kg	1.77	0.883	2
Cl5-BZ#101	ND		ug/kg	1.77	0.883	2
Cl5-BZ#105	ND		ug/kg	1.77	0.883	2
Cl5-BZ#118	ND		ug/kg	1.77	0.883	2
Cl6-BZ#128	ND		ug/kg	1.77	0.883	2
Cl6-BZ#138	1.84		ug/kg	1.77	0.883	2
Cl6-BZ#153	1.93		ug/kg	1.77	0.883	2

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-55 D Date Collected: 09/29/17 16:00

Client ID: NV COMPOSITE 8 REP E Date Received: 10/02/17

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl7-BZ#170	ND		ug/kg	1.77	0.883	2
Cl7-BZ#180	ND		ug/kg	1.77	0.883	2
Cl7-BZ#183	ND		ug/kg	1.77	0.883	2
Cl7-BZ#184	ND		ug/kg	1.77	0.883	2
Cl7-BZ#187	ND		ug/kg	1.77	0.883	2
Cl8-BZ#195	ND		ug/kg	1.77	0.883	2
Cl9-BZ#206	ND		ug/kg	1.77	0.883	2
Cl10-BZ#209	ND		ug/kg	1.77	0.883	2

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	63		30-150
Benzo(b)fluoranthene-d12	55		30-150
DBOB	81		30-150
BZ 198	74		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/07/17 16:34
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-20 Batch: WG1057014-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/07/17 16:34
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-20 Batch: WG1057014-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	83		30-150
BZ 198	81		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 00:46
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1057021-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	0.707	J	ug/kg	1.00	0.500
Cl3-BZ#18	1.28		ug/kg	1.00	0.500
Cl3-BZ#28	0.813	J	ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	0.572	J	ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/17 00:46
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1057021-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	97		30-150
Benzo(b)fluoranthene-d12	90		30-150
DBOB	92		30-150
BZ 198	87		30-150

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 18:14
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 41-55 Batch: WG1057028-1					
Naphthalene	5.87	J	ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	8.97	J	ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/17 18:14
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 41-55 Batch: WG1057028-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	79		30-150
Pyrene-d10	88		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	99		30-150
BZ 198	87		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG1057014-2 WG1057014-3								
Naphthalene	84		75		50-120	11		30
Acenaphthylene	75		67		50-120	11		30
Acenaphthene	75		67		50-120	11		30
Fluorene	72		65		50-120	10		30
Phenanthrene	80		73		50-120	9		30
Anthracene	79		72		50-120	9		30
Fluoranthene	79		73		50-120	8		30
Pyrene	78		72		50-120	8		30
Benz(a)anthracene	92		85		50-120	8		30
Chrysene	76		71		50-120	7		30
Benzo(b)fluoranthene	96		88		50-120	9		30
Benzo(k)fluoranthene	69		62		50-120	11		30
Benzo(a)pyrene	81		73		50-120	10		30
Indeno(1,2,3-cd)Pyrene	88		78		50-120	12		30
Dibenz(a,h)anthracene	86		79		50-120	8		30
Benzo(ghi)perylene	89		81		50-120	9		30
Cl2-BZ#8	78		72		50-120	8		30
Cl3-BZ#18	77		71		50-120	8		30
Cl3-BZ#28	79		74		50-120	7		30
Cl4-BZ#44	83		77		50-120	8		30
Cl4-BZ#49	77		72		50-120	7		30
Cl4-BZ#52	85		78		50-120	9		30
Cl4-BZ#66	84		79		50-120	6		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 Batch: WG1057014-2 WG1057014-3								
Cl5-BZ#87	82		77		50-120	6		30
Cl5-BZ#101	84		78		50-120	7		30
Cl5-BZ#105	82		78		50-120	5		30
Cl5-BZ#118	81		76		50-120	6		30
Cl6-BZ#128	84		80		50-120	5		30
Cl6-BZ#138	85		80		50-120	6		30
Cl6-BZ#153	85		80		50-120	6		30
Cl7-BZ#170	87		83		50-120	5		30
Cl7-BZ#180	79		74		50-120	7		30
Cl7-BZ#183	74		72		50-120	3		30
Cl7-BZ#184	80		76		50-120	5		30
Cl7-BZ#187	85		78		50-120	9		30
Cl8-BZ#195	89		84		50-120	6		30
Cl9-BZ#206	90		86		50-120	5		30
Cl10-BZ#209	87		83		50-120	5		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	82		71		30-150
Pyrene-d10	90		80		30-150
Benzo(b)fluoranthene-d12	87		77		30-150
DBOB	95		82		30-150
BZ 198	88		81		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1057021-2 WG1057021-3								
Naphthalene	75		79		50-120	5		30
Acenaphthylene	77		80		50-120	4		30
Acenaphthene	74		78		50-120	5		30
Fluorene	77		81		50-120	5		30
Phenanthrene	81		82		50-120	1		30
Anthracene	79		81		50-120	3		30
Fluoranthene	81		82		50-120	1		30
Pyrene	76		78		50-120	3		30
Benz(a)anthracene	83		86		50-120	4		30
Chrysene	82		84		50-120	2		30
Benzo(b)fluoranthene	92		94		50-120	2		30
Benzo(k)fluoranthene	72		77		50-120	7		30
Benzo(a)pyrene	83		86		50-120	4		30
Indeno(1,2,3-cd)Pyrene	84		86		50-120	2		30
Dibenz(a,h)anthracene	83		85		50-120	2		30
Benzo(ghi)perylene	86		88		50-120	2		30
Cl2-BZ#8	76		78		50-120	3		30
Cl3-BZ#18	76		78		50-120	3		30
Cl3-BZ#28	77		79		50-120	3		30
Cl4-BZ#44	79		80		50-120	1		30
Cl4-BZ#49	78		80		50-120	3		30
Cl4-BZ#52	73		75		50-120	3		30
Cl4-BZ#66	77		79		50-120	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1057021-2 WG1057021-3								
Cl5-BZ#87	78		80		50-120	3		30
Cl5-BZ#101	77		80		50-120	4		30
Cl5-BZ#105	77		79		50-120	3		30
Cl5-BZ#118	75		77		50-120	3		30
Cl6-BZ#128	80		83		50-120	4		30
Cl6-BZ#138	78		79		50-120	1		30
Cl6-BZ#153	81		83		50-120	2		30
Cl7-BZ#170	79		81		50-120	3		30
Cl7-BZ#180	76		78		50-120	3		30
Cl7-BZ#183	76		78		50-120	3		30
Cl7-BZ#184	78		80		50-120	3		30
Cl7-BZ#187	76		78		50-120	3		30
Cl8-BZ#195	79		82		50-120	4		30
Cl9-BZ#206	78		79		50-120	1		30
Cl10-BZ#209	78		79		50-120	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	76		79		30-150
Pyrene-d10	85		85		30-150
Benzo(b)fluoranthene-d12	82		82		30-150
DBOB	85		86		30-150
BZ 198	84		84		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 Batch: WG1057028-2 WG1057028-3								
Naphthalene	70		62		50-120	12		30
Acenaphthylene	72		63		50-120	13		30
Acenaphthene	72		65		50-120	10		30
Fluorene	73		66		50-120	10		30
Phenanthrene	77		72		50-120	7		30
Anthracene	77		74		50-120	4		30
Fluoranthene	80		76		50-120	5		30
Pyrene	73		69		50-120	6		30
Benz(a)anthracene	82		78		50-120	5		30
Chrysene	80		77		50-120	4		30
Benzo(b)fluoranthene	77		73		50-120	5		30
Benzo(k)fluoranthene	78		76		50-120	3		30
Benzo(a)pyrene	84		81		50-120	4		30
Indeno(1,2,3-cd)Pyrene	83		81		50-120	2		30
Dibenz(a,h)anthracene	83		80		50-120	4		30
Benzo(ghi)perylene	86		82		50-120	5		30
Cl2-BZ#8	67		62		50-120	8		30
Cl3-BZ#18	73		62		50-120	16		30
Cl3-BZ#28	69		65		50-120	6		30
Cl4-BZ#44	72		69		50-120	4		30
Cl4-BZ#49	72		69		50-120	4		30
Cl4-BZ#52	65		62		50-120	5		30
Cl4-BZ#66	69		67		50-120	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 Batch: WG1057028-2 WG1057028-3								
Cl5-BZ#87	72		70		50-120	3		30
Cl5-BZ#101	72		69		50-120	4		30
Cl5-BZ#105	76		73		50-120	4		30
Cl5-BZ#118	70		68		50-120	3		30
Cl6-BZ#128	76		73		50-120	4		30
Cl6-BZ#138	73		71		50-120	3		30
Cl6-BZ#153	77		73		50-120	5		30
Cl7-BZ#170	78		75		50-120	4		30
Cl7-BZ#180	73		70		50-120	4		30
Cl7-BZ#183	74		71		50-120	4		30
Cl7-BZ#184	75		72		50-120	4		30
Cl7-BZ#187	73		70		50-120	4		30
Cl8-BZ#195	80		77		50-120	4		30
Cl9-BZ#206	80		78		50-120	3		30
Cl10-BZ#209	80		78		50-120	3		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	73		64		30-150
Pyrene-d10	84		79		30-150
Benzo(b)fluoranthene-d12	76		71		30-150
DBOB	93		84		30-150
BZ 198	82		77		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057014-6 WG1057014-7 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A												
Naphthalene	5.46J	489	312	64		334	69		50-120	7		30
Acenaphthylene	ND	489	277	57		299	62		50-120	8		30
Acenaphthene	ND	489	273	56		294	61		50-120	7		30
Fluorene	ND	489	265	54		290	60		50-120	9		30
Phenanthrene	7.86J	489	329	67		359	74		50-120	9		30
Anthracene	ND	489	268	55		287	60		50-120	7		30
Fluoranthene	ND	489	286	59		312	65		50-120	9		30
Pyrene	ND	489	266	54		280	58		50-120	5		30
Benz(a)anthracene	ND	489	312	64		337	70		50-120	8		30
Chrysene	ND	489	286	59		324	67		50-120	12		30
Benzo(b)fluoranthene	ND	489	326	67		331	69		50-120	2		30
Benzo(k)fluoranthene	ND	489	277	57		324	67		50-120	16		30
Benzo(a)pyrene	ND	489	328	67		357	74		50-120	8		30
Indeno(1,2,3-cd)Pyrene	8.89J	489	331	68		369	77		50-120	11		30
Dibenz(a,h)anthracene	ND	489	319	65		348	72		50-120	9		30
Benzo(ghi)perylene	ND	489	330	68		360	75		50-120	9		30
Cl2-BZ#8	ND	97.8	54.8	56		54.3	56		50-120	1		30
Cl3-BZ#18	ND	97.8	163	**167**	Q	139	**144**	Q	50-120	16		30
Cl3-BZ#28	ND	97.8	80.5	82		81.2	84		50-120	1		30
Cl4-BZ#44	ND	97.8	54.9	56		53.9	56		50-120	2		30
Cl4-BZ#49	ND	97.8	48.4	**50**	Q	48.0	**50**	Q	50-120	1		30
Cl4-BZ#52	ND	97.8	61.5	63		52.0	54		50-120	17		30
Cl4-BZ#66	ND	97.8	55.0	56		56.6	59		50-120	3		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057014-6 WG1057014-7 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A												
Cl5-BZ#87	ND	97.8	56.0	57		58.9	61		50-120	5		30
Cl5-BZ#101	0.812J	97.8	78.6	80		75.3	78		50-120	4		30
Cl5-BZ#105	ND	97.8	66.3	68		78.2	81		50-120	16		30
Cl5-BZ#118	0.506J	97.8	58.0	59		59.9	62		50-120	3		30
Cl6-BZ#128	ND	97.8	60.5	62		62.9	65		50-120	4		30
Cl6-BZ#138	0.585J	97.8	61.4	63		64.8	67		50-120	5		30
Cl6-BZ#153	0.812J	97.8	69.9	71		66.3	69		50-120	5		30
Cl7-BZ#170	ND	97.8	62.4	64		64.3	67		50-120	3		30
Cl7-BZ#180	ND	97.8	58.9	60		62.0	64		50-120	5		30
Cl7-BZ#183	ND	97.8	56.3	58		59.2	61		50-120	5		30
Cl7-BZ#184	ND	97.8	66.8	68		64.9	67		50-120	3		30
Cl7-BZ#187	ND	97.8	62.4	64		63.8	66		50-120	2		30
Cl8-BZ#195	ND	97.8	63.3	65		65.2	68		50-120	3		30
Cl9-BZ#206	ND	97.8	65.7	67		68.4	71		50-120	4		30
Cl10-BZ#209	ND	97.8	63.3	65		64.2	67		50-120	1		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		63		30-150
BZ 198	67		69		30-150
Benzo(b)fluoranthene-d12	63		65		30-150
DBOB	71		78		30-150
Pyrene-d10	62		62		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057021-6 WG1057021-7 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A												
Naphthalene	ND	436	150	**34**	Q	185	**41**	Q	50-120	21		30
Acenaphthylene	ND	436	155	**36**	Q	187	**41**	Q	50-120	19		30
Acenaphthene	ND	436	145	**33**	Q	176	**39**	Q	50-120	19		30
Fluorene	ND	436	152	**35**	Q	183	**41**	Q	50-120	19		30
Phenanthrene	ND	436	208	**48**	Q	277	61		50-120	28		30
Anthracene	ND	436	166	**38**	Q	201	**45**	Q	50-120	19		30
Fluoranthene	ND	436	194	**45**	Q	258	57		50-120	28		30
Pyrene	ND	436	190	**44**	Q	225	**50**	Q	50-120	17		30
Benz(a)anthracene	ND	436	233	53		293	65		50-120	23		30
Chrysene	ND	436	174	**40**	Q	201	**45**	Q	50-120	14		30
Benzo(b)fluoranthene	ND	436	207	**47**	Q	253	56		50-120	20		30
Benzo(k)fluoranthene	ND	436	161	**37**	Q	194	**43**	Q	50-120	19		30
Benzo(a)pyrene	ND	436	171	**39**	Q	198	**44**	Q	50-120	15		30
Indeno(1,2,3-cd)Pyrene	ND	436	212	**49**	Q	259	57		50-120	20		30
Dibenz(a,h)anthracene	ND	436	195	**45**	Q	237	53		50-120	19		30
Benzo(ghi)perylene	ND	436	202	**46**	Q	246	55		50-120	20		30
Cl2-BZ#8	ND	87.3	32.8	**38**	Q	41.9	**46**	Q	50-120	24		30
Cl3-BZ#18	ND	87.3	52.2	60		65.4	73		50-120	22		30
Cl3-BZ#28	ND	87.3	37.8	**43**	Q	47.2	52		50-120	22		30
Cl4-BZ#44	ND	87.3	34.6	**40**	Q	44.4	**49**	Q	50-120	25		30
Cl4-BZ#49	ND	87.3	27.5	**32**	Q	35.3	**39**	Q	50-120	25		30
Cl4-BZ#52	ND	87.3	39.2	**45**	Q	54.4	60		50-120	**32**	Q	30
Cl4-BZ#66	ND	87.3	34.3	**39**	Q	45.0	**50**	Q	50-120	27		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057021-6 WG1057021-7 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A												
Cl5-BZ#87	ND	87.3	35.0	**40**	Q	45.6	51		50-120	26		30
Cl5-BZ#101	ND	87.3	38.6	**44**	Q	52.8	59		50-120	**31**	Q	30
Cl5-BZ#105	ND	87.3	31.3	**36**	Q	39.7	**44**	Q	50-120	24		30
Cl5-BZ#118	ND	87.3	33.8	**39**	Q	44.3	**49**	Q	50-120	27		30
Cl6-BZ#128	ND	87.3	37.1	**43**	Q	48.7	54		50-120	27		30
Cl6-BZ#138	ND	87.3	35.8	**41**	Q	46.8	52		50-120	27		30
Cl6-BZ#153	ND	87.3	40.1	**46**	Q	54.0	60		50-120	30		30
Cl7-BZ#170	ND	87.3	36.9	**42**	Q	48.5	54		50-120	27		30
Cl7-BZ#180	ND	87.3	35.2	**40**	Q	45.2	50		50-120	25		30
Cl7-BZ#183	ND	87.3	29.8	**34**	Q	37.7	**42**	Q	50-120	23		30
Cl7-BZ#184	ND	87.3	37.5	**43**	Q	52.3	58		50-120	**33**	Q	30
Cl7-BZ#187	ND	87.3	40.2	**46**	Q	54.2	60		50-120	30		30
Cl8-BZ#195	ND	87.3	37.2	**43**	Q	48.4	54		50-120	26		30
Cl9-BZ#206	ND	87.3	37.2	**43**	Q	48.6	54		50-120	27		30
Cl10-BZ#209	ND	87.3	37.3	**43**	Q	47.7	53		50-120	24		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	36		42		30-150
BZ 198	45		54		30-150
Benzo(b)fluoranthene-d12	40		47		30-150
DBOB	54		58		30-150
Pyrene-d10	48		55		30-150

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057028-6 WG1057028-7 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A												
Naphthalene	ND	472	234	**50**	Q	257	57		50-120	9		30
Acenaphthylene	ND	472	239	51		255	56		50-120	6		30
Acenaphthene	ND	472	236	**50**	Q	256	57		50-120	8		30
Fluorene	ND	472	240	51		259	57		50-120	8		30
Phenanthrene	ND	472	279	59		307	68		50-120	10		30
Anthracene	ND	472	232	**49**	Q	244	54		50-120	5		30
Fluoranthene	20.3	472	280	55		304	63		50-120	8		30
Pyrene	15.2J	472	255	54		277	61		50-120	8		30
Benz(a)anthracene	ND	472	291	62		319	71		50-120	9		30
Chrysene	ND	472	234	**50**	Q	250	55		50-120	7		30
Benzo(b)fluoranthene	ND	472	263	56		304	67		50-120	14		30
Benzo(k)fluoranthene	ND	472	229	**49**	Q	229	51		50-120	0		30
Benzo(a)pyrene	ND	472	265	56		295	65		50-120	11		30
Indeno(1,2,3-cd)Pyrene	ND	472	260	55		288	64		50-120	10		30
Dibenz(a,h)anthracene	ND	472	261	55		286	63		50-120	9		30
Benzo(ghi)perylene	ND	472	263	56		287	64		50-120	9		30
Cl2-BZ#8	ND	94.5	47.2	**50**	Q	51.0	56		50-120	8		30
Cl3-BZ#18	ND	94.5	75.1	80		79.3	88		50-120	5		30
Cl3-BZ#28	ND	94.5	52.3	55		56.8	63		50-120	8		30
Cl4-BZ#44	ND	94.5	52.8	56		55.4	61		50-120	5		30
Cl4-BZ#49	ND	94.5	43.7	**46**	Q	44.0	**49**	Q	50-120	1		30
Cl4-BZ#52	2.20	94.5	53.0	54		64.8	69		50-120	20		30
Cl4-BZ#66	ND	94.5	50.4	53		54.4	60		50-120	8		30

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057028-6 WG1057028-7 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A												
Cl5-BZ#87	ND	94.5	51.0	54		57.1	63		50-120	11		30
Cl5-BZ#101	1.47J	94.5	56.2	60		63.5	70		50-120	12		30
Cl5-BZ#105	ND	94.5	52.4	55		55.2	61		50-120	5		30
Cl5-BZ#118	ND	94.5	48.8	52		53.6	59		50-120	9		30
Cl6-BZ#128	ND	94.5	51.6	55		58.3	65		50-120	12		30
Cl6-BZ#138	ND	94.5	51.6	55		56.2	62		50-120	9		30
Cl6-BZ#153	0.923J	94.5	59.2	63		65.1	72		50-120	9		30
Cl7-BZ#170	ND	94.5	53.0	56		57.8	64		50-120	9		30
Cl7-BZ#180	ND	94.5	49.9	53		54.3	60		50-120	8		30
Cl7-BZ#183	ND	94.5	43.2	**46**	Q	48.1	53		50-120	11		30
Cl7-BZ#184	ND	94.5	55.8	59		62.6	69		50-120	11		30
Cl7-BZ#187	ND	94.5	57.9	61		62.1	69		50-120	7		30
Cl8-BZ#195	ND	94.5	54.0	57		58.1	64		50-120	7		30
Cl9-BZ#206	ND	94.5	55.0	58		59.1	65		50-120	7		30
Cl10-BZ#209	ND	94.5	54.2	57		58.1	64		50-120	7		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	50		55		30-150
BZ 198	61		71		30-150
Benzo(b)fluoranthene-d12	47		54		30-150
DBOB	65		73		30-150
Pyrene-d10	54		61		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057014-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						
Naphthalene	5.46J	5.78J	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	7.86J	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	ND	ND	ug/kg	NC		30
Pyrene	ND	ND	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	8.89J	8.55J	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057014-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	0.812J	0.640J	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	0.506J	0.665J	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	0.585J	0.577J	ug/kg	NC		30
Cl6-BZ#153	0.812J	0.899J	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	50		64		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057014-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	51		67		30-150
Benzo(b)fluoranthene-d12	49		64		30-150
DBOB	54		73		30-150
BZ 198	49		68		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057021-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	ND	ND	ug/kg	NC		30
Pyrene	ND	ND	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057021-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	ND	ND	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	ND	0.934J	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	41		40		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057021-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	55		53		30-150
Benzo(b)fluoranthene-d12	44		43		30-150
DBOB	58		60		30-150
BZ 198	52		51		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057028-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	20.3	16.4J	ug/kg	NC		30
Pyrene	15.2J	13.0J	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057028-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A						
Cl4-BZ#52	2.20	1.89	ug/kg	15		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	1.47J	1.10J	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	0.923J	0.938J	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	40		34		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057028-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	42		37		30-150
Benzo(b)fluoranthene-d12	37		32		30-150
DBOB	49		44		30-150
BZ 198	46		41		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1057014-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	61		40-140
Fluoranthene	64		40-140
Pyrene	64		40-140
Chrysene	42		40-140
Cl3-BZ#28	70		40-140
Cl4-BZ#44	45		40-140
Cl4-BZ#49	48		40-140
Cl4-BZ#52	76		40-140
Cl4-BZ#66	56		40-140
Cl5-BZ#87	40		40-140
Cl5-BZ#101	59		40-140
Cl5-BZ#105	72		40-140
Cl5-BZ#118	69		40-140
Cl6-BZ#138	116		40-140
Cl6-BZ#153	73		40-140
Cl7-BZ#187	64		40-140
2-Methylnaphthalene-d10 (Surrogate)	62		75-125
Pyrene-d10 (Surrogate)	67		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	63		75-125
DBOB (Surrogate)	70		75-125
BZ 198 (Surrogate)	64		75-125

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1057021-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	54		40-140
Fluoranthene	68		40-140
Pyrene	69		40-140
Chrysene	46		40-140
Cl3-BZ#28	112		40-140
Cl4-BZ#44	125		40-140
Cl4-BZ#49	55		40-140
Cl4-BZ#52	62		40-140
Cl4-BZ#66	64		40-140
Cl5-BZ#87	63		40-140
Cl5-BZ#101	44		40-140
Cl5-BZ#105	66		40-140
Cl5-BZ#118	69		40-140
Cl6-BZ#138	71		40-140
Cl6-BZ#153	92		40-140
Cl7-BZ#187	45		40-140
2-Methylnaphthalene-d10 (Surrogate)	65		75-125
Pyrene-d10 (Surrogate)	71		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	81		75-125
DBOB (Surrogate)	74		75-125
BZ 198 (Surrogate)	66		75-125

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1057028-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	56		40-140
Fluoranthene	57		40-140
Pyrene	56		40-140
Chrysene	52		40-140
Cl3-BZ#28	135		40-140
Cl4-BZ#44	69		40-140
Cl4-BZ#49	55		40-140
Cl4-BZ#52	46		40-140
Cl4-BZ#66	54		40-140
Cl5-BZ#87	49		40-140
Cl5-BZ#101	45		40-140
Cl5-BZ#105	74		40-140
Cl5-BZ#118	52		40-140
Cl6-BZ#138	62		40-140
Cl6-BZ#153	63		40-140
Cl7-BZ#187	41		40-140
2-Methylnaphthalene-d10 (Surrogate)	57		75-125
Pyrene-d10 (Surrogate)	61		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	54		75-125
DBOB (Surrogate)	68		75-125
BZ 198 (Surrogate)	59		75-125

PESTICIDES

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-01
Client ID: NV NATIVE BACKGROUND REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 18:03
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.931	0.931	1	A
gamma-BHC	ND		ug/kg	0.466	0.466	1	A
Heptachlor	ND		ug/kg	0.466	0.466	1	A
Aldrin	ND		ug/kg	0.466	0.466	1	A
Heptachlor epoxide	ND		ug/kg	0.931	0.931	1	B
Oxychlordane	ND		ug/kg	0.931	0.931	1	B
trans-Chlordane	ND		ug/kg	0.466	0.466	1	A
Endosulfan I	ND		ug/kg	0.466	0.466	1	A
cis-Chlordane	ND		ug/kg	0.466	0.466	1	A
trans-Nonachlor	ND		ug/kg	0.466	0.466	1	A
4,4'-DDE	ND		ug/kg	0.466	0.466	1	A
Dieldrin	ND		ug/kg	0.466	0.466	1	A
Endrin	ND		ug/kg	0.466	0.466	1	A
Endosulfan II	ND		ug/kg	0.466	0.466	1	A
4,4'-DDD	ND		ug/kg	0.466	0.466	1	A
cis-Nonachlor	ND		ug/kg	0.466	0.466	1	A
4,4'-DDT	ND		ug/kg	0.466	0.466	1	A
Methoxychlor	ND		ug/kg	4.66	4.66	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	51		30-150	A
BZ 198	59		30-150	A
DBOB	36		30-150	B
BZ 198	53		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-02
Client ID: NV NATIVE BACKGROUND REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 22:01
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.996	0.996	1	A
gamma-BHC	ND		ug/kg	0.498	0.498	1	A
Heptachlor	ND		ug/kg	0.498	0.498	1	B
Aldrin	ND		ug/kg	0.498	0.498	1	A
Heptachlor epoxide	ND		ug/kg	0.996	0.996	1	B
Oxychlordane	ND		ug/kg	0.996	0.996	1	B
trans-Chlordane	ND		ug/kg	0.498	0.498	1	A
Endosulfan I	ND		ug/kg	0.498	0.498	1	A
cis-Chlordane	ND		ug/kg	0.498	0.498	1	A
trans-Nonachlor	ND		ug/kg	0.498	0.498	1	A
4,4'-DDE	ND		ug/kg	0.498	0.498	1	A
Dieldrin	ND		ug/kg	0.498	0.498	1	A
Endrin	ND		ug/kg	0.498	0.498	1	A
Endosulfan II	ND		ug/kg	0.498	0.498	1	A
4,4'-DDD	ND		ug/kg	0.498	0.498	1	A
cis-Nonachlor	ND		ug/kg	0.498	0.498	1	A
4,4'-DDT	ND		ug/kg	0.498	0.498	1	A
Methoxychlor	ND		ug/kg	4.98	4.98	1	A
Toxaphene	ND		ug/kg	25.0	25.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	58		30-150	A
DBOB	49		30-150	B
BZ 198	60		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-03
Client ID: NV NATIVE BACKGROUND REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 22:34
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.883	0.883	1	A
gamma-BHC	ND		ug/kg	0.442	0.442	1	A
Heptachlor	ND		ug/kg	0.442	0.442	1	B
Aldrin	ND		ug/kg	0.442	0.442	1	A
Heptachlor epoxide	ND		ug/kg	0.883	0.883	1	B
Oxychlordane	ND		ug/kg	0.883	0.883	1	B
trans-Chlordane	ND		ug/kg	0.442	0.442	1	A
Endosulfan I	ND		ug/kg	0.442	0.442	1	A
cis-Chlordane	ND		ug/kg	0.442	0.442	1	A
trans-Nonachlor	ND		ug/kg	0.442	0.442	1	B
4,4'-DDE	ND		ug/kg	0.442	0.442	1	A
Dieldrin	ND		ug/kg	0.442	0.442	1	A
Endrin	ND		ug/kg	0.442	0.442	1	A
Endosulfan II	ND		ug/kg	0.442	0.442	1	A
4,4'-DDD	ND		ug/kg	0.442	0.442	1	A
cis-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDT	ND		ug/kg	0.442	0.442	1	A
Methoxychlor	ND		ug/kg	4.42	4.42	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	65		30-150	A
DBOB	41		30-150	B
BZ 198	99		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-04	Date Collected:	10/04/17 16:20
Client ID:	NV NATIVE BACKGROUND REP D	Date Received:	10/05/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
		Extraction Method:	EPA 3570
Matrix:	Tissue	Extraction Date:	10/27/17 12:30
Analytical Method:	1,8081B	Cleanup Method:	EPA 3630
Analytical Date:	11/10/17 23:08	Cleanup Date:	10/30/17
Analyst:	DP		
Percent Solids:	Results reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.874	0.874	1	A
gamma-BHC	ND		ug/kg	0.437	0.437	1	A
Heptachlor	ND		ug/kg	0.437	0.437	1	B
Aldrin	ND		ug/kg	0.437	0.437	1	A
Heptachlor epoxide	ND		ug/kg	0.874	0.874	1	B
Oxychlordane	ND		ug/kg	0.874	0.874	1	B
trans-Chlordane	ND		ug/kg	0.437	0.437	1	A
Endosulfan I	ND		ug/kg	0.437	0.437	1	A
cis-Chlordane	ND		ug/kg	0.437	0.437	1	A
trans-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDE	ND		ug/kg	0.437	0.437	1	A
Dieldrin	ND		ug/kg	0.437	0.437	1	A
Endrin	ND		ug/kg	0.437	0.437	1	A
Endosulfan II	ND		ug/kg	0.437	0.437	1	A
4,4'-DDD	ND		ug/kg	0.437	0.437	1	A
cis-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDT	ND		ug/kg	0.437	0.437	1	A
Methoxychlor	ND		ug/kg	4.37	4.37	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	59		30-150	A
DBOB	47		30-150	B
BZ 198	61		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-05
Client ID: NV NATIVE BACKGROUND REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/10/17 23:42
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.978	0.978	1	A
gamma-BHC	ND		ug/kg	0.489	0.489	1	A
Heptachlor	ND		ug/kg	0.489	0.489	1	B
Aldrin	ND		ug/kg	0.489	0.489	1	A
Heptachlor epoxide	ND		ug/kg	0.978	0.978	1	B
Oxychlordane	ND		ug/kg	0.978	0.978	1	B
trans-Chlordane	ND		ug/kg	0.489	0.489	1	A
Endosulfan I	ND		ug/kg	0.489	0.489	1	A
cis-Chlordane	ND		ug/kg	0.489	0.489	1	A
trans-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDE	ND		ug/kg	0.489	0.489	1	A
Dieldrin	ND		ug/kg	0.489	0.489	1	A
Endrin	ND		ug/kg	0.489	0.489	1	A
Endosulfan II	ND		ug/kg	0.489	0.489	1	A
4,4'-DDD	ND		ug/kg	0.489	0.489	1	B
cis-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDT	ND		ug/kg	0.489	0.489	1	A
Methoxychlor	ND		ug/kg	4.89	4.89	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	59		30-150	A
DBOB	48		30-150	B
BZ 198	62		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-06
Client ID: NV LABORATORY CONTROL REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 00:16
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.947	0.947	1	A
gamma-BHC	ND		ug/kg	0.473	0.473	1	A
Heptachlor	ND		ug/kg	0.473	0.473	1	A
Aldrin	ND		ug/kg	0.473	0.473	1	A
Heptachlor epoxide	ND		ug/kg	0.947	0.947	1	B
Oxychlordane	ND		ug/kg	0.947	0.947	1	B
trans-Chlordane	ND		ug/kg	0.473	0.473	1	A
Endosulfan I	ND		ug/kg	0.473	0.473	1	A
cis-Chlordane	ND		ug/kg	0.473	0.473	1	A
trans-Nonachlor	ND		ug/kg	0.473	0.473	1	B
4,4'-DDE	ND		ug/kg	0.473	0.473	1	A
Dieldrin	ND		ug/kg	0.473	0.473	1	A
Endrin	ND		ug/kg	0.473	0.473	1	A
Endosulfan II	ND		ug/kg	0.473	0.473	1	A
4,4'-DDD	ND		ug/kg	0.473	0.473	1	A
cis-Nonachlor	ND		ug/kg	0.473	0.473	1	A
4,4'-DDT	ND		ug/kg	0.473	0.473	1	A
Methoxychlor	ND		ug/kg	4.73	4.73	1	A
Toxaphene	ND		ug/kg	23.8	23.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	61		30-150	A
DBOB	60		30-150	B
BZ 198	65		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-07
Client ID: NV LABORATORY CONTROL REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 00:50
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.917	0.917	1	A
gamma-BHC	ND		ug/kg	0.459	0.459	1	A
Heptachlor	ND		ug/kg	0.459	0.459	1	A
Aldrin	ND		ug/kg	0.459	0.459	1	A
Heptachlor epoxide	ND		ug/kg	0.917	0.917	1	B
Oxychlordane	ND		ug/kg	0.917	0.917	1	B
trans-Chlordane	ND		ug/kg	0.459	0.459	1	A
Endosulfan I	ND		ug/kg	0.459	0.459	1	A
cis-Chlordane	ND		ug/kg	0.459	0.459	1	A
trans-Nonachlor	ND		ug/kg	0.459	0.459	1	A
4,4'-DDE	ND		ug/kg	0.459	0.459	1	A
Dieldrin	ND		ug/kg	0.459	0.459	1	A
Endrin	ND		ug/kg	0.459	0.459	1	A
Endosulfan II	ND		ug/kg	0.459	0.459	1	A
4,4'-DDD	ND		ug/kg	0.459	0.459	1	A
cis-Nonachlor	ND		ug/kg	0.459	0.459	1	A
4,4'-DDT	ND		ug/kg	0.459	0.459	1	A
Methoxychlor	ND		ug/kg	4.59	4.59	1	A
Toxaphene	ND		ug/kg	23.0	23.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	54		30-150	A
BZ 198	54		30-150	A
DBOB	48		30-150	B
BZ 198	56		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-08
Client ID: NV LABORATORY CONTROL REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 01:24
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.907	0.907	1	A
gamma-BHC	ND		ug/kg	0.454	0.454	1	A
Heptachlor	ND		ug/kg	0.454	0.454	1	A
Aldrin	ND		ug/kg	0.454	0.454	1	A
Heptachlor epoxide	ND		ug/kg	0.907	0.907	1	B
Oxychlordane	ND		ug/kg	0.907	0.907	1	B
trans-Chlordane	ND		ug/kg	0.454	0.454	1	A
Endosulfan I	ND		ug/kg	0.454	0.454	1	A
cis-Chlordane	ND		ug/kg	0.454	0.454	1	A
trans-Nonachlor	ND		ug/kg	0.454	0.454	1	B
4,4'-DDE	ND		ug/kg	0.454	0.454	1	B
Dieldrin	ND		ug/kg	0.454	0.454	1	A
Endrin	ND		ug/kg	0.454	0.454	1	A
Endosulfan II	ND		ug/kg	0.454	0.454	1	A
4,4'-DDD	ND		ug/kg	0.454	0.454	1	B
cis-Nonachlor	ND		ug/kg	0.454	0.454	1	A
4,4'-DDT	ND		ug/kg	0.454	0.454	1	A
Methoxychlor	ND		ug/kg	4.54	4.54	1	A
Toxaphene	ND		ug/kg	22.8	22.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	62		30-150	A
DBOB	55		30-150	B
BZ 198	65		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-09
Client ID: NV LABORATORY CONTROL REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 01:58
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.893	0.893	1	A
gamma-BHC	ND		ug/kg	0.446	0.446	1	A
Heptachlor	ND		ug/kg	0.446	0.446	1	A
Aldrin	ND		ug/kg	0.446	0.446	1	A
Heptachlor epoxide	ND		ug/kg	0.893	0.893	1	B
Oxychlordane	ND		ug/kg	0.893	0.893	1	B
trans-Chlordane	ND		ug/kg	0.446	0.446	1	A
Endosulfan I	ND		ug/kg	0.446	0.446	1	A
cis-Chlordane	ND		ug/kg	0.446	0.446	1	A
trans-Nonachlor	ND		ug/kg	0.446	0.446	1	B
4,4'-DDE	ND		ug/kg	0.446	0.446	1	A
Dieldrin	ND		ug/kg	0.446	0.446	1	A
Endrin	ND		ug/kg	0.446	0.446	1	A
Endosulfan II	ND		ug/kg	0.446	0.446	1	A
4,4'-DDD	ND		ug/kg	0.446	0.446	1	A
cis-Nonachlor	ND		ug/kg	0.446	0.446	1	A
4,4'-DDT	ND		ug/kg	0.446	0.446	1	A
Methoxychlor	ND		ug/kg	4.46	4.46	1	A
Toxaphene	ND		ug/kg	22.4	22.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	66		30-150	A
DBOB	58		30-150	B
BZ 198	70		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-10
Client ID: NV LABORATORY CONTROL REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 02:32
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.896	0.896	1	A
gamma-BHC	ND		ug/kg	0.448	0.448	1	A
Heptachlor	ND		ug/kg	0.448	0.448	1	A
Aldrin	ND		ug/kg	0.448	0.448	1	A
Heptachlor epoxide	ND		ug/kg	0.896	0.896	1	B
Oxychlordane	ND		ug/kg	0.896	0.896	1	B
trans-Chlordane	ND		ug/kg	0.448	0.448	1	A
Endosulfan I	ND		ug/kg	0.448	0.448	1	A
cis-Chlordane	ND		ug/kg	0.448	0.448	1	A
trans-Nonachlor	ND		ug/kg	0.448	0.448	1	B
4,4'-DDE	ND		ug/kg	0.448	0.448	1	A
Dieldrin	ND		ug/kg	0.448	0.448	1	A
Endrin	ND		ug/kg	0.448	0.448	1	A
Endosulfan II	ND		ug/kg	0.448	0.448	1	A
4,4'-DDD	ND		ug/kg	0.448	0.448	1	A
cis-Nonachlor	ND		ug/kg	0.448	0.448	1	A
4,4'-DDT	ND		ug/kg	0.448	0.448	1	A
Methoxychlor	ND		ug/kg	4.48	4.48	1	A
Toxaphene	ND		ug/kg	22.5	22.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	62		30-150	A
DBOB	54		30-150	B
BZ 198	65		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-11
Client ID: NV CLDS REFERENCE SEDIMENT REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 03:06
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.877	0.877	1	A
gamma-BHC	ND		ug/kg	0.438	0.438	1	A
Heptachlor	ND		ug/kg	0.438	0.438	1	A
Aldrin	ND		ug/kg	0.438	0.438	1	A
Heptachlor epoxide	ND		ug/kg	0.877	0.877	1	B
Oxychlordane	ND		ug/kg	0.877	0.877	1	B
trans-Chlordane	ND		ug/kg	0.438	0.438	1	A
Endosulfan I	ND		ug/kg	0.438	0.438	1	A
cis-Chlordane	ND		ug/kg	0.438	0.438	1	A
trans-Nonachlor	ND		ug/kg	0.438	0.438	1	B
4,4'-DDE	ND		ug/kg	0.438	0.438	1	A
Dieldrin	ND		ug/kg	0.438	0.438	1	A
Endrin	ND		ug/kg	0.438	0.438	1	A
Endosulfan II	ND		ug/kg	0.438	0.438	1	A
4,4'-DDD	ND		ug/kg	0.438	0.438	1	A
cis-Nonachlor	ND		ug/kg	0.438	0.438	1	A
4,4'-DDT	ND		ug/kg	0.438	0.438	1	B
Methoxychlor	ND		ug/kg	4.38	4.38	1	A
Toxaphene	ND		ug/kg	22.0	22.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	45		30-150	A
BZ 198	46		30-150	A
DBOB	34		30-150	B
BZ 198	48		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-12
Client ID: NV CLDS REFERENCE SEDIMENT REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 03:40
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.931	0.931	1	A
gamma-BHC	ND		ug/kg	0.466	0.466	1	A
Heptachlor	ND		ug/kg	0.466	0.466	1	A
Aldrin	ND		ug/kg	0.466	0.466	1	A
Heptachlor epoxide	ND		ug/kg	0.931	0.931	1	B
Oxychlordane	ND		ug/kg	0.931	0.931	1	B
trans-Chlordane	ND		ug/kg	0.466	0.466	1	A
Endosulfan I	ND		ug/kg	0.466	0.466	1	A
cis-Chlordane	ND		ug/kg	0.466	0.466	1	A
trans-Nonachlor	ND		ug/kg	0.466	0.466	1	B
4,4'-DDE	ND		ug/kg	0.466	0.466	1	B
Dieldrin	ND		ug/kg	0.466	0.466	1	A
Endrin	ND		ug/kg	0.466	0.466	1	A
Endosulfan II	ND		ug/kg	0.466	0.466	1	A
4,4'-DDD	ND		ug/kg	0.466	0.466	1	A
cis-Nonachlor	ND		ug/kg	0.466	0.466	1	A
4,4'-DDT	ND		ug/kg	0.466	0.466	1	A
Methoxychlor	ND		ug/kg	4.66	4.66	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	49		30-150	A
BZ 198	47		30-150	A
DBOB	45		30-150	B
BZ 198	50		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-13
Client ID: NV CLDS REFERENCE SEDIMENT REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 04:14
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	0.888	1	A
gamma-BHC	ND		ug/kg	0.444	0.444	1	A
Heptachlor	ND		ug/kg	0.444	0.444	1	A
Aldrin	ND		ug/kg	0.444	0.444	1	A
Heptachlor epoxide	ND		ug/kg	0.888	0.888	1	B
Oxychlordane	ND		ug/kg	0.888	0.888	1	B
trans-Chlordane	ND		ug/kg	0.444	0.444	1	A
Endosulfan I	ND		ug/kg	0.444	0.444	1	A
cis-Chlordane	ND		ug/kg	0.444	0.444	1	A
trans-Nonachlor	ND		ug/kg	0.444	0.444	1	B
4,4'-DDE	ND		ug/kg	0.444	0.444	1	A
Dieldrin	ND		ug/kg	0.444	0.444	1	A
Endrin	ND		ug/kg	0.444	0.444	1	A
Endosulfan II	ND		ug/kg	0.444	0.444	1	A
4,4'-DDD	ND		ug/kg	0.444	0.444	1	A
cis-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDT	ND		ug/kg	0.444	0.444	1	A
Methoxychlor	ND		ug/kg	4.44	4.44	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	51		30-150	A
BZ 198	63		30-150	A
DBOB	48		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-14
Client ID: NV CLDS REFERENCE SEDIMENT REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 04:48
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.901	0.901	1	A
gamma-BHC	ND		ug/kg	0.450	0.450	1	A
Heptachlor	ND		ug/kg	0.450	0.450	1	A
Aldrin	ND		ug/kg	0.450	0.450	1	A
Heptachlor epoxide	ND		ug/kg	0.901	0.901	1	B
Oxychlordane	ND		ug/kg	0.901	0.901	1	B
trans-Chlordane	ND		ug/kg	0.450	0.450	1	A
Endosulfan I	ND		ug/kg	0.450	0.450	1	A
cis-Chlordane	ND		ug/kg	0.450	0.450	1	A
trans-Nonachlor	ND		ug/kg	0.450	0.450	1	A
4,4'-DDE	ND		ug/kg	0.450	0.450	1	A
Dieldrin	ND		ug/kg	0.450	0.450	1	A
Endrin	ND		ug/kg	0.450	0.450	1	A
Endosulfan II	ND		ug/kg	0.450	0.450	1	A
4,4'-DDD	ND		ug/kg	0.450	0.450	1	A
cis-Nonachlor	ND		ug/kg	0.450	0.450	1	A
4,4'-DDT	ND		ug/kg	0.450	0.450	1	A
Methoxychlor	ND		ug/kg	4.50	4.50	1	A
Toxaphene	ND		ug/kg	22.6	22.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	48		30-150	A
BZ 198	47		30-150	A
DBOB	48		30-150	B
BZ 198	49		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-15
Client ID: NV CLDS REFERENCE SEDIMENT REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 05:22
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.988	0.988	1	A
gamma-BHC	ND		ug/kg	0.494	0.494	1	A
Heptachlor	ND		ug/kg	0.494	0.494	1	A
Aldrin	ND		ug/kg	0.494	0.494	1	A
Heptachlor epoxide	ND		ug/kg	0.988	0.988	1	B
Oxychlordane	ND		ug/kg	0.988	0.988	1	B
trans-Chlordane	ND		ug/kg	0.494	0.494	1	A
Endosulfan I	ND		ug/kg	0.494	0.494	1	A
cis-Chlordane	ND		ug/kg	0.494	0.494	1	A
trans-Nonachlor	ND		ug/kg	0.494	0.494	1	B
4,4'-DDE	ND		ug/kg	0.494	0.494	1	A
Dieldrin	ND		ug/kg	0.494	0.494	1	A
Endrin	ND		ug/kg	0.494	0.494	1	A
Endosulfan II	ND		ug/kg	0.494	0.494	1	A
4,4'-DDD	ND		ug/kg	0.494	0.494	1	A
cis-Nonachlor	ND		ug/kg	0.494	0.494	1	A
4,4'-DDT	ND		ug/kg	0.494	0.494	1	A
Methoxychlor	ND		ug/kg	4.94	4.94	1	A
Toxaphene	ND		ug/kg	24.8	24.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	50		30-150	A
BZ 198	53		30-150	A
DBOB	48		30-150	B
BZ 198	55		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-16
Client ID: NV COMPOSITE 1 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 05:56
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.949	0.949	1	A
gamma-BHC	ND		ug/kg	0.474	0.474	1	A
Heptachlor	ND		ug/kg	0.474	0.474	1	A
Aldrin	ND		ug/kg	0.474	0.474	1	A
Heptachlor epoxide	ND		ug/kg	0.949	0.949	1	B
Oxychlordane	ND		ug/kg	0.949	0.949	1	B
trans-Chlordane	ND		ug/kg	0.474	0.474	1	A
Endosulfan I	ND		ug/kg	0.474	0.474	1	A
cis-Chlordane	ND		ug/kg	0.474	0.474	1	A
trans-Nonachlor	ND		ug/kg	0.474	0.474	1	B
4,4'-DDE	ND		ug/kg	0.474	0.474	1	A
Dieldrin	ND		ug/kg	0.474	0.474	1	A
Endrin	ND		ug/kg	0.474	0.474	1	A
Endosulfan II	ND		ug/kg	0.474	0.474	1	A
4,4'-DDD	ND		ug/kg	0.474	0.474	1	A
cis-Nonachlor	ND		ug/kg	0.474	0.474	1	A
4,4'-DDT	ND		ug/kg	0.474	0.474	1	A
Methoxychlor	ND		ug/kg	4.74	4.74	1	A
Toxaphene	ND		ug/kg	23.8	23.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	62		30-150	A
DBOB	56		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-17
Client ID: NV COMPOSITE 1 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 06:30
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.914	0.914	1	A
gamma-BHC	ND		ug/kg	0.457	0.457	1	A
Heptachlor	ND		ug/kg	0.457	0.457	1	A
Aldrin	ND		ug/kg	0.457	0.457	1	A
Heptachlor epoxide	ND		ug/kg	0.914	0.914	1	B
Oxychlordane	ND		ug/kg	0.914	0.914	1	B
trans-Chlordane	ND		ug/kg	0.457	0.457	1	A
Endosulfan I	ND		ug/kg	0.457	0.457	1	A
cis-Chlordane	ND		ug/kg	0.457	0.457	1	A
trans-Nonachlor	ND		ug/kg	0.457	0.457	1	B
4,4'-DDE	ND		ug/kg	0.457	0.457	1	A
Dieldrin	ND		ug/kg	0.457	0.457	1	A
Endrin	ND		ug/kg	0.457	0.457	1	A
Endosulfan II	ND		ug/kg	0.457	0.457	1	A
4,4'-DDD	ND		ug/kg	0.457	0.457	1	A
cis-Nonachlor	ND		ug/kg	0.457	0.457	1	A
4,4'-DDT	ND		ug/kg	0.457	0.457	1	A
Methoxychlor	ND		ug/kg	4.57	4.57	1	A
Toxaphene	ND		ug/kg	22.9	22.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	42		30-150	A
BZ 198	46		30-150	A
DBOB	34		30-150	B
BZ 198	48		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-18
Client ID: NV COMPOSITE 1 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 07:04
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.973	0.973	1	A
gamma-BHC	ND		ug/kg	0.486	0.486	1	A
Heptachlor	ND		ug/kg	0.486	0.486	1	A
Aldrin	ND		ug/kg	0.486	0.486	1	A
Heptachlor epoxide	ND		ug/kg	0.973	0.973	1	B
Oxychlordane	ND		ug/kg	0.973	0.973	1	B
trans-Chlordane	ND		ug/kg	0.486	0.486	1	A
Endosulfan I	ND		ug/kg	0.486	0.486	1	A
cis-Chlordane	ND		ug/kg	0.486	0.486	1	A
trans-Nonachlor	ND		ug/kg	0.486	0.486	1	B
4,4'-DDE	ND		ug/kg	0.486	0.486	1	A
Dieldrin	ND		ug/kg	0.486	0.486	1	A
Endrin	ND		ug/kg	0.486	0.486	1	A
Endosulfan II	ND		ug/kg	0.486	0.486	1	A
4,4'-DDD	ND		ug/kg	0.486	0.486	1	A
cis-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDT	ND		ug/kg	0.486	0.486	1	A
Methoxychlor	ND		ug/kg	4.86	4.86	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	64		30-150	A
DBOB	52		30-150	B
BZ 198	67		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-19
Client ID: NV COMPOSITE 1 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 07:38
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.952	0.952	1	A
gamma-BHC	ND		ug/kg	0.476	0.476	1	A
Heptachlor	ND		ug/kg	0.476	0.476	1	A
Aldrin	ND		ug/kg	0.476	0.476	1	A
Heptachlor epoxide	ND		ug/kg	0.952	0.952	1	B
Oxychlordane	ND		ug/kg	0.952	0.952	1	B
trans-Chlordane	ND		ug/kg	0.476	0.476	1	A
Endosulfan I	ND		ug/kg	0.476	0.476	1	A
cis-Chlordane	ND		ug/kg	0.476	0.476	1	A
trans-Nonachlor	ND		ug/kg	0.476	0.476	1	B
4,4'-DDE	ND		ug/kg	0.476	0.476	1	A
Dieldrin	ND		ug/kg	0.476	0.476	1	A
Endrin	ND		ug/kg	0.476	0.476	1	A
Endosulfan II	ND		ug/kg	0.476	0.476	1	A
4,4'-DDD	ND		ug/kg	0.476	0.476	1	A
cis-Nonachlor	ND		ug/kg	0.476	0.476	1	A
4,4'-DDT	ND		ug/kg	0.476	0.476	1	A
Methoxychlor	ND		ug/kg	4.76	4.76	1	A
Toxaphene	ND		ug/kg	23.9	23.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	64		30-150	A
DBOB	53		30-150	B
BZ 198	67		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-20
Client ID: NV COMPOSITE 1 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/11/17 08:12
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.945	0.945	1	A
gamma-BHC	ND		ug/kg	0.472	0.472	1	A
Heptachlor	ND		ug/kg	0.472	0.472	1	B
Aldrin	ND		ug/kg	0.472	0.472	1	A
Heptachlor epoxide	ND		ug/kg	0.945	0.945	1	B
Oxychlordane	ND		ug/kg	0.945	0.945	1	B
trans-Chlordane	ND		ug/kg	0.472	0.472	1	A
Endosulfan I	ND		ug/kg	0.472	0.472	1	A
cis-Chlordane	ND		ug/kg	0.472	0.472	1	A
trans-Nonachlor	ND		ug/kg	0.472	0.472	1	B
4,4'-DDE	ND		ug/kg	0.472	0.472	1	A
Dieldrin	ND		ug/kg	0.472	0.472	1	A
Endrin	ND		ug/kg	0.472	0.472	1	A
Endosulfan II	ND		ug/kg	0.472	0.472	1	A
4,4'-DDD	ND		ug/kg	0.472	0.472	1	A
cis-Nonachlor	ND		ug/kg	0.472	0.472	1	A
4,4'-DDT	ND		ug/kg	0.472	0.472	1	A
Methoxychlor	ND		ug/kg	4.72	4.72	1	A
Toxaphene	ND		ug/kg	23.7	23.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	64		30-150	A
DBOB	54		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-21
Client ID: NV COMPOSITE 2 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/13/17 17:46
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.971	0.971	1	A
gamma-BHC	ND		ug/kg	0.485	0.485	1	A
Heptachlor	ND		ug/kg	0.485	0.485	1	A
Aldrin	ND		ug/kg	0.485	0.485	1	A
Heptachlor epoxide	ND		ug/kg	0.971	0.971	1	B
Oxychlordane	ND		ug/kg	0.971	0.971	1	B
trans-Chlordane	ND		ug/kg	0.485	0.485	1	A
Endosulfan I	ND		ug/kg	0.485	0.485	1	A
cis-Chlordane	ND		ug/kg	0.485	0.485	1	A
trans-Nonachlor	ND		ug/kg	0.485	0.485	1	A
4,4'-DDE	ND		ug/kg	0.485	0.485	1	A
Dieldrin	ND		ug/kg	0.485	0.485	1	A
Endrin	ND		ug/kg	0.485	0.485	1	A
Endosulfan II	ND		ug/kg	0.485	0.485	1	A
4,4'-DDD	ND		ug/kg	0.485	0.485	1	A
cis-Nonachlor	ND		ug/kg	0.485	0.485	1	A
4,4'-DDT	ND		ug/kg	0.485	0.485	1	A
Methoxychlor	ND		ug/kg	4.85	4.85	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	96		30-150	A
BZ 198	59		30-150	A
DBOB	59		30-150	B
BZ 198	61		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-22
Client ID: NV COMPOSITE 2 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 12:17
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.919	0.919	1	A
gamma-BHC	ND		ug/kg	0.460	0.460	1	A
Heptachlor	ND		ug/kg	0.460	0.460	1	A
Aldrin	ND		ug/kg	0.460	0.460	1	A
Heptachlor epoxide	ND		ug/kg	0.919	0.919	1	B
Oxychlordane	ND		ug/kg	0.919	0.919	1	B
trans-Chlordane	ND		ug/kg	0.460	0.460	1	A
Endosulfan I	ND		ug/kg	0.460	0.460	1	A
cis-Chlordane	ND		ug/kg	0.460	0.460	1	A
trans-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDE	ND		ug/kg	0.460	0.460	1	A
Dieldrin	ND		ug/kg	0.460	0.460	1	A
Endrin	ND		ug/kg	0.460	0.460	1	A
Endosulfan II	ND		ug/kg	0.460	0.460	1	A
4,4'-DDD	ND		ug/kg	0.460	0.460	1	A
cis-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDT	ND		ug/kg	0.460	0.460	1	A
Methoxychlor	ND		ug/kg	4.60	4.60	1	A
Toxaphene	ND		ug/kg	23.1	23.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	145		30-150	A
BZ 198	63		30-150	A
DBOB	113		30-150	B
BZ 198	63		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-23
Client ID: NV COMPOSITE 2 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 12:51
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.842	0.842	1	A
gamma-BHC	ND		ug/kg	0.421	0.421	1	A
Heptachlor	ND		ug/kg	0.421	0.421	1	A
Aldrin	ND		ug/kg	0.421	0.421	1	A
Heptachlor epoxide	ND		ug/kg	0.842	0.842	1	B
Oxychlordane	ND		ug/kg	0.842	0.842	1	B
trans-Chlordane	ND		ug/kg	0.421	0.421	1	A
Endosulfan I	ND		ug/kg	0.421	0.421	1	A
cis-Chlordane	ND		ug/kg	0.421	0.421	1	A
trans-Nonachlor	ND		ug/kg	0.421	0.421	1	A
4,4'-DDE	ND		ug/kg	0.421	0.421	1	A
Dieldrin	ND		ug/kg	0.421	0.421	1	A
Endrin	ND		ug/kg	0.421	0.421	1	A
Endosulfan II	ND		ug/kg	0.421	0.421	1	A
4,4'-DDD	ND		ug/kg	0.421	0.421	1	A
cis-Nonachlor	ND		ug/kg	0.421	0.421	1	A
4,4'-DDT	ND		ug/kg	0.421	0.421	1	A
Methoxychlor	ND		ug/kg	4.21	4.21	1	A
Toxaphene	ND		ug/kg	21.1	21.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	120		30-150	A
BZ 198	66		30-150	A
DBOB	86		30-150	B
BZ 198	67		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-24
Client ID: NV COMPOSITE 2 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 13:25
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.976	0.976	1	A
gamma-BHC	ND		ug/kg	0.488	0.488	1	A
Heptachlor	ND		ug/kg	0.488	0.488	1	A
Aldrin	ND		ug/kg	0.488	0.488	1	A
Heptachlor epoxide	ND		ug/kg	0.976	0.976	1	B
Oxychlordane	ND		ug/kg	0.976	0.976	1	B
trans-Chlordane	ND		ug/kg	0.488	0.488	1	A
Endosulfan I	ND		ug/kg	0.488	0.488	1	A
cis-Chlordane	ND		ug/kg	0.488	0.488	1	A
trans-Nonachlor	ND		ug/kg	0.488	0.488	1	A
4,4'-DDE	ND		ug/kg	0.488	0.488	1	A
Dieldrin	ND		ug/kg	0.488	0.488	1	A
Endrin	ND		ug/kg	0.488	0.488	1	A
Endosulfan II	ND		ug/kg	0.488	0.488	1	A
4,4'-DDD	ND		ug/kg	0.488	0.488	1	A
cis-Nonachlor	ND		ug/kg	0.488	0.488	1	A
4,4'-DDT	ND		ug/kg	0.488	0.488	1	A
Methoxychlor	ND		ug/kg	4.88	4.88	1	A
Toxaphene	ND		ug/kg	24.5	24.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	116		30-150	A
BZ 198	63		30-150	A
DBOB	76		30-150	B
BZ 198	65		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-25
Client ID: NV COMPOSITE 2 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 13:59
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.871	0.871	1	A
gamma-BHC	ND		ug/kg	0.436	0.436	1	A
Heptachlor	ND		ug/kg	0.436	0.436	1	A
Aldrin	ND		ug/kg	0.436	0.436	1	A
Heptachlor epoxide	ND		ug/kg	0.871	0.871	1	B
Oxychlordane	ND		ug/kg	0.871	0.871	1	B
trans-Chlordane	ND		ug/kg	0.436	0.436	1	A
Endosulfan I	ND		ug/kg	0.436	0.436	1	A
cis-Chlordane	ND		ug/kg	0.436	0.436	1	A
trans-Nonachlor	ND		ug/kg	0.436	0.436	1	A
4,4'-DDE	ND		ug/kg	0.436	0.436	1	A
Dieldrin	ND		ug/kg	0.436	0.436	1	A
Endrin	ND		ug/kg	0.436	0.436	1	A
Endosulfan II	ND		ug/kg	0.436	0.436	1	A
4,4'-DDD	ND		ug/kg	0.436	0.436	1	A
cis-Nonachlor	ND		ug/kg	0.436	0.436	1	A
4,4'-DDT	ND		ug/kg	0.436	0.436	1	A
Methoxychlor	ND		ug/kg	4.36	4.36	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	100		30-150	A
BZ 198	60		30-150	A
DBOB	68		30-150	B
BZ 198	80		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-26
Client ID: NV COMPOSITE 3 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 14:33
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.896	0.896	1	A
gamma-BHC	ND		ug/kg	0.448	0.448	1	A
Heptachlor	ND		ug/kg	0.448	0.448	1	A
Aldrin	ND		ug/kg	0.448	0.448	1	A
Heptachlor epoxide	ND		ug/kg	0.896	0.896	1	B
Oxychlordane	ND		ug/kg	0.896	0.896	1	B
trans-Chlordane	ND		ug/kg	0.448	0.448	1	A
Endosulfan I	ND		ug/kg	0.448	0.448	1	A
cis-Chlordane	ND		ug/kg	0.448	0.448	1	A
trans-Nonachlor	ND		ug/kg	0.448	0.448	1	A
4,4'-DDE	ND		ug/kg	0.448	0.448	1	A
Dieldrin	ND		ug/kg	0.448	0.448	1	A
Endrin	ND		ug/kg	0.448	0.448	1	A
Endosulfan II	ND		ug/kg	0.448	0.448	1	A
4,4'-DDD	ND		ug/kg	0.448	0.448	1	A
cis-Nonachlor	ND		ug/kg	0.448	0.448	1	A
4,4'-DDT	ND		ug/kg	0.448	0.448	1	A
Methoxychlor	ND		ug/kg	4.48	4.48	1	A
Toxaphene	ND		ug/kg	22.5	22.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		30-150	A
BZ 198	53		30-150	A
DBOB	47		30-150	B
BZ 198	61		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-27
Client ID: NV COMPOSITE 3 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 15:07
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.874	0.874	1	A
gamma-BHC	ND		ug/kg	0.437	0.437	1	A
Heptachlor	ND		ug/kg	0.437	0.437	1	A
Aldrin	ND		ug/kg	0.437	0.437	1	A
Heptachlor epoxide	ND		ug/kg	0.874	0.874	1	B
Oxychlordane	ND		ug/kg	0.874	0.874	1	B
trans-Chlordane	ND		ug/kg	0.437	0.437	1	A
Endosulfan I	ND		ug/kg	0.437	0.437	1	A
cis-Chlordane	ND		ug/kg	0.437	0.437	1	A
trans-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDE	ND		ug/kg	0.437	0.437	1	A
Dieldrin	ND		ug/kg	0.437	0.437	1	A
Endrin	ND		ug/kg	0.437	0.437	1	A
Endosulfan II	ND		ug/kg	0.437	0.437	1	A
4,4'-DDD	ND		ug/kg	0.437	0.437	1	A
cis-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDT	ND		ug/kg	0.437	0.437	1	A
Methoxychlor	ND		ug/kg	4.37	4.37	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	46		30-150	A
DBOB	41		30-150	B
BZ 198	55		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-28
Client ID: NV COMPOSITE 3 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 15:41
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.992	0.992	1	A
gamma-BHC	ND		ug/kg	0.496	0.496	1	A
Heptachlor	ND		ug/kg	0.496	0.496	1	A
Aldrin	ND		ug/kg	0.496	0.496	1	A
Heptachlor epoxide	ND		ug/kg	0.992	0.992	1	B
Oxychlordane	ND		ug/kg	0.992	0.992	1	B
trans-Chlordane	ND		ug/kg	0.496	0.496	1	A
Endosulfan I	ND		ug/kg	0.496	0.496	1	A
cis-Chlordane	ND		ug/kg	0.496	0.496	1	A
trans-Nonachlor	ND		ug/kg	0.496	0.496	1	A
4,4'-DDE	ND		ug/kg	0.496	0.496	1	A
Dieldrin	ND		ug/kg	0.496	0.496	1	A
Endrin	ND		ug/kg	0.496	0.496	1	A
Endosulfan II	ND		ug/kg	0.496	0.496	1	A
4,4'-DDD	ND		ug/kg	0.496	0.496	1	A
cis-Nonachlor	ND		ug/kg	0.496	0.496	1	A
4,4'-DDT	ND		ug/kg	0.496	0.496	1	A
Methoxychlor	ND		ug/kg	4.96	4.96	1	A
Toxaphene	ND		ug/kg	24.9	24.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	50		30-150	A
DBOB	42		30-150	B
BZ 198	54		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-29
Client ID: NV COMPOSITE 3 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 16:15
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.958	0.958	1	A
gamma-BHC	ND		ug/kg	0.479	0.479	1	A
Heptachlor	ND		ug/kg	0.479	0.479	1	A
Aldrin	ND		ug/kg	0.479	0.479	1	A
Heptachlor epoxide	ND		ug/kg	0.958	0.958	1	B
Oxychlordane	ND		ug/kg	0.958	0.958	1	B
trans-Chlordane	ND		ug/kg	0.479	0.479	1	A
Endosulfan I	ND		ug/kg	0.479	0.479	1	A
cis-Chlordane	ND		ug/kg	0.479	0.479	1	A
trans-Nonachlor	ND		ug/kg	0.479	0.479	1	A
4,4'-DDE	ND		ug/kg	0.479	0.479	1	A
Dieldrin	ND		ug/kg	0.479	0.479	1	A
Endrin	ND		ug/kg	0.479	0.479	1	A
Endosulfan II	ND		ug/kg	0.479	0.479	1	A
4,4'-DDD	ND		ug/kg	0.479	0.479	1	A
cis-Nonachlor	ND		ug/kg	0.479	0.479	1	A
4,4'-DDT	ND		ug/kg	0.479	0.479	1	A
Methoxychlor	ND		ug/kg	4.79	4.79	1	A
Toxaphene	ND		ug/kg	24.0	24.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	116		30-150	A
BZ 198	64		30-150	A
DBOB	68		30-150	B
BZ 198	66		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-30
Client ID: NV COMPOSITE 3 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 16:49
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.973	0.973	1	A
gamma-BHC	ND		ug/kg	0.486	0.486	1	A
Heptachlor	ND		ug/kg	0.486	0.486	1	A
Aldrin	ND		ug/kg	0.486	0.486	1	A
Heptachlor epoxide	ND		ug/kg	0.973	0.973	1	B
Oxychlordane	ND		ug/kg	0.973	0.973	1	B
trans-Chlordane	ND		ug/kg	0.486	0.486	1	A
Endosulfan I	ND		ug/kg	0.486	0.486	1	A
cis-Chlordane	ND		ug/kg	0.486	0.486	1	A
trans-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDE	ND		ug/kg	0.486	0.486	1	A
Dieldrin	ND		ug/kg	0.486	0.486	1	A
Endrin	ND		ug/kg	0.486	0.486	1	A
Endosulfan II	ND		ug/kg	0.486	0.486	1	A
4,4'-DDD	ND		ug/kg	0.486	0.486	1	A
cis-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDT	ND		ug/kg	0.486	0.486	1	A
Methoxychlor	ND		ug/kg	4.86	4.86	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	102		30-150	A
BZ 198	66		30-150	A
DBOB	63		30-150	B
BZ 198	71		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-31
Client ID: NV COMPOSITE 4 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 17:23
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.956	0.956	1	A
gamma-BHC	ND		ug/kg	0.478	0.478	1	A
Heptachlor	ND		ug/kg	0.478	0.478	1	A
Aldrin	ND		ug/kg	0.478	0.478	1	A
Heptachlor epoxide	ND		ug/kg	0.956	0.956	1	B
Oxychlordane	ND		ug/kg	0.956	0.956	1	B
trans-Chlordane	ND		ug/kg	0.478	0.478	1	A
Endosulfan I	ND		ug/kg	0.478	0.478	1	A
cis-Chlordane	ND		ug/kg	0.478	0.478	1	A
trans-Nonachlor	ND		ug/kg	0.478	0.478	1	A
4,4'-DDE	ND		ug/kg	0.478	0.478	1	A
Dieldrin	ND		ug/kg	0.478	0.478	1	A
Endrin	ND		ug/kg	0.478	0.478	1	A
Endosulfan II	ND		ug/kg	0.478	0.478	1	A
4,4'-DDD	ND		ug/kg	0.478	0.478	1	A
cis-Nonachlor	ND		ug/kg	0.478	0.478	1	A
4,4'-DDT	ND		ug/kg	0.478	0.478	1	A
Methoxychlor	ND		ug/kg	4.78	4.78	1	A
Toxaphene	ND		ug/kg	24.0	24.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	A
BZ 198	52		30-150	A
DBOB	55		30-150	B
BZ 198	57		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-32
Client ID: NV COMPOSITE 4 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 17:57
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.858	0.858	1	A
gamma-BHC	ND		ug/kg	0.429	0.429	1	A
Heptachlor	ND		ug/kg	0.429	0.429	1	A
Aldrin	ND		ug/kg	0.429	0.429	1	A
Heptachlor epoxide	ND		ug/kg	0.858	0.858	1	B
Oxychlordane	ND		ug/kg	0.858	0.858	1	B
trans-Chlordane	ND		ug/kg	0.429	0.429	1	A
Endosulfan I	ND		ug/kg	0.429	0.429	1	A
cis-Chlordane	ND		ug/kg	0.429	0.429	1	A
trans-Nonachlor	ND		ug/kg	0.429	0.429	1	A
4,4'-DDE	ND		ug/kg	0.429	0.429	1	A
Dieldrin	ND		ug/kg	0.429	0.429	1	A
Endrin	ND		ug/kg	0.429	0.429	1	A
Endosulfan II	ND		ug/kg	0.429	0.429	1	A
4,4'-DDD	ND		ug/kg	0.429	0.429	1	A
cis-Nonachlor	ND		ug/kg	0.429	0.429	1	A
4,4'-DDT	ND		ug/kg	0.429	0.429	1	A
Methoxychlor	ND		ug/kg	4.29	4.29	1	A
Toxaphene	ND		ug/kg	21.5	21.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	84		30-150	A
BZ 198	65		30-150	A
DBOB	58		30-150	B
BZ 198	68		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-33
Client ID: NV COMPOSITE 4 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 18:31
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.868	0.868	1	A
gamma-BHC	ND		ug/kg	0.434	0.434	1	A
Heptachlor	ND		ug/kg	0.434	0.434	1	A
Aldrin	ND		ug/kg	0.434	0.434	1	A
Heptachlor epoxide	ND		ug/kg	0.868	0.868	1	B
Oxychlordane	ND		ug/kg	0.868	0.868	1	B
trans-Chlordane	ND		ug/kg	0.434	0.434	1	A
Endosulfan I	ND		ug/kg	0.434	0.434	1	A
cis-Chlordane	ND		ug/kg	0.434	0.434	1	A
trans-Nonachlor	ND		ug/kg	0.434	0.434	1	A
4,4'-DDE	ND		ug/kg	0.434	0.434	1	A
Dieldrin	ND		ug/kg	0.434	0.434	1	A
Endrin	ND		ug/kg	0.434	0.434	1	A
Endosulfan II	ND		ug/kg	0.434	0.434	1	A
4,4'-DDD	ND		ug/kg	0.434	0.434	1	A
cis-Nonachlor	ND		ug/kg	0.434	0.434	1	A
4,4'-DDT	ND		ug/kg	0.434	0.434	1	A
Methoxychlor	ND		ug/kg	4.34	4.34	1	A
Toxaphene	ND		ug/kg	21.8	21.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	119		30-150	A
BZ 198	58		30-150	A
DBOB	100		30-150	B
BZ 198	62		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-34
Client ID: NV COMPOSITE 4 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 19:05
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.934	0.934	1	A
gamma-BHC	ND		ug/kg	0.467	0.467	1	A
Heptachlor	ND		ug/kg	0.467	0.467	1	A
Aldrin	ND		ug/kg	0.467	0.467	1	A
Heptachlor epoxide	ND		ug/kg	0.934	0.934	1	B
Oxychlordane	ND		ug/kg	0.934	0.934	1	B
trans-Chlordane	ND		ug/kg	0.467	0.467	1	A
Endosulfan I	ND		ug/kg	0.467	0.467	1	A
cis-Chlordane	ND		ug/kg	0.467	0.467	1	A
trans-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDE	ND		ug/kg	0.467	0.467	1	A
Dieldrin	ND		ug/kg	0.467	0.467	1	A
Endrin	ND		ug/kg	0.467	0.467	1	A
Endosulfan II	ND		ug/kg	0.467	0.467	1	A
4,4'-DDD	ND		ug/kg	0.467	0.467	1	A
cis-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDT	ND		ug/kg	0.467	0.467	1	A
Methoxychlor	ND		ug/kg	4.67	4.67	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	109		30-150	A
BZ 198	60		30-150	A
DBOB	90		30-150	B
BZ 198	64		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-35
Client ID: NV COMPOSITE 4 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 19:39
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.922	0.922	1	A
gamma-BHC	ND		ug/kg	0.461	0.461	1	A
Heptachlor	ND		ug/kg	0.461	0.461	1	A
Aldrin	ND		ug/kg	0.461	0.461	1	A
Heptachlor epoxide	ND		ug/kg	0.922	0.922	1	B
Oxychlordane	ND		ug/kg	0.922	0.922	1	B
trans-Chlordane	ND		ug/kg	0.461	0.461	1	A
Endosulfan I	ND		ug/kg	0.461	0.461	1	A
cis-Chlordane	ND		ug/kg	0.461	0.461	1	A
trans-Nonachlor	ND		ug/kg	0.461	0.461	1	A
4,4'-DDE	ND		ug/kg	0.461	0.461	1	A
Dieldrin	ND		ug/kg	0.461	0.461	1	A
Endrin	ND		ug/kg	0.461	0.461	1	A
Endosulfan II	ND		ug/kg	0.461	0.461	1	A
4,4'-DDD	ND		ug/kg	0.461	0.461	1	A
cis-Nonachlor	ND		ug/kg	0.461	0.461	1	A
4,4'-DDT	ND		ug/kg	0.461	0.461	1	A
Methoxychlor	ND		ug/kg	4.61	4.61	1	A
Toxaphene	ND		ug/kg	23.2	23.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	82		30-150	A
BZ 198	53		30-150	A
DBOB	51		30-150	B
BZ 198	57		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-36
Client ID: NV COMPOSITE 5 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 20:13
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.929	0.929	1	A
gamma-BHC	ND		ug/kg	0.465	0.465	1	A
Heptachlor	ND		ug/kg	0.465	0.465	1	A
Aldrin	ND		ug/kg	0.465	0.465	1	A
Heptachlor epoxide	ND		ug/kg	0.929	0.929	1	B
Oxychlordane	ND		ug/kg	0.929	0.929	1	B
trans-Chlordane	ND		ug/kg	0.465	0.465	1	A
Endosulfan I	ND		ug/kg	0.465	0.465	1	A
cis-Chlordane	ND		ug/kg	0.465	0.465	1	A
trans-Nonachlor	ND		ug/kg	0.465	0.465	1	A
4,4'-DDE	ND		ug/kg	0.465	0.465	1	A
Dieldrin	ND		ug/kg	0.465	0.465	1	A
Endrin	ND		ug/kg	0.465	0.465	1	A
Endosulfan II	ND		ug/kg	0.465	0.465	1	A
4,4'-DDD	ND		ug/kg	0.465	0.465	1	A
cis-Nonachlor	ND		ug/kg	0.465	0.465	1	A
4,4'-DDT	ND		ug/kg	0.465	0.465	1	A
Methoxychlor	ND		ug/kg	4.65	4.65	1	A
Toxaphene	ND		ug/kg	23.3	23.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	147		30-150	A
BZ 198	77		30-150	A
DBOB	101		30-150	B
BZ 198	80		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-37
Client ID: NV COMPOSITE 5 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 20:47
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.936	0.936	1	A
gamma-BHC	ND		ug/kg	0.468	0.468	1	A
Heptachlor	ND		ug/kg	0.468	0.468	1	A
Aldrin	ND		ug/kg	0.468	0.468	1	A
Heptachlor epoxide	ND		ug/kg	0.936	0.936	1	B
Oxychlordane	ND		ug/kg	0.936	0.936	1	B
trans-Chlordane	ND		ug/kg	0.468	0.468	1	A
Endosulfan I	ND		ug/kg	0.468	0.468	1	A
cis-Chlordane	ND		ug/kg	0.468	0.468	1	A
trans-Nonachlor	ND		ug/kg	0.468	0.468	1	A
4,4'-DDE	ND		ug/kg	0.468	0.468	1	A
Dieldrin	ND		ug/kg	0.468	0.468	1	A
Endrin	ND		ug/kg	0.468	0.468	1	A
Endosulfan II	ND		ug/kg	0.468	0.468	1	A
4,4'-DDD	ND		ug/kg	0.468	0.468	1	A
cis-Nonachlor	ND		ug/kg	0.468	0.468	1	A
4,4'-DDT	ND		ug/kg	0.468	0.468	1	A
Methoxychlor	ND		ug/kg	4.68	4.68	1	A
Toxaphene	ND		ug/kg	23.5	23.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	125		30-150	A
BZ 198	66		30-150	A
DBOB	76		30-150	B
BZ 198	68		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-38
Client ID: NV COMPOSITE 5 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 21:21
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.919	0.919	1	A
gamma-BHC	ND		ug/kg	0.460	0.460	1	A
Heptachlor	ND		ug/kg	0.460	0.460	1	A
Aldrin	ND		ug/kg	0.460	0.460	1	A
Heptachlor epoxide	ND		ug/kg	0.919	0.919	1	B
Oxychlordane	ND		ug/kg	0.919	0.919	1	B
trans-Chlordane	ND		ug/kg	0.460	0.460	1	A
Endosulfan I	ND		ug/kg	0.460	0.460	1	A
cis-Chlordane	ND		ug/kg	0.460	0.460	1	A
trans-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDE	ND		ug/kg	0.460	0.460	1	A
Dieldrin	ND		ug/kg	0.460	0.460	1	A
Endrin	ND		ug/kg	0.460	0.460	1	A
Endosulfan II	ND		ug/kg	0.460	0.460	1	A
4,4'-DDD	ND		ug/kg	0.460	0.460	1	A
cis-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDT	ND		ug/kg	0.460	0.460	1	A
Methoxychlor	ND		ug/kg	4.60	4.60	1	A
Toxaphene	ND		ug/kg	23.1	23.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	**177**	Q	30-150	A
BZ 198	84		30-150	A
DBOB	139		30-150	B
BZ 198	88		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-39
Client ID: NV COMPOSITE 5 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 21:55
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.886	0.886	1	A
gamma-BHC	ND		ug/kg	0.443	0.443	1	A
Heptachlor	ND		ug/kg	0.443	0.443	1	A
Aldrin	ND		ug/kg	0.443	0.443	1	A
Heptachlor epoxide	ND		ug/kg	0.886	0.886	1	B
Oxychlordane	ND		ug/kg	0.886	0.886	1	B
trans-Chlordane	ND		ug/kg	0.443	0.443	1	A
Endosulfan I	ND		ug/kg	0.443	0.443	1	A
cis-Chlordane	ND		ug/kg	0.443	0.443	1	A
trans-Nonachlor	ND		ug/kg	0.443	0.443	1	A
4,4'-DDE	ND		ug/kg	0.443	0.443	1	A
Dieldrin	ND		ug/kg	0.443	0.443	1	A
Endrin	ND		ug/kg	0.443	0.443	1	A
Endosulfan II	ND		ug/kg	0.443	0.443	1	A
4,4'-DDD	ND		ug/kg	0.443	0.443	1	A
cis-Nonachlor	ND		ug/kg	0.443	0.443	1	A
4,4'-DDT	ND		ug/kg	0.443	0.443	1	A
Methoxychlor	ND		ug/kg	4.43	4.43	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	131		30-150	A
BZ 198	72		30-150	A
DBOB	103		30-150	B
BZ 198	77		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-40
Client ID: NV COMPOSITE 5 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/17/17 22:29
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.973	0.973	1	A
gamma-BHC	ND		ug/kg	0.486	0.486	1	A
Heptachlor	ND		ug/kg	0.486	0.486	1	A
Aldrin	ND		ug/kg	0.486	0.486	1	A
Heptachlor epoxide	ND		ug/kg	0.973	0.973	1	B
Oxychlordane	ND		ug/kg	0.973	0.973	1	B
trans-Chlordane	ND		ug/kg	0.486	0.486	1	A
Endosulfan I	ND		ug/kg	0.486	0.486	1	A
cis-Chlordane	ND		ug/kg	0.486	0.486	1	A
trans-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDE	ND		ug/kg	0.486	0.486	1	A
Dieldrin	ND		ug/kg	0.486	0.486	1	A
Endrin	ND		ug/kg	0.486	0.486	1	A
Endosulfan II	ND		ug/kg	0.486	0.486	1	A
4,4'-DDD	ND		ug/kg	0.486	0.486	1	A
cis-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDT	ND		ug/kg	0.486	0.486	1	A
Methoxychlor	ND		ug/kg	4.86	4.86	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	134		30-150	A
BZ 198	75		30-150	A
DBOB	114		30-150	B
BZ 198	80		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-41
Client ID: NV COMPOSITE 6 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/15/17 22:09
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.853	0.853	1	A
gamma-BHC	ND		ug/kg	0.427	0.427	1	A
Heptachlor	ND		ug/kg	0.427	0.427	1	A
Aldrin	ND		ug/kg	0.427	0.427	1	A
Heptachlor epoxide	ND		ug/kg	0.853	0.853	1	B
Oxychlordane	ND		ug/kg	0.853	0.853	1	B
trans-Chlordane	ND		ug/kg	0.427	0.427	1	A
Endosulfan I	ND		ug/kg	0.427	0.427	1	A
cis-Chlordane	ND		ug/kg	0.427	0.427	1	A
trans-Nonachlor	ND		ug/kg	0.427	0.427	1	A
4,4'-DDE	ND		ug/kg	0.427	0.427	1	A
Dieldrin	ND		ug/kg	0.427	0.427	1	A
Endrin	ND		ug/kg	0.427	0.427	1	A
Endosulfan II	ND		ug/kg	0.427	0.427	1	A
4,4'-DDD	ND		ug/kg	0.427	0.427	1	A
cis-Nonachlor	ND		ug/kg	0.427	0.427	1	A
4,4'-DDT	ND		ug/kg	0.427	0.427	1	A
Methoxychlor	ND		ug/kg	4.27	4.27	1	A
Toxaphene	ND		ug/kg	21.4	21.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	38		30-150	A
BZ 198	48		30-150	A
DBOB	30		30-150	B
BZ 198	41		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-42
Client ID: NV COMPOSITE 6 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 00:26
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.980	0.980	1	A
gamma-BHC	ND		ug/kg	0.490	0.490	1	A
Heptachlor	ND		ug/kg	0.490	0.490	1	A
Aldrin	ND		ug/kg	0.490	0.490	1	A
Heptachlor epoxide	ND		ug/kg	0.980	0.980	1	B
Oxychlordane	ND		ug/kg	0.980	0.980	1	B
trans-Chlordane	ND		ug/kg	0.490	0.490	1	A
Endosulfan I	ND		ug/kg	0.490	0.490	1	A
cis-Chlordane	ND		ug/kg	0.490	0.490	1	A
trans-Nonachlor	ND		ug/kg	0.490	0.490	1	A
4,4'-DDE	ND		ug/kg	0.490	0.490	1	A
Dieldrin	ND		ug/kg	0.490	0.490	1	A
Endrin	ND		ug/kg	0.490	0.490	1	A
Endosulfan II	ND		ug/kg	0.490	0.490	1	A
4,4'-DDD	ND		ug/kg	0.490	0.490	1	A
cis-Nonachlor	ND		ug/kg	0.490	0.490	1	A
4,4'-DDT	ND		ug/kg	0.490	0.490	1	A
Methoxychlor	ND		ug/kg	4.90	4.90	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	53		30-150	A
BZ 198	**191**	Q	30-150	A
DBOB	46		30-150	B
BZ 198	57		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-43
Client ID: NV COMPOSITE 6 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 00:59
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.976	0.976	1	A
gamma-BHC	ND		ug/kg	0.488	0.488	1	A
Heptachlor	ND		ug/kg	0.488	0.488	1	A
Aldrin	ND		ug/kg	0.488	0.488	1	A
Heptachlor epoxide	ND		ug/kg	0.976	0.976	1	B
Oxychlordane	ND		ug/kg	0.976	0.976	1	B
trans-Chlordane	ND		ug/kg	0.488	0.488	1	A
Endosulfan I	ND		ug/kg	0.488	0.488	1	A
cis-Chlordane	ND		ug/kg	0.488	0.488	1	A
trans-Nonachlor	ND		ug/kg	0.488	0.488	1	A
4,4'-DDE	ND		ug/kg	0.488	0.488	1	A
Dieldrin	ND		ug/kg	0.488	0.488	1	A
Endrin	ND		ug/kg	0.488	0.488	1	A
Endosulfan II	ND		ug/kg	0.488	0.488	1	A
4,4'-DDD	ND		ug/kg	0.488	0.488	1	A
cis-Nonachlor	ND		ug/kg	0.488	0.488	1	A
4,4'-DDT	ND		ug/kg	0.488	0.488	1	A
Methoxychlor	ND		ug/kg	4.88	4.88	1	A
Toxaphene	ND		ug/kg	24.5	24.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	52		30-150	A
BZ 198	53		30-150	A
DBOB	41		30-150	B
BZ 198	54		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-44
Client ID: NV COMPOSITE 6 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 01:34
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.934	0.934	1	A
gamma-BHC	ND		ug/kg	0.467	0.467	1	A
Heptachlor	ND		ug/kg	0.467	0.467	1	A
Aldrin	ND		ug/kg	0.467	0.467	1	A
Heptachlor epoxide	ND		ug/kg	0.934	0.934	1	B
Oxychlordane	ND		ug/kg	0.934	0.934	1	B
trans-Chlordane	ND		ug/kg	0.467	0.467	1	A
Endosulfan I	ND		ug/kg	0.467	0.467	1	A
cis-Chlordane	ND		ug/kg	0.467	0.467	1	A
trans-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDE	ND		ug/kg	0.467	0.467	1	A
Dieldrin	ND		ug/kg	0.467	0.467	1	A
Endrin	ND		ug/kg	0.467	0.467	1	A
Endosulfan II	ND		ug/kg	0.467	0.467	1	A
4,4'-DDD	ND		ug/kg	0.467	0.467	1	A
cis-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDT	ND		ug/kg	0.467	0.467	1	A
Methoxychlor	ND		ug/kg	4.67	4.67	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	54		30-150	A
BZ 198	55		30-150	A
DBOB	42		30-150	B
BZ 198	56		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-45
Client ID: NV COMPOSITE 6 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 02:08
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.994	0.994	1	A
gamma-BHC	ND		ug/kg	0.497	0.497	1	A
Heptachlor	ND		ug/kg	0.497	0.497	1	A
Aldrin	ND		ug/kg	0.497	0.497	1	A
Heptachlor epoxide	ND		ug/kg	0.994	0.994	1	B
Oxychlordane	ND		ug/kg	0.994	0.994	1	B
trans-Chlordane	ND		ug/kg	0.497	0.497	1	A
Endosulfan I	ND		ug/kg	0.497	0.497	1	A
cis-Chlordane	ND		ug/kg	0.497	0.497	1	A
trans-Nonachlor	ND		ug/kg	0.497	0.497	1	A
4,4'-DDE	ND		ug/kg	0.497	0.497	1	A
Dieldrin	ND		ug/kg	0.497	0.497	1	A
Endrin	ND		ug/kg	0.497	0.497	1	A
Endosulfan II	ND		ug/kg	0.497	0.497	1	A
4,4'-DDD	ND		ug/kg	0.497	0.497	1	A
cis-Nonachlor	ND		ug/kg	0.497	0.497	1	A
4,4'-DDT	ND		ug/kg	0.497	0.497	1	A
Methoxychlor	ND		ug/kg	4.97	4.97	1	A
Toxaphene	ND		ug/kg	25.0	25.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	49		30-150	A
BZ 198	54		30-150	A
DBOB	38		30-150	B
BZ 198	70		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-46
Client ID: NV COMPOSITE 7 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 02:42
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.954	0.954	1	A
gamma-BHC	ND		ug/kg	0.477	0.477	1	A
Heptachlor	ND		ug/kg	0.477	0.477	1	A
Aldrin	ND		ug/kg	0.477	0.477	1	A
Heptachlor epoxide	ND		ug/kg	0.954	0.954	1	B
Oxychlordane	ND		ug/kg	0.954	0.954	1	B
trans-Chlordane	ND		ug/kg	0.477	0.477	1	A
Endosulfan I	ND		ug/kg	0.477	0.477	1	A
cis-Chlordane	ND		ug/kg	0.477	0.477	1	A
trans-Nonachlor	ND		ug/kg	0.477	0.477	1	A
4,4'-DDE	ND		ug/kg	0.477	0.477	1	A
Dieldrin	ND		ug/kg	0.477	0.477	1	A
Endrin	ND		ug/kg	0.477	0.477	1	A
Endosulfan II	ND		ug/kg	0.477	0.477	1	A
4,4'-DDD	ND		ug/kg	0.477	0.477	1	A
cis-Nonachlor	ND		ug/kg	0.477	0.477	1	A
4,4'-DDT	ND		ug/kg	0.477	0.477	1	A
Methoxychlor	ND		ug/kg	4.77	4.77	1	A
Toxaphene	ND		ug/kg	24.0	24.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	55		30-150	A
DBOB	44		30-150	B
BZ 198	56		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-47
Client ID: NV COMPOSITE 7 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 03:16
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.919	0.919	1	A
gamma-BHC	ND		ug/kg	0.460	0.460	1	A
Heptachlor	ND		ug/kg	0.460	0.460	1	A
Aldrin	ND		ug/kg	0.460	0.460	1	A
Heptachlor epoxide	ND		ug/kg	0.919	0.919	1	B
Oxychlordane	ND		ug/kg	0.919	0.919	1	B
trans-Chlordane	ND		ug/kg	0.460	0.460	1	A
Endosulfan I	ND		ug/kg	0.460	0.460	1	A
cis-Chlordane	ND		ug/kg	0.460	0.460	1	A
trans-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDE	ND		ug/kg	0.460	0.460	1	A
Dieldrin	ND		ug/kg	0.460	0.460	1	A
Endrin	ND		ug/kg	0.460	0.460	1	A
Endosulfan II	ND		ug/kg	0.460	0.460	1	A
4,4'-DDD	ND		ug/kg	0.460	0.460	1	A
cis-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDT	ND		ug/kg	0.460	0.460	1	A
Methoxychlor	ND		ug/kg	4.60	4.60	1	A
Toxaphene	ND		ug/kg	23.1	23.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	55		30-150	A
BZ 198	56		30-150	A
DBOB	44		30-150	B
BZ 198	58		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-48
Client ID: NV COMPOSITE 7 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 03:50
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.866	0.866	1	A
gamma-BHC	ND		ug/kg	0.433	0.433	1	A
Heptachlor	ND		ug/kg	0.433	0.433	1	A
Aldrin	ND		ug/kg	0.433	0.433	1	A
Heptachlor epoxide	ND		ug/kg	0.866	0.866	1	B
Oxychlordane	ND		ug/kg	0.866	0.866	1	B
trans-Chlordane	ND		ug/kg	0.433	0.433	1	A
Endosulfan I	ND		ug/kg	0.433	0.433	1	A
cis-Chlordane	ND		ug/kg	0.433	0.433	1	A
trans-Nonachlor	ND		ug/kg	0.433	0.433	1	A
4,4'-DDE	ND		ug/kg	0.433	0.433	1	A
Dieldrin	ND		ug/kg	0.433	0.433	1	A
Endrin	ND		ug/kg	0.433	0.433	1	A
Endosulfan II	ND		ug/kg	0.433	0.433	1	A
4,4'-DDD	ND		ug/kg	0.433	0.433	1	A
cis-Nonachlor	ND		ug/kg	0.433	0.433	1	A
4,4'-DDT	ND		ug/kg	0.433	0.433	1	A
Methoxychlor	ND		ug/kg	4.33	4.33	1	A
Toxaphene	ND		ug/kg	21.8	21.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	51		30-150	A
DBOB	44		30-150	B
BZ 198	53		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-49
Client ID: NV COMPOSITE 7 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 04:24
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.929	0.929	1	A
gamma-BHC	ND		ug/kg	0.465	0.465	1	A
Heptachlor	ND		ug/kg	0.465	0.465	1	A
Aldrin	ND		ug/kg	0.465	0.465	1	A
Heptachlor epoxide	ND		ug/kg	0.929	0.929	1	B
Oxychlordane	ND		ug/kg	0.929	0.929	1	B
trans-Chlordane	ND		ug/kg	0.465	0.465	1	A
Endosulfan I	ND		ug/kg	0.465	0.465	1	A
cis-Chlordane	ND		ug/kg	0.465	0.465	1	A
trans-Nonachlor	ND		ug/kg	0.465	0.465	1	A
4,4'-DDE	ND		ug/kg	0.465	0.465	1	A
Dieldrin	ND		ug/kg	0.465	0.465	1	A
Endrin	ND		ug/kg	0.465	0.465	1	A
Endosulfan II	ND		ug/kg	0.465	0.465	1	A
4,4'-DDD	ND		ug/kg	0.465	0.465	1	A
cis-Nonachlor	ND		ug/kg	0.465	0.465	1	A
4,4'-DDT	ND		ug/kg	0.465	0.465	1	A
Methoxychlor	ND		ug/kg	4.65	4.65	1	A
Toxaphene	ND		ug/kg	23.3	23.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	55		30-150	A
DBOB	48		30-150	B
BZ 198	55		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-50
Client ID: NV COMPOSITE 7 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 04:58
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.934	0.934	1	A
gamma-BHC	ND		ug/kg	0.467	0.467	1	A
Heptachlor	ND		ug/kg	0.467	0.467	1	A
Aldrin	ND		ug/kg	0.467	0.467	1	A
Heptachlor epoxide	ND		ug/kg	0.934	0.934	1	B
Oxychlordane	ND		ug/kg	0.934	0.934	1	B
trans-Chlordane	ND		ug/kg	0.467	0.467	1	A
Endosulfan I	ND		ug/kg	0.467	0.467	1	A
cis-Chlordane	ND		ug/kg	0.467	0.467	1	A
trans-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDE	ND		ug/kg	0.467	0.467	1	A
Dieldrin	ND		ug/kg	0.467	0.467	1	A
Endrin	ND		ug/kg	0.467	0.467	1	A
Endosulfan II	ND		ug/kg	0.467	0.467	1	A
4,4'-DDD	ND		ug/kg	0.467	0.467	1	A
cis-Nonachlor	ND		ug/kg	0.467	0.467	1	A
4,4'-DDT	ND		ug/kg	0.467	0.467	1	A
Methoxychlor	ND		ug/kg	4.67	4.67	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	60		30-150	A
DBOB	50		30-150	B
BZ 198	62		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-51
Client ID: NV COMPOSITE 8 REP A
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 05:32
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.914	0.914	1	A
gamma-BHC	ND		ug/kg	0.457	0.457	1	A
Heptachlor	ND		ug/kg	0.457	0.457	1	A
Aldrin	ND		ug/kg	0.457	0.457	1	A
Heptachlor epoxide	ND		ug/kg	0.914	0.914	1	B
Oxychlordane	ND		ug/kg	0.914	0.914	1	B
trans-Chlordane	ND		ug/kg	0.457	0.457	1	A
Endosulfan I	ND		ug/kg	0.457	0.457	1	A
cis-Chlordane	ND		ug/kg	0.457	0.457	1	A
trans-Nonachlor	ND		ug/kg	0.457	0.457	1	A
4,4'-DDE	ND		ug/kg	0.457	0.457	1	A
Dieldrin	ND		ug/kg	0.457	0.457	1	A
Endrin	ND		ug/kg	0.457	0.457	1	A
Endosulfan II	ND		ug/kg	0.457	0.457	1	A
4,4'-DDD	ND		ug/kg	0.457	0.457	1	A
cis-Nonachlor	ND		ug/kg	0.457	0.457	1	A
4,4'-DDT	ND		ug/kg	0.457	0.457	1	A
Methoxychlor	ND		ug/kg	4.57	4.57	1	A
Toxaphene	ND		ug/kg	22.9	22.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	67		30-150	A
DBOB	53		30-150	B
BZ 198	65		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-52
Client ID: NV COMPOSITE 8 REP B
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 06:06
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.978	0.978	1	A
gamma-BHC	ND		ug/kg	0.489	0.489	1	A
Heptachlor	ND		ug/kg	0.489	0.489	1	A
Aldrin	ND		ug/kg	0.489	0.489	1	A
Heptachlor epoxide	ND		ug/kg	0.978	0.978	1	B
Oxychlordane	ND		ug/kg	0.978	0.978	1	B
trans-Chlordane	ND		ug/kg	0.489	0.489	1	A
Endosulfan I	ND		ug/kg	0.489	0.489	1	A
cis-Chlordane	ND		ug/kg	0.489	0.489	1	A
trans-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDE	ND		ug/kg	0.489	0.489	1	A
Dieldrin	ND		ug/kg	0.489	0.489	1	A
Endrin	ND		ug/kg	0.489	0.489	1	A
Endosulfan II	ND		ug/kg	0.489	0.489	1	A
4,4'-DDD	ND		ug/kg	0.489	0.489	1	A
cis-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDT	ND		ug/kg	0.489	0.489	1	A
Methoxychlor	ND		ug/kg	4.89	4.89	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	51		30-150	A
BZ 198	51		30-150	A
DBOB	41		30-150	B
BZ 198	50		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-53
Client ID: NV COMPOSITE 8 REP C
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 06:40
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.838	0.838	1	A
gamma-BHC	ND		ug/kg	0.419	0.419	1	A
Heptachlor	ND		ug/kg	0.419	0.419	1	A
Aldrin	ND		ug/kg	0.419	0.419	1	A
Heptachlor epoxide	ND		ug/kg	0.838	0.838	1	B
Oxychlordane	ND		ug/kg	0.838	0.838	1	B
trans-Chlordane	ND		ug/kg	0.419	0.419	1	A
Endosulfan I	ND		ug/kg	0.419	0.419	1	A
cis-Chlordane	ND		ug/kg	0.419	0.419	1	A
trans-Nonachlor	ND		ug/kg	0.419	0.419	1	A
4,4'-DDE	ND		ug/kg	0.419	0.419	1	A
Dieldrin	ND		ug/kg	0.419	0.419	1	A
Endrin	ND		ug/kg	0.419	0.419	1	A
Endosulfan II	ND		ug/kg	0.419	0.419	1	A
4,4'-DDD	ND		ug/kg	0.419	0.419	1	A
cis-Nonachlor	ND		ug/kg	0.419	0.419	1	A
4,4'-DDT	ND		ug/kg	0.419	0.419	1	A
Methoxychlor	ND		ug/kg	4.19	4.19	1	A
Toxaphene	ND		ug/kg	21.0	21.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	50		30-150	A
BZ 198	46		30-150	A
DBOB	37		30-150	B
BZ 198	48		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-54
Client ID: NV COMPOSITE 8 REP D
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 07:14
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.853	0.853	1	A
gamma-BHC	ND		ug/kg	0.427	0.427	1	A
Heptachlor	ND		ug/kg	0.427	0.427	1	A
Aldrin	ND		ug/kg	0.427	0.427	1	A
Heptachlor epoxide	ND		ug/kg	0.853	0.853	1	B
Oxychlordane	ND		ug/kg	0.853	0.853	1	B
trans-Chlordane	ND		ug/kg	0.427	0.427	1	A
Endosulfan I	ND		ug/kg	0.427	0.427	1	A
cis-Chlordane	ND		ug/kg	0.427	0.427	1	A
trans-Nonachlor	ND		ug/kg	0.427	0.427	1	A
4,4'-DDE	ND		ug/kg	0.427	0.427	1	A
Dieldrin	ND		ug/kg	0.427	0.427	1	A
Endrin	ND		ug/kg	0.427	0.427	1	A
Endosulfan II	ND		ug/kg	0.427	0.427	1	A
4,4'-DDD	ND		ug/kg	0.427	0.427	1	A
cis-Nonachlor	ND		ug/kg	0.427	0.427	1	A
4,4'-DDT	ND		ug/kg	0.427	0.427	1	A
Methoxychlor	ND		ug/kg	4.27	4.27	1	A
Toxaphene	ND		ug/kg	21.4	21.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	53		30-150	A
BZ 198	48		30-150	A
DBOB	41		30-150	B
BZ 198	48		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-55
Client ID: NV COMPOSITE 8 REP E
Sample Location: NEW HAVEN, CT

Matrix: Tissue
Analytical Method: 1,8081B
Analytical Date: 11/16/17 07:48
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified
Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.883	0.883	1	A
gamma-BHC	ND		ug/kg	0.442	0.442	1	A
Heptachlor	ND		ug/kg	0.442	0.442	1	A
Aldrin	ND		ug/kg	0.442	0.442	1	A
Heptachlor epoxide	ND		ug/kg	0.883	0.883	1	B
Oxychlordane	ND		ug/kg	0.883	0.883	1	B
trans-Chlordane	ND		ug/kg	0.442	0.442	1	A
Endosulfan I	ND		ug/kg	0.442	0.442	1	A
cis-Chlordane	ND		ug/kg	0.442	0.442	1	A
trans-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDE	ND		ug/kg	0.442	0.442	1	A
Dieldrin	ND		ug/kg	0.442	0.442	1	A
Endrin	ND		ug/kg	0.442	0.442	1	A
Endosulfan II	ND		ug/kg	0.442	0.442	1	A
4,4'-DDD	ND		ug/kg	0.442	0.442	1	A
cis-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDT	ND		ug/kg	0.442	0.442	1	A
Methoxychlor	ND		ug/kg	4.42	4.42	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	57		30-150	A
DBOB	57		30-150	B
BZ 198	61		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/10/17 15:46
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 12:30
Cleanup Method: EPA 3630
Cleanup Date: 10/30/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-20 Batch: WG1057006-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	5.00	5.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	67		30-150	A
DBOB	56		30-150	B
BZ 198	67		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/13/17 15:30
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 13:30
Cleanup Method: EPA 3630
Cleanup Date: 11/02/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 21-40 Batch: WG1057016-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	5.00	5.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	A
BZ 198	70		30-150	A
DBOB	61		30-150	B
BZ 198	70		30-150	B

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/15/17 18:11
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/27/17 17:15
Cleanup Method: EPA 3630
Cleanup Date: 11/01/17

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 41-55 Batch: WG1057025-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	5.00	5.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	53		30-150	A
BZ 198	63		30-150	A
DBOB	56		30-150	B
BZ 198	65		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG1057006-2 WG1057006-3									
Hexachlorobenzene	59		57		50-120	3		30	A
gamma-BHC	64		61		50-120	5		30	A
Heptachlor	63		57		50-120	10		30	A
Aldrin	63		60		50-120	5		30	A
trans-Chlordane	68		68		50-120	0		30	A
Endosulfan I	69		67		50-120	3		30	A
cis-Chlordane	65		64		50-120	2		30	A
trans-Nonachlor	66		66		50-120	0		30	A
4,4'-DDE	74		75		50-120	1		30	A
Dieldrin	74		74		50-120	0		30	A
Endrin	68		64		50-120	6		30	A
4,4'-DDD	72		72		50-120	0		30	A
cis-Nonachlor	73		74		50-120	1		30	A
4,4'-DDT	62		65		50-120	5		30	A
Methoxychlor	54		58		50-120	7		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	70		63		30-150	A
BZ 198	68		72		30-150	A
DBOB	57		51		30-150	B
BZ 198	72		71		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 Batch: WG1057006-2 WG1057006-3									
Heptachlor epoxide	68		66		50-120	3		30	B
Oxychlordane	67		65		50-120	3		30	B
Endosulfan II	70		72		50-120	3		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	70		63		30-150	A
BZ 198	68		72		30-150	A
DBOB	57		51		30-150	B
BZ 198	72		71		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1057016-2 WG1057016-3									
Hexachlorobenzene	63		63		50-120	0		30	A
gamma-BHC	66		69		50-120	4		30	A
Heptachlor	64		68		50-120	6		30	A
Aldrin	68		66		50-120	3		30	A
trans-Chlordane	74		71		50-120	4		30	A
Endosulfan I	73		71		50-120	3		30	A
cis-Chlordane	70		71		50-120	1		30	A
trans-Nonachlor	71		72		50-120	1		30	A
4,4'-DDE	81		80		50-120	1		30	A
Dieldrin	82		81		50-120	1		30	A
Endrin	69		70		50-120	1		30	A
4,4'-DDD	76		75		50-120	1		30	A
cis-Nonachlor	80		79		50-120	1		30	A
4,4'-DDT	75		74		50-120	1		30	A
Methoxychlor	62		59		50-120	5		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	73		71		30-150	A
BZ 198	80		79		30-150	A
DBOB	70		65		30-150	B
BZ 198	79		73		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1057016-2 WG1057016-3									
Heptachlor epoxide	72		68		50-120	6		30	B
Oxychlordane	72		68		50-120	6		30	B
Endosulfan II	77		55		50-120	**33**	Q	30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	73		71		30-150	A
BZ 198	80		79		30-150	A
DBOB	70		65		30-150	B
BZ 198	79		73		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 Batch: WG1057025-2 WG1057025-3									
Hexachlorobenzene	**40**	Q	**43**	Q	50-120	7		30	A
gamma-BHC	**40**	Q	**45**	Q	50-120	12		30	A
Heptachlor	**41**	Q	**44**	Q	50-120	7		30	A
Aldrin	**40**	Q	**43**	Q	50-120	7		30	A
trans-Chlordane	**48**	Q	51		50-120	6		30	A
Endosulfan I	**48**	Q	53		50-120	10		30	A
cis-Chlordane	**48**	Q	**49**	Q	50-120	2		30	A
trans-Nonachlor	50		50		50-120	0		30	A
4,4'-DDE	60		59		50-120	2		30	A
Dieldrin	56		58		50-120	4		30	A
Endrin	51		53		50-120	4		30	A
4,4'-DDD	58		61		50-120	5		30	A
cis-Nonachlor	57		56		50-120	2		30	A
4,4'-DDT	60		66		50-120	10		30	A
Methoxychlor	58		73		50-120	23		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	41		44		30-150	A
BZ 198	65		113		30-150	A
DBOB	30		38		30-150	B
BZ 198	62		63		30-150	B

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 Batch: WG1057025-2 WG1057025-3									
Heptachlor epoxide	**43**	Q	52		50-120	19		30	B
Oxychlordane	**42**	Q	50		50-120	17		30	B
Endosulfan II	54		60		50-120	11		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	41		44		30-150	A
BZ 198	65		113		30-150	A
DBOB	30		38		30-150	B
BZ 198	62		63		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057006-6 WG1057006-7 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A													
Hexachlorobenzene	ND	97.8	51.1	52		57.1	59		50-120	11		30	A
gamma-BHC	ND	97.8	61.5	63		63.4	66		50-120	3		30	A
Heptachlor	ND	97.8	59.3	61		60.0	62		50-120	1		30	A
Aldrin	ND	97.8	60.6	62		56.8	59		50-120	6		30	A
Heptachlor epoxide	ND	97.8	50.4	52		49.5	51		50-120	2		30	B
Oxychlordane	ND	97.8	53.5	55		51.9	54		50-120	3		30	B
trans-Chlordane	ND	97.8	66.2	68		62.6	65		50-120	6		30	A
Endosulfan I	ND	97.8	57.0	58		54.8	57		50-120	4		30	A
cis-Chlordane	ND	97.8	59.8	61		56.4	58		50-120	6		30	A
trans-Nonachlor	ND	97.8	55.8	57		52.0	54		50-120	7		30	A
4,4'-DDE	ND	97.8	63.5	65		58.4	61		50-120	8		30	A
Dieldrin	ND	97.8	60.7	62		58.5	61		50-120	4		30	A
Endrin	ND	97.8	57.6	59		56.8	59		50-120	1		30	A
Endosulfan II	ND	97.8	59.5	61		59.0	61		50-120	1		30	B
4,4'-DDD	ND	97.8	67.5	69		63.4	66		50-120	6		30	A
cis-Nonachlor	ND	97.8	63.9	65		63.1	65		50-120	1		30	A
4,4'-DDT	ND	97.8	53.0	54		50.3	52		50-120	5		30	A
Methoxychlor	ND	97.8	54.3	56		52.9	55		50-120	3		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	71		92		30-150	A
DBOB	72		79		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057006-6 WG1057006-7 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	76		110		30-150	B
DBOB	50		55		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057016-6 WG1057016-7 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A													
Hexachlorobenzene	ND	87.3	36.2	**42**	Q	48.1	53		50-120	28		30	A
gamma-BHC	ND	87.3	40.3	**46**	Q	51.4	57		50-120	24		30	A
Heptachlor	ND	87.3	38.5	**44**	Q	49.6	55		50-120	25		30	A
Aldrin	ND	87.3	39.9	**46**	Q	50.8	56		50-120	24		30	A
Heptachlor epoxide	ND	87.3	31.6	**36**	Q	39.3	**44**	Q	50-120	22		30	B
Oxychlordane	ND	87.3	31.7	**36**	Q	40.0	**44**	Q	50-120	23		30	B
trans-Chlordane	ND	87.3	38.4	**44**	Q	47.2	52		50-120	21		30	A
Endosulfan I	ND	87.3	36.6	**42**	Q	44.8	**50**	Q	50-120	20		30	A
cis-Chlordane	ND	87.3	34.2	**39**	Q	41.8	**46**	Q	50-120	20		30	A
trans-Nonachlor	ND	87.3	34.8	**40**	Q	42.3	**47**	Q	50-120	19		30	A
4,4'-DDE	ND	87.3	37.9	**43**	Q	47.4	53		50-120	22		30	A
Dieldrin	ND	87.3	37.2	**43**	Q	46.5	52		50-120	22		30	A
Endrin	ND	87.3	33.7	**39**	Q	43.5	**48**	Q	50-120	25		30	A
Endosulfan II	ND	87.3	34.2	**39**	Q	43.6	**48**	Q	50-120	24		30	B
4,4'-DDD	ND	87.3	38.1	**44**	Q	49.3	55		50-120	26		30	A
cis-Nonachlor	ND	87.3	38.4	**44**	Q	48.8	54		50-120	24		30	A
4,4'-DDT	ND	87.3	31.4	**36**	Q	38.7	**43**	Q	50-120	21		30	A
Methoxychlor	ND	87.3	30.5	**35**	Q	38.7	**43**	Q	50-120	24		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	50		56		30-150	A
DBOB	74		91		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057016-6 WG1057016-7 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	54		62		30-150	B
DBOB	48		58		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057025-6 WG1057025-7 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A													
Hexachlorobenzene	ND	94.5	49.5	52		45.5	50		50-120	8		30	A
gamma-BHC	ND	94.5	52.8	56		48.3	53		50-120	9		30	A
Heptachlor	ND	94.5	52.8	56		46.6	52		50-120	12		30	A
Aldrin	ND	94.5	51.7	55		45.3	50		50-120	13		30	A
Heptachlor epoxide	ND	94.5	45.1	**48**	Q	39.5	**44**	Q	50-120	13		30	B
Oxychlordane	ND	94.5	43.6	**46**	Q	38.6	**43**	Q	50-120	12		30	B
trans-Chlordane	ND	94.5	51.3	54		47.4	52		50-120	8		30	A
Endosulfan I	ND	94.5	49.3	52		45.1	**50**	Q	50-120	9		30	A
cis-Chlordane	ND	94.5	45.6	**48**	Q	42.0	**47**	Q	50-120	8		30	A
trans-Nonachlor	ND	94.5	46.3	**49**	Q	42.6	**47**	Q	50-120	8		30	A
4,4'-DDE	ND	94.5	53.4	57		49.7	55		50-120	7		30	A
Dieldrin	ND	94.5	50.8	54		45.5	50		50-120	11		30	A
Endrin	ND	94.5	48.0	51		43.2	**48**	Q	50-120	11		30	A
Endosulfan II	ND	94.5	45.1	**48**	Q	40.6	**45**	Q	50-120	11		30	B
4,4'-DDD	ND	94.5	57.5	61		52.4	58		50-120	9		30	A
cis-Nonachlor	ND	94.5	48.0	51		43.7	**48**	Q	50-120	9		30	A
4,4'-DDT	ND	94.5	48.3	51		43.4	**48**	Q	50-120	11		30	A
Methoxychlor	ND	94.5	59.6	63		54.3	60		50-120	9		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	58		**206**	Q	30-150	A
DBOB	58		57		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: USACE/NHH FNP

Project Number: 60543021

Lab Number: L1735250

Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057025-6 WG1057025-7 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	61		57		30-150	B
DBOB	48		41		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057006-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057006-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	51		61		30-150	A
BZ 198	59		58		30-150	A
DBOB	36		46		30-150	B
BZ 198	53		60		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057016-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	NDI	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057016-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	96		85		30-150	A
BZ 198	59		57		30-150	A
DBOB	59		56		30-150	B
BZ 198	61		66		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057025-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057025-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	38		30		30-150	A
BZ 198	48		33		30-150	A
DBOB	30		**23**	Q	30-150	B
BZ 198	41		34		30-150	B

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1057006-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	42		40-140
4,4'-DDE	60		40-140
4,4'-DDD	78		40-140
DBOB (Surrogate)	52		30-150
DBOB (Surrogate)	60		30-150
BZ 198 (Surrogate)	61		30-150
BZ 198 (Surrogate)	64		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1057016-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	49		40-140
4,4'-DDE	43		40-140
4,4'-DDD	58		40-140
DBOB (Surrogate)	59		30-150
DBOB (Surrogate)	63		30-150
BZ 198 (Surrogate)	55		30-150
BZ 198 (Surrogate)	58		30-150

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1057025-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	32	Q	40-140
4,4'-DDE	49		40-140
4,4'-DDD	70		40-140
DBOB (Surrogate)	37		30-150
DBOB (Surrogate)	43		30-150
BZ 198 (Surrogate)	54		30-150
BZ 198 (Surrogate)	56		30-150

METALS

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-01	Date Collected:	10/04/17 16:20
Client ID:	NV NATIVE BACKGROUND REP A	Date Received:	10/05/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.05		mg/kg	0.100	0.034	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM
Cadmium, Total	0.039	J	mg/kg	0.040	0.011	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM
Chromium, Total	0.337	J	mg/kg	0.400	0.036	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM
Copper, Total	1.05		mg/kg	0.100	0.033	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM
Lead, Total	0.200		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM
Mercury, Total	0.0090	J	mg/kg	0.013	0.004	5	10/19/17 11:45	10/31/17 17:45	EPA 7474	1,7474	BV
Nickel, Total	0.262		mg/kg	0.100	0.037	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM
Zinc, Total	8.99		mg/kg	1.00	0.149	2	10/19/17 11:08	10/30/17 14:48	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-02	Date Collected:	10/04/17 16:20
Client ID:	NV NATIVE BACKGROUND REP B	Date Received:	10/05/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.93		mg/kg	0.100	0.034	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM
Cadmium, Total	0.029	J	mg/kg	0.040	0.011	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM
Chromium, Total	0.451		mg/kg	0.400	0.036	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM
Copper, Total	1.23		mg/kg	0.100	0.033	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM
Lead, Total	0.221		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM
Mercury, Total	0.018		mg/kg	0.013	0.004	5	10/19/17 11:45	10/31/17 17:58	EPA 7474	1,7474	BV
Nickel, Total	0.302		mg/kg	0.100	0.037	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM
Zinc, Total	8.61		mg/kg	1.00	0.149	2	10/19/17 11:08	10/30/17 14:52	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-03	Date Collected:	10/04/17 16:20
Client ID:	NV NATIVE BACKGROUND REP C	Date Received:	10/05/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.09		mg/kg	0.100	0.034	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM
Cadmium, Total	0.031	J	mg/kg	0.040	0.011	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM
Chromium, Total	0.717		mg/kg	0.400	0.036	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM
Copper, Total	1.28		mg/kg	0.100	0.033	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM
Lead, Total	0.320		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM
Mercury, Total	0.020		mg/kg	0.013	0.004	5	10/19/17 11:45	10/31/17 18:00	EPA 7474	1,7474	BV
Nickel, Total	0.399		mg/kg	0.100	0.037	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM
Zinc, Total	9.51		mg/kg	1.00	0.149	2	10/19/17 11:08	10/30/17 14:56	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-04	Date Collected:	10/04/17 16:20
Client ID:	NV NATIVE BACKGROUND REP D	Date Received:	10/05/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.84		mg/kg	0.091	0.031	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM
Cadmium, Total	0.035	J	mg/kg	0.036	0.010	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM
Chromium, Total	0.273	J	mg/kg	0.364	0.033	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM
Copper, Total	1.24		mg/kg	0.091	0.030	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM
Lead, Total	0.152		mg/kg	0.036	0.005	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM
Mercury, Total	0.019		mg/kg	0.011	0.003	5	10/19/17 11:45	10/31/17 18:03	EPA 7474	1,7474	BV
Nickel, Total	0.214		mg/kg	0.091	0.034	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM
Zinc, Total	8.08		mg/kg	0.909	0.135	2	10/19/17 11:08	10/30/17 15:14	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-05	Date Collected:	10/04/17 16:20
Client ID:	NV NATIVE BACKGROUND REP E	Date Received:	10/05/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	3.05		mg/kg	0.093	0.032	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM
Cadmium, Total	0.031	J	mg/kg	0.037	0.010	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM
Chromium, Total	0.295	J	mg/kg	0.374	0.034	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM
Copper, Total	0.975		mg/kg	0.093	0.031	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM
Lead, Total	0.173		mg/kg	0.037	0.005	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM
Mercury, Total	0.017		mg/kg	0.012	0.003	5	10/19/17 11:45	10/31/17 18:10	EPA 7474	1,7474	BV
Nickel, Total	0.216		mg/kg	0.093	0.035	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM
Zinc, Total	8.14		mg/kg	0.934	0.139	2	10/19/17 11:08	10/30/17 15:18	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-06	Date Collected:	09/29/17 16:00
Client ID:	NV LABORATORY CONTROL REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.94		mg/kg	0.098	0.034	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM
Cadmium, Total	0.065		mg/kg	0.039	0.010	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM
Chromium, Total	0.078	J	mg/kg	0.392	0.035	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM
Copper, Total	1.18		mg/kg	0.098	0.033	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM
Lead, Total	0.229		mg/kg	0.039	0.006	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM
Mercury, Total	0.005	J	mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 16:46	EPA 7474	1,7474	BV
Nickel, Total	0.069	J	mg/kg	0.098	0.037	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM
Zinc, Total	7.45		mg/kg	0.980	0.146	2	10/25/17 12:07	10/30/17 15:14	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-07	Date Collected:	09/29/17 16:00
Client ID:	NV LABORATORY CONTROL REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.16		mg/kg	0.095	0.033	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM
Cadmium, Total	0.034	J	mg/kg	0.038	0.010	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM
Chromium, Total	0.082	J	mg/kg	0.381	0.034	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM
Copper, Total	1.08		mg/kg	0.095	0.032	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM
Lead, Total	0.084		mg/kg	0.038	0.006	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM
Mercury, Total	0.017		mg/kg	0.012	0.003	5	10/25/17 12:07	10/31/17 16:48	EPA 7474	1,7474	BV
Nickel, Total	0.088	J	mg/kg	0.095	0.035	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM
Zinc, Total	6.82		mg/kg	0.952	0.142	2	10/25/17 12:07	10/30/17 15:18	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-08	Date Collected:	09/29/17 16:00
Client ID:	NV LABORATORY CONTROL REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.73		mg/kg	0.098	0.034	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM
Cadmium, Total	0.046		mg/kg	0.039	0.010	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM
Chromium, Total	0.067	J	mg/kg	0.392	0.035	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM
Copper, Total	0.852		mg/kg	0.098	0.033	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM
Lead, Total	0.148		mg/kg	0.039	0.006	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM
Mercury, Total	0.005	J	mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 16:51	EPA 7474	1,7474	BV
Nickel, Total	0.084	J	mg/kg	0.098	0.037	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM
Zinc, Total	7.02		mg/kg	0.980	0.146	2	10/25/17 12:07	10/30/17 15:22	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-09	Date Collected:	09/29/17 16:00
Client ID:	NV LABORATORY CONTROL REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.594		mg/kg	0.094	0.032	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.038	0.010	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM
Chromium, Total	0.038	J	mg/kg	0.377	0.034	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM
Copper, Total	0.277		mg/kg	0.094	0.032	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM
Lead, Total	0.022	J	mg/kg	0.038	0.005	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/25/17 12:07	10/31/17 16:58	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/kg	0.094	0.035	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM
Zinc, Total	1.92		mg/kg	0.943	0.140	2	10/25/17 12:07	10/30/17 15:26	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-10	Date Collected:	09/29/17 16:00
Client ID:	NV LABORATORY CONTROL REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.11		mg/kg	0.098	0.034	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM
Cadmium, Total	0.040		mg/kg	0.039	0.010	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM
Chromium, Total	0.058	J	mg/kg	0.392	0.035	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM
Copper, Total	0.778		mg/kg	0.098	0.033	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM
Lead, Total	0.126		mg/kg	0.039	0.006	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 17:01	EPA 7474	1,7474	BV
Nickel, Total	0.110		mg/kg	0.098	0.037	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM
Zinc, Total	6.31		mg/kg	0.980	0.146	2	10/25/17 12:07	10/30/17 15:30	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-11	Date Collected:	09/29/17 16:00
Client ID:	NV CLDS REFERENCE SEDIMENT REP	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.94		mg/kg	0.094	0.032	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM
Cadmium, Total	0.037	J	mg/kg	0.038	0.010	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM
Chromium, Total	0.053	J	mg/kg	0.377	0.034	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM
Copper, Total	0.889		mg/kg	0.094	0.032	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM
Lead, Total	0.160		mg/kg	0.038	0.005	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.012	0.003	5	10/25/17 12:07	10/31/17 17:03	EPA 7474	1,7474	BV
Nickel, Total	0.094	J	mg/kg	0.094	0.035	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM
Zinc, Total	6.01		mg/kg	0.943	0.140	2	10/25/17 12:07	10/30/17 15:45	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-12	Date Collected:	09/29/17 16:00
Client ID:	NV CLDS REFERENCE SEDIMENT REP	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.32		mg/kg	0.100	0.034	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM
Cadmium, Total	0.048		mg/kg	0.040	0.011	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM
Chromium, Total	0.048	J	mg/kg	0.400	0.036	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM
Copper, Total	1.02		mg/kg	0.100	0.033	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM
Lead, Total	0.205		mg/kg	0.040	0.006	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.013	0.004	5	10/25/17 12:07	10/31/17 17:06	EPA 7474	1,7474	BV
Nickel, Total	0.063	J	mg/kg	0.100	0.037	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM
Zinc, Total	6.64		mg/kg	1.00	0.149	2	10/25/17 12:07	10/30/17 15:49	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-13	Date Collected:	09/29/17 16:00
Client ID:	NV CLDS REFERENCE SEDIMENT REP	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.39		mg/kg	0.093	0.032	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM
Cadmium, Total	0.039		mg/kg	0.037	0.010	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM
Chromium, Total	0.040	J	mg/kg	0.370	0.033	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM
Copper, Total	1.13		mg/kg	0.093	0.031	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM
Lead, Total	0.122		mg/kg	0.037	0.005	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/25/17 12:07	10/31/17 17:08	EPA 7474	1,7474	BV
Nickel, Total	0.125		mg/kg	0.093	0.034	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM
Zinc, Total	6.14		mg/kg	0.926	0.138	2	10/25/17 12:07	10/30/17 15:52	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-14	Date Collected:	09/29/17 16:00
Client ID:	NV CLDS REFERENCE SEDIMENT REP	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.60		mg/kg	0.097	0.033	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM
Cadmium, Total	0.023	J	mg/kg	0.039	0.010	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM
Chromium, Total	0.081	J	mg/kg	0.388	0.035	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM
Copper, Total	0.960		mg/kg	0.097	0.032	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM
Lead, Total	0.072		mg/kg	0.039	0.006	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM
Mercury, Total	0.014		mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 17:21	EPA 7474	1,7474	BV
Nickel, Total	0.171		mg/kg	0.097	0.036	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM
Zinc, Total	5.40		mg/kg	0.971	0.145	2	10/25/17 12:07	10/30/17 15:56	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-15	Date Collected:	09/29/17 16:00
Client ID:	NV CLDS REFERENCE SEDIMENT REP	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.04		mg/kg	0.099	0.034	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM
Cadmium, Total	0.022	J	mg/kg	0.040	0.010	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM
Chromium, Total	0.063	J	mg/kg	0.396	0.036	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM
Copper, Total	1.11		mg/kg	0.099	0.033	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM
Lead, Total	0.076		mg/kg	0.040	0.006	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM
Mercury, Total	0.014		mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 17:23	EPA 7474	1,7474	BV
Nickel, Total	0.102		mg/kg	0.099	0.037	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM
Zinc, Total	6.10		mg/kg	0.990	0.148	2	10/25/17 12:07	10/30/17 16:00	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-16	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 1 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.17		mg/kg	0.095	0.033	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM
Cadmium, Total	0.038	J	mg/kg	0.038	0.010	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM
Chromium, Total	0.049	J	mg/kg	0.381	0.034	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM
Copper, Total	0.682		mg/kg	0.095	0.032	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM
Lead, Total	0.087		mg/kg	0.038	0.006	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/25/17 12:07	10/31/17 17:25	EPA 7474	1,7474	BV
Nickel, Total	0.088	J	mg/kg	0.095	0.035	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM
Zinc, Total	5.79		mg/kg	0.952	0.142	2	10/25/17 12:07	10/30/17 16:04	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-17	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 1 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.28		mg/kg	0.100	0.034	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM
Cadmium, Total	0.043		mg/kg	0.040	0.011	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM
Chromium, Total	0.051	J	mg/kg	0.400	0.036	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM
Copper, Total	0.909		mg/kg	0.100	0.033	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM
Lead, Total	0.140		mg/kg	0.040	0.006	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.013	0.004	5	10/25/17 12:07	10/31/17 17:28	EPA 7474	1,7474	BV
Nickel, Total	0.084	J	mg/kg	0.100	0.037	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM
Zinc, Total	6.40		mg/kg	1.00	0.149	2	10/25/17 12:07	10/30/17 16:08	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-18	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 1 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.02		mg/kg	0.098	0.034	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM
Cadmium, Total	0.056		mg/kg	0.039	0.010	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM
Chromium, Total	0.079	J	mg/kg	0.392	0.035	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM
Copper, Total	0.798		mg/kg	0.098	0.033	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM
Lead, Total	0.140		mg/kg	0.039	0.006	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 17:30	EPA 7474	1,7474	BV
Nickel, Total	0.093	J	mg/kg	0.098	0.037	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM
Zinc, Total	5.78		mg/kg	0.980	0.146	2	10/25/17 12:07	10/30/17 16:11	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-19	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 1 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.01		mg/kg	0.093	0.032	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM
Cadmium, Total	0.024	J	mg/kg	0.037	0.010	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM
Chromium, Total	0.051	J	mg/kg	0.370	0.033	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM
Copper, Total	0.987		mg/kg	0.093	0.031	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM
Lead, Total	0.059		mg/kg	0.037	0.005	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM
Mercury, Total	0.019		mg/kg	0.012	0.003	5	10/19/17 11:45	10/31/17 18:13	EPA 7474	1,7474	BV
Nickel, Total	0.073	J	mg/kg	0.093	0.034	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM
Zinc, Total	7.30		mg/kg	0.926	0.138	2	10/19/17 11:08	10/30/17 15:22	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-20	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 1 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.36		mg/kg	0.092	0.032	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM
Cadmium, Total	0.033	J	mg/kg	0.037	0.010	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM
Chromium, Total	0.044	J	mg/kg	0.367	0.033	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM
Copper, Total	0.884		mg/kg	0.092	0.031	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM
Lead, Total	0.066		mg/kg	0.037	0.005	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM
Mercury, Total	0.011	J	mg/kg	0.012	0.003	5	10/19/17 11:45	10/31/17 18:15	EPA 7474	1,7474	BV
Nickel, Total	0.086	J	mg/kg	0.092	0.034	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM
Zinc, Total	6.88		mg/kg	0.917	0.137	2	10/19/17 11:08	10/30/17 15:26	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-21	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 2 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.95		mg/kg	0.099	0.034	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM
Cadmium, Total	0.042		mg/kg	0.040	0.010	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM
Chromium, Total	0.066	J	mg/kg	0.396	0.036	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM
Copper, Total	1.05		mg/kg	0.099	0.033	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM
Lead, Total	0.083		mg/kg	0.040	0.006	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM
Mercury, Total	0.016		mg/kg	0.012	0.004	5	10/25/17 12:07	10/31/17 16:33	EPA 7474	1,7474	BV
Nickel, Total	0.132		mg/kg	0.099	0.037	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM
Zinc, Total	6.41		mg/kg	0.990	0.148	2	10/25/17 12:07	10/30/17 14:24	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-22	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 2 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.32		mg/kg	0.098	0.034	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM
Cadmium, Total	0.046		mg/kg	0.039	0.010	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM
Chromium, Total	0.050	J	mg/kg	0.392	0.035	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM
Copper, Total	1.00		mg/kg	0.098	0.033	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM
Lead, Total	0.136		mg/kg	0.039	0.006	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.004	5	10/19/17 11:45	10/31/17 18:18	EPA 7474	1,7474	BV
Nickel, Total	0.082	J	mg/kg	0.098	0.037	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM
Zinc, Total	6.80		mg/kg	0.980	0.146	2	10/19/17 11:08	10/30/17 15:30	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-23	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 2 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.46		mg/kg	0.097	0.033	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM
Cadmium, Total	0.055		mg/kg	0.039	0.010	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM
Chromium, Total	0.040	J	mg/kg	0.388	0.035	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM
Copper, Total	0.917		mg/kg	0.097	0.032	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM
Lead, Total	0.146		mg/kg	0.039	0.006	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.004	5	10/19/17 11:45	10/31/17 18:20	EPA 7474	1,7474	BV
Nickel, Total	0.051	J	mg/kg	0.097	0.036	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM
Zinc, Total	7.08		mg/kg	0.971	0.145	2	10/19/17 11:08	10/30/17 15:35	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-24	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 2 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.20		mg/kg	0.098	0.034	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM
Cadmium, Total	0.036	J	mg/kg	0.039	0.010	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM
Chromium, Total	0.038	J	mg/kg	0.392	0.035	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM
Copper, Total	0.930		mg/kg	0.098	0.033	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM
Lead, Total	0.119		mg/kg	0.039	0.006	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.004	5	10/19/17 11:45	10/31/17 18:27	EPA 7474	1,7474	BV
Nickel, Total	0.065	J	mg/kg	0.098	0.037	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM
Zinc, Total	5.87		mg/kg	0.980	0.146	2	10/19/17 11:08	10/30/17 15:39	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-25	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 2 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.56		mg/kg	0.098	0.034	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM
Cadmium, Total	0.043		mg/kg	0.039	0.010	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.392	0.035	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM
Copper, Total	1.53		mg/kg	0.098	0.033	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM
Lead, Total	0.205		mg/kg	0.039	0.006	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.012	0.004	5	10/19/17 11:45	10/31/17 18:30	EPA 7474	1,7474	BV
Nickel, Total	0.073	J	mg/kg	0.098	0.037	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM
Zinc, Total	7.22		mg/kg	0.980	0.146	2	10/19/17 11:08	10/30/17 15:43	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-26	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 3 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.14		mg/kg	0.099	0.034	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM
Cadmium, Total	0.034	J	mg/kg	0.040	0.010	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM
Chromium, Total	0.042	J	mg/kg	0.396	0.036	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM
Copper, Total	0.967		mg/kg	0.099	0.033	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM
Lead, Total	0.115		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM
Mercury, Total	0.010	J	mg/kg	0.012	0.004	5	10/19/17 11:45	10/31/17 18:32	EPA 7474	1,7474	BV
Nickel, Total	0.095	J	mg/kg	0.099	0.037	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM
Zinc, Total	7.09		mg/kg	0.990	0.148	2	10/19/17 11:08	10/30/17 15:47	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-27	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 3 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.07		mg/kg	0.101	0.035	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM
Cadmium, Total	0.030	J	mg/kg	0.040	0.011	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM
Chromium, Total	0.051	J	mg/kg	0.404	0.036	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM
Copper, Total	0.912		mg/kg	0.101	0.034	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM
Lead, Total	0.057		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM
Mercury, Total	0.015		mg/kg	0.013	0.004	5	10/19/17 11:45	10/31/17 18:35	EPA 7474	1,7474	BV
Nickel, Total	0.088	J	mg/kg	0.101	0.038	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM
Zinc, Total	7.06		mg/kg	1.01	0.150	2	10/19/17 11:08	10/30/17 15:51	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-28	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 3 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.29		mg/kg	0.096	0.033	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM
Cadmium, Total	0.038	J	mg/kg	0.039	0.010	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.385	0.035	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM
Copper, Total	1.20		mg/kg	0.096	0.032	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM
Lead, Total	0.134		mg/kg	0.039	0.006	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.012	0.003	5	10/19/17 11:45	10/31/17 18:37	EPA 7474	1,7474	BV
Nickel, Total	0.079	J	mg/kg	0.096	0.036	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM
Zinc, Total	6.32		mg/kg	0.962	0.143	2	10/19/17 11:08	10/30/17 16:24	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-29	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 3 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.40		mg/kg	0.099	0.034	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM
Cadmium, Total	0.031	J	mg/kg	0.040	0.010	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM
Chromium, Total	0.040	J	mg/kg	0.396	0.036	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM
Copper, Total	0.641		mg/kg	0.099	0.033	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM
Lead, Total	0.091		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.004	5	10/19/17 11:45	10/31/17 18:40	EPA 7474	1,7474	BV
Nickel, Total	0.106		mg/kg	0.099	0.037	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM
Zinc, Total	6.54		mg/kg	0.990	0.148	2	10/19/17 11:08	10/30/17 16:28	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-30	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 3 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.81		mg/kg	0.100	0.034	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM
Cadmium, Total	0.044		mg/kg	0.040	0.011	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM
Chromium, Total	0.066	J	mg/kg	0.400	0.036	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM
Copper, Total	1.10		mg/kg	0.100	0.033	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM
Lead, Total	0.115		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM
Mercury, Total	0.018		mg/kg	0.013	0.004	5	10/27/17 11:00	11/02/17 17:04	EPA 7474	1,7474	BV
Nickel, Total	0.097	J	mg/kg	0.100	0.037	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM
Zinc, Total	6.17		mg/kg	1.00	0.149	2	10/27/17 11:00	10/31/17 15:18	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-31	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 4 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.99		mg/kg	0.099	0.034	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM
Cadmium, Total	0.042		mg/kg	0.040	0.010	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM
Chromium, Total	0.040	J	mg/kg	0.396	0.036	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM
Copper, Total	1.13		mg/kg	0.099	0.033	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM
Lead, Total	0.126		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM
Mercury, Total	0.013		mg/kg	0.012	0.004	5	10/27/17 11:00	11/02/17 17:06	EPA 7474	1,7474	BV
Nickel, Total	0.063	J	mg/kg	0.099	0.037	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM
Zinc, Total	6.37		mg/kg	0.990	0.148	2	10/27/17 11:00	10/31/17 15:22	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-32	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 4 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.86		mg/kg	0.099	0.034	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM
Cadmium, Total	0.028	J	mg/kg	0.040	0.010	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM
Chromium, Total	0.058	J	mg/kg	0.396	0.036	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM
Copper, Total	1.26		mg/kg	0.099	0.033	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM
Lead, Total	0.087		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM
Mercury, Total	0.014		mg/kg	0.012	0.004	5	10/27/17 11:00	11/02/17 17:09	EPA 7474	1,7474	BV
Nickel, Total	0.085	J	mg/kg	0.099	0.037	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM
Zinc, Total	6.66		mg/kg	0.990	0.148	2	10/27/17 11:00	10/31/17 15:26	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-33	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 4 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.15		mg/kg	0.097	0.033	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM
Cadmium, Total	0.053		mg/kg	0.039	0.010	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.388	0.035	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM
Copper, Total	1.26		mg/kg	0.097	0.032	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM
Lead, Total	0.165		mg/kg	0.039	0.006	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.004	5	10/27/17 11:00	11/02/17 17:11	EPA 7474	1,7474	BV
Nickel, Total	0.063	J	mg/kg	0.097	0.036	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM
Zinc, Total	6.22		mg/kg	0.971	0.145	2	10/27/17 11:00	10/31/17 15:29	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-34	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 4 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.90		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM
Cadmium, Total	0.028	J	mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM
Chromium, Total	0.068	J	mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM
Copper, Total	1.45		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM
Lead, Total	0.094		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM
Mercury, Total	0.015		mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 17:54	EPA 7474	1,7474	BV
Nickel, Total	0.106		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM
Zinc, Total	7.26		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 17:05	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-35	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 4 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.43		mg/kg	0.095	0.033	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM
Cadmium, Total	0.049		mg/kg	0.038	0.010	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM
Chromium, Total	0.035	J	mg/kg	0.381	0.034	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM
Copper, Total	1.08		mg/kg	0.095	0.032	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM
Lead, Total	0.150		mg/kg	0.038	0.006	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/26/17 13:34	11/02/17 17:57	EPA 7474	1,7474	BV
Nickel, Total	0.086	J	mg/kg	0.095	0.035	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM
Zinc, Total	7.08		mg/kg	0.952	0.142	2	10/26/17 13:34	10/30/17 17:09	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-36	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 5 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.14		mg/kg	0.099	0.034	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM
Cadmium, Total	0.038	J	mg/kg	0.040	0.010	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.396	0.036	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM
Copper, Total	0.677		mg/kg	0.099	0.033	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM
Lead, Total	0.146		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.004	5	10/27/17 11:00	11/02/17 17:14	EPA 7474	1,7474	BV
Nickel, Total	0.062	J	mg/kg	0.099	0.037	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM
Zinc, Total	5.65		mg/kg	0.990	0.148	2	10/27/17 11:00	10/31/17 15:56	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-37	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 5 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.37		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM
Cadmium, Total	0.041		mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM
Chromium, Total	0.044	J	mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM
Copper, Total	0.801		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM
Lead, Total	0.113		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 17:59	EPA 7474	1,7474	BV
Nickel, Total	0.075	J	mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM
Zinc, Total	6.40		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 17:13	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-38	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 5 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.18		mg/kg	0.096	0.033	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM
Cadmium, Total	0.039		mg/kg	0.039	0.010	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.385	0.035	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM
Copper, Total	1.20		mg/kg	0.096	0.032	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM
Lead, Total	0.173		mg/kg	0.039	0.006	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.003	5	10/26/17 13:34	11/02/17 18:02	EPA 7474	1,7474	BV
Nickel, Total	0.086	J	mg/kg	0.096	0.036	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM
Zinc, Total	7.09		mg/kg	0.962	0.143	2	10/26/17 13:34	10/30/17 17:17	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-39	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 5 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.25		mg/kg	0.096	0.033	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM
Cadmium, Total	0.041		mg/kg	0.039	0.010	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.385	0.035	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM
Copper, Total	0.876		mg/kg	0.096	0.032	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM
Lead, Total	0.121		mg/kg	0.039	0.006	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/27/17 11:00	11/02/17 17:16	EPA 7474	1,7474	BV
Nickel, Total	0.069	J	mg/kg	0.096	0.036	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM
Zinc, Total	5.74		mg/kg	0.962	0.143	2	10/27/17 11:00	10/31/17 16:00	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-40	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 5 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.21		mg/kg	0.100	0.034	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM
Cadmium, Total	0.033	J	mg/kg	0.040	0.011	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM
Chromium, Total	0.055	J	mg/kg	0.400	0.036	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM
Copper, Total	0.906		mg/kg	0.100	0.033	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM
Lead, Total	0.139		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.013	0.004	5	10/27/17 11:00	11/02/17 17:19	EPA 7474	1,7474	BV
Nickel, Total	0.067	J	mg/kg	0.100	0.037	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM
Zinc, Total	6.36		mg/kg	1.00	0.149	2	10/27/17 11:00	10/31/17 16:04	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-41	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 6 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.12		mg/kg	0.099	0.034	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM
Cadmium, Total	0.036	J	mg/kg	0.040	0.010	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM
Chromium, Total	0.128	J	mg/kg	0.396	0.036	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM
Copper, Total	0.888		mg/kg	0.099	0.033	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM
Lead, Total	0.132		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM
Mercury, Total	0.004	J	mg/kg	0.012	0.004	5	10/27/17 11:00	11/02/17 16:41	EPA 7474	1,7474	BV
Nickel, Total	0.087	J	mg/kg	0.099	0.037	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM
Zinc, Total	6.23		mg/kg	0.990	0.148	2	10/27/17 11:00	10/31/17 14:59	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-42	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 6 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.95		mg/kg	0.098	0.034	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM
Cadmium, Total	0.036	J	mg/kg	0.039	0.010	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM
Chromium, Total	0.042	J	mg/kg	0.392	0.035	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM
Copper, Total	1.04		mg/kg	0.098	0.033	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM
Lead, Total	0.064		mg/kg	0.039	0.006	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM
Mercury, Total	0.013		mg/kg	0.012	0.004	5	10/26/17 13:34	11/02/17 18:04	EPA 7474	1,7474	BV
Nickel, Total	0.087	J	mg/kg	0.098	0.037	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM
Zinc, Total	7.05		mg/kg	0.980	0.146	2	10/26/17 13:34	10/30/17 17:21	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-43	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 6 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.04		mg/kg	0.095	0.033	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM
Cadmium, Total	0.035	J	mg/kg	0.038	0.010	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM
Chromium, Total	0.078	J	mg/kg	0.381	0.034	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM
Copper, Total	1.08		mg/kg	0.095	0.032	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM
Lead, Total	0.086		mg/kg	0.038	0.006	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM
Mercury, Total	0.011	J	mg/kg	0.012	0.003	5	10/25/17 12:07	10/31/17 17:33	EPA 7474	1,7474	BV
Nickel, Total	0.128		mg/kg	0.095	0.035	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM
Zinc, Total	6.77		mg/kg	0.952	0.142	2	10/25/17 12:07	10/30/17 16:15	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-44	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 6 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.19		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM
Cadmium, Total	0.035	J	mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM
Chromium, Total	0.053	J	mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM
Copper, Total	1.02		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM
Lead, Total	0.067		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM
Mercury, Total	0.012	J	mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 18:07	EPA 7474	1,7474	BV
Nickel, Total	0.151		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM
Zinc, Total	6.59		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 17:25	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-45	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 6 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.89		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM
Cadmium, Total	0.037	J	mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM
Chromium, Total	0.098	J	mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM
Copper, Total	1.22		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM
Lead, Total	0.128		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM
Mercury, Total	0.013		mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 18:14	EPA 7474	1,7474	BV
Nickel, Total	0.124		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM
Zinc, Total	7.16		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 17:42	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-46	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 7 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.02		mg/kg	0.095	0.033	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM
Cadmium, Total	0.038	J	mg/kg	0.038	0.010	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM
Chromium, Total	0.048	J	mg/kg	0.381	0.034	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM
Copper, Total	0.936		mg/kg	0.095	0.032	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM
Lead, Total	0.104		mg/kg	0.038	0.006	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM
Mercury, Total	0.016		mg/kg	0.012	0.003	5	10/26/17 13:34	11/02/17 18:17	EPA 7474	1,7474	BV
Nickel, Total	0.102		mg/kg	0.095	0.035	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM
Zinc, Total	7.72		mg/kg	0.952	0.142	2	10/26/17 13:34	10/30/17 17:46	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-47	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 7 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.09		mg/kg	0.097	0.033	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM
Cadmium, Total	0.035	J	mg/kg	0.039	0.010	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.388	0.035	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM
Copper, Total	0.773		mg/kg	0.097	0.032	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM
Lead, Total	0.125		mg/kg	0.039	0.006	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.004	5	10/26/17 13:34	11/02/17 18:19	EPA 7474	1,7474	BV
Nickel, Total	0.076	J	mg/kg	0.097	0.036	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM
Zinc, Total	17.0		mg/kg	0.971	0.145	2	10/26/17 13:34	10/30/17 17:50	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-48	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 7 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.03		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM
Cadmium, Total	0.033	J	mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM
Copper, Total	0.902		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM
Lead, Total	0.087		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM
Mercury, Total	0.012	J	mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 18:21	EPA 7474	1,7474	BV
Nickel, Total	0.104		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM
Zinc, Total	6.38		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 17:54	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-49	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 7 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.02		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM
Cadmium, Total	0.042		mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM
Chromium, Total	0.038	J	mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM
Copper, Total	1.10		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM
Lead, Total	0.120		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM
Mercury, Total	0.013		mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 18:24	EPA 7474	1,7474	BV
Nickel, Total	0.109		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM
Zinc, Total	6.86		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 17:58	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-50	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 7 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.53		mg/kg	0.096	0.033	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM
Cadmium, Total	0.040		mg/kg	0.039	0.010	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM
Chromium, Total	0.054	J	mg/kg	0.385	0.035	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM
Copper, Total	0.990		mg/kg	0.096	0.032	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM
Lead, Total	0.145		mg/kg	0.039	0.006	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM
Mercury, Total	0.010	J	mg/kg	0.012	0.003	5	10/26/17 13:34	11/02/17 18:26	EPA 7474	1,7474	BV
Nickel, Total	0.135		mg/kg	0.096	0.036	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM
Zinc, Total	7.28		mg/kg	0.962	0.143	2	10/26/17 13:34	10/30/17 18:02	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-51	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 8 REP A	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.40		mg/kg	0.095	0.033	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM
Cadmium, Total	0.041		mg/kg	0.038	0.010	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM
Chromium, Total	0.041	J	mg/kg	0.381	0.034	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM
Copper, Total	0.851		mg/kg	0.095	0.032	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM
Lead, Total	0.185		mg/kg	0.038	0.006	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/26/17 13:34	11/02/17 18:29	EPA 7474	1,7474	BV
Nickel, Total	0.140		mg/kg	0.095	0.035	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM
Zinc, Total	7.16		mg/kg	0.952	0.142	2	10/26/17 13:34	10/30/17 18:06	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-52	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 8 REP B	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.58		mg/kg	0.098	0.034	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM
Cadmium, Total	0.049		mg/kg	0.039	0.010	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM
Chromium, Total	0.038	J	mg/kg	0.392	0.035	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM
Copper, Total	0.818		mg/kg	0.098	0.033	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM
Lead, Total	0.121		mg/kg	0.039	0.006	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.004	5	10/26/17 13:34	11/02/17 18:31	EPA 7474	1,7474	BV
Nickel, Total	0.131		mg/kg	0.098	0.037	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM
Zinc, Total	7.18		mg/kg	0.980	0.146	2	10/26/17 13:34	10/30/17 18:11	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-53	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 8 REP C	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.13		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM
Cadmium, Total	0.037	J	mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM
Copper, Total	0.827		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM
Lead, Total	0.117		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM
Mercury, Total	0.006	J	mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 17:36	EPA 7474	1,7474	BV
Nickel, Total	0.101		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM
Zinc, Total	6.84		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 16:20	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-54	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 8 REP D	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.22		mg/kg	0.100	0.034	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM
Cadmium, Total	0.039	J	mg/kg	0.040	0.011	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM
Copper, Total	0.780		mg/kg	0.100	0.033	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM
Lead, Total	0.159		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM
Mercury, Total	0.007	J	mg/kg	0.013	0.004	5	10/27/17 11:00	11/02/17 17:21	EPA 7474	1,7474	BV
Nickel, Total	0.082	J	mg/kg	0.100	0.037	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM
Zinc, Total	5.87		mg/kg	1.00	0.149	2	10/27/17 11:00	10/31/17 16:07	EPA 3051A	1,6020A	AM

Project Name:	USACE/NHH FNP	**Lab Number:**	L1735250
Project Number:	60543021	**Report Date:**	11/20/17

SAMPLE RESULTS

Lab ID:	L1735250-55	Date Collected:	09/29/17 16:00
Client ID:	NV COMPOSITE 8 REP E	Date Received:	10/02/17
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Matrix:	Tissue		
Percent Solids:	Results are reported on an 'AS RECEIVED' basis.		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.26		mg/kg	0.094	0.032	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM
Cadmium, Total	0.037	J	mg/kg	0.038	0.010	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM
Chromium, Total	0.042	J	mg/kg	0.377	0.034	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM
Copper, Total	0.842		mg/kg	0.094	0.032	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM
Lead, Total	0.122		mg/kg	0.038	0.005	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	10/27/17 11:00	11/02/17 17:24	EPA 7474	1,7474	BV
Nickel, Total	0.078	J	mg/kg	0.094	0.035	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM
Zinc, Total	5.58		mg/kg	0.943	0.140	2	10/27/17 11:00	10/31/17 16:11	EPA 3051A	1,6020A	AM

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-05,19-20,22-29 Batch: WG1054046-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/19/17 11:08	10/30/17 14:23	1,6020A	AM

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-05,19-20,22-29 Batch: WG1054057-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/19/17 11:45	10/31/17 17:40	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 06-18,21,43 Batch: WG1056057-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/25/17 12:07	10/30/17 14:12	1,6020A	AM

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 06-18,21,43 Batch: WG1056076-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/25/17 12:07	10/31/17 16:28	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 34-35,37-38,42,44-53 Batch: WG1056489-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/26/17 13:34	10/30/17 16:03	1,6020A	AM

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 34-35,37-38,42,44-53 Batch: WG1056495-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/26/17 13:34	11/02/17 17:31	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 30-33,36,39-41,54-55 Batch: WG1056973-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	10/27/17 11:00	10/31/17 14:12	1,6020A	AM

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 30-33,36,39-41,54-55 Batch: WG1056974-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	10/27/17 11:00	11/02/17 16:36	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05,19-20,22-29 Batch: WG1054046-2								
Arsenic, Total	99		-		75-125	-		20
Cadmium, Total	103		-		75-125	-		20
Chromium, Total	100		-		75-125	-		20
Copper, Total	98		-		75-125	-		20
Lead, Total	98		-		75-125	-		20
Nickel, Total	98		-		75-125	-		20
Zinc, Total	99		-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-05,19-20,22-29 Batch: WG1054057-2 SRM Lot Number: HPHGAF								
Mercury, Total	89		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 06-18,21,43 Batch: WG1056057-2								
Arsenic, Total	100		-		75-125	-		20
Cadmium, Total	110		-		75-125	-		20
Chromium, Total	105		-		75-125	-		20
Copper, Total	104		-		75-125	-		20
Lead, Total	104		-		75-125	-		20
Nickel, Total	103		-		75-125	-		20
Zinc, Total	105		-		75-125	-		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 06-18,21,43 Batch: WG1056076-2 SRM Lot Number: HPHGAF					
Mercury, Total	93	-	80-120	-	20
Total Metals - Mansfield Lab Associated sample(s): 34-35,37-38,42,44-53 Batch: WG1056489-2					
Arsenic, Total	102	-	75-125	-	20
Cadmium, Total	104	-	75-125	-	20
Chromium, Total	102	-	75-125	-	20
Copper, Total	101	-	75-125	-	20
Lead, Total	98	-	75-125	-	20
Nickel, Total	100	-	75-125	-	20
Zinc, Total	102	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 34-35,37-38,42,44-53 Batch: WG1056495-2 SRM Lot Number: HPHGAF					
Mercury, Total	94	-	80-120	-	20

Lab Control Sample Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 30-33,36,39-41,54-55 Batch: WG1056973-2					
Arsenic, Total	99	-	75-125	-	20
Cadmium, Total	103	-	75-125	-	20
Chromium, Total	101	-	75-125	-	20
Copper, Total	99	-	75-125	-	20
Lead, Total	104	-	75-125	-	20
Nickel, Total	99	-	75-125	-	20
Zinc, Total	100	-	75-125	-	20
Total Metals - Mansfield Lab Associated sample(s): 30-33,36,39-41,54-55 Batch: WG1056974-2 SRM Lot Number: HPHGAF					
Mercury, Total	111	-	80-120	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021
Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05,19-20,22-29 QC Batch ID: WG1054046-3 WG1054046-4 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A												
Arsenic, Total	3.05	11.6	14.4	97		14.0	98		75-125	3		20
Cadmium, Total	0.039J	4.95	5.07	102		4.93	103		75-125	3		20
Chromium, Total	0.337J	19.4	18.8	97		18.3	98		75-125	3		20
Copper, Total	1.05	24.3	24.2	95		23.1	94		75-125	5		20
Lead, Total	0.200	49.5	48.1	97		46.8	98		75-125	3		20
Nickel, Total	0.262	48.5	46.3	95		45.3	96		75-125	2		20
Zinc, Total	8.99	48.5	55.4	96		54.1	96		75-125	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-05,19-20,22-29 QC Batch ID: WG1054057-3 WG1054057-4 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A												
Mercury, Total	0.0090J	0.607	0.570	94		0.572	93		80-120	0		20
Total Metals - Mansfield Lab Associated sample(s): 06-18,21,43 QC Batch ID: WG1056057-3 WG1056057-4 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A												
Arsenic, Total	1.95	11.8	13.3	96		13.2	96		75-125	1		20
Cadmium, Total	0.042	5	5.15	102		5.34	106		75-125	4		20
Chromium, Total	0.066J	19.6	18.9	96		20.1	102		75-125	6		20
Copper, Total	1.05	24.5	24.9	97		26.1	102		75-125	5		20
Lead, Total	0.083	50	49.6	99		51.8	103		75-125	4		20
Nickel, Total	0.132	49	46.8	95		50.2	102		75-125	7		20
Zinc, Total	6.41	49	54.1	97		58.1	105		75-125	7		20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 06-18,21,43 QC Batch ID: WG1056076-3 WG1056076-4 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A									
Mercury, Total	0.016	0.613	0.571	91	0.562	90	80-120	2	20
Total Metals - Mansfield Lab Associated sample(s): 34-35,37-38,42,44-53 QC Batch ID: WG1056489-3 WG1056489-4 QC Sample: L1735250-53 Client ID: NV COMPOSITE 8 REP C									
Arsenic, Total	2.13	11.6	13.9	101	13.7	102	75-125	1	20
Cadmium, Total	0.037J	4.95	5.30	107	5.24	109	75-125	1	20
Chromium, Total	ND	19.4	19.2	99	18.7	99	75-125	3	20
Copper, Total	0.827	24.3	25.0	100	24.7	101	75-125	1	20
Lead, Total	0.117	49.5	48.2	97	48.0	100	75-125	0	20
Nickel, Total	0.101	48.5	48.2	99	47.6	101	75-125	1	20
Zinc, Total	6.84	48.5	55.5	100	55.1	102	75-125	1	20
Total Metals - Mansfield Lab Associated sample(s): 34-35,37-38,42,44-53 QC Batch ID: WG1056495-3 WG1056495-4 QC Sample: L1735250-53 Client ID: NV COMPOSITE 8 REP C									
Mercury, Total	0.006J	0.584	0.623	107	0.670	110	80-120	7	20

Matrix Spike Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 30-33,36,39-41,54-55 QC Batch ID: WG1056973-3 WG1056973-4 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A									
Arsenic, Total	2.12	11.8	13.3	95	13.5	99	75-125	1	20
Cadmium, Total	0.036J	5	4.98	100	5.08	104	75-125	2	20
Chromium, Total	0.128J	19.6	18.2	93	18.7	97	75-125	3	20
Copper, Total	0.888	24.5	23.5	92	24.1	96	75-125	3	20
Lead, Total	0.132	50	49.2	98	50.2	102	75-125	2	20
Nickel, Total	0.087J	49	44.2	90	47.7	99	75-125	8	20
Zinc, Total	6.23	49	51.6	92	53.0	97	75-125	3	20
Total Metals - Mansfield Lab Associated sample(s): 30-33,36,39-41,54-55 QC Batch ID: WG1056974-3 WG1056974-4 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A									
Mercury, Total	0.004J	0.619	0.507	82	0.483	80	80-120	5	20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-05,19-20,22-29 QC Batch ID: WG1054046-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						
Arsenic, Total	3.05	2.96	mg/kg	3		20
Cadmium, Total	0.039J	0.032J	mg/kg	NC		20
Chromium, Total	0.337J	0.333J	mg/kg	NC		20
Copper, Total	1.05	1.00	mg/kg	5		20
Lead, Total	0.200	0.173	mg/kg	14		20
Nickel, Total	0.262	0.258	mg/kg	2		20
Zinc, Total	8.99	8.30	mg/kg	8		20
Total Metals - Mansfield Lab Associated sample(s): 01-05,19-20,22-29 QC Batch ID: WG1054057-5 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						
Mercury, Total	0.0090J	0.014	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 06-18,21,43 QC Batch ID: WG1056057-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						
Arsenic, Total	1.95	1.84	mg/kg	6		20
Cadmium, Total	0.042	0.032J	mg/kg	NC		20
Chromium, Total	0.066J	0.077J	mg/kg	NC		20
Copper, Total	1.05	1.16	mg/kg	10		20
Lead, Total	0.083	0.095	mg/kg	13		20
Nickel, Total	0.132	0.094J	mg/kg	NC		20
Zinc, Total	6.41	7.22	mg/kg	12		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD		RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 06-18,21,43 QC Batch ID: WG1056076-5 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						
Mercury, Total	0.016	0.019	mg/kg	17		20
Total Metals - Mansfield Lab Associated sample(s): 34-35,37-38,42,44-53 QC Batch ID: WG1056489-5 QC Sample: L1735250-53 Client ID: NV COMPOSITE 8 REP C						
Arsenic, Total	2.13	0.362	mg/kg	**142**	Q	20
Cadmium, Total	0.037J	ND	mg/kg	NC		20
Chromium, Total	ND	ND	mg/kg	NC		20
Copper, Total	0.827	0.140	mg/kg	**142**	Q	20
Lead, Total	0.117	0.017J	mg/kg	NC		20
Nickel, Total	0.101	ND	mg/kg	NC		20
Zinc, Total	6.84	1.18	mg/kg	**141**	Q	20
Total Metals - Mansfield Lab Associated sample(s): 34-35,37-38,42,44-53 QC Batch ID: WG1056495-5 QC Sample: L1735250-53 Client ID: NV COMPOSITE 8 REP C						
Mercury, Total	0.006J	ND	mg/kg	NC		20

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 30-33,36,39-41,54-55 QC Batch ID: WG1056973-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A					
Arsenic, Total	2.12	2.09	mg/kg	1	20
Cadmium, Total	0.036J	0.040	mg/kg	NC	20
Chromium, Total	0.128J	0.117J	mg/kg	NC	20
Copper, Total	0.888	0.841	mg/kg	5	20
Lead, Total	0.132	0.140	mg/kg	6	20
Nickel, Total	0.087J	0.103	mg/kg	NC	20
Zinc, Total	6.23	6.13	mg/kg	2	20
Total Metals - Mansfield Lab Associated sample(s): 30-33,36,39-41,54-55 QC Batch ID: WG1056974-5 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A					
Mercury, Total	0.004J	0.010J	mg/kg	NC	20

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1054046-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	89		65-139
Cadmium, Total	93		67-135
Copper, Total	95		65-138
Lead, Total	86		56-155
Zinc, Total	94		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1054057-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	102		41-183

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1056057-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	73		65-139
Cadmium, Total	88		67-135
Copper, Total	97		65-138
Lead, Total	110		56-155
Zinc, Total	78		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1056076-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	81		41-183

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1056489-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	88		65-139
Cadmium, Total	92		67-135
Copper, Total	90		65-138
Lead, Total	82		56-155
Zinc, Total	94		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1056495-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	110		41-183

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1056973-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	83		65-139
Cadmium, Total	90		67-135
Copper, Total	95		65-138
Lead, Total	122		56-155
Zinc, Total	85		66-136

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1056974-15

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	92		41-183

INORGANICS
&
MISCELLANEOUS

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-01
Client ID: NV NATIVE BACKGROUND REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.521		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-02
Client ID: NV NATIVE BACKGROUND REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.558		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-03
Client ID: NV NATIVE BACKGROUND REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.707		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-04
Client ID: NV NATIVE BACKGROUND REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.559		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-05
Client ID: NV NATIVE BACKGROUND REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 10/04/17 16:20
Date Received: 10/05/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.705		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-06
Client ID: NV LABORATORY CONTROL REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	1.02		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-07
Client ID: NV LABORATORY CONTROL REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.771		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-08
Client ID: NV LABORATORY CONTROL REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.871		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-09
Client ID: NV LABORATORY CONTROL REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.714		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-10
Client ID: NV LABORATORY CONTROL REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.860		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-11
Client ID: NV CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.702		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-12
Client ID: NV CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.894		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-13
Client ID: NV CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.817		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-14
Client ID: NV CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.505		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-15
Client ID: NV CLDS REFERENCE SEDIMENT REP
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.791		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-16
Client ID: NV COMPOSITE 1 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	1.06		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-17
Client ID: NV COMPOSITE 1 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.658		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-18
Client ID: NV COMPOSITE 1 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	1.36		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-19
Client ID: NV COMPOSITE 1 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	0.914		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-20
Client ID: NV COMPOSITE 1 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 13:15	121,2540G	SP
Percent Lipids	1.21		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-21
Client ID: NV COMPOSITE 2 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.621		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-22
Client ID: NV COMPOSITE 2 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.21		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-23
Client ID: NV COMPOSITE 2 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.28		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-24
Client ID: NV COMPOSITE 2 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.17		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-25
Client ID: NV COMPOSITE 2 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.15		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-26
Client ID: NV COMPOSITE 3 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.04		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-27
Client ID: NV COMPOSITE 3 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.874		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-28
Client ID: NV COMPOSITE 3 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.675		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-29
Client ID: NV COMPOSITE 3 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.30		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-30
Client ID: NV COMPOSITE 3 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.01		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-31
Client ID: NV COMPOSITE 4 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.07		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-32
Client ID: NV COMPOSITE 4 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.858		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-33
Client ID: NV COMPOSITE 4 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.972		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-34
Client ID: NV COMPOSITE 4 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.972		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-35
Client ID: NV COMPOSITE 4 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.775		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-36
Client ID: NV COMPOSITE 5 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.64		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-37
Client ID: NV COMPOSITE 5 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.39		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-38
Client ID: NV COMPOSITE 5 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.62		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-39
Client ID: NV COMPOSITE 5 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	1.31		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-40
Client ID: NV COMPOSITE 5 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 12:05	121,2540G	SP
Percent Lipids	0.934		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-41
Client ID: NV COMPOSITE 6 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	0.990		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-42
Client ID: NV COMPOSITE 6 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.06		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-43
Client ID: NV COMPOSITE 6 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.60		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-44
Client ID: NV COMPOSITE 6 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.42		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-45
Client ID: NV COMPOSITE 6 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	0.795		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-46
Client ID: NV COMPOSITE 7 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.56		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-47
Client ID: NV COMPOSITE 7 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.40		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-48
Client ID: NV COMPOSITE 7 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	0.832		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-49
Client ID: NV COMPOSITE 7 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.00		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-50
Client ID: NV COMPOSITE 7 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.20		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-51
Client ID: NV COMPOSITE 8 REP A
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.57		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-52
Client ID: NV COMPOSITE 8 REP B
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	0.705		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-53
Client ID: NV COMPOSITE 8 REP C
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	0.771		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-54
Client ID: NV COMPOSITE 8 REP D
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	1.30		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

SAMPLE RESULTS

Lab ID: L1735250-55
Client ID: NV COMPOSITE 8 REP E
Sample Location: NEW HAVEN, CT
Matrix: Tissue

Date Collected: 09/29/17 16:00
Date Received: 10/02/17
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	10/30/17 00:15	121,2540G	SP
Percent Lipids	0.848		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Project Name: USACE/NHH FNP **Lab Number:** L1735250

Project Number: 60543021 **Report Date:** 11/20/17

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab for sample(s): 01-20 Batch: WG1058135-1										
Percent Lipids	ND		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO
General Chemistry - Mansfield Lab for sample(s): 21-40 Batch: WG1058136-1										
Percent Lipids	ND		%	0.100	NA	1	-	11/01/17 00:00	111,-	KO
General Chemistry - Mansfield Lab for sample(s): 41-55 Batch: WG1059952-1										
Percent Lipids	ND		%	0.100	NA	1	-	11/06/17 00:00	111,-	AL

Lab Duplicate Analysis
Batch Quality Control

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1057659-1 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						
Moisture	88.0	87.0	%	1		10
General Chemistry - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1057662-1 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						
Moisture	89.0	89.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1057665-1 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A						
Moisture	87.0	87.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 01-20 QC Batch ID: WG1058135-2 QC Sample: L1735250-01 Client ID: NV NATIVE BACKGROUND REP A						
Percent Lipids	0.521	0.521	%	0		20
General Chemistry - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1058136-2 QC Sample: L1735250-21 Client ID: NV COMPOSITE 2 REP A						
Percent Lipids	0.621	0.583	%	6		20
General Chemistry - Mansfield Lab Associated sample(s): 41-55 QC Batch ID: WG1059952-2 QC Sample: L1735250-41 Client ID: NV COMPOSITE 6 REP A						
Percent Lipids	0.990	0.929	%	6		20

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-01A	Glass 250ml/8oz unpreserved	C	NA		0.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-02A	Glass 250ml/8oz unpreserved	C	NA		0.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-03A	Glass 250ml/8oz unpreserved	C	NA		0.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-04A	Glass 250ml/8oz unpreserved	C	NA		0.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-05A	Glass 250ml/8oz unpreserved	C	NA		0.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-06A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-07A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-08A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-09A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-10A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-11A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-12A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-13A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-14A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-15A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-16A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-17A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-18A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-19A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-20A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-21A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-22A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-23A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-24A	Glass 250ml/8oz unpreserved	A	NA		-1.8	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-25A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-26A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-27A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-28A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-29A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-30A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-31A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-32A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-33A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-34A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-35A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-36A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-37A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-38A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-39A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-40A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-41A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-42A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-43A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-44A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-45A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-46A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-47A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-48A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-49A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-50A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-51A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-52A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: USACE/NHH FNP
Project Number: 60543021

Lab Number: L1735250
Report Date: 11/20/17

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1735250-53A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-54A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1735250-55A	Glass 250ml/8oz unpreserved	B	NA		0.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

Container Comments

L1735250-06A Containers for 5250-01 thru -05 received empty. Rec'd 10/5

*Values in parentheses indicate holding time in days

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GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related

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Data Qualifiers

projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

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REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

111 NOAA Technical Memorandum NOS ORCA 130: Sampling and Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993-196 Update. March 1998.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 300: DW: Bromide
EPA 6860: NPW and SCM: Perchlorate
EPA 9010: NPW and SCM: Amenable Cyanide Distillation
EPA 9012B: NPW: Total Cyanide
EPA 9050A: NPW: Specific Conductance
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
SM 2540D: TSS
EPA 3005A NPW
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F, EPA 353.2**: Nitrate-N**, EPA 351.1, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E.**

Mansfield Facility:

Drinking Water
EPA 200.7: Ba, Be, Cd, Cr, Cu, Ni, Na, Ca. **EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, TL. **EPA 245.1** Hg.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No – PCB samples -21 to -55 due to matrix interference
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	No – BZ18 in blank associated to -21 to -40
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	Yes
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	No	CCV: opening for MB2, LCS/LCSD2, SRM2: Benz(a)anthracene @ 18% CCV: opening for L1735250-36 through -40: Benzo(k)fluoranthene @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735250-21MS: Naphthalene @ 34%, Acenaphthylene @ 36%, Acenaphthene @ 33%, Fluorene @ 35%, Phenanthrene @ 48%, Anthracene @ 38%, Fluoranthene @ 45%, Pyrene @ 44%, Chrysene @ 40%, Benzo(b)fluoranthene @ 47%, Benzo(k)fluoranthene @ 49%, Benzo(a)pyrene 39%, Indeno(1,2,3-cd)Pyrene @ 49%, Dibenz(a,h)anthracene @ 45%, Benzo(g,h,i)perylene @ 46% L1735250-21MSD: Naphthalene @ 41%, Acenaphthylene @ 41%, Acenaphthene @ 39%, Fluorene @ 41%, Anthracene @	In Data Package

			45%, Pyrene @ 50%, Chrysene @ 45%, Benzo(k)fluoranthene @ 43%, Benzo(a)pyrene 44% L1735250-41MS: Naphthalene @ 50%, Acenaphthene @ 50%, Anthracene @ 49%, Chrysene @ 50%, Benzo(k)fluoranthene @ 49%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV Opening for MB1, LCS/LCSD1, L1735250-01D/MS/MSD SRM1: channel A gamma-BHC @ 17% CCV opening for L1735250-02 through 20:channel A: gamma-BHC @ 18%, Aldrin @ 16% CCV opening for: MB2 Channel A: cis-nonachlor @ 16%, methoxychlor @ 18%, channel B: Methoxychlor @ 24% CCV opening for L1735250-42-50: Channel B : Methoxychlor @ 17%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM3: cis-chlordane @ 32%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735250-21MS: Hexachlorobenzene @ 42%, gamma-BHC @ 46%, Heptachlor @ 44%, Aldrin @ 46%, Heptachlor epoxide @ 36%, Oxychlordane @ 36%, trans-Chlordane @ 44%, Endosulfan I @ 42%,	In Data Package

			cis-Chlordane @ 39%, trans-Nonachlor @ 40%, 4,4'-DDE @ 43%, Dieldrin @ 43%, Endrin @ 39%, Endosulfan II @ 39%, 4,4'-DDD @ 44%, cis-Nonachlor @ 44%, 4,4'-DDT @ 36%, Methoxychlor @ 35% L1735250-21MSD: Heptachlor epoxide @ 44%, Oxychlordane @ 44, Endosulfan I @ 50%, cis-Chlordane @ 46%, trans-Nonachlor @ 47%, Endrin @ 48%, Endosulfan II @ 48%, 4,4'-DDT @ 43%, Methoxychlor @ 43% L1735250-41MS: Heptachlor epoxide @ 48%, Oxychlordane @ 46%,, cis-Chlordane @ 48%, trans-Nonachlor @ 49%, Endosulfan II @ 48% L1735250-41MSD: Heptachlor epoxide @ 44%, Oxychlordane @ 43%, Endosulfan I @ 50%,%,, cis-Chlordane @ 47%, trans-Nonachlor @ 47%, cis-Nonachlor @ 48%, 4,4'-DDT @ 48%,	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1735250-38: DBOB channel A @ 177% L1735250-42: BZ198 channel A @ 191% L1735250-41MSD: BZ198 channel B @ 23%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV opening for MB2,LCS/LCSD2, SRM2: Cl5-BZ#101 @ 53%, Cl6-BZ#138 @ 24% CCV opening for L1735250-36 through -40: Cl5-BZ#101 @ 78%, Cl6-BZ#128 @ 19% CCV opening for MB3, LCS/LCSD3, SRM3: Cl5-BZ3110 @ 57%, Cl9-BZ#206 @ 17% CCV opening for L1735250-41 through 55: Cl2-BZ#8 @ 20%, Cl5-BZ#101 @ 93%, Cl5-BZ#110 @ 38%, Cl9-BZ#206 @ 19%, Cl10-BZ#209 @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes.	No	L1735250-01MS: Cl3-BZ#18 @ 167%, Cl4-BZ#49 @ 50% L1735250-01MSD: Cl3-BZ#18 @ 144%,	In Data Package

	(Recovery Limits 50 to 120%; RPD <30%)		Cl4-BZ#49 @ 50% L1735250-21MS: Cl2-BZ#8 @ 38%, Cl3-BZ#28 @ 43%, Cl4-BZ#44 @ 40%, Cl4-BZ#49 @ 32%, Cl4-BZ#52 @ 45%, Cl4-BZ#66 @ 39%, Cl5-BZ#87 @ 40%, Cl5-BZ#101 @ 44%, Cl5-BZ#105 @ 36%, Cl5-BZ#118 @ 39%, Cl6-BZ#128 @ 43%, Cl6-BZ#138 @ 41%, Cl6-BZ#153 @ 46%, Cl7-BZ#170 @ 42%, Cl7-BZ#180 @ 40%, Cl7-BZ#180@ 40%, Cl7-BZ#183 @ 34%, Cl7-BZ#184 @ 43%, Cl7-BZ#187 @ 46%, Cl8-BZ#195 @ 43%, Cl9-BZ#206 @ 43%, Cl10-BZ#209 @ 43% L1735250-21MSD: Cl2-BZ#8 @ 46%, Cl4-BZ#44 @ 49%, Cl4-BZ#49 @ 39%, Cl4-BZ#66 @ 50%, Cl5-BZ#105 @ 44%, Cl5-BZ#118 @ 49%, Cl7-BZ#183 @ 42% L1735250-21MS/MSD RPD: Cl7-BZ#184 @ 33%, Cl5-BZ#101 @ 31% L1735250-41MS: Cl2-BZ#8 @ 50%, Cl4-BZ#49 @ 46%, Cl7-BZ#183 @ 46% L1735250-41MSD: Cl4-BZ#49 @ 49%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A	Performed Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1735250-53 (WG1056189-5) As(142%), Cu(142%), Zn(142%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

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Report to: Liz Porta	Address: 320 Forbes Blvd	Project Number: P0718	Task: 0001
Invoice to:	Address: Mansfield , MA 02048	Project Manager: Liz Porta	
Voice: 0	Fax: 0	email:	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
35250 .01 056	Nv Native Background Rep A	09/29/17	1600	ESI		1	9 oz	G	Frozen	Solid	N	*
.02 057	Nv Native Background Rep B					1	9 oz	G	Frozen	Solid	N	*
03 058	Nv Native Background Rep C					1	9 oz	G	Frozen	Solid	N	*
04 059	Nv Native Background Rep D					1	9 oz	G	Frozen	Solid	N	*
.05 060	Nv Native Background Rep E					1	9 oz	G	Frozen	Solid	N	*
.06 061	Nv LaBoratory Control Rep A					1	9 oz	G	Frozen	Solid	N	*
.07 062	Nv LaBoratory Control Rep B					1	9 oz	G	Frozen	Solid	N	*
08 063	Nv LaBoratory Control Rep C					1	9 oz	G	Frozen	Solid	N	*
.09 064	Nv LaBoratory Control Rep D					1	9 oz	G	Frozen	Solid	N	*
.10 065	Nv LaBoratory Control Rep E					1	9 oz	G	Frozen	Solid	N	*
.11 066	Nv CLDS Reference Sediment Rep A					1	9 oz	G	Frozen	Solid	N	*
.12 067	Nv CLDS Reference Sediment Rep B					1	9 oz	G	Frozen	Solid	N	*

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Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
.25 080	Nv Composite 2 Rep E	09/29/17	1600	ESI		1	9 oz	G	Frozen	Solid	N	*
.26 081	Nv Composite 3 Rep A					1	9 oz	G	Frozen	Solid	N	*
.27 082	Nv Composite 3 Rep B					1	9 oz	G	Frozen	Solid	N	*
.28 083	Nv Composite 3 Rep C					1	9 oz	G	Frozen	Solid	N	*
.29 084	Nv Composite 3 Rep D					1	9 oz	G	Frozen	Solid	N	*
.30 085	Nv Composite 3 Rep E					1	9 oz	G	Frozen	Solid	N	*
.31 086	Nv Composite 4 Rep A					1	9 oz	G	Frozen	Solid	N	*
.32 087	Nv Composite 4 Rep B					1	9 oz	G	Frozen	Solid	N	*
.33 088	Nv Composite 4 Rep C					1	9 oz	G	Frozen	Solid	N	*
.34 089	Nv Composite 4 Rep D					1	9 oz	G	Frozen	Solid	N	*
.35 090	Nv Composite 4 Rep E					1	9 oz	G	Frozen	Solid	N	*
.36 091	Nv Composite 5 Rep A					1	9 oz	G	Frozen	Solid	N	*

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Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
.13 068	Nv CLDS Reference Sediment Rep C	09/29/17	1000	ESI		1	9 oz	G	Frozen	Solid	N	*
.14 069	Nv CLDS Reference Sediment Rep D					1	9 oz	G	Frozen	Solid	N	*
.15 070	Nv CLDS Reference Sediment Rep E					1	9 oz	G	Frozen	Solid	N	*
.16 071	Nv Composite 1 Rep A					1	9 oz	G	Frozen	Solid	N	*
.17 072	Nv Composite 1 Rep B					1	9 oz	G	Frozen	Solid	N	*
.18 073	Nv Composite 1 Rep C					1	9 oz	G	Frozen	Solid	N	*
.19 074	Nv Composite 1 Rep D					1	9 oz	G	Frozen	Solid	N	*
.20 075	Nv Composite 1 Rep E					1	9 oz	G	Frozen	Solid	N	*
.21 076	Nv Composite 2 Rep A					1	9 oz	G	Frozen	Solid	N	*
.22 077	Nv Composite 2 Rep B					1	9 oz	G	Frozen	Solid	N	*
.23 078	Nv Composite 2 Rep C					1	9 oz	G	Frozen	Solid	N	*
.24 079	Nv Composite 2 Rep D					1	9 oz	G	Frozen	Solid	N	*

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Voice: 0	Fax: 0	email:	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
35250-37 092	Nv Composite 5 Rep B	09/29/17	1600	ESI		1	9 oz	G	Frozen	Solid	N	*
38 093	Nv Composite 5 Rep C					1	9 oz	G	Frozen	Solid	N	*
39 094	Nv Composite 5 Rep D					1	9 oz	G	Frozen	Solid	N	*
40 095	Nv Composite 5 Rep E					1	9 oz	G	Frozen	Solid	N	*
41 096	Nv Composite 6 Rep A					1	9 oz	G	Frozen	Solid	N	*
42 097	Nv Composite 6 Rep B					1	9 oz	G	Frozen	Solid	N	*
43 098	Nv Composite 6 Rep C					1	9 oz	G	Frozen	Solid	N	*
44 099	Nv Composite 6 Rep D					1	9 oz	G	Frozen	Solid	N	*
45 100	Nv Composite 6 Rep E					1	9 oz	G	Frozen	Solid	N	*
46 101	Nv Composite 7 Rep A					1	9 oz	G	Frozen	Solid	N	*
47 102	Nv Composite 7 Rep B					1	9 oz	G	Frozen	Solid	N	*
48 103	Nv Composite 7 Rep C					1	9 oz	G	Frozen	Solid	N	*

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Voice: 0	Fax: 0	email:	ERR

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Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
35250-49 104	Nv Composite 7 Rep D	09/29/17	1600	ES1		1	9 oz	G	Frozen	Solid	N	*
50 105	Nv Composite 7 Rep E					1	9 oz	G	Frozen	Solid	N	*
51 106	Nv Composite 8 Rep A					1	9 oz	G	Frozen	Solid	N	*
52 107	Nv Composite 8 Rep B					1	9 oz	G	Frozen	Solid	N	*
53 108	Nv Composite 8 Rep C					1	9 oz	G	Frozen	Solid	N	*
54 109	Nv Composite 8 Rep D					1	9 oz	G	Frozen	Solid	N	*
55 110	Nv Composite 8 Rep E					1	9 oz	G	Frozen	Solid	N	*

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Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
35250.01 056	Nv Native Background Rep A	10/04/17	1620	ESI		1	9 oz	G	Frozen	Solid	N	0
.02 057	Nv Native Background Rep B	↓	↓	↓		1	9 oz	G	Frozen	Solid	N	0
.03 058	Nv Native Background Rep C					1	9 oz	G	Frozen	Solid	N	0
.04 059	Nv Native Background Rep D					1	9 oz	G	Frozen	Solid	N	0
.05 060	Nv Native Background Rep E					1	9 oz	G	Frozen	Solid	N	0

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(E11) NV BACKGROUND TISSUE FROM SAMPLES RECEIVED ON 10/02/17 WAS NOT LOGGED DUE TO LAB OVERSIGHT AND ARE LISTED ABOVE. AM 10/04/17

Appendix E Backup Biology Laboratory Data

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003
TO#1 Project Number 60543021

Suspended Particulate Phase Evaluation

Prepared For:

AECOM
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Chelmsford, Massachusetts 01824

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Hampton, New Hampshire 03842

EnviroSystems, Inc. Master Reference 29516
Study Specific Reference 29523
August 2017 Revision 1

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, Incorporated at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's Regional Implementation Manual (RIM) for Evaluation of Dredged Material Proposed for Disposal In New England Waters. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation Section of this Report.

For EnviroSystems, Inc._____ September 8, 2017

Kenneth A. Simon
Technical Director

Date

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003
TO#1 Project Number 60543021

Suspended Particulate Phase Evaluation

1.0 INTRODUCTION

As part of a comprehensive plan to reduce adverse environmental impacts of ocean dumping, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 specifies that all sediments to be discharged into ocean waters must be evaluated to define their potential impact on existing benthic communities. The United States Environmental Protection Agency (US EPA) has determined that the most effective means to make such an assessment is through the use of bioassay tests, which provide a relatively direct estimate of potential impact.

This project was designed to evaluate the potential toxicity of sediments from the area of dredging proposed for the New Haven Harbor Federal Navigation Project (FNP) located in New Haven, Connecticut. Testing involved conduct of Suspended Particulate Phase (SPP) assays using the mysid, *Americamysis bahia*, inland silverside minnow, *Menidia beryllina*, and larvae of the sea urchin, *Arbacia punctulata*. Testing followed procedures established by the US EPA and the US Army Corps of Engineers (US ACE) for testing of dredged material, including *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE 2004), *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual* (US EPA, US ACE 1991) and *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual* (US EPA, US ACE 1998).

2.0 MATERIALS AND METHODS

2.1 Sample Collection, Preservation and Storage

Sediment cores for toxicological analysis were collected by AECOM, Chelmsford, Massachusetts using vibracoring equipment from locations identified in the dredge footprint specified in the project Sampling and Analysis Plan (AECOM, 2017). Project site water and sediment samples were received under chain of custody in 5 gallon polyethylene buckets for sediment and in carboys for water. Site sediment samples were composited based on the compositing scheme provided by AECOM's team. Reference site samples were also collected by AECOM from the Central Long Island Sound Disposal Site (CLDS). Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Prior to testing, samples were placed in a secure refrigerator and stored at a temperature of $4 \pm 2°C$ until test initiation. Sample identification, collection and receipt information is summarized in Table 1. Sample compositing information is provided in Table 2.

Water for the internal laboratory control was obtained from the Hampton Estuary, Hampton, New Hampshire. Water from this source has been used for culture and maintenance of test organisms at ESI since 1978. Seawater is obtained through a filter system located on the bottom of the estuary at a point approximately 1 mile from the open ocean. The estuary receives no direct industrial discharges.

2.2 Elutriate Sample Preparation

The elutriate sample was prepared by placing one volume of test sediment and four volumes of

overlying site water in a stainless steel container and mixing with a mechanical stirring device for 30 minutes. Speed of the stirring motor was set so that the sample did not cavitate, entrain air, and oxidize the sample. After mixing, the sediment and water mixture was allowed to settle for an hour. The resulting supernatant solution was then removed by siphon and centrifuged before being submitted for biological and chemical evaluation. A summary of the elutriate preparation is provided in Table 3.

Test concentrations were mixed by diluting the elutriate sample with the overlying water collected from the CLDS reference site. Test concentrations for all assays were 1%, 10%, 50% and 100% (undiluted elutriate). The diluent control was included to verify the relative toxicity of the reference site, and the Hampton Estuary control was included to verify the relative health of the test organisms.

2.3 Test Species

A. bahia were ≤5 days old and were obtained from cultures maintained by Aquatic Research Organisms (ARO), Hampton, New Hampshire. *M. beryllina* were 9-14 days old at the start of the assay and were obtained from Aquatic BioSystems, Inc., (ABS), Fort Collins, Colorado for the Round 1 assay, and from ARO for the Round 2 assay. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. Organisms were transferred to test vessels using a large bore pipet to minimize the amount of water added to test solutions.

Adult *A. punctulata* were from cultures maintained by ESI. Original stock was obtained from a commercial supplier. Adult sea urchins are maintained in the laboratory for as long as they are viable. Male and female urchins are maintained in separate chambers at a temperature of approximately 12±3°C after spawning.

2.4 Suspended Particulate Phase Assays

The toxicity tests were completed on a total of 8 elutriate samples that were split into two groups of 4 and analyzed in two separate rounds of assays with staggered start dates, each with their own respective laboratory control samples and reference samples. These tests are hereafter referred to as Rounds 1 and 2, and their periods of assay conduct are summarized in Table 4.

2.4.1 SPP Evaluations - *A. bahia* and *M. beryllina*

The 96 hour static acute toxicity tests were conducted at 20±2°C with a photoperiod of 16:8 hours light:dark. Test chambers were 250 mL beakers containing 200 mL of test solution in each of 5 replicates with 10 organisms/replicate. Survival in all test replicates was recorded after 1, 24, 48, 72, and 96 hours of exposure. Dissolved oxygen, pH, temperature and salinity were measured daily in one replicate of each treatment. *A. bahia* and *M. beryllina* were fed twice daily throughout testing.

2.4.2 Embryo Survival and Development SPP Evaluation - *A. punctulata*

The *A. punctulata* embryo survival and development assays were conducted at 20±1°C with a photoperiod of 16:8 hours light:dark. Test chambers for the acute assays were 250 mL glass beakers containing 200 mL test solution in each of 5 replicates. Dissolved oxygen, pH, temperature and salinity were measured in one replicate of each treatment at the start and end of the test. Gametes were obtained by potassium chloride injection to induce spawning. Gametes were collected and diluted with filtered laboratory seawater to yield approximate stock concentrations. Measured aliquots of gamete stock solutions were combined, fertilization success was monitored 15 minutes later, and the density of embryos was calculated. Sufficient embryos were removed from the stock solution and added to each test vessel to achieve a final concentration of approximately 25 to 35 embryos/mL of solution. Prior to transferring embryos from the holding vessel to the individual test vessels, the embryo stock solution was thoroughly homogenized to ensure even distribution. Embryo counts in three surrogate vessels were conducted just after the addition of the embryos to determine the actual embryo concentrations in the final elutriate solutions.

Observations in surrogate vessels were also used to determine the test endpoint. The test is terminated when approximately 90% of the fertilized embryos in the control vessels have reached the pluteus larval stage (between 48 and 96 hours). The tests were then terminated and 5 mL aliquots of each test replicate were preserved with 10% buffered formalin solution. All larvae in the 5 mL aliquot were counted to determine survival and normal development.

2.5 Data Analysis

As appropriate, statistical analysis of acute and chronic exposure data was completed using CETIS™ (Comprehensive Environmental Toxicity Information System) version 1.9.3.0 software. The program computes acute exposure endpoints based on US EPA decision tree guidelines specified in individual test methods. Statistical significance was accepted at $\propto = 0.05$.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Summaries of reference toxicant assays conducted in support of this study are provided in Table 5.

3.0 RESULTS AND DISCUSSION

A summary of endpoints for each species is provided in Table 6. Water quality characteristics are summarized in Table 7. Laboratory bench sheets, water quality data, and associated statistical support data are included in Appendix A.

3.1 SPP Evaluations - *A. bahia* Round 1

At the end of the 96 hour exposure period, *A. bahia* survival was 100% in the Hampton Estuary laboratory control and 98% in the CLDS reference water treatment. This meets the minimum test acceptability criteria of ≥90% survival in the laboratory control and is an indication that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with elutriate samples.

Review of data collected at the end of the assay documented that the mysid LC-50s in site composite elutriate solutions 1, 2, 3, and 4 were all >100%.

3.2 SPP Evaluations - *A. bahia* Round 2

At the end of the 96 hour exposure period, *A. bahia* survival was 100% in the Hampton Estuary laboratory control and 100% in the CLDS reference water treatment. This meets the minimum test acceptability criteria of ≥90% survival in the laboratory control and is an indication that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with elutriate samples.

Review of data collected at the end of the assay documented that the mysid LC-50 in site composite elutriate solution 5 was >100%. Site composite elutriate solutions 6, 7 and 8 caused significant adverse effects on mysid survival with LC-50s of 68%, 65% and 84%, respectively.

3.3 SPP Evaluations - *M. beryllina* Round 1

At the end of the 96 hour exposure period, *M. beryllina* survival was 100% in the Hampton Estuary laboratory control and 96% in the CLDS reference water treatment. This meets the minimum test acceptability criteria of ≥90% survival in the laboratory control and is an indication that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts

associated with elutriate samples.

Review of data collected at the end of the assay documented that the minnow LC-50s in site composite elutriate solutions 1, 2, 3, and 4 were all >100%.

3.4 SPP Evaluations - *M. beryllina* Round 2

At the end of the 96 hour exposure period, *M. beryllina* survival was 96% in the Hampton Estuary laboratory control and 100% in the CLDS reference water treatment. This meets the minimum test acceptability criteria of ≥90% survival in the laboratory control and is an indication that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with elutriate samples.

Review of data collected at the end of the assay documented that site composite elutriate solutions 5, 6, 7 and 8 all caused significant adverse effects on minnow survival with LC-50s of 78%, 46%, 48% and 72%, respectively.

3.5 SPP Evaluations - *A. punctulata* Round 1

Counts made in the Hampton Estuary laboratory surrogate test vessels at the initiation of the *A. punctulata* assay indicated an average initial embryo concentration of 155 embryos/5mL, equal to approximately 31 embryos/mL. The assay was terminated after 67 hours exposure when it was determined that the majority of the larvae (>90%) had reached the pluteus larval stage. Embryo counts in the Hampton Estuary laboratory control treatment showed 83% of the embryos survived at the end of the assay. Of the original embryos, 83% were normally developed pluteus larvae. Embryo counts in the CLDS reference site water showed 88% of the embryos survived and 86% were normally developed at the end of the assay. This meets the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control sample.

Review of the data collected at the end of the assay indicate that all the site composite elutriate solutions except composite 1 elutriate had significant negative impacts on embryonic survival and/or development, with LC-50s ranging from 18-21% for survival and with EC-50s ranging from 4-17% for development.

3.6 SPP Evaluations - *A. punctulata* Round 2

Counts made in the Hampton Estuary laboratory surrogate test vessels at the initiation of the *A. punctulata* assay indicated an average initial embryo concentration of 159 embryos/5mL, equal to approximately 32 embryos/mL. The assay was terminated after 48 hours exposure when it was determined that the majority of the larvae (>90%) had reached the pluteus larval stage. Embryo counts in the Hampton Estuary laboratory control treatment showed 76% of the embryos survived at the end of the assay. Of the original embryos, 72% were normally developed pluteus larvae. Embryo counts in the CLDS reference site water showed 74% of the embryos survived and 71% were normally developed at the end of the assay. This meets the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control sample.

Review of the data collected at the end of the assay indicate that all the site composite elutriate solutions had significant negative impacts on embryonic survival and/or development, with LC-50s ranging from 9-35% for survival and with EC-50s ranging from 1-4% for development.

3.7 Protocol Deviations

Review of the data collected for these assays documented a few minor deviations from the method protocol and/or ESI's standard procedures. The protocol requires that the assays be conducted at 20±2°C for the *A. bahia* and *M. beryllina* assays, and 20±1°C for the *A. punctulata* assay. Although the assays

were, for the most part, maintained in incubators set at their target temperatures, some temperatures recorded during the assays fell outside of the protocol range due to the ambient laboratory temperature at the time that dilutions were mixed and water quality measurements were taken. These species can tolerate temperatures within the ranges measured, and US EPA protocol allows temperatures of 25±2°C for these species. It was noted that the incubator for the Round 1 mysid assays was initially set too high but was corrected and possibly over-compensated the next day. It is the opinion of ESI's technical director that these deviations had no adverse impact on the outcome of the assay.

In addition, the protocol requires that the assays be conducted at 30±2‰. It is not uncommon for the salinity to drift upwards during assay conduct due to evaporation and exceed the protocol requirement, but the salinities are adjusted daily as needed to account for this occurrence. In a few instances of the Round 1 mysid assay, the measured salinity was slightly below the acceptable range. It is the opinion of ESI's technical director that these deviations had no adverse impact on the outcome of the assay.

Last, due to technician oversight ammonia samples were not collected for analysis at assay initiation for the laboratory control or CLDS reference samples. Likewise, during Round 2 of the minnow and mysid assays the final ammonia samples were not collected for analysis. Rather, ammonia samples were taken from the 50% test concentration when the assays were terminated at 96 hours. Similarly, ammonia samples were not collected at the end of the Round 2 urchin assays. While these occurrences represent a data gap and a deviation from ESI's internal protocol, it is the opinion of ESI's technical director that these deviations had no adverse impact on the outcome of the assay.

3.8 Summary

This program utilized protocols developed by the USEPA and the CENAE to assess the potential impact of the proposed dredge material collected from New Haven Harbor would have on the marine environment. Review of the data documents that there were no significant effects on any of the tested organisms following exposure to the undiluted elutriate solution from composite 1. In addition, there were no adverse effects on mysid or minnow survival after exposure to the undiluted elutriate solutions from composites 2 through 4. However, significant adverse effects on mysid and/or minnow survival occurred following exposure to composite 5 through 8 elutriate solutions, and composite 2 through 8 elutriate solutions had significant negative effects on urchin larval survival and/or development.

A notable amount of total ammonia (>10 mg/L) was observed in composites 2, 3, 4, 5, 6, 7, and 8 elutriate solution at the start of the assays. US EPA guidance suggests ammonia, generally in the unionized form, can be a source of toxicity when total ammonia values are >5 mg/l (USEPA 2002). US EPA Ambient Water Quality Criteria (AWQC) for unionized ammonia in saltwater references LC-50 values for two of the species tested: *A. bahia* (1.04 mg/L) and *M. beryllina* (0.88 mg/L) (USEPA 1989). AWQC for unionized ammonia in saltwater are not available for *A. punctulata*, however effects levels are available in the literature for urchin species ranging from 0.06 mg/L for an EC-50 for development (Maguire Group Inc., 2003) to approximately 0.336 mg/L for a 96-hour LC-50 (Chang-Hoon Lee et al., 2013). Calculated unionized ammonia values from the start of the assays for these composites and species ranged between 0.5 to 2.1 mg/L (*A. bahia*), 0.4 to 2.1 mg/L (*M. beryllina*) and 0.4 to 1.9 mg/L (*A. punctulata*). Consequently, it is possible that any observed toxicity in these composites is a product of total and unionized ammonia content.

4.0 REFERENCES

AECOM. 2017. *Draft Laboratory Testing in Support of Environmental Assessment; Sampling & Environmental Testing – New Haven Harbor FNP [Sampling and Analysis Plan]*. Chelmsford, Massachusetts. August 2017.

Chang-Hoon Lee, Chan-Gyoung Sung, Seong-Dae Moon and Jong-Hyeon Lee. 2013. *Effects of Ammonia on Fertilization, Development, and Larval Survival in the Northern Pacific Asteroid, Asterias amurensis (See Urchin)*. Bulletin of Environmental Contamination and Toxicology (2013) 91:102-106.

Maguire Group, Inc. 2003. *Laboratory Testing in Support of Site Specific Water Quality Criteria Assessment and Hydrographic Data Collection for New Bedford Harbor*. Toxicity Identification Evaluation Testing with Mysids and Sea Urchins.

US EPA Region 1, CENAE. 2004. *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters*. September 2004.

US EPA. 1989. *Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989*. EPA 440/5-88-004. April 1989.

US EPA, US ACE. 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual.* EPA-503/8-91/001, February 1991.

US EPA, US ACE. 1998. *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual*. EPA-823-B-98-004, February 1998.

US EPA 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

Table 1. Sample Collection and Receipt Information. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

				Collection		Receipt	
Field ID	ESI Code	Sample Type	Matrix	Date	Time	Date	Time
NHH-Z	29516-001	Site	Solid	08/12/17	1350	08/18/17	1300
NHH-Z	29516-002	Site	Solid	08/08/17	1153	08/18/17	1300
NHH-P	29516-003	Site	Solid	08/12/17	0850	08/18/17	1300
NHH-P	29516-004	Site	Solid	08/09/17	1219	08/18/17	1300
NHH-L	29516-005	Site	Solid	08/15/17	1405	08/18/17	1300
NHH-L	29516-006	Site	Solid	08/10/17	1300	08/18/17	1300
NHH-J	29516-007	Site	Solid	08/15/17	1405	08/18/17	1300
NHH-J	29516-008	Site	Solid	08/10/17	1141	08/18/17	1300
NHH-F	29516-009	Site	Solid	08/16/17	1658	08/18/17	1300
NHH-F	29516-010	Site	Solid	08/11/17	1650	08/18/17	1300
NHH-M	29516-011	Site	Solid	08/13/17	1220	08/18/17	1300
NHH-M	29516-012	Site	Solid	08/08/17	1610	08/18/17	1300
NHH-B	29516-013	Hold [a]	Solid	08/11/17	1157	08/18/17	1300
NHH-W	29516-014	Site	Solid	08/09/17	1634	08/18/17	1300
NHH-W	29516-015	Site	Solid	08/15/17	0938	08/18/17	1300
NHH-O	29516-016	Site	Solid	08/14/17	1614	08/18/17	1300
NHH-O	29516-017	Site	Solid	08/08/17	1445	08/18/17	1300
NHH-Y	29516-018	Site	Solid	08/13/17	0820	08/18/17	1300
NHH-Y	29516-019	Site	Solid	08/08/17	1153	08/18/17	1300
NHH-G	29516-020	Site	Solid	08/17/17	0934	08/18/17	1300
NHH-G	29516-021	Site	Solid	08/11/17	0837	08/18/17	1300
NHH-K	29516-022	Site	Solid	08/10/17	1409	08/18/17	1300
NHH-K	29516-023	Site	Solid	08/14/17	1232	08/18/17	1300
NHH-N	29516-024	Site	Solid	08/13/17	1515	08/18/17	1300
NHH-N	29516-025	Site	Solid	08/08/17	1305	08/18/17	1300
NHH-A	29516-026	Hold [a]	Solid	08/11/17	1340	08/18/17	1300
NHH-C	29516-027	Site	Solid	08/17/17	1213	08/18/17	1300
NHH-C	29516-028	Site	Solid	08/11/17	1033	08/18/17	1300
NHH-D	29516-029	Site	Solid	08/16/17	1443	08/18/17	1300
NHH-D	29516-030	Site	Solid	08/11/17	1507	08/18/17	1300
NHH-T	29516-031	Site	Solid	08/12/17	1220	08/18/17	1300
NHH-T	29516-032	Site	Solid	08/08/17	1734	08/18/17	1300
NHH-E	29516-033	Site	Solid	08/14/17	0832	08/18/17	1300
NHH-E	29516-034	Site	Solid	08/16/17	1230	08/18/17	1300
NHH-S	29516-035	Site	Solid	08/15/17	1158	08/18/17	1300
NHH-S	29516-036	Site	Solid	08/10/17	0955	08/18/17	1300
NHH-R	29516-037	Site	Solid	08/16/17	0829	08/18/17	1300
NHH-R	29516-038	Site	Solid	08/10/17	0832	08/18/17	1300
NHH-H	29516-039	Site	Solid	08/10/17	1548	08/18/17	1300
NHH-H	29516-040	Site	Solid	08/16/17	1027	08/18/17	1300

Field ID	ESI Code	Sample Type	Matrix	Collection Date	Collection Time	Receipt Date	Receipt Time
NHH-I	29516-041	Site	Solid	08/10/17	1746	08/18/17	1300
NHH-I	29516-042	Site	Solid	08/17/17	1627	08/18/17	1300
NHH-V	29516-043	Site	Solid	08/09/17	1745	08/18/17	1300
NHH-V	29516-044	Site	Solid	08/15/17	1646	08/18/17	1300
NHH-X	29516-045	Site	Solid	08/08/17	0922	08/18/17	1300
NHH-X	29516-046	Site	Solid	08/12/17	1600	08/18/17	1300
NHC-I	29516-048	Site	Water	08/17/17	1430	08/18/17	1300
NHC-V	29516-049	Site	Water	08/17/17	1528	08/18/17	1300
NHC-F	29516-050	Site	Water	08/17/17	1300	08/18/17	1300
CLDS-Ref-Top	29516-051	Reference	Water	08/17/17	1015	08/18/17	1300
CLDS-Ref-Mid	29516-052	Reference	Water	08/17/17	1015	08/18/17	1300
CLDS-Ref-Bottom	29516-053	Reference	Water	08/17/17	1015	08/18/17	1300
NHH-Q	29516-054	Site	Solid	08/09/17	1427	08/18/17	1300
NHH-U	29516-055	Site	Solid	08/09/17	0905	08/18/17	1300

Note:
[a] Samples NHH-A and NHH-B were delivered to ESI but were not included in the compositing scheme per verbal communication from the client.

Table 2. Summary of Sample Compositing Information. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Composite ID	ESI Code	Components Field ID	Components ESI Code	Final Amount	Composite Date Date	Composite Date Time
Composite Reference Water (CLDS [a])	29517-010	CLDS-Ref-Top	29516-051	30 gal	08/21/17	1445
		CLDS-Ref-Mid	29516-052			
		CLDS-Ref-Bottom	29516-053			
Composite 1	29517-001	NHH-C	29516-027	22 gal	08/21/17	0840
		NHH-C	29516-028			
Composite 2	29517-002	NHH-D	29516-029	26 gal	08/21/17	0950
		NHH-D	29516-030			
		NHH-E	29516-033			
		NHH-E	29516-034			
		NHH-F	29516-009			
		NHH-F	29516-010			
Composite 3	29517-003	NHH-G	29516-020	31 gal	08/21/17	1400
		NHH-G	29516-021			
		NHH-H	29516-039			
		NHH-H	29516-040			
		NHH-I	29516-041			
		NHH-I	29516-042			

Composite ID	ESI Code	Components Field ID	Components ESI Code	Final Amount	Composite Date Date	Composite Date Time
		NHH-J	29516-007			
		NHH-J	29516-008			
		NHH-K	29516-022	23 gal	08/21/17	1445
		NHH-K	29516-023			
		NHH-L	29516-005			
Composite 4	29517-004	NHH-L	29516-006			
		NHH-M	29516-011			
		NHH-M	29516-012			
		NHH-N	29516-024	29 gal	08/21/17	1530
		NHH-N	29516-025			
		NHH-O	29516-016			
Composite 5	29517-005	NHH-O	29516-017			
		NHH-P	29516-003			
		NHH-P	29516-004			
		NHH-Q	29516-054			
		NHH-R	29516-037	28 gal	08/21/17	1205
		NHH-R	29516-038			
		NHH-S	29516-035			
Composite 6	29517-006	NHH-S	29516-036			
		NHH-T	29516-031			
		NHH-T	29516-032			
		NHH-U	29516-055			
		NHH-V	29516-043	31 gal	08/21/17	1540
		NHH-V	29516-044			
		NHH-W	29516-014			
Composite 7	29517-007	NHH-W	29516-015			
		NHH-X	29516-045			
		NHH-X	29516-046			
		NHH-Y	29516-018	26 gal	08/21/17	1130
		NHH-Y	29516-019			
		NHH-Z	29516-001			
Composite 8	29517-008	NHH-Z	29516-002			

Note:
[a] The Composite Reference Water is referred to CLDS Reference Water hereafter.

Table 3. Elutriate Solution Preparation. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Water		Sediment		Elutriate Preparation			
Field ID	ESI Code	Composite ID	ESI Code	Elutriate ID	ESI Code	Date	Time
NHC-F	29516-050	Composite 1	29517-001	Elutriate 1 [a]	29521-002	08/22/17	1425
NHC-F	29516-050	Composite 2	29517-002	Elutriate 2 [a]	29521-004	08/22/17	1055
NHC-I	29516-048	Composite 3	29517-003	Elutriate 3 [a]	29521-006	08/22/17	1310
NHC-I	29516-048	Composite 4	29517-004	Elutriate 4 [a]	29521-008	08/22/17	1212
NHC-V	29516-049	Composite 5	29517-005	Elutriate 5	29521-010	08/23/17	1020
NHC-V	29516-049	Composite 6	29517-006	Elutriate 6	29521-012	08/23/17	1100
NHC-V	29516-049	Composite 7	29517-007	Elutriate 7	29521-014	08/23/17	0920
NHC-V	29516-049	Composite 8	29517-008	Elutriate 8	29521-016	08/23/17	1223
NHC-F	29516-050	Composite 1	29517-001	Elutriate 1 [a]	29521-017	08/25/17	0930
NHC-F	29516-050	Composite 2	29517-002	Elutriate 2 [a]	29521-018	08/25/17	1035
NHC-I	29516-048	Composite 3	29517-003	Elutriate 3 [a]	29521-019	08/25/17	1035
NHC-I	29516-048	Composite 4	29517-004	Elutriate 4 [a]	29521-020	08/25/17	1113

Note:
[a] Elutriates 1 through 4 prepared on August 22, 2017 were used for the mysid assay only. Elutriates 1 through 4 prepared on August 25, 2017 were used for the *M. beryllina* and *A. punctulata* assays.

Table 4. Period of Assay Conduct. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Elutriate			Assay Start		Assay End	
Comp/Elutirate ID	ESI Code	Test Species	Date	Time	Date	Time
Comp 1 Elutriate Comp 2 Elutriate Comp 3 Elutriate Comp 4 Elutriate	29521-002 29521-004 29521-006 29521-008	*A. bahia* Round 1	08/22/17	1540	08/26/17	1440
Comp 5 Elutriate Comp 6 Elutriate Comp 7 Elutriate Comp 8 Elutriate	29521-010 29521-012 29521-014 29521-016	*A. bahia* Round 2	08/23/17	1645	08/27/17	1540
Comp 1 Elutriate Comp 2 Elutriate Comp 3 Elutriate Comp 4 Elutriate	29521-017 29521-018 29521-019 29521-020	*M. beryllina* Round 1 [a]	08/25/17	1620	08/29/17	1500
Comp 5 Elutriate Comp 6 Elutriate Comp 7 Elutriate Comp 8 Elutriate	29521-010 29521-012 29521-014 29521-016	*M. beryllina* Round 2	08/23/17	1545	08/27/17	1345
Comp 1 Elutriate Comp 2 Elutriate Comp 3 Elutriate Comp 4 Elutriate	29521-017 29521-018 29521-019 29521-020	*A. punctulata* Round 1 [a]	08/25/17	1600	08/28/17	1125
Comp 5 Elutriate Comp 6 Elutriate Comp 7 Elutriate Comp 8 Elutriate	29521-010 29521-012 29521-014 29521-016	*A. punctulata* Round 2	08/23/17	1630	08/25/17	1630

Note:
[a] Rounds 1 of the *M. beryllina* and *A. punctulata* assay were first initiated on August 22, 2017 but failed to meet test acceptability criteria for survival in the laboratory control. The assays were successfully repeated on the dates and times listed above. The results of the first assays are included in Appendix A.

Table 5. Reference Toxicant Data Summary. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
08/31/17	03AbARO083017	96Hr LC-50	20.5	18.0	13.3 - 22.8	SDS (mg/L)
M. beryllina						
08/31/17	07MbABS082617	96Hr LC-50	7.2	6.2	3.6 - 8.8	SDS (mg/L)
A. punctulata						
08/30/17	99ApARO083017	EC-50-Dev	16.1	18.9	10.4 - 27.5	Copper (μg/L)

Notes: Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

Table 6. Summary of Endpoints and Adverse Effects. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

		A. bahia	*M. beryllina*	*A. punctulata*	
Comp/Elutriate ID	ESI Code	LC-50 (Survival)	LC-50 (Survival)	LC-50 (Survival)	EC-50 (Development)
Comp 1 Elutriate	29521-002	>100%	>100%	>100%	>100%
Comp 2 Elutriate	29521-004	>100%	>100%	21%	4%
Comp 3 Elutriate	29521-006	>100%	>100%	18%	17%
Comp 4 Elutriate	29521-008	>100%	>100%	18%	15%
Comp 5 Elutriate	29521-010	>100%	78%	23%	3%
Comp 6 Elutriate	29521-012	68%	46%	9%	4%
Comp 7 Elutriate	29521-014	65%	48%	35%	1%
Comp 8 Elutriate	29521-016	84%	72%	35%	3%

Table 7. Summary of Water Quality Data - Round 1. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Comp/Elutriate ID	pH (SU)		Salinity (‰)		Ammonia (mg/L)		Ammonia (mg/L)	
	Start	End	Start	End	Start		End	
					Total	Unionized	Total	Unionized
A. bahia								
Laboratory Control Water	7.94	7.81	30	31	[a]	[a]	[a]	[a]
CLDS Reference Water	7.85	7.86	28	30	[a]	[a]	4.3	0.1199
Comp 1 Elutriate	8.03	7.92	30	32	2.2	0.1101	4.5	0.1434
Comp 2 Elutriate	7.98	8.18	30	32	24	1.2329	7.9	0.4465
Comp 3 Elutriate	7.91	8.09	30	32	12	0.5287	7.4	0.3203
Comp 4 Elutriate	7.96	8.13	30	32	17	0.7813	7.6	0.3592
M. beryllina								
Laboratory Control Water	8.07	7.86	30	32	[a]	[a]	3.8	0.1137
CLDS Reference Water	7.87	7.87	28	31	[a]	[a]	3.9	0.1193
Comp 1 Elutriate	8.07	7.94	30	32	1.8	0.0857	4	0.1430
Comp 2 Elutriate	8.03	8.15	30	32	20	0.8725	8.7	0.4935
Comp 3 Elutriate	7.96	8.05	30	32	12	0.4485	7.5	0.3419
Comp 4 Elutriate	7.99	8.15	30	31	15	0.5991	6.9	0.3914
A. punctulata								
Laboratory Control Water	8.07	8.01	30	30	[a]	[a]	0.22	0.0098
CLDS Reference Water	7.87	8.00	28	28	[a]	[a]	0.18	0.0079
Comp 1 Elutriate	8.07	8.12	30	30	1.8	0.0857	1.8	0.1024
Comp 2 Elutriate	8.03	8.28	30	31	20	0.8725	15	1.1255
Comp 3 Elutriate	7.96	8.23	30	31	12	0.4485	10	0.7212
Comp 4 Elutriate	7.99	8.31	30	30	15	0.5991	13	1.1110

Note:
[a] Due to an oversight, ammonia samples were not collected at the start of any assays for the laboratory control and CLDS reference site, or at the end of the *A. bahia* assay for the laboratory control only.

Table 8. Summary of Water Quality Data - Round 2. Suspended Particulate Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Comp/Elutriate ID	pH (SU)		Salinity (‰)		Ammonia (mg/L)		Ammonia (mg/L)	
	Start	End	Start	End	Start		End	
					Total	Unionized	Total	Unionized
A. bahia								
Laboratory Control Water	8.11	7.93	30	30	[b]	[b]	4.4	0.14
CLDS Reference Water	7.87	7.96	28	30	[b]	[b]	4.5	0.16
Comp 5 Elutriate	7.89	8.19	30	31	34	1.1	11	0.64
Comp 6 Elutriate [a]	7.88	8.09 [a]	30	31	57	1.8	36	1.7
Comp 7 Elutriate [a]	7.92	8.14 [a]	30	30	62	2.1	19	0.98
Comp 8 Elutriate	7.94	8.15	30	31	40	1.4	19	1.01
M. beryllina								
Laboratory Control Water	8.11	7.90	30	31	[b]	[b]	4.2	0.13
CLDS Reference Water	7.87	7.86	28	30	[b]	[b]	4.4	0.12
Comp 5 Elutriate	7.89	8.24	30	31	34	1.1	12	0.77
Comp 6 Elutriate [a]	7.88	8.02 [a]	28	30	57	1.8	12	0.48
Comp 7 Elutriate [a]	7.92	7.98 [a]	30	30	62	2.1	15	0.51
Comp 8 Elutriate	7.94	8.18	30	32	40	1.4	12	0.68
A. punctulata								
Laboratory Control Water	8.12	7.82	30	30	[b]	[b]	[b]	[b]
CLDS Reference Water	7.87	7.81	28	29	[b]	[b]	[b]	[b]
Comp 5 Elutriate	7.89	8.13	30	31	34	1.1	[b]	[b]
Comp 6 Elutriate	7.88	8.13	30	30	57	1.8	[b]	[b]
Comp 7 Elutriate	7.88	8.14	30	30	62	1.9	[b]	[b]
Comp 8 Elutriate	7.91	8.16	30	30	40	1.3	[b]	[b]

Note:

[a] There was complete mortality before 96 hours, therefore water quality measurements were not taken. The last measured pH and temperature values were used for unnionized ammonia calculations instead. Due to the complete mortality that occurred prior to 96 hours, ammonia samples were collected from the 50% test concentration.

[b] Due to an oversight, ammonia samples were not collected at the start of any assays for the laboratory control and CLDS reference site, or at the end of the *A. punctulata* assay.

APPENDIX A:

RAW DATA & STATISTICAL SUPPORT

Contents	Number of Pages
Study Number Record	1
Sample Receipt Logs, Chain of Custody Records	12
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STUDY NUMBER RECORD

Issue and complete this form for studies that will require multiple tasks and directly associated support studies. Issue consecutive study numbers at the start of the project to cover all potential elements of the project.

CLIENT: AECOM

CONTACT(S): Ryan McCarthy, Christine Archer, Maura Surprenant

PROJECT: New Haven Harbor Federal Navigation Project

CONTRACT #: W912WJ-17-D-0003

	Species / Analysis Parameters:		STUDY:
Sample Receipt:			**29516**
Grain Size Analysis:			**-**
Composite Prep:			**29517**
Bulk Sediment Analysis:			**29518**
10 Day Assay:	***Leptocheirus plumulosus***		**29519**
	Americamysis bahia		**29520**
Elutriate Preparation:	**Type:**		**29521**
Elutriate Analysis:	**Pentachlorophenol**	**Yes / No**	**29522**
	Trace Metals	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	
SPP Assays:	***Menidia beryllina***		**29523**
	Americamysis bahia		
	Arbacia punctulata		
Bioaccumulation Study:	***Macoma nasuta***		**29524**
	Nereis virens		**29525**
Tissue Analysis:	**Trace Metals**	**Yes / No**	**29526**
	PAH Compounds	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	

P:\General Projects\RPT-Active\DSE 29516 AECOM - New Haven Harbor FNP\Study Number Log .wpd

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	NA
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	3		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes	Does the info on the COC match the samples?	No
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	No
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	No	Were samples received intact? (none broken or leaking)	No
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
See Chains of Custody						

Notes and qualifications:

-Majority of samples not listed on chains of custody based on container sampling information. Samples rejected and on hold until further notice.
* Residual samples from grain size analyses received to include in final composites
-Field ID NHH-Q and NHH-U presented on the associated chains of custody for this sample receipt document (ESI samples -054 and -055) wer accurately denoted based on sample containers, and were not present on revised chains of custody issued by AECOM on 08/21/17.

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature: [signature]

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sed. Eval

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed. Eval	Lab I.D.	Remarks
05	NHC-I	8/17/17	1430		X	5gal	W	4°C	NA	X		7 carboys
02	NHC-V	8/17/17	1528		X		W			X		12 carboys, 2 DIs
06	NHC-F	8/17/17	1300		X		W			X		6 carboys
04	CLDS-Ref-Top	8/17/17	1015		X		W			X		2 carboys
03	CLDS-Ref-Mid				X		W			X		2 carboys
01	CLDS-Ref-Bottom				X		W			X		2 carboys
07	NHH-C •	8/11	1033		X	5gal bucket	SD			X		7 buckets
08	NHH-D •	8/11	1507		X		SD			X	CSH	3 ~~2~~ buckets
09	NHH-E •	8/14	0832		X		SD			X		4 buckets
10	NHH-F •	8/11	1650		X		SD			X		3 buckets
11	NHH-G •	8/11	0837		X		SD			X		2 buckets
12	NHH-H •	8/10	1548		X		SD			X		4 buckets
13	NHH-I •	8/17	1627		X		SD			X		3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature: [signature]	8/18/17 Time: 1300	James T. Provencher ESI Signature: [signature]	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ 8/18

Notes: Discrepancies between most sample date & time and what is labeled on sample containers. Total container count not accurate. Conditions unacceptable for sample receipt & processing. – KC 8/18/17 1700

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

O:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM-06_3NCR.doc White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 0163

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sediment Eval

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval	Lab I.D.	Remarks
014 NHH-J	8/15/17	1405		X	5g bucket	SO	4°C	NA	X		3 buckets
015 NHH-K	8/10/17	1409		X					X		2 buckets
019 NHH-L	8/15/17	1515		X					X		2 buckets
016 NHH-M	8/8/17	1610		X					X		3 buckets
017 NHH-N	8/13/17	1515		X					X		2 buckets
018 NHH-O	8/8/17	1445		X					X		3 buckets
020 NHH-P	8/9/17	1319		X					X		3 buckets
021 NHH-Q (EID 8/21 -054)	8/9/17	1427		X					X		4 buckets
022 NHH-R	8/10/17	0832		X					X		3 buckets
023 NHH-S	8/10/17	0955		X					X		2 buckets
024 NHH-T 1734 CSH	8/8/17	~~1707~~ CSH		X					X		4 buckets
025 NHH-U (EID 8/21 -055)	8/9/17	0905		X					X		5 buckets
026 NHH-V	8/15/17	1646		X					X		3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination)~~: EID 8/18

Notes:

See page 1 of 3

EID 8/21 Samples NHH-Q & NHH-U are accurate based on sample container and were not denoted on revised CoC's.

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sed Grnl

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed Grnl	Lab I.D.	Remarks
227 NHH-W	8/15/17	0938		X	5gal bucket	SD	4°C	NA	X		2 buckets
228 NHH-X	8/13/17	1545		X					X		2 buckets
229 NHH-Y	8/8/17	1037		X					X		3 buckets
230 NHH-Z	8/8/17	1153		X					X		6 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ E3 8/18

Notes: See page 1 of 3

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody-AECOM-06-3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. NO 0165

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-Z	29516-001	S	Hold:Composite	2x5 Gal.	4C	
NHH-Z	29516-002	S	Hold:Composite	4x5 Gal.	4C	
NHH-P	29516-003	S	Hold:Composite	1x5 Gal.	4C	
NHH-P	29516-004	S	Hold:Composite	2x5 Gal.	4C	
NHH-L	29516-005	S	Hold:Composite	1x5 Gal.	4C	
NHH-L	29516-006	S	Hold:Composite	1x5 Gal.	4C	
NHH-J	29516-007	S	Hold:Composite	2x5 Gal.	4C	
NHH-J	29516-008	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-009	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-010	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-011	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-012	S	Hold:Composite	1x5 Gal.	4C	
NHH-B	29516-013	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-014	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-015	S	Hold:Composite	1x5 Gal.	4C	
NHH-O	29516-016	S	Hold:Composite	2x5 Gal.	4C	
NHH-O	29516-017	S	Hold:Composite	1x5 Gal.	4C	
NHH-Y	29516-018	S	Hold:Composite	2x5 Gal.	4C	
NHH-Y	29516-019	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-020	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-021	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-022	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-023	S	Hold:Composite	1x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-N	29516-024	S	Hold:Composite	1x5 Gal.	4C	
NHH-N	29516-025	S	Hold:Composite	1x5 Gal.	4C	
NHH-A	29516-026	S	Hold:Composite	1x5 Gal.	4C	
NHH-C	29516-027	S	Hold:Composite	5x5 Gal.	4C	
NHH-C	29516-028	S	Hold:Composite	2x5 Gal.	4C	
NHH-D	29516-029	S	Hold:Composite	1x5 Gal.	4C	
NHH-D	29516-030	S	Hold:Composite	2x5 Gal.	4C	
NHH-T	29516-031	S	Hold:Composite	1x5 Gal.	4C	
NHH-T	29516-032	S	Hold:Composite	3x5 Gal.	4C	
NHH-E	29516-033	S	Hold:Composite	2x5 Gal.	4C	
NHH-E	29516-034	S	Hold:Composite	2x5 Gal.	4C	
NHH-S	29516-035	S	Hold:Composite	1x5 Gal.	4C	
NHH-S	29516-036	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-037	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-038	S	Hold:Composite	2x5 Gal.	4C	
NHH-H	29516-039	S	Hold:Composite	3x5 Gal.	4C	
NHH-H	29516-040	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-041	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-042	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-043	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-044	S	Hold:Composite	1x5 Gal.	4C	
NHH-X	29516-045	S	Hold:Composite	2x5 Gal.	4C	
NHH-X	29516-046	S	Hold:Composite	2x5 Gal.	4C	

Notes and qualifications: 29516-024 S Hold:Composite

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
CLDS-Ref	29516-047	S	Hold:Composite	4x5 Gal.	4C	
NHC-I	29516-048	W	Hold:Composite	7x5 Gal.	4C	
NHC-V	29516-049	W	Hold:Composite	12x5 Gal.	4C	
NHC-F	29516-050	W	Hold:Composite	6x5 Gal.	4C	
CLDS-Ref-Top	29516-051	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Mid	29516-052	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Bottom	29516-053	W	Hold:Composite	2x5 Gal.	4C	
NHH-Q **	29516-054	S	Hold:Composite	4x5 Gal.	4C	
NHH-U **	29516-055	S	Hold:Composite	5x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encom all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viab containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.
** Samples denoted on original chain of custody, not on revised documents discussed above.

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sediment Eval (DSE)

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval (DSE)	Lab I.D.	Remarks
001	NHH-Z	8/12	1350		X	5g bucket	SD	4°C	NA	X		2 buckets
002	NHH-Z	8/8	1153		X					X		4 buckets
003	NHH-P	8/12	0850		X					X		1 bucket
004	NHH-P	8/9	1219		X					X		2 buckets
005	NHH-L	8/15	1405		X					X		1 bucket
006	NHH-L	8/10	1300		X					X		1 bucket
007	NHH-J	8/15	1405		X					X		2 buckets
008	NHH-J	8/10	1141		X					X		1 bucket
009	NHH-F	8/16	1658		X					X		1 bucket
010	NHH-F	8/11	1680		X					X		2 buckets
011	NHH-M	8/13	1220		X					X		2 buckets
012	NHH-M	8/8	1610		X					X		1 bucket
013	NHH-B	8/11	1157		X					X		1 bucket

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised on 8/21/17 C. Steve Howe AECOM Keith – ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature: C Steve Hone

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE								Lab I.D.	Remarks
14	NHH-W	8/9	1634		X	5g bucket	SD	4°C	NA	X									1 bucket
15	NHH-W	8/15	0938		X					X									1 bucket
16	NHH-O	8/14	1614		X					X									2 buckets
17	NHH-O	8/8	1445		X					X									1 bucket
18	NHH-Y	8/13	0820		X					X									2 buckets
19	NHH-Y	8/8	1153		X					X									1 bucket
20	NHH-G	8/17	0934		X					X									1 bucket
21	NHH-G	8/11	0837		X					X									1 bucket
22	NHH-K	8/10	1409		X					X									1 bucket
23	NHH-K	8/14	1232		X					X									1 bucket
24	NHH-N	8/13	1515		X					X									1 bucket
25	NHH-N	8/8	1305		X					X									1 bucket
26	NHH-A	8/11	1340		X					X									1 bucke

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM - ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0170

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE								Lab I.D.	Remarks
27	NHH-C	8/17/17	1213		X	5g bucket	SD	4°C	NA	X									5 buckets
28	NHH-C	8/1/17	1033		X					X									2 buckets
29	NHH-D	8/16	1443		X					X									1 bucket
30	NHH-D	8/11	1507		X					X									2 buckets
31	NHH-T	8/12	1220		X					X									1 bucket
32	NHH-T	8/8	1734		X					X									3 buckets
33	NHH-E	8/14	0832		X					X									2 buckets
34	NHH-E	8/16	1230		X					X									2 buckets
35	NHH-S	8/15	1158		X					X									1 bucket
36	NHH-S	8/10	0955		X					X									1 bucket
37	NHH-R	8/16	0829		X					X									1 bucket
38	NHH-R	8/10	0832		X					X									2 buckets

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hone AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0177

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hare AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE									Lab I.D.	Remarks
539	NHH-H	8/10	1548		X	5g bucket	SD	4°C	NA	X										3 buckets
540	NHH-A	8/16	1027		X					X										1 bucket
541	NHH-I	8/10	1746		X					X										1 bucket
542	NHH-J	8/17	1627		X					X										2 buckets
543	NHH-V	8/9	1745		X					X										2 buckets
544	NHH-V	8/15	1646		X					X										1 bucket
545	~~NHH-X~~	~~8/4~~	~~1153~~			CSH														~~2 buckets~~
546	NHH-X	8/8	0922		X	5g bucket	SD	4°C	NA	X										2 buckets
547	NHH-X	8/12	1600		X					X										2 buckets
548	CLOS-Ref	8/17	0800		X					X										4 buckets
8/24																				

Relinquished by: (Print Name)/(Affiliation)	Date / Time	Received by: (Print Name)/(Affiliation)	Date / Time
C. Steve Hare AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 ESI - 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0171

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hare AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE									Lab I.D.	Remarks
NHC-I	8/17/17	1430		X	5g carboys	W	4°C	NA	X										7 carboys
NHC-V	8/17	1528		X					X										12 carboys, 2DIs*
NHC-F	8/17	1300		X					X										6 carboys
CLDS-Ref-Top	8/17	1015		X					X										2 carboys
CLDS-Ref-Mid	8/17	1015		X					X										2 carboys
CLDS-Ref-Bottom	8/17	1015		X					X										2 carboys

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hare AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) COCs amended and revised 8/21/17 Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) C. Steve Hare AECOM Signature: -ESI 8/21/17	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

* water from a leaking carboy was transferred into to lab supplied distilled water containers

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0172

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 1

Composite Lab ID.: 29517-001

Composite Final Volume: 22 gallons

Composite Matrix: Solid

Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/21/17

1x 1 gallon bucket

Composite Prepared Time: 0840

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-C	29516-027	Solid	—	≈2.5 gallons	≈24.5 gallons	grey to black sediment with lots of shell hash
↓	↓ -028	↓	↓	↓	↓	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 29517-002 Composite Final Volume: ≈28 gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/24/17 1x1 gallon bucket

Composite Prepared Time: 0950

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-D	29516-029 030	Solid	—	—	≈10 gallons	
NHH-E	-033 034	Solid	—	~~≈7 gal~~	≈7 gallons	
NHH-F	-009 010	Solid	—	—	≈10 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 29517-003 Composite Final Volume: 31 gal

Composite Matrix: Solid Composite Container(s): 6x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon buckets

Composite Prepared Time: 1400

Initials: BK/ JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-G	29516-020 021	Solid	—	—	≈9.5gallons	
NHH-H	↓ - 039 040	Solid	—	—	≈9gallons	
NHH-I	↓ - 041 042	Solid	—	—	≈1gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 29517-004

Composite Final Volume: 23gallons

Composite Matrix: Solid

Composite Container(s): 5x5gallon buckets

1x1gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1445

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-J	29516-007 008	Solid	—	—	≈8gallons	
NHH-K	↓ -022 023	Solid	—	—	≈8gallons	
NHH-L	↓ -005 006	Solid	—	—	≈ 9.5gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 29517-005 Composite Final Volume: ≈ 29 gallons

Composite Matrix: Solid Composite Container(s): 6 x 5 gallon

Composite Prepared Date: 08/21/17 1 x 1 gallon

Composite Prepared Time: 1530

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-M	29516-011 012	Solid	—	—	≈ 9.5 g	
NHH-N	↓ -024 025	Solid	—	—	≈ 9 g	
NHH-O	↓ -016 017	Solid	—	—	≈ 10.5 g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 29517-006 Composite Final Volume: 28gallons

Composite Matrix: Solid Composite Container(s): 7x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1205

Initials: BG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-P	29516-003 004	Solid	—	—	≈8.5gallons	
NHH-Q	-054	Solid	—	—	≈14gallons	
NHH-R	-037 038	Solid	—	—	≈7gallons	
NHH-S	-035 036	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 7

Composite Lab ID.: 29517-007 Composite Final Volume: 31gallons

Composite Matrix: Solid Composite Container(s): 7x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1540

Initials: BGI JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-T	29516-031 032	Solid	—	—	≈9.5gallons	
NHH-U	-055	Solid	—	—	≈14.5gallons	
NHH-V	-043 044	Solid	—	—	≈7gallons	
NHH-W	-014 015	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 8

Composite Lab ID.: 29517-008

Composite Final Volume: ≈26gallons

Composite Matrix: Solid

Composite Container(s): 5x5gallon buckets, 1x1gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1130

Initials: DG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-X	29516-045 046	Solid	—	—	≈9.5gallons	
NHH-Y	↓ -018 019	Solid	—	—	≈ 8.5gallons	
NHH-Z	↓ -001 002	Solid	—	—	≈11.5gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite Reference Site Water

Composite Lab ID.: 29517-010 Composite Final Volume: 30 gal

Composite Matrix: Water Composite Container(s): 6x5gal

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1445

Initials: DD

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
CLDS-Ref-Bottom	29516-~~001~~ 053	Water	—	—	10 gal	
CLDS-Ref-Mid	29516-~~003~~ 052	Water	—	—	10 gal	
CLDS-Ref-Top	29516-~~004~~ 051	Water	—	—	10 gal	
	E3 MR 9/5/17					

Subsamples Removed:

Lab Number	Sample Use
29521	Elutriate Preparation

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ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 1	Time Mixing Started	1255
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1325
		Time Elutriate Siphoned Off	1425
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 1	29521-002	Composite 1	29517-001	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 2	Time Mixing Started	0925
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	0955
		Time Elutriate Siphoned Off	1055
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 2	**29521-004**	Composite 2	29517-002	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	**Elutriate Chemical Analysis**	**~ 11 L**
29523	**SPP Assays**	**~ 6 L**

NOTES:

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Elutriate Prep.wpd

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 3	Time Mixing Started	1140
Amount of Sediment	12 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	48 L	Time Mixing Stopped	1210
		Time Elutriate Siphoned Off	1310
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 3	29521-006	Composite 3	29517-003	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 18 L
29523	SPP Assays	~ 6 L

NOTES:

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Elutriate Prep.wpd

ELUTRIATE PREPARATION SUMMARY

Date: 08/22/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 4	Time Mixing Started	1042
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1112
		Time Elutriate Siphoned Off	1212
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 4	29521-008	Composite 4	29517-004	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

ELUTRIATE PREPARATION SUMMARY

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Elutriate Prep.wpd

ESI

ELUTRIATE PREPARATION SUMMARY

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, N.H. 03843-0778
p 603.926.3345 • f 603.926.3521
envirosystems.com

Date: 08/23/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 5	Time Mixing Started	0850
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	0920
		Time Elutriate Siphoned Off	1020
		Centrifuged?	(Yes) No
Preparer's Initials	BG/JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 5	29521-010	Composite 5	29517-005	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 18 L
29523	SPP Assays	~ 6 L

NOTES:

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ESI

ELUTRIATE PREPARATION SUMMARY

EnviroSystems, Inc.
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P.O. Box 778
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envirosystems.com

Date: 08/23/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 6	Time Mixing Started	0930
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1000
		Time Elutriate Siphoned Off	1100
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 6	29521-012	Composite 6	29517-006	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

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ESI

ELUTRIATE PREPARATION SUMMARY

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envirosystems.com

Date: 08/23/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 7	Time Mixing Started	0750
Amount of Sediment	12 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	48 L	Time Mixing Stopped	0820
		Time Elutriate Siphoned Off	0920
		Centrifuged?	(Yes) No
Preparer's Initials	BG/ JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 7	**29521-014**	Composite 7	29517-007	NHC-V	29516-049

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	**Elutriate Chemical Analysis**	**~ 11 L**
29523	**SPP Assays**	**~ 6 L**

NOTES:

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ESI

ELUTRIATE PREPARATION SUMMARY

EnviroSystems, Inc.
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envirosystems.com

Date: 08/23/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 8	Time Mixing Started	1053
Amount of Sediment	9 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	36 L	Time Mixing Stopped	1123
		Time Elutriate Siphoned Off	1223
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 8	29521-016	Composite 8	C 29517-008	NHC-V	29516-049

(E3) JTP 08/23/17

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29522	Elutriate Chemical Analysis	~ 11 L
29523	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study:** 29521

Client: AECOM **Project:** New Haven

VOLUMES		TIMES	
Sample ID	Elutriate 1	Time Mixing Started	0800
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	0830
		Time Elutriate Siphoned Off	0930
Preparer's Initials	JTP	Centrifuged?	(Yes) No

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 1 ~~Blank~~ (E3) MR 8/30/17	29521-017	Composite 1	29517-001	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	SPP Assays	~4 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 2	Time Mixing Started	0905
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	0935
		Time Elutriate Siphoned Off	1035
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 2	**29521-018**	Composite 2	29517-002	NHC-F	29516-050

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	**SPP Assays**	**~ 4 L**

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 3	Time Mixing Started	0905
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	0935
		Time Elutriate Siphoned Off	1035
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 3	29521-019	Composite 3	29517-003	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	SPP Assays	~4 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 08/25/17 **ESI Study: 29521**

Client: AECOM **Project: New Haven**

VOLUMES		TIMES	
Sample ID	Elutriate 4	Time Mixing Started	0943
Amount of Sediment	2 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	8 L	Time Mixing Stopped	1013
		Time Elutriate Siphoned Off	1113
		Centrifuged?	(Yes) No
Preparer's Initials	JTP		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Elutriate 4	**29521-020**	Composite 4	29517-004	NHC-I	29516-048

Sub-samples Removed

Lab Code	Elutriate Use	Volume
29523	**SPP Assays**	**~ 4 L**

NOTES:

ELUTRIATE PREPARATION SUMMARY

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Elutriate Prep.wpd

PREPARATION of DILUTIONS

STUDY: 29523 **CLIENT:** AECOM **DILUENT:** CLDS (Reference Water)

SPECIES: *A. bahia* and *M. beryllina* **TEST:** Suspended Particulate Phase (SPP)

Diluent: CLDS	Composite #: 1		Composite #: 2		Composite #: 3		Composite #: 4	
	Elutriate ID: 29521-002		Elutriate ID: 29521-004		Elutriate ID: 29521-006		Elutriate ID: 29521-008	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2000	0	2000	0	2000	0	2000
CLDS	0	↓	0	↓	0	↓	0	↓
1 %	20	↓	20	↓	20	↓	20	↓
10 %	200	↓	200	↓	200	↓	200	↓
50 %	1000	↓	1000	↓	1000	↓	1000	↓
100 %	2000	↓	2000	↓	2000	↓	2000	↓
Initial	KL		KL		KL		CFS	
Date	8/22/17		8/22/17		8/22/17		08/22/17	
Time	~~1435~~ E3 8/22 1540		1435		1435		1610	
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record (if necessary)**		**Salinity Adjustment Record (if necessary)**		**Salinity Adjustment Record (if necessary)**	
Initial Salinity (ppt)	27.4 ~~26.6~~ E3 8/22		26.6		26.~~0~~4 E3 8/22		26.4	
Vol of Elutriate (mL)	5800		5880		5800		5760	
Grams of Salt (g)	17		23		24 ~~5880~~ E3 08/22		24	
Lot number of Salt	A- 4682		A- 4682		A- 4682		A- 4682	
Final Salinity	30		30		30		30	
Date & Initial	8/22/17 KL		08/22/17 CFS		8/22/17 KL		08/22/17 CFS	
Ammonia pulled on 100% SPP and Controls	Start 29521 -002 ~~LB~~ E3 LB 8/22/17	End (Ab) -106 / End (Mb)	Start 29521 -004	End (Ab) -107 / End (Mb)	Start 29521 -006	End (Ab) -108 / End (Mb)	Start 29521 -008	End (Ab) -109 / End (Mb)

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:**

Test Species: *A. bahia* **Lot ID:** 03Ab AR0082217 **Sample:** Controls **Diluent:** CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	2	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		MW	[illegible]	[illegible]	MW	MW	AK	GRS
Date		08/22/17	8/22/17	8/22/17	8/23/17	8/24/17	8/25/17	08/26/17
Time		1540	1640	1740	1405	1500	1500	1440

Conc	Rep	HOURS 0	1	2	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9

Comments:

Notes	
Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.0	7.3	7.1	6.1	6.4	7.94	7.91	7.85	7.85	7.81	24	18	20	20	20	30	30	31	31	31	NA	NA	NA		
CLDS	A	7.9	6.8	6.8	6.0	6.1	7.85	7.84	7.84	7.85	7.86	22	18	20	20	20	28	28	29	30	30	NA	NA	NA		
Initials		UB	MW	AK	UB	BG																				
Date		8/22/17	8/23/17	8/24/17	8/25	08/26/17																				
Time		1550	1241	1350	1345	1045																				
Incub. Temp		21	24	20	20	20																				

FEEDING: *Artemia nauplii* (A-4729)

Fed By: MW KB MW AK

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	2
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YSI30D
Initial	UB	MW	AK	UB	BG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	MP01
DO Probe #	95	DO Probe #	↓
pH Meter #	1097	pH Meter #	470
pH Probe #	147	pH Probe #	146
Salinity Meter #	YS130D	Salinity Meter #	YSI30D

(a) UB 8/31/17 Inc. holding samples inadvertently set to [illegible] 20C

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03A6AR0082217 **Sample:** Composite 1 **Diluent:** CLDS

SURVIVAL - Composite # 1

Conc	Rep	0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	9	9	9	9
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	9	9	9
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9
Initials		MW	[illegible]	[illegible]	MW	MW	AK	GRS
Date		08/22/17	8/22/17	8/22/17	8/23/17	8/24/17	8/25/17	08/26/17
Time		1620	1720	1800	1420	1515	1520	1440

Comments:

Notes	
Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.6	6.7	7.3	5.6	5.6	7.80	7.84	7.92	7.80	7.83	23	18	19	20	20	27	28	29	29	29			NA		
10 %	A	7.7	6.6	7.3	6.4	5.6	7.87	7.86	8.01	7.96	7.86	23	18	19	20	20	28	29	29	30	30			NA		
50 %	A	7.6	6.5	7.1	6.4	6.3	7.96	7.92	8.02	7.96	7.85	23	19	19	20	20	29	29	30	30	30			NA		
100 %	A	6.5	6.5	7.0	6.3	5.4	8.03	7.97	8.05	7.99	7.92	23	19	19	20	20	30	30	31	32	32			NA		
Initials		KB	MW	AK	LB	TBG																				
Date		8/22/17	8/23/17	8/24/17	8/25	08/26/17																				
Time		1620	1245	1430	1345	1045																				
Incub. Temp		24	24	20	20	20																				

FEEDING: *Artemia nauplii* (A-4729)

Fed By:	MW	KB	MW	AK	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	2
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YS130D
Initial	KB	MW	AK	LB	TBG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	M701
DO Probe #	95	DO Probe #	↓
pH Meter #	1097	pH Meter #	470
pH Probe #	147	pH Probe #	146
Salinity Meter #	YS130D	Salinity Meter #	YS130D

LB 8/31/17 Incubator holding samples inactively set to 20 [illegible]

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03AbAR0082217 **Sample:** Composite 2 **Diluent:** CLDS

SURVIVAL - Composite # 2

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	9	9	9	9
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		MW	KL	KL	MW	MW	AK	GRS
Date		08/22/17	8/22/17	8/22/17	8/23/17	8/24/17	8/25/17	08/26/17
Time		1600	1700	1800	1400	1530	1540	1440

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	9	9	9	9
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9

Comments:

Notes	
Parameter	**Conditions**
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.2	6.8	7.4	5.8	6.0	7.85	7.87	8.05	7.89	7.90	25	18	19	20	20	28	28	29	29	29					
10 %	A	7.2	6.9	7.4	5.5	6.0	7.88	7.92	8.08	7.94	7.92	26	18	19	20	20	28	28	29	30	30					
50 %	A	6.9	6.8	7.4	5.5	6.5	7.95	8.06	8.12	8.11	8.06	25	18	19	20	20	29	29	30	30	31					
100 %	A	6.3	6.9	7.2	5.1	6.3	7.98	8.13	8.12	8.17	8.18	25	18	19	20	20	30	30	31	32	32					
Initials		LB	MW	AK	LB	BF																				
Date		8/22/17	8/23/17	8/24/17	8/25	08/26/17																				
Time		1550	1251	1440	1345	1045																				
Incub. Temp		24	24	20	20	20																				

FEEDING: *Artemia nauplii* (A - 4729)

Fed By: MW KB MW AK

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	2
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YS130D
Initial	LB	MW	AK	LB	BF

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	MP01
DO Probe #	95	DO Probe #	↓
pH Meter #	1097	pH Meter #	470
pH Probe #	147	pH Probe #	146
Salinity Meter #	YS130D	Salinity Meter #	YS130D

(EX) LB 8/31/17 Incubator holding samples inadvertently set to 25°C. Corrected 8/31/17 to 20°C. Author / Checked

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03ABAR0082217 **Sample:** Composite 3 **Diluent:** CLDS

SURVIVAL - Composite # 3

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	9	9	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	9	9	9	9
	D	10	10	10	10	9	9	9
	E	10	10	10	10	10	10	9
10 %	A	10	10	10	9	9	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	9	9	9	9
	E	10	10	10	10	10	10 (EB 8/24/17)	10
50 %	A	10	10	10	9	9	9	8
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	9
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	9	9	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	9	9
	E	10	10	10	10	10	10 (EB 8/24/17)	10
Initials		MW	BG	KM	MW	MW	AK	BG
Date		08/22/17	08/22/17	8/22/17	8/23/17	8/24/17	8/25/17	08/26/17
Time		1540	1705	1740	1415	1545	1605	1440

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

Comments:

(EB) LB 8/25/17 - Beaker spilled. 2 Mysids spilled but recovered.

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.8	7.2	7.2	6.4	6.6	7.85	7.91	8.05	8.00	7.93	23	17	19	20	19	28	28	29	29	30			NA		
10 %	A	7.6	7.2	7.2	5.8	6.5	7.86	7.89	8.04	7.90	7.92	23	17	19	20	19	28	28	29	30	30			NA		
50 %	A	7.2	7.1	6.9	5.6	6.6	7.89	7.96	8.02	7.96	7.92	24	17	19	20	19	29	29	30	30	31			NA		
100 %	A	6.4	7.1	7.1	5.0	6.4	7.91	8.00	8.04	7.99	8.09	25	18	19	20	19	30	30	31	32	32			NA		
Initials		LB	MW	AK	LB	BG																				
Date		8/22/17	8/23/17	8/24/17	8/25	08/26/17																				
Time		1550	1255	1435	1345	1045																				
Incub. Temp		24	24	(EB) 8/24/17 AK 20	20	20																				

FEEDING: *Artemia nauplii* (A - 4729)

Fed By: MW KB MW AK ✓

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	2
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YSI34
Initial	LB	MW	AK	LB	BG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	MPO1
DO Probe #	95	DO Probe #	↓
pH Meter #	1097	pH Meter #	470
pH Probe #	147	pH Probe #	146
Salinity Meter #	YS130D	Salinity Meter #	YSI30D

(EB) LB 8/31/17 Incubator holding samples inadvertently set to 25C. Adjusted to 20 C. Other values recorded.

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03A6AR0082217 **Sample:** Composite 4 **Diluent:** CLDS

SURVIVAL - Composite # 4

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	9
Initials		MW	MW	MW	MW	MW	AK	CFS
Date		08/22/17	8/22/17	8/22/17	8/23/17	8/24/17	8/25/17	08/26
Time		1640	1740	1830	1443	1555	1430	1440

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	9	9	9	9
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	9	9
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

Comments:

Notes	
Parameter	**Conditions**
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.5	7.0	6.6	6.2	5.3	7.82	7.77	7.82	7.90	7.85	23	18	20	20	19	27	28	28	29	28			NA		
10 %	A	7.5	6.7	6.9	6.4	6.0	7.87	7.88	7.92	7.99	7.87	23	18	20	20	19	28	28	29	29	29			NA		
50 %	A	7.2	6.7	6.6	5.4	5.8	7.94	8.05	8.08	8.04	8.01	24	18	20	20	19	29	29	30	30	30			NA		
100 %	A	6.3	6.6	6.9	6.3	6.0	7.96	8.11	8.13	8.13	8.13	24	18	20	20	19	30	30	31	31	32			NA		
Initials		KB	MW	AK	LB	BF																				
Date		8/22/17	8/23/17	8/24/17	8/25	08/26/17																				
Time		1645	1300	1425	1345	1045																				
Incub. Temp		21	21	20	20	20																				

FEEDING: *Artemia nauplii* (A-4729)

Fed By:	MW	KB	MW	AK	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	2
Thermometer or Probe #	YSI30D	YSI30D	YSI30D	YSI30D	YSI30D
Initial	KB	MW	AK	LB	BF

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	MP01
DO Probe #	95	DO Probe #	↓
pH Meter #	1097	pH Meter #	470
pH Probe #	147	pH Probe #	146
Salinity Meter #	YSI30D	Salinity Meter #	YSI30D

(E) 08/28/17 Incubator holding samples malfunctioning set to 20°C. Water temp 20.2 Initials

03Ab AR0082217

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Americamysis bahia

Source: Lab reared _____ Hatchery reared _____ Field collected _____

Hatch date 8-19-17 Receipt date _____

Lot number 081917MS Strain _____

Brood origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers _____ YCT _____ Other Encap Shrimp Diet

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 1800+

Carrier: _____ Date shipped 8-22-17

Biologist: Mark Deangelis

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

CETIS Test Data Worksheet

Report Date: 29 Aug-17 14:35 (p 1 of 1)
Test Code/ID: 17-9978-7137/29523-1Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	22 Aug-17 15:40	**Species:**	Americamysis bahia	**Sample Code:**	29521-002
End Date:	26 Aug-17	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	22 Aug-17 14:25	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 1

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	9	10				10	
0	D	2	16	10				10	
0	D	3	10	10				10	
0	D	4	26	10				10	
0	D	5	6	10				9	
0	L	1	1	10				10	
0	L	2	25	10				10	
0	L	3	2	10				10	
0	L	4	13	10				10	
0	L	5	15	10				10	
1		1	14	10				10	
1		2	27	10				10	
1		3	24	10				9	
1		4	20	10				10	
1		5	11	10				10	
10		1	4	10				10	
10		2	18	10				9	
10		3	3	10				10	
10		4	21	10				10	
10		5	22	10				9	
50		1	8	10				10	
50		2	5	10				10	
50		3	29	10				10	
50		4	23	10				10	
50		5	30	10				10	
100		1	28	10				10	
100		2	17	10				10	
100		3	7	10				10	
100		4	19	10				10	
100		5	12	10				9	

CETIS Summary Report

Report Date: 29 Aug-17 16:55 (p 1 of 1)
Test Code: 29523-1Ab | 17-9978-7137

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	17-2717-2356	**Code:**	29521-002	**Client:**	AECOM
Sample Date:	22 Aug-17 14:25	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 10:55	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	75m	**Station:**	Composite 1		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
05-8523-5824	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
05-8523-5824	96h Proportion Survived	Control Resp	0.98	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
10		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	2.04%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
100		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	0.900	1.000	1.000
10		1.000	0.900	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	0.900

CETIS Analytical Report

Report Date:	29 Aug-17 16:55 (p 1 of 1)
Test Code:	29523-1Ab | 17-9978-7137

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	05-8523-5824	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 16:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	17-2717-2356	**Code:**	29521-002	**Client:**	AECOM
Sample Date:	22 Aug-17 14:25	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 10:55	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	75m	**Station:**	Composite 1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	112086	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.07	2.82	0.7943	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
10		5	0.960	0.900	1.000	0.055	5.71%	2.04%	48/50	0.98	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.98	0.0%
100		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
1		1.000	1.000	0.900	1.000	1.000
10		1.000	0.900	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	0.900

CETIS Test Data Worksheet

Report Date: 29 Aug-17 14:40 (p 1 of 1)
Test Code/ID: 00-2774-7195/29523-2Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	22 Aug-17 15:40	**Species:**	Americamysis bahia	**Sample Code:**	29521-004
End Date:	26 Aug-17	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	22 Aug-17 10:55	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 2

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	20	10				10	
0	D	2	8	10				10	
0	D	3	3	10				10	
0	D	4	12	10				10	
0	D	5	7	10				9	
0	L	1	4	10				10	
0	L	2	24	10				10	
0	L	3	14	10				10	
0	L	4	9	10				10	
0	L	5	15	10				10	
1		1	26	10				10	
1		2	29	10				10	
1		3	27	10				9	
1		4	18	10				10	
1		5	23	10				10	
10		1	13	10				10	
10		2	17	10				10	
10		3	1	10				10	
10		4	28	10				10	
10		5	16	10				10	
50		1	11	10				10	
50		2	2	10				9	
50		3	21	10				10	
50		4	25	10				10	
50		5	19	10				9	
100		1	30	10				10	
100		2	10	10				10	
100		3	22	10				10	
100		4	6	10				10	
100		5	5	10				9	

CETIS Summary Report

Report Date: 29 Aug-17 16:57 (p 1 of 1)
Test Code: 29523-2Ab | 00-2774-7195

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	01-1641-3669	**Code:**	29521-004	**Client:**	AECOM
Sample Date:	22 Aug-17 10:55	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 10:55	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
20-5158-5943	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
20-5158-5943	96h Proportion Survived	Control Resp	0.98	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
50		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	2.04%
100		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	0.900	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	0.900	1.000	1.000	0.900
100		1.000	1.000	1.000	1.000	0.900

CETIS Analytical Report

Report Date: 29 Aug-17 16:57 (p 1 of 1)
Test Code: 29523-2Ab | 00-2774-7195

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	20-5158-5943	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 16:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	01-1641-3669	**Code:**	29521-004	**Client:**	AECOM
Sample Date:	22 Aug-17 10:55	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 10:55	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	999291	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.07	2.82	0.7943	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.987	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.987	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.987	0.0%
50		5	0.960	0.900	1.000	0.055	5.71%	2.04%	48/50	0.97	1.69%
100		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.97	1.69%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
1		1.000	1.000	0.900	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	0.900	1.000	1.000	0.900
100		1.000	1.000	1.000	1.000	0.900

CETIS Test Data Worksheet

Report Date: 29 Aug-17 14:49 (p 1 of 1)
Test Code/ID: 13-0433-7300/29523-3Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	22 Aug-17 15:40	**Species:**	Americamysis bahia	**Sample Code:**	29521-006
End Date:	26 Aug-17	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	22 Aug-17 13:10	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 3

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	25	10				10	
0	D	2	6	10				10	
0	D	3	4	10				10	
0	D	4	7	10				10	
0	D	5	24	10				9	
0	L	1	10	10				10	
0	L	2	19	10				10	
0	L	3	12	10				10	
0	L	4	20	10				10	
0	L	5	16	10				10	
1		1	28	10				9	
1		2	11	10				10	
1		3	22	10				9	
1		4	13	10				9	
1		5	5	10				9	
10		1	26	10				9	
10		2	8	10				10	
10		3	14	10				10	
10		4	17	10				9	
10		5	18	10				10	
50		1	27	10				8	
50		2	1	10				10	
50		3	2	10				9	
50		4	15	10				10	
50		5	30	10				10	
100		1	29	10				9	
100		2	21	10				10	
100		3	23	10				10	
100		4	9	10				9	
100		5	3	10				10	

CETIS Summary Report

Report Date:	29 Aug-17 16:59 (p 1 of 1)
Test Code:	29523-3Ab | 13-0433-7300

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	03-6036-7803	**Code:**	29521-006	**Client:**	AECOM
Sample Date:	22 Aug-17 13:10	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 13:10	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	3h	**Station:**	Composite 3		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
07-9291-1710	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
07-9291-1710	96h Proportion Survived	Control Resp	0.98	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
1		5	0.920	0.864	0.976	0.900	1.000	0.020	0.045	4.86%	6.12%
10		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	2.04%
50		5	0.940	0.829	1.000	0.800	1.000	0.040	0.089	9.52%	4.08%
100		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	2.04%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
0	L	1.000	1.000	1.000	1.000	1.000
1		0.900	1.000	0.900	0.900	0.900
10		0.900	1.000	1.000	0.900	1.000
50		0.800	1.000	0.900	1.000	1.000
100		0.900	1.000	1.000	0.900	1.000

CETIS Analytical Report

Report Date:	29 Aug-17 16:58 (p 1 of 1)
Test Code:	29523-3Ab | 13-0433-7300

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	07-9291-1710	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 16:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	03-6036-7803	**Code:**	29521-006	**Client:**	AECOM
Sample Date:	22 Aug-17 13:10	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 13:10	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	3h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1503231	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.43	2.82	0.2484	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.920	0.900	1.000	0.045	4.86%	6.12%	46/50	0.945	3.57%
10		5	0.960	0.900	1.000	0.055	5.71%	2.04%	48/50	0.945	3.57%
50		5	0.940	0.800	1.000	0.089	9.52%	4.08%	47/50	0.945	3.57%
100		5	0.960	0.900	1.000	0.055	5.71%	2.04%	48/50	0.945	3.57%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
1		0.900	1.000	0.900	0.900	0.900
10		0.900	1.000	1.000	0.900	1.000
50		0.800	1.000	0.900	1.000	1.000
100		0.900	1.000	1.000	0.900	1.000

CETIS Test Data Worksheet

Report Date: 29 Aug-17 14:53 (p 1 of 1)
Test Code/ID: 01-5128-6765/29523-4Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	22 Aug-17 15:40	**Species:**	Americamysis bahia	**Sample Code:**	29521-008
End Date:	26 Aug-17	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	22 Aug-17 12:12	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 4

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	19	10				10	
0	D	2	4	10				10	
0	D	3	3	10				10	
0	D	4	17	10				10	
0	D	5	12	10				9	
0	L	1	7	10				10	
0	L	2	16	10				10	
0	L	3	8	10				10	
0	L	4	9	10				10	
0	L	5	2	10				10	
1		1	13	10				10	
1		2	18	10				10	
1		3	30	10				10	
1		4	22	10				10	
1		5	28	10				10	
10		1	15	10				10	
10		2	27	10				10	
10		3	1	10				10	
10		4	21	10				10	
10		5	14	10				9	
50		1	20	10				10	
50		2	10	10				9	
50		3	24	10				10	
50		4	26	10				10	
50		5	6	10				10	
100		1	25	10				10	
100		2	29	10				9	
100		3	11	10				10	
100		4	5	10				10	
100		5	23	10				10	

CETIS Summary Report

Report Date: 29 Aug-17 17:01 (p 1 of 1)
Test Code: 29523-4Ab | 01-5128-6765

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	17-0382-9713	**Code:**	29521-008	**Client:**	AECOM
Sample Date:	22 Aug-17 12:12	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 12:12	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	3h	**Station:**	Composite 4		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
04-1622-2066	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
04-1622-2066	96h Proportion Survived	Control Resp	0.98	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-2.04%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
50		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
100		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		1.000	0.900	1.000	1.000	1.000
100		1.000	0.900	1.000	1.000	1.000

CETIS Analytical Report

Report Date: 29 Aug-17 17:01 (p 1 of 1)
Test Code: 29523-4Ab | 01-5128-6765

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	04-1622-2066	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-6735-7176	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	22 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	26 Aug-17	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	80h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	17-0382-9713	**Code:**	29521-008	**Client:**	AECOM
Sample Date:	22 Aug-17 12:12	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	22 Aug-17 12:12	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	3h	**Station:**	Composite 4		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1556176	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.19	2.82	0.5456	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.99	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	1.01%
50		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	1.01%
100		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	1.01%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	0.900
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		1.000	0.900	1.000	1.000	1.000
100		1.000	0.900	1.000	1.000	1.000

PREPARATION of DILUTIONS

STUDY: 29523 **CLIENT:** AECOM **DILUENT:** CLDS (Reference Water)

SPECIES: *A. bahia* and *M. beryllina* **TEST:** Suspended Particulate Phase (SPP)

Diluent: CLDS	Composite #: 5		Composite #: 6		Composite #: 7		Composite #: 8	
	Elutriate ID: 29521-010		Elutriate ID: 29521-012		Elutriate ID: 29521-014		Elutriate ID: 29521-016	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2000	0	2000	0	2000	0	2000
CLDS	0	↓	0	↓	0	↓	0	↓
1 %	20	↓	20	↓	20	↓	20	↓
10 %	200	↓	200	↓	200	↓	200	↓
50 %	1000	↓	1000	↓	1000	↓	1000	↓
100 %	2000	↓	2000	↓	2000	↓	2000	↓
Initial	AK		AK		AK		AK	
Date	8/23/17		8/23/17		8/23/17		8/23/17	
Time	1420		1500		1550		1530	
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	26.7		26.4		26.7		26.2	
Vol of Elutriate (mL)	5350		4820		~~4610~~ 5810 CFS 08/23		5780	
Grams of Salt (g)	20		20		~~18~~ 23 CFS 08/23		25	
Lot number of Salt	A-4682		A-4682		A-4682		A-4682	
Final Salinity	30.1		30.3		30.0		30.0	
Date & Initial	08/23/17	CFS	08/23/17	CFS	08/23/17	CFS	08/23/17	CFS
Ammonia pulled on 100% SPP and Controls	Start 104	End (Ab) MS 8/28 -112	Start 105	End (Ab) MS 8/28 -113	Start 106	End (Ab) -114	Start 107	End (Ab) -115
		End (Mb) KB 8/27 -118		End (Mb) MS 8/28 -119		End (Mb) MS 8/28 -120		End (Mb) -121

EID bottles pulled from 50 due to loss of 100 concentration

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03Ab AR0082217 **Sample:** Controls **Diluent:** CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	2	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		(E3) AK 8/23/17 AK	MS	CFS	MS	LB	GRS	MS
Date		8/23/17	08/23/17	08/23	08/24/17	8/25	08/26/17	08/27/17
Time		(E3) AK 8/23/17 ~~1620~~ 1645	1725	1800	1535	1515	1450	1540

Conc	Rep	HOURS 0	1	2	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

Comments:

Notes	
Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.7	7.1	5.8	6.4	7.0	8.11	8.05	7.82	7.88	7.93	21	20	20	20	20	30	30	30	30	30	NA				
CLDS	A	8.4	7.2	5.7	6.7	7.0	7.87	7.98	7.81	7.86	7.96	21	20	20	20	20	28	28	29	29	30	NA				
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1620	1400	1440	1210	1300																				
Incub. Temp		25 (E10) AK 8/24/17	20	20	20	20																				
FEEDING: *Artemia nauplii* (A - 4729)																										
Fed By:		MS	AK	LB	CFS																					

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YS130D
Initial	AK 8/23/17	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YS130D	Salinity Meter #	

(E10) Incubator temperature adjusted to 20°C after daily temperatures were recorded. AK 8/24/17

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03AbAR0 082217 **Sample:** Composite 5 **Diluent:** CLDS

SURVIVAL - Composite # 5

Conc	Rep	HOURS 0	1	2	24	48	72	96	Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10	50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10		B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10		C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10		D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10		E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10	100 %	A	10	10	10	10	10	9	9
	B	10	10	10	10	10	9	9		B	10	10	10	10	10	9	9
	C	10	10	10	10	10	10	10		C	10	10	10	10	9	9	9
	D	10	10	10	10	10	10	10		D	10	10	10	10	9	6	6
	E	10	10	10	10	10	9	9		E	10	10	10	10	10	8	7
Initials		KL	MS	CFS	MS	LB	GRS	MS	Comments:								
Date		8/23/17	08/23/17	08/23	08/24	8/25	08/26/17	08/27/17									
Time		1645	1730	1800	1540	1515	1450	1545									

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.6	7.0	5.8	6.0	7.0	7.85	7.93	7.86	7.82	7.86	21	19	20	20	20	28	28	28	28	29	NA	NA			
10 %	A	8.6	7.3	5.8	6.1	7.0	7.91	8.06	7.97	7.93	8.01	21	19	20	20	20	28	29	29	29	30	NA	NA			
50 %	A	8.2	7.4	5.8	6.1	7.0	7.93	8.07	8.09	8.11	8.14	21	19	20	20	20	29	29	29	30	31	NA	NA			
100 %	A	7.2	7.2	5.6	6.0	6.6	7.89	8.07	8.13	8.17	8.19	21	19	20	20	20	30	30	31	31	31	NA	NA			
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1635	1525	1440	1210	1300																				
Incub. Temp		(E10) AK 8/24/17 25	20	20	20	20																				

FEEDING: *Artemia nauplii* (A - 4729)

Fed By:	MS	AK	LB	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YS130D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YS130D	Salinity Meter #	

(E10) Incubator temperature adjusted to 20°C after daily temperatures were recorded. AK 8/23/17

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03AbAR0082217 **Sample:** Composite 6 **Diluent:** CLDS

SURVIVAL - Composite # 6

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		VL	AK	AK	MS	UB	GRS	MS
Date		8/23/17	8/23/17	8/23/17	08/24/17	8/25	08/26/17	08/27/17
Time		1645	1725	1805	1530	1515	1455 50 08 26	1550

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	9
	E	10	10	10	10	10	10	9
100 %	A	10	10	(E10) 10	8	5	0	—
	B	10	10	10	6	2	0	—
	C	10	10	10	7	2	0	—
	D	10	10	10	10	4	0	—
	E	10	10	10	8	0	—	—

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

Comments:

(E10) Mysid appear to be lethargic and lacking mobility. AK 8/23/17

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (If required) 0	24	48	72	96
1 %	A	8.0	7.4	6.6	6.2	6.9	7.88	8.01	8.03	7.95	7.98	21	20	20	20	20	28	28	28	28	29	08/24/23 2 NA				
10 %	A	8.0	7.4	6.5	6.3	6.9	7.93	8.02	8.02	7.95	8.02	21	20	20	20	20	28	28	29	29	29	NA				
50 %	A	7.8	7.3	6.2	6.4	6.9	7.91	8.04	8.09	8.06	8.12	21	19	20	20	20	28	29	30	30	30	NA				
100 %	A	6.7	7.1	6.1	6.4		7.88	8.06	8.13	8.09		21	20	20	20		30	30	30	31		NA				
Initials		AK	AK	UB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1645	1500	1440	1210	1300																				
Incub. Temp		(E10) 25 8/23/17	20	20	20	20																				

FEEDING: *Artemia nauplii* (A-4729)

Fed By:	MS	MS	UB	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YS130D
Initial	AK	AK	UB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YS130D	Salinity Meter #	

(E10) Incubator temperature adjusted to 20°C after daily temperatures were recorded. AK 8/23/17

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03A16ARO 082217 **Sample:** Composite 7 **Diluent:** CLDS

SURVIVAL - Composite # 7

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	9	8	8
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		KL	LB	CFS	MW	LB	GRS	KB
Date		8/23/17	8/23/17	08/23	8/24	8/25	08/26/17	08/27
Time		1645	1735	1800	1605	1515	1450	1445

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	8	8
	D	10	10	10	10	10	9	5
	E	10	10	10	9	9	7	7
100 %	A	10	10	(E10) 10	10	0		
	B	10	10	10	5	0		
	C	10	10	10	6	0		
	D	10	10	10	6	0		
	E	10	10	10	7	0		

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

Comments:

(E10) Mysid appear to be lethargic and lacking mobility. AK 8/23/17

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.9	7.4	6.1	6.4	6.9	7.87	8.01	7.95	~~7.95~~ 8.00	7.97	20	19	20	20	20	28	28	28	29	29	NA	NA			
10 %	A	8.0	7.4	6.2	6.3	6.8	7.90	8.02	7.97	~~7.95~~ 7.92	7.96	20	19	20	20	20	28	29	29	29	29	NA	NA			
50 %	A	8.0	7.5	6.2	6.2	6.3	7.92	8.02	8.11	8.06	8.07	20	20	20	20	20	29	29	29	29	30	NA	NA			
100 %	A	6.8	7.4	6.2	—	—	7.92	8.04	8.14	—	—	21	20	20	—	—	30	30	30	—	—	NA	NA			
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1705	1530	1440	1210	1300																				
Incub. Temp		25	20	20	~~20~~ 20	20																				

FEEDING: *Artemia nauplii* (A - 4729)

Fed By:	MS	MW	LB	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI 30D	YSI 30D	YSI 30D	YSI 30D	YSI 30D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI 30D	Salinity Meter #	

(E10) Incubator temperature adjusted to 20°C after daily temperatures were recorded. AK 8/23/17

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *A. bahia* **Lot ID:** 03AbARO 082217 **Sample:** Composite 8 **Diluent:** CLDS

SURVIVAL - Composite # 8

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	9 (EID) LB 8/25/17	9	9
	C	10	10	10	10	10	10	10
	D	10	10	10	10	9 (EID) LB 8/25/17	10	10
	E	10	10	10	10	10	9	9
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	9	9	9
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	9
100 %	A	10	10	10	10	10	9	5
	B	10	10	10	10	10	9	2
	C	10	10	10	10	10	8	3
	D	10	10	10	10	9 (EID) LB 8/25/17	4	2
	E	10	10	10	10	10	8	5

	0	1	2	24	48	72	96
Initials	KW	AK	CFS	MS	LB	BG	MS
Date	8/23/17	8/23/17	08/23	08/24	8/25	08/26/17	08/27/17
Time	1645	1730	1800	1615	1515	1450	1600

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

Comments:

(EID) LB 8/25/17 1 mysid unaccounted for

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	7.2	6.4	6.2	6.8	7.87	7.98	8.02	8.03	7.97	21	20	20	20	20	28	28	28	28	29	NA	NA			
10 %	A	8.2	7.1	6.6	6.7	6.7	7.91	8.02	8.05	8.06	8.01	21	20	20	20	20	28	28	28	29	29	NA	NA			
50 %	A	7.8	7.2	6.7	6.7	6.7	7.95	8.07	8.13	8.15	8.10	21	20	20	20	20	29	29	29	29	30	NA	NA			
100 %	A	6.9	7.0	6.8	6.8	6.8	7.94	8.10	8.16	8.19	8.15	21	20	20	20	20	30	30	30	31	31	NA	NA			

	0	24	48	72	96
Initials	AK	AK	LB	CFS	DD
Date	8/23/17	8/24/17	8/25	08/26	08/27
Time	1715	1445	1440	1210	1300
Incub. Temp	25 (EID) AK 8/24	20	20	20	20

FEEDING: *Artemia nauplii* (A - 4729)

Fed By:	MS	MS	LB	BG	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	Y5130D	Y5130D	Y5130D	Y5130D	Y5130D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	Y5130D	Salinity Meter #	

(EID) Incubator temperature adjusted to 20°C after daily temperatures were recorded. AK 8/23/17

03Ab AR0082217

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Americamysis bahia

Source: Lab reared _____ Hatchery reared _____ Field collected _____

Hatch date 8-19-17 Receipt date _____

Lot number 081917MS Strain _____

Brood origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers _____ YCT _____ Other Encap. Shrimp Diet

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 1800+

Carrier: _____ Date shipped 8-22-17

Biologist: Mark Dominguez

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

CETIS Test Data Worksheet

Report Date: 29 Aug-17 16:23 (p 1 of 1)
Test Code/ID: 18-6053-3814/29523-5Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:45	**Species:**	Americamysis bahia	**Sample Code:**	29521-010
End Date:	27 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 5

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	29	10				10	
0	D	2	14	10				10	
0	D	3	17	10				10	
0	D	4	12	10				10	
0	D	5	26	10				10	
0	L	1	7	10				10	
0	L	2	4	10				10	
0	L	3	9	10				10	
0	L	4	30	10				10	
0	L	5	20	10				10	
1		1	6	10				10	
1		2	11	10				10	
1		3	23	10				10	
1		4	16	10				10	
1		5	21	10				10	
10		1	5	10				10	
10		2	2	10				9	
10		3	27	10				10	
10		4	19	10				10	
10		5	3	10				10	
50		1	28	10				10	
50		2	8	10				10	
50		3	18	10				10	
50		4	13	10				10	
50		5	1	10				10	
100		1	24	10				9	
100		2	15	10				9	
100		3	10	10				9	
100		4	22	10				6	
100		5	25	10				7	

CETIS Summary Report

Report Date: 29 Aug-17 17:05 (p 1 of 1)
Test Code: 29523-5Ab | 18-6053-3814

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	00-1005-1229	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 5		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-5269-8559	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
09-2444-4660	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
00-5269-8559	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
09-2444-4660	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.800	0.624	0.976	0.600	0.900	0.063	0.141	17.68%	20.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	0.900	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.900	0.900	0.900	0.600	0.700

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-5269-8559	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	00-1005-1229	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 5		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	979844	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.99	2.82	0.0220	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.98	2.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.98	2.0%
100		5	0.800	0.600	0.900	0.141	17.70%	20.0%	40/50	0.8	20.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	0.900	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.900	0.900	0.900	0.600	0.700

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	09-2444-4660	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	00-1005-1229	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 5		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1311594	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.98	2.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.98	2.0%
100		4	0.850	0.700	0.900	0.100	11.80%	15.0%	34/40	0.85	15.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	0.900	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.900	0.900	0.900	Outlier	0.700

CETIS Test Data Worksheet

Report Date: 29 Aug-17 16:43 (p 1 of 1)
Test Code/ID: 13-7846-4617/29523-6Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:45	**Species:**	Americamysis bahia	**Sample Code:**	29521-012
End Date:	27 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 6

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	14	10		10	10	10	
0	D	2	10	10		10	10	10	
0	D	3	28	10		10	10	10	
0	D	4	18	10		10	10	10	
0	D	5	27	10		10	10	10	
0	L	1	30	10		10	10	10	
0	L	2	17	10		10	10	10	
0	L	3	4	10		10	10	10	
0	L	4	21	10		10	10	10	
0	L	5	1	10		10	10	10	
1		1	26	10		10	10	10	
1		2	15	10		10	10	10	
1		3	2	10		10	10	10	
1		4	25	10		10	10	10	
1		5	6	10		10	10	10	
10		1	11	10		10	10	10	
10		2	12	10		10	10	10	
10		3	5	10		10	10	10	
10		4	8	10		10	10	10	
10		5	3	10		10	10	10	
50		1	9	10		10	10	10	
50		2	24	10		10	10	10	
50		3	19	10		10	10	10	
50		4	23	10		10	10	9	
50		5	20	10		10	10	9	
100		1	22	10		5	0	0	
100		2	29	10		2	0	0	
100		3	13	10		2	0	0	
100		4	16	10		4	0	0	
100		5	7	10		0	0	0	

CETIS Summary Report

Report Date:	01 Sep-17 14:18 (p 1 of 1)
Test Code:	29523-6Ab | 13-7846-4617

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	16-0192-7624	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 11:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 6		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-6395-4281	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	69.8	68.1	71.3	1.434	
07-5108-4435	96h Proportion Survived	Spearman-Kärber	EC50	67.5	63.4	72	1.481	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
00-6395-4281	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
07-5108-4435	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:18 (p 1 of 1)
Test Code: 29523-6Ab | 13-7846-4617

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	07-5108-4435	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:07	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-0192-7624	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 11:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 6		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	1.83	0.0139	67.5	63.4	72

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.82	0.0918	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.96	4.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:18 (p 1 of 1)
Test Code: 29523-6Ab | 13-7846-4617

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-6395-4281	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-0192-7624	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 11:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 6		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	613243	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.82	0.0918	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	69.8	68.1	71.3	1.434	1.403	1.468

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.96	4.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 29 Aug-17 16:43 (p 1 of 1)
Test Code/ID: 18-3142-4760/29523-7Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:45	**Species:**	Americamysis bahia	**Sample Code:**	29521-014
End Date:	27 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 7

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	23	10	10	10	10	10	
0	D	2	28	10	10	10	10	10	
0	D	3	10	10	10	10	10	10	
0	D	4	20	10	10	10	10	10	
0	D	5	5	10	10	10	10	10	
0	L	1	29	10	10	10	10	10	
0	L	2	4	10	10	10	10	10	
0	L	3	18	10	10	10	10	10	
0	L	4	1	10	10	10	10	10	
0	L	5	15	10	10	10	10	10	
1		1	27	10	10	10	10	10	
1		2	16	10	10	10	10	10	
1		3	11	10	10	9	8	8	
1		4	19	10	10	10	10	10	
1		5	24	10	10	10	10	10	
10		1	26	10	10	10	10	10	
10		2	6	10	10	10	10	10	
10		3	3	10	10	10	10	10	
10		4	30	10	10	10	10	10	
10		5	9	10	10	10	10	10	
50		1	13	10	10	10	10	10	
50		2	12	10	10	10	10	10	
50		3	21	10	10	10	8	8	
50		4	7	10	10	10	9	5	
50		5	14	10	9	9	7	7	
100		1	25	10	10	0	0	0	
100		2	22	10	5	0	0	0	
100		3	8	10	6	0	0	0	
100		4	17	10	6	0	0	0	
100		5	2	10	7	0	0	0	

CETIS Summary Report

Report Date:	01 Sep-17 14:20 (p 1 of 1)
Test Code:	29523-7Ab | 18-3142-4760

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	14-8125-5183	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 7		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-9121-1494	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	64.9	54.9	71.4	1.541	✓
06-7922-8296	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	67.4	60.9	72	1.485	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
01-9121-1494	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
06-7922-8296	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	4.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	0.800	0.537	1.000	0.500	1.000	0.095	0.212	26.52%	20.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	0.800	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	0.800	0.500	0.700
100		0.000	0.000	0.000	0.000	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	01-9121-1494	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	14-8125-5183	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 7		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1185141	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.86	2.82	0.0412	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	64.9	54.9	71.4	1.541	1.401	1.822

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.960	0.800	1.000	0.089	9.32%	4.0%	48/50	0.98	2.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.98	2.0%
50		5	0.800	0.500	1.000	0.212	26.50%	20.0%	40/50	0.8	20.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	0.800	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	0.800	0.500	0.700
100		0.000	0.000	0.000	0.000	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	06-7922-8296	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	14-8125-5183	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 7		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1388723	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	67.4	60.9	72	1.485	1.389	1.642

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.960	0.800	1.000	0.089	9.32%	4.0%	48/50	0.98	2.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.98	2.0%
50		4	0.875	0.700	1.000	0.150	17.10%	12.5%	35/40	0.875	12.5%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	0.800	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	0.800	Outlier	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 29 Aug-17 16:06 (p 1 of 1)
Test Code/ID: 14-0376-5950/29523-8Ab

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:45	**Species:**	Americamysis bahia	**Sample Code:**	29521-016
End Date:	27 Aug-17 15:40	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 12:23	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 8

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	15	10				10	
0	D	2	8	10				10	
0	D	3	19	10				10	
0	D	4	16	10				10	
0	D	5	11	10				10	
0	L	1	10	10				10	
0	L	2	18	10				10	
0	L	3	2	10				10	
0	L	4	22	10				10	
0	L	5	1	10				10	
1		1	28	10				10	
1		2	29	10				9	
1		3	17	10				10	
1		4	24	10				10	
1		5	23	10				9	
10		1	6	10				10	
10		2	26	10				10	
10		3	20	10				10	
10		4	5	10				10	
10		5	4	10				10	
50		1	7	10				10	
50		2	14	10				10	
50		3	9	10				9	
50		4	27	10				10	
50		5	21	10				9	
100		1	3	10				5	
100		2	25	10				2	
100		3	13	10				3	
100		4	30	10				2	
100		5	12	10				5	

CETIS Summary Report

Report Date:	29 Aug-17 17:22 (p 1 of 1)
Test Code:	29523-8Ab | 14-0376-5950

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	01-3889-4880	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 12:23	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 12:23	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	4h	**Station:**	Composite 8		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
11-7782-7967	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	83.7	74.2	100	1.195	
15-5443-2768	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	83.6	74.7	93.6	1.196	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
11-7782-7967	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
15-5443-2768	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
100		5	0.340	0.152	0.528	0.200	0.500	0.068	0.152	44.61%	66.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	0.900	1.000	0.900
100		0.500	0.200	0.300	0.200	0.500

CETIS Analytical Report

Report Date:	29 Aug-17 17:22 (p 1 of 1)
Test Code:	29523-8Ab | 14-0376-5950

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	15-5443-2768	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:21	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	01-3889-4880	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 12:23	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 12:23	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	4h	**Station:**	Composite 8		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	34.00%	1.92	0.0244	83.6	74.7	93.6

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.82	0.8924	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.98	2.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.98	2.0%
50		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.96	4.0%
100		5	0.340	0.200	0.500	0.152	44.60%	66.0%	17/50	0.34	66.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	0.900	1.000	0.900
100		0.500	0.200	0.300	0.200	0.500

CETIS Analytical Report

Report Date:	29 Aug-17 17:21 (p 1 of 1)
Test Code:	29523-8Ab | 14-0376-5950

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	11-7782-7967	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 17:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	11-6984-8376	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 15:40	**Species:**	Americamysis bahia	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	<5

Sample ID:	01-3889-4880	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 12:23	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 12:23	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	4h	**Station:**	Composite 8		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	965885	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.82	0.8924	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	83.7	74.2	100	1.195	0.999	1.348

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.98	2.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.98	2.0%
50		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.96	4.0%
100		5	0.340	0.200	0.500	0.152	44.60%	66.0%	17/50	0.34	66.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	0.900	1.000	0.900
100		0.500	0.200	0.300	0.200	0.500

PREPARATION of DILUTIONS

STUDY: 29523 **CLIENT:** AECOM **DILUENT:** CLDS (Reference Water)

SPECIES: *M. beryllina* + *A. punctulata* **TEST:** Suspended Particulate Phase (SPP)

Diluent: CLDS	Composite #: 1		Composite #: 2		Composite #: 3		Composite #: 4	
	Elutriate ID: 29521-017		Elutriate ID: 29521-018		Elutriate ID: 29521-019		Elutriate ID: 29521-020	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2000	0	2000	0	2000	0	2000
CLDS	0	↓	0	↓	0	↓	0	↓
1 %	20	↓	20	↓	20	↓	20	↓
10 %	200	↓	200	↓	200	↓	200	↓
50 %	1000	↓	1000	↓	1000	↓	1000	↓
100 %	2000	↓	2000	↓	2000	↓	2000	↓
Initial	kw		kw		kw		kw	
Date	8/25/17		8/25/17		8/25/17		8/25/17	
Time	1430		1430		1430		1430	
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	27.2		26.9		26.~~9~~ 4 (E3 8/25 kw)		26.1	
Vol of Elutriate (mL)	3700		3320		4000 ~~3320~~ (E3 kw 8/25)		4000	
Grams of Salt (g)	12 (A-4682)		12		1~~2~~7 (E3 kw 8/25)		18	
Lot number of Salt	A-4682		A-4682		A-4682		A-4682	
Final Salinity	29.8		30.0		30.~~0~~1 (E3 kw 8/25)		29.7	
Date & Initial	8/25/17 kw		08/25/17 CFS		08/25/17 kw		08/25/17	
Ammonia pulled on 100% SPP and Controls	Start 29523 -100	End (~~Ab~~) Mb 8/31/17 130 ~~106~~ 8/31/17	Start 29523 -101	End (~~Ab~~) Mb 8/31/17 131 ~~107~~ 8/31/17	Start (E3 kw 8/25) 29~~7~~523 ~~102~~ 102 8/31/17	End (~~Ab~~) 8/31/17 Mb 132 ~~108~~ 8/31/17	Start 29523 -103	End (~~Ab~~) 8/31/17 133 ~~109~~ 8/31/17
		AP ~~Ab~~ End (~~Mb~~) 8/31/17 -124		AP End (~~Mb~~) 8/31/17 -125		AP End (~~Mb~~) 8/31/17 -126		AP End (~~Mb~~) 8/31/17 -127

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbAR0082417 **Sample:** Controls **Diluent:** CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	2	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		BG	CFS	AK	CFS	MS	KB	LB
Date		08/25/17	08/25/17	8/25/17	08/26	08/27	08/28	8/29
Time		1620	50 1655 (CFS 08/25)	1715	1420	1455 ~~1255~~ (MS 8/27)	1535 ~~13~~ (KB 08/27)	1500

Conc	Rep	HOURS 0	1	2	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	9	8
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

Comments:

Notes	
Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.4	7.0	6.8	7.2	6.4	8.07	7.99	7.92	7.95	7.86	21	~~21~~ 19 (CFS 08/26)	20	20	21	30	~~28~~ 30 (CFS 08/26)	30	30	32					
CLDS	A	7.9	6.8	6.9	7.1	6.4	7.87	7.96	7.92	7.97	7.87	21	19	20	19	21	28	29	29	30	31					
Initials		KB	CFS	DD	KB	MS																				
Date		8/25/17	08/26	08/27	08/28	08/29																				
Time		1600	1135	1150	1510	1529																				
Incub. Temp		20	20	20	20	20																				
FEEDING: *Artemia nauplii* (A -4729)																										
Fed By:		AK	CFS	MS	KB																					

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI300	YSI300	YSI300	YSI300	YSI300
Initial	KB	CFS	DD	KB	MS

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	~~84~~ 95 (CS 8/25)	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI300	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbAR0082417 **Sample:** Composite1 **Diluent:** CLDS

SURVIVAL - Composite # 1

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	9
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		KB TBC	CFS	AK	CFS	MS	KB	UB
Date		8/25/17 08/25	08/25 1400	8/25/17	08/26	08/27	08/28	8/29
Time		1600 1629	1700	1715	1420	1455	1535	1500

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	9	9	9	9
	E	10	10	10	10	10	10	10

Comments:

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.5	7.4	7.0	7.6	5.9	7.87	8.00	7.95 / 7.94	7.89	7.80	21	19	20 / 19	20	21	28	28	28 / 28	29	30					
10 %	A	7.6	7.2	7.1	7.6	6.1	7.89	8.03	7.99 / 7.93	7.96	7.82	21	19	20 / 19	20	21	28	28	29 / 28	29	30					
50 %	A	7.6	7.2	7.0	7.5	6.3	7.99	8.07	8 / 8.03	7.98 / 8.00	7.91	21	19	20 / 20	20	21	29	29	30 / 29	30	31					
100 %	A	7.5	7.2	6.9	7.4	6.4	8.07	8.09	8.08 / 8.04	8.04	7.94	21	19	19 / 20	20	21	30	30	30 / 31	31	32					
Initials		KB	CFS	DD	KB	MS																				
Date		8/25/17	08/26	08/27	08/28	08/29																				
Time		1600	1135	1155	1510	1529																				
Incub. Temp		20	20 CFS 08/26	20	20	20																				

FEEDING: *Artemia nauplii* (A -4729)

Fed By:	AK	CFS	MS	KB	

RECORD OF METERS USED CFS 08/26

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI300	YSI300	YSI300	YSI300	YSI300
Initial	KB	CFS	CFS	KB	MS

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	~~YSI300~~ 1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI300	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09M6ARO082417 **Sample:** Composite 2 **Diluent:** CLDS

SURVIVAL - Composite # 2

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		TBG	CFS	AK	CFS	MS	KB	LB
Date		08/25/17	08/25	8/25/17	08/26	08/27	08/28	8/29
Time		1620	1710	1725	1420	1510	1535	1500

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	8	8
	D	10	10	10	10	10	10	10
	E	10	10	10	10	9	9	9

Comments:

Notes	
Parameter	**Conditions**
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.7	6.6	6.7	7.1	6.1	7.88	8.07 (1:14)	7.89	7.92	7.82	21	19	20	20	21	28	28	~~30~~ 28	28	30					
10 %	A	7.8	6.7	6.8	7.1	6.1	7.92	8.02 (7.93)	7.93	7.96	7.88	21	19	20	20	21	28	28	29	29	30					
50 %	A	7.8	6.7	6.8	7.1	6.1	8.01	8.05 (8.04)	8.03	8.05	8.02	21	19	20	20	21	29	29	29	30	30					
100 %	A	6.8	6.7	6.8	7.1	6.0	8.03	8.08 (8.08)	8.11	8.10	8.15	21	19	20	20	21	30	30	30	31	32					
Initials		KB	CFS	DD	KB	MS																				
Date		8/25/17	08/26	08/27	08/28	08/29																				
Time		1600	1135	1155	1510	1529																				
Incub. Temp		20	20	20	20	20																				

FEEDING: *Artemia nauplii* (A -4729)

Fed By: AK CFS MS KB

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI30D	YSI30D	YSI30D	YSI30D	YSI30D
Initial	KB	CFS	DD	KB	MS

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI30D	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbAR082417 **Sample:** Composite 3 **Diluent:** CLDS

SURVIVAL - Composite # 3

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		TBG	CFS	AK	CFS	MS	KB	JB
Date		08/25/17	08/25	8/25/17	08/26	08/27	08/28	8/29
Time		1620	1720	1735	1420	1525	1535	1500

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

Comments:

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.7	6.7	7.0	7.4	6.1	7.86	8.02 7.90	7.89	7.92	7.87	21	20	20	20	21	28	28	28	28	29					
10 %	A	7.6	6.8	7.0	7.3	6.2	7.88	8.02 7.90	7.90	7.89	7.90	21	20	20	20	21	28	28	29	29	30					
50 %	A	7.5	6.9	7.0	7.1	6.3	7.94	8.00 8.00	8.01	7.98	7.97	20	20	20	20	21	29	29	29	30	31					
100 %	A	6.5	6.9	7.0	6.9	6.2	7.96	8.08 8.02	8.05	8.07	8.05	21	20	20	20	21	30	30	31	31	32					
Initials		JW	CFS	DD	KB	MS																				
Date		8/25/17	08/26	08/27	08/28	08/29																				
Time		1600	1135	1155	1510	1529																				
Incub. Temp		20	20	20	20	20																				
FEEDING: *Artemia nauplii* (A-4729)																										
Fed By:		AK	CFS	MS	KB																					

@ 08/25 08/26

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI300	YSI300	YSI300	YSI300	YSI300
Initial	JW	CFS	DD	KB	MS

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI30D	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbAR0082417 **Sample:** Composite 4 **Diluent:** CLDS

SURVIVAL - Composite # 4

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	9 (RD MS 8/27)	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	9
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		BG	CFS	AK	CFS	MS	KB	LB
Date		08/25/17	08/25	8/25/17	08/26	08/27	08/28	8/29
Time		1620	1730	1745	1420	1530	1535	1500

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

(E) LB 8/29/17

RD MS 8/27 Organism missing

Comments:

Notes	
Parameter	**Conditions**
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.2	7.4	6.9	7.4	6.7	7.88	7.90	7.91	7.91	7.90	21	21	20	20	21	28	28	28	28	30					
10 %	A	7.6	7.2	6.9	7.2	6.5	7.90	7.90	7.93	7.91	7.90	21	21	20	20	21	28	28	29	29	30					
50 %	A	7.2	7.1	6.9	7.0	6.4	7.96	8.00	8.05	8.06	8.06	21	21	20	20	21	29	29	29	30	31					
100 %	A	5.5	6.9	6.9	7.0	6.3	7.99	8.02	8.12	8.13	8.15	21	21	20	20	21	30	30	30	31	31					
Initials		KW	CFS	DD	KB	MS																				
Date		8/25/17	08/26	08/27	08/28	08/29																				
Time		1600	1135	1155	1510	1529																				
Incub. Temp		20	20	20	20	20																				

FEEDING: *Artemia nauplii* (A - 4729)

Fed By:	AK	CFS	MS	KB	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI30D	YSI30D	YSI30D	YSI30D	YSI30D
Initial	KW	CFS	DD	KB	MS

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI30D	Salinity Meter #	

09MbAR0082417

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Menidia beryllina

Source: Lab reared ✓ Hatchery reared____ Field collected____

Hatch date 08/15/17 Receipt date____

Lot number 081117MB Strain ARO

Brood origination Cape Cod, MA

II. Water Quality

Temperature 25 °C Salinity 25 ppt D.O. Sat ppm

pH 8.2 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater____ Saltwater ✓ Other____

Recirculating ✓ Flow through____ Static renewal ____

DIET: Flake food X Phytoplankton____ Trout chow____

Artemia X Rotifers X YCT____ Other____

Prophylactic treatments:____

Comments:____

IV. Shipping Information

Client: EST # of Organisms 1000+

Carrier: PKK UP Date shipped 8/24/17

Biologist:____

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

STUDY: 29253
CLIENT: AECOM
PROJECT: New Haven
ASSAY: MB96SPP
SPECIES: *M. beryllina*
TASK: **Wet Weight Data - Balance Output File**
BALANCE: **Ohaus Discovery Balance Model DV215CD**
Serial #: **1124024313**

Date / Intials: 08/25/17 LB LB

Rep	
1	0.00085
2	0.00304
3	0.00458
4	0.00447
5	0.00316
6	0.00444
7	0.00194
8	0.00379
9	0.00167
10	0.00326
11	0.00472
12	0.00211
13	0.00386
14	0.00226
15	0.00177
16	0.00314
17	0.00193
18	0.00257
19	0.00206
20	0.00271

Mean Weight (g):	0.00292
Test Volume (L):	0.2
Loading Rate(g/L):	0.14583

CETIS Test Data Worksheet

Report Date: 30 Aug-17 10:00 (p 1 of 1)
Test Code/ID: 20-7647-7184/29523-1Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:20	**Species:**	Menidia beryllina	**Sample Code:**	29521-017
End Date:	29 Aug-17 15:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 1

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	2	10				8	
0	D	2	19	10				10	
0	D	3	15	10				10	
0	D	4	28	10				10	
0	D	5	23	10				10	
0	L	1	25	10				10	
0	L	2	7	10				10	
0	L	3	21	10				10	
0	L	4	30	10				10	
0	L	5	22	10				10	
1		1	13	10				10	
1		2	24	10				10	
1		3	12	10				10	
1		4	3	10				10	
1		5	10	10				10	
10		1	11	10				10	
10		2	1	10				9	
10		3	26	10				10	
10		4	16	10				10	
10		5	27	10				10	
50		1	5	10				10	
50		2	4	10				10	
50		3	9	10				10	
50		4	29	10				10	
50		5	18	10				10	
100		1	6	10				10	
100		2	8	10				10	
100		3	20	10				10	
100		4	14	10				9	
100		5	17	10				10	

CETIS Summary Report

Report Date:	30 Aug-17 10:04 (p 1 of 1)
Test Code:	29523-1Mb | 20-7647-7184

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	16-7813-7221	**Code:**	29521-017	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 1		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-2935-1650	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
14-5877-4211	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
01-2935-1650	96h Proportion Survived	Control Resp	0.96	0.9	>>	Yes	Passes Criteria
14-5877-4211	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
100		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	0.900	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	0.900	1.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	01-2935-1650	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:03	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	16-7813-7221	**Code:**	29521-017	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	387419	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.5	2.82	9.2E-04	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.960	0.800	1.000	0.089	9.32%	0.0%	48/50	0.985	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.985	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	-2.08%	49/50	0.985	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.985	0.0%
100		5	0.980	0.900	1.000	0.045	4.56%	-2.08%	49/50	0.98	0.51%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	0.900	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	0.900	1.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	14-5877-4211	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:03	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	16-7813-7221	**Code:**	29521-017	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	203934	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.98	2.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	Outlier	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	0.900	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	0.900	1.000

CETIS Test Data Worksheet

Report Date: 30 Aug-17 09:58 (p 1 of 1)
Test Code/ID: 09-6478-4789/29523-2Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:20	**Species:**	Menidia beryllina	**Sample Code:**	29521-018
End Date:	29 Aug-17 15:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 2

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	9	10				8	
0	D	2	2	10				10	
0	D	3	3	10				10	
0	D	4	5	10				10	
0	D	5	7	10				10	
0	L	1	15	10				10	
0	L	2	26	10				10	
0	L	3	17	10				10	
0	L	4	25	10				10	
0	L	5	18	10				10	
1		1	23	10				9	
1		2	20	10				10	
1		3	16	10				10	
1		4	28	10				10	
1		5	19	10				10	
10		1	11	10				10	
10		2	13	10				10	
10		3	30	10				10	
10		4	8	10				10	
10		5	21	10				10	
50		1	4	10				10	
50		2	14	10				10	
50		3	22	10				10	
50		4	29	10				10	
50		5	24	10				10	
100		1	1	10				10	
100		2	12	10				10	
100		3	27	10				8	
100		4	10	10				10	
100		5	6	10				9	

CETIS Summary Report

Report Date:	30 Aug-17 10:06 (p 1 of 1)
Test Code:	29523-2Mb | 09-6478-4789

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	13-1951-3050	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 2		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
06-9898-3546	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
11-1078-1103	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
06-9898-3546	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
11-1078-1103	96h Proportion Survived	Control Resp	0.96	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
100		5	0.940	0.829	1.000	0.800	1.000	0.040	0.089	9.52%	2.08%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		0.900	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	0.800	1.000	0.900

CETIS Analytical Report

Report Date: 01 Sep-17 14:29 (p 1 of 1)
Test Code: 29523-2Mb | 09-6478-4789

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	11-1078-1103	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	13-1951-3050	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1046884	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.89	2.82	0.0369	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.960	0.800	1.000	0.089	9.32%	0.0%	48/50	0.985	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	-2.08%	49/50	0.985	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.985	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.985	0.0%
100		5	0.940	0.800	1.000	0.089	9.52%	2.08%	47/50	0.94	4.57%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
1		0.900	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	0.800	1.000	0.900

CETIS Analytical Report

Report Date:	30 Aug-17 10:05 (p 1 of 1)
Test Code:	29523-2Mb | 09-6478-4789

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	06-9898-3546	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	13-1951-3050	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1684252	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		5	0.940	0.800	1.000	0.089	9.52%	6.0%	47/50	0.94	6.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	Outlier	1.000	1.000	1.000	1.000
1		0.900	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	0.800	1.000	0.900

CETIS Test Data Worksheet

Report Date: 30 Aug-17 10:11 (p 1 of 1)
Test Code/ID: 14-0561-8459/29523-3Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:20	**Species:**	Menidia beryllina	**Sample Code:**	29521-019
End Date:	29 Aug-17 15:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 3

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	14	10				8	
0	D	2	27	10				10	
0	D	3	8	10				10	
0	D	4	23	10				10	
0	D	5	4	10				10	
0	L	1	29	10				10	
0	L	2	13	10				10	
0	L	3	1	10				10	
0	L	4	18	10				10	
0	L	5	25	10				10	
1		1	6	10				10	
1		2	16	10				10	
1		3	3	10				10	
1		4	12	10				10	
1		5	15	10				10	
10		1	20	10				10	
10		2	2	10				10	
10		3	30	10				10	
10		4	28	10				10	
10		5	11	10				10	
50		1	24	10				10	
50		2	10	10				10	
50		3	9	10				10	
50		4	17	10				10	
50		5	7	10				10	
100		1	5	10				10	
100		2	19	10				10	
100		3	22	10				10	
100		4	21	10				10	
100		5	26	10				10	

CETIS Summary Report

Report Date:	30 Aug-17 10:12 (p 1 of 1)
Test Code:	29523-3Mb | 14-0561-8459

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	06-4038-7516	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 3		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
15-6056-8353	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
16-3855-6139	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
15-6056-8353	96h Proportion Survived	Control Resp	0.96	0.9	>>	Yes	Passes Criteria
16-3855-6139	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	15-6056-8353	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	06-4038-7516	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1082181	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.38	2.82	1.6E-07	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.960	0.800	1.000	0.089	9.32%	0.0%	48/50	0.992	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.992	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.992	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.992	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.992	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	16-3855-6139	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	06-4038-7516	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1402449	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	Outlier	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Test Data Worksheet

Report Date: 30 Aug-17 10:28 (p 1 of 1)
Test Code/ID: 12-5799-8215/29523-4Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:20	**Species:**	Menidia beryllina	**Sample Code:**	29521-020
End Date:	29 Aug-17 15:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 4

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	3	10				8	
0	D	2	25	10				10	
0	D	3	9	10				10	
0	D	4	29	10				10	
0	D	5	8	10				10	
0	L	1	18	10				10	
0	L	2	13	10				10	
0	L	3	12	10				10	
0	L	4	28	10				10	
0	L	5	21	10				10	
1		1	16	10				9	
1		2	23	10				10	
1		3	17	10				9	
1		4	19	10				10	
1		5	15	10				10	
10		1	2	10				10	
10		2	1	10				10	
10		3	6	10				10	
10		4	26	10				10	
10		5	4	10				10	
50		1	30	10				10	
50		2	5	10				10	
50		3	27	10				10	
50		4	11	10				10	
50		5	22	10				10	
100		1	14	10				10	
100		2	20	10				10	
100		3	7	10				10	
100		4	10	10				10	
100		5	24	10				10	

CETIS Summary Report

Report Date:	30 Aug-17 10:29 (p 1 of 1)
Test Code:	29523-4Mb | 12-5799-8215

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	20-6993-5038	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
07-3399-4987	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
20-6433-7982	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
07-3399-4987	96h Proportion Survived	Control Resp	0.96	0.9	>>	Yes	Passes Criteria
20-6433-7982	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	0.00%
0	L	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
1		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	1.000	1.000
1		0.900	1.000	0.900	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	07-3399-4987	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	20-6993-5038	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	340958	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.67	2.82	2.2E-04	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.960	0.800	1.000	0.089	9.32%	0.0%	48/50	0.984	0.0%
1		5	0.960	0.900	1.000	0.055	5.71%	0.0%	48/50	0.984	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.984	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.984	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	-4.17%	50/50	0.984	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.800	1.000	1.000	1.000	1.000
1		0.900	1.000	0.900	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	20-6433-7982	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	10-3163-0969	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:20	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	29 Aug-17 15:00	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	10

Sample ID:	20-6993-5038	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1897952	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
1		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.99	1.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	Outlier	1.000	1.000	1.000	1.000
1		0.900	1.000	0.900	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:**

Test Species: *M. beryllina* **Lot ID:** 09MbABS082217 **Sample:** Controls **Diluent:** CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	2	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	9
	E	10	10	10	9	9	9	9
Initials		MW	KB	LB	[illegible]	AK	CFS	KB
Date		8/23/17	08/23	8/23	8/24/17	8/25/17	08/26	08/27
Time		1545	1710	1740	1505	1345	~~1440~~ 1400 CFS 08/26	1345

Conc	Rep	HOURS 0	1	2	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10

Comments:

Notes	
Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.7	6.8	6.8	6.7	7.0	8.11	7.98	8.02	7.89	7.90	21	20	20	20	20	30	30	31	31	31	NA	NA			
CLDS	A	8.4	6.9	6.8	6.6	6.9	7.87	7.90	8.02	7.85	7.86	21	20	20	20	20	28	28	29	29	30	NA	NA			
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1620	1415	1310	1140	1230																				
Incub. Temp		25	20	20	20	20																				
FEEDING: *Artemia nauplii* (A - 4729)																										
Fed By:		KB	AK	AK	CFS																					

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI30D	YSI30D	YSI30D	YSI30D	YSI30D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI30D	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbABS082217 **Sample:** Composite 5 **Diluent:** CLDS

SURVIVAL - Composite # 5

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	10	10	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	9	9	8	8
	E	10	10	10	10	10	9	9
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	9	9
	D	10	10	10	10	10	10	10
	E	10	10	10	9	8	8	8
100 %	A	10	10	10	10	8	7	6
	B	10	10	10	10	8	6	5
	C	10	10	10	10	6	1	1
	D	10	10	10	5	4	2	1
	E	10	10	10	8	4	0	—
Initials		MW	KB	LB	KL	AK	CFS	KB
Date		8/23/17	08/23	8/23	8/24/17	8/25/17	08/26	08/27
Time		1620	1705	1740	1555	1500	~~1440~~ 1400	1425

@CFS 08/26

Comments:

Notes	
Parameter	**Conditions**
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.6	7.1	6.7	6.5	7.2	7.85	7.99	7.98	7.87	7.96	21	20	20	20	20	28	28	28	29	29	NA	NA			
10 %	A	8.6	7.0	6.6	6.4	7.2	7.91	8.02	8.02	7.99	7.99	21	20	20	20	20	28	28	29	29	30	NA	NA			
50 %	A	8.2	6.6	6.6	6.4	7.0	7.93	8.05	8.08	8.09	8.11	21	20	20	20	20	29	29	30	31	30	NA	NA			
100 %	A	7.2	6.9	6.6	6.5	6.9	7.89	8.06	8.12	8.19	8.24	21	20	20	20	20	30	30	30	31	31	NA	NA			
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1635	1405	1310	1145	1230																				
Incub. Temp		25	20	20	20 @CFS 08/26	20																				
FEEDING: *Artemia nauplii* (A - 4729)																										
Fed By:		KB	AK	AK	CFS																					

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI30D	YSI30D	YSI30D	YSI30D	YSI30D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI30D	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbABS082217 **Sample:** Composite 6 **Diluent:** CLDS

SURVIVAL - Composite # 6

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
10 %	A	10	10	10	8	8	8	7
	B	10	10	10	9	9	9	9
	C	10	10	10	10	10	9	9
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		MW	KB	LB	AK	AK	CFS	KB
Date		8/23/17	08/23	8/23	8/24/17	8/25/17	08/26	08/27
Time		1550	1720	1740	1605	1410	1400 ~~1440~~	1350

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	9	9	9
	B	10	10	10	10	10	8	7
	C	10	10	10	10	10	10	10
	D	10	10	10	10	9	7	7
	E	10	10	10	10	8	7	7
100 %	A	10	10	10	0			
	B	10	10	10	0			
	C	10	10	10	0			
	D	10	10	10	0			
	E	10	10	10	0			

LB 8/25/17

Notes	
Parameter	**Conditions**
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

Comments:

LB 8/25/17 - Beaker spilled - no orgs lost

CFS 08/26

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (If required) 0	24	48	72	96
1 %	A	8.0	6.8	6.5	6.2	6.2	7.88	7.91	7.97	7.87	7.87	21	20	20	20	20	28	28	28	29	29	NA	NA			
10 %	A	8.0	6.9	6.1	6.1	6.2	7.93	7.99	7.95	7.93	7.92	21	20	20	20	20	28	28	29	29	29	NA	NA			
50 %	A	7.8	6.6	6.4	6.1	6.2	7.91	8.01	8.04	8.07	8.08	21	20	20	20	20	28	29	30	30	30	NA	NA			
100 %	A	6.7	5.9	—	—	—	7.88	8.02	—	—	—	21	20	~~20~~	—	—	28	30	~~30~~	—	—	NA	NA	—	—	—
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1645	1415	1310	1140	1230																				
Incub. Temp		25	20	20	20	20																				
FEEDING: *Artemia nauplii* (A - 4729)																										
Fed By:		KB	AK	CFS	CFS																					

LB 8/25/17

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI 30D	YSI 30D	YSI 30D	YSI 30D	YSI 30D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI 30D	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** 1

Test Species: *M. beryllina* **Lot ID:** 09MbABS082217 **Sample:** Composite 7 **Diluent:** CLDS

SURVIVAL - Composite # 7

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	9
	C	10	10	10	10	10	10	9
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9
10 %	A	10	10	10	10	10	9	9
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		MW	KB	LB	AK	AK	CFS	KB
Date		8/23/17	08/23	8/23	8/24/17	8/25/17	08/26	08/27
Time		1615	1710	1740	1625	1420	1400	1415

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	~~10~~ 9	6	6
	B	10	10	10	10	10	9	9
	C	10	10	10	10	9	7	7
	D	10	10	10	10	8	6	5
	E	10	10	10	10	8	7	6
100 %	A	10	10	10	0			
	B	10	10	10	0			
	C	10	10	10	0			
	D	10	10	10	0			
	E	10	10	~~9~~ 10	0			

LB 8/23/17

Comments:

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	7.9	7.0	6.3	6.5	6.4	7.87	7.96	7.88	7.97	7.85	20	20	20	20	20	28	28	28	29	28	NA	NA			
10 %	A	8.0	7.2	6.1	6.5	6.8	7.90	8.00	7.95	7.95	7.98	20	19	20	20	20	28	28	29	29	29	NA	NA			
50 %	A	8.0	7.4	6.2	6.6	6.9	7.92	8.01	~~7.95~~ 8.03	8.08	8.06	20	19	20	20	20	29	29	29	30	30	NA	NA			
100 %	A	6.8	6.5				7.92	7.98	LB 8/25/17			21	19	~~20~~			30	30	~~29~~ LB 8/25/17			NA	NA			
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		1705	1545	1310	1140	1230																				
Incub. Temp		25	20	20	20	DD																				
FEEDING: *Artemia nauplii* (A - 4799)																										
Fed By:		KB	AK	AK	CFS																					

RECORD OF METERS USED

LB 8/25/17

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YS130D	YS130D	YS130D	YS130D	YS130D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YS130D	Salinity Meter #	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Project:** New Haven, CT **Client:** AECOM **Incubator ID:** /

Test Species: *M. beryllina* **Lot ID:** 09MbABS082217 **Sample:** Composite 8 **Diluent:** CLDS

SURVIVAL - Composite # 8

Conc	Rep	HOURS 0	1	2	24	48	72	96
1 %	A	10	10	10	9	9	9	9
	B	10	10	10	9	9	9	9
	C	10	10	10	8	8	7	7
	D	10	10	10	10	10	10	10
	E	10	10	10	9	9	9	9
10 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	8
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
Initials		MW	KB	LB	MW	AK	CFS	KB
Date		8/23/17	08/23	8/23	8/24	8/25/17	08/26	08/27
Time		1600	1715	1740	1625	~~1435~~ 1435	1400	1405

Conc	Rep	HOURS 0	1	2	24	48	72	96
50 %	A	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10
	E	10	10	10	10	10	10	10
100 %	A	10	10	10	4	0	—	—
	B	10	10	10	10	4	2	2
	C	10	10	10	9	2	0	—
	D	10	10	10	10	7	2	2
	E	10	10	10	6	2	0	—

Comments:

Notes

Parameter	Conditions
Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 ± 0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	7.2	6.4	6.5	7.3	7.87	8.02	7.95	7.93	7.95	21	19	20	20	20	28	28	29	30	29	NA				
10 %	A	8.2	7.3	6.2	6.4	7.2	7.91	8.04	8.00	7.95	8.01	21	19	20	20	20	28	29	29	30	30	NA				
50 %	A	7.8	7.3	6.2	6.4	7.2	7.95	8.03	8.05	8.08	8.10	21	19	20	20	20	29	30	30	31	31	NA				
100 %	A	6.9	7.5	6.5	6.4	7.2	7.94	8.04	8.10	8.17	8.18	21	19	20	20	20	30	30	31	31	32	NA				
Initials		AK	AK	LB	CFS	DD																				
Date		8/23/17	8/24/17	8/25	08/26	08/27																				
Time		~~1700~~ 1715	1550	1310	1140	1230																				
Incub. Temp		~~21~~ 25	20	20	20	20																				

FEEDING: *Artemia nauplii* (A - 4729)

Fed By:	KB	MW	AK	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	1	1	1
Thermometer or Probe #	YSI30D	YSI30D	YSI30D	YSI30D	YSI30D
Initial	AK	AK	LB	CFS	DD

Water Quality Station #1		Water Quality Station #2	
DO Meter #	24	DO Meter #	
DO Probe #	95	DO Probe #	
pH Meter #	1097	pH Meter #	
pH Probe #	147	pH Probe #	
Salinity Meter #	YSI 30D	Salinity Meter #	

09MbABS082217

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 8/21/2017

SPECIES: *Menidia beryllina*

AGE: 8 day

LIFE STAGE: Juvenile

HATCH DATE: 8/13/2017

BEGAN FEEDING: Immediately

FOOD: Rotifers, *Artemia* sp.

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	24 °C	23-26 °C
SALINITY/CONDUCTIVITY:	25 ppt	23-26 ppt
TOTAL HARDNESS (as $CaCO_3$):	--	--
TOTAL ALKALINITY (as $CaCO_3$):	210 mg/l	165-210 mg/l
pH:	8.18	7.87-8.24

Comments:

Facility Supervisor

Aquatic BioSystems, Inc • Quality Research Organisms

STUDY: 29253
CLIENT: AECOM
PROJECT: New Haven
ASSAY: MB96SPP
SPECIES: *M. beryllina*
TASK: **Wet Weight Data - Balance Output File**
BALANCE: **Ohaus Discovery Balance Model DV215CD**
Serial #: **1124024313**

Date / Intials: 08/25/17 LB LB

Rep	
1	0.00085
2	0.00304
3	0.00458
4	0.00447
5	0.00316
6	0.00444
7	0.00194
8	0.00379
9	0.00167
10	0.00326
11	0.00472
12	0.00211
13	0.00386
14	0.00226
15	0.00177
16	0.00314
17	0.00193
18	0.00257
19	0.00206
20	0.00271

Mean Weight (g):	0.00292
Test Volume (L):	0.2
Loading Rate(g/L):	0.14583

CETIS Test Data Worksheet

Report Date: 30 Aug-17 10:43 (p 1 of 1)
Test Code/ID: 02-8117-9254/29523-5Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 15:45	**Species:**	Menidia beryllina	**Sample Code:**	29521-010
End Date:	27 Aug-17 13:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 5

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	15	10				10	
0	D	2	4	10				10	
0	D	3	30	10				10	
0	D	4	21	10				10	
0	D	5	18	10				10	
0	L	1	25	10				10	
0	L	2	24	10				10	
0	L	3	12	10				10	
0	L	4	16	10				9	
0	L	5	8	10				9	
1		1	19	10				10	
1		2	5	10				10	
1		3	28	10				10	
1		4	3	10				10	
1		5	29	10				10	
10		1	10	10				9	
10		2	22	10				10	
10		3	20	10				10	
10		4	13	10				8	
10		5	9	10				9	
50		1	11	10				10	
50		2	1	10				10	
50		3	27	10				9	
50		4	23	10				10	
50		5	26	10				8	
100		1	6	10				6	
100		2	7	10				5	
100		3	2	10				1	
100		4	14	10				1	
100		5	17	10				0	

CETIS Summary Report

Report Date:	30 Aug-17 10:44 (p 1 of 1)
Test Code:	29523-5Mb | 02-8117-9254

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	12-5436-7579	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 13:45	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	94h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	10

Sample ID:	21-1289-0687	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 5		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
16-5960-4891	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	78.1	67.1	103	1.281	
19-2984-3945	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	78	71.5	85.1	1.282	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
16-5960-4891	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
19-2984-3945	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	0.920	0.816	1.000	0.800	1.000	0.037	0.084	9.09%	8.00%
50		5	0.940	0.829	1.000	0.800	1.000	0.040	0.089	9.52%	6.00%
100		5	0.260	0.000	0.595	0.000	0.600	0.121	0.270	103.92%	74.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	0.900	0.900
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	0.800	0.900
50		1.000	1.000	0.900	1.000	0.800
100		0.600	0.500	0.100	0.100	0.000

CETIS Analytical Report

Report Date:	30 Aug-17 10:44 (p 1 of 1)
Test Code:	29523-5Mb | 02-8117-9254

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-2984-3945	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:43	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	12-5436-7579	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 13:45	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	94h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	10

Sample ID:	21-1289-0687	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 5		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	26.00%	1.89	0.0188	78	71.5	85.1

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.58	2.82	0.1403	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.920	0.800	1.000	0.084	9.09%	8.0%	46/50	0.93	7.0%
50		5	0.940	0.800	1.000	0.089	9.52%	6.0%	47/50	0.93	7.0%
100		5	0.260	0.000	0.600	0.270	104.00%	74.0%	13/50	0.26	74.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	0.800	0.900
50		1.000	1.000	0.900	1.000	0.800
100		0.600	0.500	0.100	0.100	0.000

CETIS Analytical Report

Report Date:	30 Aug-17 10:44 (p 1 of 1)
Test Code:	29523-5Mb | 02-8117-9254

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	16-5960-4891	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 10:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	12-5436-7579	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 13:45	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	94h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	10

Sample ID:	21-1289-0687	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 5		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	188726	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.58	2.82	0.1403	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	78.1	67.1	103	1.281	0.9733	1.49

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.920	0.800	1.000	0.084	9.09%	8.0%	46/50	0.93	7.0%
50		5	0.940	0.800	1.000	0.089	9.52%	6.0%	47/50	0.93	7.0%
100		5	0.260	0.000	0.600	0.270	104.00%	74.0%	13/50	0.26	74.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	0.800	0.900
50		1.000	1.000	0.900	1.000	0.800
100		0.600	0.500	0.100	0.100	0.000

CETIS Test Data Worksheet

Report Date: 30 Aug-17 11:15 (p 1 of 1)
Test Code/ID: 14-8750-3417/29523-6Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 15:45	**Species:**	Menidia beryllina	**Sample Code:**	29521-012
End Date:	27 Aug-17 13:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 6

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	26	10	10			10	
0	D	2	9	10	10			10	
0	D	3	12	10	10			10	
0	D	4	7	10	10			10	
0	D	5	18	10	10			10	
0	L	1	22	10	10			10	
0	L	2	3	10	10			10	
0	L	3	28	10	10			10	
0	L	4	21	10	10			9	
0	L	5	11	10	9			9	
1		1	2	10	10			10	
1		2	6	10	10			10	
1		3	14	10	10			10	
1		4	27	10	10			10	
1		5	8	10	10			10	
10		1	1	10	8			7	
10		2	29	10	9			9	
10		3	17	10	10			9	
10		4	30	10	10			10	
10		5	10	10	10			10	
50		1	24	10	10			9	
50		2	15	10	10			7	
50		3	16	10	10			10	
50		4	20	10	10			7	
50		5	5	10	10			7	
100		1	25	10	0			0	
100		2	4	10	0			0	
100		3	13	10	0			0	
100		4	23	10	0			0	
100		5	19	10	0			0	

CETIS Summary Report

Report Date:	01 Sep-17 14:40 (p 1 of 1)
Test Code:	29523-6Mb | 14-8750-3417

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	12-5436-7579	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 13:45	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	94h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	10

Sample ID:	00-0656-6621	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 11:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 6		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
04-9816-4895	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	64.9	59	69.3	1.541	
15-4998-9446	96h Proportion Survived	Spearman-Kärber	EC50	46.2	37.4	57	2.165	✓

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
04-9816-4895	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
15-4998-9446	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	0.900	0.748	1.000	0.700	1.000	0.055	0.122	13.61%	10.00%
50		5	0.800	0.624	0.976	0.700	1.000	0.063	0.141	17.68%	20.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	0.900	0.900
1		1.000	1.000	1.000	1.000	1.000
10		0.700	0.900	0.900	1.000	1.000
50		0.900	0.700	1.000	0.700	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:40 (p 1 of 1)
Test Code: 29523-6Mb | 14-8750-3417

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	15-4998-9446	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:17	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	00-0656-6621	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 11:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 6		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	1.66	0.0458	46.2	37.4	57

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.69	2.82	0.0904	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.900	0.700	1.000	0.122	13.60%	10.0%	45/50	0.9	10.0%
50		5	0.800	0.700	1.000	0.141	17.70%	20.0%	40/50	0.8	20.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.700	0.900	0.900	1.000	1.000
50		0.900	0.700	1.000	0.700	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:40 (p 1 of 1)
Test Code: 29523-6Mb | 14-8750-3417

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	04-9816-4895	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	00-0656-6621	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 11:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 6		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1847553	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.69	2.82	0.0904	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	64.9	59	69.3	1.541	1.444	1.694

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.900	0.700	1.000	0.122	13.60%	10.0%	45/50	0.9	10.0%
50		5	0.800	0.700	1.000	0.141	17.70%	20.0%	40/50	0.8	20.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.700	0.900	0.900	1.000	1.000
50		0.900	0.700	1.000	0.700	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 30 Aug-17 11:24 (p 1 of 1)
Test Code/ID: 15-1707-9159/29521-7Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 15:45	**Species:**	Menidia beryllina	**Sample Code:**	29521-014
End Date:	27 Aug-17 13:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 7

Conc-%	Code	Rep	Pos	# Exposed	Survival 24h	Survival 48h	Survival 72h	Survival 96h	Notes
0	D	1	15	10	10			10	
0	D	2	1	10	10			10	
0	D	3	30	10	10			10	
0	D	4	29	10	10			10	
0	D	5	24	10	10			10	
0	L	1	5	10	10			10	
0	L	2	10	10	10			10	
0	L	3	2	10	10			10	
0	L	4	22	10	10			9	
0	L	5	13	10	9			9	
1		1	27	10	10			10	
1		2	23	10	10			9	
1		3	26	10	10			9	
1		4	9	10	10			10	
1		5	3	10	9			9	
10		1	18	10	10			9	
10		2	25	10	10			10	
10		3	6	10	10			10	
10		4	11	10	10			10	
10		5	7	10	10			10	
50		1	19	10	10			6	
50		2	28	10	10			9	
50		3	16	10	10			7	
50		4	21	10	10			5	
50		5	4	10	10			6	
100		1	20	10	0			0	
100		2	8	10	0			0	
100		3	17	10	0			0	
100		4	12	10	0			0	
100		5	14	10	0			0	

CETIS Summary Report

Report Date:	01 Sep-17 14:43 (p 1 of 1)
Test Code:	29523-7Mb | 15-1707-9159

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	12-5436-7579	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 13:45	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	94h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	10

Sample ID:	06-5739-9893	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 7		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
11-0380-2708	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	59.2	51.2	66.7	1.69	
16-1057-2153	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	56.2	49.5	61.8	1.781	
15-8665-2651	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	44.4	36.4	54.3	2.25	✓
19-7491-5458	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	47.9	40.2	57	2.088	

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
11-0380-2708	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
15-8665-2651	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
16-1057-2153	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
19-7491-5458	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
1		5	0.940	0.872	1.000	0.900	1.000	0.025	0.055	5.83%	6.00%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
50		5	0.660	0.472	0.848	0.500	0.900	0.068	0.152	22.98%	34.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	0.900	0.900
1		1.000	0.900	0.900	1.000	0.900
10		0.900	1.000	1.000	1.000	1.000
50		0.600	0.900	0.700	0.500	0.600
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-7491-5458	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:25	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	06-5739-9893	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 7		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	4.00%	1.68	0.0379	47.9	40.2	57

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.35	2.82	0.0026	Outlier Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.940	0.900	1.000	0.055	5.83%	6.0%	47/50	0.96	4.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.96	4.0%
50		5	0.660	0.500	0.900	0.152	23.00%	34.0%	33/50	0.66	34.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	0.900	1.000	0.900
10		0.900	1.000	1.000	1.000	1.000
50		0.600	0.900	0.700	0.500	0.600
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	15-8665-2651	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:25	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	06-5739-9893	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 7		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	4.00%	1.65	0.0433	44.4	36.4	54.3

96h Proportion Survived Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.940	0.900	1.000	0.055	5.83%	6.0%	47/50	0.96	4.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.96	4.0%
50		4	0.600	0.500	0.700	0.082	13.60%	40.0%	24/40	0.6	40.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	0.900	1.000	0.900
10		0.900	1.000	1.000	1.000	1.000
50		0.600	Outlier	0.700	0.500	0.600
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	11-0380-2708	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	06-5739-9893	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 7		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	934254	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.35	2.82	0.0026	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	59.2	51.2	66.7	1.69	1.5	1.952

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.940	0.900	1.000	0.055	5.83%	6.0%	47/50	0.96	4.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.96	4.0%
50		5	0.660	0.500	0.900	0.152	23.00%	34.0%	33/50	0.66	34.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	0.900	1.000	0.900
10		0.900	1.000	1.000	1.000	1.000
50		0.600	0.900	0.700	0.500	0.600
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	16-1057-2153	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	06-5739-9893	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 09:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 7		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1268623	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	56.2	49.5	61.8	1.781	1.619	2.022

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.940	0.900	1.000	0.055	5.83%	6.0%	47/50	0.96	4.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.96	4.0%
50		4	0.600	0.500	0.700	0.082	13.60%	40.0%	24/40	0.6	40.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	0.900	1.000	0.900
10		0.900	1.000	1.000	1.000	1.000
50		0.600	Outlier	0.700	0.500	0.600
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 30 Aug-17 11:45 (p 1 of 1)
Test Code/ID: 17-1858-3587/29523-8Mb

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 15:45	**Species:**	Menidia beryllina	**Sample Code:**	29521-016
End Date:	27 Aug-17 13:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 16:00	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 8

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	D	1	26	10		10		10	
0	D	2	9	10		10		10	
0	D	3	17	10		10		10	
0	D	4	6	10		10		10	
0	D	5	22	10		10		10	
0	L	1	24	10		10		10	
0	L	2	18	10		10		10	
0	L	3	1	10		10		10	
0	L	4	5	10		9		9	
0	L	5	11	10		9		9	
1		1	27	10		9		9	
1		2	12	10		9		9	
1		3	16	10		8		7	
1		4	28	10		10		10	
1		5	7	10		9		9	
10		1	21	10		10		10	
10		2	8	10		10		8	
10		3	30	10		10		10	
10		4	4	10		10		10	
10		5	3	10		10		10	
50		1	2	10		10		10	
50		2	25	10		10		10	
50		3	15	10		10		10	
50		4	10	10		10		10	
50		5	20	10		10		10	
100		1	19	10		0		0	
100		2	13	10		4		2	
100		3	23	10		2		0	
100		4	14	10		7		2	
100		5	29	10		2		0	

CETIS Summary Report

Report Date:	01 Sep-17 14:45 (p 1 of 1)
Test Code:	29523-8Mb | 17-1858-3587

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	12-5436-7579	**Test Type:**	Survival (96h)	**Analyst:**	Amanda Komarek
Start Date:	23 Aug-17 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLIS Reference Site
Ending Date:	27 Aug-17 13:45	**Species:**	Menidia beryllina	**Brine:**	Generic commercial salts
Duration:	94h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	10

Sample ID:	20-8019-1167	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 16:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 16:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	n/a	**Station:**	Composite 8		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
19-1147-1611	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	71.5	67.6	76.6	1.398	
19-2516-9214	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	71.5	68.7	74.4	1.399	✓

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
19-1147-1611	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria
19-2516-9214	96h Proportion Survived	Control Resp	1	0.9	>>	Yes	Passes Criteria

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	L	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
1		5	0.880	0.744	1.000	0.700	1.000	0.049	0.110	12.45%	12.00%
10		5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	4.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.080	0.000	0.216	0.000	0.200	0.049	0.110	136.93%	92.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
0	L	1.000	1.000	1.000	0.900	0.900
1		0.900	0.900	0.700	1.000	0.900
10		1.000	0.800	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.000	0.200	0.000	0.200	0.000

CETIS Analytical Report

Report Date:	01 Sep-17 14:44 (p 1 of 1)
Test Code:	29523-8Mb | 17-1858-3587

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-2516-9214	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:46	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	20-8019-1167	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 16:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 16:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	n/a	**Station:**	Composite 8		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	8.00%	1.85	0.00871	71.5	68.7	74.4

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.27	2.82	0.4247	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.880	0.700	1.000	0.110	12.40%	12.0%	44/50	0.947	5.33%
10		5	0.960	0.800	1.000	0.089	9.32%	4.0%	48/50	0.947	5.33%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.947	5.33%
100		5	0.080	0.000	0.200	0.110	137.00%	92.0%	4/50	0.08	92.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		0.900	0.900	0.700	1.000	0.900
10		1.000	0.800	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.000	0.200	0.000	0.200	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:44 (p 1 of 1)
Test Code: 29523-8Mb | 17-1858-3587

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-1147-1611	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	30 Aug-17 11:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	20-8019-1167	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 16:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 16:00	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	n/a	**Station:**	Composite 8		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	976373	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.27	2.82	0.4247	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	71.5	67.6	76.6	1.398	1.306	1.48

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.880	0.700	1.000	0.110	12.40%	12.0%	44/50	0.947	5.33%
10		5	0.960	0.800	1.000	0.089	9.32%	4.0%	48/50	0.947	5.33%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.947	5.33%
100		5	0.080	0.000	0.200	0.110	137.00%	92.0%	4/50	0.08	92.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	1.000	1.000	1.000	1.000	1.000
1		0.900	0.900	0.700	1.000	0.900
10		1.000	0.800	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.000	0.200	0.000	0.200	0.000

EMBRYO WORKSHEET

DATE: 08/25/17 ESI STUDY: 29523

CLIENT: AECOM PROJECT: New Haven

Round 1 Redo

Eggs Collected @: 1520 Pre-assay fertilization check: 96/100 ANALYST: GRS

Sperm Collected @: 1520 *A mated subsample of egg+sperm must achieve ≥90% fertilization in order to be used in testing.*

Egg Stock Suspension Count:

Take 1mL of egg stock suspension and using a glass graduated cylinder dilute with seawater to a final volume of 100 mL. Count a subsample of the diluted suspension to get an estimate of the egg concentration. The diluted suspension should have 40 - 50 eggs/mL, (which would represent an egg concentration of 4,000 - 5,000 in the stock suspension.)

Egg Count (per mL) of diluted suspension: 40 /mL

Sperm Stock Suspension Count:

1. Hemocytometer Count (D): / (GRS 08-29 Individual sides not recorded)
2. Hemocytometer Count (D): /

Average Count (D): 246 X10^4 = spm solution D = 2.46×10^6

Sperm Concentrations: Solution D X 40 = Solution A = 9.84×10^7

Solution D X 20 = Solution B = 4.92×10^7

Solution D X 5 = Solution C = 1.23×10^{7} (GRS 08-29)

Once added to the egg stock, the final sperm concentration should be 1×10^5 - 1×10^7 in solution D.

Sperm Count (per mL): 2.46×10^6

mL of Eggs to Add: 125

mL of Sperm to Add: 19 Gametes mixed @: 1553

Gametes must be mixed within 1 hour of collection.

Calculated Embryo Stock Concentration (per mL): 3480

Calculated Embryo Stock (mL) needed per chamber: 6000

The test concentration should be 15 - 30 embryos per mL.

Add calculated amount of embryo stock to a surrogate chamber, gently mix, then count a 5mL aliquot.

Embryo Concentration Check: 151

If the check concentration is acceptable, then proceed with embryo addition to the test.

Volume Embryo Stock (mL) added to test solutions: 1.72

Embryos Added to Test Solutions @: 1600

INITIAL COUNTS:	Embryos/ 5 mL
SURROGATE A	151
SURROGATE B	153
SURROGATE C	160
Mean:	155

Organism Lot ID: 99ApARO062017

Mean per mL: (GRS 08-29) ~~51~~ 31

Round 1 Redo

ENVIROSYSTEMS, INCORPORATED
REFERENCE TOXICANT ASSAY
***Arbacia punctulata* Developmental ASSAY**

MONTH/YEAR:	TOXICANT: Copper
ORGANISM: *Arbacia punctulata*	LOT:

Concentration	DO (mg/L)	pH (SU)	SALINITY (ppt)
Lab Control			
1 ppb			
5 ppb			
10 ppb			
50 ppb			
100 ppb			

Water Quality Station	
DO meter #	
DO probe #	
pH meter #	
pH probe #	
Salinity meter	
Initials	
Date	

#10 GRS 0831

Data Sheet not provided Solf tox Sheet was used as template

SPERM DILUTIONS:

Hemacytometer Count E: 246 X 10^4 = Sperm Solution D= 2.46×10^6

Sperm Concentrations:

Solution E X 40 = Solution A = 9.84×10^7 SPM

Solution E X 20 = Solution B = 4.92×10^7 SPM

Solution E X 5 = Solution C = 1.23×10^7 SPM

FINAL COUNTS:

Final Sperm Count: 2.46×10^6

Final Egg Count: 4000

TEST TIMES:

Sperm Collected: 1520

Eggs Collected: 1520

Gametes Mixed: 1553

Gametes Added to Test:

SURROGATES:

	Embryos / 5 ml	Embryos / ml
Surrogate A	151	
Surrogate B	153	
Surrogate C	160	
Mean	155	

Copper Reference Toxicant Stock Solution:

Saltwater ID:

P:\General Projects\FORMS\LABFORMS\dmr&RefTox\Arbacia punctulata Developmental Reference Toxicant 2013.wpd

Arbacia punctulata Survival / Development Assay

ESI Study: 29523
Client: AECOM - New Haven, CT
Count Date: 08/28/2017

Assay Start: 8/25/17
Assay End: 8/28/17 1125
Initials: CR

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Lab Control Water	125/125	140/140	114/113	143/143	123/122
XXXX Reference Water	129/129	139/136	130/130	138/138	142/135
Composite 1 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	124/123	88/88	129/129	121/121	117/116
10%	118/116	109/108	116/115	111/108	118/114
50%	112/106	139/133	156/149	152/147	141/137
100%	135/96	142/99	127/83	132/91	19/78
Composite 2 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	123/121	116/105	117/95	134/131	94/89
10%	114/34	84/34	129/48	133/51	137/41
50%	13/0	1/0	6/0	4/0	7/0
100%	0/0	0/0	0/0	0/0	0/0
Composite 3 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	90/88	124/123	89/87	111/109	101/101
10%	103/99	108/102	117/108	99/91	114/109
50%	0/0	0/0	0/0	0/0	0/0
100%	0/0	0/0	0/0	0/0	0/0
Composite 4 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	116/115	126/125	111/111	128/125	120/115
10%	105/103	128/114	120/110	121/102	101/88
50%	0/0	0/0	0/0	0/0	0/0
100%	0/0	0/0	0/0	0/0	0/0

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 29523 **Client:** AECOM **Project:** New Haven

Test Species: *A. punctulata* **Lot ID:** 99APAR0062017 **Diluent:** CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)	
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr
Controls	Lab	7.4	7.2	8.07	8.01	21	22	30	30
	CLDS	7.9	7.3	7.87	8.00	21	22	28	28
Composite #1	1 %	7.5	7.3	7.87	7.99	21	22	28	28
	10 %	7.6	7.3	7.89	8.01	21	22	28	29
	50 %	7.6	7.3	7.99	8.05	21	22	29	29
	100 %	7.5	7.3	8.07	8.12	21	22	30	30
Composite #2	1 %	7.7	7.32	7.88	8.03 8.02	21	22 1	28	28
	10 %	7.8 8	7.3	7.92	8.09 8.06	21	22 1	28	28 29
	50 %	7.8 8	7.23	8.01	8.25 8.14	21	22 1	29	30 29
	100 %	6.8 8	7.2	8.03	8.28 8.23	21	22 1	30	31
Composite #3	1 %	7.7	7.23	7.86	8.02 8.03	21	21 2	28	28
	10 %	7.6 8.6	7.3	7.88	8.06 8.08	21	21 2	28	29 28
	50 %	7.5 8.5	7.32	7.94	8.16 8.25	21	21 2	29	29 30
	100 %	6.5 8.5	7.2	7.96	8.23 8.28	21	21 2	30	31
Composite #4	1 %	7.2	7.2	7.88	8.03	21	22	28	28
	10 %	7.6	7.2	7.90	8.06	21	22	28	28
	50 %	7.2	7.2	7.96	8.21	21	22	29	29
	100 %	5.5	7.1	7.99	8.31	21	22	30	30
Initials		KC / LB	LB	RECORD OF METERS USED				Water Quality Station # 1	
Date		8/25/17	8/28	Exposure				DO Meter #	24
Time		1600	1255			0	24	DO Probe #	95
Incub. Temp		20°C	21°C	Water Quality Station #		1	1	pH Meter #	1097
Comments: Original data obtained by KC 8/25/17				Thermometer or Probe #		YS130D	YS130D	pH Probe #	147
LB 8/29/17 Data transcribed from M. bergilina sheet				Initial		KC	LB	Salinity Meter	YS130D

CETIS Test Data Worksheet

Report Date: 29 Aug-17 12:28 (p 1 of 1)
Test Code/ID: 05-7565-8624/29523-1Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:00	**Species:**	Arbacia punctulata	**Sample Code:**	29521-002
End Date:	28 Aug-17 11:25	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 1

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	17	155	129	129	
0	D	2	1	155	139	136	
0	D	3	30	155	130	130	
0	D	4	4	155	138	138	
0	D	5	28	155	142	135	
0	L	1	21	155	125	125	
0	L	2	15	155	140	140	
0	L	3	16	155	114	113	
0	L	4	11	155	143	143	
0	L	5	26	155	123	122	
1		1	23	155	124	123	
1		2	2	155	88	88	
1		3	14	155	129	129	
1		4	24	155	121	121	
1		5	3	155	117	116	
10		1	18	155	118	116	
10		2	6	155	109	108	
10		3	22	155	116	115	
10		4	8	155	111	108	
10		5	12	155	118	114	
50		1	19	155	112	106	
50		2	5	155	139	133	
50		3	13	155	156	149	
50		4	9	155	152	147	
50		5	27	155	141	137	
100		1	20	155	135	96	
100		2	25	155	142	99	
100		3	29	155	127	83	
100		4	7	155	132	91	
100		5	10	155	119	78	

CETIS Summary Report

Report Date:	29 Aug-17 13:28 (p 1 of 1)
Test Code:	29523-1Ap | 05-7565-8624

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-8418-6650	**Code:**	29521-002	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 1		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
14-3059-9022	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
18-8486-7596	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
13-1884-6473	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.862	0.831	0.893	0.832	0.890	0.011	0.025	2.93%	0.00%
0	L	5	0.830	0.729	0.931	0.729	0.923	0.036	0.081	9.81%	3.74%
1		5	0.745	0.616	0.873	0.568	0.832	0.046	0.103	13.87%	13.62%
10		5	0.724	0.693	0.755	0.697	0.748	0.011	0.025	3.47%	16.02%
50		5	0.866	0.729	1.000	0.684	0.955	0.049	0.110	12.69%	-0.46%
100		5	0.577	0.506	0.647	0.503	0.639	0.025	0.057	9.83%	33.08%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.875	0.829	0.921	0.832	0.916	0.017	0.037	4.26%	0.00%
0	L	5	0.832	0.735	0.930	0.735	0.923	0.035	0.079	9.45%	4.87%
1		5	0.747	0.618	0.876	0.568	0.832	0.047	0.104	13.94%	14.60%
10		5	0.738	0.705	0.771	0.703	0.761	0.012	0.027	3.64%	15.63%
50		5	0.902	0.766	1.000	0.723	1.000	0.049	0.110	12.15%	-3.10%
100		5	0.845	0.776	0.914	0.768	0.916	0.025	0.056	6.59%	3.39%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
0	L	0.806	0.903	0.729	0.923	0.787
1		0.794	0.568	0.832	0.781	0.748
10		0.748	0.697	0.742	0.697	0.735
50		0.684	0.858	0.955	0.948	0.884
100		0.619	0.639	0.535	0.587	0.503

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
0	L	0.806	0.903	0.735	0.923	0.794
1		0.800	0.568	0.832	0.781	0.755
10		0.761	0.703	0.748	0.716	0.761
50		0.723	0.897	1.000	0.981	0.910
100		0.871	0.916	0.819	0.852	0.768

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	18-8486-7596	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-8418-6650	**Code:**	29521-002	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1599905	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.89	2.82	0.0367	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.745	0.568	0.832	0.103	13.90%	13.6%	577/775	0.778	9.73%
10		5	0.724	0.697	0.748	0.025	3.47%	16.0%	561/775	0.778	9.73%
50		5	0.866	0.684	0.955	0.110	12.70%	-0.46%	672/776	0.778	9.73%
100		5	0.577	0.503	0.639	0.057	9.83%	33.1%	447/775	0.577	33.1%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.794	0.568	0.832	0.781	0.748
10		0.748	0.697	0.742	0.697	0.735
50		0.684	0.858	0.955	0.948	0.884
100		0.619	0.639	0.535	0.587	0.503

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-3059-9022	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-8418-6650	**Code:**	29521-002	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1599653	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.745	0.568	0.832	0.103	13.90%	13.6%	577/775	0.793	7.97%
10		5	0.724	0.697	0.748	0.025	3.47%	16.0%	561/775	0.793	7.97%
50		4	0.911	0.858	0.955	0.048	5.26%	-5.73%	566/621	0.793	7.97%
100		5	0.577	0.503	0.639	0.057	9.83%	33.1%	447/775	0.577	33.1%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.794	0.568	0.832	0.781	0.748
10		0.748	0.697	0.742	0.697	0.735
50		Outlier	0.858	0.955	0.948	0.884
100		0.619	0.639	0.535	0.587	0.503

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-1884-6473	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-8418-6650	**Code:**	29521-002	**Client:**	AECOM
Sample Date:	25 Aug-17 09:30	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 09:30	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 1		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1554445	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.76	2.82	0.0653	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.747	0.568	0.832	0.104	13.90%	14.6%	579/775	0.808	7.63%
10		5	0.738	0.703	0.761	0.027	3.64%	15.6%	572/775	0.808	7.63%
50		5	0.902	0.723	1.000	0.110	12.20%	-3.1%	700/776	0.808	7.63%
100		5	0.845	0.768	0.916	0.056	6.59%	3.39%	655/775	0.808	7.63%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.800	0.568	0.832	0.781	0.755
10		0.761	0.703	0.748	0.716	0.761
50		0.723	0.897	1.000	0.981	0.910
100		0.871	0.916	0.819	0.852	0.768

CETIS Test Data Worksheet

Report Date: 29 Aug-17 12:33 (p 1 of 1)
Test Code/ID: 14-0213-6970/29523-2Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:00	**Species:**	Arbacia punctulata	**Sample Code:**	29521-018
End Date:	28 Aug-17 11:25	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 2

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	6	155	129	129	
0	D	2	14	155	139	136	
0	D	3	25	155	130	130	
0	D	4	10	155	138	138	
0	D	5	13	155	142	135	
0	L	1	5	155	125	125	
0	L	2	1	155	140	140	
0	L	3	4	155	114	113	
0	L	4	18	155	143	143	
0	L	5	19	155	123	122	
1		1	21	155	123	121	
1		2	28	155	116	105	
1		3	16	155	117	95	
1		4	20	155	134	131	
1		5	15	155	94	89	
10		1	9	155	114	34	
10		2	2	155	84	34	
10		3	30	155	129	48	
10		4	27	155	133	51	
10		5	24	155	137	41	
50		1	7	155	13	0	
50		2	12	155	1	0	
50		3	29	155	6	0	
50		4	3	155	4	0	
50		5	11	155	7	0	
100		1	8	155	0	0	
100		2	22	155	0	0	
100		3	23	155	0	0	
100		4	26	155	0	0	
100		5	17	155	0	0	

CETIS Summary Report

Report Date:	29 Aug-17 13:18 (p 1 of 1)
Test Code:	29523-2Ap | 14-0213-6970

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-9817-1672	Proportion Normal	Linear Interpolation (ICPIN)	EC50	4.77	3.29	6.13	20.96	
13-9470-5031	Proportion Normal	Linear Interpolation (ICPIN)	EC50	4.43	2.88	6	22.56	
10-3628-4322	Proportion Normal	Trimmed Spearman-Kärber	EC50	3.86	3.43	4.35	25.91	✓
15-7246-2672	Proportion Normal	Trimmed Spearman-Kärber	EC50	4.21	3.8	4.67	23.74	
07-0555-4050	Proportion Survived	Linear Interpolation (ICPIN)	EC50	20.9	15.6	23.3	4.78	
15-0297-8852	Proportion Survived	Linear Interpolation (ICPIN)	EC50	21.6	19.4	23.7	4.622	
07-5974-6192	Proportion Survived	Trimmed Spearman-Kärber	EC50	20.6	20	21.2	4.851	
14-9069-3109	Proportion Survived	Trimmed Spearman-Kärber	EC50	21.3	20.8	21.9	4.69	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.862	0.831	0.893	0.832	0.890	0.011	0.025	2.93%	0.00%
0	L	5	0.830	0.729	0.931	0.729	0.923	0.036	0.081	9.81%	3.74%
1		5	0.698	0.557	0.839	0.574	0.845	0.051	0.113	16.25%	19.01%
10		5	0.268	0.206	0.331	0.219	0.329	0.023	0.051	18.82%	68.86%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.875	0.829	0.921	0.832	0.916	0.017	0.037	4.26%	0.00%
0	L	5	0.832	0.735	0.930	0.735	0.923	0.035	0.079	9.45%	4.87%
1		5	0.754	0.636	0.871	0.606	0.865	0.042	0.094	12.52%	13.86%
10		5	0.770	0.597	0.943	0.542	0.884	0.062	0.139	18.10%	11.95%
50		5	0.040	0.004	0.076	0.006	0.084	0.013	0.029	71.59%	95.43%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
0	L	0.806	0.903	0.729	0.923	0.787
1		0.781	0.677	0.613	0.845	0.574
10		0.219	0.219	0.310	0.329	0.265
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
0	L	0.806	0.903	0.735	0.923	0.794
1		0.794	0.748	0.755	0.865	0.606
10		0.735	0.542	0.832	0.858	0.884
50		0.084	0.006	0.039	0.026	0.045
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	15-7246-2672	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:13	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.138	19.01%	0.624	0.0224	4.21	3.8	4.67

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.9	2.82	0.0347	Outlier Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.698	0.574	0.845	0.113	16.30%	19.0%	541/775	0.698	19.0%
10		5	0.268	0.219	0.329	0.051	18.80%	68.9%	208/775	0.268	68.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.781	0.677	0.613	0.845	0.574
10		0.219	0.219	0.310	0.329	0.265
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	10-3628-4322	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:13	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.138	23.28%	0.587	0.0258	3.86	3.43	4.35

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		4	0.661	0.574	0.781	0.090	13.60%	23.3%	410/620	0.661	23.3%
10		5	0.268	0.219	0.329	0.051	18.80%	68.9%	208/775	0.268	68.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.781	0.677	0.613	Outlier	0.574
10		0.219	0.219	0.310	0.329	0.265
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:53 (p 1 of 1)
Test Code: 29523-2Ap | 14-0213-6970

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-9817-1672	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	134917	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.9	2.82	0.0347	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	4.77	3.29	6.13	20.96	16.3	30.36

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.698	0.574	0.845	0.113	16.30%	19.0%	541/775	0.698	19.0%
10		5	0.268	0.219	0.329	0.051	18.80%	68.9%	208/775	0.268	68.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.781	0.677	0.613	0.845	0.574
10		0.219	0.219	0.310	0.329	0.265
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-9470-5031	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1707004	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	4.43	2.88	6	22.56	16.68	34.68

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		4	0.661	0.574	0.781	0.090	13.60%	23.3%	410/620	0.661	23.3%
10		5	0.268	0.219	0.329	0.051	18.80%	68.9%	208/775	0.268	68.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.781	0.677	0.613	Outlier	0.574
10		0.219	0.219	0.310	0.329	0.265
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	07-5974-6192	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:13	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.125	12.91%	1.31	0.0063	20.6	20	21.2

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.9	2.82	0.0354	Outlier Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.754	0.606	0.865	0.094	12.50%	13.9%	584/775	0.762	12.9%
10		5	0.770	0.542	0.884	0.139	18.10%	11.9%	597/775	0.762	12.9%
50		5	0.040	0.006	0.084	0.029	71.60%	95.4%	31/775	0.04	95.4%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.794	0.748	0.755	0.865	0.606
10		0.735	0.542	0.832	0.858	0.884
50		0.084	0.006	0.039	0.026	0.045
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-9069-3109	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:13	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.125	9.64%	1.33	0.00587	21.3	20.8	21.9

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.754	0.606	0.865	0.094	12.50%	13.9%	584/775	0.79	9.64%
10		4	0.827	0.735	0.884	0.065	7.83%	5.42%	513/620	0.79	9.64%
50		5	0.040	0.006	0.084	0.029	71.60%	95.4%	31/775	0.04	95.4%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.794	0.748	0.755	0.865	0.606
10		0.735	Outlier	0.832	0.858	0.884
50		0.084	0.006	0.039	0.026	0.045
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	07-0555-4050	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	215507	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.9	2.82	0.0354	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	20.9	15.6	23.3	4.78	4.292	6.43

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.754	0.606	0.865	0.094	12.50%	13.9%	584/775	0.762	12.9%
10		5	0.770	0.542	0.884	0.139	18.10%	11.9%	597/775	0.762	12.9%
50		5	0.040	0.006	0.084	0.029	71.60%	95.4%	31/775	0.04	95.4%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.794	0.748	0.755	0.865	0.606
10		0.735	0.542	0.832	0.858	0.884
50		0.084	0.006	0.039	0.026	0.045
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	15-0297-8852	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	09-5276-1895	**Code:**	29521-018	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 2		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	130931	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	21.6	19.4	23.7	4.622	4.223	5.165

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.754	0.606	0.865	0.094	12.50%	13.9%	584/775	0.79	9.64%
10		4	0.827	0.735	0.884	0.065	7.83%	5.42%	513/620	0.79	9.64%
50		5	0.040	0.006	0.084	0.029	71.60%	95.4%	31/775	0.04	95.4%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.794	0.748	0.755	0.865	0.606
10		0.735	Outlier	0.832	0.858	0.884
50		0.084	0.006	0.039	0.026	0.045
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 29 Aug-17 12:34 (p 1 of 1)
Test Code/ID: 12-6326-8142/29523-3Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:00	**Species:**	Arbacia punctulata	**Sample Code:**	29521-019
End Date:	28 Aug-17 11:25	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 3

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	13	155	129	129	
0	D	2	16	155	139	136	
0	D	3	21	155	130	130	
0	D	4	20	155	138	138	
0	D	5	28	155	142	135	
0	L	1	11	155	125	125	
0	L	2	17	155	140	140	
0	L	3	6	155	114	113	
0	L	4	1	155	143	143	
0	L	5	29	155	123	122	
1		1	22	155	90	88	
1		2	8	155	124	123	
1		3	3	155	89	87	
1		4	14	155	111	109	
1		5	27	155	101	101	
10		1	25	155	103	99	
10		2	26	155	108	102	
10		3	4	155	117	108	
10		4	9	155	99	91	
10		5	15	155	114	109	
50		1	5	155	0	0	
50		2	30	155	0	0	
50		3	10	155	0	0	
50		4	19	155	0	0	
50		5	23	155	0	0	
100		1	7	155	0	0	
100		2	24	155	0	0	
100		3	18	155	0	0	
100		4	12	155	0	0	
100		5	2	155	0	0	

CETIS Summary Report

Report Date:	29 Aug-17 13:35 (p 1 of 1)
Test Code:	29523-3Ap | 12-6326-8142

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-6701-0986	Proportion Normal	Linear Interpolation (ICPIN)	EC50	17.1	15.1	18.8	5.841	
10-8996-4669	Proportion Normal	Linear Interpolation (ICPIN)	EC50	17.6	15.5	18.8	5.675	
03-4774-1452	Proportion Normal	Trimmed Spearman-Kärber	EC50	17.4	16.6	18.1	5.756	
20-8468-4247	Proportion Normal	Trimmed Spearman-Kärber	EC50	16.9	16.1	17.7	5.923	✓
01-3303-2935	Proportion Survived	Linear Interpolation (ICPIN)	EC50	17.6	15.7	19.3	5.69	
04-9187-9008	Proportion Survived	Linear Interpolation (ICPIN)	EC50	18	16	19.7	5.541	
11-2628-1050	Proportion Survived	Trimmed Spearman-Kärber	EC50	17.3	16.6	18.1	5.771	
20-1905-2802	Proportion Survived	Trimmed Spearman-Kärber	EC50	17.8	17.1	18.5	5.621	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.862	0.831	0.893	0.832	0.890	0.011	0.025	2.93%	0.00%
0	L	5	0.830	0.729	0.931	0.729	0.923	0.036	0.081	9.81%	3.74%
1		5	0.655	0.535	0.776	0.561	0.794	0.044	0.097	14.86%	23.95%
10		5	0.657	0.598	0.715	0.587	0.703	0.021	0.047	7.20%	23.80%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.875	0.829	0.921	0.832	0.916	0.017	0.037	4.26%	0.00%
0	L	5	0.832	0.735	0.930	0.735	0.923	0.035	0.079	9.45%	4.87%
1		5	0.665	0.546	0.783	0.574	0.800	0.043	0.095	14.35%	24.04%
10		5	0.698	0.638	0.758	0.639	0.755	0.022	0.048	6.90%	20.21%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
0	L	0.806	0.903	0.729	0.923	0.787
1		0.568	0.794	0.561	0.703	0.652
10		0.639	0.658	0.697	0.587	0.703
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
0	L	0.806	0.903	0.735	0.923	0.794
1		0.581	0.800	0.574	0.716	0.652
10		0.665	0.697	0.755	0.639	0.735
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	03-4774-1452	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.138	23.88%	1.24	0.00924	17.4	16.6	18.1

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.06	2.82	0.0150	Outlier Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.655	0.561	0.794	0.097	14.90%	24.0%	508/775	0.656	23.9%
10		5	0.657	0.587	0.703	0.047	7.20%	23.8%	509/775	0.656	23.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.568	0.794	0.561	0.703	0.652
10		0.639	0.658	0.697	0.587	0.703
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	20-8468-4247	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.138	25.88%	1.23	0.01	16.9	16.1	17.7

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		4	0.621	0.561	0.703	0.069	11.00%	28.0%	385/620	0.639	25.9%
10		5	0.657	0.587	0.703	0.047	7.20%	23.8%	509/775	0.639	25.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.568	Outlier	0.561	0.703	0.652
10		0.639	0.658	0.697	0.587	0.703
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 14:57 (p 1 of 1)
Test Code: 29523-3Ap | 12-6326-8142

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	10-8996-4669	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2109238	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.06	2.82	0.0150	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	17.6	15.5	18.8	5.675	5.333	6.435

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.655	0.561	0.794	0.097	14.90%	24.0%	508/775	0.656	23.9%
10		5	0.657	0.587	0.703	0.047	7.20%	23.8%	509/775	0.656	23.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.568	0.794	0.561	0.703	0.652
10		0.639	0.658	0.697	0.587	0.703
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-6701-0986	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1890452	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	17.1	15.1	18.8	5.841	5.309	6.637

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		4	0.621	0.561	0.703	0.069	11.00%	28.0%	385/620	0.639	25.9%
10		5	0.657	0.587	0.703	0.047	7.20%	23.8%	509/775	0.639	25.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.568	Outlier	0.561	0.703	0.652
10		0.639	0.658	0.697	0.587	0.703
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	20-1905-2802	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.125	22.12%	1.25	0.00859	17.8	17.1	18.5

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.86	2.82	0.0425	Outlier Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.665	0.574	0.800	0.095	14.40%	24.0%	515/775	0.681	22.1%
10		5	0.698	0.639	0.755	0.048	6.90%	20.2%	541/775	0.681	22.1%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.581	0.800	0.574	0.716	0.652
10		0.665	0.697	0.755	0.639	0.735
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-2628-1050	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.125	24.06%	1.24	0.0093	17.3	16.6	18.1

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		4	0.631	0.574	0.716	0.067	10.60%	27.9%	391/620	0.664	24.1%
10		5	0.698	0.639	0.755	0.048	6.90%	20.2%	541/775	0.664	24.1%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.581	Outlier	0.574	0.716	0.652
10		0.665	0.697	0.755	0.639	0.735
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	04-9187-9008	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1432113	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.86	2.82	0.0425	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	18	16	19.7	5.541	5.072	6.24

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.665	0.574	0.800	0.095	14.40%	24.0%	515/775	0.681	22.1%
10		5	0.698	0.639	0.755	0.048	6.90%	20.2%	541/775	0.681	22.1%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.581	0.800	0.574	0.716	0.652
10		0.665	0.697	0.755	0.639	0.735
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	01-3303-2935	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-0765-3354	**Code:**	29521-019	**Client:**	AECOM
Sample Date:	25 Aug-17 10:35	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 10:35	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 3		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	677133	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	17.6	15.7	19.3	5.69	5.178	6.357

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		4	0.631	0.574	0.716	0.067	10.60%	27.9%	391/620	0.664	24.1%
10		5	0.698	0.639	0.755	0.048	6.90%	20.2%	541/775	0.664	24.1%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.581	Outlier	0.574	0.716	0.652
10		0.665	0.697	0.755	0.639	0.735
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 29 Aug-17 12:34 (p 1 of 1)
Test Code/ID: 10-4882-0233/29523-4Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Aug-17 16:00	**Species:**	Arbacia punctulata	**Sample Code:**	29521-020
End Date:	28 Aug-17 11:25	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 4

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	21	155	129	129	
0	D	2	18	155	139	136	
0	D	3	12	155	130	130	
0	D	4	5	155	138	138	
0	D	5	10	155	142	135	
0	L	1	4	155	125	125	
0	L	2	19	155	140	140	
0	L	3	14	155	114	113	
0	L	4	30	155	143	143	
0	L	5	26	155	123	122	
1		1	9	155	116	115	
1		2	23	155	126	125	
1		3	16	155	111	111	
1		4	13	155	128	125	
1		5	2	155	120	115	
10		1	24	155	105	103	
10		2	3	155	128	114	
10		3	6	155	120	110	
10		4	7	155	121	102	
10		5	28	155	101	88	
50		1	27	155	0	0	
50		2	17	155	0	0	
50		3	15	155	0	0	
50		4	8	155	0	0	
50		5	1	155	0	0	
100		1	11	155	0	0	
100		2	20	155	0	0	
100		3	25	155	0	0	
100		4	22	155	0	0	
100		5	29	155	0	0	

CETIS Summary Report

Report Date:	29 Aug-17 13:42 (p 1 of 1)
Test Code:	29523-4Ap | 10-4882-0233

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	01-1364-5250	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
15-1933-2440	Proportion Normal	Linear Interpolation (ICPIN)	EC50	17.9	15.9	20	5.577	
03-2769-0764	Proportion Normal	Trimmed Spearman-Kärber	EC50	15.2	14	16.5	6.567	✓
19-0640-6544	Proportion Survived	Linear Interpolation (ICPIN)	EC50	19.6	17.1	21.4	5.09	
10-3978-6191	Proportion Survived	Trimmed Spearman-Kärber	EC50	18.3	17	19.7	5.459	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.862	0.831	0.893	0.832	0.890	0.011	0.025	2.93%	0.00%
0	L	5	0.830	0.729	0.931	0.729	0.923	0.036	0.081	9.81%	3.74%
1		5	0.763	0.711	0.814	0.716	0.806	0.019	0.041	5.43%	11.53%
10		5	0.667	0.587	0.747	0.568	0.735	0.029	0.064	9.61%	22.60%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.875	0.829	0.921	0.832	0.916	0.017	0.037	4.26%	0.00%
0	L	5	0.832	0.735	0.930	0.735	0.923	0.035	0.079	9.45%	4.87%
1		5	0.775	0.719	0.832	0.716	0.826	0.020	0.045	5.84%	11.36%
10		5	0.742	0.650	0.834	0.652	0.826	0.033	0.074	9.97%	15.19%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
0	L	0.806	0.903	0.729	0.923	0.787
1		0.742	0.806	0.716	0.806	0.742
10		0.665	0.735	0.710	0.658	0.568
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
0	L	0.806	0.903	0.735	0.923	0.794
1		0.748	0.813	0.716	0.826	0.774
10		0.677	0.826	0.774	0.781	0.652
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	03-2769-0764	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:40	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	01-1364-5250	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.138	11.53%	1.18	0.018	15.2	14	16.5

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.78	2.82	0.0594	No Outliers Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.763	0.716	0.806	0.041	5.43%	11.5%	591/775	0.763	11.5%
10		5	0.667	0.568	0.735	0.064	9.61%	22.6%	517/775	0.667	22.6%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.742	0.806	0.716	0.806	0.742
10		0.665	0.735	0.710	0.658	0.568
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	15-1933-2440	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	01-1364-5250	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	234830	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.78	2.82	0.0594	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	17.9	15.9	20	5.577	5.002	6.298

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.862	0.832	0.890	0.025	2.93%	0.0%	668/775	0.862	0.0%
1		5	0.763	0.716	0.806	0.041	5.43%	11.5%	591/775	0.763	11.5%
10		5	0.667	0.568	0.735	0.064	9.61%	22.6%	517/775	0.667	22.6%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.877	0.839	0.890	0.871
1		0.742	0.806	0.716	0.806	0.742
10		0.665	0.735	0.710	0.658	0.568
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	10-3978-6191	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:40	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	01-1364-5250	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.125	11.36%	1.26	0.0159	18.3	17	19.7

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.82	0.5979	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.775	0.716	0.826	0.045	5.84%	11.4%	601/775	0.775	11.4%
10		5	0.742	0.652	0.826	0.074	9.97%	15.2%	575/775	0.742	15.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.748	0.813	0.716	0.826	0.774
10		0.677	0.826	0.774	0.781	0.652
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	19-0640-6544	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 13:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	05-4045-2670	**Test Type:**	Survival-Development	**Analyst:**	Amanda Komarek
Start Date:	25 Aug-17 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	28 Aug-17 11:25	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	67h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	01-1364-5250	**Code:**	29521-020	**Client:**	AECOM
Sample Date:	25 Aug-17 11:13	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Aug-17 11:13	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 4		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	53302	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.82	0.5979	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	19.6	17.1	21.4	5.09	4.665	5.859

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.875	0.832	0.916	0.037	4.26%	0.0%	678/775	0.875	0.0%
1		5	0.775	0.716	0.826	0.045	5.84%	11.4%	601/775	0.775	11.4%
10		5	0.742	0.652	0.826	0.074	9.97%	15.2%	575/775	0.742	15.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/775	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.832	0.897	0.839	0.890	0.916
1		0.748	0.813	0.716	0.826	0.774
10		0.677	0.826	0.774	0.781	0.652
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

PREPARATION of DILUTIONS

STUDY: 29523 **CLIENT:** AECOM **DILUENT:** CLDS (Reference Water)

SPECIES: *A. punctulata* **TEST:** Suspended Particulate Phase (SPP)

Diluent: CLDS	**Composite #: 1** Elutriate ID:		**Composite #: 2** Elutriate ID:		**Composite #: 3** Elutriate ID:		**Composite #: 4** Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1000	0	1,000	0	1,000	0	1,000
CLDS	0	↓	0	↓	0	↓	0	↓
1 %	10	↓	10	↓	10	↓	10	↓
10 %	100	↓	100	↓	100	↓	100	↓
50 %	500	↓	500	↓	500	↓	500	↓
100 %	1000	↓	1,000	↓	1,000	↓	1,000	↓
Initial	CFS		CFS		CFS		CFS	
Date	08/22/17		08/22/17		08/22/17		08/22/17	
Time	1630		1515		1550		~~1630~~ 1645 @3CFS 08/22	
	If salinity adjustment is necessary, please see *A. bahia/M.beryllina* paper work for record of adjustment.							
Ammonia pulled on 100% SPP and Controls	Start	End (Ap)	Start	End (Ap)	Start	End (Ap)	Start	End (Ap)

E10 MR 9/5/17

Diluent: CLDS	**Composite #: 5** Elutriate ID:		**Composite #: 6** Elutriate ID:		**Composite #: 7** Elutriate ID:		**Composite #: 8** Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1,000	0	1,000	0	1,000	0	1,000
CLDS	0	↓	0	↓	0	↓	0	↓
1 %	10	↓	10	↓	10	↓	10	↓
10 %	100	↓	100	↓	100	↓	100	↓
50 %	500	↓	500	↓	500	↓	500	↓
100 %	1,000	↓	1,000	↓	1,000	↓	1,000	↓
Initial	CFS		CFS		CFS		CFS	
Date	08/23/17		08/23/17		08/23/17		08/23/17	
Time	1600		1615		1630		1640	
	If salinity adjustment is necessary, please see *A. bahia/M.beryllina* paper work for record of adjustment.							
Ammonia pulled on 100% SPP and Controls	Start	End (Ap)	Start	End (Ap)	Start	End (Ap)	Start	End (Ap)

E10 9/5/17 Dilutions prepared for 1st attempt at Round 1 Assay

EMBRYO WORKSHEET

DATE: 08/23/17 ESI STUDY: 29523

CLIENT: AECOM PROJECT: New Haven

Eggs Collected @: 1610 Pre-assay fertilization check: 92/100 ANALYST: GRS

Sperm Collected @: 1605 *A mated subsample of egg+sperm must achieve ≥90% fertilization in order to be used in testing.*

Egg Stock Suspension Count:

Take 1mL of egg stock suspension and using a glass graduated cylinder dilute with seawater to a final volume of 100 mL. Count a subsample of the diluted suspension to get an estimate of the egg concentration. The diluted suspension should have 40 - 50 eggs/mL, (which would represent an egg concentration of 4,000 - 5,000 in the stock suspension.)

GRS 0829

Egg Count (per mL) of diluted suspension: 4000

Sperm Stock Suspension Count:

GRS 0829 Individual sides not recorded

1. Hemocytometer Count (D): ~~/~~
2. Hemocytometer Count (D): ~~/~~

Once added to the egg stock, the final sperm concentration should be $1x10^5$ - $1x10^7$ in solution D. E

Average Count (D): 215 X10^4 = spm solution D = 2.15×10^6

Sperm Concentrations:

Solution D X 40 E = Solution A = 8.60×10^7

Solution D X 20 E = Solution B = 4.30×10^7

Solution D X 5 E = Solution C = 1.08×10^7

GRS 08'29

Sperm Count (per mL): 2.15×10^6

mL of Eggs to Add: 100

mL of Sperm to Add: 20 Gametes mixed @: ~~1553~~ 1636 GRS0829

Gametes must be mixed within 1 hour of collection.

Calculated Embryo Stock Concentration (per mL): 3480

Calculated Embryo Stock (mL) needed per chamber: 1.72

The test concentration should be 15 - 30 embryos per mL.

Add calculated amount of embryo stock to a surrogate chamber, gently mix, then count a 5mL aliquot.

Embryo Concentration Check: 158 *If the check concentration is acceptable, then proceed with embryo addition to the test.*

Volume Embryo Stock (mL) added to test solutions: 1.72 Embryos Added to Test Solutions @: 1730

INITIAL COUNTS:	Embryos/ 5 mL
SURROGATE A	158
SURROGATE B	172
SURROGATE C	147
Mean:	159

Organism Lot ID: 99APARO062017 GRS0829

Mean per mL: 32

Round 2

ENVIROSYSTEMS, INCORPORATED
REFERENCE TOXICANT ASSAY
***Arbacia punctulata* Developmental ASSAY**

MONTH/YEAR: TOXICANT: Copper
ORGANISM: *Arbacia punctulata* LOT:

Concentration	DO (mg/L)	pH (SU)	SALINITY (ppt)
Lab Control			
1 ppb			
5 ppb			
10 ppb			
50 ppb			
100 ppb			

Water Quality Station	
DO meter #	
DO probe #	
pH meter #	
pH probe #	
Salinity meter	
Initials	
Date	

GRS0831

Data sheet not Provided so ref tox Sheet was used as Template.

SPERM DILUTIONS:

Hemacytometer Count E: 215 X 10^4 = Sperm Solution D= 2.15×10^6

Sperm Concentrations:
Solution E X 40 = Solution A = 8.60×10^7 SPM
Solution E X 20 = Solution B = 4.30×10^7 SPM
Solution E X 5 = Solution C = 1.08×10^7 SPM

FINAL COUNTS:

Final Sperm Count: 2.15×10^6
Final Egg Count: 4600

TEST TIMES:

Sperm Collected: 1605
Eggs Collected: 1610
Gametes Mixed: 1636
Gametes Added to Test: ~~1636~~ 1730

SURROGATES:

	Embryos / 5 ml	Embryos / ml	
Surrogate A	158	32	157/136
Surrogate B	172	34	137/109
Surrogate C	147	29	120/93
Mean	~~477~~ 159	32	

Copper Reference Toxicant Stock Solution:
Saltwater ID:

P:\General Projects\FORMS\LABFORMS\dmr&RefTox\Arbacia punctulata Developmental Reference Toxicant 2013.wpd

Arbacia punctulata Survival / Development Assay

ESI Study: 29523 Assay Start: 8/23/17 16:30

Client: AECOM Assay End: 8/25/17 16:30

8/26/17 Count Date: ~~8/24/2017~~ ③ ~~KHS~~ Initials: ~~TAS~~

8/27/17 ~~8/24/2017~~ ③ ~~KHS~~

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Lab Control Water	125/111	112/108	130/121	110/108	128/124
CLDS Reference Water	109/~~90~~ 100	116/108	134/128	115/113	114/112

Composite 5 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	157/155	138/136	115/114	121/121	144/144
10%	105/3	132/2	97/0	130/0	117/0
50%	16/0	26/0	15/0	21/0	10/0
100%	0/0	0/0	0/0	0/0	0/0

Composite 6 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	98/95	132/127	147/139	123/120	118/116
10%	~~33/0~~ ② KHS	68/0	29/0	65/0	60/0
50%	36/0	26/0	22/0	15/0	33/0
100%	38/0	52/0	44/0	40/0	29/0

Rep A 33/0 KHS 8/27/17

Composite 7 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	127/13	109/41	112/39	121/48	136/54
10%	~~33/0~~	~~68/0~~	~~29/0~~	~~65/0~~	~~60/0~~ ③ KHS 8/27/17
50%	43/0	61/0	43/0	45/0	37/0
100%	57/0	45/0	58/0	43/0	46/0

KHS

Composite 8 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	135/118	112/104	130/128	107/91	126/118
10%	82/0	109/0	110/0	119/0	126/0
50%	24/0	44/0	52/0	41/0	57/0
100%	32/0	33/0	32/0	47/0	43/0

Comp 7 10% 143/1 97/0 87/0 86/0 93/0

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	29523	**Client:**	AECOM	**Project:**	New Haven, CT
Test Species:	*A. punctulata*	**Lot ID:**	99ApAR0062017	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)	
		0 hr	END 48 hr	0 hr	END 48 hr	0 hr	END 48 hr	0 hr	END 48 hr
Controls	Lab	7.6	5.8	8.12 ~~29.5~~ 30.2 @CFS 08/23	7.82	21	20	30.2	30
	CLDS	7.5	5.7	7.87 ~~28.0~~ @CFS 08/23	7.81	21	20	28.0	29
Composite #5	1 %	7.7	5.8	7.85	7.86	21	20	27.5 ~~28.7~~ @CFS 08/23	@LB 8/25/17 28
	10 %	7.8	5.8	7.87	7.97	21	20	28.1 ~~29.9~~	29
	50 %	7.8	5.8	7.91	8.09	21	20	28.8 ~~27.9~~	29
	100 %	7.8	5.6	7.89	8.13	21	20	~~29.8~~	31
Composite #6	1 %	7.7	6.6	7.86	8.03	21	20	27.9	28
	10 %	7.8	6.5	7.87	8.02	21	20	28.1	29
	50 %	7.8	6.2	7.89	8.09	21	20	28.9	30
	100 %	7.8	6.1	7.88	8.13	21	20	30.0	30
Composite #7	1 %	7.6	6.1	7.90	7.95	21	20	27.9	28
	10 %	7.7	6.2	7.88	7.97	21	20	28.1	29
	50 %	7.8	6.2	7.90	8.11	21	20	28.6	29
	100 %	7.5	6.2	7.88	8.14	21	20	29.9	30
Composite #8	1 %	7.7	6.4	7.89	8.02	21	20	27.9	28
	10 %	7.8	6.6	7.88	8.05	21	20	28.2	28
	50 %	7.8	6.7	7.91	8.13	21	20	28.8	29
	100 %	7.8	6.8	7.91	8.16	21	20	29.9	30

Initials	CFS	LB
Date	08/23/17	8/25/17
Time	1630	@LB 8/25/17 ~~1515~~ 1440
Incub. Temp	21	21

Comments: 48 hr temps not taken. Data is from Albahia assay at 48hrs 8/25/17 LB

RECORD OF METERS USED

Exposure	0	24
Water Quality Station #	1	1
Thermometer or Probe #	YS130D	YS130D
Initial	CFS	LB

Water Quality Station #	1
DO Meter #	24
DO Probe #	95
pH Meter #	1097
pH Probe #	147
Salinity Meter	YS130D

CETIS Test Data Worksheet

Report Date: 29 Aug-17 13:58 (p 1 of 1)
Test Code/ID: 13-5311-2647/29523-5Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:30	**Species:**	Arbacia punctulata	**Sample Code:**	29521-010
End Date:	25 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 5

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	5	159	109	100	
0	D	2	24	159	116	108	
0	D	3	19	159	134	128	
0	D	4	14	159	115	113	
0	D	5	2	159	114	112	
0	L	1	27	159	125	111	
0	L	2	4	159	112	108	
0	L	3	11	159	130	121	
0	L	4	6	159	110	108	
0	L	5	1	159	129	124	
1		1	25	159	157	155	
1		2	20	159	138	136	
1		3	18	159	115	114	
1		4	30	159	121	121	
1		5	26	159	144	144	
10		1	22	159	105	3	
10		2	28	159	132	2	
10		3	10	159	97	0	
10		4	7	159	130	0	
10		5	16	159	117	0	
50		1	15	159	16	0	
50		2	29	159	26	0	
50		3	21	159	15	0	
50		4	12	159	21	0	
50		5	23	159	10	0	
100		1	17	159	0	0	
100		2	8	159	0	0	
100		3	13	159	0	0	
100		4	3	159	0	0	
100		5	9	159	0	0	

CETIS Summary Report

Report Date:	29 Aug-17 09:53 (p 1 of 1)
Test Code:	29523-5Ap | 13-5311-2647

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	19-6036-1069	**Code:**	29521-010	**Client:**	AECOM
Sample Date:	23 Aug-17 10:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 10:20	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	6h	**Station:**	Composite 5		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
18-2305-9428	Proportion Normal	Linear Interpolation (ICPIN)	EC50	3.72	3.67	3.8	26.85	
19-7766-7632	Proportion Normal	Linear Interpolation (ICPIN)	EC50	3.72	3.67	3.77	26.86	
03-3840-3058	Proportion Normal	Spearman-Kärber	EC50	3.21	3.17	3.25	31.11	
06-3472-8270	Proportion Normal	Spearman-Kärber	EC50	3.21	3.17	3.25	31.12	✓
19-7354-1182	Proportion Survived	Linear Interpolation (ICPIN)	EC50	24.1	19.4	27.8	4.148	
11-9170-4790	Proportion Survived	Spearman-Kärber	EC50	22.5	21.4	23.5	4.454	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.706	0.626	0.785	0.629	0.805	0.029	0.064	9.10%	0.00%
0	L	5	0.719	0.660	0.779	0.679	0.780	0.021	0.048	6.62%	-1.96%
1		5	0.843	0.712	0.973	0.717	0.975	0.047	0.105	12.45%	-19.43%
10		5	0.006	0.000	0.017	0.000	0.019	0.004	0.009	141.42%	99.11%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.740	0.665	0.814	0.686	0.843	0.027	0.060	8.13%	0.00%
0	L	5	0.762	0.688	0.837	0.692	0.818	0.027	0.060	7.86%	-3.06%
1		5	0.849	0.715	0.983	0.723	0.987	0.048	0.108	12.67%	-14.80%
10		5	0.731	0.611	0.850	0.610	0.830	0.043	0.096	13.16%	1.19%
50		5	0.111	0.063	0.158	0.063	0.164	0.017	0.038	34.70%	85.03%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
0	L	0.698	0.679	0.761	0.679	0.780
1		0.975	0.855	0.717	0.761	0.906
10		0.019	0.013	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
0	L	0.786	0.704	0.818	0.692	0.811
1		0.987	0.868	0.723	0.761	0.906
10		0.660	0.830	0.610	0.818	0.736
50		0.101	0.164	0.094	0.132	0.063
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	06-3472-8270	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 9:28	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.294	0.00%	0.507	0.0027	3.21	3.17	3.25

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.05	2.82	0.0158	Outlier Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.774	0.0%
1		5	0.843	0.717	0.975	0.105	12.50%	-19.4%	670/795	0.774	0.0%
10		5	0.006	0.000	0.019	0.009	141.00%	99.1%	5/795	0.00629	99.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.975	0.855	0.717	0.761	0.906
10		0.019	0.013	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	03-3840-3058	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 9:28	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.294	0.00%	0.507	0.00273	3.21	3.17	3.25

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.758	0.0%
1		4	0.810	0.717	0.906	0.086	10.60%	-14.8%	515/636	0.758	0.0%
10		5	0.006	0.000	0.019	0.009	141.00%	99.1%	5/795	0.00629	99.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		Outlier	0.855	0.717	0.761	0.906
10		0.019	0.013	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	19-7766-7632	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 9:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	905407	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.05	2.82	0.0158	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	3.72	3.67	3.77	26.86	26.52	27.22

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.774	0.0%
1		5	0.843	0.717	0.975	0.105	12.50%	-19.4%	670/795	0.774	0.0%
10		5	0.006	0.000	0.019	0.009	141.00%	99.1%	5/795	0.00629	99.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.975	0.855	0.717	0.761	0.906
10		0.019	0.013	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	18-2305-9428	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 9:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	494939	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	3.72	3.67	3.8	26.85	26.32	27.25

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.758	0.0%
1		4	0.810	0.717	0.906	0.086	10.60%	-14.8%	515/636	0.758	0.0%
10		5	0.006	0.000	0.019	0.009	141.00%	99.1%	5/795	0.00629	99.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		Outlier	0.855	0.717	0.761	0.906
10		0.019	0.013	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-9170-4790	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 9:28	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.26	0.00%	1.35	0.0102	22.5	21.4	23.5

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.79	2.82	0.0565	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.794	0.0%
1		5	0.849	0.723	0.987	0.108	12.70%	-14.8%	675/795	0.794	0.0%
10		5	0.731	0.610	0.830	0.096	13.20%	1.19%	581/795	0.731	8.0%
50		5	0.111	0.063	0.164	0.038	34.70%	85.0%	88/795	0.111	86.1%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.987	0.868	0.723	0.761	0.906
10		0.660	0.830	0.610	0.818	0.736
50		0.101	0.164	0.094	0.132	0.063
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	19-7354-1182	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 9:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	968228	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.79	2.82	0.0565	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	24.1	19.4	27.8	4.148	3.604	5.163

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.794	0.0%
1		5	0.849	0.723	0.987	0.108	12.70%	-14.8%	675/795	0.794	0.0%
10		5	0.731	0.610	0.830	0.096	13.20%	1.19%	581/795	0.731	8.0%
50		5	0.111	0.063	0.164	0.038	34.70%	85.0%	88/795	0.111	86.1%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.987	0.868	0.723	0.761	0.906
10		0.660	0.830	0.610	0.818	0.736
50		0.101	0.164	0.094	0.132	0.063
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 29 Aug-17 13:58 (p 1 of 1)
Test Code/ID: 15-2598-5713/29523-6Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:30	**Species:**	Arbacia punctulata	**Sample Code:**	29521-012
End Date:	25 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 6

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	24	159	109	100	
0	D	2	9	159	116	108	
0	D	3	1	159	134	128	
0	D	4	27	159	115	113	
0	D	5	28	159	114	112	
0	L	1	18	159	125	111	
0	L	2	19	159	112	108	
0	L	3	7	159	130	121	
0	L	4	2	159	110	108	
0	L	5	21	159	129	124	
1		1	30	159	98	95	
1		2	4	159	132	127	
1		3	15	159	147	139	
1		4	17	159	123	120	
1		5	13	159	118	116	
10		1	16	159	33	0	
10		2	22	159	68	0	
10		3	26	159	29	0	
10		4	6	159	65	0	
10		5	10	159	60	0	
50		1	20	159	36	0	
50		2	14	159	26	0	
50		3	25	159	22	0	
50		4	8	159	15	0	
50		5	11	159	33	0	
100		1	3	159	38	0	
100		2	23	159	52	0	
100		3	12	159	44	0	
100		4	29	159	40	0	
100		5	5	159	29	0	

CETIS Summary Report

Report Date:	29 Aug-17 10:13 (p 1 of 1)
Test Code:	29523-6Ap | 15-2598-5713

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-3917-3224	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:		**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 6		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-9169-0060	Proportion Normal	Binomial/Graphical	EC50	3.16	1	10	31.62	✓
14-9296-5144	Proportion Normal	Binomial/Graphical	EC50	3.16	1	10	31.62	✓
01-1871-9120	Proportion Normal	Linear Interpolation (ICPIN)	EC50	3.69	3.69	3.69	27.1	
14-7330-7968	Proportion Normal	Linear Interpolation (ICPIN)	EC50	3.69	3.33	3.69	27.1	
11-3827-4018	Proportion Survived	Linear Interpolation (ICPIN)	EC50	7.76	4.74	17.3	12.89	
02-9902-8918	Proportion Survived	Trimmed Spearman-Kärber	EC50	8.7	7.23	10.5	11.5	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.706	0.626	0.785	0.629	0.805	0.029	0.064	9.10%	0.00%
0	L	5	0.719	0.660	0.779	0.679	0.780	0.021	0.048	6.62%	-1.96%
1		5	0.751	0.624	0.877	0.597	0.874	0.046	0.102	13.56%	-6.42%
10		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.740	0.665	0.814	0.686	0.843	0.027	0.060	8.13%	0.00%
0	L	5	0.762	0.688	0.837	0.692	0.818	0.027	0.060	7.86%	-3.06%
1		5	0.777	0.636	0.918	0.616	0.925	0.051	0.114	14.61%	-5.10%
10		5	0.321	0.176	0.465	0.182	0.428	0.052	0.117	36.34%	56.63%
50		5	0.166	0.100	0.232	0.094	0.226	0.024	0.053	31.98%	77.55%
100		5	0.255	0.190	0.321	0.182	0.327	0.024	0.053	20.72%	65.48%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
0	L	0.698	0.679	0.761	0.679	0.780
1		0.597	0.799	0.874	0.755	0.730
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
0	L	0.786	0.704	0.818	0.692	0.811
1		0.616	0.830	0.925	0.774	0.742
10		0.208	0.428	0.182	0.409	0.377
50		0.226	0.164	0.138	0.094	0.208
100		0.239	0.327	0.277	0.252	0.182

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	00-9169-0060	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:06	**Analysis:**	Binomial Method	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Binomial/Graphical Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.294	0.00%	0.5	0	3.16	1	10

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.02	2.82	0.0192	Outlier Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.728	0.0%
1		5	0.751	0.597	0.874	0.102	13.60%	-6.42%	597/795	0.728	0.0%
10		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.597	0.799	0.874	0.755	0.730
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-9296-5144	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:06	**Analysis:**	Binomial Method	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Binomial/Graphical Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.294	0.00%	0.5	0	3.16	1	10

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.747	0.0%
1		4	0.789	0.730	0.874	0.063	8.03%	-11.9%	502/636	0.747	0.0%
10		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		Outlier	0.799	0.874	0.755	0.730
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 01 Sep-17 15:06 (p 1 of 1)
Test Code: 29523-6Ap | 15-2598-5713

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-7330-7968	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	15-3917-3224	**Code:**	29521-012	**Client:**	AECOM
Sample Date:	23 Aug-17 11:00	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:		**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	5h	**Station:**	Composite 6		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1349940	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.02	2.82	0.0192	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	3.69	3.33	3.69	27.1	27.1	29.99

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.728	0.0%
1		5	0.751	0.597	0.874	0.102	13.60%	-6.42%	597/795	0.728	0.0%
10		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.597	0.799	0.874	0.755	0.730
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	01-1871-9120	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	163876	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	3.69	3.69	3.69	27.1	27.1	27.1

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.747	0.0%
1		4	0.789	0.730	0.874	0.063	8.03%	-11.9%	502/636	0.747	0.0%
10		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		Outlier	0.799	0.874	0.755	0.730
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	02-9902-8918	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:06	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.26	27.78%	0.939	0.0401	8.7	7.23	10.5

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.82	0.5738	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.758	0.0%
1		5	0.777	0.616	0.925	0.114	14.60%	-5.1%	618/795	0.758	0.0%
10		5	0.321	0.182	0.428	0.117	36.30%	56.6%	255/795	0.321	57.7%
50		5	0.166	0.094	0.226	0.053	32.00%	77.6%	132/795	0.211	72.2%
100		5	0.255	0.182	0.327	0.053	20.70%	65.5%	203/795	0.211	72.2%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.616	0.830	0.925	0.774	0.742
10		0.208	0.428	0.182	0.409	0.377
50		0.226	0.164	0.138	0.094	0.208
100		0.239	0.327	0.277	0.252	0.182

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-3827-4018	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1296179	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.82	0.5738	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	7.76	4.74	17.3	12.89	5.783	21.08

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.758	0.0%
1		5	0.777	0.616	0.925	0.114	14.60%	-5.1%	618/795	0.758	0.0%
10		5	0.321	0.182	0.428	0.117	36.30%	56.6%	255/795	0.321	57.7%
50		5	0.166	0.094	0.226	0.053	32.00%	77.6%	132/795	0.211	72.2%
100		5	0.255	0.182	0.327	0.053	20.70%	65.5%	203/795	0.211	72.2%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.616	0.830	0.925	0.774	0.742
10		0.208	0.428	0.182	0.409	0.377
50		0.226	0.164	0.138	0.094	0.208
100		0.239	0.327	0.277	0.252	0.182

CETIS Test Data Worksheet

Report Date: 29 Aug-17 13:58 (p 1 of 1)
Test Code/ID: 06-3183-5457/29523-7Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:30	**Species:**	Arbacia punctulata	**Sample Code:**	29521-014
End Date:	25 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 7

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	2	159	109	100	
0	D	2	21	159	116	108	
0	D	3	28	159	134	128	
0	D	4	6	159	115	113	
0	D	5	24	159	114	112	
0	L	1	11	159	125	111	
0	L	2	3	159	112	108	
0	L	3	9	159	130	121	
0	L	4	19	159	110	108	
0	L	5	22	159	129	124	
1		1	7	159	127	13	
1		2	8	159	109	41	
1		3	25	159	112	39	
1		4	1	159	121	48	
1		5	4	159	136	54	
10		1	29	159	143	1	
10		2	26	159	97	0	
10		3	13	159	87	0	
10		4	23	159	86	0	
10		5	10	159	93	0	
50		1	14	159	43	0	
50		2	17	159	61	0	
50		3	16	159	43	0	
50		4	5	159	45	0	
50		5	12	159	37	0	
100		1	27	159	51	0	
100		2	20	159	49	0	
100		3	30	159	58	0	
100		4	18	159	43	0	
100		5	15	159	46	0	

CETIS Summary Report

Report Date:	29 Aug-17 11:03 (p 1 of 1)
Test Code:	29523-7Ap | 06-3183-5457

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	04-6121-0446	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:		**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 7		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-3980-1862	Proportion Normal	Linear Interpolation (ICPIN)	EC50	0.791	0.642	0.949	126.4	
09-0716-6369	Proportion Normal	Linear Interpolation (ICPIN)	EC50	0.701	0.523	0.959	142.7	✓
02-4705-7158	Proportion Normal	Regression: 3P Log-Logistic	EC50	0.777	0.639	0.943	128.8	
11-1092-5912	Proportion Normal	Regression: 3P Log-Logistic	EC50	0.863	0.778	0.958	115.9	
17-8588-6085	Proportion Survived	Linear Interpolation (ICPIN)	EC50	32.2	23.9	42.6	3.103	
19-3061-0683	Proportion Survived	Linear Interpolation (ICPIN)	EC50	35.1	25.6	45.4	2.847	
08-4790-7036	Proportion Survived	Regression: 3P Log-Logistic	EC50	46.4	32.6	66	2.157	
09-9400-1946	Proportion Survived	Regression: 3P Log-Logistic	EC50	41	30	56	2.437	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.706	0.626	0.785	0.629	0.805	0.029	0.064	9.10%	0.00%
0	L	5	0.719	0.660	0.779	0.679	0.780	0.021	0.048	6.62%	-1.96%
1		5	0.245	0.123	0.368	0.082	0.340	0.044	0.099	40.26%	65.24%
10		5	0.001	0.000	0.005	0.000	0.006	0.001	0.003	223.61%	99.82%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.740	0.665	0.814	0.686	0.843	0.027	0.060	8.13%	0.00%
0	L	5	0.762	0.688	0.837	0.692	0.818	0.027	0.060	7.86%	-3.06%
1		5	0.761	0.675	0.847	0.686	0.855	0.031	0.069	9.11%	-2.89%
10		5	0.636	0.451	0.822	0.541	0.899	0.067	0.150	23.51%	13.95%
50		5	0.288	0.218	0.358	0.233	0.384	0.025	0.057	19.67%	61.05%
100		5	0.311	0.266	0.355	0.270	0.365	0.016	0.036	11.50%	57.99%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
0	L	0.698	0.679	0.761	0.679	0.780
1		0.082	0.258	0.245	0.302	0.340
10		0.006	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
0	L	0.786	0.704	0.818	0.692	0.811
1		0.799	0.686	0.704	0.761	0.855
10		0.899	0.610	0.547	0.541	0.585
50		0.270	0.384	0.270	0.283	0.233
100		0.321	0.308	0.365	0.270	0.289

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	02-4705-7158	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:01	**Analysis:**	Nonlinear Regression (NLR)	**Official Results:**	Yes

Sample ID:	04-6121-0446	**Code:**	29521-014	**Client:**	AECOM
Sample Date:	23 Aug-17 09:20	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:		**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	7h	**Station:**	Composite 7		

Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Log-Logistic: μ=α/[1+[x/δ]^γ]	Binomial [ω=n/[p·q]]	Off [μ*=μ]	None	None

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	-54.5	116	119	0.9629	Yes	0.00438	3.49	0.9956	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	0.777	0.639	0.943	128.8	106	156.4

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
α	0.706	0.0244	0.655	0.756	28.9	<1.0E-37	Significant Parameter
γ	2.49	0.651	1.14	3.84	3.82	9.3E-04	Significant Parameter
δ	0.777	0.0734	0.625	0.929	10.6	<1.0E-37	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Lack of Fit	0.022	0.011	2	0.00438	0.9956	Non-Significant
Model	2170	722	3	316	<1.0E-37	Significant
Pure Error	50.3	2.51	20			
Residual	50.3	2.29	22			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF Test	50.3	33.9	5.4E-04	Significant Heterogeneity
	Likelihood Ratio GOF Test	54.9	33.9	1.2E-04	Significant Heterogeneity
Extreme Value	Grubbs Extreme Value Test	3.31	2.82	0.0034	Outlier Detected
Variances	Mod Levene Equality of Variance	2.81	3.06	0.0633	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.78	0.92	1.1E-04	Non-Normal Distribution
	Anderson-Darling A2 Normality Te	2.79	2.49	<1.0E-37	Non-Normal Distribution

Proportion Normal Summary

			Calculated Variate(A/B)								
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	D	5	0.706	0.629	0.805	0.029	0.064	9.10%	0.0%	561	795
1		5	0.245	0.082	0.340	0.044	0.099	40.30%	65.2%	195	795
10		5	0.001	0.000	0.006	0.001	0.003	224.00%	99.8%	1	795
50		5	0.000	0.000	0.000	0.000	0.000		100.0%	0	795
100		5	0.000	0.000	0.000	0.000	0.000		100.0%	0	795

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.082	0.258	0.245	0.302	0.340
10		0.006	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-1092-5912	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:01	**Analysis:**	Nonlinear Regression (NLR)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Log-Logistic: μ=α/[1+[x/δ]^γ]	Binomial [ω=n/[p·q]]	Off [μ*=μ]	None	None

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	-35.2	77.7	80	0.9842	Yes	0.00825	3.52	0.9918	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	0.863	0.778	0.958	115.9	104.4	128.6

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
α	0.706	0.0162	0.672	0.739	43.5	<1.0E-37	Significant Parameter
γ	2.6	0.433	1.69	3.5	5.99	6.1E-06	Significant Parameter
δ	0.863	0.0449	0.77	0.956	19.2	<1.0E-37	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Lack of Fit	0.0183	0.00916	2	0.00825	0.9918	Non-Significant
Model	2160	721	3	717	<1.0E-37	Significant
Pure Error	21.1	1.11	19			
Residual	21.1	1.01	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF Test	21.1	32.7	0.4525	Non-Significant Heterogeneity
	Likelihood Ratio GOF Test	20.6	32.7	0.4832	Non-Significant Heterogeneity
Variances	Mod Levene Equality of Variance	2.59	3.06	0.0792	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.917	0.0014	Non-Normal Distribution
	Anderson-Darling A2 Normality Te	2.12	2.49	<1.0E-37	Non-Normal Distribution

Proportion Normal Summary

			Calculated Variate(A/B)								
Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	D	5	0.706	0.629	0.805	0.029	0.064	9.10%	0.0%	561	795
1		4	0.286	0.245	0.340	0.022	0.043	15.10%	59.4%	182	636
10		5	0.001	0.000	0.006	0.001	0.003	224.00%	99.8%	1	795
50		5	0.000	0.000	0.000	0.000	0.000		100.0%	0	795
100		5	0.000	0.000	0.000	0.000	0.000		100.0%	0	795

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		Outlier	0.258	0.245	0.302	0.340
10		0.006	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-0716-6369	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	244441	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.6	2.82	4.1E-04	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	0.701	0.523	0.959	142.7	104.3	191.3

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.706	0.0%
1		5	0.245	0.082	0.340	0.099	40.30%	65.2%	195/795	0.245	65.2%
10		5	0.001	0.000	0.006	0.003	224.00%	99.8%	1/795	0.00126	99.8%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.082	0.258	0.245	0.302	0.340
10		0.006	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	01-3980-1862	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2124643	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	0.791	0.642	0.949	126.4	105.4	155.7

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.706	0.0%
1		4	0.286	0.245	0.340	0.043	15.10%	59.4%	182/636	0.286	59.4%
10		5	0.001	0.000	0.006	0.003	224.00%	99.8%	1/795	0.00126	99.8%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		Outlier	0.258	0.245	0.302	0.340
10		0.006	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	08-4790-7036	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:01	**Analysis:**	Nonlinear Regression (NLR)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Log-Logistic: μ=α/[1+[x/δ]^γ]	Binomial [ω=n/[p·q]]	Off [μ*=μ]	None	None

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
14	-145	296	299	0.8504	Yes	4.14	3.49	0.0314	Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	46.4	32.6	66	2.157	1.516	3.07

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
α	0.763	0.0323	0.696	0.831	23.6	<1.0E-37	Significant Parameter
γ	0.891	0.198	0.479	1.3	4.49	1.8E-04	Significant Parameter
δ	46.4	9.63	26.4	66.3	4.81	8.3E-05	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Lack of Fit	41.9	21	2	4.14	0.0314	Significant
Model	6790	2260	3	348	<1.0E-37	Significant
Pure Error	101	5.07	20			
Residual	143	6.52	22			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF Test	143	33.9	<1.0E-37	Significant Heterogeneity
	Likelihood Ratio GOF Test	157	33.9	1.2E-07	Significant Heterogeneity
Extreme Value	Grubbs Extreme Value Test	3.08	2.82	0.0139	Outlier Detected
Variances	Mod Levene Equality of Variance	0.612	3.06	0.6601	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.92	0.0473	Non-Normal Distribution
	Anderson-Darling A2 Normality Te	0.593	2.49	0.1251	Normal Distribution

Proportion Survived Summary

			Calculated Variate(A/B)								
Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	D	5	0.740	0.686	0.843	0.027	0.060	8.13%	0.0%	588	795
1		5	0.761	0.686	0.855	0.031	0.069	9.11%	-2.89%	605	795
10		5	0.636	0.541	0.899	0.067	0.150	23.50%	13.9%	506	795
50		5	0.288	0.233	0.384	0.025	0.057	19.70%	61.1%	229	795
100		5	0.311	0.270	0.365	0.016	0.036	11.50%	58.0%	247	795

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.799	0.686	0.704	0.761	0.855
10		0.899	0.610	0.547	0.541	0.585
50		0.270	0.384	0.270	0.283	0.233
100		0.321	0.308	0.365	0.270	0.289

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-9400-1946	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:01	**Analysis:**	Nonlinear Regression (NLR)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Non-Linear Regression Options

Model Name and Function	Weighting Function	PTBS Function	X Trans	Y Trans
3P Log-Logistic: μ=α/[1+[x/δ]^γ]	Binomial [ω=n/[p·q]]	Off [μ*=μ]	None	None

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
11	-104	216	218	0.9095	Yes	7.8	3.52	0.0034	Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	41	30	56	2.437	1.784	3.328

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
α	0.766	0.0263	0.711	0.82	29.1	<1.0E-37	Significant Parameter
γ	0.756	0.131	0.482	1.03	5.75	1.0E-05	Significant Parameter
δ	41	7.76	24.9	57.2	5.29	3.0E-05	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Lack of Fit	35.5	17.8	2	7.8	0.0034	Significant
Model	6210	2070	3	552	<1.0E-37	Significant
Pure Error	43.3	2.28	19			
Residual	78.8	3.75	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF Test	78.8	32.7	<1.0E-37	Significant Heterogeneity
	Likelihood Ratio GOF Test	81.3	32.7	<1.0E-37	Significant Heterogeneity
Variances	Bartlett Equality of Variance Test	2.98	9.49	0.5605	Equal Variances
	Mod Levene Equality of Variance	0.768	3.06	0.5626	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.917	0.8247	Normal Distribution
	Anderson-Darling A2 Normality Te	0.246	2.49	0.7831	Normal Distribution

Proportion Survived Summary

			Calculated Variate(A/B)								
Conc-%	Code	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	D	5	0.740	0.686	0.843	0.027	0.060	8.13%	0.0%	588	795
1		5	0.761	0.686	0.855	0.031	0.069	9.11%	-2.89%	605	795
10		4	0.571	0.541	0.610	0.016	0.033	5.72%	22.8%	363	636
50		5	0.288	0.233	0.384	0.025	0.057	19.70%	61.1%	229	795
100		5	0.311	0.270	0.365	0.016	0.036	11.50%	58.0%	247	795

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.799	0.686	0.704	0.761	0.855
10		Outlier	0.610	0.547	0.541	0.585
50		0.270	0.384	0.270	0.283	0.233
100		0.321	0.308	0.365	0.270	0.289

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	19-3061-0683	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	434134	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.47	2.82	0.0011	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	35.1	25.6	45.4	2.847	2.204	3.909

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.75	0.0%
1		5	0.761	0.686	0.855	0.069	9.11%	-2.89%	605/795	0.75	0.0%
10		5	0.636	0.541	0.899	0.150	23.50%	13.9%	506/795	0.636	15.2%
50		5	0.288	0.233	0.384	0.057	19.70%	61.1%	229/795	0.299	60.1%
100		5	0.311	0.270	0.365	0.036	11.50%	58.0%	247/795	0.299	60.1%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.799	0.686	0.704	0.761	0.855
10		0.899	0.610	0.547	0.541	0.585
50		0.270	0.384	0.270	0.283	0.233
100		0.321	0.308	0.365	0.270	0.289

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	17-8588-6085	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 10:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1398931	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	32.2	23.9	42.6	3.103	2.345	4.191

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.75	0.0%
1		5	0.761	0.686	0.855	0.069	9.11%	-2.89%	605/795	0.75	0.0%
10		4	0.571	0.541	0.610	0.033	5.72%	22.8%	363/636	0.571	23.9%
50		5	0.288	0.233	0.384	0.057	19.70%	61.1%	229/795	0.299	60.1%
100		5	0.311	0.270	0.365	0.036	11.50%	58.0%	247/795	0.299	60.1%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.799	0.686	0.704	0.761	0.855
10		Outlier	0.610	0.547	0.541	0.585
50		0.270	0.384	0.270	0.283	0.233
100		0.321	0.308	0.365	0.270	0.289

CETIS Test Data Worksheet

Report Date: 29 Aug-17 13:59 (p 1 of 1)
Test Code/ID: 16-5765-6999/29523-8Ap

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	23 Aug-17 16:30	**Species:**	Arbacia punctulata	**Sample Code:**	29521-016
End Date:	25 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	23 Aug-17 12:23	**Material:**	Dredged Sediment Suspended Particulat	**Sample Station:**	Composite 8

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	D	1	11	159	109	100	
0	D	2	27	159	116	108	
0	D	3	4	159	134	128	
0	D	4	17	159	115	113	
0	D	5	7	159	114	112	
0	L	1	29	159	125	111	
0	L	2	5	159	112	108	
0	L	3	14	159	130	121	
0	L	4	15	159	110	108	
0	L	5	3	159	129	124	
1		1	16	159	135	118	
1		2	18	159	112	104	
1		3	12	159	130	128	
1		4	28	159	107	91	
1		5	10	159	126	118	
10		1	1	159	82	0	
10		2	23	159	109	0	
10		3	9	159	110	0	
10		4	13	159	119	0	
10		5	20	159	126	0	
50		1	26	159	24	0	
50		2	21	159	44	0	
50		3	30	159	52	0	
50		4	24	159	41	0	
50		5	8	159	57	0	
100		1	22	159	32	0	
100		2	2	159	33	0	
100		3	25	159	32	0	
100		4	6	159	47	0	
100		5	19	159	43	0	

CETIS Summary Report

Report Date:	29 Aug-17 11:11 (p 1 of 1)
Test Code:	29523-8Ap | 16-5765-6999

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Sample ID:	15-5843-8317	**Code:**	29521-016	**Client:**	AECOM
Sample Date:	23 Aug-17 12:23	**Material:**	Dredged Sediment Suspended Particulate	**Project:**	Dredged Sediment Evaluation
Receipt Date:	23 Aug-17 12:23	**Source:**	New Haven Harbor FNP -2017 (NHHarborF		
Sample Age:	4h	**Station:**	Composite 8		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
13-0643-5301	Proportion Normal	Linear Interpolation (ICPIN)	EC50	3.68	2.89	3.7	27.2	
21-4223-1242	Proportion Normal	Trimmed Spearman-Kärber	EC50	3.15	3.13	3.16	31.75	✓
09-2986-4731	Proportion Survived	Linear Interpolation (ICPIN)	EC50	33.8	25.6	43.9	2.955	
01-4436-7495	Proportion Survived	Trimmed Spearman-Kärber	EC50	34.8	30.8	39.3	2.874	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.706	0.626	0.785	0.629	0.805	0.029	0.064	9.10%	0.00%
0	L	5	0.719	0.660	0.779	0.679	0.780	0.021	0.048	6.62%	-1.96%
1		5	0.703	0.590	0.816	0.572	0.805	0.041	0.091	12.91%	0.36%
10		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	5	0.740	0.665	0.814	0.686	0.843	0.027	0.060	8.13%	0.00%
0	L	5	0.762	0.688	0.837	0.692	0.818	0.027	0.060	7.86%	-3.06%
1		5	0.767	0.674	0.861	0.673	0.849	0.034	0.075	9.82%	-3.74%
10		5	0.687	0.556	0.817	0.516	0.792	0.047	0.105	15.32%	7.14%
50		5	0.274	0.175	0.373	0.151	0.358	0.036	0.080	29.04%	62.93%
100		5	0.235	0.180	0.291	0.201	0.296	0.020	0.045	18.96%	68.20%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
0	L	0.698	0.679	0.761	0.679	0.780
1		0.742	0.654	0.805	0.572	0.742
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
0	L	0.786	0.704	0.818	0.692	0.811
1		0.849	0.704	0.818	0.673	0.792
10		0.516	0.686	0.692	0.748	0.792
50		0.151	0.277	0.327	0.258	0.358
100		0.201	0.208	0.201	0.296	0.270

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	21-4223-1242	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:09	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.294	0.36%	0.498	0.00106	3.15	3.13	3.16

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.79	2.82	0.0568	No Outliers Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.706	0.0%
1		5	0.703	0.572	0.805	0.091	12.90%	0.36%	559/795	0.703	0.36%
10		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.742	0.654	0.805	0.572	0.742
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-0643-5301	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1319743	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.79	2.82	0.0568	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	3.68	2.89	3.7	27.2	27.04	34.56

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	D	5	0.706	0.629	0.805	0.064	9.10%	0.0%	561/795	0.706	0.0%
1		5	0.703	0.572	0.805	0.091	12.90%	0.36%	559/795	0.703	0.36%
10		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/795	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.629	0.679	0.805	0.711	0.704
1		0.742	0.654	0.805	0.572	0.742
10		0.000	0.000	0.000	0.000	0.000
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	01-4436-7495	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:09	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.26	31.22%	1.54	0.0264	34.8	30.8	39.3

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.28	2.82	0.4144	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.753	0.0%
1		5	0.767	0.673	0.849	0.075	9.82%	-3.74%	610/795	0.753	0.0%
10		5	0.687	0.516	0.792	0.105	15.30%	7.14%	546/795	0.687	8.85%
50		5	0.274	0.151	0.358	0.080	29.00%	62.9%	218/795	0.274	63.6%
100		5	0.235	0.201	0.296	0.045	19.00%	68.2%	187/795	0.235	68.8%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.849	0.704	0.818	0.673	0.792
10		0.516	0.686	0.692	0.748	0.792
50		0.151	0.277	0.327	0.258	0.358
100		0.201	0.208	0.201	0.296	0.270

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-2986-4731	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Aug-17 11:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	18-0026-3205	**Test Type:**	Survival-Development	**Analyst:**	Kenneth Simon
Start Date:	23 Aug-17 16:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLIS Reference Site
Ending Date:	25 Aug-17 16:30	**Species:**	Arbacia punctulata	**Brine:**	Generic commercial salts
Duration:	48h	**Source:**	In-House Culture	**Age:**	<4

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	917029	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.28	2.82	0.4144	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	33.8	25.6	43.9	2.955	2.279	3.909

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	5	0.740	0.686	0.843	0.060	8.13%	0.0%	588/795	0.753	0.0%
1		5	0.767	0.673	0.849	0.075	9.82%	-3.74%	610/795	0.753	0.0%
10		5	0.687	0.516	0.792	0.105	15.30%	7.14%	546/795	0.687	8.85%
50		5	0.274	0.151	0.358	0.080	29.00%	62.9%	218/795	0.274	63.6%
100		5	0.235	0.201	0.296	0.045	19.00%	68.2%	187/795	0.235	68.8%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	D	0.686	0.730	0.843	0.723	0.717
1		0.849	0.704	0.818	0.673	0.792
10		0.516	0.686	0.692	0.748	0.792
50		0.151	0.277	0.327	0.258	0.358
100		0.201	0.208	0.201	0.296	0.270

STUDY: 29523
CLIENT: AECOM
PROJECT: New Haven Harbor FNP, Contract #W912WJ-17-D-0003
ASSAY: Suspended Particulate Phase Round 1
TASK: Ammonia Summary
METHOD: SM 4500-NH3 G

				Ammonia				
Sample ID	**Hour**	**ESI Code**	**Total**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**
Start *Americamysis bahia*								
Laboratory Control	00			0.0000				
CLDS Reference Site	00			0.0000				
Composite 1	00	29521-100	2.2	0.1101	0.1	mg/L as N	08/22/17	08/25/17 1542
Composite 2	00	29521-101	24	1.2329	0.5	mg/L as N	08/22/17	08/25/17 1542
Composite 3	00	29521-102	12	0.5287	0.1	mg/L as N	08/22/17	08/25/17 1542
Composite 4	00	29521-103	17	0.7813	0.1	mg/L as N	08/22/17	08/25/17 1542
Start *Menidia beryllina*								
Laboratory Control	00			0.0000				
CLDS Reference Site	00			0.0000				
Composite 1	00	29523-100	1.8	0.0857	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Composite 2	00	29523-101	20	0.8725	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Composite 3	00	29523-102	12	0.4485	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Composite 4	00	29523-103	15	0.5991	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Start *Arbacia punctulata*								
Laboratory Control	00			0.0000				
CLDS Reference Site	00			0.0000				
Composite 1	00	29523-100	1.8	0.0857	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Composite 2	00	29523-101	20	0.8725	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Composite 3	00	29523-102	12	0.4485	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
Composite 4	00	29523-103	15	0.5991	0.1	mg/L as N	08/25/17 1535	09/01/17 1110
End *Americamysis bahia*								
Laboratory Control	96			0.0000				
CLDS Reference Site	96	29523-105	4.3	0.1199	0.1	mg/L as N	08/26/17 1500	09/01/17 1110
Composite 1	96	29523-106	4.5	0.1434	0.1	mg/L as N	08/26/17 1500	09/01/17 1110
Composite 2	96	29523-107	7.9	0.4465	0.1	mg/L as N	08/26/17 1500	09/01/17 1110
Composite 3	96	29523-108	7.4	0.3203	0.1	mg/L as N	08/26/17 1500	09/01/17 1110
Composite 4	96	29523-109	7.6	0.3592	0.1	mg/L as N	08/26/17 1500	09/01/17 1110
End *Menidia beryllina*								
Laboratory Control	96	29523-128	3.8	0.1137	0.1	mg/L as N	08/29/17 1540	09/01/17 1110
CLDS Reference Site	96	29523-129	3.9	0.1193	0.1	mg/L as N	08/29/17 1540	09/01/17 1110
Composite 1	96	29523-130	4	0.1430	0.1	mg/L as N	08/29/17 1540	09/01/17 1110
Composite 2	96	29523-131	8.7	0.4935	0.1	mg/L as N	08/29/17 1540	09/01/17 1110
Composite 3	96	29523-132	7.5	0.3419	0.1	mg/L as N	08/29/17 1540	09/01/17 1110
Composite 4	96	29523-133	6.9	0.3914	0.1	mg/L as N	08/29/17 1540	09/01/17 1110
End *Arbacia punctulata*								
Laboratory Control	67	29523-122	0.22	0.0098	0.1	mg/L as N	08/29/17 1625	09/01/17 1110
CLDS Reference Site	67	29523-123	0.18	0.0079	0.1	mg/L as N	08/29/17 1625	09/01/17 1110
Composite 1	67	29523-124	1.8	0.1024	0.1	mg/L as N	08/29/17 1625	09/01/17 1110
Composite 2	67	29523-125	15	1.1255	0.1	mg/L as N	08/29/17 1625	09/01/17 1110
Composite 3	67	29523-126	10	0.7212	0.1	mg/L as N	08/29/17 1625	09/01/17 1110
Composite 4	67	29523-127	13	1.1110	0.1	mg/L as N	08/29/17 1625	09/01/17 1110

STUDY: 29523
CLIENT: AECOM
PROJECT: New Haven Harbor FNP, Contract #W912WJ-17-D-0003
ASSAY: Suspended Particulate Phase Round 2
TASK: Ammonia Summary
METHOD: SM 4500-NH3 G

Sample ID	Hour	ESI Code	Ammonia Total	Ammonia Unionized	QLimit	Units	Sampled	Analyzed
Start *Americamysis bahia* and *Menidia beryllina*								
Laboratory Control	00			0.0000				
CLDS Reference Site	00			0.0000				
Composite 5	00	29521-104	34	1.0876	2	mg/L as N	08/23/17 1200	08/25/17 1542
Composite 6	00	29521-105	57	1.7831	2	mg/L as N	08/23/17 1200	08/25/17 1542
Composite 7	00	29521-106	62	2.1203	2	mg/L as N	08/23/17 1200	08/25/17 1542
Composite 8	00	29521-107	40	1.4301	2	mg/L as N	08/23/17 1200	08/25/17 1542
Start *Arbacia punctulata*								
Laboratory Control	00			0.0000				
CLDS Reference Site	00			0.0000				
Composite 5	00	29521-104	34	1.0876	2	mg/L as N	08/23/17 1200	08/25/17 1542
Composite 6	00	29521-105	57	1.7831	2	mg/L as N	08/23/17 1200	08/25/17 1542
Composite 7	00	29521-106	62	1.9396	2	mg/L as N	08/23/17 1200	08/25/17 1542
Composite 8	00	29521-107	40	1.3378	2	mg/L as N	08/23/17 1200	08/25/17 1542
End *Americamysis bahia*								
Laboratory Control	96	29523-110	4.4	0.1434	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
CLDS Reference Site	96	29523-111	4.5	0.1568	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 5	96	29523-112	11	0.6353	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 6 [a]	96	29523-113	36	1.6715	0.5	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 7 [a]	96	29523-114	19	0.9843	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 8	96	29523-115	19	1.0060	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
End *Menidia beryllina*								
Laboratory Control	96	29523-116	4.2	0.1280	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
CLDS Reference Site	96	29523-117	4.4	0.1226	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 5	96	29523-118	12	0.7722	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 6 [a]	96	29523-119	12	0.4775	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 7 [a]	96	29523-120	15	0.5090	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
Composite 8	96	29523-121	12	0.6782	0.1	mg/L as N	08/27/17 1600	09/01/17 1110
End *Arbacia punctulata* [b]								
Laboratory Control	48			0.0000	0.1	mg/L as N		
CLDS Reference Site	48			0.0000	0.1	mg/L as N		
Composite 5	48			0.0000	0.1	mg/L as N		
Composite 6	48			0.0000	0.1	mg/L as N		
Composite 7	48			0.0000	0.1	mg/L as N		
Composite 8	48			0.0000	0.1	mg/L as N		

Notes:

[a] There was complete mortality before 96 hours, therefore water quality measurements were not taken. The last measured pH and temperature values were used for unnionized ammonia calculations instead. Due to the complete mortality that occurred prior to 96 hours, ammonia samples were collected from the 50% test concentration.

[b] Due to an oversight, ammonia samples were not collected at the end of the *A. punctulata* assay.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	NA, No SAP available. Methods followed per RIM requirements.
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	NA
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	NA, cores collected by prime contractor
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes, see revised COC
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes, see revised COC
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for temperature and salinity.
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	Yes
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes, except as noted for temperature and salinity.	Round 1 *A. bahia* temperature and salinity outside of acceptable range.	Section 3.7 and Appendix A
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Appendix A
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; ≤ 40% clam larvae, ≤ 30% sea urchin larvae	Yes		Appendix A
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	NA		

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ASSAY REVIEW CHECKLIST

STUDY#: 29523

CLIENT: AECOM

PROJECT: New Haven Harbor FNP Contract # W912WJ-17-D-0003

ASSAY: Suspended Particulate Phase

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	8/21/17	[illegible]	Original CoC provided did not
Sample Receipt Complete	↓	[illegible]	capture all samples submitted. CoC revised & resubmitted on 8/21.
Organism Culture Sheet(s)	8/29/17	AK	
Bench Sheets Complete (dates, times, initials, etc...)	8/29/17	AK	
Water Quality Data Complete	8/29/17	AK	
Weights Reported	8/29/17	AK	
Assay Acceptability Review	8/29/17	AK	

Technical Report Review	Date	Initials	Comments
Statistical Analysis			
Survival / Normality	8/30/17	AK	
Chemical	NA		
Statistical Analysis Reviewed	8/29/17 8/29 / 8/30/17	JTP CS (NR) / NR	
Data Acceptability Review	8/30/17	NR	
Support Documentation			
Temperature Data Logger	NA		
Daily WQ Data	9/1/17	NR	
Overlying ~~and/or Pore~~ Water Chemistry	9/5/17	NR	
Other Chemical Analysis Data	NA		
Draft Report	9/5/17	NR	Rev. 1 9/8/17 (NR)
Final Report Reviewed	9/5/17	[illegible]	Rev. 1 9/8/17 ([illegible])
QA Audit/Review Complete			
Final Report Printed - PDF	9/5/17	NR	Rev. 1 9/8/17 (NR)
Report E-mailed / Faxed	9/5/17	NR	Rev. 1 9/8/17 (NR)
Report Logged Out	↓	↓	↓

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003
TO#1 Project Number 60543021

10 Day Solid Phase Evaluation

Prepared For:

AECOM
250 Apollo Drive
Chelmsford, Massachusetts 01824

Prepared By:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

EnviroSystems, Inc. Master Reference 29516
Specific Studies 29519 & 29520
September 2017

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, Incorporated at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's Regional Implementation Manual (RIM) for Evaluation of Dredged Material Proposed for Disposal In New England Waters. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation Section of this Report.

For EnviroSystems, Inc. September 27, 2017

Kenneth A. Simon
Technical Director

Date

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003
TO#1 Project Number 60543021

10 Day Solid Phase Evaluation

1.0 INTRODUCTION

As part of a comprehensive plan to reduce adverse environmental impacts of ocean dumping, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 specifies that all sediments to be discharged into ocean waters must be evaluated to define their potential impact on existing benthic communities. The United States Environmental Protection Agency (US EPA) has determined that the most effective means to make such an assessment is through the use of bioassay tests, which provide a relatively direct estimate of potential impact.

This project was designed to evaluate the potential toxicity of sediments from the area of dredging proposed for the New Haven Harbor Federal Navigation Project (FNP) located in New Haven, Connecticut. Testing involved conduct of acute exposure 10 day solid phase assays using the mysid, *Americamysis bahia*, and the amphipod, *Leptocheirus plumulosus*. Testing followed procedures established by the US EPA and the United States Army Corps of Engineers (US ACE) for testing of dredged material. Procedures are presented in *Evaluation of Dredged Material Proposed for Ocean Disposal* (US EPA, US ACE 1991), *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual* (US EPA, US ACE 1998), and the *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE, 2004).

2.0 MATERIALS AND METHODS

2.1 Sample Collection, Preservation and Storage

Sediment cores for toxicological analysis were collected by AECOM, Chelmsford, Massachusetts using vibracoring equipment from locations identified in the dredge footprint specified in the project Sampling and Analysis Plan (AECOM, 2017). Sediment samples were received under chain of custody in 5 gallon polyethylene buckets, and were composited based on the compositing scheme provided by AECOM's team. Reference site samples were also collected by AECOM from the Central Long Island Sound Disposal Site (CLDS). Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Prior to testing, samples were placed in a secure refrigerator and stored at a temperature of $4 \pm 2^{\circ}$C until test initiation. Sample identification, collection and receipt information is summarized in Table 1. Sample compositing information is provided in Table 2.

Sediment for the laboratory control treatment was collected from the Hampton Estuary, Hampton, New Hampshire. The area is not known to receive any direct industrial inputs and has been used as a laboratory reference sediment in the testing of marine sediments for over 25 years. Overlying seawater was obtained from the Hampton Estuary. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. Seawater is obtained through a filter system located on the bottom of the estuary at a point approximately 1 mile from the open ocean.

2.2 Sediment Preparation

Before organisms were added to the test vessels, ammonia levels in the pore water were determined. If the pore water was found to contain an unionized ammonia level of ≥0.8 mg/L, then test initiation was delayed and the sediments were monitored until the ammonia levels achieved an acceptable level. Test chambers were renewed daily with 1 volume addition of overlying water during this pre-assay phase.

2.3 Bioassay Procedures

2.3.1 *A. bahia* 10 Day Solid Phase Evaluation

The 10 day exposure toxicity test was completed using *A. bahia* obtained from Aquatic Resource Organisms (ARO) of Hampton, New Hampshire. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *A. bahia* used in the assay were ≤5 days old at the start of the test.

The assay was conducted in a static renewal mode. Test chambers were 1 liter beakers modified for static renewal testing. Each beaker contained approximately 2 cm of sediment and was filled to the 1 liter mark with seawater. The test chambers were allowed to stabilize for a minimum of 24 hours, or until overlying water unionized ammonia levels were within acceptable limits (≤0.6 mg/L at pH 7.9-8.0) prior to the addition of the test organisms. A total of 20 organisms were randomly selected from the lot received and added to each replicate. All treatment groups included 5 replicates. Each day during the test, chambers received 1 volume of new seawater having similar salinity and temperature as the overlying water in the vessels. This results in an approximate 50% renewal of overlying water. Water temperature was 20±1°C, and the salinity regimen was established at 30±2‰. The photoperiod was set at 16:8 hours light:dark. Dissolved oxygen, pH, salinity, specific conductivity and temperature were measured daily in one replicate of each treatment and in all replicates on days 0 and 10. Ammonia levels were measured in the overlying water of a representative test chamber on days 0, 3 and 10. All test chambers were aerated throughout the assay and dissolved oxygen levels were maintained at ≥6.0 mg/L per ESI's protocol (≥40% saturation following RIM protocol). Water quality measurements were completed prior to water renewals. Test chambers were observed daily to ensure proper aeration and to note any test or treatment abnormalities. Any such observations were recorded on data sheets. Mysids were fed ≤24 hour old *Artemia* nauplii twice daily. After 10 days of exposure, the organisms were recovered for survival counts.

2.3.2 *L. plumulosus* 10 Day Solid Phase Evaluation

L. plumulosus were obtained from cultures maintained by ARO. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *L. plumulosus* were non-reproductive adults.

The assay was conducted in a static renewal mode. Test chambers were 1 liter beakers modified for static renewal testing. Each beaker contained approximately 2 cm of sediment and was filled to the 1 liter mark with seawater. The test chambers were allowed to stabilize for a minimum of 24 hours, or until pore water unionized ammonia levels were within acceptable limits (≤0.8 mg/L) prior to the addition of the test organisms. A total of 20 organisms were randomly selected from the lot received and added to each replicate. Each treatment group included 5 replicates and a surrogate test chamber that was used to obtain water qualities during the assay without disturbing the test animals. The surrogate chamber was treated the same as actual test chambers with the addition of animals and food, but was not used to determine endpoint data. Each day during the test, chambers received 1 volume of new seawater having similar salinity and temperature as the overlying water in the vessels. This results in an approximate 50% renewal of overlying water. Water temperature was 20±1°C, and the salinity regimen was established at 20±2‰. The photoperiod was set at 16:8 hours light:dark. Dissolved oxygen, pH, salinity, specific conductivity and temperature were measured daily in the surrogate replicate of each treatment and in all replicates on days 0 and 10. Ammonia levels were measured in the overlying and pore water of the surrogate test chamber on days 0, 3 and 10. All test chambers were aerated throughout the assay and dissolved oxygen levels were

maintained at ≥6.0 mg/L per ESI's protocol (≥40% saturation following RIM protocol). Water quality measurements were completed prior to water renewals. Test chambers were observed daily to ensure proper aeration and to note any test or treatment abnormalities. Any such observations were recorded on data sheets. After 10 days of exposure, the organisms were recovered for survival counts.

2.4 Statistical Analysis

Survival data were analyzed using CETIS™(Comprehensive Environmental Toxicity Information System) v1.9.3.0 software to determine significant differences between the project sediments and the reference site. Survival data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistics. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Pair-wise comparisons were based on the appropriate statistical analysis. Statistical difference was evaluated at $\alpha = 0.05$.

2.5 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Summaries of acute exposure reference toxicant assays conducted in support of this study are provided in Table 3.

3.0 RESULTS AND DISCUSSION

Table 4 provides a summary of assay acceptability and laboratory control performance. Tables 5 and 6 summarize the results of the statistical analysis for *Americamysis bahia* (mysid) and *Leptocheirus plumulosus* (amphipod), respectively. Tables 7 and 8 summarize water quality data collected during the *A. bahia* and *L. plumulosus* assays. Laboratory bench sheets, water quality data, and associated statistical support data are included in Appendix A.

3.1 *A. bahia* 10 Day Solid Phase Evaluation

Mean mysid survival in the laboratory control sediment was 92% with a coefficient of variation (CV) of 6%. Assay protocol requires that mean control survival be ≥90%. Based on this, the mysids were considered healthy and the overlying water was determined to have had no adverse impact on the outcome of the assay. Mean survival in the CLDS reference sediment was 98% with an associated CV of 5%.

Mean mysid survival in the site composites ranged from 74% (Composite 6) to 96% (Composite 8), and the statistical analyses show that there were negative effects on survival for mysids exposed to site Composite samples 1, 5 and 6 as compared to mysids exposed to the CLDS reference sediment. The difference in survival from the CLDS reference sediment was <20% for Composite samples 1 and 5, however it was >20% for Composite sample 6.

Temperature data collected during the daily water quality observations documented a mean value of 20.5°C with a range of 19.5 to 22.1°C. Confirmation temperature data collected on an hourly basis from a data logger documented a mean value of 20.8°C with a range of 19.6 to 29.6°C. Salinity levels ranged from 29.0 to 31.8‰ with a mean value of 30.1‰. Test acceptability criteria requires a mean temperature of 20±1°C with maximum temporary fluctuations of 20±3°C, and salinity within a range of 30±2‰. See Section 3.3 for a discussion of the temperature deviation.

3.2 *L. plumulosus* 10 Day Solid Phase Evaluation

Mean amphipod survival in the laboratory control sediment was 94% with a CV of 2%. Assay protocol requires that mean control survival be ≥90%. Based on this, the amphipods were considered healthy and the overlying water was determined to have had no adverse impact on the outcome of the assay. Mean amphipod survival in the CLDS reference sediment was 95% with an associated CV of 5%.

Mean amphipod survival in the site composites ranged from 87% (Composite 8) to 96% (Composite 7). The statistical analyses show that there were no negative effects on survival for amphipods exposed to any of the site composites, except for Composite 8, as compared to amphipods exposed to the CLDS reference sediment. In Composite 8 however, the difference in survival from the CLDS reference sediment was <20%.

Temperature data collected during the daily water quality observations documented a mean value of 20.6°C with a range of 19.7 to 22.2°C. Confirmation temperature data collected on an hourly basis from a data logger documented a mean value of 20.8°C with a range of 19.6 to 29.6°C. Salinity levels ranged from 18.8 to 22.3‰ with a mean value of 19.6‰. Test acceptability criteria requires a mean temperature of 20±1°C with maximum temporary fluctuations of 20±3°C, and salinity within a range of 20±2‰. See Section 3.3 for a discussion of the temperature deviation.

3.3 Protocol Deviations

Review of data collected as part of the biological evaluation documented the following deviations from either the method protocol or ESI's Standard Operating Procedures:

Protocol requires that the assays be conducted at 20±1°C for the *A. bahia* and *L. plumulosus* assays. A temperature spike occurred beginning in the overnight hours at the outset of the assay, and the hourly temperatures exceeded the protocol range for approximately 16 hours reaching a maximum of 29.6°C at 5:37 AM on Saturday morning, September 2, 2017. The technician conducting the study assessed the temperature control unit of the water bath being used and determined that the unit was set to 19.5°C, with a thermostat reading of 19°C, indicating that the unit had malfunctioned. To correct the issue, the unit was disabled and room temperature adjusted to compensate. No further temperature deviations were noted for the remainder of the assay as demonstrated by the mean temperature of 20.8°C, which falls within the protocol range. The maximum temperature recorded also falls within the acceptable range for the species. It is the opinion of ESI's technical director that this deviation had no adverse impact on the outcome of the assay.

ESI's protocol requires that the dissolved oxygen (DO) levels are maintained at or above 6 mg/L, and the assays were aerated from the start to ensure this requirement was met. However, there were sporadic DO measurements that fell below 6 mg/L in both assays (1 measurement in the *L. plumulosus* assay and 4 measurements in the *A. bahia* assay). There were no notations indicating a reason for this, however it is most likely that aeration tubes had fallen out of the test vessels and were replaced on discovery. The mean DO levels were well above the threshold, indicating that overall the desired DO levels were maintained. Furthermore, both assays met the RIM protocol of ≥40% saturation. Therefore it is the opinion of ESI's technical director that this deviation had no adverse impact on the outcome of the assay.

Upon review of final ammonia data it was determined that the unionized ammonia levels in Composites 6 and 8 of the *L. plumulosus* assay were above the protocol threshold limit of 0.8 mg/L for assay initiation, with calculated unionized ammonia values of 1.64 and 0.86 mg/L, respectively. No significant effects occurred with organisms exposed to Composite 6, which had two times the level of unionized ammonia than the threshold. Although survival for Composite 8 was statistically different from the reference, there was only an 8% difference in mean survival for Composite 8 as c ompared to the reference site. The unionized ammonia levels in Composite 8 had reached 0.11 mg/L by test day 3, suggesting that organism exposures above the target threshold were limited. This rapid reduction in unionized ammonia levels, coupled with the fact that no significant effect occurred in Composite 6, suggest that effects in Composite 8 do not stem from ammonia toxicity. A colorimetric test has been used to determine total ammonia values during the pre-assay monitoring phase of testing, and given that this test is reliant on analyst interpretation, it likely was unclear that total ammonia values were high enough to result in a protocol excursion (there have been no known prior excursions from this protocol). A corrective action involving confirmatory ammonia analysis has been put in place to ensure that the target ammonia levels have been achieved prior to assay initiation.

4.0 SUMMARY

This program utilized protocols developed by the US EPA and the CENAE to assess the potential impact of the proposed dredge material collected from New Haven Harbor on the marine environment. Review of the data presented in Tables 5 and 6 documents that exposure to Composites 1, 5, 6 and 8 caused significant impacts on either *A. bahia* or *L. plumulosus* survival as compared to the CLDS reference sediment, however Composite 6 was the only sediment that caused >20% difference in survival (*A. bahia* only).

5.0 REFERENCES

AECOM. 2017. Draft Laboratory Testing in Support of Environmental Assessment; Sampling & Environmental Testing – New Haven Harbor FNP [Sampling and Analysis Plan]. Chelmsford, Massachusetts. August 2017.

US EPA, US ACE. 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual*. EPA-503/8-91/001. 204 pages.

US EPA, US ACE. 1998. *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual*. EPA-823-B-98-004, February 1998.

US EPA Region I, Corps of Engineers, New England District. 2004. *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters*. September 2004.

Table 1. Sample Collection and Receipt Information. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

				Collection		Receipt	
Field ID	ESI Code	Sample Type	Matrix	Date	Time	Date	Time
NHH-Z	29516-001	Site	Solid	08/12/17	1350	08/18/17	1300
NHH-Z	29516-002	Site	Solid	08/08/17	1153	08/18/17	1300
NHH-P	29516-003	Site	Solid	08/12/17	0850	08/18/17	1300
NHH-P	29516-004	Site	Solid	08/09/17	1219	08/18/17	1300
NHH-L	29516-005	Site	Solid	08/15/17	1405	08/18/17	1300
NHH-L	29516-006	Site	Solid	08/10/17	1300	08/18/17	1300
NHH-J	29516-007	Site	Solid	08/15/17	1405	08/18/17	1300
NHH-J	29516-008	Site	Solid	08/10/17	1141	08/18/17	1300
NHH-F	29516-009	Site	Solid	08/16/17	1658	08/18/17	1300
NHH-F	29516-010	Site	Solid	08/11/17	1650	08/18/17	1300
NHH-M	29516-011	Site	Solid	08/13/17	1220	08/18/17	1300
NHH-M	29516-012	Site	Solid	08/08/17	1610	08/18/17	1300
NHH-B	29516-013	Hold [a]	Solid	08/11/17	1157	08/18/17	1300
NHH-W	29516-014	Site	Solid	08/09/17	1634	08/18/17	1300
NHH-W	29516-015	Site	Solid	08/15/17	0938	08/18/17	1300
NHH-O	29516-016	Site	Solid	08/14/17	1614	08/18/17	1300
NHH-O	29516-017	Site	Solid	08/08/17	1445	08/18/17	1300
NHH-Y	29516-018	Site	Solid	08/13/17	0820	08/18/17	1300
NHH-Y	29516-019	Site	Solid	08/08/17	1153	08/18/17	1300
NHH-G	29516-020	Site	Solid	08/17/17	0934	08/18/17	1300
NHH-G	29516-021	Site	Solid	08/11/17	0837	08/18/17	1300
NHH-K	29516-022	Site	Solid	08/10/17	1409	08/18/17	1300
NHH-K	29516-023	Site	Solid	08/14/17	1232	08/18/17	1300
NHH-N	29516-024	Site	Solid	08/13/17	1515	08/18/17	1300
NHH-N	29516-025	Site	Solid	08/08/17	1305	08/18/17	1300
NHH-A	29516-026	Hold [a]	Solid	08/11/17	1340	08/18/17	1300
NHH-C	29516-027	Site	Solid	08/17/17	1213	08/18/17	1300
NHH-C	29516-028	Site	Solid	08/11/17	1033	08/18/17	1300
NHH-D	29516-029	Site	Solid	08/16/17	1443	08/18/17	1300
NHH-D	29516-030	Site	Solid	08/11/17	1507	08/18/17	1300
NHH-T	29516-031	Site	Solid	08/12/17	1220	08/18/17	1300
NHH-T	29516-032	Site	Solid	08/08/17	1734	08/18/17	1300
NHH-E	29516-033	Site	Solid	08/14/17	0832	08/18/17	1300
NHH-E	29516-034	Site	Solid	08/16/17	1230	08/18/17	1300
NHH-S	29516-035	Site	Solid	08/15/17	1158	08/18/17	1300
NHH-S	29516-036	Site	Solid	08/10/17	0955	08/18/17	1300
NHH-R	29516-037	Site	Solid	08/16/17	0829	08/18/17	1300
NHH-R	29516-038	Site	Solid	08/10/17	0832	08/18/17	1300
NHH-H	29516-039	Site	Solid	08/10/17	1548	08/18/17	1300

Field ID	ESI Code	Sample Type	Matrix	Collection		Receipt	
				Date	Time	Date	Time
NHH-H	29516-040	Site	Solid	08/16/17	1027	08/18/17	1300
NHH-I	29516-041	Site	Solid	08/10/17	1746	08/18/17	1300
NHH-I	29516-042	Site	Solid	08/17/17	1627	08/18/17	1300
NHH-V	29516-043	Site	Solid	08/09/17	1745	08/18/17	1300
NHH-V	29516-044	Site	Solid	08/15/17	1646	08/18/17	1300
NHH-X	29516-045	Site	Solid	08/08/17	0922	08/18/17	1300
NHH-X	29516-046	Site	Solid	08/12/17	1600	08/18/17	1300
CLDS-Ref	29516-047	Reference	Solid	08/17/17	0800	08/18/17	1300
NHH-Q	29516-054	Site	Solid	08/09/17	1427	08/18/17	1300
NHH-U	29516-055	Site	Solid	08/09/17	0905	08/18/17	1300

Note:
[a] Samples NHH-A and NHH-B were delivered to ESI but were not included in the compositing scheme per verbal communication from the client.

Table 2. Summary of Sample Compositing Information. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Composite ID	ESI Code	Components		Final	Composite	
		Field ID	ESI Code	Amount	Date	Time
CLDS Reference Site [a]	29517-009	CLDS-Ref	29516-047	20 gal	08/21/17	1630
Composite 1	29517-001	NHH-C	29516-027	22 gal	08/21/17	0840
		NHH-C	29516-028			
Composite 2	29517-002	NHH-D	29516-029	26 gal	08/21/17	0950
		NHH-D	29516-030			
		NHH-E	29516-033			
		NHH-E	29516-034			
		NHH-F	29516-009			
		NHH-F	29516-010			
Composite 3	29517-003	NHH-G	29516-020	31 gal	08/21/17	1400
		NHH-G	29516-021			
		NHH-H	29516-039			
		NHH-H	29516-040			
		NHH-I	29516-041			
		NHH-I	29516-042			
Composite 4	29517-004	NHH-J	29516-007	23 gal	08/21/17	1445
		NHH-J	29516-008			
		NHH-K	29516-022			
		NHH-K	29516-023			
		NHH-L	29516-005			
		NHH-L	29516-006			

Composite ID	ESI Code	Components		Final Amount	Composite	
		Field ID	ESI Code		Date	Time
Composite 5	29517-005	NHH-M	29516-011	29 gal	08/21/17	1530
		NHH-M	29516-012			
		NHH-N	29516-024			
		NHH-N	29516-025			
		NHH-O	29516-016			
		NHH-O	29516-017			
Composite 6	29517-006	NHH-P	29516-003	28 gal	08/21/17	1205
		NHH-P	29516-004			
		NHH-Q	29516-054			
		NHH-R	29516-037			
		NHH-R	29516-038			
		NHH-S	29516-035			
		NHH-S	29516-036			
Composite 7	29517-007	NHH-T	29516-031	31 gal	08/21/17	1540
		NHH-T	29516-032			
		NHH-U	29516-055			
		NHH-V	29516-043			
		NHH-V	29516-044			
		NHH-W	29516-014			
		NHH-W	29516-015			
Composite 8	29517-008	NHH-X	29516-045	26 gal	08/21/17	1130
		NHH-X	29516-046			
		NHH-Y	29516-018			
		NHH-Y	29516-019			
		NHH-Z	29516-001			
		NHH-Z	29516-002			

Notes:
[a] This sample was homogenized only.

Table 3. Summary of Reference Toxicant Data. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
Americamysis bahia						
08/31/17	03AbARO083017	96Hr LC-50	20.5	18.0	13.3 - 22.8	SDS (mg/L)
Leptocheirus plumulosus						
09/02/17	11LpARO083117	96Hr LC-50	0.8	1.1	0.0 - 3.3	Cadmium (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

Table 4. Summary of Laboratory Control Performance. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Endpoint / Measurement		Protocol Criteria	Unit	*A. bahia*	*L. plumulosus*
Mean Survival			%	92%	94%
		Laboratory Control ≥ 90%	Protocol Met	Yes	Yes
Salinity	Minimum:	*A. bahia* - 28ppt	ppt	29.0	18.8
		L. plumulosus - 18ppt	Protocol Met	Yes	Yes
	Maximum:	*A. bahia* - 32ppt	ppt	31.8	22.3 [a]
		L. plumulosus - 22ppt	Protocol Met	Yes	Yes
Temperature		Mean: 20°±1°C	Daily / Hourly °C	20.5 / 20.8	20.6 / 20.8
		Minimum: 17°C	Daily / Hourly °C	19.5 / 19.6	19.7 / 19.6
		Maximum: 23°C	Daily / Hourly °C	22.1 / 29.6 [b]	22.2 / 29.6 [b]
			Protocol Met	Yes / No [b]	Yes / No [b]

Notes:
[a] The value meets the protocol requirement when rounded to the whole number precision reflected in the method, therefore is not considered a protocol deviation.
[b] Refer to Section 3.3 for a discussion of the deviation.

Table 5. Summary of Survival Data: *A. bahia*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Day 10 Proportion Survived Summary - Mean Mysid Survival						
Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	29520-000	5	92%	85%	100%	6%
CLDS Reference Site	29517-009	5	98%	90%	100%	5%
Composite 1	29517-001	5	86%	70%	100%	14%
Composite 2	29517-002	5	94%	90%	100%	4%
Composite 3	29517-003	5	90%	75%	100%	10%
Composite 4	29517-004	5	94%	85%	100%	7%
Composite 5	29517-005	5	90%	80%	100%	9%
Composite 6	29517-006	5	74%	50%	90%	21%
Composite 7	59517-007	5	90%	70%	100%	14%
Composite 8	29517-008	5	96%	90%	100%	6%

Day 10 Survival Statistical Analysis			Statistically Significant Difference, "<" as Compared to:	Difference in Survival as Compared to CLDS (29517-009)	
Sample ID	ESI Code	Mean	CLDS (29517-009)	>20%	
CLDS Reference Site	29517-009	98%	-	-	-
Composite 1	29517-001	86%	Yes	No	12%
Composite 2	29517-002	94%	No	No	4%
Composite 3	29517-003	90%	No	No	8%
Composite 4	29517-004	94%	No	No	4%
Composite 5	29517-005	90%	Yes	No	8%
Composite 6	29517-006	74%	Yes	Yes	24%
Composite 7	59517-007	90%	No	No	8%
Composite 8	29517-008	96%	No	No	2%

Table 6. Summary of Survival Data: *L. plumulosus*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Day 10 Proportion Survived Summary - Mean Amphipod Survival						
Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	29519-000	5	94%	90%	95%	2%
CLDS Reference Site	29517-009	5	95%	90%	100%	5%
Composite 1	29517-001	5	95%	85%	100%	6%
Composite 2	29517-002	5	91%	85%	100%	7%
Composite 3	29517-003	5	93%	85%	100%	6%
Composite 4	29517-004	5	96%	90%	100%	4%
Composite 5	29517-005	5	92%	85%	100%	6%
Composite 6	29517-006	5	89%	80%	95%	7%
Composite 7	59517-007	5	96%	90%	100%	6%
Composite 8	29517-008	5	87%	75%	90%	8%

Day 10 Survival Statistical Analysis			Statistically Significant Difference, "<" as Compared to:	Difference in Survival as Compared to CLDS (29517-009)	
Sample ID	ESI Code	Mean	CLDS (29517-009)	>20%	
CLDS Reference Site	29517-009	95%	-	-	-
Composite 1	29517-001	95%	No	No	0%
Composite 2	29517-002	91%	No	No	4%
Composite 3	29517-003	93%	No	No	2%
Composite 4	29517-004	96%	No	No	-1%
Composite 5	29517-005	92%	No	No	3%
Composite 6	29517-006	89%	No	No	6%
Composite 7	59517-007	96%	No	No	-1%
Composite 8	29517-008	87%	Yes	No	8%

Table 7. Summary of Overlying Water Quality Data: *A. bahia*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Sample ID	Day	Temperature (°C)	pH (SU)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
Laboratory Control	00	21.2	7.93	0.15	0.0053
CLDS Reference Site	00	21.2	7.95	<0.1	<0.0019
Composite 1	00	21.3	7.96	0.12	0.0046
Composite 2	00	21.3	7.98	1.9	0.0758
Composite 3	00	21.3	7.95	0.31	0.0116
Composite 4	00	21.3	8.00	2	0.0834
Composite 5	00	21.2	8.05	4.1	0.1895
Composite 6	00	21.2	7.98	7.4	0.2932
Composite 7	00	21.2	7.94	8.6	0.3118
Composite 8	00	21.2	8.05	4.3	0.1988
Laboratory Control	03	20.4	7.95	0.42	0.0147
CLDS Reference Site	03	20.4	7.98	0.18	0.0067
Composite 1	03	20.4	7.98	0.29	0.0109
Composite 2	03	20.4	8.03	1.2	0.0502
Composite 3	03	20.4	7.99	0.11	0.0042
Composite 4	03	20.4	8.02	0.58	0.0237
Composite 5	03	20.4	8.04	2.3	0.0984
Composite 6	03	20.4	8.00	5.1	0.1997
Composite 7	03	20.4	7.95	5.8	0.2033
Composite 8	03	20.4	8.10	3.1	0.1513
Laboratory Control	10	19.8	8.00	<0.1	<0.0019
CLDS Reference Site	10	19.8	8.06	<0.1	<0.0021
Composite 1	10	19.8	8.07	<0.1	<0.0022
Composite 2	10	19.8	8.14	0.17	0.0087
Composite 3	10	19.7	8.06	<0.1	<0.0021
Composite 4	10	19.7	8.23	<0.1	<0.0031
Composite 5	10	19.7	8.28	0.11	0.0076
Composite 6	10	19.7	8.08	0.11	0.0049
Composite 7	10	19.7	7.98	<0.1	<0.0018
Composite 8	10	19.7	8.06	0.15	0.0064

Note: Data in summary obtained from the "A" replicate of each treatment.

Table 8. Summary of Overlying Water Quality Data: *L. plumulosus*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Sample ID	Day	Temperature (°C)	pH (SU)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
Laboratory Control	00	21.3	7.82	<0.1	<0.0014
CLDS Reference Site	00	21.4	7.84	<0.1	<0.0015
Composite 1	00	21.3	7.84	<0.1	<0.0015
Composite 2	00	21.3	7.89	2	0.0653
Composite 3	00	21.3	7.91	0.37	0.0126
Composite 4	00	21.3	7.87	1.6	0.0500
Composite 5	00	21.3	7.99	3.6	0.1468
Composite 6	00	21.3	8.00	7.4	0.3085
Composite 7	00	21.3	7.91	8.4	0.2869
Composite 8	00	21.3	8.00	3.8	0.1584
Laboratory Control	03	20.4	8.03	0.17	0.0071
CLDS Reference Site	03	20.4	7.95	0.6	0.0210
Composite 1	03	20.4	7.93	0.14	0.0047
Composite 2	03	20.4	7.95	<0.1	<0.0018
Composite 3	03	20.4	7.93	<0.1	<0.0017
Composite 4	03	20.4	7.91	0.85	0.0273
Composite 5	03	20.4	8.00	2.5	0.0979
Composite 6	03	20.4	7.98	2.1	0.0787
Composite 7	03	20.4	7.87	1.1	0.0323
Composite 8	03	20.4	8.11	0.43	0.0214
Laboratory Control	10	19.8	7.99	<0.1	<0.0018
CLDS Reference Site	10	19.8	7.93	<0.1	<0.0016
Composite 1	10	19.8	7.97	<0.1	<0.0018
Composite 2	10	19.8	8.03	<0.1	<0.0020
Composite 3	10	19.8	8.00	<0.1	<0.0019
Composite 4	10	19.8	8.01	<0.1	<0.0019
Composite 5	10	19.8	8.14	<0.1	<0.0026
Composite 6	10	19.8	8.14	0.12	0.0061
Composite 7	10	19.8	7.93	0.19	0.0061
Composite 8	10	19.8	8.10	<0.1	<0.0023

Note: Data in summary are obtained from the “Surrogate” replicate of each treatment.

Table 9. Summary of Pore Water Quality Data: *L. plumulosus*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. September 2017.

Sample ID	Day	Temperature (°C)	pH (SU)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
Laboratory Control	00	22	7.30	0.4	0.0036
CLDS Reference Site	00	22	7.53	<0.1	<0.0008
Composite 1	00	22	7.61	3	0.0549
Composite 2	00	22	7.65	6.7	0.1342
Composite 3	00	22	7.44	5.1	0.0635
Composite 4	00	22	7.61	7	0.1281
Composite 5	00	22	7.58	17	0.2907
Composite 6	00	22	7.72	70	1.6419
Composite 7	00	22	7.53	51	0.7788
Composite 8	00	22	7.63	45	0.8617
Laboratory Control	03	22	7.41	0.13	0.0015
CLDS Reference Site	03	22	7.54	<0.1	<0.0008
Composite 1	03	22	7.71	2.5	0.0573
Composite 2	03	22	7.56	2.8	0.0458
Composite 3	03	22	7.34	2	0.0198
Composite 4	03	22	7.41	1.9	0.0221
Composite 5	03	22	7.33	7.1	0.0688
Composite 6	03	22	7.46	38	0.4950
Composite 7	03	22	7.11	17.8	0.1043
Composite 8	03	22	7.29	13	0.1150
Laboratory Control	10	22	7.32	<0.1	<0.0005
CLDS Reference Site	10	22	7.46	<0.1	<0.0007
Composite 1	10	22	7.52	0.17	0.0025
Composite 2	10	22	7.09	<0.1	<0.0003
Composite 3	10	22	7.21	1.2	0.0088
Composite 4	10	22	7.14	1.4	0.0088
Composite 5	10	22	6.86	1.4	0.0046
Composite 6	10	22	7.26	0.95	0.0078
Composite 7	10	22	7.09	1.3	0.0073
Composite 8	10	22	6.95	11	0.0447

Note: Data in summary are obtained from the “Surrogate” replicate of each treatment.

APPENDIX A:

RAW DATA & STATISTICAL SUPPORT

Contents	Number of Pages
Study Number Record	1
Sample Receipt Logs and Chain of Custody Records	12
Composite Preparation Forms	9
Test Sediment Preparation Notes	1
A. bahia 10 Day Solid Phase Evaluation	
Pre-Assay Monitoring Record	1
Organism History Record; Organism Addition Record	2
Daily Record	1
Day 10 Recovery Bench Sheets	1
Survival Statistical Analysis Data Package	13
Sample Reading Order; Daily Water Quality Summary	7
Ammonia Calculations	1
L. plumulosus 10 Day Solid Phase Evaluation	
Pre-Assay Monitoring Record	1
Organism History Record; Organism Addition Record	2
Daily Record	1
Day 10 Recovery Bench Sheets	1
Survival Statistical Analysis Data Package	13
Sample Reading Order; Daily Water Quality Summary	8
Ammonia Calculations	2
Pore Water pH Record	2
Temperature Profile and Data	8
RIM QC Data Report Tables	2
Assay Review Checklists	1
Total Appendix Pages	90

STUDY NUMBER RECORD

Issue and complete this form for studies that will require multiple tasks and directly associated support studies. Issue consecutive study numbers at the start of the project to cover all potential elements of the project.

CLIENT: AECOM

CONTACT(S): Ryan McCarthy, Christine Archer, Maura Surprenant

PROJECT: New Haven Harbor Federal Navigation Project

CONTRACT #: W912WJ-17-D-0003

	Species / Analysis Parameters:		STUDY:
Sample Receipt:			**29516**
Grain Size Analysis:			**-**
Composite Prep:			**29517**
Bulk Sediment Analysis:			**29518**
10 Day Assay:	***Leptocheirus plumulosus***		**29519**
	Americamysis bahia		**29520**
Elutriate Preparation:	**Type:**		**29521**
Elutriate Analysis:	**Pentachlorophenol**	**Yes / No**	**29522**
	Trace Metals	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	
SPP Assays:	***Menidia beryllina***		**29523**
	Americamysis bahia		
	Arbacia punctulata		
Bioaccumulation Study:	***Macoma nasuta***		**29524**
	Nereis virens		**29525**
Tissue Analysis:	**Trace Metals**	**Yes / No**	**29526**
	PAH Compounds	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	

P:\General Projects\RPT-Active\DSE 29516 AECOM - New Haven Harbor FNP\Study Number Log .wpd

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	NA
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	3		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes	Does the info on the COC match the samples?	No
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	No
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	No	Were samples received intact? (none broken or leaking)	No
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
See Chains of Custody						

Notes and qualifications:

-Majority of samples not listed on chains of custody based on container sampling information. Samples rejected and on hold until further notice.
* Residual samples from grain size analyses received to include in final composites
-Field ID NHH-Q and NHH-U presented on the associated chains of custody for this sample receipt document (ESI samples -054 and -055) wer accurately denoted based on sample containers, and were not present on revised chains of custody issued by AECOM on 08/21/17.

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature: [signature]

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sed. Eval

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed. Eval								Lab I.D.	Remarks
05	NHC-I	8/17/17	1430		X	5gal	W	4°C	NA	X									7 carboys
02	NHC-V	8/17/17	1528		X		W			X									12 carboys, 2 DIs
06	NHC-F	8/17/17	1300		X		W			X									6 carboys
04	CLDS-Ref-Top	8/17/17	1015		X		W			X									2 carboys
03	CLDS-Ref-Mid				X		W			X									2 carboys
01	CLDS-Ref-Bottom				X		W			X									2 carboys
07	NHH-C •	8/11	1033		X	5gal bucket	SD			X									7 buckets
08	NHH-D •	8/11	1507		X		SD			X						CSH		3 ~~2~~	buckets
09	NHH-E •	8/14	0832		X		SD			X									4 buckets
10	NHH-F •	8/11	1650		X		SD			X									3 buckets
11	NHH-G •	8/11	0837		X		SD			X									2 buckets
12	NHH-H •	8/10	1548		X		SD			X									4 buckets
13	NHH-I •	8/17	1627		X		SD			X									3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature: [signature]	8/18/17 Time: 1300	James T. Provencher ESI Signature: [signature]	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ 8/18

Notes: Discrepancies between most sample date & time and what is labeled on sample containers. Total container count not accurate. Conditions unacceptable for sample receipt & processing. – KC 8/18/17 1700

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

O:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM-06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 0163

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval									Lab I.D.	Remarks
014 NHH-J •	8/15/17	1405		X	5g bucket	SO	4°C	NA	X										3 buckets
015 NHH-K •	8/10/17	1409		X					X										2 buckets
019 NHH-L •	8/15/17	1515		X					X										2 buckets
016 NHH-M •	8/8/17	1610		X					X										3 buckets
017 NHH-N •	8/13/17	1515		X					X										2 buckets
018 NHH-O •	8/8/17	1445		X					X										3 buckets
020 NHH-P •	8/9/17	1319		X					X										3 buckets
021 NHH-Q (EID 8/21 -054)	8/9/17	1427		X					X										4 buckets
022 NHH-R •	8/10/17	0832		X					X										3 buckets
023 NHH-S •	8/10/17	0955		X					X										2 buckets
024 NHH-T 1734 CSH •	8/8/17	~~1707~~ CSH		X					X										4 buckets
025 NHH-U (EID 8/21 -055)	8/9/17	0905		X					X										5 buckets
026 NHH-V •	8/15/17	1646		X					X										3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination)~~: EID 8/18

Notes:

See page 1 of 3

EID 8/21 Samples NHH-Q & NHH-U are accurate based on sample container and were not denoted on revised CoC's.

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed Grab	Lab I.D.	Remarks
227 NHH-W	8/15/17	0938		X	5gal bucket	SD	4°C	NA	X		2 buckets
228 NHH-X	8/13/17	1545		X					X		2 buckets
229 NHH-Y	8/8/17	1037		X					X		3 buckets
230 NHH-Z	8/8/17	1153		X					X		6 buckets

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Howe AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ E3 8/18

Notes: See page 1 of 3

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody-AECOM-06-3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. NO 0165

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-Z	29516-001	S	Hold:Composite	2x5 Gal.	4C	
NHH-Z	29516-002	S	Hold:Composite	4x5 Gal.	4C	
NHH-P	29516-003	S	Hold:Composite	1x5 Gal.	4C	
NHH-P	29516-004	S	Hold:Composite	2x5 Gal.	4C	
NHH-L	29516-005	S	Hold:Composite	1x5 Gal.	4C	
NHH-L	29516-006	S	Hold:Composite	1x5 Gal.	4C	
NHH-J	29516-007	S	Hold:Composite	2x5 Gal.	4C	
NHH-J	29516-008	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-009	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-010	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-011	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-012	S	Hold:Composite	1x5 Gal.	4C	
NHH-B	29516-013	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-014	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-015	S	Hold:Composite	1x5 Gal.	4C	
NHH-O	29516-016	S	Hold:Composite	2x5 Gal.	4C	
NHH-O	29516-017	S	Hold:Composite	1x5 Gal.	4C	
NHH-Y	29516-018	S	Hold:Composite	2x5 Gal.	4C	
NHH-Y	29516-019	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-020	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-021	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-022	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-023	S	Hold:Composite	1x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-N	29516-024	S	Hold:Composite	1x5 Gal.	4C	
NHH-N	29516-025	S	Hold:Composite	1x5 Gal.	4C	
NHH-A	29516-026	S	Hold:Composite	1x5 Gal.	4C	
NHH-C	29516-027	S	Hold:Composite	5x5 Gal.	4C	
NHH-C	29516-028	S	Hold:Composite	2x5 Gal.	4C	
NHH-D	29516-029	S	Hold:Composite	1x5 Gal.	4C	
NHH-D	29516-030	S	Hold:Composite	2x5 Gal.	4C	
NHH-T	29516-031	S	Hold:Composite	1x5 Gal.	4C	
NHH-T	29516-032	S	Hold:Composite	3x5 Gal.	4C	
NHH-E	29516-033	S	Hold:Composite	2x5 Gal.	4C	
NHH-E	29516-034	S	Hold:Composite	2x5 Gal.	4C	
NHH-S	29516-035	S	Hold:Composite	1x5 Gal.	4C	
NHH-S	29516-036	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-037	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-038	S	Hold:Composite	2x5 Gal.	4C	
NHH-H	29516-039	S	Hold:Composite	3x5 Gal.	4C	
NHH-H	29516-040	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-041	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-042	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-043	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-044	S	Hold:Composite	1x5 Gal.	4C	
NHH-X	29516-045	S	Hold:Composite	2x5 Gal.	4C	
NHH-X	29516-046	S	Hold:Composite	2x5 Gal.	4C	

Notes and qualifications: 29516-024 S Hold:Composite

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
CLDS-Ref	29516-047	S	Hold:Composite	4x5 Gal.	4C	
NHC-I	29516-048	W	Hold:Composite	7x5 Gal.	4C	
NHC-V	29516-049	W	Hold:Composite	12x5 Gal.	4C	
NHC-F	29516-050	W	Hold:Composite	6x5 Gal.	4C	
CLDS-Ref-Top	29516-051	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Mid	29516-052	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Bottom	29516-053	W	Hold:Composite	2x5 Gal.	4C	
NHH-Q **	29516-054	S	Hold:Composite	4x5 Gal.	4C	
NHH-U **	29516-055	S	Hold:Composite	5x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encom all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viab containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.
** Samples denoted on original chain of custody, not on revised documents discussed above.

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sediment Eval (DSE)

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval (DSE)	Lab I.D.	Remarks
01	NHH-Z	8/12	1350		X	5g bucket	SD	4°C	NA	X		2 buckets
02	NHH-Z	8/8	1153		X					X		4 buckets
03	NHH-P	8/12	0850		X					X		1 bucket
04	NHH-P	8/9	1219		X					X		2 buckets
05	NHH-L	8/15	1405		X					X		1 bucket
06	NHH-L	8/10	1300		X					X		1 bucket
07	NHH-J	8/15	1405		X					X		2 buckets
08	NHH-J	8/10	1141		X					X		1 bucket
09	NHH-F	8/16	1658		X					X		1 bucket
10	NHH-F	8/11	1680		X					X		2 buckets
11	NHH-M	8/13	1220		X					X		2 buckets
12	NHH-M	8/8	1610		X					X		1 bucket
13	NHH-B	8/11	1157		X					X		1 bucket

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised on 8/21/17 C. Steve Howe AECOM Rich – ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature: C Steve Hone

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE								Lab I.D.	Remarks
14	NHH-W	8/9	1634		X	5g bucket	SD	4°C	NA	X									1 bucket
15	NHH-W	8/15	0938		X					X									1 bucket
16	NHH-O	8/14	1614		X					X									2 buckets
17	NHH-O	8/8	1445		X					X									1 bucket
18	NHH-Y	8/13	0820		X					X									2 buckets
19	NHH-Y	8/8	1153		X					X									1 bucket
20	NHH-G	8/17	0934		X					X									1 bucket
21	NHH-G	8/11	0837		X					X									1 bucket
22	NHH-K	8/10	1409		X					X									1 bucket
23	NHH-K	8/14	1232		X					X									1 bucket
24	NHH-N	8/13	1515		X					X									1 bucket
25	NHH-N	8/8	1305		X					X									1 bucket
26	NHH-A	8/11	1340		X					X									1 bucke

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM - ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE								Lab I.D.	Remarks
27	NHH-C	8/17/17	1213		X	5g bucket	SD	4°C	NA	X									5 buckets
528	NHH-C	8/17/17	1033		X					X									2 buckets
29	NHH-D	8/16	1443		X					X									1 bucket
530	NHH-D	8/11	1507		X					X									2 buckets
31	NHH-T	8/12	1220		X					X									1 bucket
532	NHH-T	8/8	1734		X					X									3 buckets
533	NHH-E	8/14	0832		X					X									2 buckets
534	NHH-E	8/16	1230		X					X									2 buckets
35	NHH-S	8/15	1158		X					X									1 bucket
536	NHH-S	8/10	0955		X					X									1 bucket
37	NHH-R	8/16	0829		X					X									1 bucket
538	NHH-R	8/10	0832		X					X									2 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0177

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hare AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE									Lab I.D.	Remarks
539	NHH-H	8/10	1548		X	5g bucket	SD	4°C	NA	X										3 buckets
540	NHH-A	8/16	1027		X					X										1 bucket
541	NHH-I	8/10	1746		X					X										1 bucket
542	NHH-J	8/17	1627		X					X										2 buckets
543	NHH-V	8/9	1745		X					X										2 buckets
544	NHH-V	8/15	1646		X					X										1 bucket
545	~~NHH-X~~	~~8/8~~	~~1153~~			CSH														~~2 buckets~~
546	NHH-X	8/8	0922		X	5g bucket	SD	4°C	NA	X										2 buckets
547	NHH-X	8/12	1600		X					X										2 buckets
548	CLOS-Ref	8/17	0800		X					X										4 buckets
8/24																				

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hare AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 ESI - 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0171

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hare AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE	Lab I.D.	Remarks
NHC-I	8/17/17	1430		X	5g carboys	W	4°C	NA	X		7 carboys
NHC-V	8/17	1528		X					X		12 carboys, 2DIs*
NHC-F	8/17	1300		X					X		6 carboys
CLDS-Ref-Top	8/17	1015		X					X		2 carboys
CLDS-Ref-Mid	8/17	1015		X					X		2 carboys
CLDS-Ref-Bottom	8/17	1015		X					X		2 carboys

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hare AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) COCs amended and revised 8/21/17 Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) C. Steve Hare AECOM Signature: -ESI 8/21/17	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

* water from a leaking carboy was transferred into to lab supplied distilled water containers

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

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White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0172

Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 1

Composite Lab ID.: 29517-001 Composite Final Volume: 22 gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/21/17 1x 1 gallon bucket

Composite Prepared Time: 0840

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-C	29516-027	Solid	—	≈2.5 gallons	≈24.5 gallons	grey to black sediment with lots of shell hash
↓	↓ -028	↓	↓	↓	↓	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 29517-002 Composite Final Volume: ≈28 gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/24/17 1x1 gallon bucket

Composite Prepared Time: 0950

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-D	29516-029 030	Solid	—	—	≈10 gallons	
NHH-E	-033 034	Solid	—	~~≈7 gal~~	≈7 gallons	
NHH-F	-009 010	Solid	—	—	≈10 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 29517-003 Composite Final Volume: 31 gal

Composite Matrix: Solid Composite Container(s): 6x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon buckets

Composite Prepared Time: 1400

Initials: BK/ JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-G	29516-020 021	Solid	—	—	≈9.5gallons	
NHH-H	↓ - 039 040	Solid	—	—	≈9gallons	
NHH-I	↓ - 041 042	Solid	—	—	≈1gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 29517-004

Composite Final Volume: 23gallons

Composite Matrix: Solid

Composite Container(s): 5x5gallon buckets, 1x1gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1445

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-J	29516-007 008	Solid	—	—	≈8gallons	
NHH-K	↓ -022 023	Solid	—	—	≈8gallons	
NHH-L	↓ -005 006	Solid	—	—	≈ 9.5gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 29517-005 Composite Final Volume: ≈ 29 gallons

Composite Matrix: Solid Composite Container(s): 6 x 5 gallon

Composite Prepared Date: 08/21/17 1 x 1 gallon

Composite Prepared Time: 1530

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-M	29516-011 012	Solid	—	—	≈ 9.5 g	
NHH-N	↓ -024 025	Solid	—	—	≈ 9 g	
NHH-O	↓ -016 017	Solid	—	—	≈ 10.5 g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 29517-006 Composite Final Volume: 28gallons

Composite Matrix: Solid Composite Container(s): 7x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1205

Initials: BG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-P	29516-003 004	Solid	—	—	≈8.5gallons	
NHH-Q	-054	Solid	—	—	≈14gallons	
NHH-R	-037 038	Solid	—	—	≈7gallons	
NHH-S	-035 036	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 7

Composite Lab ID.: 29517-007 Composite Final Volume: 31gallons

Composite Matrix: Solid Composite Container(s): 7x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1540

Initials: BGI JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-T	29516-031 032	Solid	—	—	≈9.5gallons	
NHH-U	-055	Solid	—	—	≈14.5gallons	
NHH-V	-043 044	Solid	—	—	≈7gallons	
NHH-W	-014 015	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 8

Composite Lab ID.: 29517-008 Composite Final Volume: ≈26gallons

Composite Matrix: Solid Composite Container(s): 5x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1130

Initials: DG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-X	29516-045 046	Solid	—	—	≈9.5gallons	
NHH-Y	↓ -018 019	Solid	—	—	≈ 8.5gallons	
NHH-Z	↓ -001 002	Solid	—	—	≈11.5gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Homogenization Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: CLDS Reference Site

Composite Lab ID.: 29517-009 Composite Final Volume: ≈ 20 gallons

Composite Matrix: Solid Composite Container(s): 4x5 gallons

Composite Prepared Date: 08/21/17 1x1 gallon

Composite Prepared Time: 1630

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-CLDS	29516-047	Solid	—	few shells	≈20g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
~~29521~~	~~Elutriate Preparation~~ JTP 08/25/17
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Composite and Subsampling Prep Form.wpd

Test Sediment Preparation Notes

Study: 29519 & 29520

Client: AECOM

Project: New Haven Harbor

Field ID	Receipt Number	Notes
Composite 1	29517-001	Sieved 2mm, 1 gallon. ≈200mL excluded. Few rocks and shells. "pudding" like. High moisture, fine. Dark gray
Composite 2	29517-002	Sieved 2mm, 1 gallon. Few small shells excluded. Very fine sediment - High moisture. Dark black / gray.
Composite 3	29517-003	Sieved 2mm, 1 gallon. ≈50mL excluded. Few shells / rocks. Fine grain, high moisture. Gray.
Composite 4	29517-004	Sieved 2mm, 1 gallon. ≈25mL excluded of shells. High to medium moisture. Sticky black sediment.
Composite 5	29517-005	Sieved 2mm, 1 gallon. Few shells excluded. High moisture. Black, Fine grain.
Composite 6	29517-006	Sieved 2mm, 1 gallon, Nothing excluded. Medium moisture. Black, granular sediment.
Composite 7	29517-007	Sieved 2mm, 1 gallon. Nothing excluded. Black, high moisture. Fine sediment
Composite 8	29517-008	Sieved 2mm, 1 gallon. Nothing excluded. Granular brown to black sediment. High moisture.
CLDS Ref Site	29517-009	Sieved 2mm, 1 gallon. Nothing excluded. Pudding-like, high moisture.

Date: 08/24/17
Initial: JTP/BG

P:\General Projects\FORMS\LABFORMS\Soil and Sediment Tests\Soil & Sediment Preparation\Test Sediment Preparation Notes 2015.wpd

Pre-Assay Monitoring
Americamysis bahia
ACUTE EXPOSURE SEDIMENT ASSAY

Study: 29520
Client: AECOM
Project: New Haven Harbor

Day	Date	Renew	Pore Water Ammonia Measured	Initial
(sediment into beakers)	08/25/17			BG
1	08/25/17	✓		BG
2	08/26/17	✓		BG
3	08/27/17	✓		DD
4	08/28/17	✓		DD
5	08/29/17	✓		DD
6	08/30/17	✓		DD
7	08/31/17	✓		BG
8				
9				
10				
11				
12				
13				

Notes: • ~~30°C~~ 20°C • Salinity: 30 ppt • Renew Daily-One Exchange

03AbAR083117

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species AMERICAMYSIS BAHIA

Source: Lab reared _____ Hatchery reared _____ Field collected _____

Hatch date 8-28-17 Receipt date _____

Lot number 082817MS Strain _____

Brood origination _____

II. Water Quality

Temperature 25 °C Salinity ~28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers _____ YCT _____ Other Encap. Shrimp Diet

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 22007

Carrier: _____ Date shipped 8-31-17

Biologist: Mark Rosenzweig

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

EnviroSystems Inc.

Organism Addition Record

Study Number: 29520	**Species:** A. bahia
Client: AECOM	**Organism Lot ID:** 03AbAR0083117
Project: New Haven	**Number of Organisms added to each chamber:** 20
Date: 9/1/17	
Initials: AK	

Notes: Organisms were added to exposure @ 1600. AK 9/1/17

P:\General Projects\FORMS\LABFORMS\Organism Addition Record R0-2015.wpd

Americamysis bahia
ACUTE EXPOSURE SEDIMENT ASSAY

Study: 29520
Client: AECOM
Project: New Haven Harbor

Day	Date	Renew / Feed	Initial
0 (E10) AK 9/1/17 (all beakers)	09/01/17	✓ / ✓	BG
1	09/02/17	✓ / ✓	BG
2	09/03/17	✓ / ✓	MS
3	09/04/17	✓ / ✓	MS
4	09/05/17	✓ / ✓	DD
5	09/06/17	✓ / ✓	BG
6	09/07/17	✓ / ✓	DD
7	09/08/17	✓ / ✓	BG
8	09/09/17	✓ / ✓	BG
9	09/10/17	✓ / ✓	DD
10 (all beakers)	09/11/17	✓ / —	DD

Overlying water collected for NH_3	Day 0	Initial: BG
	Day 3	Initial: MS
	Day 10	Initial: AK 9/11/17

Notes: • 20°C • Salinity: 30 ppt • Feed Brine Shrimp x2 Daily • Renew Daily-One Exchange

(E10) 20 live A. bahia added to each beaker @ 1600. AK 9/1/17

(F10) BG 09/02 Temperature at 27°C, bath turned down to resolve issue.

DAY10 *Americamysis bahia* Sediment Assay Recovery

DATE: 9/11/2017 **STUDY:** 29520

CLIENT: AECOM **PROJECT:** New Haven Harbor Navigation Improvement Project

SAMPLE ID	REP	#LIVE ADULTS	DATE & INITIAL
Laboratory Control	A	17	9/11/17 KL
	B	18	
	C	18	
	D	20	
	E	19	
CLDS Reference Sediment	A	20	9/11/17 KL
	B	20	
	C	20	
	D	18	
	E	20	
Composite #1	A	14	9/11/17 KL
	B	17	
	C	16	
	D	19	
	E	20	
Composite #2	A	19	9/11/17 KL
	B	20	
	C	18	
	D	19	
	E	18	
Composite #3	A	18	9/11/17 KL
	B	15	
	C	20	
	D	19	
	E	18	

SAMPLE ID	REP	#LIVE ADULTS	DATE & INITIAL
Composite #4	A	17	9/11/17 KL
	B	19	
	C	20	
	D	20	
	E	18	
Composite #5	A	17	9/11/17 KL
	B	19	
	C	18	
	D	20	
	E	16	
Composite #6	A	17	9/11/17 KL
	B	15	
	C	14	
	D	10	
	E	18	
Composite #7	A	18	9/11/17 KL
	B	14	
	C	18	
	D	20	
	E	20	
Composite #8	A	20	9/11/17 KL
	B	18	
	C	18	
	D	20	
	E	20	

CETIS Test Data Worksheet

Report Date: 12 Sep-17 11:05 (p 1 of 2)
Test Code/ID: 04-6648-1218/29520Ab

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Start Date: 01 Sep-17 12:00 **Species:** Americamysis bahia **Sample Code:** 29520-000
End Date: 11 Sep-17 12:00 **Protocol:** EPA/600/R-94/025 (1994) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 01 Sep-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29520

Sample	Rep	Pos	# Exposed	# Survived	Notes
29520-000	1	1	20	17	
29520-000	2	20	20	18	
29520-000	3	25	20	18	
29520-000	4	40	20	20	
29520-000	5	45	20	19	
29517-009	1	6	20	20	
29517-009	2	15	20	20	
29517-009	3	29	20	20	
29517-009	4	33	20	18	
29517-009	5	47	20	20	
29517-001	1	7	20	14	
29517-001	2	14	20	17	
29517-001	3	23	20	16	
29517-001	4	37	20	19	
29517-001	5	41	20	20	
29517-002	1	10	20	19	
29517-002	2	18	20	20	
29517-002	3	26	20	18	
29517-002	4	35	20	19	
29517-002	5	43	20	18	
29517-003	1	9	20	18	
29517-003	2	17	20	15	
29517-003	3	28	20	20	
29517-003	4	32	20	19	
29517-003	5	44	20	18	
29517-004	1	2	20	17	
29517-004	2	13	20	19	
29517-004	3	21	20	20	
29517-004	4	39	20	20	
29517-004	5	46	20	18	
29517-005	1	3	20	17	
29517-005	2	16	20	19	
29517-005	3	22	20	18	
29517-005	4	31	20	20	
29517-005	5	49	20	16	
29517-006	1	4	20	17	
29517-006	2	12	20	15	
29517-006	3	27	20	14	
29517-006	4	36	20	10	
29517-006	5	42	20	18	
59517-007	1	8	20	18	
59517-007	2	19	20	14	
59517-007	3	30	20	18	
59517-007	4	38	20	20	
59517-007	5	50	20	20	
29517-008	1	5	20	20	
29517-008	2	11	20	18	

Sample	Rep	Pos	# Exposed	# Survived	Notes
29517-008	3	24	20	18	
29517-008	4	34	20	20	
29517-008	5	48	20	20	

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Batch ID:	00-0170-8791	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	01 Sep-17 12:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Not Applicable
Ending Date:	11 Sep-17 12:00	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29520-000	15-6829-9501	01 Sep-17	01 Sep-17	12h	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h		
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	11d 3h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	11d 2h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	10d 22h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	10d 21h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	10d 20h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	11d		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	10d 20h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	11d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29520-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29520	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-0524-2246	Proportion Survived	Equal Variance t Two-Sample Test	0.9518	29517-009 passed proportion survived
16-9465-5364	Proportion Survived	Equal Variance t Two-Sample Test	0.0316	29517-001 failed proportion survived
14-7523-0566	Proportion Survived	Equal Variance t Two-Sample Test	0.0825	29517-002 passed proportion survived
07-6055-1711	Proportion Survived	Equal Variance t Two-Sample Test	0.0512	29517-003 passed proportion survived
04-8531-6311	Proportion Survived	Equal Variance t Two-Sample Test	0.1453	29517-004 passed proportion survived
07-5694-8658	Proportion Survived	Equal Variance t Two-Sample Test	0.0403	29517-005 failed proportion survived
10-7830-4760	Proportion Survived	Equal Variance t Two-Sample Test	0.0018	29517-006 failed proportion survived
20-9616-2148	Proportion Survived	Equal Variance t Two-Sample Test	0.0980	59517-007 passed proportion survived
21-3427-1691	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-008 passed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29520-000	LC	5	0.920	0.849	0.991	0.850	1.000	0.026	0.057	6.20%	0.00%
29517-009	RS	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-6.52%
29517-001		5	0.860	0.712	1.000	0.700	1.000	0.053	0.119	13.88%	6.52%
29517-002		5	0.940	0.888	0.992	0.900	1.000	0.019	0.042	4.45%	-2.17%
29517-003		5	0.900	0.784	1.000	0.750	1.000	0.042	0.094	10.39%	2.17%
29517-004		5	0.940	0.859	1.000	0.850	1.000	0.029	0.065	6.94%	-2.17%
29517-005		5	0.900	0.802	0.998	0.800	1.000	0.035	0.079	8.78%	2.17%
29517-006		5	0.740	0.547	0.933	0.500	0.900	0.070	0.156	21.04%	19.57%
59517-007		5	0.900	0.748	1.000	0.700	1.000	0.055	0.122	13.61%	2.17%
29517-008		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-4.35%

Americamysis bahia 10-Day Survival Sediment Test **EnviroSystems, Inc.**

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29520-000	LC	0.850	0.900	0.900	1.000	0.950
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-001		0.700	0.850	0.800	0.950	1.000
29517-002		0.950	1.000	0.900	0.950	0.900
29517-003		0.900	0.750	1.000	0.950	0.900
29517-004		0.850	0.950	1.000	1.000	0.900
29517-005		0.850	0.950	0.900	1.000	0.800
29517-006		0.850	0.750	0.700	0.500	0.900
59517-007		0.900	0.700	0.900	1.000	1.000
29517-008		1.000	0.900	0.900	1.000	1.000

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-0524-2246	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29520-000	15-6829-9501	01 Sep-17	01 Sep-17	12h	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29520-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29520	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-009 passed proportion survived	7.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	-1.88	1.86	0.12	8	CDF	0.9518	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6026	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0370699	0.0370699	1	3.55	0.0964	Non-Significant Effect
Error	0.0836128	0.0104516	8			
Total	0.120683		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.38	23.2	0.7644	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.741	0.3108	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29520-000	LC	5	0.920	0.849	0.991		0.850	1.000	0.026	6.20%	0.00%
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	-6.52%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29520-000	LC	5	1.3	1.16	1.43		1.17	1.46	0.0492	8.50%	0.00%
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	-9.40%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29520-000	LC	0.850	0.900	0.900	1.000	0.950
29517-009	RS	1.000	1.000	1.000	0.900	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29520-000	LC					
29517-009	RS					

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-9465-5364	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	11d 3h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-001 failed proportion survived	8.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001*	2.16	1.86	0.174	8	CDF	0.0316	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5904	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.101735	0.101735	1	4.65	0.0632	Non-Significant Effect
Error	0.175069	0.0218836	8			
Total	0.276804		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.98	23.2	0.2099	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7186	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-001		5	0.860	0.712	1.000		0.700	1.000	0.053	13.88%	12.24%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-001		5	1.22	0.983	1.45		0.991	1.46	0.0836	15.39%	14.24%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-001		0.700	0.850	0.800	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-001						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-7523-0566	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	11d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-002 passed proportion survived	4.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1.53	1.86	0.106	8	CDF	0.0825	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2665	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0190676	0.0190676	1	2.33	0.1650	Non-Significant Effect
Error	0.0653354	0.0081669	8			
Total	0.084403		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.17	23.2	0.8847	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1705	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-002		5	0.940	0.888	0.992		0.900	1.000	0.019	4.45%	4.08%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-002		5	1.33	1.22	1.44		1.25	1.46	0.0388	6.53%	6.16%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-002		0.950	1.000	0.900	0.950	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-002						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-6055-1711	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	10d 22h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-003 passed proportion survived	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	1.84	1.86	0.148	8	CDF	0.0512	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.29	0.3837	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0539857	0.0539857	1	3.4	0.1024	Non-Significant Effect
Error	0.127	0.015875	8			
Total	0.180986		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.61	23.2	0.3754	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.896	0.741	0.1965	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-003		5	0.900	0.784	1.000		0.750	1.000	0.042	10.39%	8.16%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-003		5	1.27	1.08	1.46		1.05	1.46	0.0678	11.93%	10.37%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-003		0.900	0.750	1.000	0.950	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-003						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-8531-6311	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	10d 21h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-004 passed proportion survived	6.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.13	1.86	0.131	8	CDF	0.1453	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9183	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0159311	0.0159311	1	1.28	0.2905	Non-Significant Effect
Error	0.0995027	0.0124378	8			
Total	0.115434		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.83	23.2	0.5733	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.857	0.741	0.0708	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-004		5	0.940	0.859	1.000		0.850	1.000	0.029	6.94%	4.08%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-004		5	1.34	1.18	1.49		1.17	1.46	0.0567	9.48%	5.63%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-004		0.850	0.950	1.000	1.000	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-004						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-5694-8658	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	10d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-005 failed proportion survived	6.51%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	2	1.86	0.14	8	CDF	0.0403	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6501	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0563622	0.0563622	1	4	0.0806	Non-Significant Effect
Error	0.112775	0.0140969	8			
Total	0.169137		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.21	23.2	0.4625	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3140	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-005		5	0.900	0.802	0.998		0.800	1.000	0.035	8.78%	8.16%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-005		5	1.27	1.09	1.44		1.11	1.46	0.0623	11.00%	10.60%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-005		0.850	0.950	0.900	1.000	0.800

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-005						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-7830-4760	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	11d		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-006 failed proportion survived	8.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.07	1.86	0.168	8	CDF	0.0018	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2793	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.337893	0.337893	1	16.5	0.0036	Significant Effect
Error	0.163437	0.0204296	8			
Total	0.501329		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.65	23.2	0.2382	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.3989	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-006		5	0.740	0.547	0.933		0.500	0.900	0.070	21.04%	24.49%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-006		5	1.05	0.827	1.27		0.785	1.25	0.0801	17.07%	25.95%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-006		0.850	0.750	0.700	0.500	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-006						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-9616-2148	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:19	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	10d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	59517-007 passed proportion survived	8.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	1.41	1.86	0.179	8	CDF	0.0980	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.03	2.29	0.2082	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0458756	0.0458756	1	1.99	0.1960	Non-Significant Effect
Error	0.184431	0.0230538	8			
Total	0.230306		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.24	23.2	0.1906	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.898	0.741	0.2058	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
59517-007		5	0.900	0.748	1.000		0.700	1.000	0.055	13.61%	8.16%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
59517-007		5	1.28	1.04	1.52		0.991	1.46	0.0864	15.07%	9.56%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
59517-007		0.900	0.700	0.900	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
59517-007						

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-3427-1691	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:19	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	11d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-008 passed proportion survived	5.61%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	25	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004398	0.004398	1	0.4	0.5447	Non-Significant Effect
Error	0.087959	0.0109949	8			
Total	0.092357		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.759	0.741	0.0045	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	0.00%
29517-008		5	0.960	0.892	1.000		0.900	1.000	0.025	5.71%	2.04%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	0.00%
29517-008		5	1.37	1.23	1.52		1.25	1.46	0.0514	8.35%	2.96%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	1.000	1.000	0.900	1.000
29517-008		1.000	0.900	0.900	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-008						

Sample Reading Order for Water Quality Measurements

Study: 29520
Client: AECOM
Project: New Haven Harbor

Reading order for days 0 and 10

Reading Number	Field ID	Replicate	Lab Code
1	Laboratory Control Sediment	A	29520-000
2		B	
3		C	
4		D	
5		E	
6	CLDS Reference Sediment	A	29517-009
7		B	
8		C	
9		D	
10		E	
11	Composite 1	A	29517-001
12		B	
13		C	
14		D	
15		E	
16	Composite 2	A	29517-002
17		B	
18		C	
19		D	
20		E	
21	Composite 3	A	29517-003
22		B	
23		C	
24		D	
25		E	
26	Composite 4	A	29517-004
27		B	
28		C	
29		D	
30		E	
31	Composite 5	A	29517-005
32		B	
33		C	
34		D	
35		E	
36	Composite 6	A	29517-006
37		B	
38		C	
39		D	
40		E	

Sample Reading Order for Water Quality Measurements

Study: 29520
Client: AECOM
Project: New Haven Harbor

41	Composite 7	A	29517-007
42		B	
43		C	
44		D	
45		E	
46	Composite 8	A	29517-008
47		B	
48		C	
49		D	
50		E	

Reading order for days 1 - 9

Reading Number	Field ID	Replicate	Lab Code
1	Laboratory Control Sediment	A	29520-000
2	CLDS Reference Sediment	A	29517-009
3	Composite 1	A	29517-001
4	Composite 2	A	29517-002
5	Composite 3	A	29517-003
6	Composite 4	A	29517-004
7	Composite 5	A	29517-005
8	Composite 6	A	29517-006
9	Composite 7	A	29517-007
10	Composite 8	A	29517-008

STUDY: 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Americamysis bahia* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.5	7.06	93.3	8.02	46313	30.11
Minimum:	19.5	3.11	40.2	7.79	44816	29.02
Maximum:	22.1	7.93	102.7	8.31	48623	31.80

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	00	9/1/2017 09:06:55	21.2	7.15	95.8	7.93	45859	29.77
Laboratory Control	B	00	9/1/2017 09:07:16	21.2	7.14	95.7	7.95	46040	29.91
Laboratory Control	C	00	9/1/2017 09:07:33	21.2	7.12	95.4	7.93	45956	29.84
Laboratory Control	D	00	9/1/2017 09:07:47	21.2	7.2	96.3	7.91	45701	29.66
Laboratory Control	E	00	9/1/2017 09:08:10	21.3	7.05	94.4	7.92	45659	29.63
CLDS Reference Site	A	00	9/1/2017 09:08:33	21.2	7.06	94.6	7.95	45846	29.77
CLDS Reference Site	B	00	9/1/2017 09:08:55	21.3	7.07	94.7	7.96	45713	29.67
CLDS Reference Site	C	00	9/1/2017 09:09:07	21.2	7.07	94.7	7.96	46180	30.01
CLDS Reference Site	D	00	9/1/2017 09:09:25	21.2	7.14	95.6	7.97	46027	29.9
CLDS Reference Site	E	00	9/1/2017 09:09:39	21.3	7.09	94.8	7.97	45604	29.59
Composite 1	A	00	9/1/2017 09:10:03	21.3	7.07	94.8	7.96	45965	29.85
Composite 1	B	00	9/1/2017 09:10:17	21.3	7.05	94.4	7.96	45760	29.7
Composite 1	C	00	9/1/2017 09:10:33	21.3	7.1	95.1	7.96	45792	29.73
Composite 1	D	00	9/1/2017 09:10:55	21.3	7.14	95.6	7.97	45620	29.6
Composite 1	E	00	9/1/2017 09:11:12	21.3	7.08	94.8	7.97	45576	29.57
Composite 2	A	00	9/1/2017 09:11:41	21.3	7.05	94.5	7.98	45862	29.78
Composite 2	B	00	9/1/2017 09:12:00	21.3	7.03	94.2	7.97	45686	29.65
Composite 2	C	00	9/1/2017 09:12:18	21.3	7.07	94.6	7.97	45609	29.59
Composite 2	D	00	9/1/2017 09:12:41	21.3	6.98	93.4	7.98	45636	29.61
Composite 2	E	00	9/1/2017 09:13:00	21.3	7.07	94.6	7.98	45533	29.54
Composite 3	A	00	9/1/2017 09:13:33	21.3	6.99	93.6	7.95	45568	29.56
Composite 3	B	00	9/1/2017 09:13:52	21.3	7.01	93.8	7.94	45537	29.54
Composite 3	C	00	9/1/2017 09:14:13	21.2	7.02	93.9	7.95	45538	29.54
Composite 3	D	00	9/1/2017 09:14:35	21.2	7.12	95.3	7.95	45527	29.53
Composite 3	E	00	9/1/2017 09:14:52	21.2	7.06	94.3	7.94	45340	29.4
Composite 4	A	00	9/1/2017 09:15:15	21.3	6.96	93.2	8	45838	29.76
Composite 4	B	00	9/1/2017 09:15:30	21.2	7.02	94	8.01	45832	29.76
Composite 4	C	00	9/1/2017 09:15:48	21.2	7.05	93.9	8.01	44816	29.02
Composite 4	D	00	9/1/2017 09:16:06	21.2	6.95	93	8.02	45794	29.73
Composite 4	E	00	9/1/2017 09:16:25	21.2	7.01	93.9	8.02	45864	29.78
Composite 5	A	00	9/1/2017 09:17:06	21.2	7.02	94	8.05	45887	29.79
Composite 5	B	00	9/1/2017 09:17:27	21.2	6.98	93.5	8.03	45884	29.79
Composite 5	C	00	9/1/2017 09:17:50	21.2	6.96	93.2	8.03	45856	29.77
Composite 5	D	00	9/1/2017 09:18:08	21.2	7.07	94.7	8.04	45893	29.8
Composite 5	E	00	9/1/2017 09:18:31	21.2	7.03	94.1	8.06	45985	29.87
Composite 6	A	00	9/1/2017 09:18:54	21.2	6.94	92.9	7.98	45934	29.83
Composite 6	B	00	9/1/2017 09:19:06	21.2	6.98	93.4	7.98	45918	29.82
Composite 6	C	00	9/1/2017 09:19:35	21.2	7.02	94	8.02	46044	29.91
Composite 6	D	00	9/1/2017 09:19:57	21.2	7.04	94.2	7.98	45876	29.79
Composite 6	E	00	9/1/2017 09:20:19	21.2	6.95	93	7.97	45936	29.83
Composite 7	A	00	9/1/2017 09:20:43	21.2	6.95	93.1	7.94	45949	29.84

STUDY: 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Americamysis bahia* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.5	7.06	93.3	8.02	46313	30.11
Minimum:	19.5	3.11	40.2	7.79	44816	29.02
Maximum:	22.1	7.93	102.7	8.31	48623	31.80

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 7	B	00	9/1/2017 09:21:06	21.2	7.05	94.3	7.95	45949	29.84
Composite 7	C	00	9/1/2017 09:21:24	21.2	7.08	94.8	7.96	45935	29.83
Composite 7	D	00	9/1/2017 09:21:42	21.2	6.94	92.9	7.93	45964	29.85
Composite 7	E	00	9/1/2017 09:22:00	21.2	7.05	94.4	7.93	45967	29.85
Composite 8	A	00	9/1/2017 09:22:21	21.2	7.02	94	8.05	46106	29.95
Composite 8	B	00	9/1/2017 09:22:32	21.2	6.98	93.5	8.06	46072	29.93
Composite 8	C	00	9/1/2017 09:22:48	21.1	7.1	95.1	8.05	46448	30.2
Composite 8	D	00	9/1/2017 09:23:13	21.2	6.65	89	8.02	45927	29.82
Composite 8	E	00	9/1/2017 09:23:31	21.2	7	93.7	8.06	45999	29.88
Laboratory Control	A	01	9/2/2017 12:31:46	22	6.79	92.4	7.83	48223	31.49
CLDS Reference Site	A	01	9/2/2017 12:32:05	21.9	6.47	87.9	7.87	48412	31.62
Composite 1	A	01	9/2/2017 12:32:21	22	6.44	87.7	7.86	48355	31.58
Composite 2	A	01	9/2/2017 12:32:36	22	6.76	92.2	7.91	48244	31.5
Composite 3	A	01	9/2/2017 12:32:49	22	6.79	92.5	7.9	48101	31.4
Composite 4	A	01	9/2/2017 12:33:05	22	6.54	89.2	7.88	48363	31.59
Composite 5	A	01	9/2/2017 12:33:27	22	6.44	87.9	7.88	48477	31.67
Composite 6	A	01	9/2/2017 12:33:42	22	6.48	88.3	7.87	48480	31.67
Composite 7	A	01	9/2/2017 12:34:02	22.1	6.7	91.4	7.88	48456	31.65
Composite 8	A	01	9/2/2017 12:34:16	22.1	6.57	89.6	8	48386	31.6
Laboratory Control	A	02	9/3/2017 13:06:25	20.5	7.47	98.6	8.02	45385	29.44
CLDS Reference Site	A	02	9/3/2017 13:06:34	20.5	7.41	97.7	8	45284	29.36
Composite 1	A	02	9/3/2017 13:06:59	20.5	4.06	53.6	7.79	45223	29.32
Composite 2	A	02	9/3/2017 13:08:01	20.5	7.22	95.2	7.99	45246	29.34
Composite 3	A	02	9/3/2017 13:08:18	20.5	7.28	96	7.99	45094	29.23
Composite 4	A	02	9/3/2017 13:08:32	20.5	7.18	94.9	8	45745	29.7
Composite 5	A	02	9/3/2017 13:08:47	20.5	7.11	93.8	8.01	45436	29.47
Composite 6	A	02	9/3/2017 13:09:00	20.5	7.03	93	7.98	45940	29.84
Composite 7	A	02	9/3/2017 13:09:16	20.5	7.16	94.8	7.96	45928	29.83
Composite 8	A	02	9/3/2017 13:09:29	20.5	5.63	74.5	7.97	45885	29.8
Laboratory Control	A	03	9/4/2017 10:07:50	20.4	7.28	96.7	7.95	46281	30.09
CLDS Reference Site	A	03	9/4/2017 10:08:14	20.4	7.2	95.5	7.98	46159	30
Composite 1	A	03	9/4/2017 10:08:36	20.4	7.14	94.7	7.98	46118	29.97
Composite 2	A	03	9/4/2017 10:09:04	20.4	7.11	94.2	8.03	46089	29.95
Composite 3	A	03	9/4/2017 10:09:28	20.4	7.17	95	7.99	45996	29.88
Composite 4	A	03	9/4/2017 10:09:52	20.4	6.92	91.9	8.02	46419	30.19
Composite 5	A	03	9/4/2017 10:10:07	20.4	6.84	90.8	8.04	46542	30.28
Composite 6	A	03	9/4/2017 10:10:31	20.4	6.83	90.8	8	46640	30.35
Composite 7	A	03	9/4/2017 10:10:53	20.4	7.09	94.1	7.95	46601	30.32

STUDY: 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Americamysis bahia* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.5	7.06	93.3	8.02	46313	30.11
Minimum:	19.5	3.11	40.2	7.79	44816	29.02
Maximum:	22.1	7.93	102.7	8.31	48623	31.80

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 8	A	03	9/4/2017 10:11:13	20.4	6.92	91.9	8.1	46571	30.3
Laboratory Control	A	04	9/5/2017 10:26:18	20.7	7.39	99.2	7.99	46854	30.5
CLDS Reference Site	A	04	9/5/2017 10:26:32	20.7	7.35	98.6	8.01	46785	30.45
Composite 1	A	04	9/5/2017 10:26:53	20.7	7.08	95	7.99	46800	30.46
Composite 2	A	04	9/5/2017 10:27:15	20.7	7.12	95.4	8.05	46775	30.44
Composite 3	A	04	9/5/2017 10:27:27	20.6	7.25	97.2	8.03	46750	30.43
Composite 4	A	04	9/5/2017 10:27:44	20.6	7.01	93.9	8.07	46960	30.58
Composite 5	A	04	9/5/2017 10:27:56	20.6	7.02	94.1	8.09	47023	30.62
Composite 6	A	04	9/5/2017 10:28:10	20.6	6.85	91.8	8.02	47075	30.66
Composite 7	A	04	9/5/2017 10:28:28	20.6	7.1	95.3	7.96	47077	30.66
Composite 8	A	04	9/5/2017 10:28:42	20.6	7.03	94.3	8.14	47069	30.66
Laboratory Control	A	05	9/6/2017 10:11:35	20.9	7.21	96.6	7.96	46416	30.18
CLDS Reference Site	A	05	9/6/2017 10:11:55	20.9	7.12	95.4	8	46494	30.24
Composite 1	A	05	9/6/2017 10:12:20	20.9	6.79	91	8	46479	30.23
Composite 2	A	05	9/6/2017 10:12:43	20.9	6.97	93.4	8.06	46504	30.25
Composite 3	A	05	9/6/2017 10:13:07	21	7.01	94	8.02	46431	30.19
Composite 4	A	05	9/6/2017 10:13:22	21	6.87	92.2	8.1	46637	30.34
Composite 5	A	05	9/6/2017 10:13:41	21	6.7	89.8	8.13	46654	30.35
Composite 6	A	05	9/6/2017 10:14:02	21	6.65	89.3	8.04	46714	30.4
Composite 7	A	05	9/6/2017 10:14:18	21	6.88	92	7.97	45958	29.85
Composite 8	A	05	9/6/2017 10:14:33	21	6.81	91.4	8.13	46641	30.34
Laboratory Control	A	06	9/7/2017 09:54:04	20.6	7.29	97.5	7.93	46617	30.33
CLDS Reference Site	A	06	9/7/2017 09:54:17	20.6	7.45	99.7	7.98	46634	30.34
Composite 1	A	06	9/7/2017 09:54:34	20.6	7.23	96.7	7.99	46675	30.37
Composite 2	A	06	9/7/2017 09:54:44	20.6	7.15	95.6	8.05	46734	30.41
Composite 3	A	06	9/7/2017 09:54:52	20.6	7.19	96.2	8.03	46707	30.39
Composite 4	A	06	9/7/2017 09:56:34	20.6	7.03	94.2	8.18	46986	30.6
Composite 5	A	06	9/7/2017 09:56:52	20.6	6.9	92.4	8.16	46944	30.57
Composite 6	A	06	9/7/2017 09:57:06	20.6	6.78	90.9	8.05	47025	30.63
Composite 7	A	06	9/7/2017 09:57:29	20.6	7.11	95.1	7.94	46716	30.4
Composite 8	A	06	9/7/2017 09:57:53	20.6	6.99	93.6	8.15	46949	30.57
Laboratory Control	A	07	9/8/2017 09:07:53	20	7.48	97.6	7.96	45369	29.43
CLDS Reference Site	A	07	9/8/2017 09:08:11	20	7.64	99.7	8.01	45492	29.52
Composite 1	A	07	9/8/2017 09:08:26	20	7.42	96.9	8.03	45515	29.54
Composite 2	A	07	9/8/2017 09:08:47	20	7.26	94.8	8.09	45546	29.56
Composite 3	A	07	9/8/2017 09:09:07	20	7.29	95.2	8.05	45585	29.59
Composite 4	A	07	9/8/2017 09:09:29	20	7.21	94.2	8.17	45782	29.73

STUDY: 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Americamysis bahia* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.5	7.06	93.3	8.02	46313	30.11
Minimum:	19.5	3.11	40.2	7.79	44816	29.02
Maximum:	22.1	7.93	102.7	8.31	48623	31.80

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	A	07	9/8/2017 09:09:46	20	7.07	92.4	8.19	45767	29.72
Composite 6	A	07	9/8/2017 09:10:08	20	6.87	89.8	8.04	45846	29.77
Composite 7	A	07	9/8/2017 09:10:31	19.9	7.3	95.4	7.95	45697	29.67
Composite 8	A	07	9/8/2017 09:10:49	20	7.16	93.5	8.1	45837	29.77
Laboratory Control	A	08	9/9/2017 09:59:49	19.7	7.44	96.1	7.93	45669	29.65
CLDS Reference Site	A	08	9/9/2017 10:00:11	19.7	7.63	98.7	7.98	45955	29.86
Composite 1	A	08	9/9/2017 10:00:35	19.7	7.33	94.8	8.01	45984	29.88
Composite 2	A	08	9/9/2017 10:00:55	19.7	7.22	93.4	8.07	45952	29.85
Composite 3	A	08	9/9/2017 10:01:09	19.7	7.28	94.1	8.03	45975	29.87
Composite 4	A	08	9/9/2017 10:01:26	19.7	7.03	91	8.13	46201	30.03
Composite 5	A	08	9/9/2017 10:01:48	19.7	6.96	90.1	8.18	46275	30.09
Composite 6	A	08	9/9/2017 10:02:08	19.7	6.86	88.9	8.02	46302	30.11
Composite 7	A	08	9/9/2017 10:02:26	19.7	7.24	93.7	7.92	46218	30.05
Composite 8	A	08	9/9/2017 10:02:41	19.7	7.16	92.8	8.02	46312	30.11
Laboratory Control	A	09	9/10/2017 10:16:16	20	7.63	99	7.97	46361	30.15
CLDS Reference Site	A	09	9/10/2017 10:16:34	19.9	7.93	102.7	8	46428	30.2
Composite 1	A	09	9/10/2017 10:16:56	19.9	7.54	97.7	8.02	46526	30.27
Composite 2	A	09	9/10/2017 10:17:10	19.9	7.29	94.5	8.07	46571	30.3
Composite 3	A	09	9/10/2017 10:17:18	19.9	7.37	95.6	8.03	46573	30.3
Composite 4	A	09	9/10/2017 10:17:31	19.9	7.2	93.4	8.14	46844	30.5
Composite 5	A	09	9/10/2017 10:17:39	19.9	7.17	93	8.17	46817	30.48
Composite 6	A	09	9/10/2017 10:17:51	19.9	7.1	92.2	8.05	46925	30.56
Composite 7	A	09	9/10/2017 10:18:06	19.9	7.48	97.1	7.94	46811	30.47
Composite 8	A	09	9/10/2017 10:18:21	19.9	7.27	94.4	8.02	46880	30.52
Laboratory Control	A	10	9/11/2017 09:09:54	19.8	7.54	97.7	8	46287	30.1
Laboratory Control	B	10	9/11/2017 09:10:13	19.8	7.46	96.8	7.97	46619	30.34
Laboratory Control	C	10	9/11/2017 09:10:36	19.7	7.45	96.5	7.93	46577	30.31
Laboratory Control	D	10	9/11/2017 09:11:01	19.8	7.39	95.7	7.92	46158	30
Laboratory Control	E	10	9/11/2017 09:11:21	19.8	7.43	96.1	7.94	46213	30.04
CLDS Reference Site	A	10	9/11/2017 09:11:41	19.8	7.75	100.4	8.06	46423	30.19
CLDS Reference Site	B	10	9/11/2017 09:11:57	19.8	7.52	97.5	8.02	46377	30.16
CLDS Reference Site	C	10	9/11/2017 09:12:14	19.5	7.29	94.9	7.95	48623	31.8
CLDS Reference Site	D	10	9/11/2017 09:12:27	19.8	7.27	94.2	7.97	46336	30.13
CLDS Reference Site	E	10	9/11/2017 09:12:40	19.8	7.45	96.4	7.99	46163	30.01
Composite 1	A	10	9/11/2017 09:13:01	19.8	7.45	96.6	8.07	46417	30.19
Composite 1	B	10	9/11/2017 09:13:15	19.8	7.34	95.1	8.09	46258	30.07
Composite 1	C	10	9/11/2017 09:13:27	19.7	7.26	93.9	8.05	46286	30.09
Composite 1	D	10	9/11/2017 09:13:47	19.8	4.3	55.6	7.93	46116	29.97

STUDY: 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Americamysis bahia* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.5	7.06	93.3	8.02	46313	30.11
Minimum:	19.5	3.11	40.2	7.79	44816	29.02
Maximum:	22.1	7.93	102.7	8.31	48623	31.80

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 1	E	10	9/11/2017 09:14:10	19.7	7.22	93.4	8	46196	30.03
Composite 2	A	10	9/11/2017 09:16:23	19.8	7.25	94.1	8.14	46510	30.26
Composite 2	B	10	9/11/2017 09:21:17	19.8	7.1	92.1	8.08	46327	30.12
Composite 2	C	10	9/11/2017 09:21:30	19.7	7.2	93.2	8.12	46290	30.1
Composite 2	D	10	9/11/2017 09:21:42	19.7	7.22	93.4	8.1	46188	30.02
Composite 2	E	10	9/11/2017 09:22:03	19.7	7.24	93.6	8.12	46122	29.98
Composite 3	A	10	9/11/2017 09:22:20	19.7	7.46	96.6	8.06	46505	30.25
Composite 3	B	10	9/11/2017 09:22:37	19.7	7.48	96.7	8.06	46304	30.11
Composite 3	C	10	9/11/2017 09:22:53	19.7	7.32	94.7	8.03	46370	30.16
Composite 3	D	10	9/11/2017 09:23:03	19.7	7.3	94.4	8.02	46244	30.06
Composite 3	E	10	9/11/2017 09:23:23	19.7	7.57	97.9	8.06	46172	30.01
Composite 4	A	10	9/11/2017 09:23:43	19.7	7.25	93.8	8.23	46565	30.3
Composite 4	B	10	9/11/2017 09:24:03	19.7	7.11	92.1	8.16	46489	30.24
Composite 4	C	10	9/11/2017 09:24:25	19.7	7.2	93.3	8.16	46540	30.28
Composite 4	D	10	9/11/2017 09:24:46	19.7	3.11	40.2	8.18	46297	30.1
Composite 4	E	10	9/11/2017 09:25:09	19.7	7.12	92.1	8.2	46331	30.13
Composite 5	A	10	9/11/2017 09:25:45	19.7	7.13	92.4	8.28	46565	30.3
Composite 5	B	10	9/11/2017 09:26:05	19.7	7.07	91.4	8.31	46403	30.18
Composite 5	C	10	9/11/2017 09:27:48	19.7	7.06	91.4	8.18	46335	30.13
Composite 5	D	10	9/11/2017 09:28:17	19.7	7.03	91	8.24	46342	30.14
Composite 5	E	10	9/11/2017 09:28:32	19.7	7.22	93.5	8.19	46350	30.14
Composite 6	A	10	9/11/2017 09:28:54	19.7	7.1	91.9	8.08	46623	30.34
Composite 6	B	10	9/11/2017 09:29:03	19.7	7.18	92.9	8.07	46407	30.18
Composite 6	C	10	9/11/2017 09:29:30	19.7	7.17	92.8	8.04	46371	30.16
Composite 6	D	10	9/11/2017 09:29:42	19.7	7.1	91.9	8.02	46287	30.1
Composite 6	E	10	9/11/2017 09:30:03	19.7	7.19	93.1	8.01	46373	30.16
Composite 7	A	10	9/11/2017 09:30:25	19.7	7.5	97.1	7.98	46524	30.27
Composite 7	B	10	9/11/2017 09:30:40	19.7	7.27	94	7.93	46388	30.17
Composite 7	C	10	9/11/2017 09:30:55	19.7	7.28	94.2	7.92	46306	30.11
Composite 7	D	10	9/11/2017 09:31:12	19.7	7.12	92.1	7.86	46307	30.11
Composite 7	E	10	9/11/2017 09:31:21	19.7	7.19	93	7.86	46333	30.13
Composite 8	A	10	9/11/2017 09:31:44	19.7	7.22	93.5	8.06	46549	30.29
Composite 8	B	10	9/11/2017 09:32:17	19.7	7.22	93.5	8.11	46676	30.38
Composite 8	C	10	9/11/2017 09:32:28	19.7	7.14	92.4	8.08	46462	30.22
Composite 8	D	10	9/11/2017 09:32:43	19.7	6.61	85.6	8.06	46302	30.11
Composite 8	E	10	9/11/2017 09:33:00	19.7	7.23	93.6	8.11	46338	30.13

STUDY: 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Americamysis bahia* 10 Day Solid Phase Sediment Assay

TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

			Ammonia					
Sample ID	Day	ESI Code	Total	Unionized	QLimit	Units	Sampled	Analyzed
Laboratory Control	00	29520-100	0.15	0.0053	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
CLDS Reference Site	00	29520-101	ND	0.0019	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 1	00	29520-102	0.12	0.0046	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 2	00	29520-103	1.9	0.0758	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 3	00	29520-104	0.31	0.0116	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 4	00	29520-105	2	0.0834	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 5	00	29520-106	4.1	0.1895	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 6	00	29520-107	7.4	0.2932	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 7	00	29520-108	8.6	0.3118	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 8	00	29520-109	4.3	0.1988	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Laboratory Control	03	29520-200	0.42	0.0147	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
CLDS Reference Site	03	29520-201	0.18	0.0067	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 1	03	29520-202	0.29	0.0109	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 2	03	29520-203	1.2	0.0502	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 3	03	29520-204	0.11	0.0042	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 4	03	29520-205	0.58	0.0237	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 5	03	29520-206	2.3	0.0984	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 6	03	29520-207	5.1	0.1997	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 7	03	29520-208	5.8	0.2033	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 8	03	29520-209	3.1	0.1513	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Laboratory Control	10	29520-300	ND	0.0019	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
CLDS Reference Site	10	29520-301	ND	0.0021	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 1	10	29520-302	ND	0.0022	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 2	10	29520-303	0.17	0.0087	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 3	10	29520-304	ND	0.0021	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 4	10	29520-305	ND	0.0031	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 5	10	29520-306	0.11	0.0076	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 6	10	29520-307	0.11	0.0049	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 7	10	29520-308	ND	0.0018	0.1	mg/L as N	09/11/17 0930	09/19/17 1239
Composite 8	10	29520-309	0.15	0.0064	0.1	mg/L as N	09/11/17 0930	09/19/17 1239

Pre-Assay Monitoring
Leptocheirus plumulosus
ACUTE EXPOSURE SEDIMENT ASSAY

Study: 29519
Client: AECOM
Project: New Haven Harbor

Day	Date	Renew	Pore Water Ammonia Measured	Initial
(sediment into beakers)	08/24/17			JG
1	08/25/17	✓		JG
2	08/26/17	✓		JG
3	08/27/17	✓		DD
4	08/28/17	✓		DD
5	08/29/17	✓		DD
6	08/30/17	✓		DD
7	08/31/17	✓		JG
8				
9				
10				
11				
12				
13				

Notes: • 20°C • Salinity: 20 ppt • Renew Daily-One Exchange

99
NLPAR0083117
09/13

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Leptocheirus plumulosus

Source: Lab reared x Hatchery reared ____ Field collected ____

Hatch date 8/2017 Receipt date ____

Lot number 080017LP Strain ARO

Brood origination Chesapeake Bay, MD

II. Water Quality

Temperature 24 °C Salinity ~20 ppt D.O. SAT ppm

pH ~8.0 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater ____ Saltwater x Other ____

Recirculating ____ Flow through ____ Static renewal x

DIET: Flake food x Phytoplankton ____ Trout chow x

Artemia ____ Rotifers ____ YCT ____ Other "GORP"

Prophylactic treatments: ____

Comments: 2-4mm long

IV. Shipping Information

Client: ESI # of Organisms 2500+

Carrier: FedEx Date shipped 8/31/17

Biologist: ____

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

EnviroSystems Inc.

Organism Addition Record

Study Number: 29519	**Species:** L. plumulosus
Client: AECOM	**Organism Lot ID:** 11Lp AR0083117
Project: New Haven Harbor	**Number of Organisms added to each chamber:** 20
Date: 09/01/17	
Initials: BG/ JTP	

Notes: Pill cups counted by BG and JTP

P:\General Projects\FORMS\LABFORMS\Organism Addition Record R0-2015.wpd

Leptocheirus plumulosus
ACUTE EXPOSURE SEDIMENT ASSAY

Study: 29519
Client: AECOM
Project: New Haven Harbor

Day	Date	Renew	Initial
0 (all beakers)	09/01/17	✓	BG
1	09/02/17	✓	BG
2	09/03/17	✓	MS
3	09/04/17	✓	MS
4 (E10) GRS 09/04	09/05/17	✓	DD
5	09/06/17	✓	BG
6	09/07/17	✓	DD
7	09/08/17	✓	BG
8	09/09/17	✓	BG
9	09/10/17	✓	DD
10 (all beakers)	09/11/17	—	DD

Pore water collected for pH and NH_3 Overlying water collected for NH_3	Day 0	Initial: BG
	Day 3	Initial: MS
	Day 10	Initial: AK 9/11/17

Notes: • 20°C • Salinity: 20 ppt • Do Not Feed • Renew Daily-One Exchange

(E10) BG 09/02 Temperature noted as 27°C, back turned down.

(E10) GRS 09/04 Fed with brine shrimp accidentally

DAY10 *Leptocheirus plumulosus* Sediment Assay Recovery

DATE: 9/11/2017 **STUDY:** 29519

CLIENT: AECOM **PROJECT:** New Haven Harbor Navigation Improvement Project

SAMPLE ID	REP	#LIVE ADULTS	DATE & INITIAL
Laboratory Control	A	18	9/11/17 KAS
	B	19	9/11/17 KAS
	C	19	9/11/17 KAS
	D	19	9/11/17 KAS
	E	19	9/11/17 KAS
CLDS Reference Sediment	A	19	9/11/17 KAS
	B	20	9/11/17 KAS
	C	18	9/11/17 KAS
	D	18	9/11/17 KAS
	E	20	9/11/17 KAS
Composite #1	A	19	9/11/17 KAS
	B	20	9/11/17 KAS
	C	17	9/11/17 KAS
	D	20	9/11/17 KAS
	E	19	9/11/17 KAS
Composite #2	A	17	9/11/17 KAS
	B	20	9/11/17 KAS
	C	17	9/11/17 KAS
	D	18	9/11/17 KAS
	E	19	9/11/17 KAS
Composite #3	A	18	9/11/17 KAS
	B	17	9/11/17 KAS
	C	19	9/11/17 KAS
	D	19	9/11/17 KAS
	E	KAS 9/11/17 ③ 19 20	9/11/17 KAS

SAMPLE ID	REP	#LIVE ADULTS	DATE & INITIAL
Composite #4	A	20	09/11/17 GRS
	B	20	↓
	C	19	
	D	19	
	E	18	9/11/17 KAS
Composite #5	A	19	9/11/17 KAS
	B	18	9/11/17 KAS
	C	18	9/11/17 KAS
	D	20	9/11/17 KAS
	E	17	9/11/17 KAS
Composite #6	A	19	9/11/17 KAS
	B	16	9/11/17 KAS
	C	17	9/11/17 KAS
	D	18	9/11/17 KAS
	E	19	9/11/17 KAS
Composite #7	A	18	9/11/17 KAS
	B	20	9/11/17 KAS
	C	20	9/11/17 KAS
	D	9/11/17 ~~18~~ ③ KAS 18	9/11/17 KAS
	E	20	9/11/17 KAS
Composite #8	A	18	9/11/17 KAS
	B	15	9/11/17 KAS
	C	18	9/11/17 KAS
	D	18	9/11/17 KAS
	E	18	9/11/17 KAS

CETIS Test Data Worksheet

Report Date: 12 Sep-17 11:47 (p 1 of 2)
Test Code/ID: 11-3091-7112/29519Lp

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Start Date: 01 Sep-17 12:00 **Species:** Leptocheirus plumulosus **Sample Code:** 29519-000
End Date: 11 Sep-17 12:00 **Protocol:** EPA/600/R-94/025 (1994) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 01 Sep-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29519

Sample	Rep	Pos	# Exposed	# Survived	# Reburied	Notes
29519-000	1	6	20	18		
29519-000	2	12	20	19		
29519-000	3	30	20	19		
29519-000	4	31	20	19		
29519-000	5	50	20	19		
29517-009	1	4	20	19		
29517-009	2	11	20	20		
29517-009	3	24	20	18		
29517-009	4	39	20	18		
29517-009	5	47	20	20		
29517-001	1	9	20	19		
29517-001	2	16	20	20		
29517-001	3	26	20	17		
29517-001	4	37	20	20		
29517-001	5	44	20	19		
29517-002	1	2	20	17		
29517-002	2	19	20	20		
29517-002	3	22	20	17		
29517-002	4	38	20	18		
29517-002	5	42	20	19		
29517-003	1	10	20	18		
29517-003	2	17	20	17		
29517-003	3	27	20	19		
29517-003	4	36	20	19		
29517-003	5	45	20	20		
29517-004	1	1	20	20		
29517-004	2	14	20	20		
29517-004	3	28	20	19		
29517-004	4	35	20	19		
29517-004	5	43	20	18		
29517-005	1	5	20	19		
29517-005	2	20	20	18		
29517-005	3	21	20	18		
29517-005	4	34	20	20		
29517-005	5	46	20	17		
29517-006	1	8	20	19		
29517-006	2	18	20	16		
29517-006	3	29	20	17		
29517-006	4	33	20	18		
29517-006	5	49	20	19		
59517-007	1	7	20	18		
59517-007	2	13	20	20		
59517-007	3	25	20	20		
59517-007	4	32	20	18		
59517-007	5	41	20	20		
29517-008	1	3	20	18		
29517-008	2	15	20	15		

Sample	Rep	Pos	# Exposed	# Survived	# Reburied	Notes
29517-008	3	23	20	18		
29517-008	4	40	20	18		
29517-008	5	48	20	18		

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Batch ID:	14-6581-1248	**Test Type:**	Survival-Reburial	**Analyst:**	Nancy Roka
Start Date:	01 Sep-17 12:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Not Applicable
Ending Date:	11 Sep-17 12:00	**Species:**	Leptocheirus plumulosus	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29519-000	13-7877-0805	01 Sep-17	01 Sep-17	12h	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h		
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	11d 3h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	11d 2h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	10d 22h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	10d 21h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	10d 20h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	11d		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	10d 20h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	11d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29519-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29519	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
05-0735-7775	Proportion Survived	Equal Variance t Two-Sample Test	0.6899	29517-009 passed proportion survived
05-9198-0601	Proportion Survived	Equal Variance t Two-Sample Test	0.5223	29517-001 passed proportion survived
12-1328-9380	Proportion Survived	Equal Variance t Two-Sample Test	0.1727	29517-002 passed proportion survived
13-5565-1158	Proportion Survived	Equal Variance t Two-Sample Test	0.2949	29517-003 passed proportion survived
19-6359-8052	Proportion Survived	Equal Variance t Two-Sample Test	0.6189	29517-004 passed proportion survived
06-6072-2673	Proportion Survived	Equal Variance t Two-Sample Test	0.2126	29517-005 passed proportion survived
13-3196-7384	Proportion Survived	Equal Variance t Two-Sample Test	0.0711	29517-006 passed proportion survived
19-2658-9148	Proportion Survived	Equal Variance t Two-Sample Test	0.6237	59517-007 passed proportion survived
05-8914-5430	Proportion Survived	Equal Variance t Two-Sample Test	0.0245	29517-008 failed proportion survived

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
05-0735-7775	Proportion Survived	Control Resp	0.94	0.9	>>	Yes	Passes Criteria

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29519-000	LC	5	0.940	0.912	0.968	0.900	0.950	0.010	0.022	2.38%	0.00%
29517-009	RS	5	0.950	0.888	1.000	0.900	1.000	0.022	0.050	5.26%	-1.06%
29517-001		5	0.950	0.874	1.000	0.850	1.000	0.027	0.061	6.45%	-1.06%
29517-002		5	0.910	0.829	0.991	0.850	1.000	0.029	0.065	7.16%	3.19%
29517-003		5	0.930	0.859	1.000	0.850	1.000	0.026	0.057	6.13%	1.06%
29517-004		5	0.960	0.908	1.000	0.900	1.000	0.019	0.042	4.36%	-2.13%
29517-005		5	0.920	0.849	0.991	0.850	1.000	0.026	0.057	6.20%	2.13%
29517-006		5	0.890	0.809	0.971	0.800	0.950	0.029	0.065	7.32%	5.32%
59517-007		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-2.13%
29517-008		5	0.870	0.787	0.953	0.750	0.900	0.030	0.067	7.71%	7.45%

Leptocheirus 10-d Survival and Reburial Sediment Test **EnviroSystems, Inc.**

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29519-000	LC	0.900	0.950	0.950	0.950	0.950
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-001		0.950	1.000	0.850	1.000	0.950
29517-002		0.850	1.000	0.850	0.900	0.950
29517-003		0.900	0.850	0.950	0.950	1.000
29517-004		1.000	1.000	0.950	0.950	0.900
29517-005		0.950	0.900	0.900	1.000	0.850
29517-006		0.950	0.800	0.850	0.900	0.950
59517-007		0.900	1.000	1.000	0.900	1.000
29517-008		0.900	0.750	0.900	0.900	0.900

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-0735-7775	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29519-000	13-7877-0805	01 Sep-17	01 Sep-17	12h	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29519-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29519	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-009 passed proportion survived	5.39%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	-0.515	1.86	0.094	8	CDF	0.6899	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.41	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0017086	0.0017086	1	0.266	0.6202	Non-Significant Effect
Error	0.0514482	0.0064310	8			
Total	0.0531568		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.94	23.2	0.1125	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1413	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29519-000	LC	5	0.940	0.912	0.968	0.950	0.900	0.950	0.010	2.38%	0.00%
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	-1.06%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29519-000	LC	5	1.33	1.27	1.38	1.35	1.25	1.35	0.0192	3.25%	0.00%
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	-1.97%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29519-000	LC	0.900	0.950	0.950	0.950	0.950
29517-009	RS	0.950	1.000	0.900	0.900	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29519-000	LC	1.25	1.35	1.35	1.35	1.35
29517-009	RS	1.35	1.46	1.25	1.25	1.46

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-9198-0601	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	11d 3h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-001 passed proportion survived	7.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.0577	1.86	0.131	8	CDF	0.5223	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5896	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.116E-05	4.116E-05	1	0.00333	0.9554	Non-Significant Effect
Error	0.0988406	0.0123551	8			
Total	0.0988818		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8373	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.871	0.741	0.1022	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-001		5	0.950	0.874	1.000	0.950	0.850	1.000	0.027	6.45%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-001		5	1.36	1.21	1.5	1.35	1.17	1.46	0.0523	8.63%	-0.30%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-001		0.950	1.000	0.850	1.000	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-001		1.35	1.46	1.17	1.46	1.35

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-1328-9380	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	11d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-002 passed proportion survived	7.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1	1.86	0.134	8	CDF	0.1727	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7593	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0130762	0.0130762	1	1.01	0.3454	Non-Significant Effect
Error	0.10407	0.0130088	8			
Total	0.117146		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.36	23.2	0.7713	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.869	0.741	0.0966	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-002		5	0.910	0.829	0.991	0.900	0.850	1.000	0.029	7.16%	4.21%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-002		5	1.28	1.13	1.43	1.25	1.17	1.46	0.0548	9.57%	5.35%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-002		0.850	1.000	0.850	0.900	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-002		1.17	1.46	1.17	1.25	1.35

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-5565-1158	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	10d 22h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-003 passed proportion survived	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.562	1.86	0.125	8	CDF	0.2949	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.44	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0035882	0.0035882	1	0.315	0.5898	Non-Significant Effect
Error	0.0910236	0.0113779	8			
Total	0.0946117		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.07	23.2	0.9515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4616	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-003		5	0.930	0.859	1.000	0.950	0.850	1.000	0.026	6.13%	2.11%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-003		5	1.31	1.18	1.45	1.35	1.17	1.46	0.0485	8.25%	2.80%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-003		0.900	0.850	0.950	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-003		1.25	1.17	1.35	1.35	1.46

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-6359-8052	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	10d 21h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-004 passed proportion survived	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.313	1.86	0.114	8	CDF	0.6189	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.33	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009262	0.0009262	1	0.098	0.7623	Non-Significant Effect
Error	0.0756368	0.0094546	8			
Total	0.0765629		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.39	23.2	0.7555	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.741	0.0889	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-004		5	0.960	0.908	1.000	0.950	0.900	1.000	0.019	4.36%	-1.05%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-004		5	1.37	1.26	1.48	1.35	1.25	1.46	0.0397	6.48%	-1.42%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-004		1.000	1.000	0.950	0.950	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-004		1.46	1.46	1.35	1.35	1.25

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-6072-2673	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	10d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-005 passed proportion survived	6.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.84	1.86	0.126	8	CDF	0.2126	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.62	2.29	0.8707	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0081603	0.0081603	1	0.706	0.4252	Non-Significant Effect
Error	0.0924681	0.0115585	8			
Total	0.100628		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.1	23.2	0.9288	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.917	0.741	0.3337	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-005		5	0.920	0.849	0.991	0.900	0.850	1.000	0.026	6.20%	3.16%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-005		5	1.3	1.16	1.43	1.25	1.17	1.46	0.0492	8.50%	4.23%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-005		0.950	0.900	0.900	1.000	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-005		1.35	1.25	1.25	1.46	1.17

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-3196-7384	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	11d		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-006 passed proportion survived	6.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.63	1.86	0.124	8	CDF	0.0711	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.38	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0292718	0.0292718	1	2.65	0.1421	Non-Significant Effect
Error	0.0883364	0.011042	8			
Total	0.117608		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.01	23.2	0.9956	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.85	0.741	0.0587	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-006		5	0.890	0.809	0.971	0.900	0.800	0.950	0.029	7.32%	6.32%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-006		5	1.24	1.11	1.37	1.25	1.11	1.35	0.0471	8.46%	8.00%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-006		0.950	0.800	0.850	0.900	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-006		1.35	1.11	1.17	1.25	1.35

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-2658-9148	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	10d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	59517-007 passed proportion survived	6.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.326	1.86	0.129	8	CDF	0.6237	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.21	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	0.106	0.7526	Non-Significant Effect
Error	0.0968143	0.0121018	8			
Total	0.098102		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.2	23.2	0.8650	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.79	0.741	0.0108	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
59517-007		5	0.960	0.892	1.000	1.000	0.900	1.000	0.025	5.71%	-1.05%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
59517-007		5	1.37	1.23	1.52	1.46	1.25	1.46	0.0514	8.35%	-1.68%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
59517-007		0.900	1.000	1.000	0.900	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
59517-007		1.25	1.46	1.46	1.25	1.46

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-8914-5430	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	12 Sep-17 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	15d 4h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	11d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-008 failed proportion survived	6.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.32	1.86	0.115	8	CDF	0.0245	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5851	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0514822	0.0514822	1	5.37	0.0491	Significant Effect
Error	0.0766331	0.0095791	8			
Total	0.128115		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7776	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.741	0.1227	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	0.00%
29517-008		5	0.870	0.787	0.953	0.900	0.750	0.900	0.030	7.71%	8.42%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	0.00%
29517-008		5	1.21	1.1	1.32	1.25	1.05	1.25	0.0404	7.47%	10.61%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	1.000	0.900	0.900	1.000
29517-008		0.900	0.750	0.900	0.900	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.46	1.25	1.25	1.46
29517-008		1.25	1.05	1.25	1.25	1.25

Sample Reading Order for Water Quality Measurements

Study: 29519
Client: AECOM
Project: New Haven Harbor

Reading order for days 0 and 10

Reading Number	Field ID	Replicate	Lab Code
1	Laboratory Control Sediment	surrogate	29519-000
2		A	
3		B	
4		C	
5		D	
6		E	
7	CLDS Reference Sediment	surrogate	29517-009
8		A	
9		B	
10		C	
11		D	
12		E	
13	Composite 1	surrogate	29517-001
14		A	
15		B	
16		C	
17		D	
18		E	
19	Composite 2	surrogate	29517-002
20		A	
21		B	
22		C	
23		D	
24		E	
25	Composite 3	surrogate	29517-003
26		A	
27		B	
28		C	
29		D	
30		E	
31	Composite 4	surrogate	29517-004
32		A	
33		B	
34		C	
35		D	
36		E	
37	Composite 5	surrogate	29517-005
38		A	
39		B	
40		C	
41		D	
42		E	
43	Composite 6	surrogate	29517-006
44		A	
45		B	
46		C	
47		D	
48		E	

Sample Reading Order for Water Quality Measurements

Study: 29519
Client: AECOM
Project: New Haven Harbor

49	Composite 7	surrogate	29517-007
50		A	
51		B	
52		C	
53		D	
54		E	
55	Composite 8	surrogate	29517-008
56		A	
57		B	
58		C	
59		D	
60		E	

Reading order for days 1 - 9

Reading Number	Field ID	Replicate	Lab Code
1	Laboratory Control Sediment	surrogate	29519-000
2	CLDS Reference Sediment	surrogate	29517-009
3	Composite 1	surrogate	29517-001
4	Composite 2	surrogate	29517-002
5	Composite 3	surrogate	29517-003
6	Composite 4	surrogate	29517-004
7	Composite 5	surrogate	29517-005
8	Composite 6	surrogate	29517-006
9	Composite 7	surrogate	29517-007
10	Composite 8	surrogate	29517-008

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.6	7.60	94.5	7.98	31472	19.63
Minimum:	19.7	3.74	47.6	7.76	30257	18.79
Maximum:	22.2	8.17	104.3	8.26	35366	22.33

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	Surrogate	00	9/1/2017 08:38:08	21.3	7.77	97.8	7.82	30643	19.06
Laboratory Control	A	00	9/1/2017 08:38:30	21.3	7.83	98.6	7.84	30764	19.14
Laboratory Control	B	00	9/1/2017 08:38:48	21.3	7.16	90.2	7.76	30696	19.09
Laboratory Control	C	00	9/1/2017 08:39:14	21.3	7.78	98	7.85	30853	19.2
Laboratory Control	D	00	9/1/2017 08:39:27	21.3	7.78	98.1	7.85	30625	19.05
Laboratory Control	E	00	9/1/2017 08:39:49	21.3	7.75	97.6	7.85	30637	19.05
Reference Site	Surrogate	00	9/1/2017 08:41:58	21.4	7.49	94.5	7.84	30790	19.16
Reference Site	A	00	9/1/2017 08:42:16	21.3	7.53	94.9	7.86	30714	19.11
Reference Site	B	00	9/1/2017 08:42:29	21.3	7.69	97	7.88	30884	19.22
Reference Site	C	00	9/1/2017 08:42:48	21.2	7.65	96.5	7.87	31425	19.6
Reference Site	D	00	9/1/2017 08:43:04	21.3	7.66	96.5	7.88	30743	19.13
Reference Site	E	00	9/1/2017 08:43:25	21.3	7.63	96.3	7.89	31182	19.43
Composite 1	Surrogate	00	9/1/2017 08:44:07	21.3	7.51	94.7	7.84	30794	19.16
Composite 1	A	00	9/1/2017 08:44:24	21.3	7.69	96.9	7.87	30660	19.07
Composite 1	B	00	9/1/2017 08:44:43	21.3	7.61	96	7.86	30838	19.19
Composite 1	C	00	9/1/2017 08:44:58	21.3	7.53	94.9	7.87	30696	19.09
Composite 1	D	00	9/1/2017 08:45:15	21.3	7.65	96.4	7.87	30593	19.02
Composite 1	E	00	9/1/2017 08:45:38	21.3	7.61	95.9	7.87	30703	19.1
Composite 2	Surrogate	00	9/1/2017 08:46:13	21.3	7.46	94.1	7.89	30701	19.1
Composite 2	A	00	9/1/2017 08:46:35	21.3	7.6	96	7.97	31220	19.45
Composite 2	B	00	9/1/2017 08:46:50	21.3	7.59	95.6	7.95	30731	19.12
Composite 2	C	00	9/1/2017 08:47:07	21.3	7.64	96.2	7.94	30687	19.09
Composite 2	D	00	9/1/2017 08:47:29	21.3	7.66	96.5	7.95	30696	19.1
Composite 2	E	00	9/1/2017 08:47:42	21.3	7.65	96.4	7.95	30692	19.09
Composite 3	Surrogate	00	9/1/2017 08:48:06	21.3	7.46	94.1	7.91	30847	19.2
Composite 3	A	00	9/1/2017 08:48:26	21.3	7.59	95.7	7.91	30744	19.13
Composite 3	B	00	9/1/2017 08:48:42	21.3	7.55	95.4	7.91	31235	19.46
Composite 3	C	00	9/1/2017 08:49:03	21.3	7.6	95.8	7.89	30721	19.11
Composite 3	D	00	9/1/2017 08:49:19	21.3	7.6	95.8	7.91	30780	19.15
Composite 3	E	00	9/1/2017 08:49:36	21.3	7.62	96	7.91	30739	19.12
Composite 4	Surrogate	00	9/1/2017 08:50:36	21.3	7.22	90.9	7.87	30388	18.88
Composite 4	A	00	9/1/2017 08:50:54	21.3	7.59	95.6	7.95	30508	18.97
Composite 4	B	00	9/1/2017 08:51:14	21.3	7.58	95.4	7.98	30326	18.84
Composite 4	C	00	9/1/2017 08:51:36	21.3	7.38	92.8	7.96	30262	18.8
Composite 4	D	00	9/1/2017 08:51:59	21.3	7.58	95.4	7.96	30257	18.79
Composite 4	E	00	9/1/2017 08:52:16	21.3	7.61	95.7	7.98	30289	18.82
Composite 5	Surrogate	00	9/1/2017 08:52:38	21.3	7.42	93.5	7.99	30488	18.95
Composite 5	A	00	9/1/2017 08:52:53	21.3	7.56	95.1	8	30398	18.89
Composite 5	B	00	9/1/2017 08:53:07	21.3	7.59	95.6	8.02	30493	18.96
Composite 5	C	00	9/1/2017 08:53:20	21.3	7.6	95.6	8.03	30426	18.91
Composite 5	D	00	9/1/2017 08:53:41	21.3	7.42	93.4	8.01	30359	18.86

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.6	7.60	94.5	7.98	31472	19.63
Minimum:	19.7	3.74	47.6	7.76	30257	18.79
Maximum:	22.2	8.17	104.3	8.26	35366	22.33

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	E	00	9/1/2017 08:53:54	21.3	7.48	94.2	8.02	30602	19.03
Composite 6	Surrogate	00	9/1/2017 08:54:12	21.3	7.45	93.8	8	30642	19.06
Composite 6	A	00	9/1/2017 08:54:32	21.3	7.52	94.6	7.99	30439	18.92
Composite 6	B	00	9/1/2017 08:54:46	21.3	7.53	94.9	8	30633	19.05
Composite 6	C	00	9/1/2017 08:55:04	21.3	7.59	95.5	8.03	30465	18.94
Composite 6	D	00	9/1/2017 08:55:26	21.3	7.42	93.4	7.98	30355	18.86
Composite 6	E	00	9/1/2017 08:55:39	21.3	7.62	95.9	8	30466	18.94
Composite 7	Surrogate	00	9/1/2017 08:56:00	21.3	7.44	93.6	7.91	30521	18.98
Composite 7	A	00	9/1/2017 08:56:14	21.3	7.4	93.2	7.95	30713	19.11
Composite 7	B	00	9/1/2017 08:56:48	21.3	7.54	95	7.98	30526	18.98
Composite 7	C	00	9/1/2017 08:57:14	21.3	7.58	95.5	7.96	30500	18.96
Composite 7	D	00	9/1/2017 08:57:29	21.3	7.52	94.6	7.93	30416	18.9
Composite 7	E	00	9/1/2017 08:57:43	21.3	7.53	94.8	7.96	30423	18.91
Composite 8	Surrogate	00	9/1/2017 08:58:06	21.3	7.47	94.1	8	30587	19.02
Composite 8	A	00	9/1/2017 08:58:20	21.3	7.56	95.2	8.01	30510	18.97
Composite 8	B	00	9/1/2017 08:58:40	21.3	7.59	95.5	8.02	30484	18.95
Composite 8	C	00	9/1/2017 08:58:53	21.3	7.53	94.7	8.01	30381	18.88
Composite 8	D	00	9/1/2017 08:59:08	21.3	7.54	94.8	8	30384	18.88
Composite 8	E	00	9/1/2017 08:59:20	21.3	7.55	94.9	8.01	30396	18.89
Laboratory Control	Surrogate	01	9/2/2017 12:28:09	21.9	8.17	104.3	7.77	32772	20.51
Reference Site	Surrogate	01	9/2/2017 12:28:21	21.8	8.13	103.6	7.82	32979	20.66
Composite 1	Surrogate	01	9/2/2017 12:28:43	22.1	7.88	100.9	7.85	33132	20.76
Composite 2	Surrogate	01	9/2/2017 12:29:03	22.2	7.7	98.7	7.9	32738	20.49
Composite 3	Surrogate	01	9/2/2017 12:29:20	22.2	7.58	97.2	7.89	32727	20.48
Composite 4	Surrogate	01	9/2/2017 12:29:48	22.2	7.37	94	7.89	31297	19.5
Composite 5	Surrogate	01	9/2/2017 12:30:11	22.2	7.59	96.8	7.96	31354	19.54
Composite 6	Surrogate	01	9/2/2017 12:30:27	22.1	7.47	95.2	7.97	31720	19.79
Composite 7	Surrogate	01	9/2/2017 12:30:50	22	7.35	93.5	7.87	31600	19.71
Composite 8	Surrogate	01	9/2/2017 12:31:05	22.1	3.74	47.6	7.87	31645	19.74
Laboratory Control	Surrogate	02	9/3/2017 12:42:27	20.6	7.59	94.5	7.99	31147	19.41
Reference Site	Surrogate	02	9/3/2017 12:42:43	20.6	7.62	95	7.94	31215	19.46
Composite 1	Surrogate	02	9/3/2017 12:43:07	20.6	7.65	95.3	7.94	31279	19.5
Composite 2	Surrogate	02	9/3/2017 12:43:23	20.6	7.48	93.1	7.96	31113	19.39
Composite 3	Surrogate	02	9/3/2017 12:43:41	20.6	7.59	94.4	7.94	31115	19.39
Composite 4	Surrogate	02	9/3/2017 12:44:05	20.6	7.26	90.1	7.92	30341	18.86
Composite 5	Surrogate	02	9/3/2017 12:44:28	20.6	7.57	94	7.99	30430	18.92
Composite 6	Surrogate	02	9/3/2017 12:44:52	20.5	7.53	93.5	7.99	30690	19.1
Composite 7	Surrogate	02	9/3/2017 12:45:13	20.5	7.54	93.6	7.89	30569	19.02
Composite 8	Surrogate	02	9/3/2017 12:45:32	20.5	7.63	94.6	8.09	30621	19.05

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.6	7.60	94.5	7.98	31472	19.63
Minimum:	19.7	3.74	47.6	7.76	30257	18.79
Maximum:	22.2	8.17	104.3	8.26	35366	22.33

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	Surrogate	03	9/4/2017 10:01:21	20.4	7.49	93.2	8.03	30572	19.02
Reference Site	Surrogate	03	9/4/2017 10:01:42	20.4	7.43	92.4	7.95	30615	19.05
Composite 1	Surrogate	03	9/4/2017 10:02:05	20.4	7.56	94	7.93	30377	18.89
Composite 2	Surrogate	03	9/4/2017 10:02:33	20.4	7.54	93.8	7.95	30519	18.98
Composite 3	Surrogate	03	9/4/2017 10:02:57	20.4	7.36	91.6	7.93	30589	19.03
Composite 4	Surrogate	03	9/4/2017 10:03:21	20.4	6.89	85.9	7.91	31112	19.39
Composite 5	Surrogate	03	9/4/2017 10:03:47	20.4	7.38	92	8	31181	19.44
Composite 6	Surrogate	03	9/4/2017 10:04:12	20.4	7.2	89.8	7.98	31371	19.57
Composite 7	Surrogate	03	9/4/2017 10:04:34	20.4	7.19	89.6	7.87	31238	19.47
Composite 8	Surrogate	03	9/4/2017 10:04:59	20.4	7.4	92.2	8.11	30902	19.24
Laboratory Control	Surrogate	04	9/5/2017 10:31:58	20.7	7.5	95.2	7.84	33413	20.97
Reference Site	Surrogate	04	9/5/2017 10:32:20	20.7	7.47	94.7	7.89	33386	20.95
Composite 1	Surrogate	04	9/5/2017 10:32:43	20.7	7.51	95.4	7.91	33719	21.18
Composite 2	Surrogate	04	9/5/2017 10:33:00	20.7	7.39	93.8	7.95	33374	20.94
Composite 3	Surrogate	04	9/5/2017 10:33:14	20.7	7.29	92.5	7.92	33517	21.04
Composite 4	Surrogate	04	9/5/2017 10:33:29	20.6	6.97	88.9	7.91	34865	21.98
Composite 5	Surrogate	04	9/5/2017 10:33:46	20.7	7.18	91.6	8.03	34980	22.06
Composite 6	Surrogate	04	9/5/2017 10:34:06	20.7	7.02	89.6	7.97	35193	22.2
Composite 7	Surrogate	04	9/5/2017 10:34:22	20.7	6.98	89.2	7.84	35231	22.23
Composite 8	Surrogate	04	9/5/2017 10:34:35	20.7	7.26	92.8	8.06	35366	22.33
Laboratory Control	Surrogate	05	9/6/2017 10:07:13	21	7.51	95.3	7.87	32998	20.68
Reference Site	Surrogate	05	9/6/2017 10:07:37	21	7.4	93.8	7.89	32948	20.65
Composite 1	Surrogate	05	9/6/2017 10:07:57	21	7.45	94.6	7.91	33070	20.73
Composite 2	Surrogate	05	9/6/2017 10:08:12	21	7.35	93.2	7.95	32941	20.64
Composite 3	Surrogate	05	9/6/2017 10:08:29	21	7.31	92.7	7.93	32983	20.67
Composite 4	Surrogate	05	9/6/2017 10:08:44	20.9	7.07	89.6	7.94	32935	20.64
Composite 5	Surrogate	05	9/6/2017 10:09:20	20.9	7.09	89.9	8.09	32964	20.66
Composite 6	Surrogate	05	9/6/2017 10:09:44	20.9	7.09	89.8	8.02	33057	20.72
Composite 7	Surrogate	05	9/6/2017 10:10:01	20.9	7.1	89.9	7.89	32951	20.65
Composite 8	Surrogate	05	9/6/2017 10:10:37	20.9	7.03	89.1	8.16	33003	20.68
Laboratory Control	Surrogate	06	9/7/2017 09:51:28	20.6	7.68	96.7	7.83	31871	19.91
Reference Site	Surrogate	06	9/7/2017 09:51:40	20.6	7.73	97.3	7.88	31941	19.96
Composite 1	Surrogate	06	9/7/2017 09:51:56	20.6	7.73	97.3	7.92	32023	20.01
Composite 2	Surrogate	06	9/7/2017 09:52:18	20.6	7.64	96.2	7.98	31925	19.94
Composite 3	Surrogate	06	9/7/2017 09:52:29	20.6	7.64	96.2	7.95	31960	19.97
Composite 4	Surrogate	06	9/7/2017 09:52:41	20.6	7.46	93.9	7.96	31767	19.84
Composite 5	Surrogate	06	9/7/2017 09:52:53	20.6	7.5	94.4	8.08	31814	19.87

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.6	7.60	94.5	7.98	31472	19.63
Minimum:	19.7	3.74	47.6	7.76	30257	18.79
Maximum:	22.2	8.17	104.3	8.26	35366	22.33

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	Surrogate	06	9/7/2017 09:53:09	20.6	7.38	92.8	8.04	32036	20.02
Composite 7	Surrogate	06	9/7/2017 09:53:21	20.6	7.39	92.9	7.9	31688	19.78
Composite 8	Surrogate	06	9/7/2017 09:53:42	20.6	7.43	93.4	8.17	31781	19.85
Laboratory Control	Surrogate	07	9/8/2017 09:04:07	20	7.88	97	8.03	31210	19.46
Reference Site	Surrogate	07	9/8/2017 09:04:24	20.1	7.8	96	7.98	30965	19.29
Composite 1	Surrogate	07	9/8/2017 09:04:42	20	7.86	96.7	7.98	31000	19.31
Composite 2	Surrogate	07	9/8/2017 09:04:56	20	7.74	95.3	8.01	30938	19.27
Composite 3	Surrogate	07	9/8/2017 09:05:20	20	7.64	94	7.98	30946	19.28
Composite 4	Surrogate	07	9/8/2017 09:05:46	20	7.54	92.7	7.99	30714	19.12
Composite 5	Surrogate	07	9/8/2017 09:06:05	20	7.64	93.9	8.11	30744	19.14
Composite 6	Surrogate	07	9/8/2017 09:06:23	20	7.45	91.6	8.09	30876	19.23
Composite 7	Surrogate	07	9/8/2017 09:06:55	20	7.37	90.4	7.89	30696	19.11
Composite 8	Surrogate	07	9/8/2017 09:07:25	20	7.56	92.9	8.16	30752	19.14
Laboratory Control	Surrogate	08	9/9/2017 09:56:20	19.8	8	97.3	8	31084	19.37
Reference Site	Surrogate	08	9/9/2017 09:56:43	19.8	7.95	96.7	7.96	31007	19.32
Composite 1	Surrogate	08	9/9/2017 09:57:07	19.8	7.91	96.2	7.97	30949	19.28
Composite 2	Surrogate	08	9/9/2017 09:57:20	19.8	7.79	94.8	7.99	30984	19.3
Composite 3	Surrogate	08	9/9/2017 09:57:37	19.8	7.81	94.9	7.98	30982	19.3
Composite 4	Surrogate	08	9/9/2017 09:58:05	19.7	7.65	93	7.99	30837	19.2
Composite 5	Surrogate	08	9/9/2017 09:58:29	19.7	7.8	94.8	8.11	30867	19.23
Composite 6	Surrogate	08	9/9/2017 09:58:44	19.7	7.68	93.3	8.09	30988	19.31
Composite 7	Surrogate	08	9/9/2017 09:59:04	19.7	7.46	90.6	7.93	30879	19.23
Composite 8	Surrogate	08	9/9/2017 09:59:23	19.7	7.61	92.4	8.08	30971	19.3
Laboratory Control	Surrogate	09	9/10/2017 10:27:11	20	8.05	98.2	7.93	31656	19.76
Reference Site	Surrogate	09	9/10/2017 10:27:25	20	8.06	98.4	7.94	31631	19.75
Composite 1	Surrogate	09	9/10/2017 10:27:33	20	8.02	97.9	7.96	31744	19.82
Composite 2	Surrogate	09	9/10/2017 10:27:45	20	7.96	97.1	8	31659	19.77
Composite 3	Surrogate	09	9/10/2017 10:27:55	20	7.97	97.2	7.99	31693	19.79
Composite 4	Surrogate	09	9/10/2017 10:28:09	20	7.74	94.6	7.99	32204	20.14
Composite 5	Surrogate	09	9/10/2017 10:28:21	20	7.79	95.3	8.09	32231	20.16
Composite 6	Surrogate	09	9/10/2017 10:28:41	20	7.68	93.9	8.1	32305	20.21
Composite 7	Surrogate	09	9/10/2017 10:28:57	20	7.65	93.5	7.92	32261	20.18
Composite 8	Surrogate	09	9/10/2017 10:29:12	20	7.73	94.5	8.1	32283	20.2
Laboratory Control	Surrogate	10	9/11/2017 08:51:24	19.8	7.98	97.2	7.99	31303	19.52
Laboratory Control	A	10	9/11/2017 08:51:34	19.8	8.02	97.7	7.96	31345	19.55
Laboratory Control	B	10	9/11/2017 08:51:49	19.8	7.66	93.3	7.85	31306	19.53
Laboratory Control	C	10	9/11/2017 08:52:05	19.8	7.98	97.2	7.9	31408	19.6

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.6	7.60	94.5	7.98	31472	19.63
Minimum:	19.7	3.74	47.6	7.76	30257	18.79
Maximum:	22.2	8.17	104.3	8.26	35366	22.33

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	D	10	9/11/2017 08:52:15	19.8	8.01	97.6	7.91	31328	19.54
Laboratory Control	E	10	9/11/2017 08:52:25	19.8	7.99	97.2	7.91	31325	19.54
Reference Site	Surrogate	10	9/11/2017 08:52:52	19.8	7.87	95.9	7.93	31310	19.53
Reference Site	A	10	9/11/2017 08:53:13	19.8	7.98	97.2	7.96	31276	19.5
Reference Site	B	10	9/11/2017 08:53:24	19.8	7.92	96.4	7.96	31360	19.56
Reference Site	C	10	9/11/2017 08:53:36	19.8	7.92	96.4	7.95	31418	19.6
Reference Site	D	10	9/11/2017 08:53:49	19.8	7.92	96.5	7.95	31323	19.54
Reference Site	E	10	9/11/2017 08:53:59	19.8	7.91	96.3	7.96	31512	19.67
Composite 1	Surrogate	10	9/11/2017 08:54:14	19.8	7.89	96.2	7.97	31397	19.59
Composite 1	A	10	9/11/2017 08:54:24	19.8	7.93	96.6	7.98	31265	19.5
Composite 1	B	10	9/11/2017 08:54:32	19.8	7.87	95.9	7.98	31309	19.53
Composite 1	C	10	9/11/2017 08:54:44	19.8	7.87	95.8	7.98	31324	19.54
Composite 1	D	10	9/11/2017 08:55:11	19.8	7.9	96.2	7.99	31279	19.51
Composite 1	E	10	9/11/2017 08:55:26	19.8	7.9	96.2	7.98	31377	19.57
Composite 2	Surrogate	10	9/11/2017 08:55:49	19.8	7.82	95.2	8.03	31297	19.52
Composite 2	A	10	9/11/2017 08:56:06	19.8	7.78	94.8	8.02	31302	19.52
Composite 2	B	10	9/11/2017 08:56:28	19.8	7.8	95	8.06	31326	19.54
Composite 2	C	10	9/11/2017 08:56:45	19.8	7.8	95	8.06	31424	19.61
Composite 2	D	10	9/11/2017 08:57:00	19.8	7.88	95.9	8.06	31355	19.56
Composite 2	E	10	9/11/2017 08:57:18	19.8	7.83	95.3	8.09	31368	19.57
Composite 3	Surrogate	10	9/11/2017 08:57:43	19.8	7.84	95.4	8	31321	19.54
Composite 3	A	10	9/11/2017 08:58:19	19.8	7.83	95.3	8	31292	19.52
Composite 3	B	10	9/11/2017 08:58:45	19.8	7.84	95.5	8	31336	19.55
Composite 3	C	10	9/11/2017 08:59:07	19.8	7.81	95.1	7.99	31397	19.59
Composite 3	D	10	9/11/2017 08:59:24	19.8	7.88	96	7.99	31412	19.6
Composite 3	E	10	9/11/2017 08:59:39	19.8	7.91	96.4	8.01	31445	19.62
Composite 4	Surrogate	10	9/11/2017 09:00:06	19.8	7.54	92	8.01	31971	19.98
Composite 4	A	10	9/11/2017 09:00:24	19.8	7.77	94.9	8.06	31958	19.97
Composite 4	B	10	9/11/2017 09:00:42	19.8	7.77	94.9	8.13	31964	19.98
Composite 4	C	10	9/11/2017 09:01:06	19.8	7.74	94.4	8.12	31964	19.98
Composite 4	D	10	9/11/2017 09:01:21	19.8	7.84	95.7	8.12	32069	20.05
Composite 4	E	10	9/11/2017 09:01:35	19.8	7.82	95.5	8.13	32130	20.09
Composite 5	Surrogate	10	9/11/2017 09:01:56	19.8	7.69	93.9	8.14	32056	20.04
Composite 5	A	10	9/11/2017 09:02:16	19.8	7.64	93.3	8.22	31996	20
Composite 5	B	10	9/11/2017 09:02:33	19.8	7.65	93.4	8.19	31988	19.99
Composite 5	C	10	9/11/2017 09:02:48	19.8	7.53	92	8.26	32102	20.07
Composite 5	D	10	9/11/2017 09:03:00	19.8	7.47	91.2	8.19	32129	20.09
Composite 5	E	10	9/11/2017 09:03:11	19.8	7.47	91.2	8.15	32160	20.11
Composite 6	Surrogate	10	9/11/2017 09:03:38	19.8	7.6	92.8	8.14	32140	20.1
Composite 6	A	10	9/11/2017 09:04:03	19.8	7.67	93.7	8.09	32009	20.01
Composite 6	B	10	9/11/2017 09:04:22	19.8	7.73	94.4	8.04	31999	20

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay
TASK: Daily Water Qualities

	Temp	DO	%DO	pH	SpCond	Salinity
Mean:	20.6	7.60	94.5	7.98	31472	19.63
Minimum:	19.7	3.74	47.6	7.76	30257	18.79
Maximum:	22.2	8.17	104.3	8.26	35366	22.33

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO %	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	C	10	9/11/2017 09:04:43	19.8	7.72	94.3	8.07	32099	20.07
Composite 6	D	10	9/11/2017 09:05:00	19.8	7.72	94.3	8.08	32054	20.04
Composite 6	E	10	9/11/2017 09:05:23	19.8	7.77	94.9	8.11	32136	20.1
Composite 7	Surrogate	10	9/11/2017 09:05:46	19.8	7.6	92.8	7.93	32093	20.07
Composite 7	A	10	9/11/2017 09:05:58	19.8	7.76	94.8	7.94	32037	20.03
Composite 7	B	10	9/11/2017 09:06:18	19.8	7.83	95.6	7.94	32087	20.06
Composite 7	C	10	9/11/2017 09:06:39	19.8	7.73	94.3	7.9	32027	20.02
Composite 7	D	10	9/11/2017 09:07:08	19.8	7.63	93.1	7.87	32041	20.03
Composite 7	E	10	9/11/2017 09:07:22	19.8	7.8	95.3	7.89	32119	20.08
Composite 8	Surrogate	10	9/11/2017 09:07:47	19.8	7.66	93.6	8.1	32168	20.12
Composite 8	A	10	9/11/2017 09:08:09	19.8	7.81	95.3	8.13	32193	20.14
Composite 8	B	10	9/11/2017 09:08:26	19.8	7.78	95	8.03	32142	20.1
Composite 8	C	10	9/11/2017 09:08:41	19.8	7.68	93.8	8.11	32163	20.11
Composite 8	D	10	9/11/2017 09:08:55	19.8	7.57	92.4	8.13	32123	20.09
Composite 8	E	10	9/11/2017 09:09:14	19.8	7.74	94.5	8.13	32148	20.1

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay

TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

			Ammonia					
Sample ID	**Day**	**ESI Code**	**Total**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**
Laboratory Control	00	29519-100	ND	0.0014	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
CLDS Reference Site	00	29519-101	ND	0.0015	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 1	00	29519-102	ND	0.0015	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 2	00	29519-103	2	0.0653	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 3	00	29519-104	0.37	0.0126	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 4	00	29519-105	1.6	0.0500	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 5	00	29519-106	3.6	0.1468	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 6	00	29519-107	7.4	0.3085	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 7	00	29519-108	8.4	0.2869	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 8	00	29519-109	3.8	0.1584	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Laboratory Control	03	29519-200	0.17	0.0071	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
CLDS Reference Site	03	29519-201	0.6	0.0210	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 1	03	29519-202	0.14	0.0047	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 2	03	29519-203	ND	0.0018	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 3	03	29519-204	ND	0.0017	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 4	03	29519-205	0.85	0.0273	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 5	03	29519-206	2.5	0.0979	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 6	03	29519-207	2.1	0.0787	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 7	03	29519-208	1.1	0.0323	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 8	03	29519-209	0.43	0.0214	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Laboratory Control	10	29519-300	ND	0.0018	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
CLDS Reference Site	10	29519-301	ND	0.0016	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 1	10	29519-302	ND	0.0018	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 2	10	29519-303	ND	0.0020	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 3	10	29519-304	ND	0.0019	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 4	10	29519-305	ND	0.0019	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 5	10	29519-306	ND	0.0026	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 6	10	29519-307	0.12	0.0061	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 7	10	29519-308	0.19	0.0061	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 8	10	29519-309	ND	0.0023	0.1	mg/L as N	09/11/17 1000	09/19/17 1239

STUDY: 29519
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Sediment Assay

TASK: Pore Water Ammonia Summary
METHOD: SM 4500-NH3 G

			Ammonia					
Sample ID	Day	ESI Code	Total	Unionized	QLimit	Units	Sampled	Analyzed
Laboratory Control	00	29519-111	0.4	0.0036	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
CLDS Reference Site	00	29519-112	ND	0.0008	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 1	00	29519-113	3	0.0549	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 2	00	29519-114	6.7	0.1342	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 3	00	29519-115	5.1	0.0635	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 4	00	29519-116	7	0.1281	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 5	00	29519-117	17	0.2907	0.1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 6	00	29519-118	70	1.6419	1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 7	00	29519-119	51	0.7788	1	mg/L as N	09/01/17 1130	09/11/17 1030
Composite 8	00	29519-120	45	0.8617	1	mg/L as N	09/01/17 1130	09/11/17 1030
Laboratory Control	03	29519-211	0.13	0.0015	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
CLDS Reference Site	03	29519-212	ND	0.0008	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 1	03	29519-213	2.5	0.0573	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 2	03	29519-214	2.8	0.0458	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 3	03	29519-215	2	0.0198	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 4	03	29519-216	1.9	0.0221	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 5	03	29519-217	7.1	0.0688	0.1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 6	03	29519-218	38	0.4950	1	mg/L as N	09/04/17 1030	09/11/17 1030
Composite 7	03	29519-219	17.8	0.1043	0.1	mg/L as N	09/04/17 1030	9/07/17 1043
Composite 8	03	29519-220	13	0.1150	0.1	mg/L as N	09/04/17 1030	9/07/17 1043
Laboratory Control	10	29519-311	ND	0.0005	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
CLDS Reference Site	10	29519-312	ND	0.0007	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 1	10	29519-313	0.17	0.0025	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 2	10	29519-314	ND	0.0003	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 3	10	29519-315	1.2	0.0088	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 4	10	29519-316	1.4	0.0088	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 5	10	29519-317	1.4	0.0046	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 6	10	29519-318	0.95	0.0078	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 7	10	29519-319	1.3	0.0073	0.1	mg/L as N	09/11/17 1000	09/19/17 1239
Composite 8	10	29519-320	11	0.0447	0.1	mg/L as N	09/11/17 1000	09/19/17 1239

Pore Water pH Record

Study: 29519
Client: AECOM
Project: New Haven Harbor

Day 0 Pore Water Quality

Sample	Temperature	pH value
Laboratory Control Sediment	22	7.30
CLDS Reference Site Sediment		7.53
Composite 1		7.61
Composite 2		7.65
Composite 3		7.44
Composite 4		7.61
Composite 5		7.58
Composite 6		7.72
Composite 7		7.53
Composite 8		7.63

Date: 09/01/17 **pH Meter ID:** 470
Initial: BG

Day 3 Pore Water Quality

Sample	Temperature	pH value
Laboratory Control Sediment	22	7.41
CLDS Reference Site Sediment		7.54
Composite 1		7.71
Composite 2		7.56
Composite 3		7.34
Composite 4		7.41
Composite 5		7.33
Composite 6		7.46
Composite 7		7.11
Composite 8		7.29

Date: 09/12/17 **pH Meter ID:** 470
Initial: MS

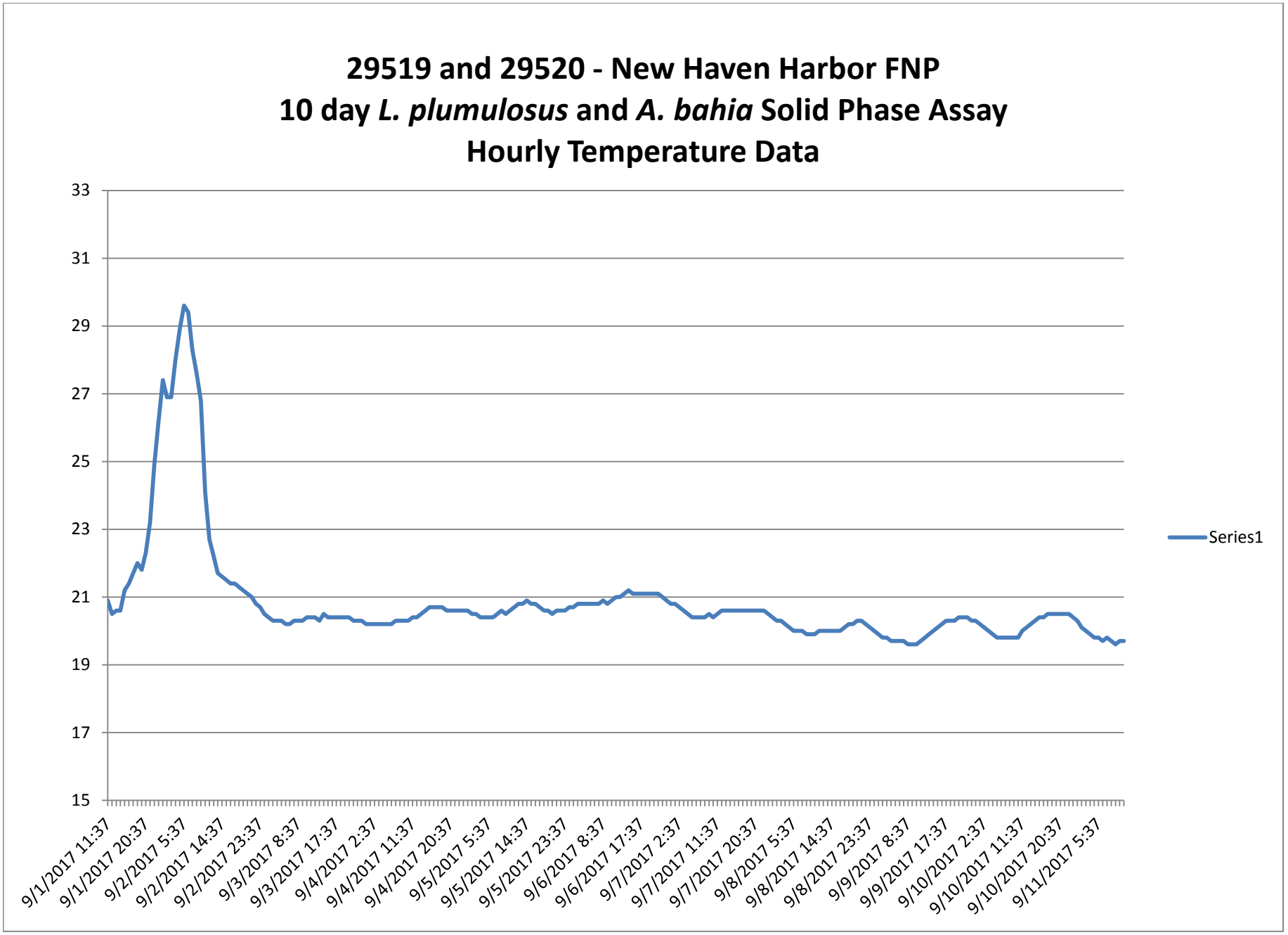
Pore Water pH Record

Study: 29519
Client: AECOM
Project: New Haven Harbor

Day 10 Pore Water Quality

Sample	Temperature	pH value
Laboratory Control Sediment	22	7.32
CLDS Reference Site Sediment		7.46
Composite 1		7.52
Composite 2		7.09
Composite 3		7.21
Composite 4		7.14
Composite 5		6.86
Composite 6		7.26
Composite 7		7.09
Composite 8		6.95

Date: 9/11/17 **pH Meter ID:** 470
Initial: KL


29519 and 29520 - New Haven Harbor FNP
10 day L. plumulosus and A. bahia Solid Phase Assay
Hourly Temperature Data
33
31
29
27
25
23
21
19
17
15
9/1/2017 11:37
9/1/2017 20:37
9/2/2017 5:37
9/2/2017 14:37
9/2/2017 23:37
9/3/2017 8:37
9/3/2017 17:37
9/4/2017 2:37
9/4/2017 11:37
9/4/2017 20:37
9/5/2017 5:37
9/5/2017 14:37
9/5/2017 23:37
9/6/2017 8:37
9/6/2017 17:37
9/7/2017 2:37
9/7/2017 11:37
9/7/2017 20:37
9/8/2017 5:37
9/8/2017 14:37
9/8/2017 23:37
9/9/2017 8:37
9/9/2017 17:37
9/10/2017 2:37
9/10/2017 11:37
9/10/2017 20:37
9/11/2017 5:37
Series1

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
1	9/1/2017 11:37	20.9
2	9/1/2017 12:37	20.5
3	9/1/2017 13:37	20.6
4	9/1/2017 14:37	20.6
5	9/1/2017 15:37	21.2
6	9/1/2017 16:37	21.4
7	9/1/2017 17:37	21.7
8	9/1/2017 18:37	22
9	9/1/2017 19:37	21.8
10	9/1/2017 20:37	22.3
11	9/1/2017 21:37	23.2
12	9/1/2017 22:37	24.9
13	9/1/2017 23:37	26.2
14	9/2/2017 0:37	27.4
15	9/2/2017 1:37	26.9
16	9/2/2017 2:37	26.9
17	9/2/2017 3:37	28
18	9/2/2017 4:37	28.9
19	9/2/2017 5:37	29.6
20	9/2/2017 6:37	29.4
21	9/2/2017 7:37	28.3
22	9/2/2017 8:37	27.6
23	9/2/2017 9:37	26.8
24	9/2/2017 10:37	24.1
25	9/2/2017 11:37	22.7
26	9/2/2017 12:37	22.2
27	9/2/2017 13:37	21.7
28	9/2/2017 14:37	21.6
29	9/2/2017 15:37	21.5
30	9/2/2017 16:37	21.4
31	9/2/2017 17:37	21.4
32	9/2/2017 18:37	21.3
33	9/2/2017 19:37	21.2
34	9/2/2017 20:37	21.1
35	9/2/2017 21:37	21
36	9/2/2017 22:37	20.8
37	9/2/2017 23:37	20.7

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
38	9/3/2017 0:37	20.5
39	9/3/2017 1:37	20.4
40	9/3/2017 2:37	20.3
41	9/3/2017 3:37	20.3
42	9/3/2017 4:37	20.3
43	9/3/2017 5:37	20.2
44	9/3/2017 6:37	20.2
45	9/3/2017 7:37	20.3
46	9/3/2017 8:37	20.3
47	9/3/2017 9:37	20.3
48	9/3/2017 10:37	20.4
49	9/3/2017 11:37	20.4
50	9/3/2017 12:37	20.4
51	9/3/2017 13:37	20.3
52	9/3/2017 14:37	20.5
53	9/3/2017 15:37	20.4
54	9/3/2017 16:37	20.4
55	9/3/2017 17:37	20.4
56	9/3/2017 18:37	20.4
57	9/3/2017 19:37	20.4
58	9/3/2017 20:37	20.4
59	9/3/2017 21:37	20.3
60	9/3/2017 22:37	20.3
61	9/3/2017 23:37	20.3
62	9/4/2017 0:37	20.2
63	9/4/2017 1:37	20.2
64	9/4/2017 2:37	20.2
65	9/4/2017 3:37	20.2
66	9/4/2017 4:37	20.2
67	9/4/2017 5:37	20.2
68	9/4/2017 6:37	20.2
69	9/4/2017 7:37	20.3
70	9/4/2017 8:37	20.3
71	9/4/2017 9:37	20.3
72	9/4/2017 10:37	20.3
73	9/4/2017 11:37	20.4
74	9/4/2017 12:37	20.4

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
75	9/4/2017 13:37	20.5
76	9/4/2017 14:37	20.6
77	9/4/2017 15:37	20.7
78	9/4/2017 16:37	20.7
79	9/4/2017 17:37	20.7
80	9/4/2017 18:37	20.7
81	9/4/2017 19:37	20.6
82	9/4/2017 20:37	20.6
83	9/4/2017 21:37	20.6
84	9/4/2017 22:37	20.6
85	9/4/2017 23:37	20.6
86	9/5/2017 0:37	20.6
87	9/5/2017 1:37	20.5
88	9/5/2017 2:37	20.5
89	9/5/2017 3:37	20.4
90	9/5/2017 4:37	20.4
91	9/5/2017 5:37	20.4
92	9/5/2017 6:37	20.4
93	9/5/2017 7:37	20.5
94	9/5/2017 8:37	20.6
95	9/5/2017 9:37	20.5
96	9/5/2017 10:37	20.6
97	9/5/2017 11:37	20.7
98	9/5/2017 12:37	20.8
99	9/5/2017 13:37	20.8
100	9/5/2017 14:37	20.9
101	9/5/2017 15:37	20.8
102	9/5/2017 16:37	20.8
103	9/5/2017 17:37	20.7
104	9/5/2017 18:37	20.6
105	9/5/2017 19:37	20.6
106	9/5/2017 20:37	20.5
107	9/5/2017 21:37	20.6
108	9/5/2017 22:37	20.6
109	9/5/2017 23:37	20.6
110	9/6/2017 0:37	20.7
111	9/6/2017 1:37	20.7

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
112	9/6/2017 2:37	20.8
113	9/6/2017 3:37	20.8
114	9/6/2017 4:37	20.8
115	9/6/2017 5:37	20.8
116	9/6/2017 6:37	20.8
117	9/6/2017 7:37	20.8
118	9/6/2017 8:37	20.9
119	9/6/2017 9:37	20.8
120	9/6/2017 10:37	20.9
121	9/6/2017 11:37	21
122	9/6/2017 12:37	21
123	9/6/2017 13:37	21.1
124	9/6/2017 14:37	21.2
125	9/6/2017 15:37	21.1
126	9/6/2017 16:37	21.1
127	9/6/2017 17:37	21.1
128	9/6/2017 18:37	21.1
129	9/6/2017 19:37	21.1
130	9/6/2017 20:37	21.1
131	9/6/2017 21:37	21.1
132	9/6/2017 22:37	21
133	9/6/2017 23:37	20.9
134	9/7/2017 0:37	20.8
135	9/7/2017 1:37	20.8
136	9/7/2017 2:37	20.7
137	9/7/2017 3:37	20.6
138	9/7/2017 4:37	20.5
139	9/7/2017 5:37	20.4
140	9/7/2017 6:37	20.4
141	9/7/2017 7:37	20.4
142	9/7/2017 8:37	20.4
143	9/7/2017 9:37	20.5
144	9/7/2017 10:37	20.4
145	9/7/2017 11:37	20.5
146	9/7/2017 12:37	20.6
147	9/7/2017 13:37	20.6
148	9/7/2017 14:37	20.6

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
149	9/7/2017 15:37	20.6
150	9/7/2017 16:37	20.6
151	9/7/2017 17:37	20.6
152	9/7/2017 18:37	20.6
153	9/7/2017 19:37	20.6
154	9/7/2017 20:37	20.6
155	9/7/2017 21:37	20.6
156	9/7/2017 22:37	20.6
157	9/7/2017 23:37	20.5
158	9/8/2017 0:37	20.4
159	9/8/2017 1:37	20.3
160	9/8/2017 2:37	20.3
161	9/8/2017 3:37	20.2
162	9/8/2017 4:37	20.1
163	9/8/2017 5:37	20
164	9/8/2017 6:37	20
165	9/8/2017 7:37	20
166	9/8/2017 8:37	19.9
167	9/8/2017 9:37	19.9
168	9/8/2017 10:37	19.9
169	9/8/2017 11:37	20
170	9/8/2017 12:37	20
171	9/8/2017 13:37	20
172	9/8/2017 14:37	20
173	9/8/2017 15:37	20
174	9/8/2017 16:37	20
175	9/8/2017 17:37	20.1
176	9/8/2017 18:37	20.2
177	9/8/2017 19:37	20.2
178	9/8/2017 20:37	20.3
179	9/8/2017 21:37	20.3
180	9/8/2017 22:37	20.2
181	9/8/2017 23:37	20.1
182	9/9/2017 0:37	20
183	9/9/2017 1:37	19.9
184	9/9/2017 2:37	19.8
185	9/9/2017 3:37	19.8

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
186	9/9/2017 4:37	19.7
187	9/9/2017 5:37	19.7
188	9/9/2017 6:37	19.7
189	9/9/2017 7:37	19.7
190	9/9/2017 8:37	19.6
191	9/9/2017 9:37	19.6
192	9/9/2017 10:37	19.6
193	9/9/2017 11:37	19.7
194	9/9/2017 12:37	19.8
195	9/9/2017 13:37	19.9
196	9/9/2017 14:37	20
197	9/9/2017 15:37	20.1
198	9/9/2017 16:37	20.2
199	9/9/2017 17:37	20.3
200	9/9/2017 18:37	20.3
201	9/9/2017 19:37	20.3
202	9/9/2017 20:37	20.4
203	9/9/2017 21:37	20.4
204	9/9/2017 22:37	20.4
205	9/9/2017 23:37	20.3
206	9/10/2017 0:37	20.3
207	9/10/2017 1:37	20.2
208	9/10/2017 2:37	20.1
209	9/10/2017 3:37	20
210	9/10/2017 4:37	19.9
211	9/10/2017 5:37	19.8
212	9/10/2017 6:37	19.8
213	9/10/2017 7:37	19.8
214	9/10/2017 8:37	19.8
215	9/10/2017 9:37	19.8
216	9/10/2017 10:37	19.8
217	9/10/2017 11:37	20
218	9/10/2017 12:37	20.1
219	9/10/2017 13:37	20.2
220	9/10/2017 14:37	20.3
221	9/10/2017 15:37	20.4
222	9/10/2017 16:37	20.4

STUDY: 29519 & 29520
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Sediment Assay

TASK: Hourly Temperature Data
Serial #: 10015860

	°C
Mean:	20.8
Minimum:	19.6
Maximum:	29.6

29519-20	Time	Celsius(°C)
223	9/10/2017 17:37	20.5
224	9/10/2017 18:37	20.5
225	9/10/2017 19:37	20.5
226	9/10/2017 20:37	20.5
227	9/10/2017 21:37	20.5
228	9/10/2017 22:37	20.5
229	9/10/2017 23:37	20.4
230	9/11/2017 0:37	20.3
231	9/11/2017 1:37	20.1
232	9/11/2017 2:37	20
233	9/11/2017 3:37	19.9
234	9/11/2017 4:37	19.8
235	9/11/2017 5:37	19.8
236	9/11/2017 6:37	19.7
237	9/11/2017 7:37	19.8
238	9/11/2017 8:37	19.7
239	9/11/2017 9:37	19.6
240	9/11/2017 10:37	19.7
241	9/11/2017 11:37	19.7

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	NA, No CENAE SAP available. Methods followed per RIM requirements and as outlined in the SAP provided by prime contractor.
3. If not, were deviations documented?	Yes
4. Was the SAP approved by the New England District?	NA
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	NA, cores collected by prime contractor
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes, see revised COC
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes, see revised COC
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for temperature, dissolved oxygen and ammonia (*L. plumulosus* only).
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	Yes
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes, except as noted for temperature, dissolved oxygen and ammonia (*L. plumulosus* only).

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes, except as noted for temperature, DO and ammonia.	Temperature spike above acceptable range on Day 0-1, and sporadic DO measurements <6 mg/L (both species). Unionized ammonia levels >0.8 mg/L in Composites 6 and 8 at assay initiation (*L. plumulosus* only).	Section 3.1, 3.2 and 3.3, and Appendix A
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Appendix A
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; ≤ 40% clam larvae, ≤ 30% sea urchin larvae	NA		
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	Yes		Appendix A

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ASSAY REVIEW CHECKLIST

STUDY#: 29519 / 29520

CLIENT: AECOM

PROJECT: New Haven Harbor FNP Contract # W912WJ-17-D-0003

ASSAY: 10-day Solid Phase

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	09/12/17	BG	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	↓	↓	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	
Water Quality Data Complete	↓	↓	
Weights Reported	N/A	↓	
Assay Acceptability Review	09/12/17	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis			
Survival	9/12/17	NR	
Chemical	NA		
Statistical Analysis Reviewed	9/12/17	LB	
Data Acceptability Review	9/12/17	NR	
Support Documentation			
Temperature Data Logger	9/13/17	NR	
Daily WQ Data	9/12/17	NR	9/27/17 Rev. 1 (NR)
Overlying and/or Pore Water Chemistry	9/20/17	NR	
Other Chemical Analysis Data	NA		
Draft Report	9/14/17	NR	9/27/17 Rev. 1 (NR)
Final Report Reviewed	9/15/17	[illegible]	9/27/17 Rev. 1 (KC)
QA Audit/Review Complete			
Final Report Printed - PDF	9/21/17	NR	9/27/17 Rev. 1 (NR)
Report E-mailed / Faxed	9/21/17	NR	9/27/17 Rev 1. (NR)
Report Logged Out	↓	↓	

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003
TO#1 Project Number 60543021

28 Day Sediment Toxicity and Bioaccumulation Evaluation

Prepared for:

AECOM
250 Apollo Drive
Chelmsford, Massachusetts 01824

Prepared by:

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

EnviroSystems, Inc. Master Reference 29516
Study Specific Reference 29524 / 29525
August 2017

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, Incorporated at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. ESI also has an approved Laboratory Quality Assurance Plan (LQAP) covering all portions of this project. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's Regional Implementation Manual (RIM) for Evaluation of Dredged Material Proposed for Disposal In New England Waters. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation Section of this Report.

For EnviroSystems, Inc._____ December 5, 2017

Kenneth A. Simon
Technical Director

Date

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003
TO#1 Project Number 60543021

28 Day Sediment Toxicity and Bioaccumulation Evaluation

1.0 INTRODUCTION

As part of a comprehensive plan to reduce adverse environmental impacts of ocean dumping, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, specifies that all sediments to be discharged into ocean waters must be evaluated to define their potential impact on existing benthic communities. The United States Environmental Protection Agency (US EPA) has determined that the most effective means to make such an assessment is through the use of bioassay tests which provide a relatively direct estimate of potential impact.

This project was designed to evaluate the potential toxicity of sediments from the area of dredging proposed for the New Haven Harbor Navigation Improvement Project located in New Haven, Connecticut. Testing involved conduct of 28-day bioaccumulation evaluations using *Nereis virens* (polychaete worm) and *Macoma nasuta* (bivalve clam). Testing followed procedures established by the US EPA, US Army Corps of Engineers and the New England District Army Corps of Engineers (CENAE) for testing of dredged material. Procedures are presented in *Evaluation of Dredged Material Proposed for Ocean Disposal* (US EPA, US ACE 1991), *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual* (US EPA, US ACE 1998), and the *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE, 2004), (RIM document).

2.0 METHODS AND MATERIALS

2.1 Sample Collection, Preservation and Storage

Sediment cores for toxicological analysis were collected by AECOM, Chelmsford, Massachusetts using vibracoring equipment from locations identified in the dredge footprint specified in the project Sampling and Analysis Plan (AECOM, 2017). Sediment samples were received under chain of custody in 5 gallon polyethylene buckets, and were composited based on the compositing scheme provided by AECOM's team. Reference site samples were also collected by AECOM from the Central Long Island Sound Disposal Site (CLDS). Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Prior to testing, samples were placed in a secure refrigerator and stored at a temperature of 4±2°C until test initiation. Sample identification, collection and receipt information is summarized in Table 1. Sample compositing information is provided in Table 2.

Sediment for the laboratory control treatment was collected from the Hampton Estuary, Hampton, New Hampshire. The area is not known to receive any direct industrial inputs and has been used as a laboratory reference sediment in the testing of marine sediments for more than 25 years. Overlying seawater was obtained from the Hampton Estuary. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. Seawater is obtained through a filter system located on the bottom of the estuary at a point approximately 1 mile from the open ocean.

2.2 Test Organisms

M. nasuta, 15-40 mm in total length, were obtained from Aquatic Research Organisms (ARO), Hampton, New Hampshire. Organisms were field collected along the Washington coast and shipped to ARO via overnight delivery. At ESI, the clams were placed in clean holding sediment with flowing seawater and monitored for at least 24 hours prior to use. Damaged bivalves and those that would not close when prodded were discarded.

Adult *N. virens* were also obtained from ARO. Worms were collected in the field from the Damariscotta River in Boothbay Harbor, Maine and delivered to ARO. At ESI, the worms were placed in clean holding sediment with flowing seawater and monitored for at least 24 hours prior to use. Damaged and inactive worms were not used in the assay.

2.3 Bioaccumulation Evaluation

The assay was started by placing a 5-7 cm layer of sediment (control, reference or site sediment) into 10 gallon aquaria designed for flow-through testing. Overlying water was then added to each aquarium. The volume of the overlying water in these chambers was approximately 6 gallons. Water flow was adjusted to provide approximately 6 volume additions of water/day to each aquarium. Flow into each aquarium was set so that incoming water mixed throughout the tank and did not stratify as a surface layer.

M. nasuta and *N. virens* were indiscriminately selected from the pool of organisms and randomly added to the aquaria. A total of 20 worms and 30 clams were added to each of 5 replicates; species were tested in separate test chambers. Temperature was maintained at 12-16°C with no readings exceeding ±3°C. Salinity was maintained at 30±2‰. The photoperiod was set at 16:8 hours light:dark. Dissolved oxygen, pH, temperature, specific conductance and salinity were measured daily in all tanks. Dissolved oxygen levels were maintained at a minimum level of ≥60% saturation by providing aeration to all tanks from the start of the assay. Organisms were not fed during the exposure period.

After 28 days exposure, *M. nasuta* and *N. virens* were recovered from the test sediments and counted. Survival counts were used for statistical analysis. All living organisms were transferred to clean test vessels and maintained in clean seawater for 24 hours to allow for removal of sediment from the animals' digestive tract. After the depuration period, organisms were transferred to plastic bags and frozen for subsequent delivery to Alpha Analytical, Mansfield, Massachusetts for tissue analysis.

2.4 Tissue Analysis

Methods used by Alpha Analytical in the analyses of tissues generated from the bioaccumulation tests followed protocols recommended in Table 8 of the New England District RIM document with appropriate updates related to current methods. Trace metals were evaluated using EPA Method 6020A, Inductively Coupled Plasma - Mass Spectrometry (ICP-MS), and mercury was evaluated using EPA Method 7474. Organic compounds were evaluated as follows: PCB Congeners and PAH compounds by SW 846 8270D-SIM/EPA 680(M) and pesticides by SW 846 8081B. The complete analytical chemistry and quality assurance data package was provided under separate cover and in appropriate Electronic Data Deliverable (EDD) files by Alpha Analytical.

2.5 Data Analysis

Tissue chemistry data were provided by Alpha Analytical. The statistical analyses of survival and body burden data were completed at ESI using CETIS™ ver. 1.9.3.0 (Comprehensive Environmental Toxicity Information System) software to determine significant differences between the reference sediment and each site composite sample. Data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistics. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Statistical difference was evaluated at $\alpha = 0.05$. Per RIM guidelines, the MDL is used in instances when a compound of concern is not detected for purposes of calculating a mean concentration. MDLs used in statistical computations are adjusted for differences in tissue mass and final extract volumes used in the analysis for each sample.

Following CENAE protocol, the statistical analyses were completed for all compounds of concern (COCs) identified in the SAP and are included in Appendix A, however the findings of significance presented in the report focus only on those COCs detected in the reference sample.

2.6 Reference Toxicant Evaluation

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while

allowing for comparison with historic data sets. Summaries of acute exposure reference toxicant assays conducted in support of this study are provided in Table 3.

3.0 RESULTS

Table 4 provides a summary of laboratory control performance and test acceptability criteria. Tables 5 and 6 provide a summary of *M. nasuta* and *N. virens* survival data and statistical analyses. Tables 7 and 8 provide summaries of body burden data and findings of significance for *M. nasuta* and *N. virens*, respectively. Laboratory bench sheets, detailed summaries of survival, body burden data and associated support data are included in Appendix A.

3.1 *Macoma nasuta*

3.1.1 Survival

Mean *M. nasuta* survival in the laboratory control sediment was 97% with a coefficient of variation (CV) of 2%. Mean survival in the CLDS reference sediment was 99% with a CV of 2%. Surviving organisms from the control and reference site provided sufficient tissue for preparation and analysis of body burdens. The endpoints met and/or exceeded requirements specified in the current version of the RIM.

After 28 days exposure, mean survival of the bivalves in the site composite sediments ranged from 96 to 99%. The statistical evaluation of the data showed no significant reduction in survival for bivalves maintained in the site composites when compared to the CLDS reference sediment, with the exception of Composite 8, however the difference in survival was <10% as compared with the CLDS reference sediment.

3.1.2 Water Quality Summary

Daily water quality data collected during the assay documented a mean temperature of 12.5°C with a range of 11.9 to 12.8°C. Confirmation temperature data collected on an hourly basis documented a mean temperature of 12.7°C with a range of 12.2 to 14.1°C. Additional daily water quality data documented salinity levels during the assay varied from 28.1 to 30.4‰ with a mean value of 29.5‰. Dissolved oxygen levels ranged from 61% to 119% with a mean level of 99% while pH ranged from 7.62 to 7.97 SU. Review of temperature and salinity data documented that all values fell within limits specified by the RIM and ESI's protocol.

3.1.3 Body Burden Analysis

Based on CENAE criteria, there were significant increases in body burdens for clams reared in site composites as compared to reference tissue for the following COCs: cadmium, chromium, copper, lead, 5 PAHs (benzo[a]anthracene, benzo[b]fluoranthene, fluoranthene, phenanthrene and pyrene) and DDE. Nickel, zinc, and endrin were the only COCs detected in reference tissue that did not demonstrate significant uptake in site composite tissue. Tissue from composites 4, 5, 6, 7 and 8 consistently demonstrated significant increases in body burden. There was also significant uptake of pyrene from composite 2.

Review of body burden data showed that the following COCs were also detected in site composite tissues, but no further analysis was required because the COC was not detected in reference tissue: 4 PAHs (benzo[a]pyrene, benzo[k]fluoranthene, chrysene, and indeno[1,2,3-cd]pyrene), 9 PCB congeners (8, 44, 52, 66, 101, 105, 118, 138 and 153) and 6 pesticides (cis-chlordane, trans-nonachlor, DDT, DDD, dieldrin and beta-Endosulfan). These COCs were primarily present at high concentrations in composites 4, 5, 6, 7 and 8.

3.2 *Nereis virens*

3.2.1 Survival

Mean *N. virens* survival in the laboratory control sediment was 92% with a coefficient of variation (CV) of 5%. Mean survival in the CLDS reference sediment was 97% with a CV of 3%. Surviving organisms from the control and reference site provided sufficient tissue for preparation and analysis of body burdens. The endpoints met and/or exceeded requirements specified in the current version of the RIM.

After 28 days exposure, mean survival of the polychaetes in the site composite sediments ranged from 93 to 98%. The statistical evaluation of the data showed no significant reduction in survival for polychaetes maintained in the site composites when compared to the CLDS reference sediment, with the exception of Composite 6 however the difference in survival was <10% as compared with the CLDS reference sediment.

3.2.2 Water Quality Summary

Daily water quality data collected during the assay documented a mean temperature of 12.4°C with a range of 11.8 to 12.6°C. Confirmation temperature data collected on an hourly basis are based on those collected for *M. nasuta*, which documented a mean temperature of 12.7°C with a range of 12.2 to 14.1°C. Please see a discussion of the hourly temperature data for *N. virens* in Section 3.3, Protocol Deviations. Additional daily water quality data documented salinity levels during the assay varied from 28.4 to 30.3‰ with a mean value of 29.5‰. Dissolved oxygen levels ranged from 61% to 102% with a mean level of 96% while pH ranged from 7.53 to 8.04 SU. Review of temperature and salinity data documented that all values fell within limits specified by the RIM and ESI's protocol.

3.2.3 Body Burden Analysis

Based on CENAE criteria, there were significant increases in body burdens for worms maintained in site composites as compared to reference site tissue for the following COCs: copper, zinc, 4 PAHs (acenaphthene, acenaphthylene, naphthalene and phenanthrene) and 2 PCB congeners (138 and 153). It should be noted that nearly all PAHs and PCBs reflect higher mean tissue concentrations in the site composites as compared with the reference composites, and the majority of the mean COC concentrations are at or near the MDL suggesting interferences with the tissue matrix, rather than actual detection of these COCs in worm tissue. This is true for zinc and 2 of the PAHs (acenaphthene and naphthalene) all were found to be significantly higher in site composite tissue as compared with reference tissue. The same is true for phenanthrene, which was detected at or near the MDL in all composites except composite 1 where the compound was detected above the reporting limit. In this instance, however, the only hit above the reporting limit (in replicate A) was identified as an outlier. Tissue from composite 4 demonstrated significant uptake of copper, and composites 6, 7 and 8 demonstrated significant increases in body burden for the PCB congeners 138 and 153. The other incidences of significant uptake of COCs from composites 2, 3, 4, 5, 6, 7 and 8 appeared to be at or near the MDL.

Review of body burden data showed that the following COCs were also detected in site composite tissues, but no further analysis was required because the COC was not detected in reference tissue: 4 PAHs (anthracene, fluoranthene, fluorene and pyrene) and 4 PCB congeners (52, 101, 180 and 187). Most of these COCs were primarily present at high concentrations in composites 4, 5, 6, 7 and 8, although many of these COCs were present at low concentrations (at or slightly above the MDL) in composite 1.

3.3 Protocol Deviations

Review of the assay data revealed only one deviation from the method and/or ESI's protocol. The hourly temperature logger was activated on Day 0 (August 29, 2017) of the *M. nasuta* assay, 2 days earlier than the *N. virens* test was initiated. Due to an oversight, the temperature logger was removed from the temperature controlled room at the end of the *M. nasuta* assay on September 26, 2017, 2 days prior to the end of the *N. virens* assay, therefore 2 days worth of hourly temperatures were not measured. There were no abnormalities observed in the daily water quality measurements that were collected during this period. This represents a deviation from ESI's SOP and a data gap, however it is the opinion of ESI's study director that this deviation did not adversely affect the outcome of the assay.

3.4 Summary

This program utilized protocols developed by the US EPA and the CENAE to assess the potential impact of the proposed dredge material collected from New Haven Harbor on the marine environment. Results of the 28-day toxicity evaluation indicate that long term exposure to Composites 8 and 6 sediment negatively impacted the survival of *M. nasuta* (clam) and *N. virens* (polychaete worm), respectively, when compared against the CLDS reference sediment, however the difference in survival was <10% in both cases.

Results of body burden data generated from recovered *M. nasuta* and *N. virens* tissue consistently showed significant uptake of COCs from composites 4, 5, 6, 7 and 8. Other COCs were also present in these composites at elevated concentrations. There were also sporadic incidences of significant uptake of COCs from composites 2 and 3, however these appeared to be at or near the MDL except in a few instances (e.g., fluorene and pyrene uptake in the clam from composite 2).

4.0 REFERENCES

AECOM. 2017. *Draft Laboratory Testing in Support of Environmental Assessment; Sampling & Environmental Testing – New Haven Harbor FNP [Sampling and Analysis Plan]*. Chelmsford, Massachusetts. August 2017.

US EPA, US ACE. 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual*. EPA-503/8-91/001. 204 pages.

US EPA, US ACE. 1998. *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual*. EPA-823-B-98-004, February 1998.

US EPA Region I, Corps of Engineers, New England District. 2004. *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters*. September 2004.

Table 1. Sample Collection and Receipt Information. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Field ID	ESI Code	Sample Type	Matrix	Collection		Receipt	
				Date	Time	Date	Time
NHH-Z	29516-001	Site	Solid	08/12/17	1350	08/18/17	1300
NHH-Z	29516-002	Site	Solid	08/08/17	1153	08/18/17	1300
NHH-P	29516-003	Site	Solid	08/12/17	0850	08/18/17	1300
NHH-P	29516-004	Site	Solid	08/09/17	1219	08/18/17	1300
NHH-L	29516-005	Site	Solid	08/15/17	1405	08/18/17	1300
NHH-L	29516-006	Site	Solid	08/10/17	1300	08/18/17	1300
NHH-J	29516-007	Site	Solid	08/15/17	1405	08/18/17	1300
NHH-J	29516-008	Site	Solid	08/10/17	1141	08/18/17	1300
NHH-F	29516-009	Site	Solid	08/16/17	1658	08/18/17	1300
NHH-F	29516-010	Site	Solid	08/11/17	1650	08/18/17	1300
NHH-M	29516-011	Site	Solid	08/13/17	1220	08/18/17	1300
NHH-M	29516-012	Site	Solid	08/08/17	1610	08/18/17	1300
NHH-B	29516-013	Hold [a]	Solid	08/11/17	1157	08/18/17	1300
NHH-W	29516-014	Site	Solid	08/09/17	1634	08/18/17	1300
NHH-W	29516-015	Site	Solid	08/15/17	0938	08/18/17	1300
NHH-O	29516-016	Site	Solid	08/14/17	1614	08/18/17	1300
NHH-O	29516-017	Site	Solid	08/08/17	1445	08/18/17	1300
NHH-Y	29516-018	Site	Solid	08/13/17	0820	08/18/17	1300
NHH-Y	29516-019	Site	Solid	08/08/17	1153	08/18/17	1300
NHH-G	29516-020	Site	Solid	08/17/17	0934	08/18/17	1300
NHH-G	29516-021	Site	Solid	08/11/17	0837	08/18/17	1300
NHH-K	29516-022	Site	Solid	08/10/17	1409	08/18/17	1300
NHH-K	29516-023	Site	Solid	08/14/17	1232	08/18/17	1300
NHH-N	29516-024	Site	Solid	08/13/17	1515	08/18/17	1300
NHH-N	29516-025	Site	Solid	08/08/17	1305	08/18/17	1300
NHH-A	29516-026	Hold [a]	Solid	08/11/17	1340	08/18/17	1300
NHH-C	29516-027	Site	Solid	08/17/17	1213	08/18/17	1300
NHH-C	29516-028	Site	Solid	08/11/17	1033	08/18/17	1300
NHH-D	29516-029	Site	Solid	08/16/17	1443	08/18/17	1300
NHH-D	29516-030	Site	Solid	08/11/17	1507	08/18/17	1300
NHH-T	29516-031	Site	Solid	08/12/17	1220	08/18/17	1300
NHH-T	29516-032	Site	Solid	08/08/17	1734	08/18/17	1300
NHH-E	29516-033	Site	Solid	08/14/17	0832	08/18/17	1300
NHH-E	29516-034	Site	Solid	08/16/17	1230	08/18/17	1300
NHH-S	29516-035	Site	Solid	08/15/17	1158	08/18/17	1300
NHH-S	29516-036	Site	Solid	08/10/17	0955	08/18/17	1300
NHH-R	29516-037	Site	Solid	08/16/17	0829	08/18/17	1300
NHH-R	29516-038	Site	Solid	08/10/17	0832	08/18/17	1300
NHH-H	29516-039	Site	Solid	08/10/17	1548	08/18/17	1300
NHH-H	29516-040	Site	Solid	08/16/17	1027	08/18/17	1300
NHH-I	29516-041	Site	Solid	08/10/17	1746	08/18/17	1300

Field ID	ESI Code	Sample Type	Matrix	Collection		Receipt	
				Date	Time	Date	Time
NHH-I	29516-042	Site	Solid	08/17/17	1627	08/18/17	1300
NHH-V	29516-043	Site	Solid	08/09/17	1745	08/18/17	1300
NHH-V	29516-044	Site	Solid	08/15/17	1646	08/18/17	1300
NHH-X	29516-045	Site	Solid	08/08/17	0922	08/18/17	1300
NHH-X	29516-046	Site	Solid	08/12/17	1600	08/18/17	1300
CLDS-Ref	29516-047	Reference	Solid	08/17/17	0800	08/18/17	1300
NHC-I	29516-048	Site	Water	08/17/17	1430	08/18/17	1300
NHC-V	29516-049	Site	Water	08/17/17	1528	08/18/17	1300
NHC-F	29516-050	Site	Water	08/17/17	1300	08/18/17	1300
CLDS-Ref-Top	29516-051	Reference	Water	08/17/17	1015	08/18/17	1300
CLDS-Ref-Mid	29516-052	Reference	Water	08/17/17	1015	08/18/17	1300
CLDS-Ref-Bottom	29516-053	Reference	Water	08/17/17	1015	08/18/17	1300
NHH-Q	29516-054	Site	Solid	08/09/17	1427	08/18/17	1300
NHH-U	29516-055	Site	Solid	08/09/17	0905	08/18/17	1300

Note:
[a] Samples NHH-A and NHH-B were delivered to ESI but were not included in the compositing scheme per verbal communication from the client.

Table 2. Summary of Sample Compositing Schedule. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Composite ID	ESI Code	Components		Final Amount	Composite Date	
		Field ID	ESI Code		Date	Time
CLDS Reference Site [a]	29517-009	CLDS-Ref	29516-047	20 gal	08/21/17	1630
Composite 1	29517-001	NHH-C	29516-027	22 gal	08/21/17	0840
		NHH-C	29516-028			
Composite 2	29517-002	NHH-D	29516-029	26 gal	08/21/17	0950
		NHH-D	29516-030			
		NHH-E	29516-033			
		NHH-E	29516-034			
		NHH-F	29516-009			
		NHH-F	29516-010			
Composite 3	29517-003	NHH-G	29516-020	31 gal	08/21/17	1400
		NHH-G	29516-021			
		NHH-H	29516-039			
		NHH-H	29516-040			
		NHH-I	29516-041			
		NHH-I	29516-042			
Composite 4	29517-004	NHH-J	29516-007	23 gal	08/21/17	1445
		NHH-J	29516-008			
		NHH-K	29516-022			
		NHH-K	29516-023			
		NHH-L	29516-005			
		NHH-L	29516-006			

Composite ID	ESI Code	Components Field ID	Components ESI Code	Final Amount	Composite Date Date	Composite Date Time
Composite 5	29517-005	NHH-M	29516-011	29 gal	08/21/17	1530
		NHH-M	29516-012			
		NHH-N	29516-024			
		NHH-N	29516-025			
		NHH-O	29516-016			
		NHH-O	29516-017			
Composite 6	29517-006	NHH-P	29516-003	28 gal	08/21/17	1205
		NHH-P	29516-004			
		NHH-Q	29516-054			
		NHH-R	29516-037			
		NHH-R	29516-038			
		NHH-S	29516-035			
		NHH-S	29516-036			
Composite 7	29517-007	NHH-T	29516-031	31 gal	08/21/17	1540
		NHH-T	29516-032			
		NHH-U	29516-055			
		NHH-V	29516-043			
		NHH-V	29516-044			
		NHH-W	29516-014			
		NHH-W	29516-015			
Composite 8	29517-008	NHH-X	29516-045	26 gal	08/21/17	1130
		NHH-X	29516-046			
		NHH-Y	29516-018			
		NHH-Y	29516-019			
		NHH-Z	29516-001			
		NHH-Z	29516-002			

Notes:
[a] This sample was homogenized only.

Table 3. Summary of Reference Toxicant Data. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Date	Endpoint		Value	Historic Mean	Acceptable Range	Reference Toxicant
Macoma nasuta						
08/29/17	Survival	LC-50	9.2	9.0	1.1 - 16.8	Copper (mg/L)
Nereis virens						
08/31/17	Survival	LC-50	3.2	3.6	1.3 - 5.8	Copper (mg/L)

Note: Means and Acceptable Ranges based on the past 20 reference toxicant assays. Acceptable range is defined as ± 2 standard deviations of historic mean.

Table 4. Summary of Laboratory Control Performance and Assay Acceptability Criteria. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Endpoint / Measurement		Protocol Criteria	Unit	*M. nasuta*	*N. virens*
Mean Survival		laboratory Control ≥ 90%	%	97%	92%
			Protocol Met	Yes	Yes
Tissue Mass		Sufficient for analysis	Protocol Met	Yes	Yes
Salinity	Minimum:	28‰	ppt	28.1	28.4
			Protocol Met	Yes	Yes
	Maximum:	32‰	ppt	30.4	30.3
			Protocol Met	Yes	Yes
Temperature		Mean: 12-16°C	Daily / Hourly	12.5 / 12.7	12.4 / 12.7 [a]
		Minimum: 9°C	Daily / Hourly	11.9 / 12.2	11.8 / 12.2 [a]
		Maximum: 15°C	Daily / Hourly	12.8 / 14.1	12.6 / 14.1 [a]
			Protocol Met	Yes / Yes	Yes / Yes

Notes:
[a] The *M. nasuta* and *N. virens* assays did not run concurrently, the *M. nasuta* assay started and ended 2 days earlier than the *N. virens* assay. However, the shared hourly temperature logger was removed from the temperature-controlled room at the end of the *M. nasuta* assay, two days before the end of the *N. virens* assay, therefore these measurements were not collected. The values reported for *N. virens* are the same as for *M. nasuta*. See Section 3.3 for a discussion of the protocol deviation.

Table 5. *Macoma nasuta* Day 28 Survival Data. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Day 28 Proportion Survived Summary - Mean *Macoma nasuta* Survival

Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	29524-000	5	97%	97%	100%	2%
CLDS Reference	29517-009	5	99%	97%	100%	2%
Composite 1	29517-001	5	97%	93%	100%	3%
Composite 2	29517-002	5	98%	97%	100%	2%
Composite 3	29517-003	5	98%	97%	100%	2%
Composite 4	29517-004	5	99%	93%	100%	3%
Composite 5	29517-005	5	98%	93%	100%	3%
Composite 6	29517-006	5	99%	93%	100%	3%
Composite 7	59517-007	5	99%	97%	100%	2%
Composite 8	29517-008	5	96%	93%	100%	3%

Day 28 Survival Statistical Analysis			Statistically Significant Difference, "<" as Compared to:	Difference in Survival as Compared to: CLDS Reference	
Sample ID	ESI Code	Mean	CLDS Reference	>10% (% Difference)	
CLDS Reference	29517-009	99%	-	-	-
Composite 1	29517-001	97%	No	No	2%
Composite 2	29517-002	98%	No	No	1%
Composite 3	29517-003	98%	No	No	1%
Composite 4	29517-004	99%	No/No	No	0%
Composite 5	29517-005	98%	No	No	1%
Composite 6	29517-006	99%	No/No	No	0%
Composite 7	59517-007	99%	No	No	0%
Composite 8	29517-008	96%	Yes	No	3%

Table 6. *Nereis virens* Day 28 Survival Data. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Day 28 Proportion Survived Summary - Mean *Nereis virens* Survival

Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	29525-000	5	92%	85%	95%	5%
CLDS Reference	29517-009	5	97%	95%	100%	3%
Composite 1	29517-001	5	96%	85%	100%	7%
Composite 2	29517-002	5	98%	95%	100%	3%
Composite 3	29517-003	5	98%	95%	100%	3%
Composite 4	29517-004	5	95%	85%	100%	6%
Composite 5	29517-005	5	96%	90%	100%	4%
Composite 6	29517-006	5	93%	90%	95%	3%
Composite 7	59517-007	5	97%	95%	100%	3%
Composite 8	29517-008	5	97%	95%	100%	3%

Day 28 Survival Statistical Analysis			Statistically Significant Difference, "<" as Compared to:	Difference in Survival as Compared to: CLDS Reference	
Sample ID	ESI Code	Mean	CLDS Reference	>10% (% Difference)	
CLDS Reference	29517-009	97%	-	-	-
Composite 1	29517-001	96%	No	No	1%
Composite 2	29517-002	98%	No	No	-1%
Composite 3	29517-003	98%	No	No	-1%
Composite 4	29517-004	95%	No	No	2%
Composite 5	29517-005	96%	No	No	1%
Composite 6	29517-006	93%	Yes	No	4%
Composite 7	59517-007	97%	No	No	0%
Composite 8	29517-008	97%	No	No	0%

Table 7. Statistical Comparisons of *Macoma nasuta* Body Burdens vs. CLDS Reference Site. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Compound	Units	CLDS		Comp 1		Comp 2		Comp 3		Comp 4		Comp 5		Comp 6		Comp 7		Comp 8	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals																			
Arsenic, total	mg/Kg	3.20		2.43	NS	2.07	NS	2.15	NS	2.40	NS	2.18	NS	1.65	NS	2.30	NS	2.33	NS
Cadmium, total	mg/Kg	0.028	b	0.020	bNS	0.023	bNS	0.025	bNS	0.045	bS	0.037	bNS	0.063	S	0.045	bS	0.042	bNS
Chromium, total	mg/Kg	0.245	b	0.146	bNS	0.228	bNS	0.227	bNS	0.416	bNS	0.263	bNS	0.715	S	0.494	bS	0.534	bS
Copper, total	mg/Kg	1.87		1.28	NS	1.66	NS	1.48	NS	2.46	NS	3.87	NS	2.99	S	2.62	NS	2.54	S
Lead, total	mg/Kg	0.348		0.192	NS	0.300	NS	0.285	NS	0.589	S	0.389	NS	0.824	S	0.701	S	0.683	S
Mercury, total	mg/Kg	0.004	ab	0.004	aNS	0.004	abNS	0.004	abNS	0.005	abNS	0.004	aNS	0.004	aNS	0.004	abNS	0.004	abNS
Nickel, total	mg/Kg	0.387		0.227	NS	0.278	NS	0.256	NS	0.352	NS	0.333	NS	0.408	NS	0.365	NS	0.392	NS
Zinc, total	mg/Kg	11.19		8.39	NS	7.43	NS	8.22	NS	12.23	NS	10.97	NS	12.74	NS	10.59	NS	11.17	NS
PAH Compounds																			
Acenaphthene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.50	ac	9.50	abc	9.56	abc	8.97	ac
Acenaphthylene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.50	ac	9.09	ac	8.92	ac	8.97	ac
Anthracene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.50	ac	9.09	ac	8.92	ac	8.97	ac
Benzo(a)anthracene	µg/Kg	11.22	a	8.99	aNS	13.26	abNS	11.24	abNS	36.28	S	24.90	S	39.80	S	36.30	S	38.66	S
Benzo(a)pyrene	µg/Kg	9.15	a	8.99	ac	9.28	abc	9.26	ac	16.16	abc	8.91	abc	14.94	bc	12.07	abc	11.22	bc
Benzo(b)fluoranthene	µg/Kg	9.76	ab	8.99	aNS	10.43	abNS	9.26	aNS	24.82	bS	15.00	bS	25.66	S	23.38	bS	21.76	bS
Benzo(k)fluoranthene	µg/Kg	9.15	a	8.99	ac	9.19	abc	9.26	ac	14.82	bc	8.83	abc	12.03	bc	10.34	abc	10.95	bc
Benzo(g,h,i)perylene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	9.50	abc	8.50	ac	9.54	abc	8.99	abc	8.97	ac
Chrysene	µg/Kg	9.15	a	8.99	ac	10.80	abc	9.26	ac	28.90	bc	18.00	bc	34.24	c	28.64	c	28.36	c
Dibenz(a,h)anthracene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.50	ac	9.09	ac	8.92	ac	8.97	ac
Fluoranthene	µg/Kg	10.14	ab	8.99	aNS	23.50	bNS/S	11.76	abNS	56.32	S	41.64	S	76.46	S	69.36	S	92.30	S
Fluorene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.50	ac	9.09	ac	8.92	ac	8.97	ac
Indeno(1,2,3-c,d)pyrene	µg/Kg	9.15	a	8.99	ac	18.28	bc	15.50	abc	21.88	c	18.90	c	10.38	abc	10.90	ac	15.24	ac
Naphthalene	µg/Kg	9.15	a	8.99	ac	9.11	ac	9.26	ac	8.99	ac	8.50	ac	9.09	ac	8.92	ac	8.97	ac
Phenanthrene	µg/Kg	9.30	ab	8.99	aNS	9.97	abNS	9.26	aNS	9.99	abNS	10.15	abNS	20.06	bS	16.32	bS	22.18	S
Pyrene	µg/Kg	10.34	ab	8.99	aNS	23.76	S	11.24	abNS	63.24	S	37.50	S	65.00	S	57.94	S	74.00	S
Total PAHs	µg/Kg	151.4		143.8		192.2		160.9		335.9		243.3		363.1		328.4		377.5	

Compound	Units	CLDS		Comp 1		Comp 2		Comp 3		Comp 4		Comp 5		Comp 6		Comp 7		Comp 8	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
PCB Congeners																			
PCB 008	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	1.26	ac	0.90	ac
PCB 018	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 028	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 044	µg/Kg	0.92	a	0.90	ac	1.26	ac	2.16	c	2.41	ac	2.67	c	2.39	c	2.19	bc	2.02	abc
PCB 052	µg/Kg	0.92	a	0.90	ac	0.98	abc	0.93	ac	0.91	abc	1.23	bc	2.69	c	2.95	c	2.61	c
PCB 066	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	abc	0.91	abc	1.44	bc	1.27	bc	0.94	abc
PCB 101	µg/Kg	0.92	a	0.90	ac	1.84	abc	1.94	bc	2.68	c	2.75	c	3.22	c	2.30	bc	2.04	ac
PCB 105	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	1.22	abc	0.89	ac	0.90	ac
PCB 118	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.95	abc	0.85	ac	1.26	bc	0.97	abc	0.90	ac
PCB 128	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 138	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	1.03	abc	1.05	abc	1.76	bc	1.24	bc	1.17	abc
PCB 153	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	1.04	abc	1.05	abc	1.42	bc	1.21	abc	1.06	abc
PCB 170	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 180	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 187	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 195	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 206	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
PCB 209	µg/Kg	0.92	a	0.90	ac	0.91	ac	0.93	ac	0.90	ac	0.85	ac	0.91	ac	0.89	ac	0.90	ac
Total PCBs	µg/Kg	33.1		32.4		35.5		38.0		39.6		39.7		49.0		44.6		41.3	
Pesticides																			
Aldrin	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
cis-Chlordane	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.609	ac	0.624	ac	0.475	ac
trans-Chlordane	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
cis-Nonachlor	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
trans-Nonachlor	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.535	ac	0.750	ac	1.082	ac
Oxychlordane	µg/Kg	0.915	a	0.899	ac	0.911	ac	0.926	ac	0.899	ac	0.850	ac	0.909	ac	0.892	ac	0.897	ac
Total Chlordanes	µg/Kg	2.75		2.70		2.73		2.78		2.70		2.55		2.96		3.16		3.35	
4,4'-DDT	µg/Kg	0.458	a	0.449	ac	0.632	ac	0.463	ac	0.449	ac	0.425	ac	0.876	c	0.911	c	0.903	ac
4,4'-DDD	µg/Kg	0.458	a	0.449	ac	0.758	ac	0.463	ac	0.449	ac	0.425	ac	0.485	ac	0.459	ac	1.204	ac
4,4'-DDE	µg/Kg	0.466	a	0.449	aNS	0.864	aNS	0.519	aNS	0.538	aNS	0.782	S	1.546	S	1.294	S	1.033	S
Total DDT	µg/Kg	1.38		1.35		2.25		1.45		1.44		1.63		2.91		2.66		3.14	

Compound	Units	CLDS		Comp 1		Comp 2		Comp 3		Comp 4		Comp 5		Comp 6		Comp 7		Comp 8	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Dieldrin	µg/Kg	0.458	a	0.449	ac	0.618	ac	0.463	ac	0.449	ac	0.425	ac	0.714	c	0.629	ac	0.503	c
alpha-Endosulfan	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
beta-Endosulfan	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.843	ac	1.280	ac	0.639	ac
Total Endosulfans	µg/Kg	0.916		0.898		0.910		0.926		0.898		0.850		1.30		1.73		1.09	
Endrin	µg/Kg	2.163		1.963	NS	1.069	NS	5.331	aNS	2.816	aNS	0.708	NS	0.958	NS	3.602	NS	5.722	NS
Heptachlor	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
Heptachlor epoxide	µg/Kg	0.915	a	0.899	ac	0.911	ac	0.926	ac	0.899	ac	0.850	ac	0.909	ac	0.892	ac	0.897	ac
Hexachlorobenzene	µg/Kg	0.915	a	0.899	ac	0.911	ac	0.926	ac	0.899	ac	0.850	ac	0.909	ac	0.892	ac	0.897	ac
Lindane	µg/Kg	0.458	a	0.449	ac	0.455	ac	0.463	ac	0.449	ac	0.425	ac	0.454	ac	0.446	ac	0.449	ac
Methoxychlor	µg/Kg	4.576	a	4.494	ac	4.552	ac	4.628	ac	4.494	ac	4.252	ac	4.544	ac	4.460	ac	4.488	ac
Toxaphene	µg/Kg	22.96	a	22.54	ac	22.84		23.22	ac	22.54	ac	21.36	ac	22.80	ac	22.40	ac	22.52	ac

Notes:
a = Analyte not detected (below MDL) in at least one replicate; mean value was calculated using the project specific MDL for non-detected values.
b = Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05
NS/S indicates that a statistical outlier was detected and the findings of significance were different with and without the statistical outlier included in the analysis.

Table 8. Statistical Comparisons of *Nereis virens* Body Burdens vs. CLDS Reference Site. Sediment Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. August 2017.

Compound	Units	CLDS		Comp 1		Comp 2		Comp 3		Comp 4		Comp 5		Comp 6		Comp 7		Comp 8	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals																			
Arsenic, total	mg/Kg	2.06		2.17	NS	2.30	NS	2.14	NS	2.07	NS	2.23	NS	2.04	NS	2.14	NS	2.32	NS
Cadmium, total	mg/Kg	0.034	b	0.039	bNS	0.044	bNS	0.035	bNS	0.040	bNS	0.038	bNS	0.036	bNS	0.038	bNS	0.041	bNS
Chromium, total	mg/Kg	0.057	b	0.055	bNS	0.046	abNS	0.047	abNS	0.047	abNS	0.041	abNS	0.080	bNS	0.042	abNS	0.039	abNS
Copper, total	mg/Kg	1.02		0.85	NS	1.09	NS	0.96	NS	1.24	S	0.89	NS	1.05	NS	0.94	NS	0.82	NS
Lead, total	mg/Kg	0.127		0.098	NS	0.138	NS	0.102	NS	0.124	NS	0.138	NS	0.095	NS	0.116	NS	0.141	NS
Mercury, total	mg/Kg	0.010	b	0.011	bNS	0.008	bNS	0.011	bNS	0.012	bNS	0.007	bNS	0.011	bNS	0.012	bNS	0.007	bNS
Nickel, total	mg/Kg	0.111	b	0.085	bNS	0.081	bNS	0.093	bNS	0.081	bNS	0.072	bNS	0.115	bNS	0.105	bNS	0.106	bNS
Zinc, total	mg/Kg	6.06		6.43	NS	6.68	S	6.64	S	6.72	S	6.25	NS	6.76	S	9.05	S	6.53	NS
PAH Compounds																			
Acenaphthene	µg/Kg	7.26	ab	7.89	abNS	9.16	aNS/S	9.39	aNS/S	9.08	aNS/S	9.29	aNS/S	9.96	abNS/S	11.06	abNS/S	13.32	bS
Acenaphthylene	µg/Kg	11.94	a	4.84	abNS	9.16	aNS/S	9.39	aNS/S	9.08	aNS/S	9.29	aNS/S	9.47	aNS/S	9.20	aNS/S	8.93	aNS/S
Anthracene	µg/Kg	4.58	a	4.77	abc	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Benzo(a)anthracene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Benzo(a)pyrene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Benzo(b)fluoranthene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Benzo(k)fluoranthene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Benzo(g,h,i)perylene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Chrysene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Dibenz(a,h)anthracene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Fluoranthene	µg/Kg	4.58	a	4.89	abc	9.49	abc	9.39	ac	13.00	abc	10.74	abc	16.96	bc	21.68	bc	33.50	c
Fluorene	µg/Kg	4.58	a	7.06	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Indeno(1,2,3-c,d)pyrene	µg/Kg	4.58	a	4.73	ac	9.16	ac	9.39	ac	9.08	ac	9.29	ac	9.47	ac	9.20	ac	8.93	ac
Naphthalene	µg/Kg	4.73	ab	5.06	abNS	9.16	aS	9.39	aS	9.08	aS	9.29	aS	9.47	aS	9.20	aS	8.93	aS
Phenanthrene	µg/Kg	5.89	ab	10.50	abNS	9.16	aS	9.39	aS	9.08	aS	9.29	aS	9.47	aS	9.20	aS	8.93	aS
Pyrene	µg/Kg	4.58	a	4.73	ac	9.28	abc	9.39	ac	14.18	abc	10.23	abc	13.09	abc	15.62	bc	24.22	bc
Total PAHs	µg/Kg	84.8		87.6		147.0		150.2		154.3		151.0		163.1		168.0		187.1	

Compound	Units	CLDS		Comp 1		Comp 2		Comp 3		Comp 4		Comp 5		Comp 6		Comp 7		Comp 8	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
PCB Congeners																			
PCB 008	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 018	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 028	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 044	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 052	µg/Kg	0.46	a	0.47	ac	0.92	abc	0.94	ac	0.91	ac	0.93	ac	2.05	bc	2.18	ac	1.58	ac
PCB 066	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 101	µg/Kg	0.46	a	0.54	abc	0.95	abc	0.94	abc	0.91	ac	0.93	ac	1.31	abc	0.92	ac	0.89	ac
PCB 105	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 118	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 128	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 138	µg/Kg	0.61	ab	0.76	bNS	0.92	aS	0.95	abS	0.99	abS	0.93	abS	1.38	abS	1.43	bS	1.36	abS
PCB 153	µg/Kg	0.87	b	1.16	bNS	0.97	abNS	1.09	abNS	1.18	abNS	1.18	abNS	2.07	bS	2.19	S	1.73	bS
PCB 170	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 180	µg/Kg	0.46	a	0.56	abc	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 187	µg/Kg	0.46	a	0.53	abc	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 195	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 206	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
PCB 209	µg/Kg	0.46	a	0.47	ac	0.92	ac	0.94	ac	0.91	ac	0.93	ac	0.95	ac	0.92	ac	0.89	ac
Total PCBs	µg/Kg	17.7		19.3		33.3		34.2		33.5		34.0		40.2		39.2		36.0	
Pesticides																			
Aldrin	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
cis-Chlordane	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
trans-Chlordane	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
cis-Nonachlor	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
trans-Nonachlor	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
Oxychlordane	µg/Kg	0.917	a	0.947	ac	0.916	ac	0.939	ac	0.908	ac	0.929	ac	0.947	ac	0.920	ac	0.893	ac
Total Chlordanes	µg/Kg	2.75		2.84		2.75		2.82		2.72		2.79		2.84		2.76		2.68	
4,4'-DDT	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
4,4'-DDD	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
4,4'-DDE	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
Total DDT	µg/Kg	1.37		1.42		1.37		1.41		1.36		1.39		1.42		1.38		1.34	

Compound	Units	CLDS		Comp 1		Comp 2		Comp 3		Comp 4		Comp 5		Comp 6		Comp 7		Comp 8	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Dieldrin	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
alpha-Endosulfan	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
beta-Endosulfan	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
Total Endosulfans	µg/Kg	0.916		0.946		0.916		0.938		0.908		0.928		0.948		0.920		0.894	
Endrin	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
Heptachlor	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
Heptachlor epoxide	µg/Kg	0.917	a	0.947	ac	0.916	ac	0.939	ac	0.908	ac	0.929	ac	0.947	ac	0.920	ac	0.893	ac
Hexachlorobenzene	µg/Kg	0.917	a	0.947	ac	0.916	ac	0.939	ac	0.908	ac	0.929	ac	0.947	ac	0.920	ac	0.893	ac
Lindane	µg/Kg	0.458	a	0.473	ac	0.458	ac	0.469	ac	0.454	ac	0.464	ac	0.474	ac	0.460	ac	0.447	ac
Methoxychlor	µg/Kg	4.584	a	4.730	ac	4.580	ac	4.692	ac	4.538	ac	4.644	ac	4.738	ac	4.604	ac	4.468	ac
Toxaphene	µg/Kg	23.02	a	23.74	ac	23.00	ac	23.54	ac	22.78	ac	23.30	ac	23.78	ac	23.12	ac	22.42	ac

Notes:
a = Analyte not detected (below MDL) in at least one replicate; mean value was calculated using the project specific MDL for non-detected values.
b = Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05
NS/S indicates that a statistical outlier was detected and the findings of significance were different with and without the statistical outlier included in the analysis.

APPENDIX A:

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STUDY NUMBER RECORD

Issue and complete this form for studies that will require multiple tasks and directly associated support studies. Issue consecutive study numbers at the start of the project to cover all potential elements of the project.

CLIENT: AECOM

CONTACT(S): Ryan McCarthy, Christine Archer, Maura Surprenant

PROJECT: New Haven Harbor Federal Navigation Project

CONTRACT #: W912WJ-17-D-0003

	Species / Analysis Parameters:		STUDY:
Sample Receipt:			**29516**
Grain Size Analysis:			**-**
Composite Prep:			**29517**
Bulk Sediment Analysis [a]:			**29518**
10 Day Assay:	***Leptocheirus plumulosus***		**29519**
	Americamysis bahia		**29520**
Elutriate Preparation:	**Type:**		**29521**
Elutriate Analysis:	**Pentachlorophenol**	**Yes / No**	**29522**
	Trace Metals	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	
SPP Assays:	***Menidia beryllina***		**29523**
	Americamysis bahia		
	Arbacia punctulata		
Bioaccumulation Study:	***Macoma nasuta***		**29524**
	Nereis virens		**29525**
Tissue Analysis [a]:	**Trace Metals**	**Yes / No**	**29526**
	PAH Compounds	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	

Notes:
[a] Bulk sediment and tissue analyses were completed by Alpha Analytical, Mansfield, Massachusetts.

P:\General Projects\RPT-Active\DSE 29516 AECOM - New Haven Harbor FNP\Study Number Log .wpd

Sample ID	Latitude (NAD 83)	Longitude (NAD 83)	Predicted Water Depth (FT MLLW)	Project Depth (FT MLLW) Including Allowable Over Depth	Est Penetration From Water/ Sediment Interface	Estimated Volume (Gallons) Per Location *	Estimated Number of Cores/Grabs Needed
NHH-A#	41.222715	-72.910995	28.6	36.6	10.0	4.2	3
NHH-B	41.223094	-72.909953	39.5	42.0	4.5	1.9	4
NHH-C	41.223443	-72.909040	33.5	42.0	10.5	4.4	2
NHH-D	41.248083	-72.915987	18.6	33.6	17.0	7.1	1
NHH-E	41.247915	-72.915987	36	42.0	8.0	3.3	2
NHH-F#	41.247866	-72.913942	17.8	26.2	10.4	4.3	3
NHH-G#	41.262183	-72.913826	15.4	27.7	14.3	5.9	2
NHH-H	41.262103	-72.913150	39.9	42.0	7.1	3.0	3
NHH-I	41.262042	-72.911773	22.8	31.0	10.2	4.2	2
NHH-J#	41.278348	-72.913132	25.1	24.5	1.4	0.6	15
NHH-K	41.278367	-72.912477	36.8	42.0	7.2	3.0	3
NHH-L	41.278436	-72.911054	23.8	26.6	4.8	2.0	4
NHH-M#	41.286420	-72.912045	24.7	35.0	12.3	5.1	3
NHH-N	41.286272	-72.910575	37.4	42.0	6.6	2.7	3
NHH-O	41.286130	-72.909167	36.6	26.4	8.2	3.4	2
NHH-P#	41.292373	-72.913125	19.2	42.0	24.8	10.3	2
NHH-Q	41.292245	-72.911934	14.8	42.0	29.2	12.1	1
NHH-R	41.292011	-72.909869	36.5	26.0	8.5	3.5	2
NHH-S#	41.281829	-72.908069	38.3	42.0	5.7	2.4	4
NHH-T#	41.294296	-72.912018	8.0	23.0	17.0	7.1	2
NHH-U	41.294206	-72.911217	15.7	42.0	28.3	11.8	1
NHH-V	41.294024	-72.909459	36.7	42.0	7.3	3.0	2
NHH-W#	41.293841	-72.907753	36.8	42.0	7.2	3.0	3
NHH-X	41.297451	-72.907596	17.8	25.0	9.2	3.8	2
NHH-Y	41.296875	-72.906705	37.3	42.0	6.7	2.8	3
NHH-Z#	41.296409	-72.906006	36.7	42.0	7.3	3.0	4
NHH-	41.149165	-72.8825	80	NA	NA	20.9	4

From AECOM's Sampling and Analysis Plan (August, 2017)

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature: [signature]

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sed. Eval

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed. Eval	Lab I.D.	Remarks
05	NHC-I	8/17/17	1430		X	5gal	W	4°C	NA	X		7 carboys
02	NHC-V	8/17/17	1528		X		W			X		12 carboys, 2 DIs
06	NHC-F	8/17/17	1300		X		W			X		6 carboys
04	CLDS-Ref-Top	8/17/17	1015		X		W			X		2 carboys
03	CLDS-Ref-Mid				X		W			X		2 carboys
01	CLDS-Ref-Bottom				X		W			X		2 carboys
07	NHH-C •	8/11	1033		X	5gal bucket	SD			X		7 buckets
08	NHH-D •	8/11	1507		X		SD			X	CSH	3 ~~2~~ buckets
09	NHH-E •	8/14	0832		X		SD			X		4 buckets
10	NHH-F •	8/11	1650		X		SD			X		3 buckets
11	NHH-G •	8/11	0837		X		SD			X		2 buckets
12	NHH-H •	8/10	1548		X		SD			X		4 buckets
13	NHH-I •	8/17	1627		X		SD			X		3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature: [signature]	8/18/17 Time: 1300	James T. Provencher ESI Signature: [signature]	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ 8/18

Notes: Discrepancies between most sample date & time and what is labeled on sample containers. Total container count not accurate. Conditions unacceptable for sample receipt & processing. – KC 8/18/17 1700

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

O:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM-06_3NCR.doc White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 0163

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval									Lab I.D.	Remarks
014 NHH-J •	8/15/17	1405		X	5g bucket	SO	4°C	NA	X										3 buckets
015 NHH-K •	8/10/17	1409		X					X										2 buckets
019 NHH-L •	8/15/17	1515		X					X										2 buckets
016 NHH-M •	8/8/17	1610		X					X										3 buckets
017 NHH-N •	8/13/17	1515		X					X										2 buckets
018 NHH-O •	8/8/17	1445		X					X										3 buckets
020 NHH-P •	8/9/17	1319		X					X										3 buckets
021 NHH-Q (EID 8/21 -054)	8/9/17	1427		X					X										4 buckets
022 NHH-R •	8/10/17	0832		X					X										3 buckets
023 NHH-S •	8/10/17	0955		X					X										2 buckets
024 NHH-T 1734 CSH •	8/8/17	~~1707~~ CSH		X					X										4 buckets
025 NHH-U (EID 8/21 -055)	8/9/17	0905		X					X										5 buckets
026 NHH-V •	8/15/17	1646		X					X										3 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination)~~: EID 8/18

Notes:

See page 1 of 3

EID 8/21 Samples NHH-Q & NHH-U are accurate based on sample container and were not denoted on revised CoC's.

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven, CT

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sed Grnl	Lab I.D.	Remarks
227 NHH-W	8/15/17	0938		X	5gal bucket	SD	4°C	NA	X		2 buckets
228 NHH-X	8/13/17	1545		X					X		2 buckets
229 NHH-Y	8/8/17	1037		X					X		3 buckets
230 NHH-Z	8/8/17	1153		X					X		6 buckets

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	08/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

~~Analytical Laboratory (Destination):~~ E3 8/18

Notes: See page 1 of 3

Sample Shipped Via: AECOM

UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody-AECOM-06-3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. NO 0165

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	NA
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	3		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes	Does the info on the COC match the samples?	No
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	No
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	No	Were samples received intact? (none broken or leaking)	No
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
See Chains of Custody						

Notes and qualifications:

-Majority of samples not listed on chains of custody based on container sampling information. Samples rejected and on hold until further notice.
* Residual samples from grain size analyses received to include in final composites
-Field ID NHH-Q and NHH-U presented on the associated chains of custody for this sample receipt document (ESI samples -054 and -055) wer accurately denoted based on sample containers, and were not present on revised chains of custody issued by AECOM on 08/21/17.

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Howe AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested: Dredge Sediment Eval (DSE)

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Dredge Sediment Eval (DSE)	Lab I.D.	Remarks
001	NHH-Z	8/12	1350		X	5g bucket	SD	4°C	NA	X		2 buckets
002	NHH-Z	8/8	1153		X					X		4 buckets
003	NHH-P	8/12	0850		X					X		1 bucket
004	NHH-P	8/9	1219		X					X		2 buckets
005	NHH-L	8/15	1405		X					X		1 bucket
006	NHH-L	8/10	1300		X					X		1 bucket
007	NHH-J	8/15	1405		X					X		2 buckets
008	NHH-J	8/10	1141		X					X		1 bucket
009	NHH-F	8/16	1658		X					X		1 bucket
010	NHH-F	8/11	1680		X					X		2 buckets
011	NHH-M	8/13	1220		X					X		2 buckets
012	NHH-M	8/8	1610		X					X		1 bucket
013	NHH-B	8/11	1157		X					X		1 bucket

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Howe AECOM Signature:	8/18/17 Time: 1300	James T Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised on 8/21/17 C. Steve Howe AECOM Rich – ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature: C Steve Hone

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE								Lab I.D.	Remarks
14	NHH-W	8/9	1634		X	5g bucket	SD	4°C	NA	X									1 bucket
15	NHH-W	8/15	0938		X					X									1 bucket
16	NHH-O	8/14	1614		X					X									2 buckets
17	NHH-O	8/8	1445		X					X									1 bucket
18	NHH-Y	8/13	0820		X					X									2 buckets
19	NHH-Y	8/8	1153		X					X									1 bucket
20	NHH-G	8/17	0934		X					X									1 bucket
21	NHH-G	8/11	0837		X					X									1 bucket
22	NHH-K	8/10	1409		X					X									1 bucket
23	NHH-K	8/14	1232		X					X									1 bucket
24	NHH-N	8/13	1515		X					X									1 bucket
25	NHH-N	8/8	1305		X					X									1 bucket
26	NHH-A	8/11	1340		X					X									1 bucke

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hone AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM - ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. Nº 0170

AECOM

CHAIN OF CUSTODY RECORD

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hone AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE								Lab I.D.	Remarks
27	NHH-C	8/17/17	1213		X	5g bucket	SD	4°C	NA	X									5 buckets
28	NHH-C	8/1/17	1033		X					X									2 buckets
29	NHH-D	8/16	1443		X					X									1 bucket
30	NHH-D	8/11	1507		X					X									2 buckets
31	NHH-T	8/12	1220		X					X									1 bucket
32	NHH-T	8/8	1734		X					X									3 buckets
33	NHH-E	8/14	0832		X					X									2 buckets
34	NHH-E	8/16	1230		X					X									2 buckets
35	NHH-S	8/15	1158		X					X									1 bucket
36	NHH-S	8/10	0955		X					X									1 bucket
37	NHH-R	8/16	0829		X					X									1 bucket
38	NHH-R	8/10	0832		X					X									2 buckets

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hone AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 AECOM ESI 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0177

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hare AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE									Lab I.D.	Remarks
539	NHH-H	8/10	1548		X	5g bucket	SD	4°C	NA	X										3 buckets
540	NHH-A	8/16	1027		X					X										1 bucket
541	NHH-I	8/10	1746		X					X										1 bucket
542	NHH-J	8/17	1627		X					X										2 buckets
543	NHH-V	8/9	1745		X					X										2 buckets
544	NHH-V	8/15	1646		X					X										1 bucket
545	~~NHH-X~~	~~8/4~~	~~1153~~			CSH														~~2 buckets~~
546	NHH-X	8/8	0922		X	5g bucket	SD	4°C	NA	X										2 buckets
547	NHH-X	8/12	1600		X					X										2 buckets
548	CLOS-Ref	8/17	0800		X					X										4 buckets
8/24																				

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
C. Steve Hare AECOM Signature:	8/18/17 Time: 1300	James T. Provencher ESI Signature:	8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): COCs amended and revised 8/21/17 ESI - 8/21/17

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

AECOM

CHAIN OF CUSTODY RECORD

29516

Client/Project Name: USACE-NHH-FNP

Project Location: New Haven Harbor

Project Number:

Field Logbook No.:

Sampler (Print Name)/(Affiliation): C. Steve Hare AECOM

Chain of Custody Tape Nos.:

Signature:

Send Results/Report to:

TAT:

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	2017 Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	DSE	Lab I.D.	Remarks
NHC-I	8/17/17	1430		X	5g carboys	W	4°C	NA	X		7 carboys
NHC-V	8/17	1528		X					X		12 carboys, 2 DIs*
NHC-F	8/17	1300		X					X		6 carboys
CLDS-Ref-Top	8/17	1015		X					X		2 carboys
CLDS-Ref-Mid	8/17	1015		X					X		2 carboys
CLDS-Ref-Bottom	8/17	1015		X					X		2 carboys

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
C. Steve Hare AECOM Signature:	Date: 8/18/17 Time: 1300	James T. Provencher ESI Signature:	Date: 8/18/17 Time: 1300
Relinquished by: (Print Name)/(Affiliation) COCs amended and revised 8/21/17 Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) C. Steve Hare AECOM Signature: -ESI 8/21/17	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

* water from a leaking carboy was transferred into to lab supplied distilled water containers

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

O:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. № 0172

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	_____

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-Z	29516-001	S	Hold:Composite	2x5 Gal.	4C	
NHH-Z	29516-002	S	Hold:Composite	4x5 Gal.	4C	
NHH-P	29516-003	S	Hold:Composite	1x5 Gal.	4C	
NHH-P	29516-004	S	Hold:Composite	2x5 Gal.	4C	
NHH-L	29516-005	S	Hold:Composite	1x5 Gal.	4C	
NHH-L	29516-006	S	Hold:Composite	1x5 Gal.	4C	
NHH-J	29516-007	S	Hold:Composite	2x5 Gal.	4C	
NHH-J	29516-008	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-009	S	Hold:Composite	1x5 Gal.	4C	
NHH-F	29516-010	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-011	S	Hold:Composite	2x5 Gal.	4C	
NHH-M	29516-012	S	Hold:Composite	1x5 Gal.	4C	
NHH-B	29516-013	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-014	S	Hold:Composite	1x5 Gal.	4C	
NHH-W	29516-015	S	Hold:Composite	1x5 Gal.	4C	
NHH-O	29516-016	S	Hold:Composite	2x5 Gal.	4C	
NHH-O	29516-017	S	Hold:Composite	1x5 Gal.	4C	
NHH-Y	29516-018	S	Hold:Composite	2x5 Gal.	4C	
NHH-Y	29516-019	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-020	S	Hold:Composite	1x5 Gal.	4C	
NHH-G	29516-021	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-022	S	Hold:Composite	1x5 Gal.	4C	
NHH-K	29516-023	S	Hold:Composite	1x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
NHH-N	29516-024	S	Hold:Composite	1x5 Gal.	4C	
NHH-N	29516-025	S	Hold:Composite	1x5 Gal.	4C	
NHH-A	29516-026	S	Hold:Composite	1x5 Gal.	4C	
NHH-C	29516-027	S	Hold:Composite	5x5 Gal.	4C	
NHH-C	29516-028	S	Hold:Composite	2x5 Gal.	4C	
NHH-D	29516-029	S	Hold:Composite	1x5 Gal.	4C	
NHH-D	29516-030	S	Hold:Composite	2x5 Gal.	4C	
NHH-T	29516-031	S	Hold:Composite	1x5 Gal.	4C	
NHH-T	29516-032	S	Hold:Composite	3x5 Gal.	4C	
NHH-E	29516-033	S	Hold:Composite	2x5 Gal.	4C	
NHH-E	29516-034	S	Hold:Composite	2x5 Gal.	4C	
NHH-S	29516-035	S	Hold:Composite	1x5 Gal.	4C	
NHH-S	29516-036	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-037	S	Hold:Composite	1x5 Gal.	4C	
NHH-R	29516-038	S	Hold:Composite	2x5 Gal.	4C	
NHH-H	29516-039	S	Hold:Composite	3x5 Gal.	4C	
NHH-H	29516-040	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-041	S	Hold:Composite	1x5 Gal.	4C	
NHH-I	29516-042	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-043	S	Hold:Composite	2x5 Gal.	4C	
NHH-V	29516-044	S	Hold:Composite	1x5 Gal.	4C	
NHH-X	29516-045	S	Hold:Composite	2x5 Gal.	4C	
NHH-X	29516-046	S	Hold:Composite	2x5 Gal.	4C	

Notes and qualifications: 29516-024 S Hold:Composite

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encompa all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viable containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	29516		
SDG No:			
Project:	FNP: New Haven Harbor		
Delivered via:	Client		
Date and Time Received:	08/18/17 1300	Date and TIme Logged into Lab:	08/21/17 1600
Received By:	JTP	Logged into Lab by:	KC
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	No	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival	NA	Custody Seals intact?	NA
Number of COC Pages:	5		
COC Serial Number(s):	See CoCs		
COC Complete:	Yes *	Does the info on the COC match the samples?	Yes *
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes *
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking	Yes *
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis	Yes *
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
CLDS-Ref	29516-047	S	Hold:Composite	4x5 Gal.	4C	
NHC-I	29516-048	W	Hold:Composite	7x5 Gal.	4C	
NHC-V	29516-049	W	Hold:Composite	12x5 Gal.	4C	
NHC-F	29516-050	W	Hold:Composite	6x5 Gal.	4C	
CLDS-Ref-Top	29516-051	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Mid	29516-052	W	Hold:Composite	2x5 Gal.	4C	
CLDS-Ref-Bottom	29516-053	W	Hold:Composite	2x5 Gal.	4C	
NHH-Q **	29516-054	S	Hold:Composite	4x5 Gal.	4C	
NHH-U **	29516-055	S	Hold:Composite	5x5 Gal.	4C	

Notes and qualifications:

- See COC
* On day samples were dropped off, chains of custody provided did not correspond to sampling information on individual sample containers. As a result, samples were rejected and stored at 4 C. AECOM staff were present at ESI on 08/21/17 and revised chains of custody to encom all samples received. Samples were subsequently accepted and processed. One container of -049 was leaking and was exchnaged into viab containers upon receipt. Compositing information was relayed by AECOM staff, as no formal compositing scheme was provided to ESI. Residual sample from grain size analyses were utilized in sample compositing, as per AECOM.
** Samples denoted on original chain of custody, not on revised documents discussed above.

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 1

Composite Lab ID.: 29517-001 Composite Final Volume: 22 gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/21/17 1x 1 gallon bucket

Composite Prepared Time: 0840

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-C	29516-027	Solid	—	≈2.5 gallons	≈24.5 gallons	gray to black sediment with lots of shell hash
↓	↓ -028	↓	↓	↓	↓	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 29517-002 Composite Final Volume: ≈28 gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/24/17 1x1 gallon bucket

Composite Prepared Time: 0950

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-D	29516-029 030	Solid	—	—	≈10 gallons	
NHH-E	-033 034	Solid	—	~~≈7 gal~~	≈7 gallons	
NHH-F	-009 010	Solid	—	—	≈10 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 29517-003 Composite Final Volume: 31 gal

Composite Matrix: Solid Composite Container(s): 6x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon buckets

Composite Prepared Time: 1400

Initials: BK/ JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-G	29516-020 021	Solid	—	—	≈9.5gallons	
NHH-H	↓ - 039 040	Solid	—	—	≈9gallons	
NHH-I	↓ - 041 042	Solid	—	—	≈1gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 29517-004 Composite Final Volume: 23 gallons

Composite Matrix: Solid Composite Container(s): 5x5 gallon buckets

Composite Prepared Date: 08/21/17 1x1 gallon bucket

Composite Prepared Time: 1445

Initials: BG/JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-J	29516-007 008	Solid	—	—	≈8 gallons	
NHH-K	↓ -022 023	Solid	—	—	≈8 gallons	
NHH-L	↓ -005 006	Solid	—	—	≈ 9.5 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 29517-005 Composite Final Volume: ≈ 29 gallons

Composite Matrix: Solid Composite Container(s): 6 x 5 gallon

Composite Prepared Date: 08/21/17 1 x 1 gallon

Composite Prepared Time: 1530

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-M	29516-011 012	Solid	—	—	≈ 9.5 g	
NHH-N	↓ -024 025	Solid	—	—	≈ 9 g	
NHH-O	↓ -016 017	Solid	—	—	≈ 10.5 g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 29517-006 Composite Final Volume: 28gallons

Composite Matrix: Solid Composite Container(s): 7x5gallon buckets

Composite Prepared Date: 08/21/17 1x1gallon bucket

Composite Prepared Time: 1205

Initials: BG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-P	29516-003 004	Solid	—	—	≈8.5gallons	
NHH-Q	-054	Solid	—	—	≈14gallons	
NHH-R	-037 038	Solid	—	—	≈7gallons	
NHH-S	-035 036	Solid	—	—	≈7gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 7

Composite Lab ID.: 29517-007 Composite Final Volume: 3 gallons

Composite Matrix: Solid Composite Container(s): 7 x 5 gallon buckets

Composite Prepared Date: 08/21/17 1 x 1 gallon bucket

Composite Prepared Time: 1540

Initials: BGI JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-T	29516-031 032	Solid	—	—	~9.5 gallons	
NHH-U	-055	Solid	—	—	≈14.5 gallons	
NHH-V	-043 044	Solid	—	—	≈7 gallons	
NHH-W	-014 015	Solid	—	—	≈7 gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Composite Preparation Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: Composite 8

Composite Lab ID.: 29517-008

Composite Final Volume: ≈26gallons

Composite Matrix: Solid

Composite Container(s): 5x5gallon buckets, 1x1gallon bucket

Composite Prepared Date: 08/21/17

Composite Prepared Time: 1130

Initials: DG / JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-X	29516-045 046	Solid	—	—	≈9.5gallons	
NHH-Y	-018 019	Solid	—	—	≈ 8.5gallons	
NHH-Z	-001 002	Solid	—	—	≈11.5gallons	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
29521	Elutriate Preparation
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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Laboratory Homogenization Documentation

Project Number: 29516

Project Name: New Haven Harbor

Composite Identifier: CLDS Reference Site

Composite Lab ID.: 29517-009 Composite Final Volume: ≈ 20 gallons

Composite Matrix: Solid Composite Container(s): 4x5 gallons

Composite Prepared Date: 08/21/17 1x1 gallon

Composite Prepared Time: 1630

Initials: JTP

Protocol: ESI SOP 1478

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
NHH-CLDS	29516-047	Solid	—	few shells	≈20g	

Subsamples Removed:

Lab Number	Sample Use
29519	10-Day Solid Phase *L. plumulosus*
29520	10-Day Solid Phase *A. bahia*
~~29521~~	~~Elutriate Preparation~~ JTP 08/25/17
29524	28-Day Bio-accumulation *M. nasuta*
29525	28-Day Bio-accumulation *N. virens*

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99MnAR0082217

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Macoma nasuta

Source: Lab reared _____ Hatchery reared _____ Field collected ✓

Hatch date Mixed ages Receipt date 08/22/17

Lot number 082217MN Strain WILD

Brood origination WA

II. Water Quality

Temperature 13 °C Salinity 30 ppt D.O. SAT ppm

pH 8.4 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating _____ Flow through ✓ Static renewal _____

DIET: Flake food _____ Phytoplankton _____ Trout chow _____

Artemia _____ Rotifers _____ YCT _____ Other _____

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 2000

Carrier: PICKUP Date shipped 8/22/17

Biologist: [signature]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

Macoma nasuta 28 Day Study # 29524 - AECOM New Haven

Day	Date	Water Qualities and Flow	Initial	Day	Date	Water Qualities and Flow	Initial
0	08/29/17	✓	BG	15	09/13/17	✓	DD
1	08/30/17	✓	DD	16	09/14/17	✓	BG
2	08/31/17	✓	MS	17	09/15/17	✓	JTP
3	09/01/17	✓	BG	18	09/16/17	✓	BG
4	09/02/17	✓	BG	19	09/17/17	✓	DD
5	09/03/17	✓	MS	20	09/18/17	✓	DD
6	09/04/17	✓	MS	21	09/19/17	✓	BG
7	09/05/17	✓	DD	22	09/20/17	✓	DD
8	09/06/17	✓	BG	23	09/21/17	✓	DD
9	09/07/17	✓	DD	24	09/22/17	✓	CFS
10	09/08/17	✓	BG	25	09/23/17	✓	BG
11	09/09/17	✓	BG	26	09/24/17	✓	DD
12	09/10/17	✓	DD	27	09/25/17	✓	DD
13	09/11/17	✓	DD	28	09/26/17	✓	JTP
14	09/12/17	✓	BG				

Notes:

P:\General Projects\FORMS\LABFORMS\DSE Template\00009 Bioaccumulation Assays\Forms\Daily Water Quality Check Sheet 2015.wpd

Daily Flow Rates for *Macoma nasuta* - AECOM - New Haven

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	BG	✓	DD	✓	MS	✓	BG	✓	BG	✓	MS	✓	MS
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	BG	✓	DD	✓	MS	✓	BG	✓	BG	✓	MS	✓	MS
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

	Day 7		Day 8		Day 9		Day 10		Day 11		Day 12		Day 13	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	DD	✓	BG	✓	DD	✓	BG	✓	BG	✓	DD	✓	DD
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	

	Day 7		Day 8		Day 9		Day 10		Day 11		Day 12		Day 13	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	DD	✓	BG	✓	DD	✓	BG	✓	BG	✓	DD	✓	DD
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

Assay Initiation Date 08/29/17

Assay Termination Date 09/26/17

P:\General Projects\RPT-Active\DSE 29746 AECOM Chebeague FNP\Daily Flow Rates for Bioaccumulation.wpd

Daily Flow Rates for *Macoma nasuta* - AECOM - New Haven

	Day 14		Day 15		Day 16		Day 17		Day 18		Day 19		Day 20	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	BG	✓	DD	✓	BG	✓	JTP	✓	BG	✓	DD	✓	DD
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	

	Day 14		Day 15		Day 16		Day 17		Day 18		Day 19		Day 20	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	BG	✓	DD	✓	BG	✓	JTP	✓	BG	✓	DD	✓	DD
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

	Day 21		Day 22		Day 23		Day 24		Day 25		Day 26		Day 27	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	BG	✓	DD	✓	DD	✓	CFS	✓	BG	✓	DD	✓	DD
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	

	Day 21		Day 22		Day 23		Day 24		Day 25		Day 26		Day 27	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	BG	✓	DD	✓	DD	✓	CFS	✓	BG	✓	DD	✓	DD
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

Assay Initiation Date 08/29/17

Assay Termination Date 09/26/17

P:\General Projects\RPT-Active\DSE 29746 AECOM Chebeague FNP\Daily Flow Rates for Bioaccumulation.wpd

Daily Observations for *Macoma nasuta* Study # 29524 - AECOM New Haven

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Laboratory Control	A	✓	✓	✓	✓	✓	✓	✓	1S	1S	1S	1S	1S	✓	✓
Laboratory Control	B	1R	✓	✓	1S	✓	✓	✓	✓	1S	2S	2S	2S	2S	2S
Laboratory Control	C	1R	1S	1S	1S	1S	1S	✓	1S	1S	1S	✓	✓	✓	✓
Laboratory Control	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2S
Laboratory Control	E	1R	✓	✓	✓	1S	1S	✓	✓	1S	1S	2S	2S	1S	D
CLDS Reference	A	1R	1S	1S	1S	1S	1S	1S	1S	1S	1S	1S	1S	1S	1S
CLDS Reference	B	✓	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	C	2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	A	4R	1S	1S	1S	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	B	5R	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	C	1R	✓	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	1S
Composite 1	D	3R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	E	3R	✓	✓	✓	✓	✓	✓	✓	✓	1S	1S	1S	✓	✓
Composite 2	A	7R	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	5R	✓	1S	✓	✓	✓	✓	1S	✓	✓	✓	✓	✓	✓
Composite 2	C	5R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	2R	1S	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	3R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	4R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	3R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	5R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	4R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG/DD	BG	BG	BG	MS	MS	DD	DD	DD	BG	BG	DD	DD	BG
Date		08/30/17	08/31/17	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Daily Observations for Bioaccumulation Assay Mn.wpd

Daily Observations for *Macoma nasuta* Study # 29524 - AECOM New Haven

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Composite 4	A	2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	B	1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	6R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	5R	✓	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	4R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	A	2R	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	D	2R	1S	1S	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	E	7R	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	A	1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	B	1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	D	2R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	E	3R	✓	1S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial	BG/DD	BG	BG	BG	MS	MS	DD	DD	DD	BG	BG	DD	DD	BG
Date	08/30/17	08/31/17	09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17

BG 11/02
DG 09/08/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

Daily Observations for *Macoma nasuta* Study # 29524 - AECOM New Haven

TANK		DAY												
	Rep	15	16	17	18	19	20	21	22	23	24	25	26	27
Laboratory Control	A	1S	1S	✓	1S	1S	1S	✓	✓	✓	1S	✓	1S	1S
Laboratory Control	B	2S	2S	✓	2S	1S 1D	1S	✓	✓	✓	1S	1S	✓	✓
Laboratory Control	C	✓	1S	✓	1S	1S	1S	1S	1S	1S	1S	1S	2S	1S
Laboratory Control	D	1S	1S/1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	1S	✓	✓	✓	✓	1S	1S	✓	1S	✓	✓	1S
CLDS Reference	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	B	✓	✓	✓	✓	✓	✓	1S	1S	✓	✓	1S	✓	✓
Composite 1	C	1D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	1S	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		DD	BG	JTP	BG	DD	DD	BG	DD	DD	CFS	BG	DD	DD
Date		09/13/17	09/14/17	09/15/17	09/16/17	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

Daily Observations for *Macoma nasuta* Study # 29524 - AECOM New Haven

TANK		DAY												
	Rep	15	16	17	18	19	20	21	22	23	24	25	26	27
Composite 4	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	E	✓	✓	✓	1S	1S	1D	✓	✓	✓	✓	✓	✓	✓
Initial		DD	BG	JTP	BG	DD	DD	BG	DD	DD	CFS	BG	DD	DD
Date		09/13/17	09/14/17	09/15/17	09/16/17	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	00	8/29/2017 09:00:09	12.5	113.7	7.82	46266	29.97
Laboratory Control	B	00	8/29/2017 09:00:28	12.4	108.2	7.83	46252	29.96
Laboratory Control	C	00	8/29/2017 09:00:43	12.3	97.6	7.79	46181	29.9
Laboratory Control	D	00	8/29/2017 09:01:03	12.2	105.3	7.81	46293	29.98
Laboratory Control	E	00	8/29/2017 09:01:20	12.2	98.9	7.78	46293	29.98
CLDS Reference Site	A	00	8/29/2017 09:01:50	12.3	86.6	7.76	46222	29.93
CLDS Reference Site	B	00	8/29/2017 09:02:10	12.3	89.1	7.76	46175	29.9
CLDS Reference Site	C	00	8/29/2017 09:02:32	12.3	102.4	7.8	46221	29.93
CLDS Reference Site	D	00	8/29/2017 09:02:49	12.3	91.4	7.78	46290	29.98
CLDS Reference Site	E	00	8/29/2017 09:03:15	12.3	102.6	7.8	46249	29.95
Composite 1	A	00	8/29/2017 09:03:36	12.5	97.1	7.82	45931	29.73
Composite 1	B	00	8/29/2017 09:04:06	12.6	96	7.81	46258	29.97
Composite 1	C	00	8/29/2017 09:04:30	12.5	101.8	7.81	46221	29.94
Composite 1	D	00	8/29/2017 09:04:51	12.4	91.8	7.8	46082	29.84
Composite 1	E	00	8/29/2017 09:05:14	12.4	99	7.81	46204	29.92
Composite 2	A	00	8/29/2017 09:05:33	12.4	94.4	7.76	46139	29.88
Composite 2	B	00	8/29/2017 09:05:51	12.4	90.2	7.73	46111	29.86
Composite 2	C	00	8/29/2017 09:06:17	12.4	100.3	7.78	46213	29.93
Composite 2	D	00	8/29/2017 09:06:48	12.4	82.8	7.72	45884	29.69
Composite 2	E	00	8/29/2017 09:07:19	12.4	84.6	7.71	46081	29.83
Composite 3	A	00	8/29/2017 09:07:42	12.4	98.7	7.78	45685	29.55
Composite 3	B	00	8/29/2017 09:08:04	12.4	89.5	7.75	46111	29.86
Composite 3	C	00	8/29/2017 09:08:29	12.4	91.2	7.76	45211	29.21
Composite 3	D	00	8/29/2017 09:08:47	12.5	85.5	7.73	46091	29.85
Composite 3	E	00	8/29/2017 09:09:17	12.5	102.2	7.78	46249	29.96
Composite 4	A	00	8/29/2017 09:09:30	12.5	102.3	7.8	46138	29.88
Composite 4	B	00	8/29/2017 09:10:00	12.6	65.8	7.62	45250	29.25
Composite 4	C	00	8/29/2017 09:10:24	12.6	82.8	7.68	46128	29.88
Composite 4	D	00	8/29/2017 09:10:46	12.6	94.4	7.73	46134	29.88
Composite 4	E	00	8/29/2017 09:11:05	12.5	101.6	7.85	45249	29.24
Composite 5	A	00	8/29/2017 09:11:30	12.5	98.7	7.78	46161	29.9
Composite 5	B	00	8/29/2017 09:12:07	12.5	81.8	7.64	46212	29.93
Composite 5	C	00	8/29/2017 09:12:31	12.5	101	7.78	46232	29.95
Composite 5	D	00	8/29/2017 09:12:53	12.5	97.3	7.74	46221	29.94
Composite 5	E	00	8/29/2017 09:13:14	12.5	99.4	7.77	46197	29.92
Composite 6	A	00	8/29/2017 09:13:31	12.5	95.5	7.76	46164	29.9
Composite 6	B	00	8/29/2017 09:14:26	12.3	100.4	7.96	45976	29.76
Composite 6	C	00	8/29/2017 09:14:47	12.2	100.3	8.09	45516	29.42
Composite 6	D	00	8/29/2017 09:15:17	12.2	74.8	7.72	45471	29.39
Composite 6	E	00	8/29/2017 09:15:42	12	80.7	7.65	45953	29.73
Composite 7	A	00	8/29/2017 09:16:06	11.9	100.5	7.99	45634	29.49
Composite 7	B	00	8/29/2017 09:16:42	11.8	101.5	8.02	45771	29.59
Composite 7	C	00	8/29/2017 09:17:03	11.8	100.3	8.1	45596	29.46
Composite 7	D	00	8/29/2017 09:17:33	12	100.5	7.97	46030	29.78
Composite 7	E	00	8/29/2017 09:17:53	12	99.4	8.06	45620	29.49
Composite 8	A	00	8/29/2017 09:18:19	11.9	100.8	7.95	46068	29.81
Composite 8	B	00	8/29/2017 09:18:36	12	101.1	7.91	46159	29.87
Composite 8	C	00	8/29/2017 09:18:58	12	102.6	7.88	46297	29.98
Composite 8	D	00	8/29/2017 09:19:24	12.3	100	7.87	46089	29.84
Composite 8	E	00	8/29/2017 09:19:38	12.2	100	7.91	45833	29.65

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: ***Macoma nasuta***

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	01	8/30/2017 11:26:32	12.7	104.6	7.74	47541	30.9
Laboratory Control	B	01	8/30/2017 11:26:53	12.8	102.6	7.76	47486	30.86
Laboratory Control	C	01	8/30/2017 11:27:10	12.9	99.9	7.78	47508	30.88
Laboratory Control	D	01	8/30/2017 11:27:30	13	101.9	7.79	47507	30.88
Laboratory Control	E	01	8/30/2017 11:27:41	12.7	100.1	7.78	47532	30.89
CLDS Reference Site	A	01	8/30/2017 11:27:52	12.6	99.3	7.79	47514	30.88
CLDS Reference Site	B	01	8/30/2017 11:28:47	12.8	100.4	7.81	47488	30.86
CLDS Reference Site	C	01	8/30/2017 11:28:59	12.7	101.4	7.82	47498	30.87
CLDS Reference Site	D	01	8/30/2017 11:29:09	12.8	101.5	7.82	47473	30.85
CLDS Reference Site	E	01	8/30/2017 11:29:21	12.5	101.5	7.82	47511	30.87
Composite 1	A	01	8/30/2017 11:29:31	12.6	100.6	7.82	47513	30.88
Composite 1	B	01	8/30/2017 11:29:46	12.9	100.7	7.82	47482	30.86
Composite 1	C	01	8/30/2017 11:30:26	12.9	100.7	7.83	47502	30.88
Composite 1	D	01	8/30/2017 11:30:44	12.5	94	7.8	47473	30.84
Composite 1	E	01	8/30/2017 11:30:59	12.7	98.7	7.81	47531	30.89
Composite 2	A	01	8/30/2017 11:31:08	12.8	99.2	7.81	47511	30.88
Composite 2	B	01	8/30/2017 11:31:17	12.7	98.7	7.81	47451	30.83
Composite 2	C	01	8/30/2017 11:31:30	13.1	100.7	7.82	47452	30.85
Composite 2	D	01	8/30/2017 11:32:09	12.5	99.2	7.84	47453	30.83
Composite 2	E	01	8/30/2017 11:32:24	12.5	96.3	7.8	47472	30.84
Composite 3	A	01	8/30/2017 11:32:46	12.4	96.5	7.79	47369	30.76
Composite 3	B	01	8/30/2017 11:32:59	12.7	97.4	7.79	47441	30.83
Composite 3	C	01	8/30/2017 11:33:11	12.6	98.1	7.8	47388	30.78
Composite 3	D	01	8/30/2017 11:33:26	12.9	100	7.81	47430	30.83
Composite 3	E	01	8/30/2017 11:35:41	13.5	101.2	7.86	47364	30.8
Composite 4	A	01	8/30/2017 11:35:54	13.1	100.6	7.85	47398	30.81
Composite 4	B	01	8/30/2017 11:36:06	12.9	100.2	7.86	47373	30.78
Composite 4	C	01	8/30/2017 11:36:21	13.1	98.3	7.82	47406	30.81
Composite 4	D	01	8/30/2017 11:36:30	13.2	99.7	7.82	47395	30.81
Composite 4	E	01	8/30/2017 11:36:43	12.5	100.2	7.92	46353	30.03
Composite 5	A	01	8/30/2017 11:37:42	12.8	96.3	7.78	47459	30.84
Composite 5	B	01	8/30/2017 11:37:57	13	99.1	7.8	47429	30.83
Composite 5	C	01	8/30/2017 11:38:08	13.1	99.9	7.81	47426	30.83
Composite 5	D	01	8/30/2017 11:38:22	13.1	99.5	7.8	47441	30.84
Composite 5	E	01	8/30/2017 11:38:32	13	99.3	7.8	47422	30.82
Composite 6	A	01	8/30/2017 11:38:55	12.7	94.9	7.77	47477	30.85
Composite 6	B	01	8/30/2017 11:39:57	12.4	98.9	7.87	47467	30.83
Composite 6	C	01	8/30/2017 11:40:18	12.4	99.2	7.85	47458	30.83
Composite 6	D	01	8/30/2017 11:40:39	12.2	99.8	7.94	47189	30.62
Composite 6	E	01	8/30/2017 11:41:00	12.2	84.9	7.77	47499	30.85
Composite 7	A	01	8/30/2017 11:41:36	12.2	96.5	7.83	47465	30.82
Composite 7	B	01	8/30/2017 11:41:57	12.3	98.8	7.83	47468	30.83
Composite 7	C	01	8/30/2017 11:42:46	12.3	100	7.85	47479	30.84
Composite 7	D	01	8/30/2017 11:43:00	12.4	98.9	7.84	47459	30.83
Composite 7	E	01	8/30/2017 11:43:16	12.3	100.2	7.88	47430	30.8
Composite 8	A	01	8/30/2017 11:43:29	12.4	100.1	7.86	47462	30.83
Composite 8	B	01	8/30/2017 11:43:44	12.3	98.8	7.83	47462	30.83
Composite 8	C	01	8/30/2017 11:44:06	12.7	100.7	7.84	47420	30.81
Composite 8	D	01	8/30/2017 11:44:34	12.4	98.5	7.82	47443	30.82
Composite 8	E	01	8/30/2017 11:44:52	12.5	97.4	7.81	47421	30.8

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	02	8/31/2017 09:18:28	12.5	99	7.75	45012	29.07
Laboratory Control	B	02	8/31/2017 09:18:56	12.4	95.7	7.72	44977	29.05
Laboratory Control	C	02	8/31/2017 09:20:12	12.4	97.1	7.71	44921	29
Laboratory Control	D	02	8/31/2017 09:20:29	12.4	95.4	7.7	45172	29.18
Laboratory Control	E	02	8/31/2017 09:21:25	12.4	82.1	7.67	44987	29.05
CLDS Reference Site	A	02	8/31/2017 09:22:01	12.4	97.7	7.73	45000	29.06
CLDS Reference Site	B	02	8/31/2017 09:22:23	12.4	99.9	7.76	45085	29.12
CLDS Reference Site	C	02	8/31/2017 09:22:42	12.4	99.3	7.75	44868	28.97
CLDS Reference Site	D	02	8/31/2017 09:23:08	12.4	100.5	7.78	45071	29.11
CLDS Reference Site	E	02	8/31/2017 09:23:36	12.5	98.8	7.77	45195	29.2
Composite 1	A	02	8/31/2017 09:23:59	12.6	95.3	7.73	44914	29.01
Composite 1	B	02	8/31/2017 09:24:39	12.6	100.1	7.76	44988	29.06
Composite 1	C	02	8/31/2017 09:25:05	12.5	90.7	7.71	45223	29.22
Composite 1	D	02	8/31/2017 09:25:37	12.5	98.7	7.75	45073	29.12
Composite 1	E	02	8/31/2017 09:25:59	12.5	94.7	7.72	44920	29.01
Composite 2	A	02	8/31/2017 09:26:25	12.5	98.1	7.76	45113	29.14
Composite 2	B	02	8/31/2017 09:26:49	12.5	99.1	7.77	45032	29.09
Composite 2	C	02	8/31/2017 09:27:21	12.5	98.9	7.8	45129	29.16
Composite 2	D	02	8/31/2017 09:27:52	12.5	90.1	7.71	45114	29.14
Composite 2	E	02	8/31/2017 09:28:15	12.4	97.3	7.73	44992	29.06
Composite 3	A	02	8/31/2017 09:28:37	12.5	95.9	7.72	44919	29.01
Composite 3	B	02	8/31/2017 09:28:58	12.5	97.9	7.74	44996	29.06
Composite 3	C	02	8/31/2017 09:29:24	12.5	87.3	7.68	45302	29.28
Composite 3	D	02	8/31/2017 09:30:04	12.5	103.4	7.84	45079	29.12
Composite 3	E	02	8/31/2017 09:30:26	12.6	102	7.86	45049	29.1
Composite 4	A	02	8/31/2017 09:30:51	12.6	101.6	7.86	45062	29.11
Composite 4	B	02	8/31/2017 09:31:29	12.6	61.2	7.63	45118	29.15
Composite 4	C	02	8/31/2017 09:32:06	12.6	76.9	7.62	45300	29.28
Composite 4	D	02	8/31/2017 09:32:36	12.6	101.1	7.86	44561	28.75
Composite 4	E	02	8/31/2017 09:33:13	12.5	95.1	7.74	44913	29
Composite 5	A	02	8/31/2017 09:33:38	12.5	99	7.8	45319	29.29
Composite 5	B	02	8/31/2017 09:34:04	12.5	101.1	7.83	45221	29.22
Composite 5	C	02	8/31/2017 09:34:28	12.5	89.6	7.7	45152	29.17
Composite 5	D	02	8/31/2017 09:35:38	12.5	98.1	7.76	45124	29.15
Composite 5	E	02	8/31/2017 09:36:04	12.6	93.2	7.7	45086	29.13
Composite 6	A	02	8/31/2017 09:37:05	12.3	101.2	7.85	45193	29.2
Composite 6	B	02	8/31/2017 09:37:22	12.3	100.7	7.85	45194	29.19
Composite 6	C	02	8/31/2017 09:37:44	12.2	101	7.92	45112	29.13
Composite 6	D	02	8/31/2017 09:38:05	12.1	101.5	7.86	44999	29.05
Composite 6	E	02	8/31/2017 09:38:49	12	101.3	7.83	45068	29.09
Composite 7	A	02	8/31/2017 09:39:24	11.9	101.1	7.84	45120	29.13
Composite 7	B	02	8/31/2017 09:39:47	11.9	102.2	7.87	45116	29.12
Composite 7	C	02	8/31/2017 09:40:12	12	99.8	7.84	45274	29.24
Composite 7	D	02	8/31/2017 09:40:36	12	101.9	7.9	45287	29.25
Composite 7	E	02	8/31/2017 09:41:26	12.1	101.5	7.88	45051	29.08
Composite 8	A	02	8/31/2017 09:41:40	12.1	100.5	7.85	44990	29.04
Composite 8	B	02	8/31/2017 09:42:03	12.1	102.4	7.87	44984	29.04
Composite 8	C	02	8/31/2017 09:42:38	12.3	99	7.81	44902	28.99
Composite 8	D	02	8/31/2017 09:43:02	12.3	97	7.77	44944	29.02
Composite 8	E	02	8/31/2017 16:16:49	12.3	99.1	7.72	44942	29.02

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	03	9/1/2017 09:52:50	12.6	118.3	7.73	45497	29.42
Laboratory Control	B	03	9/1/2017 09:53:15	12.5	111.4	7.73	45489	29.41
Laboratory Control	C	03	9/1/2017 09:53:45	12.5	106.6	7.7	45463	29.39
Laboratory Control	D	03	9/1/2017 09:54:00	12.5	106.8	7.7	45455	29.39
Laboratory Control	E	03	9/1/2017 09:54:25	12.4	102.2	7.7	45524	29.44
CLDS Reference Site	A	03	9/1/2017 09:54:45	12.4	103.7	7.71	45462	29.39
CLDS Reference Site	B	03	9/1/2017 09:55:07	12.5	103.4	7.72	45455	29.39
CLDS Reference Site	C	03	9/1/2017 09:55:26	12.5	103	7.73	45452	29.39
CLDS Reference Site	D	03	9/1/2017 09:55:39	12.5	102.8	7.72	45443	29.38
CLDS Reference Site	E	03	9/1/2017 09:56:04	12.5	102	7.76	45465	29.4
Composite 1	A	03	9/1/2017 09:56:26	12.5	101.3	7.74	45468	29.4
Composite 1	B	03	9/1/2017 09:56:45	12.6	101.2	7.71	45421	29.37
Composite 1	C	03	9/1/2017 09:57:09	12.5	101.3	7.75	45467	29.4
Composite 1	D	03	9/1/2017 09:57:45	12.5	97.2	7.73	45588	29.48
Composite 1	E	03	9/1/2017 09:58:06	12.5	99.7	7.74	45471	29.4
Composite 2	A	03	9/1/2017 09:58:26	12.5	97.8	7.72	45484	29.41
Composite 2	B	03	9/1/2017 09:58:47	12.5	98.6	7.74	45512	29.43
Composite 2	C	03	9/1/2017 09:59:03	12.5	99.6	7.75	45478	29.41
Composite 2	D	03	9/1/2017 09:59:25	12.5	99.2	7.76	45494	29.42
Composite 2	E	03	9/1/2017 09:59:51	12.5	97.3	7.73	45463	29.4
Composite 3	A	03	9/1/2017 10:00:07	12.5	99.3	7.73	45445	29.38
Composite 3	B	03	9/1/2017 10:00:38	12.5	98.7	7.72	45444	29.38
Composite 3	C	03	9/1/2017 10:00:50	12.5	98.2	7.73	45485	29.41
Composite 3	D	03	9/1/2017 10:01:02	12.5	96.3	7.71	45631	29.52
Composite 3	E	03	9/1/2017 10:01:28	12.4	101	7.82	45562	29.46
Composite 4	A	03	9/1/2017 10:01:46	12.5	100.1	7.84	45557	29.46
Composite 4	B	03	9/1/2017 10:02:13	12.5	99.6	7.84	45553	29.46
Composite 4	C	03	9/1/2017 10:02:41	12.5	98.1	7.81	45596	29.49
Composite 4	D	03	9/1/2017 10:03:06	12.5	96.3	7.76	45743	29.6
Composite 4	E	03	9/1/2017 10:03:28	12.5	99.6	7.82	45403	29.35
Composite 5	A	03	9/1/2017 10:04:06	12.5	98.2	7.73	45448	29.39
Composite 5	B	03	9/1/2017 10:04:29	12.5	97	7.81	45774	29.62
Composite 5	C	03	9/1/2017 10:04:51	12.5	99.3	7.83	45615	29.5
Composite 5	D	03	9/1/2017 10:05:13	12.5	92.4	7.71	45576	29.48
Composite 5	E	03	9/1/2017 10:05:34	12.5	97.4	7.76	45540	29.45
Composite 6	A	03	9/1/2017 10:05:46	12.6	95.8	7.73	45497	29.42
Composite 6	B	03	9/1/2017 10:06:33	12.4	98.7	7.84	45739	29.59
Composite 6	C	03	9/1/2017 10:06:56	12.4	98.3	7.86	45830	29.65
Composite 6	D	03	9/1/2017 10:07:12	12.3	99.2	7.9	45730	29.58
Composite 6	E	03	9/1/2017 10:07:34	12.2	99.9	7.86	45526	29.43
Composite 7	A	03	9/1/2017 10:07:49	12.1	99.5	7.83	45604	29.48
Composite 7	B	03	9/1/2017 10:08:09	12	99.6	7.85	45760	29.59
Composite 7	C	03	9/1/2017 10:08:45	12	100.3	7.88	45703	29.55
Composite 7	D	03	9/1/2017 10:09:14	12.2	98.2	7.82	45655	29.52
Composite 7	E	03	9/1/2017 10:09:47	12.2	99.3	7.86	45700	29.55
Composite 8	A	03	9/1/2017 10:10:10	12.3	99.4	7.82	45556	29.45
Composite 8	B	03	9/1/2017 10:10:35	12.3	99.6	7.79	45487	29.4
Composite 8	C	03	9/1/2017 10:11:02	12.3	100	7.82	45526	29.43
Composite 8	D	03	9/1/2017 10:11:32	12.4	98	7.79	45546	29.45
Composite 8	E	03	9/1/2017 10:11:55	12.3	97.6	7.76	45499	29.42

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: ***Macoma nasuta***

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	04	9/2/2017 09:04:32	12.5	118.9	7.78	46421	30.09
Laboratory Control	B	04	9/2/2017 09:04:50	12.5	114.9	7.78	46416	30.08
Laboratory Control	C	04	9/2/2017 09:05:16	12.5	111.5	7.75	46435	30.09
Laboratory Control	D	04	9/2/2017 09:05:41	12.5	109.7	7.76	46501	30.14
Laboratory Control	E	04	9/2/2017 09:06:02	12.4	106.4	7.75	46417	30.08
CLDS Reference Site	A	04	9/2/2017 09:06:18	12.4	106.2	7.75	46402	30.07
CLDS Reference Site	B	04	9/2/2017 09:06:45	12.4	106.7	7.76	46406	30.07
CLDS Reference Site	C	04	9/2/2017 09:07:06	12.4	107	7.77	46416	30.08
CLDS Reference Site	D	04	9/2/2017 09:07:28	12.5	105.7	7.76	46429	30.09
CLDS Reference Site	E	04	9/2/2017 09:07:52	12.5	104	7.8	46409	30.07
Composite 1	A	04	9/2/2017 09:08:17	12.5	102.8	7.78	46394	30.07
Composite 1	B	04	9/2/2017 09:08:42	12.6	104.1	7.79	46441	30.1
Composite 1	C	04	9/2/2017 09:09:09	12.5	103.7	7.8	46412	30.08
Composite 1	D	04	9/2/2017 09:09:30	12.5	103.4	7.83	46362	30.04
Composite 1	E	04	9/2/2017 09:09:45	12.4	102.8	7.8	46402	30.07
Composite 2	A	04	9/2/2017 09:10:02	12.4	101.5	7.78	46418	30.08
Composite 2	B	04	9/2/2017 09:10:23	12.4	101.6	7.8	46371	30.05
Composite 2	C	04	9/2/2017 09:10:41	12.5	101.7	7.8	46392	30.06
Composite 2	D	04	9/2/2017 09:11:05	12.5	101.5	7.8	46405	30.07
Composite 2	E	04	9/2/2017 09:11:19	12.5	100.1	7.77	46397	30.07
Composite 3	A	04	9/2/2017 09:11:34	12.5	101.5	7.78	46408	30.07
Composite 3	B	04	9/2/2017 09:12:10	12.5	100.9	7.78	46399	30.07
Composite 3	C	04	9/2/2017 09:12:38	12.5	97.3	7.74	46377	30.05
Composite 3	D	04	9/2/2017 09:13:08	12.4	102.8	7.86	46381	30.05
Composite 3	E	04	9/2/2017 09:13:25	12.4	102.8	7.87	46332	30.02
Composite 4	A	04	9/2/2017 09:13:42	12.5	100.4	7.86	46355	30.04
Composite 4	B	04	9/2/2017 09:14:02	12.5	100.2	7.84	46326	30.02
Composite 4	C	04	9/2/2017 09:14:23	12.5	98.8	7.82	46388	30.06
Composite 4	D	04	9/2/2017 09:14:44	12.5	101.8	7.85	46315	30.01
Composite 4	E	04	9/2/2017 09:15:10	12.5	101.3	7.79	46433	30.09
Composite 5	A	04	9/2/2017 09:15:33	12.5	100.6	7.89	46416	30.08
Composite 5	B	04	9/2/2017 09:15:56	12.5	101.3	7.86	46393	30.06
Composite 5	C	04	9/2/2017 09:16:21	12.5	95.9	7.75	46365	30.04
Composite 5	D	04	9/2/2017 09:16:38	12.6	99.5	7.8	46367	30.05
Composite 5	E	04	9/2/2017 09:16:56	12.6	97.9	7.76	46389	30.06
Composite 6	A	04	9/2/2017 09:17:41	12.4	101.4	7.87	46424	30.08
Composite 6	B	04	9/2/2017 09:17:56	12.4	100.3	7.88	46522	30.15
Composite 6	C	04	9/2/2017 09:18:14	12.3	101.1	7.92	46385	30.05
Composite 6	D	04	9/2/2017 09:18:37	12.3	101.3	7.88	46357	30.03
Composite 6	E	04	9/2/2017 09:18:56	12.2	100.8	7.86	46392	30.05
Composite 7	A	04	9/2/2017 09:18:58	12.2	100.7	7.86	46420	30.07
Composite 7	B	04	9/2/2017 09:19:23	12.1	100.8	7.86	46515	30.14
Composite 7	C	04	9/2/2017 09:19:59	12.1	101.2	7.9	46513	30.13
Composite 7	D	04	9/2/2017 09:20:19	12.3	100	7.85	46436	30.08
Composite 7	E	04	9/2/2017 09:20:41	12.3	101.3	7.88	46440	30.09
Composite 8	A	04	9/2/2017 09:21:06	12.3	100.7	7.84	46482	30.12
Composite 8	B	04	9/2/2017 09:21:17	12.4	101.2	7.83	46444	30.1
Composite 8	C	04	9/2/2017 09:21:39	12.4	101.4	7.85	46429	30.08
Composite 8	D	04	9/2/2017 09:22:09	12.4	100	7.83	46367	30.04
Composite 8	E	04	9/2/2017 09:22:29	12.4	100	7.8	46370	30.04

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	05	9/3/2017 11:53:26	12.6	117.8	7.79	44599	28.78
Laboratory Control	B	05	9/3/2017 11:53:51	12.5	114.6	7.79	44561	28.75
Laboratory Control	C	05	9/3/2017 11:54:15	12.5	111.4	7.76	44544	28.74
Laboratory Control	D	05	9/3/2017 11:54:36	12.5	111.9	7.77	44546	28.74
Laboratory Control	E	05	9/3/2017 11:54:53	12.4	108.3	7.77	44549	28.74
CLDS Reference Site	A	05	9/3/2017 11:55:10	12.5	106.7	7.76	44531	28.73
CLDS Reference Site	B	05	9/3/2017 11:55:35	12.5	106.3	7.77	44542	28.73
CLDS Reference Site	C	05	9/3/2017 11:56:12	12.5	106.3	7.78	44529	28.73
CLDS Reference Site	D	05	9/3/2017 11:56:35	12.5	105.6	7.78	44530	28.73
CLDS Reference Site	E	05	9/3/2017 11:56:55	12.5	105.6	7.81	44536	28.73
Composite 1	A	05	9/3/2017 11:57:11	12.6	103.7	7.79	44541	28.74
Composite 1	B	05	9/3/2017 11:57:29	12.6	104.6	7.8	44558	28.75
Composite 1	C	05	9/3/2017 11:58:01	12.6	104	7.81	44542	28.74
Composite 1	D	05	9/3/2017 11:58:15	12.5	103.6	7.84	44545	28.74
Composite 1	E	05	9/3/2017 11:58:33	12.5	102.3	7.82	44541	28.73
Composite 2	A	05	9/3/2017 11:58:54	12.5	102	7.78	44537	28.73
Composite 2	B	05	9/3/2017 11:59:17	12.5	100.9	7.8	44546	28.74
Composite 2	C	05	9/3/2017 11:59:35	12.5	102	7.81	44547	28.74
Composite 2	D	05	9/3/2017 11:59:59	12.5	102.1	7.82	44544	28.74
Composite 2	E	05	9/3/2017 12:00:21	12.5	99	7.77	44537	28.73
Composite 3	A	05	9/3/2017 12:00:44	12.5	101.2	7.78	44543	28.74
Composite 3	B	05	9/3/2017 12:01:26	12.5	101.6	7.79	44548	28.74
Composite 3	C	05	9/3/2017 12:01:51	12.6	99.9	7.79	44563	28.75
Composite 3	D	05	9/3/2017 12:02:21	12.5	103.7	7.9	44582	28.77
Composite 3	E	05	9/3/2017 12:02:46	12.5	102.6	7.91	44503	28.71
Composite 4	A	05	9/3/2017 12:03:09	12.5	102.6	7.87	44528	28.73
Composite 4	B	05	9/3/2017 12:03:11	12.5	102.5	7.87	44531	28.73
Composite 4	C	05	9/3/2017 12:03:18	12.5	102.5	7.87	44535	28.73
Composite 4	D	05	9/3/2017 12:03:47	12.5	100.4	7.85	44518	28.72
Composite 4	E	05	9/3/2017 12:04:12	12.5	95.2	7.8	44550	28.74
Composite 5	A	05	9/3/2017 12:04:37	12.5	102.4	7.86	44532	28.73
Composite 5	B	05	9/3/2017 12:05:07	12.6	99.9	7.78	44571	28.76
Composite 5	C	05	9/3/2017 12:05:34	12.5	100.2	7.9	44573	28.76
Composite 5	D	05	9/3/2017 12:05:53	12.5	101.4	7.89	44576	28.76
Composite 5	E	05	9/3/2017 12:06:13	12.5	95.2	7.78	44575	28.76
Composite 6	A	05	9/3/2017 12:06:33	12.6	99.6	7.81	44561	28.75
Composite 6	B	05	9/3/2017 12:06:53	12.6	97.6	7.77	44585	28.77
Composite 6	C	05	9/3/2017 12:07:35	12.5	100.8	7.89	44674	28.83
Composite 6	D	05	9/3/2017 12:08:00	12.4	101.4	7.89	44644	28.81
Composite 6	E	05	9/3/2017 12:08:20	12.5	101.6	7.85	44583	28.76
Composite 7	A	05	9/3/2017 12:08:41	12.3	101	7.87	44574	28.75
Composite 7	B	05	9/3/2017 12:09:02	12.2	100.8	7.87	44618	28.78
Composite 7	C	05	9/3/2017 12:09:21	12.1	101.6	7.88	44698	28.83
Composite 7	D	05	9/3/2017 12:10:03	12.1	102.1	7.95	44705	28.84
Composite 7	E	05	9/3/2017 12:10:17	12.3	100.1	7.9	44616	28.78
Composite 8	A	05	9/3/2017 12:10:40	12.3	101.4	7.93	44642	28.8
Composite 8	B	05	9/3/2017 12:11:04	12.4	101.3	7.88	44602	28.78
Composite 8	C	05	9/3/2017 12:11:21	12.4	101.6	7.85	44614	28.78
Composite 8	D	05	9/3/2017 12:11:40	12.4	102	7.88	44637	28.8
Composite 8	E	05	9/3/2017 12:12:15	12.4	100.2	7.85	44577	28.76

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: ***Macoma nasuta***

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	06	9/4/2017 08:41:22	12.6	99.1	7.75	46034	29.81
Laboratory Control	B	06	9/4/2017 08:41:46	12.5	99.5	7.76	46020	29.8
Laboratory Control	C	06	9/4/2017 08:42:10	12.4	95.1	7.74	46052	29.82
Laboratory Control	D	06	9/4/2017 08:42:28	12.4	98.5	7.74	46086	29.84
Laboratory Control	E	06	9/4/2017 08:42:47	12.4	98.6	7.75	46066	29.82
CLDS Reference Site	A	06	9/4/2017 08:43:05	12.4	95.8	7.73	46048	29.81
CLDS Reference Site	B	06	9/4/2017 08:43:46	12.4	98	7.75	46048	29.81
CLDS Reference Site	C	06	9/4/2017 08:44:03	12.4	98.8	7.76	46058	29.82
CLDS Reference Site	D	06	9/4/2017 08:44:28	12.4	97.8	7.74	46142	29.88
CLDS Reference Site	E	06	9/4/2017 08:44:48	12.5	100.3	7.78	46045	29.81
Composite 1	A	06	9/4/2017 08:45:10	12.5	98.4	7.77	46040	29.81
Composite 1	B	06	9/4/2017 08:45:32	12.5	100.3	7.78	46085	29.84
Composite 1	C	06	9/4/2017 08:45:59	12.5	99.4	7.78	46043	29.81
Composite 1	D	06	9/4/2017 08:46:19	12.5	100.4	7.81	45993	29.78
Composite 1	E	06	9/4/2017 08:46:42	12.4	98.9	7.79	46048	29.81
Composite 2	A	06	9/4/2017 08:46:58	12.4	97.5	7.77	46060	29.82
Composite 2	B	06	9/4/2017 08:47:12	12.5	96.9	7.77	46004	29.78
Composite 2	C	06	9/4/2017 08:47:35	12.5	98.4	7.78	46033	29.8
Composite 2	D	06	9/4/2017 08:48:02	12.5	99	7.79	46035	29.81
Composite 2	E	06	9/4/2017 08:48:31	12.5	94.4	7.74	46016	29.79
Composite 3	A	06	9/4/2017 08:48:45	12.5	96.8	7.75	46028	29.8
Composite 3	B	06	9/4/2017 08:49:08	12.5	97.9	7.76	46015	29.79
Composite 3	C	06	9/4/2017 08:49:31	12.5	97.8	7.77	46035	29.81
Composite 3	D	06	9/4/2017 08:49:53	12.6	97.3	7.77	46001	29.78
Composite 3	E	06	9/4/2017 08:50:40	12.6	101.9	7.88	45971	29.76
Composite 4	A	06	9/4/2017 08:51:00	12.6	100.7	7.89	45881	29.7
Composite 4	B	06	9/4/2017 08:51:19	12.5	100	7.85	45991	29.78
Composite 4	C	06	9/4/2017 08:51:33	12.5	98.8	7.83	45961	29.75
Composite 4	D	06	9/4/2017 08:51:52	12.6	93.9	7.79	45909	29.72
Composite 4	E	06	9/4/2017 08:52:22	12.5	98.9	7.84	45986	29.77
Composite 5	A	06	9/4/2017 08:52:45	12.5	96.2	7.77	46042	29.81
Composite 5	B	06	9/4/2017 08:53:06	12.5	98.9	7.87	45951	29.75
Composite 5	C	06	9/4/2017 08:53:27	12.5	99.3	7.85	45992	29.78
Composite 5	D	06	9/4/2017 08:53:51	12.5	91.9	7.75	45985	29.77
Composite 5	E	06	9/4/2017 08:54:15	12.6	98	7.8	45987	29.77
Composite 6	A	06	9/4/2017 08:54:41	12.6	95	7.74	46016	29.8
Composite 6	B	06	9/4/2017 09:00:47	12.5	100.1	7.94	46041	29.81
Composite 6	C	06	9/4/2017 09:00:58	12.4	100.2	7.91	46025	29.8
Composite 6	D	06	9/4/2017 09:01:15	12.3	100.7	7.86	46046	29.81
Composite 6	E	06	9/4/2017 09:01:29	12.3	100.2	7.87	45972	29.75
Composite 7	A	06	9/4/2017 09:01:44	12.2	99.1	7.87	45998	29.77
Composite 7	B	06	9/4/2017 09:01:54	12.1	99.7	7.86	46045	29.8
Composite 7	C	06	9/4/2017 09:02:44	12.1	100.9	7.94	46055	29.81
Composite 7	D	06	9/4/2017 09:03:00	12.2	99.2	7.89	45971	29.75
Composite 7	E	06	9/4/2017 09:03:25	12.2	100.8	7.93	45981	29.76
Composite 8	A	06	9/4/2017 09:03:43	12.3	100.2	7.87	46044	29.8
Composite 8	B	06	9/4/2017 09:03:58	12.3	99.8	7.85	46069	29.82
Composite 8	C	06	9/4/2017 09:04:18	12.3	100.3	7.87	46035	29.8
Composite 8	D	06	9/4/2017 09:04:44	12.4	98.4	7.84	45961	29.75
Composite 8	E	06	9/4/2017 09:04:58	12.4	97.5	7.81	45995	29.77

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	07	9/5/2017 11:48:38	12.7	104.8	7.73	46326	30.02
Laboratory Control	B	07	9/5/2017 11:49:00	12.5	104.2	7.74	46002	29.78
Laboratory Control	C	07	9/5/2017 11:49:14	12.5	100.8	7.71	46022	29.8
Laboratory Control	D	07	9/5/2017 11:49:32	12.4	102.2	7.72	45994	29.77
Laboratory Control	E	07	9/5/2017 11:49:53	12.4	101.7	7.73	46104	29.85
CLDS Reference Site	A	07	9/5/2017 11:50:11	12.4	99	7.72	46043	29.81
CLDS Reference Site	B	07	9/5/2017 11:50:57	12.4	99.4	7.74	46051	29.82
CLDS Reference Site	C	07	9/5/2017 11:51:15	12.4	100.4	7.75	45998	29.78
CLDS Reference Site	D	07	9/5/2017 11:51:37	12.4	98.6	7.73	45980	29.76
CLDS Reference Site	E	07	9/5/2017 11:51:59	12.5	101.2	7.77	46029	29.8
Composite 1	A	07	9/5/2017 11:52:22	12.5	99.2	7.76	46076	29.84
Composite 1	B	07	9/5/2017 11:52:45	12.6	100.3	7.77	45993	29.78
Composite 1	C	07	9/5/2017 11:53:22	12.6	99.2	7.78	46060	29.83
Composite 1	D	07	9/5/2017 11:53:44	12.5	100.7	7.81	46230	29.95
Composite 1	E	07	9/5/2017 11:53:55	12.5	99	7.79	46101	29.85
Composite 2	A	07	9/5/2017 11:54:11	12.5	96.8	7.76	45991	29.77
Composite 2	B	07	9/5/2017 11:54:22	12.5	96.7	7.76	46161	29.9
Composite 2	C	07	9/5/2017 11:54:45	12.5	98.3	7.77	46082	29.84
Composite 2	D	07	9/5/2017 11:55:10	12.5	98.8	7.78	46061	29.82
Composite 2	E	07	9/5/2017 11:55:33	12.5	94.7	7.73	46053	29.82
Composite 3	A	07	9/5/2017 11:55:49	12.5	96	7.75	46064	29.83
Composite 3	B	07	9/5/2017 11:56:03	12.5	97.5	7.75	46039	29.81
Composite 3	C	07	9/5/2017 11:56:17	12.5	97.7	7.76	46060	29.82
Composite 3	D	07	9/5/2017 11:56:32	12.5	96.9	7.76	46232	29.95
Composite 3	E	07	9/5/2017 11:57:41	12.6	101.4	7.9	46285	29.99
Composite 4	A	07	9/5/2017 11:58:00	12.6	101	7.91	46266	29.98
Composite 4	B	07	9/5/2017 11:58:15	12.5	100.6	7.86	46092	29.85
Composite 4	C	07	9/5/2017 11:58:32	12.6	96.7	7.82	46266	29.98
Composite 4	D	07	9/5/2017 11:58:49	12.6	93.4	7.78	46265	29.97
Composite 4	E	07	9/5/2017 11:59:08	12.5	100	7.83	46088	29.85
Composite 5	A	07	9/5/2017 11:59:30	12.5	94.9	7.76	46008	29.79
Composite 5	B	07	9/5/2017 11:59:56	12.5	98.7	7.87	46270	29.98
Composite 5	C	07	9/5/2017 12:00:10	12.5	98.4	7.86	46256	29.97
Composite 5	D	07	9/5/2017 12:00:33	12.5	91.3	7.73	46174	29.91
Composite 5	E	07	9/5/2017 12:00:53	12.6	97.7	7.79	46154	29.89
Composite 6	A	07	9/5/2017 12:01:10	12.6	94.6	7.73	46144	29.89
Composite 6	B	07	9/5/2017 12:01:50	12.4	100.2	7.9	46501	30.14
Composite 6	C	07	9/5/2017 12:02:08	12.4	99.4	7.87	46269	29.97
Composite 6	D	07	9/5/2017 12:02:21	12.3	99.9	7.85	46130	29.87
Composite 6	E	07	9/5/2017 12:02:35	12.2	100.1	7.87	46282	29.97
Composite 7	A	07	9/5/2017 12:02:52	12.1	99.4	7.88	46459	30.09
Composite 7	B	07	9/5/2017 12:03:12	12	99.7	7.88	46509	30.12
Composite 7	C	07	9/5/2017 12:03:43	12	100.2	7.97	46578	30.18
Composite 7	D	07	9/5/2017 12:04:00	12.1	98.7	7.89	46406	30.06
Composite 7	E	07	9/5/2017 12:04:13	12.2	99.7	7.94	46486	30.12
Composite 8	A	07	9/5/2017 12:04:24	12.2	99.8	7.89	46136	29.87
Composite 8	B	07	9/5/2017 12:04:36	12.2	98.8	7.85	46104	29.84
Composite 8	C	07	9/5/2017 12:04:56	12.2	100.3	7.89	46316	29.99
Composite 8	D	07	9/5/2017 12:05:30	12.4	98	7.84	46254	29.96
Composite 8	E	07	9/5/2017 12:05:52	12.3	96.7	7.79	46137	29.87

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	08	9/6/2017 10:24:58	12.6	98.6	7.72	45186	29.2
Laboratory Control	B	08	9/6/2017 10:25:15	12.5	98.2	7.73	45099	29.13
Laboratory Control	C	08	9/6/2017 10:25:35	12.4	97.5	7.7	45185	29.19
Laboratory Control	D	08	9/6/2017 10:25:58	12.4	98.3	7.7	45196	29.2
Laboratory Control	E	08	9/6/2017 10:26:11	12.4	98.1	7.71	45219	29.22
CLDS Reference Site	A	08	9/6/2017 10:26:28	12.4	97.2	7.69	45223	29.22
CLDS Reference Site	B	08	9/6/2017 10:26:49	12.4	98.1	7.7	45215	29.21
CLDS Reference Site	C	08	9/6/2017 10:27:15	12.4	99.1	7.72	45179	29.19
CLDS Reference Site	D	08	9/6/2017 10:27:30	12.4	98.7	7.7	45168	29.18
CLDS Reference Site	E	08	9/6/2017 10:27:53	12.5	99.7	7.74	45206	29.21
Composite 1	A	08	9/6/2017 10:28:16	12.5	98.8	7.73	45242	29.24
Composite 1	B	08	9/6/2017 10:28:33	12.6	99.7	7.73	45160	29.18
Composite 1	C	08	9/6/2017 10:28:59	12.5	99.4	7.74	45227	29.23
Composite 1	D	08	9/6/2017 10:29:15	12.5	99.9	7.76	45316	29.29
Composite 1	E	08	9/6/2017 10:29:28	12.4	99.6	7.74	45233	29.23
Composite 2	A	08	9/6/2017 10:29:41	12.4	98.5	7.73	45177	29.19
Composite 2	B	08	9/6/2017 10:30:03	12.4	98.3	7.73	45264	29.25
Composite 2	C	08	9/6/2017 10:30:17	12.5	98.5	7.74	45256	29.25
Composite 2	D	08	9/6/2017 10:30:38	12.4	99.2	7.75	45235	29.23
Composite 2	E	08	9/6/2017 10:31:05	12.4	96.5	7.71	45234	29.23
Composite 3	A	08	9/6/2017 10:31:29	12.4	97.4	7.72	45247	29.24
Composite 3	B	08	9/6/2017 10:31:47	12.4	98.4	7.72	45189	29.2
Composite 3	C	08	9/6/2017 10:32:09	12.5	97.3	7.72	45257	29.25
Composite 3	D	08	9/6/2017 10:32:29	12.5	97.9	7.73	45344	29.31
Composite 3	E	08	9/6/2017 10:32:59	12.5	101	7.8	45286	29.27
Composite 4	A	08	9/6/2017 10:33:20	12.5	100.1	7.82	45363	29.32
Composite 4	B	08	9/6/2017 10:33:41	12.5	100	7.78	45158	29.18
Composite 4	C	08	9/6/2017 10:33:57	12.5	98.1	7.78	45399	29.35
Composite 4	D	08	9/6/2017 10:34:09	12.5	96.7	7.76	45402	29.35
Composite 4	E	08	9/6/2017 10:34:30	12.5	99.9	7.78	45233	29.23
Composite 5	A	08	9/6/2017 10:34:59	12.5	96	7.72	45186	29.2
Composite 5	B	08	9/6/2017 10:35:21	12.5	98.4	7.79	45433	29.37
Composite 5	C	08	9/6/2017 10:35:48	12.5	98	7.8	45502	29.42
Composite 5	D	08	9/6/2017 10:36:10	12.5	93.2	7.71	45355	29.32
Composite 5	E	08	9/6/2017 10:36:28	12.5	98.2	7.74	45300	29.28
Composite 6	A	08	9/6/2017 10:36:48	12.6	95.9	7.7	45212	29.22
Composite 6	B	08	9/6/2017 10:37:35	12.4	93.4	7.77	45375	29.33
Composite 6	C	08	9/6/2017 10:37:49	12.4	99	7.78	45284	29.26
Composite 6	D	08	9/6/2017 10:38:07	12.3	99.1	7.78	45287	29.26
Composite 6	E	08	9/6/2017 10:38:20	12.2	99.9	7.78	45203	29.2
Composite 7	A	08	9/6/2017 10:38:41	12.1	99.7	7.78	45371	29.32
Composite 7	B	08	9/6/2017 10:39:01	12.1	99.2	7.76	45211	29.2
Composite 7	C	08	9/6/2017 10:39:41	12.1	99.7	7.78	45229	29.21
Composite 7	D	08	9/6/2017 10:40:03	12.2	98.3	7.75	45234	29.22
Composite 7	E	08	9/6/2017 10:40:27	12.2	99.7	7.77	45235	29.22
Composite 8	A	08	9/6/2017 10:40:52	12.2	99.2	7.78	45268	29.25
Composite 8	B	08	9/6/2017 10:41:04	12.2	99.1	7.76	45193	29.19
Composite 8	C	08	9/6/2017 10:41:22	12.2	100	7.77	45161	29.17
Composite 8	D	08	9/6/2017 10:42:04	12.4	97.3	7.75	45252	29.24
Composite 8	E	08	9/6/2017 10:42:23	12.3	97	7.73	45233	29.22

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	09	9/7/2017 10:07:17	12.6	100.2	7.63	46745	30.32
Laboratory Control	B	09	9/7/2017 10:07:34	12.5	99.7	7.71	46616	30.23
Laboratory Control	C	09	9/7/2017 10:07:49	12.5	97	7.7	46779	30.34
Laboratory Control	D	09	9/7/2017 10:08:05	12.5	98.9	7.72	46725	30.3
Laboratory Control	E	09	9/7/2017 10:08:18	12.4	99.3	7.72	46725	30.3
CLDS Reference Site	A	09	9/7/2017 10:08:31	12.4	96.2	7.7	46715	30.29
CLDS Reference Site	B	09	9/7/2017 10:08:59	12.5	96.4	7.72	46700	30.28
CLDS Reference Site	C	09	9/7/2017 10:09:13	12.4	98.5	7.72	46738	30.31
CLDS Reference Site	D	09	9/7/2017 10:09:28	12.5	95.8	7.7	46786	30.35
CLDS Reference Site	E	09	9/7/2017 10:09:51	12.5	100.3	7.75	46717	30.3
Composite 1	A	09	9/7/2017 10:10:04	12.6	97.9	7.73	46724	30.3
Composite 1	B	09	9/7/2017 10:10:24	12.6	99.8	7.74	46790	30.35
Composite 1	C	09	9/7/2017 10:10:52	12.6	98.6	7.74	46730	30.31
Composite 1	D	09	9/7/2017 10:11:05	12.5	100.4	7.76	46676	30.27
Composite 1	E	09	9/7/2017 10:11:16	12.5	98.5	7.75	46697	30.28
Composite 2	A	09	9/7/2017 10:11:32	12.5	96.1	7.72	46740	30.31
Composite 2	B	09	9/7/2017 10:11:45	12.5	96.7	7.73	46657	30.25
Composite 2	C	09	9/7/2017 10:11:56	12.5	98	7.74	46646	30.25
Composite 2	D	09	9/7/2017 10:12:18	12.5	98.8	7.75	46694	30.28
Composite 2	E	09	9/7/2017 10:12:34	12.5	95.2	7.71	46698	30.28
Composite 3	A	09	9/7/2017 10:12:55	12.5	97	7.72	46687	30.28
Composite 3	B	09	9/7/2017 10:13:04	12.5	97.2	7.71	46724	30.3
Composite 3	C	09	9/7/2017 10:13:16	12.6	97	7.72	46713	30.3
Composite 3	D	09	9/7/2017 10:13:31	12.6	97.4	7.73	46685	30.28
Composite 3	E	09	9/7/2017 10:14:07	12.6	101.7	7.81	46727	30.31
Composite 4	A	09	9/7/2017 10:14:30	12.5	101.3	7.81	46663	30.26
Composite 4	B	09	9/7/2017 10:14:46	12.6	100.1	7.79	46699	30.29
Composite 4	C	09	9/7/2017 10:15:01	12.6	98	7.78	46658	30.26
Composite 4	D	09	9/7/2017 10:15:21	12.6	95.3	7.75	46673	30.27
Composite 4	E	09	9/7/2017 10:15:40	12.6	100.2	7.77	46707	30.29
Composite 5	A	09	9/7/2017 10:16:04	12.6	93.7	7.71	46708	30.29
Composite 5	B	09	9/7/2017 10:16:25	12.6	98.3	7.78	46691	30.28
Composite 5	C	09	9/7/2017 10:16:46	12.6	100.4	7.8	46713	30.3
Composite 5	D	09	9/7/2017 10:17:01	12.6	91.5	7.71	46674	30.27
Composite 5	E	09	9/7/2017 10:17:17	12.6	97.9	7.75	46703	30.29
Composite 6	A	09	9/7/2017 10:17:32	12.6	94.9	7.7	46666	30.26
Composite 6	B	09	9/7/2017 10:18:18	12.5	99.3	7.77	46739	30.31
Composite 6	C	09	9/7/2017 10:18:43	12.4	100.1	7.79	46699	30.28
Composite 6	D	09	9/7/2017 10:19:01	12.4	100.4	7.81	46622	30.22
Composite 6	E	09	9/7/2017 10:19:22	12.3	100.2	7.78	46733	30.3
Composite 7	A	09	9/7/2017 10:19:39	12.3	99	7.76	46745	30.31
Composite 7	B	09	9/7/2017 10:19:50	12.2	99.6	7.75	46749	30.31
Composite 7	C	09	9/7/2017 10:20:31	12.2	100.7	7.78	46788	30.33
Composite 7	D	09	9/7/2017 10:20:46	12.3	98.4	7.75	46703	30.28
Composite 7	E	09	9/7/2017 10:21:02	12.3	100.7	7.77	46741	30.31
Composite 8	A	09	9/7/2017 10:21:11	12.3	100.3	7.77	46717	30.29
Composite 8	B	09	9/7/2017 10:21:24	12.3	98.7	7.74	46760	30.32
Composite 8	C	09	9/7/2017 10:21:46	12.3	100.8	7.78	46735	30.3
Composite 8	D	09	9/7/2017 10:22:19	12.5	97.5	7.75	46700	30.28
Composite 8	E	09	9/7/2017 10:22:35	12.4	96.4	7.73	46706	30.28

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	10	9/8/2017 09:12:12	12.5	99.6	7.86	44790	28.91
Laboratory Control	B	10	9/8/2017 09:12:33	12.4	98.6	7.82	44669	28.82
Laboratory Control	C	10	9/8/2017 09:13:01	12.4	96.2	7.78	44733	28.87
Laboratory Control	D	10	9/8/2017 09:13:21	12.4	97.7	7.78	44743	28.88
Laboratory Control	E	10	9/8/2017 09:13:43	12.4	98	7.78	44770	28.89
CLDS Reference Site	A	10	9/8/2017 09:14:01	12.4	95.4	7.77	44756	28.88
CLDS Reference Site	B	10	9/8/2017 09:14:23	12.4	96	7.76	44830	28.94
CLDS Reference Site	C	10	9/8/2017 09:14:37	12.4	97.6	7.77	44724	28.86
CLDS Reference Site	D	10	9/8/2017 09:14:54	12.4	96.3	7.77	44690	28.84
CLDS Reference Site	E	10	9/8/2017 09:15:09	12.5	99	7.79	44942	29.02
Composite 1	A	10	9/8/2017 09:15:26	12.6	97.1	7.78	44968	29.04
Composite 1	B	10	9/8/2017 09:15:45	12.6	99.1	7.8	44690	28.84
Composite 1	C	10	9/8/2017 09:16:13	12.5	98.4	7.79	44778	28.9
Composite 1	D	10	9/8/2017 09:16:29	12.4	99.7	7.8	44868	28.97
Composite 1	E	10	9/8/2017 09:16:44	12.4	98.3	7.79	44778	28.9
Composite 2	A	10	9/8/2017 09:17:07	12.4	94.9	7.76	44755	28.88
Composite 2	B	10	9/8/2017 09:18:00	12.4	94	7.77	44866	28.96
Composite 2	C	10	9/8/2017 09:18:15	12.4	98.2	7.78	44796	28.92
Composite 2	D	10	9/8/2017 09:18:41	12.4	98.9	7.79	44801	28.92
Composite 2	E	10	9/8/2017 09:19:04	12.4	95.5	7.75	44741	28.88
Composite 3	A	10	9/8/2017 09:19:26	12.4	96.9	7.75	44805	28.92
Composite 3	B	10	9/8/2017 09:19:44	12.4	96.8	7.75	44750	28.88
Composite 3	C	10	9/8/2017 09:20:01	12.5	96.8	7.75	44812	28.93
Composite 3	D	10	9/8/2017 09:20:23	12.6	96.6	7.77	44983	29.05
Composite 3	E	10	9/8/2017 09:20:49	12.5	101.7	7.84	44946	29.02
Composite 4	A	10	9/8/2017 09:21:06	12.5	100.7	7.84	44787	28.91
Composite 4	B	10	9/8/2017 09:21:28	12.4	100.4	7.82	44781	28.9
Composite 4	C	10	9/8/2017 09:21:45	12.5	98.2	7.82	45061	29.11
Composite 4	D	10	9/8/2017 09:22:06	12.6	88.9	7.75	45186	29.2
Composite 4	E	10	9/8/2017 09:22:26	12.5	99.8	7.81	44878	28.98
Composite 5	A	10	9/8/2017 09:22:53	12.5	93.6	7.75	44840	28.95
Composite 5	B	10	9/8/2017 09:23:08	12.5	97.8	7.78	44982	29.05
Composite 5	C	10	9/8/2017 09:23:29	12.5	100.4	7.83	44945	29.03
Composite 5	D	10	9/8/2017 09:23:51	12.5	91.4	7.74	44939	29.02
Composite 5	E	10	9/8/2017 09:24:10	12.5	97.4	7.76	44773	28.9
Composite 6	A	10	9/8/2017 09:24:30	12.6	94.2	7.72	44994	29.06
Composite 6	B	10	9/8/2017 09:25:20	12.4	99.8	7.78	44822	28.93
Composite 6	C	10	9/8/2017 09:25:46	12.4	100.3	7.81	44965	29.04
Composite 6	D	10	9/8/2017 09:26:01	12.4	100.1	7.83	45028	29.08
Composite 6	E	10	9/8/2017 09:26:22	12.3	99.6	7.81	44752	28.88
Composite 7	A	10	9/8/2017 09:26:38	12.2	98.5	7.79	44838	28.94
Composite 7	B	10	9/8/2017 09:26:54	12.2	100	7.8	44824	28.93
Composite 7	C	10	9/8/2017 09:27:44	12.2	101.1	7.82	44860	28.95
Composite 7	D	10	9/8/2017 09:28:03	12.3	98.4	7.79	45059	29.1
Composite 7	E	10	9/8/2017 09:28:25	12.3	100.3	7.81	44799	28.91
Composite 8	A	10	9/8/2017 09:28:47	12.3	100.3	7.83	44905	28.99
Composite 8	B	10	9/8/2017 09:29:04	12.3	99.2	7.8	44723	28.86
Composite 8	C	10	9/8/2017 09:29:26	12.3	101.1	7.83	44964	29.03
Composite 8	D	10	9/8/2017 09:30:01	12.4	98	7.79	44870	28.97
Composite 8	E	10	9/8/2017 09:30:30	12.4	95.2	7.75	44847	28.95

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	11	9/9/2017 10:06:52	12.7	97.2	7.76	45068	29.12
Laboratory Control	B	11	9/9/2017 10:07:08	12.6	97	7.75	45080	29.13
Laboratory Control	C	11	9/9/2017 10:07:25	12.6	95	7.73	45072	29.12
Laboratory Control	D	11	9/9/2017 10:07:46	12.6	96.6	7.74	45081	29.12
Laboratory Control	E	11	9/9/2017 10:08:02	12.5	97.4	7.74	45073	29.12
CLDS Reference Site	A	11	9/9/2017 10:08:19	12.5	94.9	7.72	45080	29.12
CLDS Reference Site	B	11	9/9/2017 10:08:41	12.5	95.6	7.73	45083	29.12
CLDS Reference Site	C	11	9/9/2017 10:08:58	12.5	98	7.74	45085	29.13
CLDS Reference Site	D	11	9/9/2017 10:09:14	12.6	96.9	7.73	45097	29.14
CLDS Reference Site	E	11	9/9/2017 10:09:30	12.6	98.3	7.76	45120	29.15
Composite 1	A	11	9/9/2017 10:09:55	12.6	96.5	7.76	45136	29.17
Composite 1	B	11	9/9/2017 10:10:13	12.7	98.9	7.77	45082	29.13
Composite 1	C	11	9/9/2017 10:10:43	12.6	98.6	7.76	45076	29.12
Composite 1	D	11	9/9/2017 10:11:08	12.6	98.6	7.78	45072	29.12
Composite 1	E	11	9/9/2017 10:11:29	12.6	97.1	7.76	45076	29.12
Composite 2	A	11	9/9/2017 10:11:42	12.6	95.7	7.74	45090	29.13
Composite 2	B	11	9/9/2017 10:12:16	12.5	93.5	7.74	45080	29.12
Composite 2	C	11	9/9/2017 10:12:38	12.6	96.7	7.75	45079	29.12
Composite 2	D	11	9/9/2017 10:13:06	12.6	97.9	7.78	45079	29.12
Composite 2	E	11	9/9/2017 10:13:29	12.6	94.8	7.73	45086	29.13
Composite 3	A	11	9/9/2017 10:13:48	12.6	95.5	7.73	45079	29.12
Composite 3	B	11	9/9/2017 10:14:12	12.6	95.9	7.73	45084	29.13
Composite 3	C	11	9/9/2017 10:14:28	12.6	96.8	7.73	45090	29.13
Composite 3	D	11	9/9/2017 10:14:45	12.6	96	7.74	45182	29.2
Composite 3	E	11	9/9/2017 10:15:11	12.6	101.3	7.83	45130	29.16
Composite 4	A	11	9/9/2017 10:15:28	12.6	99.9	7.83	45063	29.11
Composite 4	B	11	9/9/2017 10:16:09	12.6	96.1	7.79	45196	29.21
Composite 4	C	11	9/9/2017 10:16:24	12.6	93.3	7.76	43635	28.09
Composite 4	D	11	9/9/2017 10:16:34	12.6	90.6	7.73	45314	29.29
Composite 4	E	11	9/9/2017 10:16:55	12.6	99	7.79	45085	29.13
Composite 5	A	11	9/9/2017 10:17:27	12.6	93.1	7.72	45106	29.14
Composite 5	B	11	9/9/2017 10:17:48	12.6	97.7	7.77	45135	29.16
Composite 5	C	11	9/9/2017 10:18:05	12.6	100.2	7.8	45131	29.16
Composite 5	D	11	9/9/2017 10:18:22	12.6	91.7	7.73	45122	29.16
Composite 5	E	11	9/9/2017 10:18:45	12.6	97.6	7.74	45094	29.14
Composite 6	A	11	9/9/2017 10:19:03	12.7	92.5	7.7	45158	29.18
Composite 6	B	11	9/9/2017 10:19:59	12.5	97.3	7.76	45105	29.14
Composite 6	C	11	9/9/2017 10:20:16	12.5	99.2	7.79	45151	29.17
Composite 6	D	11	9/9/2017 10:20:29	12.4	99.9	7.81	45215	29.22
Composite 6	E	11	9/9/2017 10:20:50	12.4	99.7	7.79	45111	29.14
Composite 7	A	11	9/9/2017 10:21:06	12.3	98.6	7.77	45117	29.14
Composite 7	B	11	9/9/2017 10:21:27	12.2	99.8	7.78	45130	29.15
Composite 7	C	11	9/9/2017 10:22:22	12.2	100	7.8	45138	29.15
Composite 7	D	11	9/9/2017 10:22:49	12.3	97.5	7.77	45205	29.2
Composite 7	E	11	9/9/2017 10:23:03	12.4	99.2	7.79	45099	29.13
Composite 8	A	11	9/9/2017 10:23:19	12.3	98.6	7.81	45136	29.16
Composite 8	B	11	9/9/2017 10:23:37	12.4	98.5	7.78	45112	29.14
Composite 8	C	11	9/9/2017 10:24:00	12.3	100.3	7.83	45165	29.17
Composite 8	D	11	9/9/2017 10:24:36	12.5	96.6	7.79	45108	29.14
Composite 8	E	11	9/9/2017 10:24:54	12.4	95.4	7.75	45115	29.14

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	12	9/10/2017 11:03:16	12.8	103.8	7.7	46075	29.84
Laboratory Control	B	12	9/10/2017 11:03:28	12.7	104.2	7.7	46051	29.83
Laboratory Control	C	12	9/10/2017 11:03:39	12.7	103.4	7.7	46087	29.85
Laboratory Control	D	12	9/10/2017 11:03:51	12.7	103.2	7.7	46071	29.84
Laboratory Control	E	12	9/10/2017 11:04:07	12.6	103.6	7.71	46072	29.84
CLDS Reference Site	A	12	9/10/2017 11:04:24	12.6	102.6	7.71	46067	29.83
CLDS Reference Site	B	12	9/10/2017 11:05:30	12.6	99.9	7.72	46120	29.87
CLDS Reference Site	C	12	9/10/2017 11:05:50	12.6	102.3	7.73	46079	29.84
CLDS Reference Site	D	12	9/10/2017 11:06:12	12.7	102	7.72	46065	29.83
CLDS Reference Site	E	12	9/10/2017 11:06:26	12.6	101.8	7.75	46184	29.92
Composite 1	A	12	9/10/2017 11:06:46	12.7	101.4	7.78	46180	29.92
Composite 1	B	12	9/10/2017 11:07:00	12.8	101.9	7.77	46091	29.86
Composite 1	C	12	9/10/2017 11:07:48	12.7	100.6	7.77	46111	29.87
Composite 1	D	12	9/10/2017 11:08:00	12.6	101.6	7.78	46123	29.87
Composite 1	E	12	9/10/2017 11:08:15	12.7	101.3	7.76	46071	29.84
Composite 2	A	12	9/10/2017 11:08:29	12.7	98.9	7.74	46078	29.84
Composite 2	B	12	9/10/2017 11:08:44	12.6	98.5	7.74	46135	29.88
Composite 2	C	12	9/10/2017 11:08:57	12.7	99.9	7.76	46101	29.86
Composite 2	D	12	9/10/2017 11:09:33	12.6	100.4	7.77	46119	29.87
Composite 2	E	12	9/10/2017 11:09:53	12.7	98.2	7.75	46076	29.84
Composite 3	A	12	9/10/2017 11:10:07	12.7	98.4	7.74	46100	29.86
Composite 3	B	12	9/10/2017 11:10:20	12.7	99.1	7.74	46077	29.84
Composite 3	C	12	9/10/2017 11:10:35	12.7	98.9	7.74	46105	29.86
Composite 3	D	12	9/10/2017 11:10:51	12.6	97.7	7.74	46277	29.99
Composite 3	E	12	9/10/2017 11:13:56	12.6	102.4	7.85	46135	29.88
Composite 4	A	12	9/10/2017 11:14:14	12.7	100.8	7.83	46108	29.86
Composite 4	B	12	9/10/2017 11:14:37	12.7	100.9	7.81	46094	29.86
Composite 4	C	12	9/10/2017 11:14:53	12.6	99.2	7.8	46231	29.95
Composite 4	D	12	9/10/2017 11:15:12	12.6	95.9	7.77	46262	29.97
Composite 4	E	12	9/10/2017 11:15:27	12.7	99.9	7.8	46117	29.87
Composite 5	A	12	9/10/2017 11:16:09	12.7	96.9	7.73	46095	29.86
Composite 5	B	12	9/10/2017 11:16:30	12.6	98.6	7.77	46189	29.92
Composite 5	C	12	9/10/2017 11:16:41	12.6	99.9	7.79	46164	29.9
Composite 5	D	12	9/10/2017 11:16:58	12.7	98.1	7.77	46167	29.91
Composite 5	E	12	9/10/2017 11:17:07	12.7	98.8	7.77	46111	29.87
Composite 6	A	12	9/10/2017 11:17:22	12.7	95.6	7.72	46177	29.92
Composite 6	B	12	9/10/2017 11:18:28	12.6	99.6	7.79	46205	29.93
Composite 6	C	12	9/10/2017 11:18:46	12.5	100.4	7.8	46196	29.92
Composite 6	D	12	9/10/2017 11:18:58	12.5	100.1	7.82	46326	30.01
Composite 6	E	12	9/10/2017 11:19:12	12.5	100.5	7.8	46123	29.87
Composite 7	A	12	9/10/2017 11:19:31	12.4	99.9	7.77	46133	29.87
Composite 7	B	12	9/10/2017 11:19:41	12.3	100.4	7.78	46160	29.89
Composite 7	C	12	9/10/2017 11:20:29	12.3	100.1	7.81	46165	29.89
Composite 7	D	12	9/10/2017 11:20:49	12.3	99	7.78	46252	29.96
Composite 7	E	12	9/10/2017 11:21:03	12.3	100.6	7.82	46236	29.94
Composite 8	A	12	9/10/2017 11:21:15	12.5	100.3	7.81	46113	29.86
Composite 8	B	12	9/10/2017 11:21:23	12.4	100.3	7.8	46158	29.89
Composite 8	C	12	9/10/2017 11:21:34	12.4	100.9	7.81	46114	29.86
Composite 8	D	12	9/10/2017 11:22:38	12.5	98.3	7.8	46172	29.91
Composite 8	E	12	9/10/2017 11:22:51	12.5	97.6	7.76	46113	29.86

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	13	9/11/2017 10:04:42	12.6	105.3	7.74	44991	29.06
Laboratory Control	B	13	9/11/2017 10:05:06	12.6	103.1	7.75	45028	29.09
Laboratory Control	C	13	9/11/2017 10:05:19	12.6	101.3	7.74	45042	29.1
Laboratory Control	D	13	9/11/2017 10:05:35	12.5	101.3	7.74	45060	29.11
Laboratory Control	E	13	9/11/2017 10:05:45	12.5	101.4	7.74	45046	29.1
CLDS Reference Site	A	13	9/11/2017 10:05:58	12.5	100.4	7.74	45023	29.08
CLDS Reference Site	B	13	9/11/2017 10:06:42	12.5	99.4	7.75	45029	29.08
CLDS Reference Site	C	13	9/11/2017 10:06:54	12.5	99.9	7.75	45074	29.12
CLDS Reference Site	D	13	9/11/2017 10:07:11	12.5	99.6	7.76	45262	29.25
CLDS Reference Site	E	13	9/11/2017 10:07:23	12.6	100.2	7.78	45270	29.26
Composite 1	A	13	9/11/2017 10:07:38	12.7	100.3	7.8	45363	29.33
Composite 1	B	13	9/11/2017 10:07:57	12.7	100.4	7.79	45030	29.09
Composite 1	C	13	9/11/2017 10:08:45	12.6	99.1	7.79	45093	29.13
Composite 1	D	13	9/11/2017 10:09:07	12.6	99.6	7.81	45168	29.19
Composite 1	E	13	9/11/2017 10:09:21	12.6	98.6	7.79	45018	29.08
Composite 2	A	13	9/11/2017 10:09:35	12.5	97.3	7.77	44967	29.04
Composite 2	B	13	9/11/2017 10:09:44	12.6	97	7.77	45160	29.18
Composite 2	C	13	9/11/2017 10:09:54	12.6	97.9	7.78	45128	29.16
Composite 2	D	13	9/11/2017 10:10:24	12.6	98	7.79	45083	29.13
Composite 2	E	13	9/11/2017 10:10:48	12.6	95.3	7.76	45075	29.12
Composite 3	A	13	9/11/2017 10:11:08	12.6	96.3	7.76	45089	29.13
Composite 3	B	13	9/11/2017 10:11:31	12.6	96.6	7.75	44977	29.05
Composite 3	C	13	9/11/2017 10:11:52	12.6	96.9	7.76	45076	29.12
Composite 3	D	13	9/11/2017 10:12:08	12.6	97.4	7.77	45213	29.22
Composite 3	E	13	9/11/2017 10:13:32	12.6	100.3	7.87	45247	29.24
Composite 4	A	13	9/11/2017 10:13:50	12.6	99.7	7.86	45229	29.23
Composite 4	B	13	9/11/2017 10:14:16	12.6	99	7.83	45098	29.14
Composite 4	C	13	9/11/2017 10:14:39	12.6	96.7	7.82	45375	29.34
Composite 4	D	13	9/11/2017 10:14:55	12.6	96.6	7.79	45314	29.29
Composite 4	E	13	9/11/2017 10:15:21	12.6	99.1	7.82	45137	29.17
Composite 5	A	13	9/11/2017 10:16:36	12.6	93.7	7.74	45046	29.1
Composite 5	B	13	9/11/2017 10:17:00	12.6	97	7.78	45285	29.27
Composite 5	C	13	9/11/2017 10:17:10	12.6	98.2	7.8	45221	29.23
Composite 5	D	13	9/11/2017 10:17:25	12.6	96.9	7.79	45237	29.24
Composite 5	E	13	9/11/2017 10:17:45	12.6	97.2	7.79	45083	29.13
Composite 6	A	13	9/11/2017 10:18:01	12.7	93.4	7.74	45291	29.28
Composite 6	B	13	9/11/2017 10:19:11	12.5	98.3	7.81	45223	29.23
Composite 6	C	13	9/11/2017 10:19:27	12.5	98.6	7.81	45276	29.26
Composite 6	D	13	9/11/2017 10:19:38	12.5	98.6	7.81	45174	29.19
Composite 6	E	13	9/11/2017 10:19:47	12.4	98.9	7.81	45109	29.14
Composite 7	A	13	9/11/2017 10:19:57	12.3	98.4	7.79	45111	29.14
Composite 7	B	13	9/11/2017 10:20:09	12.3	98.5	7.8	45098	29.12
Composite 7	C	13	9/11/2017 10:20:48	12.3	98.8	7.81	45073	29.11
Composite 7	D	13	9/11/2017 10:21:03	12.4	97.2	7.78	45124	29.15
Composite 7	E	13	9/11/2017 10:21:17	12.4	98.8	7.81	45193	29.2
Composite 8	A	13	9/11/2017 10:21:33	12.4	98.7	7.82	45097	29.13
Composite 8	B	13	9/11/2017 10:21:43	12.3	98.8	7.81	45103	29.13
Composite 8	C	13	9/11/2017 10:21:54	12.3	99	7.82	45301	29.27
Composite 8	D	13	9/11/2017 10:22:56	12.5	96.2	7.81	45283	29.27
Composite 8	E	13	9/11/2017 10:23:12	12.5	95.1	7.77	45100	29.13

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	14	9/12/2017 08:58:44	12.6	114.3	7.76	44845	28.96
Laboratory Control	B	14	9/12/2017 08:59:09	12.5	109.6	7.77	44863	28.97
Laboratory Control	C	14	9/12/2017 08:59:47	12.5	104.7	7.76	44838	28.95
Laboratory Control	D	14	9/12/2017 09:00:08	12.5	104.8	7.77	44854	28.96
Laboratory Control	E	14	9/12/2017 09:00:28	12.4	105.2	7.78	44822	28.93
CLDS Reference Site	A	14	9/12/2017 09:00:46	12.5	102	7.78	44852	28.96
CLDS Reference Site	B	14	9/12/2017 09:01:07	12.5	102.2	7.78	44812	28.93
CLDS Reference Site	C	14	9/12/2017 09:01:30	12.5	103	7.8	44878	28.98
CLDS Reference Site	D	14	9/12/2017 09:01:48	12.5	102	7.79	44736	28.87
CLDS Reference Site	E	14	9/12/2017 09:02:11	12.5	103.2	7.8	44722	28.87
Composite 1	A	14	9/12/2017 09:02:42	12.6	102.9	7.82	44681	28.84
Composite 1	B	14	9/12/2017 09:03:02	12.6	103.2	7.82	44878	28.98
Composite 1	C	14	9/12/2017 09:03:32	12.6	101.2	7.82	44795	28.92
Composite 1	D	14	9/12/2017 09:03:51	12.5	101.5	7.82	44802	28.92
Composite 1	E	14	9/12/2017 09:04:06	12.5	100.7	7.82	44821	28.94
Composite 2	A	14	9/12/2017 09:04:25	12.5	98.1	7.8	44906	29
Composite 2	B	14	9/12/2017 09:04:44	12.5	99.6	7.8	44758	28.89
Composite 2	C	14	9/12/2017 09:05:08	12.5	100.8	7.82	44834	28.95
Composite 2	D	14	9/12/2017 09:05:31	12.5	100.8	7.82	44798	28.92
Composite 2	E	14	9/12/2017 09:05:49	12.5	97.4	7.81	44804	28.92
Composite 3	A	14	9/12/2017 09:06:11	12.5	99	7.8	44813	28.93
Composite 3	B	14	9/12/2017 09:06:29	12.5	98.3	7.8	44900	28.99
Composite 3	C	14	9/12/2017 09:06:48	12.6	98.9	7.8	44807	28.93
Composite 3	D	14	9/12/2017 09:07:18	12.6	98.1	7.8	44836	28.95
Composite 3	E	14	9/12/2017 09:07:50	12.6	102.5	7.85	44814	28.93
Composite 4	A	14	9/12/2017 09:08:08	12.6	101.6	7.85	44754	28.89
Composite 4	B	14	9/12/2017 09:08:28	12.6	100.8	7.84	44786	28.91
Composite 4	C	14	9/12/2017 09:08:44	12.6	99	7.84	44714	28.86
Composite 4	D	14	9/12/2017 09:09:03	12.6	93.8	7.78	44704	28.86
Composite 4	E	14	9/12/2017 09:09:22	12.6	90.8	7.77	44787	28.91
Composite 5	A	14	9/12/2017 09:09:56	12.6	96.2	7.78	44881	28.98
Composite 5	B	14	9/12/2017 09:10:10	12.6	98.3	7.79	44759	28.89
Composite 5	C	14	9/12/2017 09:10:26	12.6	100.6	7.82	44694	28.85
Composite 5	D	14	9/12/2017 09:10:44	12.6	99.1	7.81	44734	28.88
Composite 5	E	14	9/12/2017 09:11:06	12.6	99.5	7.81	44866	28.97
Composite 6	A	14	9/12/2017 09:11:27	12.6	96.5	7.76	44741	28.88
Composite 6	B	14	9/12/2017 09:12:47	12.5	101.3	7.81	44865	28.97
Composite 6	C	14	9/12/2017 09:13:07	12.5	99.7	7.81	44796	28.92
Composite 6	D	14	9/12/2017 09:13:29	12.4	101.5	7.82	44863	28.96
Composite 6	E	14	9/12/2017 09:13:53	12.4	100.9	7.82	44828	28.94
Composite 7	A	14	9/12/2017 09:14:19	12.3	100.9	7.81	44870	28.96
Composite 7	B	14	9/12/2017 09:14:30	12.3	101.2	7.81	44916	29
Composite 7	C	14	9/12/2017 09:15:29	12.3	101.6	7.82	44904	28.99
Composite 7	D	14	9/12/2017 09:15:52	12.3	100	7.8	44816	28.93
Composite 7	E	14	9/12/2017 09:16:15	12.4	101.6	7.83	44813	28.92
Composite 8	A	14	9/12/2017 09:16:35	12.4	101.2	7.84	44857	28.96
Composite 8	B	14	9/12/2017 09:16:51	12.4	100.2	7.82	44855	28.96
Composite 8	C	14	9/12/2017 09:17:08	12.3	102.1	7.83	44784	28.9
Composite 8	D	14	9/12/2017 09:17:46	12.5	97.9	7.82	44830	28.94
Composite 8	E	14	9/12/2017 09:18:08	12.5	97	7.8	44896	28.99

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	15	9/13/2017 09:07:13	12.7	98.4	7.83	46228	29.95
Laboratory Control	B	15	9/13/2017 09:07:26	12.6	98.6	7.83	46243	29.96
Laboratory Control	C	15	9/13/2017 09:07:41	12.6	96.3	7.82	46247	29.96
Laboratory Control	D	15	9/13/2017 09:07:54	12.6	96.8	7.82	46256	29.97
Laboratory Control	E	15	9/13/2017 09:08:05	12.5	97.4	7.83	46250	29.96
CLDS Reference Site	A	15	9/13/2017 09:08:25	12.5	95.9	7.84	46252	29.96
CLDS Reference Site	B	15	9/13/2017 09:09:16	12.5	95	7.84	46214	29.94
CLDS Reference Site	C	15	9/13/2017 09:09:35	12.5	96.8	7.85	46268	29.98
CLDS Reference Site	D	15	9/13/2017 09:09:57	12.5	96.3	7.84	46117	29.87
CLDS Reference Site	E	15	9/13/2017 09:10:08	12.6	97.5	7.85	46064	29.83
Composite 1	A	15	9/13/2017 09:10:22	12.6	98.6	7.86	45946	29.75
Composite 1	B	15	9/13/2017 09:10:39	12.7	98	7.87	46286	29.99
Composite 1	C	15	9/13/2017 09:11:08	12.6	96.8	7.86	46237	29.96
Composite 1	D	15	9/13/2017 09:11:21	12.6	98	7.87	46234	29.95
Composite 1	E	15	9/13/2017 09:11:34	12.6	96.4	7.87	46232	29.95
Composite 2	A	15	9/13/2017 09:11:45	12.6	94.3	7.86	46278	29.98
Composite 2	B	15	9/13/2017 09:12:01	12.6	95.3	7.86	46162	29.9
Composite 2	C	15	9/13/2017 09:12:19	12.6	96.7	7.87	46244	29.96
Composite 2	D	15	9/13/2017 09:13:22	12.6	96.5	7.87	46218	29.94
Composite 2	E	15	9/13/2017 09:13:48	12.6	93	7.86	46238	29.96
Composite 3	A	15	9/13/2017 09:14:08	12.6	95.1	7.85	46217	29.94
Composite 3	B	15	9/13/2017 09:14:23	12.6	94.1	7.85	46291	29.99
Composite 3	C	15	9/13/2017 09:14:34	12.6	95.1	7.85	46215	29.94
Composite 3	D	15	9/13/2017 09:14:53	12.6	94.8	7.83	46192	29.92
Composite 3	E	15	9/13/2017 09:17:01	12.6	99.7	7.91	46241	29.96
Composite 4	A	15	9/13/2017 09:17:19	12.6	98.6	7.9	46149	29.89
Composite 4	B	15	9/13/2017 09:17:40	12.6	97.8	7.89	46203	29.93
Composite 4	C	15	9/13/2017 09:17:59	12.6	93.6	7.87	46031	29.81
Composite 4	D	15	9/13/2017 09:18:15	12.6	92.1	7.84	46029	29.81
Composite 4	E	15	9/13/2017 09:18:34	12.6	84.4	7.82	46234	29.95
Composite 5	A	15	9/13/2017 09:25:11	12.6	92.3	7.84	46311	30.01
Composite 5	B	15	9/13/2017 09:25:31	12.6	95.8	7.85	46107	29.86
Composite 5	C	15	9/13/2017 09:25:49	12.6	97.5	7.86	46090	29.85
Composite 5	D	15	9/13/2017 09:26:07	12.6	95.4	7.86	46157	29.9
Composite 5	E	15	9/13/2017 09:26:24	12.6	95.8	7.86	46302	30
Composite 6	A	15	9/13/2017 09:26:51	12.7	91.3	7.79	46144	29.89
Composite 6	B	15	9/13/2017 09:28:01	12.5	97.1	7.85	46309	30.01
Composite 6	C	15	9/13/2017 09:28:20	12.5	97.6	7.85	46217	29.94
Composite 6	D	15	9/13/2017 09:28:49	12.5	97.5	7.85	46297	29.99
Composite 6	E	15	9/13/2017 09:29:07	12.4	97.5	7.85	46295	29.99
Composite 7	A	15	9/13/2017 09:29:20	12.4	97	7.85	46352	30.03
Composite 7	B	15	9/13/2017 09:29:40	12.3	97.6	7.85	46305	29.99
Composite 7	C	15	9/13/2017 09:30:33	12.3	98.3	7.86	46328	30.01
Composite 7	D	15	9/13/2017 09:30:57	12.4	96.4	7.84	46252	29.96
Composite 7	E	15	9/13/2017 09:31:14	12.4	98.2	7.86	46259	29.96
Composite 8	A	15	9/13/2017 09:31:29	12.4	98	7.87	46280	29.98
Composite 8	B	15	9/13/2017 09:31:48	12.4	96.9	7.86	46317	30.01
Composite 8	C	15	9/13/2017 09:32:00	12.4	98	7.87	46310	30
Composite 8	D	15	9/13/2017 09:33:09	12.5	94.8	7.87	46250	29.96
Composite 8	E	15	9/13/2017 09:33:30	12.5	93.7	7.86	46309	30

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	16	9/14/2017 09:30:22	12.6	97.5	7.81	45946	29.75
Laboratory Control	B	16	9/14/2017 09:30:44	12.5	97.4	7.82	45910	29.72
Laboratory Control	C	16	9/14/2017 09:31:10	12.5	94.9	7.8	45951	29.74
Laboratory Control	D	16	9/14/2017 09:31:28	12.4	97	7.81	45960	29.75
Laboratory Control	E	16	9/14/2017 09:31:43	12.4	96.9	7.81	45965	29.75
CLDS Reference Site	A	16	9/14/2017 09:32:09	12.4	95	7.82	45950	29.74
CLDS Reference Site	B	16	9/14/2017 09:32:25	12.4	95.6	7.82	45933	29.73
CLDS Reference Site	C	16	9/14/2017 09:32:52	12.4	97.7	7.83	45962	29.75
CLDS Reference Site	D	16	9/14/2017 09:33:07	12.4	97.2	7.83	45931	29.73
CLDS Reference Site	E	16	9/14/2017 09:33:21	12.5	98.8	7.83	45886	29.7
Composite 1	A	16	9/14/2017 09:33:40	12.5	99.8	7.84	45841	29.67
Composite 1	B	16	9/14/2017 09:33:55	12.6	99.6	7.85	45960	29.75
Composite 1	C	16	9/14/2017 09:34:23	12.6	98	7.84	45952	29.75
Composite 1	D	16	9/14/2017 09:34:42	12.5	99.5	7.85	45958	29.75
Composite 1	E	16	9/14/2017 09:35:04	12.5	97.6	7.85	45967	29.76
Composite 2	A	16	9/14/2017 09:35:21	12.5	94.9	7.84	45969	29.76
Composite 2	B	16	9/14/2017 09:35:42	12.5	96.2	7.83	45939	29.74
Composite 2	C	16	9/14/2017 09:36:00	12.5	97.7	7.85	45950	29.74
Composite 2	D	16	9/14/2017 09:36:25	12.5	98.3	7.85	45972	29.76
Composite 2	E	16	9/14/2017 09:36:43	12.5	95.1	7.84	45955	29.75
Composite 3	A	16	9/14/2017 09:36:59	12.5	96.3	7.84	45960	29.75
Composite 3	B	16	9/14/2017 09:37:15	12.5	95.7	7.83	45949	29.75
Composite 3	C	16	9/14/2017 09:37:33	12.5	97.5	7.83	45954	29.75
Composite 3	D	16	9/14/2017 09:37:49	12.5	96.4	7.83	45987	29.77
Composite 3	E	16	9/14/2017 09:38:17	12.5	101.6	7.88	45968	29.76
Composite 4	A	16	9/14/2017 09:38:40	12.6	100.3	7.88	45935	29.74
Composite 4	B	16	9/14/2017 09:38:56	12.6	100	7.88	45917	29.72
Composite 4	C	16	9/14/2017 09:39:16	12.6	96.9	7.87	45803	29.64
Composite 4	D	16	9/14/2017 09:39:38	12.6	94.3	7.84	45895	29.71
Composite 4	E	16	9/14/2017 09:39:53	12.5	88.8	7.82	45961	29.75
Composite 5	A	16	9/14/2017 09:40:25	12.5	93.8	7.83	45989	29.77
Composite 5	B	16	9/14/2017 09:40:41	12.5	97.3	7.83	45899	29.71
Composite 5	C	16	9/14/2017 09:40:56	12.5	99.6	7.86	45915	29.72
Composite 5	D	16	9/14/2017 09:41:24	12.5	97.1	7.84	45946	29.74
Composite 5	E	16	9/14/2017 09:41:45	12.5	97.6	7.85	45990	29.78
Composite 6	A	16	9/14/2017 09:41:55	12.6	95.1	7.81	45955	29.75
Composite 6	B	16	9/14/2017 09:42:32	12.4	99.4	7.83	46009	29.78
Composite 6	C	16	9/14/2017 09:43:04	12.4	99.8	7.84	45920	29.72
Composite 6	D	16	9/14/2017 09:43:25	12.3	99.4	7.85	45991	29.77
Composite 6	E	16	9/14/2017 09:43:42	12.2	99.7	7.85	46001	29.77
Composite 7	A	16	9/14/2017 09:44:01	12.2	98	7.84	46020	29.78
Composite 7	B	16	9/14/2017 09:44:18	12.1	99.5	7.84	46015	29.77
Composite 7	C	16	9/14/2017 09:44:48	12.1	100.2	7.85	46024	29.78
Composite 7	D	16	9/14/2017 09:45:13	12.2	97.4	7.83	46008	29.78
Composite 7	E	16	9/14/2017 09:45:32	12.3	99.9	7.85	45991	29.77
Composite 8	A	16	9/14/2017 09:45:51	12.2	100.5	7.86	45993	29.77
Composite 8	B	16	9/14/2017 09:46:22	12.2	98.1	7.85	46029	29.79
Composite 8	C	16	9/14/2017 09:46:39	12.2	100.6	7.87	46018	29.78
Composite 8	D	16	9/14/2017 09:47:32	12.4	96.1	7.86	46012	29.79
Composite 8	E	16	9/14/2017 09:47:48	12.3	94.2	7.84	46007	29.78

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	17	9/15/2017 07:31:30	13.7	96.4	7.55	45106	29.18
Laboratory Control	B	17	9/15/2017 07:31:54	13.7	94.8	7.57	45021	29.12
Laboratory Control	C	17	9/15/2017 07:32:18	13.6	91.5	7.58	45088	29.16
Laboratory Control	D	17	9/15/2017 07:32:33	13.5	91.9	7.58	45070	29.15
Laboratory Control	E	17	9/15/2017 07:32:59	13.4	92.4	7.6	45109	29.17
CLDS Reference Site	A	17	9/15/2017 07:33:21	13.3	90.3	7.61	45077	29.15
CLDS Reference Site	B	17	9/15/2017 07:34:06	13	91.8	7.62	45229	29.25
CLDS Reference Site	C	17	9/15/2017 07:34:29	13.3	91.3	7.63	45070	29.14
CLDS Reference Site	D	17	9/15/2017 07:34:50	12.9	92.1	7.64	45249	29.26
CLDS Reference Site	E	17	9/15/2017 07:35:18	12.8	94.3	7.68	45357	29.33
Composite 1	A	17	9/15/2017 07:35:57	12.8	94.8	7.7	45373	29.34
Composite 1	B	17	9/15/2017 07:36:29	13.2	93.9	7.69	45096	29.16
Composite 1	C	17	9/15/2017 07:37:00	13.4	92.4	7.68	45196	29.24
Composite 1	D	17	9/15/2017 07:37:19	13.5	93.9	7.7	45140	29.2
Composite 1	E	17	9/15/2017 07:37:38	13.5	92.1	7.69	45151	29.21
Composite 2	A	17	9/15/2017 07:38:05	13.8	88.5	7.66	45051	29.14
Composite 2	B	17	9/15/2017 07:38:31	13.3	90.6	7.68	45251	29.27
Composite 2	C	17	9/15/2017 07:39:55	13.5	91.3	7.7	45136	29.19
Composite 2	D	17	9/15/2017 07:40:19	13.2	92.9	7.71	45255	29.27
Composite 2	E	17	9/15/2017 07:40:44	13.4	88.2	7.69	45138	29.19
Composite 3	A	17	9/15/2017 07:41:09	13.4	90.4	7.68	45124	29.18
Composite 3	B	17	9/15/2017 07:41:42	13	89.8	7.68	45338	29.32
Composite 3	C	17	9/15/2017 07:42:08	13.1	92.3	7.69	45247	29.26
Composite 3	D	17	9/15/2017 07:42:34	13.2	90.1	7.68	45153	29.2
Composite 3	E	17	9/15/2017 07:43:07	13.6	94.2	7.73	45077	29.15
Composite 4	A	17	9/15/2017 07:43:33	13.3	94.7	7.75	45229	29.26
Composite 4	B	17	9/15/2017 07:43:56	13.2	93.4	7.76	45272	29.28
Composite 4	C	17	9/15/2017 07:44:18	13	91.2	7.76	45342	29.33
Composite 4	D	17	9/15/2017 07:45:09	13.2	89.7	7.7	45274	29.28
Composite 4	E	17	9/15/2017 07:57:38	13.3	70	7.58	45372	29.36
Composite 5	A	17	9/15/2017 07:58:24	13.5	86.8	7.66	45161	29.21
Composite 5	B	17	9/15/2017 07:59:03	13.1	91.5	7.7	45349	29.33
Composite 5	C	17	9/15/2017 07:59:44	13	93.9	7.75	45383	29.36
Composite 5	D	17	9/15/2017 08:00:08	13.1	91.2	7.72	45349	29.34
Composite 5	E	17	9/15/2017 08:00:31	13.4	90.9	7.72	45210	29.25
Composite 6	A	17	9/15/2017 08:00:50	13	87.7	7.67	45399	29.37
Composite 6	B	17	9/15/2017 08:01:13	13.1	93.3	7.69	45192	29.22
Composite 6	C	17	9/15/2017 08:01:30	12.8	94.3	7.71	45309	29.3
Composite 6	D	17	9/15/2017 08:01:50	12.8	93.9	7.72	45327	29.31
Composite 6	E	17	9/15/2017 08:02:05	12.8	94.2	7.72	45254	29.26
Composite 7	A	17	9/15/2017 08:02:30	13.1	90.4	7.7	45138	29.18
Composite 7	B	17	9/15/2017 08:02:56	12.5	93.9	7.71	45295	29.27
Composite 7	C	17	9/15/2017 08:03:17	12.7	94.4	7.72	45214	29.22
Composite 7	D	17	9/15/2017 08:03:43	12.8	92	7.7	45275	29.27
Composite 7	E	17	9/15/2017 08:04:30	12.8	94	7.74	45320	29.3
Composite 8	A	17	9/15/2017 08:04:55	12.9	93.6	7.74	45244	29.25
Composite 8	B	17	9/15/2017 08:05:24	12.9	91.5	7.72	45213	29.23
Composite 8	C	17	9/15/2017 08:05:42	12.6	94.8	7.74	45339	29.31
Composite 8	D	17	9/15/2017 08:06:08	13	90.6	7.73	45221	29.24
Composite 8	E	17	9/15/2017 08:06:32	13	85.1	7.68	45186	29.21

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	18	9/16/2017 08:43:10	13.1	116.2	7.77	45431	29.39
Laboratory Control	B	18	9/16/2017 08:43:35	13.1	111.8	7.79	45369	29.35
Laboratory Control	C	18	9/16/2017 08:43:58	13	106.9	7.77	45414	29.38
Laboratory Control	D	18	9/16/2017 08:44:18	12.8	104.1	7.76	45405	29.36
Laboratory Control	E	18	9/16/2017 08:45:08	12.8	100.6	7.75	45395	29.36
CLDS Reference Site	A	18	9/16/2017 08:45:31	12.7	104.8	7.83	45397	29.36
CLDS Reference Site	B	18	9/16/2017 08:45:51	12.9	104.8	7.8	45391	29.36
CLDS Reference Site	C	18	9/16/2017 08:46:09	12.8	103.1	7.81	45411	29.37
CLDS Reference Site	D	18	9/16/2017 08:46:27	12.5	102.8	7.84	45390	29.34
CLDS Reference Site	E	18	9/16/2017 08:46:51	12.6	101.5	7.85	45410	29.36
Composite 1	A	18	9/16/2017 08:47:19	12.7	100.9	7.86	45387	29.35
Composite 1	B	18	9/16/2017 08:47:34	12.8	101.3	7.86	45339	29.32
Composite 1	C	18	9/16/2017 08:48:12	13.1	98.9	7.84	45355	29.34
Composite 1	D	18	9/16/2017 08:48:34	13.1	100	7.86	45338	29.32
Composite 1	E	18	9/16/2017 08:48:56	13.2	100	7.85	45361	29.35
Composite 2	A	18	9/16/2017 08:49:23	13.2	97.2	7.82	45368	29.35
Composite 2	B	18	9/16/2017 08:49:38	13.1	97.5	7.83	45356	29.34
Composite 2	C	18	9/16/2017 08:49:57	13	98.2	7.84	45341	29.33
Composite 2	D	18	9/16/2017 08:50:24	12.9	97.8	7.86	45355	29.33
Composite 2	E	18	9/16/2017 08:50:49	13	94.4	7.83	45354	29.33
Composite 3	A	18	9/16/2017 08:51:18	13	97.5	7.83	45359	29.34
Composite 3	B	18	9/16/2017 08:51:41	12.9	96.8	7.81	45349	29.33
Composite 3	C	18	9/16/2017 08:52:07	12.9	96.5	7.83	45401	29.37
Composite 3	D	18	9/16/2017 08:52:29	12.8	95.6	7.82	45343	29.32
Composite 3	E	18	9/16/2017 08:53:00	13.1	100.2	7.9	45356	29.34
Composite 4	A	18	9/16/2017 08:53:19	13	99.6	7.92	45301	29.3
Composite 4	B	18	9/16/2017 08:53:42	13	99	7.91	45305	29.3
Composite 4	C	18	9/16/2017 08:53:59	13.2	96.8	7.89	45317	29.31
Composite 4	D	18	9/16/2017 08:54:14	13.2	96.1	7.85	45319	29.32
Composite 4	E	18	9/16/2017 08:54:38	13	99.5	7.91	45344	29.33
Composite 5	A	18	9/16/2017 08:55:12	13.1	94.5	7.85	45348	29.33
Composite 5	B	18	9/16/2017 08:55:37	13	95.3	7.85	45340	29.32
Composite 5	C	18	9/16/2017 08:55:55	12.8	98.5	7.9	45370	29.34
Composite 5	D	18	9/16/2017 08:56:13	13	96.9	7.88	45342	29.33
Composite 5	E	18	9/16/2017 08:56:30	13.1	96.4	7.87	45338	29.33
Composite 6	A	18	9/16/2017 08:56:46	13	95.2	7.82	45348	29.33
Composite 6	B	18	9/16/2017 08:58:22	12.6	98.7	7.87	45390	29.35
Composite 6	C	18	9/16/2017 08:58:41	12.6	98.3	7.86	45371	29.33
Composite 6	D	18	9/16/2017 08:58:57	12.6	98.2	7.87	45370	29.33
Composite 6	E	18	9/16/2017 08:59:19	12.5	97.6	7.87	45371	29.33
Composite 7	A	18	9/16/2017 08:59:35	12.5	96.3	7.84	45383	29.34
Composite 7	B	18	9/16/2017 09:00:03	12.3	96.3	7.86	45421	29.36
Composite 7	C	18	9/16/2017 09:00:47	12.2	97.7	7.88	45404	29.34
Composite 7	D	18	9/16/2017 09:01:08	12.7	97.3	7.85	45362	29.33
Composite 7	E	18	9/16/2017 09:01:25	12.6	98.6	7.87	45340	29.31
Composite 8	A	18	9/16/2017 09:01:41	12.5	98.6	7.89	45388	29.34
Composite 8	B	18	9/16/2017 09:02:00	12.4	97.1	7.87	45368	29.32
Composite 8	C	18	9/16/2017 09:02:27	12.3	99.4	7.9	45445	29.38
Composite 8	D	18	9/16/2017 09:02:56	12.7	96.2	7.88	45345	29.32
Composite 8	E	18	9/16/2017 09:03:20	12.7	89.2	7.81	45332	29.31

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	19	9/17/2017 10:40:24	13.1	94.9	7.33	47109	30.6
Laboratory Control	B	19	9/17/2017 10:40:39	13.1	95.5	7.44	47085	30.59
Laboratory Control	C	19	9/17/2017 10:41:01	13	93.3	7.5	47136	30.62
Laboratory Control	D	19	9/17/2017 10:41:13	12.8	94.1	7.53	47076	30.57
Laboratory Control	E	19	9/17/2017 10:41:31	12.9	93.1	7.55	47094	30.58
CLDS Reference Site	A	19	9/17/2017 10:41:54	12.9	97.6	7.63	47095	30.58
CLDS Reference Site	B	19	9/17/2017 10:43:40	12.9	92.2	7.63	47109	30.59
CLDS Reference Site	C	19	9/17/2017 10:43:59	12.9	94.9	7.64	47103	30.59
CLDS Reference Site	D	19	9/17/2017 10:44:23	12.5	97.9	7.71	46840	30.39
CLDS Reference Site	E	19	9/17/2017 10:44:40	12.5	97.8	7.73	46712	30.29
Composite 1	A	19	9/17/2017 10:44:50	12.6	97.9	7.73	46793	30.36
Composite 1	B	19	9/17/2017 10:45:08	12.9	97.5	7.72	47109	30.59
Composite 1	C	19	9/17/2017 10:47:13	12.9	95.4	7.73	47015	30.53
Composite 1	D	19	9/17/2017 10:47:30	12.9	97.4	7.75	46921	30.46
Composite 1	E	19	9/17/2017 10:47:45	13.1	95.4	7.72	47084	30.58
Composite 2	A	19	9/17/2017 10:48:01	13	93.7	7.71	47075	30.57
Composite 2	B	19	9/17/2017 10:48:15	13	95.1	7.72	47056	30.56
Composite 2	C	19	9/17/2017 10:48:26	12.9	96.2	7.73	47053	30.55
Composite 2	D	19	9/17/2017 10:48:44	12.7	97.3	7.75	46961	30.48
Composite 2	E	19	9/17/2017 10:49:00	12.8	93.2	7.73	47019	30.53
Composite 3	A	19	9/17/2017 10:49:12	12.9	94.6	7.72	47074	30.57
Composite 3	B	19	9/17/2017 10:49:34	12.6	91.6	7.71	46474	30.13
Composite 3	C	19	9/17/2017 10:49:47	12.7	94.4	7.72	46827	30.38
Composite 3	D	19	9/17/2017 10:50:08	12.7	94.8	7.71	47042	30.54
Composite 3	E	19	9/17/2017 10:51:56	12.8	99.9	7.83	46983	30.5
Composite 4	A	19	9/17/2017 10:52:13	12.8	98.9	7.84	46679	30.28
Composite 4	B	19	9/17/2017 10:52:27	12.8	98.2	7.83	46671	30.27
Composite 4	C	19	9/17/2017 10:52:41	12.9	94.9	7.81	46880	30.43
Composite 4	D	19	9/17/2017 10:52:54	13	93.8	7.76	47031	30.54
Composite 4	E	19	9/17/2017 10:53:13	12.9	99.2	7.81	47037	30.54
Composite 5	A	19	9/17/2017 10:53:36	13	92.2	7.74	47099	30.59
Composite 5	B	19	9/17/2017 10:53:53	12.8	95.4	7.76	46872	30.42
Composite 5	C	19	9/17/2017 10:54:10	12.7	99	7.82	46908	30.44
Composite 5	D	19	9/17/2017 10:54:25	12.9	96.1	7.78	47054	30.55
Composite 5	E	19	9/17/2017 10:54:40	13	95.7	7.76	47097	30.59
Composite 6	A	19	9/17/2017 10:54:57	12.9	93.1	7.71	47091	30.58
Composite 6	B	19	9/17/2017 10:56:28	12.7	98	7.78	47057	30.55
Composite 6	C	19	9/17/2017 10:56:45	12.8	97.7	7.77	47122	30.6
Composite 6	D	19	9/17/2017 10:56:56	12.7	98.1	7.77	47096	30.58
Composite 6	E	19	9/17/2017 10:57:28	12.7	97.3	7.77	47108	30.59
Composite 7	A	19	9/17/2017 10:57:42	12.7	95.9	7.75	47142	30.61
Composite 7	B	19	9/17/2017 10:58:16	12.4	98	7.76	47137	30.6
Composite 7	C	19	9/17/2017 10:59:16	12.4	98.8	7.78	47141	30.6
Composite 7	D	19	9/17/2017 10:59:41	12.8	96.9	7.75	47155	30.63
Composite 7	E	19	9/17/2017 10:59:51	12.7	97.8	7.76	47104	30.58
Composite 8	A	19	9/17/2017 11:00:04	12.7	98	7.78	47112	30.59
Composite 8	B	19	9/17/2017 11:00:20	12.6	95.7	7.76	47107	30.58
Composite 8	C	19	9/17/2017 11:00:36	12.5	98.9	7.79	47085	30.56
Composite 8	D	19	9/17/2017 11:01:24	12.6	95.2	7.79	46906	30.44
Composite 8	E	19	9/17/2017 11:01:42	12.6	90.6	7.72	47060	30.55

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	20	9/18/2017 11:06:15	13.2	96	7.71	46987	30.52
Laboratory Control	B	20	9/18/2017 11:06:39	13.2	96.3	7.72	46937	30.48
Laboratory Control	C	20	9/18/2017 11:06:55	13.1	94.4	7.7	46988	30.51
Laboratory Control	D	20	9/18/2017 11:07:29	12.8	94.5	7.71	47008	30.52
Laboratory Control	E	20	9/18/2017 11:07:51	12.9	94.2	7.71	46990	30.51
CLDS Reference Site	A	20	9/18/2017 11:08:11	12.6	100.9	7.79	46966	30.48
CLDS Reference Site	B	20	9/18/2017 11:09:18	12.9	92.6	7.72	46992	30.51
CLDS Reference Site	C	20	9/18/2017 11:09:38	12.8	97.1	7.75	47001	30.51
CLDS Reference Site	D	20	9/18/2017 11:09:57	12.6	99.5	7.78	46940	30.46
CLDS Reference Site	E	20	9/18/2017 11:10:11	12.6	99.9	7.81	46785	30.35
Composite 1	A	20	9/18/2017 11:10:25	12.7	99.7	7.81	46892	30.43
Composite 1	B	20	9/18/2017 11:10:43	13	98.6	7.79	46987	30.51
Composite 1	C	20	9/18/2017 11:11:43	13	97.6	7.79	46987	30.51
Composite 1	D	20	9/18/2017 11:11:57	12.9	99.3	7.81	46952	30.48
Composite 1	E	20	9/18/2017 11:12:09	12.8	98.6	7.8	46955	30.48
Composite 2	A	20	9/18/2017 11:12:23	13	95.3	7.77	46978	30.5
Composite 2	B	20	9/18/2017 11:12:36	13	95.4	7.76	46968	30.5
Composite 2	C	20	9/18/2017 11:12:47	12.9	97	7.78	46963	30.49
Composite 2	D	20	9/18/2017 11:13:44	12.9	97.8	7.8	46967	30.49
Composite 2	E	20	9/18/2017 11:14:02	12.9	93.9	7.78	46954	30.48
Composite 3	A	20	9/18/2017 11:14:15	12.7	96.2	7.78	46961	30.48
Composite 3	B	20	9/18/2017 11:14:40	12.7	95.2	7.77	46834	30.39
Composite 3	C	20	9/18/2017 11:15:05	12.9	97.2	7.78	46977	30.5
Composite 3	D	20	9/18/2017 11:15:19	12.8	97	7.77	46995	30.51
Composite 3	E	20	9/18/2017 11:19:14	12.7	102.1	7.91	46931	30.46
Composite 4	A	20	9/18/2017 11:19:33	12.8	101	7.9	46832	30.39
Composite 4	B	20	9/18/2017 11:19:55	12.9	99.8	7.86	46921	30.46
Composite 4	C	20	9/18/2017 11:20:12	12.8	96.6	7.86	46843	30.4
Composite 4	D	20	9/18/2017 11:20:29	13	94.9	7.8	46950	30.48
Composite 4	E	20	9/18/2017 11:21:01	12.9	101.4	7.88	46945	30.48
Composite 5	A	20	9/18/2017 11:21:53	13	93.3	7.79	46987	30.51
Composite 5	B	20	9/18/2017 11:22:09	12.8	96.7	7.81	46907	30.44
Composite 5	C	20	9/18/2017 11:22:26	12.8	100.5	7.87	46965	30.49
Composite 5	D	20	9/18/2017 11:22:46	12.9	97.7	7.83	46963	30.49
Composite 5	E	20	9/18/2017 11:23:07	13.1	96.7	7.81	46966	30.5
Composite 6	A	20	9/18/2017 11:23:22	12.9	93.6	7.76	46988	30.51
Composite 6	B	20	9/18/2017 11:24:17	12.6	100.4	7.84	46959	30.48
Composite 6	C	20	9/18/2017 11:24:43	12.8	99.3	7.82	46994	30.51
Composite 6	D	20	9/18/2017 11:25:03	12.8	99.5	7.82	46993	30.51
Composite 6	E	20	9/18/2017 11:25:24	12.8	99.3	7.82	46993	30.51
Composite 7	A	20	9/18/2017 11:25:41	12.8	97.7	7.8	46992	30.51
Composite 7	B	20	9/18/2017 11:26:03	12.6	99.2	7.81	47014	30.51
Composite 7	C	20	9/18/2017 11:26:58	12.6	99.9	7.83	47020	30.52
Composite 7	D	20	9/18/2017 11:27:19	12.5	98.6	7.8	46986	30.49
Composite 7	E	20	9/18/2017 11:27:36	12.7	100.1	7.83	46983	30.5
Composite 8	A	20	9/18/2017 11:27:46	12.8	100	7.83	46988	30.5
Composite 8	B	20	9/18/2017 11:28:13	12.7	95.3	7.79	46981	30.49
Composite 8	C	20	9/18/2017 11:28:32	12.6	100.5	7.84	46996	30.5
Composite 8	D	20	9/18/2017 11:29:37	12.9	96.1	7.79	46974	30.5
Composite 8	E	20	9/18/2017 11:29:55	12.8	92.5	7.76	46976	30.5

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	21	9/19/2017 08:52:36	12.7	95.5	7.64	45949	29.75
Laboratory Control	B	21	9/19/2017 08:52:56	12.6	96.1	7.68	45918	29.73
Laboratory Control	C	21	9/19/2017 08:53:17	12.6	96.1	7.7	45981	29.77
Laboratory Control	D	21	9/19/2017 08:53:34	12.5	97.6	7.72	45899	29.71
Laboratory Control	E	21	9/19/2017 08:53:50	12.5	95.8	7.72	45953	29.75
CLDS Reference Site	A	21	9/19/2017 08:56:17	12.5	99.2	7.8	45917	29.72
CLDS Reference Site	B	21	9/19/2017 08:56:45	12.5	93.5	7.76	45953	29.75
CLDS Reference Site	C	21	9/19/2017 08:57:04	12.5	96.6	7.77	45947	29.74
CLDS Reference Site	D	21	9/19/2017 08:57:23	12.5	98.5	7.79	45824	29.65
CLDS Reference Site	E	21	9/19/2017 08:57:45	12.5	99	7.79	45723	29.58
Composite 1	A	21	9/19/2017 08:58:02	12.6	98.5	7.8	45847	29.68
Composite 1	B	21	9/19/2017 08:58:21	12.7	98.5	7.8	45937	29.74
Composite 1	C	21	9/19/2017 08:58:45	12.7	98	7.8	45902	29.72
Composite 1	D	21	9/19/2017 08:59:00	12.6	98.7	7.81	45915	29.72
Composite 1	E	21	9/19/2017 08:59:21	12.6	97.1	7.8	45875	29.69
Composite 2	A	21	9/19/2017 08:59:38	12.6	95.2	7.78	45938	29.74
Composite 2	B	21	9/19/2017 08:59:51	12.6	95.2	7.78	45931	29.73
Composite 2	C	21	9/19/2017 09:00:13	12.6	96.6	7.79	45881	29.7
Composite 2	D	21	9/19/2017 09:00:36	12.6	97.8	7.8	45915	29.72
Composite 2	E	21	9/19/2017 09:00:58	12.6	94.6	7.79	45921	29.73
Composite 3	A	21	9/19/2017 09:01:22	12.6	95.8	7.78	45918	29.73
Composite 3	B	21	9/19/2017 09:01:40	12.6	94.9	7.78	45864	29.69
Composite 3	C	21	9/19/2017 09:01:58	12.6	97.3	7.79	45956	29.75
Composite 3	D	21	9/19/2017 09:02:12	12.6	96.9	7.78	45925	29.73
Composite 3	E	21	9/19/2017 09:02:46	12.6	100.8	7.86	45846	29.67
Composite 4	A	21	9/19/2017 09:03:00	12.6	100.4	7.87	45791	29.64
Composite 4	B	21	9/19/2017 09:03:19	12.6	98.9	7.86	45854	29.68
Composite 4	C	21	9/19/2017 09:03:36	12.6	95.7	7.83	45859	29.68
Composite 4	D	21	9/19/2017 09:03:59	12.6	95.3	7.81	45911	29.72
Composite 4	E	21	9/19/2017 09:04:22	12.6	100.2	7.85	45945	29.74
Composite 5	A	21	9/19/2017 09:05:01	12.6	92.6	7.8	45981	29.77
Composite 5	B	21	9/19/2017 09:05:21	12.6	96.4	7.8	45894	29.71
Composite 5	C	21	9/19/2017 09:05:47	12.6	99.4	7.86	45879	29.7
Composite 5	D	21	9/19/2017 09:06:13	12.6	97	7.83	45944	29.75
Composite 5	E	21	9/19/2017 09:06:30	12.6	96.7	7.82	45965	29.76
Composite 6	A	21	9/19/2017 09:06:47	12.7	93.4	7.78	45972	29.77
Composite 6	B	21	9/19/2017 09:07:45	12.5	98.4	7.82	45889	29.7
Composite 6	C	21	9/19/2017 09:08:13	12.5	98.3	7.82	45955	29.75
Composite 6	D	21	9/19/2017 09:08:37	12.4	98.7	7.82	45962	29.75
Composite 6	E	21	9/19/2017 09:08:59	12.4	98.1	7.82	45950	29.74
Composite 7	A	21	9/19/2017 09:09:17	12.3	97.8	7.8	45976	29.76
Composite 7	B	21	9/19/2017 09:09:41	12.2	99	7.81	45974	29.75
Composite 7	C	21	9/19/2017 09:10:23	12.2	99.1	7.83	46002	29.77
Composite 7	D	21	9/19/2017 09:10:45	12.3	96.7	7.8	45918	29.71
Composite 7	E	21	9/19/2017 09:11:13	12.4	98.5	7.82	45913	29.71
Composite 8	A	21	9/19/2017 09:11:32	12.4	98.3	7.83	45993	29.77
Composite 8	B	21	9/19/2017 09:12:04	12.4	94.8	7.8	45966	29.75
Composite 8	C	21	9/19/2017 09:12:26	12.4	99.2	7.84	45997	29.77
Composite 8	D	21	9/19/2017 09:12:57	12.5	96.3	7.81	45992	29.78
Composite 8	E	21	9/19/2017 09:13:20	12.5	92.4	7.78	45962	29.75

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	22	9/20/2017 10:11:25	12.7	95.1	7.75	47564	30.92
Laboratory Control	B	22	9/20/2017 10:11:40	12.7	95.4	7.76	47533	30.89
Laboratory Control	C	22	9/20/2017 10:11:56	12.6	95.4	7.76	47592	30.93
Laboratory Control	D	22	9/20/2017 10:12:17	12.5	96.3	7.77	47595	30.93
Laboratory Control	E	22	9/20/2017 10:12:40	12.5	94.1	7.77	47568	30.91
CLDS Reference Site	A	22	9/20/2017 10:12:59	12.4	99	7.81	47531	30.88
CLDS Reference Site	B	22	9/20/2017 10:13:36	12.5	92.9	7.79	47544	30.89
CLDS Reference Site	C	22	9/20/2017 10:14:02	12.5	96	7.8	47569	30.91
CLDS Reference Site	D	22	9/20/2017 10:14:21	12.4	97.9	7.82	47481	30.84
CLDS Reference Site	E	22	9/20/2017 10:14:37	12.5	97.9	7.82	47414	30.8
Composite 1	A	22	9/20/2017 10:14:53	12.6	98.2	7.83	47501	30.87
Composite 1	B	22	9/20/2017 10:15:04	12.7	97.7	7.83	47569	30.92
Composite 1	C	22	9/20/2017 10:15:40	12.7	95.2	7.81	47547	30.9
Composite 1	D	22	9/20/2017 10:16:06	12.6	97.8	7.83	47548	30.9
Composite 1	E	22	9/20/2017 10:16:20	12.6	96.2	7.83	47516	30.88
Composite 2	A	22	9/20/2017 10:17:56	12.6	94.1	7.81	47562	30.91
Composite 2	B	22	9/20/2017 10:18:10	12.6	94.9	7.8	47554	30.9
Composite 2	C	22	9/20/2017 10:18:28	12.6	96.4	7.82	47536	30.89
Composite 2	D	22	9/20/2017 10:18:55	12.6	96.8	7.83	47551	30.9
Composite 2	E	22	9/20/2017 10:19:14	12.6	93.7	7.82	47549	30.9
Composite 3	A	22	9/20/2017 10:19:36	12.6	95.2	7.82	47553	30.9
Composite 3	B	22	9/20/2017 10:19:51	12.6	94.4	7.81	47517	30.88
Composite 3	C	22	9/20/2017 10:20:08	12.6	96	7.82	47566	30.91
Composite 3	D	22	9/20/2017 10:20:20	12.6	95.7	7.82	47566	30.91
Composite 3	E	22	9/20/2017 10:21:07	12.6	99.7	7.88	47499	30.86
Composite 4	A	22	9/20/2017 10:21:28	12.6	98.7	7.89	47431	30.82
Composite 4	B	22	9/20/2017 10:21:49	12.6	98.2	7.88	47455	30.83
Composite 4	C	22	9/20/2017 10:22:09	12.6	93.1	7.85	47492	30.86
Composite 4	D	22	9/20/2017 10:22:19	12.6	93.6	7.83	47544	30.9
Composite 4	E	22	9/20/2017 10:22:43	12.6	99.7	7.87	47563	30.91
Composite 5	A	22	9/20/2017 10:23:09	12.7	91.2	7.83	47587	30.93
Composite 5	B	22	9/20/2017 10:23:35	12.6	95.6	7.83	47531	30.89
Composite 5	C	22	9/20/2017 10:23:51	12.6	98.5	7.87	47558	30.91
Composite 5	D	22	9/20/2017 10:24:10	12.6	96.2	7.86	47578	30.92
Composite 5	E	22	9/20/2017 10:24:21	12.7	95.6	7.85	47565	30.91
Composite 6	A	22	9/20/2017 10:24:35	12.7	92.9	7.8	47569	30.92
Composite 6	B	22	9/20/2017 10:25:26	12.5	98	7.83	47543	30.89
Composite 6	C	22	9/20/2017 10:25:44	12.5	98	7.83	47584	30.92
Composite 6	D	22	9/20/2017 10:26:10	12.4	98.3	7.84	47578	30.91
Composite 6	E	22	9/20/2017 10:26:31	12.4	97.7	7.84	47590	30.92
Composite 7	A	22	9/20/2017 10:26:45	12.3	97.5	7.83	47614	30.94
Composite 7	B	22	9/20/2017 10:27:01	12.2	97.7	7.82	47593	30.92
Composite 7	C	22	9/20/2017 10:27:33	12.2	98.8	7.84	47601	30.92
Composite 7	D	22	9/20/2017 10:27:46	12.3	97.1	7.82	47524	30.87
Composite 7	E	22	9/20/2017 10:28:09	12.4	98	7.84	47569	30.91
Composite 8	A	22	9/20/2017 10:28:27	12.4	98.3	7.85	47592	30.92
Composite 8	B	22	9/20/2017 10:28:42	12.4	94.7	7.82	47602	30.93
Composite 8	C	22	9/20/2017 10:29:06	12.4	98.4	7.85	47621	30.94
Composite 8	D	22	9/20/2017 10:30:03	12.5	95.5	7.83	47587	30.92
Composite 8	E	22	9/20/2017 10:30:26	12.5	93.2	7.81	47586	30.92

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	23	9/21/2017 10:03:10	12.6	95.1	7.86	47761	31.05
Laboratory Control	B	23	9/21/2017 10:03:27	12.6	96.1	7.85	47745	31.04
Laboratory Control	C	23	9/21/2017 10:03:39	12.5	95.7	7.85	47807	31.08
Laboratory Control	D	23	9/21/2017 10:03:50	12.5	95.5	7.84	47765	31.05
Laboratory Control	E	23	9/21/2017 10:04:03	12.4	95.2	7.84	47763	31.05
CLDS Reference Site	A	23	9/21/2017 10:04:21	12.4	99	7.87	47743	31.03
CLDS Reference Site	B	23	9/21/2017 10:04:50	12.4	93.2	7.86	47776	31.06
CLDS Reference Site	C	23	9/21/2017 10:05:07	12.4	96.3	7.86	47768	31.05
CLDS Reference Site	D	23	9/21/2017 10:05:26	12.4	98.1	7.87	47740	31.03
CLDS Reference Site	E	23	9/21/2017 10:05:36	12.5	98	7.87	47729	31.03
Composite 1	A	23	9/21/2017 10:05:51	12.6	98.1	7.87	47721	31.02
Composite 1	B	23	9/21/2017 10:06:07	12.6	97.8	7.88	47750	31.05
Composite 1	C	23	9/21/2017 10:06:34	12.6	95.3	7.86	47729	31.03
Composite 1	D	23	9/21/2017 10:06:56	12.6	97.1	7.88	47775	31.06
Composite 1	E	23	9/21/2017 10:07:13	12.5	96.8	7.86	47679	30.99
Composite 2	A	23	9/21/2017 10:07:32	12.5	92.7	7.86	47749	31.04
Composite 2	B	23	9/21/2017 10:07:50	12.5	94.7	7.86	47748	31.04
Composite 2	C	23	9/21/2017 10:08:03	12.5	96.9	7.87	47753	31.04
Composite 2	D	23	9/21/2017 10:09:40	12.5	97.7	7.89	47753	31.04
Composite 2	E	23	9/21/2017 10:09:56	12.5	93.8	7.88	47745	31.04
Composite 3	A	23	9/21/2017 10:10:10	12.5	95.1	7.87	47740	31.04
Composite 3	B	23	9/21/2017 10:10:23	12.5	95	7.86	47729	31.03
Composite 3	C	23	9/21/2017 10:10:38	12.5	97.1	7.87	47792	31.07
Composite 3	D	23	9/21/2017 10:10:48	12.6	95.9	7.86	47742	31.04
Composite 3	E	23	9/21/2017 10:11:22	12.5	100.6	7.9	47708	31.01
Composite 4	A	23	9/21/2017 10:11:35	12.6	99.1	7.9	47731	31.03
Composite 4	B	23	9/21/2017 10:11:51	12.6	98.3	7.9	47673	30.99
Composite 4	C	23	9/21/2017 10:12:02	12.6	93.9	7.88	47698	31.01
Composite 4	D	23	9/21/2017 10:12:23	12.6	92.8	7.86	47755	31.05
Composite 4	E	23	9/21/2017 10:12:42	12.5	100.2	7.89	47742	31.04
Composite 5	A	23	9/21/2017 10:13:08	12.5	90.6	7.88	47802	31.08
Composite 5	B	23	9/21/2017 10:13:26	12.6	94.8	7.87	47702	31.01
Composite 5	C	23	9/21/2017 10:13:45	12.5	98.9	7.91	47750	31.04
Composite 5	D	23	9/21/2017 10:14:05	12.6	96.6	7.89	47746	31.04
Composite 5	E	23	9/21/2017 10:14:18	12.6	95.9	7.89	47779	31.07
Composite 6	A	23	9/21/2017 10:14:30	12.6	93.5	7.85	47794	31.08
Composite 6	B	23	9/21/2017 11:53:29	12.4	101.7	7.81	47799	31.07
Composite 6	C	23	9/21/2017 11:53:45	12.3	102.6	7.82	47821	31.09
Composite 6	D	23	9/21/2017 11:53:58	12.3	102.3	7.83	47834	31.09
Composite 6	E	23	9/21/2017 11:54:12	12.2	102.3	7.83	47822	31.08
Composite 7	A	23	9/21/2017 11:54:22	12.1	101.4	7.82	47835	31.09
Composite 7	B	23	9/21/2017 11:54:36	12	102	7.82	47844	31.09
Composite 7	C	23	9/21/2017 11:55:16	12.1	101.9	7.83	47846	31.09
Composite 7	D	23	9/21/2017 11:55:38	12.2	100	7.82	47833	31.09
Composite 7	E	23	9/21/2017 11:55:49	12.3	100.9	7.83	47823	31.08
Composite 8	A	23	9/21/2017 11:56:01	12.3	101.3	7.84	47828	31.09
Composite 8	B	23	9/21/2017 11:56:17	12.2	97.9	7.83	47829	31.09
Composite 8	C	23	9/21/2017 11:56:43	12.2	101.7	7.84	47829	31.09
Composite 8	D	23	9/21/2017 11:57:17	12.4	97.6	7.85	47812	31.08
Composite 8	E	23	9/21/2017 11:57:29	12.3	96.1	7.84	47809	31.08

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	24	9/22/2017 12:35:29	13.1	98.7	7.77	46525	30.18
Laboratory Control	B	24	9/22/2017 12:35:51	13.1	99.5	7.78	46533	30.18
Laboratory Control	C	24	9/22/2017 12:36:13	13.2	97.1	7.78	46501	30.17
Laboratory Control	D	24	9/22/2017 12:36:31	12.8	99.1	7.79	46335	30.03
Laboratory Control	E	24	9/22/2017 12:36:51	12.8	96.3	7.78	46513	30.16
CLDS Reference Site	A	24	9/22/2017 12:37:08	12.7	100.8	7.82	46530	30.17
CLDS Reference Site	B	24	9/22/2017 12:37:30	12.7	93.9	7.8	46540	30.18
CLDS Reference Site	C	24	9/22/2017 12:37:51	12.7	97.8	7.81	46521	30.16
CLDS Reference Site	D	24	9/22/2017 12:38:08	12.5	99.7	7.82	46570	30.19
CLDS Reference Site	E	24	9/22/2017 12:38:27	12.7	99.9	7.82	46537	30.18
Composite 1	A	24	9/22/2017 12:38:52	12.7	99	7.83	46569	30.2
Composite 1	B	24	9/22/2017 12:39:14	12.9	98.6	7.83	46490	30.15
Composite 1	C	24	9/22/2017 12:39:38	13	97.7	7.83	46509	30.17
Composite 1	D	24	9/22/2017 12:39:59	13	97.3	7.84	46521	30.17
Composite 1	E	24	9/22/2017 12:40:17	13.1	95.4	7.82	46504	30.16
Composite 2	A	24	9/22/2017 12:40:33	13	93.2	7.82	46519	30.17
Composite 2	B	24	9/22/2017 12:40:54	13	94.5	7.82	46509	30.16
Composite 2	C	24	9/22/2017 12:41:16	13	96.6	7.83	46504	30.16
Composite 2	D	24	9/22/2017 12:41:43	12.9	97.2	7.84	46535	30.18
Composite 2	E	24	9/22/2017 12:42:06	12.8	93.2	7.84	46532	30.18
Composite 3	A	24	9/22/2017 12:42:26	12.8	95.4	7.83	46512	30.16
Composite 3	B	24	9/22/2017 12:42:46	12.8	94.7	7.82	46507	30.16
Composite 3	C	24	9/22/2017 12:43:02	12.9	95.4	7.82	46530	30.18
Composite 3	D	24	9/22/2017 12:43:16	12.7	95.8	7.82	46564	30.2
Composite 3	E	24	9/22/2017 12:43:40	12.9	100	7.87	46538	30.18
Composite 4	A	24	9/22/2017 12:44:03	12.9	99.5	7.88	46522	30.17
Composite 4	B	24	9/22/2017 12:44:23	12.9	98.2	7.87	46495	30.15
Composite 4	C	24	9/22/2017 12:44:44	12.9	91.1	7.85	46495	30.15
Composite 4	D	24	9/22/2017 12:44:57	13.1	93.9	7.83	46506	30.17
Composite 4	E	24	9/22/2017 12:45:14	12.9	100	7.87	46519	30.17
Composite 5	A	24	9/22/2017 12:45:37	13.2	89.6	7.83	46486	30.16
Composite 5	B	24	9/22/2017 12:45:53	12.8	95.3	7.83	46527	30.17
Composite 5	C	24	9/22/2017 12:46:10	12.8	99	7.87	46512	30.16
Composite 5	D	24	9/22/2017 12:46:28	12.9	94.8	7.85	46527	30.17
Composite 5	E	24	9/22/2017 12:46:47	12.9	95	7.85	46603	30.23
Composite 6	A	24	9/22/2017 12:47:03	12.8	91.2	7.8	46524	30.17
Composite 6	B	24	9/22/2017 12:47:44	12.6	97.7	7.82	46590	30.21
Composite 6	C	24	9/22/2017 12:48:02	12.6	97.6	7.83	46576	30.2
Composite 6	D	24	9/22/2017 12:48:25	12.6	97.3	7.83	46549	30.18
Composite 6	E	24	9/22/2017 12:48:41	12.6	98	7.84	46528	30.16
Composite 7	A	24	9/22/2017 12:49:04	12.6	96.1	7.82	46519	30.16
Composite 7	B	24	9/22/2017 12:49:25	12.3	96.4	7.82	46568	30.18
Composite 7	C	24	9/22/2017 12:49:40	12.3	99.1	7.83	46570	30.18
Composite 7	D	24	9/22/2017 12:50:06	12.6	96.1	7.82	46518	30.16
Composite 7	E	24	9/22/2017 12:50:26	12.7	95.8	7.83	46552	30.19
Composite 8	A	24	9/22/2017 12:50:40	12.7	97.3	7.84	46552	30.19
Composite 8	B	24	9/22/2017 12:50:58	12.6	95.2	7.83	46539	30.17
Composite 8	C	24	9/22/2017 12:51:18	12.5	98.9	7.85	46555	30.18
Composite 8	D	24	9/22/2017 12:51:43	12.7	92.4	7.83	46521	30.16
Composite 8	E	24	9/22/2017 12:51:59	12.6	93	7.82	46511	30.15

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	25	9/23/2017 08:58:00	12.6	108.3	7.79	46622	30.23
Laboratory Control	B	25	9/23/2017 08:58:21	12.5	106.9	7.79	46613	30.22
Laboratory Control	C	25	9/23/2017 08:58:50	12.5	103.3	7.81	46622	30.23
Laboratory Control	D	25	9/23/2017 08:59:05	12.5	104.1	7.8	46590	30.2
Laboratory Control	E	25	9/23/2017 08:59:30	12.4	101.4	7.8	46607	30.22
CLDS Reference Site	A	25	9/23/2017 08:59:48	12.4	105.9	7.83	46588	30.2
CLDS Reference Site	B	25	9/23/2017 09:00:11	12.4	96.3	7.8	46576	30.19
CLDS Reference Site	C	25	9/23/2017 09:00:31	12.4	101.2	7.81	46591	30.2
CLDS Reference Site	D	25	9/23/2017 09:00:49	12.4	103	7.83	46591	30.2
CLDS Reference Site	E	25	9/23/2017 09:01:04	12.5	102.4	7.83	46587	30.2
Composite 1	A	25	9/23/2017 09:01:26	12.6	102.6	7.84	46563	30.19
Composite 1	B	25	9/23/2017 09:01:45	12.6	102.7	7.85	46611	30.22
Composite 1	C	25	9/23/2017 09:02:12	12.6	99.6	7.84	46611	30.22
Composite 1	D	25	9/23/2017 09:02:26	12.6	100.9	7.85	46581	30.2
Composite 1	E	25	9/23/2017 09:02:58	12.5	98.8	7.83	46603	30.22
Composite 2	A	25	9/23/2017 09:03:19	12.5	95.3	7.83	46601	30.21
Composite 2	B	25	9/23/2017 09:03:43	12.5	97.6	7.83	46600	30.21
Composite 2	C	25	9/23/2017 09:04:01	12.5	99.4	7.84	46599	30.21
Composite 2	D	25	9/23/2017 09:04:25	12.5	100.3	7.85	46574	30.19
Composite 2	E	25	9/23/2017 09:04:45	12.5	93.3	7.83	46558	30.18
Composite 3	A	25	9/23/2017 09:05:12	12.5	97.3	7.83	46597	30.21
Composite 3	B	25	9/23/2017 09:05:30	12.5	95.9	7.82	46570	30.19
Composite 3	C	25	9/23/2017 09:05:51	12.6	97.8	7.83	46625	30.23
Composite 3	D	25	9/23/2017 09:06:14	12.5	98	7.83	46651	30.25
Composite 3	E	25	9/23/2017 09:06:42	12.5	102.1	7.88	46615	30.22
Composite 4	A	25	9/23/2017 09:07:09	12.6	100.9	7.89	46557	30.19
Composite 4	B	25	9/23/2017 09:07:36	12.6	99.8	7.88	46582	30.2
Composite 4	C	25	9/23/2017 09:07:56	12.6	95.7	7.86	46578	30.2
Composite 4	D	25	9/23/2017 09:08:13	12.6	96	7.85	46605	30.22
Composite 4	E	25	9/23/2017 09:08:33	12.5	101.1	7.88	46603	30.22
Composite 5	A	25	9/23/2017 09:09:01	12.6	92.4	7.86	46639	30.24
Composite 5	B	25	9/23/2017 09:09:21	12.6	95.5	7.84	46581	30.2
Composite 5	C	25	9/23/2017 09:09:44	12.5	100.5	7.89	46602	30.21
Composite 5	D	25	9/23/2017 09:10:03	12.6	95.6	7.87	46612	30.22
Composite 5	E	25	9/23/2017 09:10:23	12.6	96.6	7.87	46635	30.24
Composite 6	A	25	9/23/2017 09:10:46	12.6	92.1	7.8	46622	30.23
Composite 6	B	25	9/23/2017 09:12:06	12.4	99.4	7.84	46634	30.23
Composite 6	C	25	9/23/2017 09:12:37	12.4	97.7	7.85	46623	30.23
Composite 6	D	25	9/23/2017 09:13:08	12.3	98.3	7.85	46638	30.23
Composite 6	E	25	9/23/2017 09:13:35	12.3	98.6	7.86	46630	30.22
Composite 7	A	25	9/23/2017 09:14:05	12.2	97.5	7.84	46649	30.24
Composite 7	B	25	9/23/2017 09:14:24	12.1	98.9	7.84	46645	30.23
Composite 7	C	25	9/23/2017 09:15:20	12.1	99.3	7.86	46647	30.23
Composite 7	D	25	9/23/2017 09:15:57	12.3	96.6	7.83	46622	30.22
Composite 7	E	25	9/23/2017 09:16:20	12.3	98.5	7.85	46625	30.22
Composite 8	A	25	9/23/2017 09:16:55	12.3	99.3	7.88	46648	30.24
Composite 8	B	25	9/23/2017 09:17:38	12.3	95.7	7.83	46646	30.24
Composite 8	C	25	9/23/2017 09:18:19	12.3	100	7.87	46649	30.24
Composite 8	D	25	9/23/2017 09:19:28	12.5	96.1	7.85	46614	30.22
Composite 8	E	25	9/23/2017 09:19:49	12.4	94	7.83	46612	30.22

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CLIENT: AECOM
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Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	26	9/24/2017 10:53:39	14	106.5	7.81	47913	31.21
Laboratory Control	B	26	9/24/2017 10:53:58	13.7	105.1	7.81	47894	31.19
Laboratory Control	C	26	9/24/2017 10:54:16	13.9	102	7.82	47934	31.22
Laboratory Control	D	26	9/24/2017 10:54:28	13.5	102.1	7.82	47933	31.21
Laboratory Control	E	26	9/24/2017 10:54:37	13.6	101.5	7.82	47920	31.2
CLDS Reference Site	A	26	9/24/2017 10:54:55	13.4	104.8	7.85	47917	31.2
CLDS Reference Site	B	26	9/24/2017 10:55:37	13.2	96.5	7.84	47919	31.19
CLDS Reference Site	C	26	9/24/2017 10:55:57	13.4	99.5	7.85	47929	31.2
CLDS Reference Site	D	26	9/24/2017 10:56:27	13	100.9	7.86	47948	31.2
CLDS Reference Site	E	26	9/24/2017 10:57:50	13.3	100.6	7.87	47922	31.2
Composite 1	A	26	9/24/2017 10:58:00	13.1	100	7.87	47962	31.22
Composite 1	B	26	9/24/2017 10:58:21	13.6	99.5	7.88	47922	31.21
Composite 1	C	26	9/24/2017 10:58:53	13.3	97.5	7.86	47948	31.22
Composite 1	D	26	9/24/2017 10:59:02	13.5	98.7	7.87	47926	31.21
Composite 1	E	26	9/24/2017 10:59:17	13.8	96.2	7.86	47907	31.2
Composite 2	A	26	9/24/2017 10:59:39	13.6	94.4	7.86	47923	31.21
Composite 2	B	26	9/24/2017 10:59:50	13.7	95.4	7.86	47908	31.2
Composite 2	C	26	9/24/2017 11:00:04	13.7	97.6	7.86	47912	31.2
Composite 2	D	26	9/24/2017 11:00:51	13.3	97.1	7.87	47933	31.2
Composite 2	E	26	9/24/2017 11:01:08	13.2	93.2	7.86	47934	31.2
Composite 3	A	26	9/24/2017 11:01:21	13.4	95.6	7.86	47932	31.21
Composite 3	B	26	9/24/2017 11:01:30	13.3	96.2	7.86	47921	31.2
Composite 3	C	26	9/24/2017 11:01:39	13.5	96.5	7.86	47927	31.21
Composite 3	D	26	9/24/2017 11:01:52	13.2	97.7	7.87	47964	31.22
Composite 3	E	26	9/24/2017 11:03:11	13.1	100.8	7.92	47975	31.23
Composite 4	A	26	9/24/2017 11:03:33	13.4	99	7.9	47921	31.2
Composite 4	B	26	9/24/2017 11:03:47	13.4	98.5	7.9	47917	31.2
Composite 4	C	26	9/24/2017 11:04:03	13.5	95	7.88	47952	31.23
Composite 4	D	26	9/24/2017 11:04:17	13.9	95.7	7.87	47900	31.2
Composite 4	E	26	9/24/2017 11:04:41	13.5	100.5	7.91	47924	31.2
Composite 5	A	26	9/24/2017 11:05:16	14.1	92	7.87	47902	31.21
Composite 5	B	26	9/24/2017 11:05:36	13.4	95	7.86	47937	31.21
Composite 5	C	26	9/24/2017 11:05:45	13.4	97.7	7.89	47948	31.22
Composite 5	D	26	9/24/2017 11:05:59	13.5	96.7	7.88	47958	31.23
Composite 5	E	26	9/24/2017 11:06:14	13.5	96.4	7.88	47951	31.22
Composite 6	A	26	9/24/2017 11:06:26	13.2	94.1	7.85	47958	31.22
Composite 6	B	26	9/24/2017 11:07:16	12.8	99.1	7.86	47994	31.23
Composite 6	C	26	9/24/2017 11:07:25	13	98.8	7.87	47976	31.22
Composite 6	D	26	9/24/2017 11:07:40	12.9	99.2	7.87	47987	31.23
Composite 6	E	26	9/24/2017 11:08:01	13.1	98.4	7.88	47955	31.21
Composite 7	A	26	9/24/2017 11:08:12	12.9	98	7.87	47979	31.22
Composite 7	B	26	9/24/2017 11:08:26	12.5	99.1	7.86	48030	31.24
Composite 7	C	26	9/24/2017 11:08:59	12.4	100.1	7.87	48022	31.24
Composite 7	D	26	9/24/2017 11:09:14	13	96.9	7.85	47980	31.23
Composite 7	E	26	9/24/2017 11:09:28	13.2	98.7	7.86	47971	31.23
Composite 8	A	26	9/24/2017 11:09:41	13.6	98.6	7.88	47933	31.22
Composite 8	B	26	9/24/2017 11:09:48	13.4	98	7.87	47921	31.2
Composite 8	C	26	9/24/2017 11:10:03	12.7	99.6	7.88	48038	31.26
Composite 8	D	26	9/24/2017 11:10:37	12.9	96.3	7.86	47963	31.21
Composite 8	E	26	9/24/2017 11:10:50	13.2	93.9	7.85	47956	31.22

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	27	9/25/2017 11:26:59	13.9	95.4	7.67	47602	30.98
Laboratory Control	B	27	9/25/2017 11:27:14	13.7	96.4	7.67	47536	30.93
Laboratory Control	C	27	9/25/2017 11:27:28	13.7	97.1	7.68	47725	31.07
Laboratory Control	D	27	9/25/2017 11:27:40	13.5	98.5	7.69	47627	30.99
Laboratory Control	E	27	9/25/2017 11:27:53	13.5	98.6	7.7	47626	30.99
CLDS Reference Site	A	27	9/25/2017 11:28:00	13.3	99.8	7.72	47609	30.97
CLDS Reference Site	B	27	9/25/2017 11:28:31	13.2	94.5	7.71	47672	31.01
CLDS Reference Site	C	27	9/25/2017 11:28:43	13.3	95.3	7.71	47646	31
CLDS Reference Site	D	27	9/25/2017 11:28:57	13	98.3	7.72	47716	31.03
CLDS Reference Site	E	27	9/25/2017 11:29:06	13	99	7.73	47679	31.01
Composite 1	A	27	9/25/2017 11:29:15	13	99.2	7.73	47694	31.02
Composite 1	B	27	9/25/2017 11:29:25	13.4	98.3	7.73	47653	31
Composite 1	C	27	9/25/2017 11:29:47	13.7	95.1	7.73	47639	31
Composite 1	D	27	9/25/2017 11:29:58	13.8	96.9	7.73	47641	31.01
Composite 1	E	27	9/25/2017 11:30:19	13.6	94.8	7.72	47673	31.02
Composite 2	A	27	9/25/2017 11:30:35	13.4	89.7	7.71	47817	31.12
Composite 2	B	27	9/25/2017 11:30:58	13.7	94	7.72	47627	31
Composite 2	C	27	9/25/2017 11:31:09	13.7	95.4	7.73	47628	30.99
Composite 2	D	27	9/25/2017 11:31:18	13.6	96.6	7.73	47628	30.99
Composite 2	E	27	9/25/2017 11:31:26	13.5	94.5	7.73	47641	31
Composite 3	A	27	9/25/2017 11:31:36	13.6	93.7	7.72	47637	31
Composite 3	B	27	9/25/2017 11:31:45	13.4	94.3	7.72	47674	31.02
Composite 3	C	27	9/25/2017 11:31:54	13.5	95.2	7.72	47674	31.02
Composite 3	D	27	9/25/2017 11:32:15	13.1	95.8	7.73	47703	31.03
Composite 3	E	27	9/25/2017 11:32:46	13.1	100.8	7.79	47786	31.09
Composite 4	A	27	9/25/2017 11:33:02	13.6	98.8	7.78	47662	31.02
Composite 4	B	27	9/25/2017 11:33:23	13.8	96.7	7.76	47624	31
Composite 4	C	27	9/25/2017 11:33:44	13.7	93.6	7.75	47682	31.04
Composite 4	D	27	9/25/2017 11:33:54	13.8	94.3	7.74	47634	31
Composite 4	E	27	9/25/2017 11:34:09	13.5	99.6	7.78	47668	31.02
Composite 5	A	27	9/25/2017 11:34:33	13.9	89	7.72	47595	30.98
Composite 5	B	27	9/25/2017 11:34:46	13.3	93.7	7.72	47751	31.07
Composite 5	C	27	9/25/2017 11:35:00	13.5	98	7.77	47667	31.02
Composite 5	D	27	9/25/2017 11:37:23	13.5	93.3	7.72	47678	31.03
Composite 5	E	27	9/25/2017 11:37:37	13.6	94.2	7.74	47631	31
Composite 6	A	27	9/25/2017 11:37:54	13.2	91.6	7.7	47660	31
Composite 6	B	27	9/25/2017 11:38:33	12.8	97.8	7.74	47751	31.05
Composite 6	C	27	9/25/2017 11:38:48	13.1	97.4	7.75	47688	31.02
Composite 6	D	27	9/25/2017 11:39:00	13.2	96.5	7.75	47653	31
Composite 6	E	27	9/25/2017 11:39:16	13	97.5	7.75	47684	31.01
Composite 7	A	27	9/25/2017 11:39:28	13.1	96.8	7.75	47652	30.99
Composite 7	B	27	9/25/2017 11:39:37	12.8	96.9	7.75	47665	30.99
Composite 7	C	27	9/25/2017 11:40:11	12.7	98.4	7.76	47699	31.01
Composite 7	D	27	9/25/2017 11:40:38	13.2	95.9	7.73	47664	31
Composite 7	E	27	9/25/2017 11:40:46	13.3	96.7	7.74	47665	31.01
Composite 8	A	27	9/25/2017 11:40:56	13.4	97.2	7.75	47639	30.99
Composite 8	B	27	9/25/2017 11:41:12	13.1	93.2	7.73	47670	31
Composite 8	C	27	9/25/2017 11:41:33	12.5	99.1	7.76	47778	31.06
Composite 8	D	27	9/25/2017 11:42:11	13.4	92.6	7.74	47615	30.98
Composite 8	E	27	9/25/2017 11:42:21	13.4	91.8	7.73	47620	30.98

STUDY: 29524
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Macoma nasuta*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.5	99.24		45595	29.49
Minimum:	11.9	61.20	7.62	43635	28.09
Maximum:	12.8	118.90	7.97	46790	30.35

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	28	9/26/2017 09:28:01	12.8	101.6	7.69	46392	30.07
Laboratory Control	B	28	9/26/2017 09:28:22	12.7	102	7.69	46204	29.94
Laboratory Control	C	28	9/26/2017 09:28:39	12.6	103.2	7.7	46377	30.05
Laboratory Control	D	28	9/26/2017 09:29:03	12.5	104.4	7.73	46394	30.06
Laboratory Control	E	28	9/26/2017 09:29:34	12.4	104.7	7.76	46402	30.07
CLDS Reference Site	A	28	9/26/2017 09:29:59	12.4	105.5	7.78	46394	30.06
CLDS Reference Site	B	28	9/26/2017 09:30:20	12.3	100	7.75	46409	30.07
CLDS Reference Site	C	28	9/26/2017 09:30:42	12.3	101.9	7.75	46394	30.06
CLDS Reference Site	D	28	9/26/2017 09:31:00	12.4	103.3	7.77	46458	30.11
CLDS Reference Site	E	28	9/26/2017 09:31:17	12.4	103.7	7.78	46416	30.08
Composite 1	A	28	9/26/2017 09:31:57	12.5	103.1	7.79	46424	30.09
Composite 1	B	28	9/26/2017 09:32:28	12.6	102.6	7.8	46393	30.07
Composite 1	C	28	9/26/2017 09:33:00	12.8	99.4	7.79	46418	30.09
Composite 1	D	28	9/26/2017 09:33:25	12.8	100.1	7.8	46408	30.09
Composite 1	E	28	9/26/2017 09:33:55	12.7	97	7.77	46419	30.09
Composite 2	A	28	9/26/2017 09:34:26	12.7	85.7	7.73	46451	30.11
Composite 2	B	28	9/26/2017 09:34:46	12.7	96	7.76	46426	30.09
Composite 2	C	28	9/26/2017 09:35:09	12.7	98.2	7.78	46415	30.09
Composite 2	D	28	9/26/2017 09:35:42	12.6	99.9	7.8	46420	30.09
Composite 2	E	28	9/26/2017 09:36:02	12.6	90.5	7.77	46417	30.09
Composite 3	A	28	9/26/2017 09:36:27	12.6	95.9	7.77	46443	30.1
Composite 3	B	28	9/26/2017 09:36:44	12.6	93.9	7.76	46428	30.09
Composite 3	C	28	9/26/2017 09:37:26	12.6	97.2	7.78	46492	30.14
Composite 3	D	28	9/26/2017 09:38:09	12.6	96.4	7.78	46502	30.15
Composite 3	E	28	9/26/2017 09:38:45	12.7	102	7.83	46485	30.14
Composite 4	A	28	9/26/2017 09:39:00	12.8	100.9	7.83	46418	30.09
Composite 4	B	28	9/26/2017 09:39:23	12.8	99.5	7.82	46421	30.1
Composite 4	C	28	9/26/2017 09:39:43	12.9	91.4	7.79	46402	30.08
Composite 4	D	28	9/26/2017 09:40:12	12.8	93.5	7.78	46441	30.11
Composite 4	E	28	9/26/2017 09:40:31	12.7	101.1	7.82	46438	30.1
Composite 5	A	28	9/26/2017 09:41:02	12.7	89	7.78	46467	30.13
Composite 5	B	28	9/26/2017 09:41:20	12.7	94.9	7.77	46444	30.11
Composite 5	C	28	9/26/2017 09:41:43	12.7	99.6	7.83	46490	30.14
Composite 5	D	28	9/26/2017 09:42:08	12.7	93.3	7.79	46469	30.13
Composite 5	E	28	9/26/2017 09:42:32	12.7	96.6	7.81	46462	30.12
Composite 6	A	28	9/26/2017 09:42:54	12.6	85.9	7.73	46479	30.13
Composite 6	B	28	9/26/2017 09:43:44	12.4	99.9	7.78	46495	30.13
Composite 6	C	28	9/26/2017 09:44:02	12.3	99.3	7.79	46477	30.12
Composite 6	D	28	9/26/2017 09:44:25	12.2	99.3	7.79	46456	30.1
Composite 6	E	28	9/26/2017 09:44:39	12.1	99.7	7.81	46466	30.1
Composite 7	A	28	9/26/2017 09:45:02	12	97.7	7.79	46468	30.1
Composite 7	B	28	9/26/2017 09:45:25	11.9	99.3	7.79	46496	30.11
Composite 7	C	28	9/26/2017 09:46:07	11.9	100.2	7.8	46496	30.11
Composite 7	D	28	9/26/2017 09:46:27	12.1	96.8	7.77	46467	30.1
Composite 7	E	28	9/26/2017 09:46:45	12.1	99.2	7.79	46434	30.08
Composite 8	A	28	9/26/2017 09:47:06	12.1	99.8	7.81	46509	30.13
Composite 8	B	28	9/26/2017 09:47:31	12.1	94.2	7.77	46468	30.1
Composite 8	C	28	9/26/2017 09:47:55	12.1	99.7	7.8	46507	30.13
Composite 8	D	28	9/26/2017 09:48:25	12.4	95.7	7.78	46421	30.08
Composite 8	E	28	9/26/2017 09:48:43	12.4	93	7.76	46462	30.11

Macoma nasuta Day 28 Recovery Record

DATE: 09/26/17 ESI STUDY: 29524

CLIENT: AECOM PROJECT: New Haven

SAMPLE ID	REP	# LIVE	Initials	SAMPLE ID	REP	# LIVE	Initials
Laboratory Control Sediment	A	29	DD	Composite 2	A	29	DD
Laboratory Control Sediment	B	29	BG	Composite 2	B	29	BG
Laboratory Control Sediment	C	30	JTP	Composite 2	C	30	JTP
Laboratory Control Sediment	D	29	JTP	Composite 2	D	29	DD
Laboratory Control Sediment	E	29	BG	Composite 2	E	30	JTP
CLDS Reference Sediment	A	30	DD	Composite 3	A	29	BG
CLDS Reference Sediment	B	29	JTP	Composite 3	B	30	DD
CLDS Reference Sediment	C	30	BG	Composite 3	C	30	JTP
CLDS Reference Sediment	D	30	DD	Composite 3	D	29	DD
CLDS Reference Sediment	E	30	JTP	Composite 3	E	29	BG
Composite 1	A	30	BG	Composite 4	A	30	JTP
Composite 1	B	29	DD	Composite 4	B	30	BG
Composite 1	C	28	JTP	Composite 4	C	30	JTP
Composite 1	D	30	BG	Composite 4	D	28	DD
Composite 1	E	29	JTP	Composite 4	E	30	JTP

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Bioaccumulation Assay Recovery Record Mn.wpd

Macoma nasuta Day 28 Recovery Record

DATE: 09/26/17 **ESI STUDY:** 29524

CLIENT: AECOM **PROJECT:** New Haven

SAMPLE ID	REP	# LIVE	Initials	SAMPLE ID	REP	# LIVE	Initials
Composite 5	A	29	DD	Composite 7	A	29	JTP
Composite 5	B	30	JTP	Composite 7	B	30	BG
Composite 5	C	30	JTP	Composite 7	C	30	JTP
Composite 5	D	30	DD	Composite 7	D	29	BG
Composite 5	E	28	JTP	Composite 7	E	30	JTP
Composite 6	A	28	BG	Composite 8	A	30	DD
Composite 6	B	30	DD	Composite 8	B	28	JTP
Composite 6	C	30	JTP	Composite 8	C	29	BG
Composite 6	D	30	BG	Composite 8	D	29	DD
Composite 6	E	30	DD	Composite 8	E	28	JTP

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Bioaccumulation Assay Recovery Record Mn.wpd

28 day *Macoma nasuta* Sediment Bioaccumulation Evaluation

Statistical Analysis Reports

Survival

CETIS Test Data Worksheet

Report Date: 28 Sep-17 10:11 (p 1 of 2)
Test Code/ID: 02-7548-0737/29524Mn

Bioaccumulation Evaluation - Survival Endpoint **EnviroSystems, Inc.**

Start Date:	29 Aug-17	**Species:**	Macoma nasuta	**Sample Code:**	29524-000
End Date:	26 Sep-17	**Protocol:**	US ACE NED RIM (2004)	**Sample Source:**	New Haven Harbor FNP -2017
Sample Date:	29 Aug-17	**Material:**	Laboratory Control Sediment	**Sample Station:**	Laboratory Control - 29524

Sample	Rep	Pos	# Exposed	# Survived	Notes
29524-000	1	3	30	29	
29524-000	2	13	30	29	
29524-000	3	27	30	30	
29524-000	4	33	30	29	
29524-000	5	45	30	29	
29517-009	1	1	30	30	
29517-009	2	17	30	29	
29517-009	3	21	30	30	
29517-009	4	31	30	30	
29517-009	5	46	30	30	
29517-001	1	4	30	30	
29517-001	2	19	30	29	
29517-001	3	23	30	28	
29517-001	4	39	30	30	
29517-001	5	43	30	29	
29517-002	1	8	30	29	
29517-002	2	12	30	29	
29517-002	3	29	30	30	
29517-002	4	38	30	29	
29517-002	5	41	30	30	
29517-003	1	10	30	29	
29517-003	2	15	30	30	
29517-003	3	28	30	30	
29517-003	4	35	30	29	
29517-003	5	47	30	29	
29517-004	1	7	30	30	
29517-004	2	11	30	30	
29517-004	3	25	30	30	
29517-004	4	40	30	28	
29517-004	5	48	30	30	
29517-005	1	2	30	29	
29517-005	2	16	30	30	
29517-005	3	30	30	30	
29517-005	4	34	30	30	
29517-005	5	44	30	28	
29517-006	1	6	30	28	
29517-006	2	20	30	30	
29517-006	3	24	30	30	
29517-006	4	37	30	30	
29517-006	5	49	30	30	
59517-007	1	9	30	29	
59517-007	2	18	30	30	
59517-007	3	22	30	30	
59517-007	4	36	30	29	
59517-007	5	50	30	30	
29517-008	1	5	30	30	
29517-008	2	14	30	28	

Sample	Rep	Pos	# Exposed	# Survived	Notes
29517-008	3	26	30	29	
29517-008	4	32	30	29	
29517-008	5	42	30	28	

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Batch ID:	09-7543-6973	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	29 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Sep-17	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29524-000	12-6247-7143	29 Aug-17	29 Aug-17	n/a	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h		
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29524-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29524	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-9963-3410	Proportion Survived	Equal Variance t Two-Sample Test	0.9667	29517-009 passed proportion survived
15-7906-0925	Proportion Survived	Equal Variance t Two-Sample Test	0.0978	29517-001 passed proportion survived
14-0107-5896	Proportion Survived	Equal Variance t Two-Sample Test	0.1208	29517-002 passed proportion survived
03-5683-8309	Proportion Survived	Equal Variance t Two-Sample Test	0.1208	29517-003 passed proportion survived
07-5877-9843	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5556	29517-004 passed proportion survived
18-1139-8433	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-004 passed proportion survived
17-1715-6272	Proportion Survived	Equal Variance t Two-Sample Test	0.2046	29517-005 passed proportion survived
01-0925-9554	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-006 passed proportion survived
01-6618-3624	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5556	29517-006 passed proportion survived
15-2156-9727	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5000	59517-007 passed proportion survived
10-8645-0317	Proportion Survived	Equal Variance t Two-Sample Test	0.0226	29517-008 failed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29524-000	LC	5	0.973	0.955	0.992	0.967	1.000	0.007	0.015	1.53%	0.00%
29517-009	RS	5	0.993	0.975	1.000	0.967	1.000	0.007	0.015	1.50%	-2.05%
29517-001		5	0.973	0.939	1.000	0.933	1.000	0.013	0.028	2.87%	0.00%
29517-002		5	0.980	0.957	1.000	0.967	1.000	0.008	0.018	1.86%	-0.68%
29517-003		5	0.980	0.957	1.000	0.967	1.000	0.008	0.018	1.86%	-0.68%
29517-004		5	0.987	0.950	1.000	0.933	1.000	0.013	0.030	3.02%	-1.37%
29517-005		5	0.980	0.943	1.000	0.933	1.000	0.013	0.030	3.04%	-0.68%
29517-006		5	0.987	0.950	1.000	0.933	1.000	0.013	0.030	3.02%	-1.37%
59517-007		5	0.987	0.964	1.000	0.967	1.000	0.008	0.018	1.85%	-1.37%
29517-008		5	0.960	0.925	0.995	0.933	1.000	0.013	0.028	2.91%	1.37%

Bioaccumulation Evaluation - Survival Endpoint **EnviroSystems, Inc.**

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC	0.967	0.967	1.000	0.967	0.967
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-001		1.000	0.967	0.933	1.000	0.967
29517-002		0.967	0.967	1.000	0.967	1.000
29517-003		0.967	1.000	1.000	0.967	0.967
29517-004		1.000	1.000	1.000	0.933	1.000
29517-005		0.967	1.000	1.000	1.000	0.933
29517-006		0.933	1.000	1.000	1.000	1.000
59517-007		0.967	1.000	1.000	0.967	1.000
29517-008		1.000	0.933	0.967	0.967	0.933

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	04-9963-3410	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Sep-17 10:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29524-000	12-6247-7143	29 Aug-17	29 Aug-17	n/a	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29524-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29524	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-009 passed proportion survived	1.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	-2.12	1.86	0.049	8	CDF	0.9667	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0076490	0.0076490	1	4.5	0.0667	Non-Significant Effect
Error	0.0135983	0.0016998	8			
Total	0.0212473		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.901	0.741	0.2226	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29524-000	LC	5	0.973	0.955	0.992	0.967	0.967	1.000	0.007	1.53%	0.00%
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	-2.05%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29524-000	LC	5	1.41	1.35	1.46	1.39	1.39	1.48	0.0184	2.93%	0.00%
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	-3.94%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC	0.967	0.967	1.000	0.967	0.967
29517-009	RS	1.000	0.967	1.000	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC	1.39	1.39	1.48	1.39	1.39
29517-009	RS	1.48	1.39	1.48	1.48	1.48

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	15-7906-0925	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 9:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-001 passed proportion survived	2.51%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.41	1.86	0.069	8	CDF	0.0978	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5166	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0068609	0.0068609	1	1.99	0.1956	Non-Significant Effect
Error	0.0275292	0.0034412	8			
Total	0.0343901		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.05	23.2	0.3057	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.911	0.741	0.2880	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-001		5	0.973	0.939	1.000	0.967	0.933	1.000	0.013	2.87%	2.01%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-001		5	1.41	1.32	1.5	1.39	1.31	1.48	0.0322	5.11%	3.59%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-001		1.000	0.967	0.933	1.000	0.967

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-001		1.48	1.39	1.31	1.48	1.39

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	14-0107-5896	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-002 passed proportion survived	2.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1.26	1.86	0.054	8	CDF	0.1208	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0033996	0.0033996	1	1.6	0.2415	Non-Significant Effect
Error	0.0169979	0.0021247	8			
Total	0.0203974		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1713	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-002		5	0.980	0.957	1.000	0.967	0.967	1.000	0.008	1.86%	1.34%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-002		5	1.42	1.36	1.49	1.39	1.39	1.48	0.0226	3.55%	2.52%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-002		0.967	0.967	1.000	0.967	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-002		1.39	1.39	1.48	1.39	1.48

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	03-5683-8309	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-003 passed proportion survived	2.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	1.26	1.86	0.054	8	CDF	0.1208	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0033996	0.0033996	1	1.6	0.2415	Non-Significant Effect
Error	0.0169979	0.0021247	8			
Total	0.0203974		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1713	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-003		5	0.980	0.957	1.000	0.967	0.967	1.000	0.008	1.86%	1.34%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-003		5	1.42	1.36	1.49	1.39	1.39	1.48	0.0226	3.55%	2.52%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-003		0.967	1.000	1.000	0.967	0.967

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-003		1.39	1.48	1.48	1.39	1.39

CETIS Analytical Report

Report Date:	29 Sep-17 10:09 (p 1 of 1)
Test Code:	29524Mn | 02-7548-0737

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	18-1139-8433	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-004 passed proportion survived	2.62%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	27	n/a	1	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.36	2.29	0.0306	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006015	0.0006015	1	0.161	0.6986	Non-Significant Effect
Error	0.0298493	0.0037312	8			
Total	0.0304508		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.39	23.2	0.2640	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.638	0.741	1.6E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000		0.967	1.000	0.007	1.50%	0.00%
29517-004		5	0.987	0.950	1.000		0.933	1.000	0.013	3.02%	0.67%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51		1.39	1.48	0.0184	2.82%	0.00%
29517-004		5	1.45	1.35	1.54		1.31	1.48	0.0339	5.25%	1.06%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-004		1.000	1.000	1.000	0.933	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS					
29517-004						

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	07-5877-9843	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-004 passed proportion survived	1.56%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	22	n/a	1	7	Exact	0.5556	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007555	0.0007555	1	0.778	0.4071	Non-Significant Effect
Error	0.0067992	0.0009713	7			
Total	0.0075546		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	5.53	12.2	0.0510	Equal Variances
Variances	Mod Levene Equality of Variance Test	1	13.7	0.3559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.701	2.4E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-004		4	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	-0.67%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-004		4	1.48	1.48	1.48	1.48	1.48	1.48	0	0.00%	-1.26%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-004		1.000	1.000	1.000	Outlier	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-004		1.48	1.48	1.48	1.48	

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	17-1715-6272	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-005 passed proportion survived	2.64%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.871	1.86	0.073	8	CDF	0.2046	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2152	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0028813	0.0028813	1	0.759	0.4092	Non-Significant Effect
Error	0.030389	0.0037986	8			
Total	0.0332703		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.47	23.2	0.2555	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.828	0.741	0.0318	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-005		5	0.980	0.943	1.000	1.000	0.933	1.000	0.013	3.04%	1.34%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-005		5	1.43	1.33	1.52	1.48	1.31	1.48	0.0343	5.38%	2.32%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-005		0.967	1.000	1.000	1.000	0.933

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-005		1.39	1.48	1.48	1.48	1.31

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	01-0925-9554	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-006 passed proportion survived	2.62%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	27	n/a	1	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.36	2.29	0.0306	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006015	0.0006015	1	0.161	0.6986	Non-Significant Effect
Error	0.0298493	0.0037312	8			
Total	0.0304508		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.39	23.2	0.2640	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.638	0.741	1.6E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-006		5	0.987	0.950	1.000	1.000	0.933	1.000	0.013	3.02%	0.67%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-006		5	1.45	1.35	1.54	1.48	1.31	1.48	0.0339	5.25%	1.06%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-006		0.933	1.000	1.000	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-006		1.31	1.48	1.48	1.48	1.48

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	01-6618-3624	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-006 passed proportion survived	1.56%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	22	n/a	1	7	Exact	0.5556	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007555	0.0007555	1	0.778	0.4071	Non-Significant Effect
Error	0.0067992	0.0009713	7			
Total	0.0075546		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	5.53	12.2	0.0510	Equal Variances
Variances	Mod Levene Equality of Variance Test	1	13.7	0.3559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.701	2.4E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-006		4	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	-0.67%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-006		4	1.48	1.48	1.48	1.48	1.48	1.48	0	0.00%	-1.26%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-006		Outlier	1.000	1.000	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-006		1.48	1.48	1.48	1.48	

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	15-2156-9727	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	59517-007 passed proportion survived	2.01%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	25	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008499	0.0008499	1	0.4	0.5447	Non-Significant Effect
Error	0.0169979	0.0021247	8			
Total	0.0178478		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.759	0.741	0.0045	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
59517-007		5	0.987	0.964	1.000	1.000	0.967	1.000	0.008	1.85%	0.67%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
59517-007		5	1.44	1.38	1.51	1.48	1.39	1.48	0.0226	3.50%	1.26%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
59517-007		0.967	1.000	1.000	0.967	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
59517-007		1.39	1.48	1.48	1.39	1.48

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	10-8645-0317	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-008 failed proportion survived	2.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.37	1.86	0.068	8	CDF	0.0226	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.93	2.29	0.3119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0186344	0.0186344	1	5.62	0.0452	Significant Effect
Error	0.0265354	0.0033169	8			
Total	0.0451698		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.9	23.2	0.3266	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.833	0.741	0.0366	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.993	0.975	1.000	1.000	0.967	1.000	0.007	1.50%	0.00%
29517-008		5	0.960	0.925	0.995	0.967	0.933	1.000	0.013	2.91%	3.36%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.46	1.41	1.51	1.48	1.39	1.48	0.0184	2.82%	0.00%
29517-008		5	1.37	1.29	1.46	1.39	1.31	1.48	0.0314	5.11%	5.91%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.000	0.967	1.000	1.000	1.000
29517-008		1.000	0.933	0.967	0.967	0.933

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.48	1.39	1.48	1.48	1.48
29517-008		1.48	1.31	1.39	1.39	1.31

Aquatic Research Organisms

DATA SHEET/ CUSTODY CHAIN 99NvAR0083117

I. Organism History

Species Neanthes (Neries) virens.

Source: Lab reared____ Hatchery reared____ Field collected X

Hatch date Mixed aged adults Receipt date 8-31-17

Lot number____ Strain Wild

Brood origination: Damariscotta River, Boothbay Harbor, Maine

II. Water Quality

Temperature 4 °C Salinity 28-32 ppt D.O. Saturated ppm

pH 8.0-8.4 su Hardness N.A. ppm Alkalinity N.A. ppm

III. Culture Conditions

Freshwater____ Saltwater X Other____

Recirculating____ Flow through____ Static____

DIET: Flake food____ Phytoplankton____ Trout chow____

Artemia____ Rotifers____ YCT____ Other Not fed

Prophylactic treatments:____

Comments: Held at 4C on moist seaweed. Shipped with gel ice packs to keep cool

IV. Shipping Information

Client: EST # of Organisms 1500

Carrier:____ Date shipped 8-31-17

Tracking #____ # of boxes____

Released by: [signature] Date: 8-31-17 Time: 9:15AM

Received by:____ Date:____ Time:____

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

Nereis virens 28 Day Study # 29525 - AECOM New Haven

Day	Date	Water Qualities and Flow	Initial	Day	Date	Water Qualities and Flow	Initial
0	08/31/17	✓	MS	15	09/15/17	✓	JTP
1	09/01/17	✓	BG	16	09/16/17	✓	BG
2	09/02/17	✓	BG	17	09/17/17	✓	DD
3	09/03/17	✓	MS	18	09/18/17	✓	DD
4	09/04/17	✓	MS	19	09/19/17	✓	BG
5	09/05/17	✓	DD	20	09/20/17	✓	DD
6	09/06/17	✓	BG	21	09/21/17	✓	DD
7	09/07/17	✓	DD	22	09/22/17	✓	CFS
8	09/08/17	✓	BG	23	09/23/17	✓	BG
9	09/09/17	✓	BG	24	09/24/17	✓	DD
10	09/10/17	✓	DD	25	09/25/17	✓	DD
11	09/11/17	✓	DD	26	09/26/17	✓	BG
12	09/12/17	✓	BG	27	09/27/17	✓	DD
13	09/13/17	✓	DD	28	09/28/17	✓	JTP
14	09/14/17	✓	BG				

Notes: E1C BG 09/01/17 Rep 5D on day 01 DO_2 was below 2mg/L. Aeration had stopped overnight and was turned on once low DO_2 was observed.

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Daily Flow Rates for *Nereis virens* - AECOM - New Haven

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	MS	✓	BG	✓	BG	✓	MS	✓	MS	✓	DD	✓	BG
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	
	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	MS	✓	BG	✓	BG	✓	MS	✓	MS	✓	DD	✓	BG
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	
	Day 7		Day 8		Day 9		Day 10		Day 11		Day 12		Day 13	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	DD	✓	BG	✓	BG	✓	DD	✓	DD	✓	BG	✓	DD
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	
	Day 7		Day 8		Day 9		Day 10		Day 11		Day 12		Day 13	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	DD	✓	BG	✓	BG	✓	DD	✓	DD	✓	BG	✓	DD
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

Assay Initiation Date 08/31/17

Assay Termination Date 09/28/17

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Daily Flow Rates for *Nereis virens* - AECOM - New Haven

	Day 14		Day 15		Day 16		Day 17		Day 18		Day 19		Day 20	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	BG	✓	JTP	✓	BG	✓	DD	✓	DD	✓	BG	✓	DD
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	

	Day 14		Day 15		Day 16		Day 17		Day 18		Day 19		Day 20	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	BG	✓	JTP	✓	BG	✓	DD	✓	DD	✓	BG	✓	DD
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

	Day 21		Day 22		Day 23		Day 24		Day 25		Day 26		Day 27	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Lab Control	✓	DD	✓	CFS	✓	BG	✓	DD	✓	DD	✓	BG	✓	DD
Reference	✓		✓		✓		✓		✓		✓		✓	
Comp 1	✓		✓		✓		✓		✓		✓		✓	
Comp 2	✓		✓		✓		✓		✓		✓		✓	
Comp 3	✓		✓		✓		✓		✓		✓		✓	

	Day 21		Day 22		Day 23		Day 24		Day 25		Day 26		Day 27	
SAMPLE	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials	Checked	Initials
Comp 4	✓	DD	✓	CFS	✓	BG	✓	DD	✓	DD	✓	BG	✓	AD
Comp 5	✓		✓		✓		✓		✓		✓		✓	
Comp 6	✓		✓		✓		✓		✓		✓		✓	
Comp 7	✓		✓		✓		✓		✓		✓		✓	
Comp 8	✓		✓		✓		✓		✓		✓		✓	

Assay Initiation Date 08/31/17

Assay Termination Date 09/28/17

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Daily Observations for *Nereis virens* Study # 29525 - AECOM New Haven

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Laboratory Control	A	R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	B	✓	S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG	BG	MS	MS	DD	DD	DD	BG	BG	DD	DJ	BG	DD	BG
Date		09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Daily Observations for Bioaccumulation Assay Mn.wpd

Daily Observations for *Nereis virens* Study # 29525 - AECOM New Haven

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Composite 4	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG	BG	MS	MS	DD	DD	DD	BG	BG	DD	DD	BG	DD	BG
Date		09/01/17	09/02/17	09/03/17	09/04/17	09/05/17	09/06/17	09/07/17	09/08/17	09/09/17	09/10/17	09/11/17	09/12/17	09/13/17	09/14/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

Daily Observations for *Nereis virens* Study # 29525 - AECOM New Haven

TANK	Rep	DAY 15	16	17	18	19	20	21	22	23	24	25	26	27
Laboratory Control	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Reference	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 1	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		JTP	BG	DD	DD	BG	DD	DD	CFS	BG	DD	DD	BG	DD
Date		09/15/17	09/16/17	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

Daily Observations for *Nereis virens* Study # 29525 - AECOM New Haven

TANK	Rep	15	16	17	18	19	20	21	22	23	24	25	26	27
		DAY												
Composite 4	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 7	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 8	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		JTP	BG	DD	DD	BG	DD	DD	CFS	BG	DD	DD	BG	DD
Date		09/15/17	09/16/17	09/17/17	09/18/17	09/19/17	09/20/17	09/21/17	09/22/17	09/23/17	09/24/17	09/25/17	09/26/17	09/27/17

Observation Codes:

R animals replaced during the first 24 hours

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Daily Observations for Bioaccumulation Assay Mn.wpd

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	00	8/31/2017 09:49:11	12.3	94.5	7.75	45301	29.27
Laboratory Control	B	00	8/31/2017 09:49:37	12.3	98.4	7.77	44941	29.01
Laboratory Control	C	00	8/31/2017 09:50:05	12.2	101.8	7.86	45402	29.34
Laboratory Control	D	00	8/31/2017 09:50:27	12.2	102.3	7.82	44869	28.96
Laboratory Control	E	00	8/31/2017 09:50:55	12.3	102.6	7.82	44851	28.95
CLDS Reference Site	A	00	8/31/2017 09:51:19	12.2	101.5	7.8	44882	28.97
CLDS Reference Site	B	00	8/31/2017 09:51:44	12.2	102.8	7.81	44978	29.04
CLDS Reference Site	C	00	8/31/2017 09:52:09	12.2	103.8	7.85	44911	28.99
CLDS Reference Site	D	00	8/31/2017 09:52:35	12.2	90.7	7.81	45339	29.29
CLDS Reference Site	E	00	8/31/2017 09:53:02	12.1	103.5	7.86	45301	29.27
Composite 1	A	00	8/31/2017 09:53:47	12.3	83.7	7.79	45428	29.36
Composite 1	B	00	8/31/2017 09:54:17	12.2	75.5	7.74	44908	28.99
Composite 1	C	00	8/31/2017 09:54:44	12.1	102.4	7.84	45330	29.29
Composite 1	D	00	8/31/2017 09:55:08	12.1	104.1	7.88	45045	29.08
Composite 1	E	00	8/31/2017 09:55:36	12.3	102.9	7.85	44981	29.04
Composite 2	A	00	8/31/2017 09:56:01	12.2	102.4	7.96	45152	29.16
Composite 2	B	00	8/31/2017 09:56:29	12.2	103.7	7.93	44309	28.56
Composite 2	C	00	8/31/2017 09:56:50	12.2	104	7.9	44943	29.01
Composite 2	D	00	8/31/2017 09:57:13	12.2	102.8	7.93	45394	29.33
Composite 2	E	00	8/31/2017 09:57:30	12.3	102.9	7.9	44983	29.04
Composite 3	A	00	8/31/2017 09:57:55	12.2	77.1	7.72	45097	29.12
Composite 3	B	00	8/31/2017 09:58:21	12.2	102.3	7.85	45380	29.32
Composite 3	C	00	8/31/2017 09:58:54	12.3	103	7.96	45085	29.12
Composite 3	D	00	8/31/2017 09:59:40	12.3	100.3	7.84	44837	28.94
Composite 3	E	00	8/31/2017 10:00:05	12.2	102.6	7.9	45224	29.22
Composite 4	A	00	8/31/2017 10:00:28	12.4	102.4	7.83	44741	28.87
Composite 4	B	00	8/31/2017 10:00:51	12.4	102.3	7.82	44894	28.98
Composite 4	C	00	8/31/2017 10:01:17	12.3	104	7.96	44980	29.04
Composite 4	D	00	8/31/2017 10:01:46	12.4	103.7	7.89	44741	28.87
Composite 4	E	00	8/31/2017 10:02:04	12.2	104.2	7.98	44834	28.94
Composite 5	A	00	8/31/2017 10:02:29	12.3	102.9	7.89	44996	29.05
Composite 5	B	00	8/31/2017 10:02:58	12.3	103.4	7.87	44972	29.04
Composite 5	C	00	8/31/2017 10:03:21	12.2	104.3	7.9	44977	29.04
Composite 5	D	00	8/31/2017 10:03:47	12.2	72.5	7.7	45187	29.18
Composite 5	E	00	8/31/2017 16:10:16	12.3	107.9	7.76	45362	29.32
Composite 6	A	00	8/31/2017 16:10:40	12.3	102.1	7.87	45159	29.17
Composite 6	B	00	8/31/2017 16:11:04	12.2	94	7.83	45166	29.17
Composite 6	C	00	8/31/2017 16:11:32	12.2	98.2	7.87	45142	29.16
Composite 6	D	00	8/31/2017 16:12:13	12.2	100.9	7.96	44900	28.98
Composite 6	E	00	8/31/2017 16:12:27	12.1	100.9	7.88	45214	29.2
Composite 7	A	00	8/31/2017 16:12:50	12	96.5	7.76	45145	29.15
Composite 7	B	00	8/31/2017 16:13:04	12	95.9	7.74	45231	29.21
Composite 7	C	00	8/31/2017 16:13:28	12.2	97.1	7.86	45146	29.16
Composite 7	D	00	8/31/2017 16:13:56	12.3	99.4	7.87	45262	29.24
Composite 7	E	00	8/31/2017 16:14:14	12.5	94.4	7.84	44891	28.99
Composite 8	A	00	8/31/2017 16:14:27	12.5	92.7	7.86	44856	28.96
Composite 8	B	00	8/31/2017 16:14:56	12.5	91	7.7	45265	29.25
Composite 8	C	00	8/31/2017 16:15:20	12.4	92.5	7.7	45267	29.25
Composite 8	D	00	8/31/2017 16:15:41	12.5	89.8	7.64	45039	29.09
Composite 8	E	00	8/31/2017 16:16:05	12.5	93.4	7.67	45144	29.17

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	01	9/1/2017 10:13:16	12.3	74.8	7.45	45601	29.49
Laboratory Control	B	01	9/1/2017 10:13:48	12.4	92.2	7.6	45492	29.41
Laboratory Control	C	01	9/1/2017 10:14:14	12.4	94	7.67	45506	29.42
Laboratory Control	D	01	9/1/2017 10:14:31	12.4	95.6	7.68	45468	29.39
Laboratory Control	E	01	9/1/2017 10:15:41	12.4	97.7	7.72	45480	29.4
CLDS Reference Site	A	01	9/1/2017 10:16:02	12.3	89	7.69	45477	29.4
CLDS Reference Site	B	01	9/1/2017 10:16:22	12.3	79.7	7.61	45588	29.48
CLDS Reference Site	C	01	9/1/2017 10:16:50	12.3	98.2	7.75	45484	29.4
CLDS Reference Site	D	01	9/1/2017 10:17:11	12.3	85.3	7.68	45570	29.46
CLDS Reference Site	E	01	9/1/2017 10:17:34	12.2	97.4	7.77	45772	29.61
Composite 1	A	01	9/1/2017 10:18:09	12.4	92.9	7.72	45471	29.4
Composite 1	B	01	9/1/2017 10:18:24	12.3	93.4	7.73	45505	29.42
Composite 1	C	01	9/1/2017 10:18:44	12.3	93.9	7.76	45739	29.58
Composite 1	D	01	9/1/2017 10:19:21	12.3	98.3	7.81	45481	29.4
Composite 1	E	01	9/1/2017 10:19:47	12.3	95.8	7.77	45474	29.4
Composite 2	A	01	9/1/2017 10:20:15	12.3	92.8	7.86	45688	29.55
Composite 2	B	01	9/1/2017 10:20:37	12.1	97.8	7.93	45711	29.56
Composite 2	C	01	9/1/2017 10:20:55	12.2	97.2	7.87	45470	29.39
Composite 2	D	01	9/1/2017 10:21:18	12.2	93.4	7.87	45891	29.69
Composite 2	E	01	9/1/2017 10:21:35	12.3	95.7	7.83	45469	29.39
Composite 3	A	01	9/1/2017 10:21:56	12.2	93.3	7.81	45547	29.45
Composite 3	B	01	9/1/2017 10:22:28	12.2	95.6	7.82	45779	29.61
Composite 3	C	01	9/1/2017 10:23:49	12.3	96.2	7.9	45652	29.52
Composite 3	D	01	9/1/2017 10:24:05	12.4	94.9	7.82	45430	29.37
Composite 3	E	01	9/1/2017 10:24:22	12.3	93.6	7.85	45654	29.52
Composite 4	A	01	9/1/2017 10:24:46	12.5	96.6	7.78	45452	29.39
Composite 4	B	01	9/1/2017 10:25:11	12.4	94.6	7.76	45436	29.37
Composite 4	C	01	9/1/2017 10:25:34	12.3	97.5	7.96	45394	29.34
Composite 4	D	01	9/1/2017 10:26:01	12.4	99	7.85	45442	29.38
Composite 4	E	01	9/1/2017 10:26:27	12.2	97.9	7.97	45285	29.26
Composite 5	A	01	9/1/2017 10:27:02	12.3	91.8	7.81	45477	29.4
Composite 5	B	01	9/1/2017 10:27:48	12.3	94.5	7.8	45473	29.4
Composite 5	C	01	9/1/2017 10:28:08	12.2	98.3	7.87	45475	29.39
Composite 5	D	01	9/1/2017 10:59:23	12.2	70.6	7.57	45861	29.67
Composite 5	E	01	9/1/2017 11:00:03	12.2	97.6	7.75	45572	29.46
Composite 6	A	01	9/1/2017 11:00:26	12.1	95.4	7.86	45650	29.51
Composite 6	B	01	9/1/2017 11:00:45	12.1	90.3	7.79	45624	29.5
Composite 6	C	01	9/1/2017 11:01:02	12.1	92.1	7.78	45591	29.47
Composite 6	D	01	9/1/2017 11:01:22	12	96.9	7.82	45551	29.44
Composite 6	E	01	9/1/2017 11:01:35	12	96.9	7.82	45614	29.48
Composite 7	A	01	9/1/2017 11:02:05	12	95.8	7.78	45594	29.47
Composite 7	B	01	9/1/2017 11:02:23	12.1	93.7	7.77	45610	29.49
Composite 7	C	01	9/1/2017 11:02:33	12.2	94.1	7.79	45598	29.48
Composite 7	D	01	9/1/2017 11:02:54	12.3	95.8	7.8	45584	29.48
Composite 7	E	01	9/1/2017 11:03:15	12.4	92.9	7.74	45542	29.45
Composite 8	A	01	9/1/2017 11:03:31	12.4	92.5	7.73	45524	29.44
Composite 8	B	01	9/1/2017 11:03:56	12.3	90.6	7.72	45583	29.48
Composite 8	C	01	9/1/2017 11:04:17	12.3	85.9	7.68	45657	29.53
Composite 8	D	01	9/1/2017 11:04:37	12.3	82.1	7.65	45535	29.44
Composite 8	E	01	9/1/2017 11:05:01	12.3	91	7.68	45545	29.45

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	02	9/2/2017 09:22:54	12.5	100.2	7.77	46478	30.12
Laboratory Control	B	02	9/2/2017 09:23:16	12.4	98.9	7.76	46464	30.11
Laboratory Control	C	02	9/2/2017 09:23:32	12.4	98.2	7.76	46463	30.11
Laboratory Control	D	02	9/2/2017 09:24:02	12.4	98.8	7.75	46463	30.11
Laboratory Control	E	02	9/2/2017 09:24:16	12.4	101	7.75	46459	30.11
CLDS Reference Site	A	02	9/2/2017 09:24:36	12.4	96.6	7.77	46441	30.09
CLDS Reference Site	B	02	9/2/2017 09:24:59	12.4	95.5	7.77	46429	30.08
CLDS Reference Site	C	02	9/2/2017 09:25:20	12.4	100	7.79	46456	30.1
CLDS Reference Site	D	02	9/2/2017 09:25:42	12.3	97	7.78	46384	30.05
CLDS Reference Site	E	02	9/2/2017 09:26:02	12.3	100.2	7.82	46507	30.14
Composite 1	A	02	9/2/2017 09:26:27	12.4	97.3	7.77	46503	30.14
Composite 1	B	02	9/2/2017 09:26:41	12.4	96.9	7.78	46378	30.05
Composite 1	C	02	9/2/2017 09:26:53	12.3	96.6	7.79	46428	30.08
Composite 1	D	02	9/2/2017 09:27:08	12.3	100.3	7.82	46456	30.1
Composite 1	E	02	9/2/2017 09:27:30	12.4	97.9	7.79	46427	30.08
Composite 2	A	02	9/2/2017 09:27:47	12.3	94.1	7.87	46324	30.01
Composite 2	B	02	9/2/2017 09:28:14	12.2	99.4	7.95	46347	30.02
Composite 2	C	02	9/2/2017 09:28:38	12.3	99.5	7.86	46485	30.12
Composite 2	D	02	9/2/2017 09:28:59	12.3	95.2	7.91	46487	30.12
Composite 2	E	02	9/2/2017 09:29:21	12.4	97.8	7.84	46433	30.09
Composite 3	A	02	9/2/2017 09:29:45	12.3	96.1	7.86	46173	29.9
Composite 3	B	02	9/2/2017 09:30:27	12.3	97.7	7.84	46418	30.08
Composite 3	C	02	9/2/2017 09:31:23	12.3	97.8	7.93	46255	29.96
Composite 3	D	02	9/2/2017 09:31:53	12.4	98	7.81	46486	30.13
Composite 3	E	02	9/2/2017 09:32:15	12.3	95.7	7.88	46226	29.94
Composite 4	A	02	9/2/2017 09:32:41	12.5	99.7	7.81	46505	30.14
Composite 4	B	02	9/2/2017 09:33:10	12.4	95.8	7.77	46448	30.1
Composite 4	C	02	9/2/2017 09:33:32	12.3	99.5	7.99	45949	29.74
Composite 4	D	02	9/2/2017 09:34:02	12.4	101.7	7.87	46526	30.16
Composite 4	E	02	9/2/2017 09:34:27	12.3	99.8	8.02	45892	29.69
Composite 5	A	02	9/2/2017 09:34:47	12.3	94.9	7.86	46386	30.05
Composite 5	B	02	9/2/2017 09:35:03	12.3	97.1	7.82	46506	30.14
Composite 5	C	02	9/2/2017 09:35:21	12.3	99.8	7.85	46489	30.12
Composite 5	D	02	9/2/2017 09:35:42	12.4	100.4	7.82	46548	30.17
Composite 5	E	02	9/2/2017 09:36:31	12.3	99	7.82	46525	30.15
Composite 6	A	02	9/2/2017 09:36:48	12.2	97	7.9	46402	30.06
Composite 6	B	02	9/2/2017 09:37:03	12.3	92.3	7.81	46475	30.11
Composite 6	C	02	9/2/2017 09:37:25	12.2	95.9	7.8	46476	30.11
Composite 6	D	02	9/2/2017 09:37:40	12.2	98.2	7.82	46480	30.11
Composite 6	E	02	9/2/2017 09:38:01	12.1	99.1	7.82	46483	30.11
Composite 7	A	02	9/2/2017 09:38:35	12.1	96.7	7.78	46527	30.14
Composite 7	B	02	9/2/2017 09:38:56	12.2	95.2	7.76	46509	30.13
Composite 7	C	02	9/2/2017 09:39:10	12.3	95.9	7.81	46433	30.08
Composite 7	D	02	9/2/2017 09:39:27	12.4	97.9	7.79	46525	30.15
Composite 7	E	02	9/2/2017 09:40:01	12.4	95.4	7.73	46531	30.16
Composite 8	A	02	9/2/2017 09:40:26	12.5	93.7	7.73	46486	30.13
Composite 8	B	02	9/2/2017 09:40:55	12.4	90.8	7.73	46373	30.05
Composite 8	C	02	9/2/2017 09:41:15	12.4	85.6	7.7	46367	30.04
Composite 8	D	02	9/2/2017 09:41:35	12.4	90	7.7	46451	30.1
Composite 8	E	02	9/2/2017 09:41:52	12.4	95.5	7.72	46523	30.15

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	03	9/3/2017 12:13:19	12.6	95.1	7.79	44609	28.79
Laboratory Control	B	03	9/3/2017 12:13:48	12.4	99.5	7.78	44610	28.78
Laboratory Control	C	03	9/3/2017 12:14:09	12.4	98.9	7.76	44610	28.78
Laboratory Control	D	03	9/3/2017 12:14:26	12.4	98.6	7.76	44622	28.79
Laboratory Control	E	03	9/3/2017 12:14:49	12.5	101.5	7.78	44621	28.79
CLDS Reference Site	A	03	9/3/2017 12:15:07	12.4	97.7	7.77	44614	28.78
CLDS Reference Site	B	03	9/3/2017 12:15:23	12.4	95.6	7.77	44615	28.78
CLDS Reference Site	C	03	9/3/2017 12:15:42	12.5	100.6	7.8	44622	28.79
CLDS Reference Site	D	03	9/3/2017 12:16:06	12.4	96.3	7.79	44599	28.77
CLDS Reference Site	E	03	9/3/2017 12:16:28	12.4	100.4	7.84	44696	28.84
Composite 1	A	03	9/3/2017 12:16:55	12.5	97.9	7.79	44614	28.79
Composite 1	B	03	9/3/2017 12:19:19	12.4	95.9	7.8	44611	28.78
Composite 1	C	03	9/3/2017 12:19:42	12.3	96	7.81	44618	28.78
Composite 1	D	03	9/3/2017 12:20:06	12.4	101.1	7.86	44635	28.8
Composite 1	E	03	9/3/2017 12:20:32	12.4	98.1	7.81	44638	28.8
Composite 2	A	03	9/3/2017 12:20:57	12.3	94.7	7.92	44456	28.67
Composite 2	B	03	9/3/2017 12:21:23	12.3	100.8	7.99	44579	28.76
Composite 2	C	03	9/3/2017 12:21:45	12.4	101	7.89	44645	28.81
Composite 2	D	03	9/3/2017 12:22:05	12.3	96.7	7.94	44666	28.82
Composite 2	E	03	9/3/2017 12:22:19	12.4	98.7	7.88	44637	28.8
Composite 3	A	03	9/3/2017 12:22:42	12.4	94	7.84	44367	28.61
Composite 3	B	03	9/3/2017 12:23:04	12.4	98.3	7.86	44600	28.77
Composite 3	C	03	9/3/2017 12:23:28	12.4	98.4	7.95	44423	28.65
Composite 3	D	03	9/3/2017 12:23:44	12.5	98.6	7.86	44640	28.8
Composite 3	E	03	9/3/2017 12:23:57	12.4	97.6	7.91	44422	28.64
Composite 4	A	03	9/3/2017 12:24:18	12.6	100.5	7.83	44645	28.81
Composite 4	B	03	9/3/2017 12:24:48	12.5	95.8	7.78	44612	28.78
Composite 4	C	03	9/3/2017 12:25:11	12.4	100.8	8.04	44100	28.42
Composite 4	D	03	9/3/2017 12:25:43	12.6	102.2	7.9	44646	28.81
Composite 4	E	03	9/3/2017 12:26:01	12.3	101	8.04	44024	28.36
Composite 5	A	03	9/3/2017 12:26:24	12.4	95.9	7.86	44632	28.8
Composite 5	B	03	9/3/2017 12:26:46	12.4	98	7.82	44654	28.81
Composite 5	C	03	9/3/2017 12:27:07	12.4	100.9	7.88	44662	28.82
Composite 5	D	03	9/3/2017 12:27:31	12.5	100.2	7.84	44663	28.82
Composite 5	E	03	9/3/2017 12:28:20	12.5	100.7	7.84	44667	28.83
Composite 6	A	03	9/3/2017 12:28:43	12.3	94.9	7.92	44615	28.78
Composite 6	B	03	9/3/2017 12:29:03	12.4	92	7.79	44660	28.82
Composite 6	C	03	9/3/2017 12:29:17	12.3	93.6	7.79	44680	28.83
Composite 6	D	03	9/3/2017 12:29:45	12.3	98.1	7.87	44687	28.83
Composite 6	E	03	9/3/2017 12:30:02	12.3	99.2	7.84	44679	28.83
Composite 7	A	03	9/3/2017 12:30:43	12.2	96.7	7.78	44703	28.84
Composite 7	B	03	9/3/2017 12:31:00	12.2	93.8	7.77	44726	28.86
Composite 7	C	03	9/3/2017 12:31:22	12.3	93.8	7.85	44631	28.79
Composite 7	D	03	9/3/2017 12:31:39	12.4	97.7	7.82	44689	28.84
Composite 7	E	03	9/3/2017 12:32:04	12.4	93.9	7.74	44695	28.84
Composite 8	A	03	9/3/2017 12:32:28	12.5	94.1	7.73	44666	28.83
Composite 8	B	03	9/3/2017 12:33:06	12.5	88.5	7.7	44635	28.8
Composite 8	C	03	9/3/2017 12:33:28	12.4	84.3	7.67	44639	28.8
Composite 8	D	03	9/3/2017 12:33:50	12.4	87.2	7.67	44652	28.81
Composite 8	E	03	9/3/2017 12:34:13	12.4	93.9	7.72	44667	28.82

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	04	9/4/2017 09:05:51	12.3	96.8	7.77	46065	29.82
Laboratory Control	B	04	9/4/2017 09:06:12	12.3	96.4	7.76	46049	29.81
Laboratory Control	C	04	9/4/2017 09:06:34	12.3	96	7.75	46042	29.8
Laboratory Control	D	04	9/4/2017 09:06:52	12.3	94	7.74	46044	29.81
Laboratory Control	E	04	9/4/2017 09:07:15	12.3	97.7	7.75	46060	29.82
CLDS Reference Site	A	04	9/4/2017 09:07:33	12.3	94.6	7.75	46026	29.79
CLDS Reference Site	B	04	9/4/2017 09:07:57	12.3	87.2	7.71	46027	29.79
CLDS Reference Site	C	04	9/4/2017 09:08:20	12.3	98.2	7.77	46048	29.81
CLDS Reference Site	D	04	9/4/2017 09:08:42	12.3	92.7	7.75	45944	29.73
CLDS Reference Site	E	04	9/4/2017 09:09:04	12.3	99.9	7.82	46007	29.78
Composite 1	A	04	9/4/2017 09:09:27	12.4	92.7	7.76	46043	29.81
Composite 1	B	04	9/4/2017 09:09:43	12.4	94.1	7.76	45981	29.76
Composite 1	C	04	9/4/2017 09:10:07	12.3	94.2	7.77	45927	29.72
Composite 1	D	04	9/4/2017 09:10:31	12.3	100.3	7.83	46013	29.78
Composite 1	E	04	9/4/2017 09:10:50	12.3	95.8	7.79	46028	29.8
Composite 2	A	04	9/4/2017 09:11:12	12.3	92.8	7.91	45704	29.56
Composite 2	B	04	9/4/2017 09:11:36	12.3	99.4	7.97	45890	29.69
Composite 2	C	04	9/4/2017 09:12:03	12.3	99.5	7.86	46047	29.81
Composite 2	D	04	9/4/2017 09:12:29	12.3	95.8	7.95	45953	29.74
Composite 2	E	04	9/4/2017 09:12:50	12.3	97	7.84	46029	29.8
Composite 3	A	04	9/4/2017 09:13:10	12.3	89.6	7.79	45669	29.54
Composite 3	B	04	9/4/2017 09:13:32	12.3	97	7.82	45907	29.71
Composite 3	C	04	9/4/2017 09:13:57	12.4	97	7.93	45695	29.56
Composite 3	D	04	9/4/2017 09:14:09	12.4	96.2	7.85	46041	29.81
Composite 3	E	04	9/4/2017 09:14:25	12.4	96.6	7.9	45690	29.55
Composite 4	A	04	9/4/2017 09:14:39	12.4	96.7	7.83	46044	29.81
Composite 4	B	04	9/4/2017 09:15:02	12.4	92.2	7.76	45998	29.78
Composite 4	C	04	9/4/2017 09:15:26	12.4	99.7	8.01	45312	29.28
Composite 4	D	04	9/4/2017 09:15:51	12.3	100.6	7.87	46057	29.82
Composite 4	E	04	9/4/2017 09:16:16	12.3	99.3	8.02	45244	29.23
Composite 5	A	04	9/4/2017 09:16:37	12.3	94.4	7.83	45990	29.77
Composite 5	B	04	9/4/2017 09:17:00	12.3	95.7	7.79	46039	29.8
Composite 5	C	04	9/4/2017 09:17:30	12.3	100.4	7.85	46021	29.79
Composite 5	D	04	9/4/2017 09:17:52	12.3	98.6	7.81	46053	29.81
Composite 5	E	04	9/4/2017 09:18:27	12.2	99	7.81	46104	29.85
Composite 6	A	04	9/4/2017 09:18:43	12.2	96.2	7.93	45803	29.63
Composite 6	B	04	9/4/2017 09:19:09	12.2	90	7.76	46062	29.81
Composite 6	C	04	9/4/2017 09:19:32	12.1	86.1	7.71	46021	29.78
Composite 6	D	04	9/4/2017 09:19:55	12.1	97.4	7.83	46008	29.77
Composite 6	E	04	9/4/2017 09:20:17	12.1	96.7	7.8	46043	29.79
Composite 7	A	04	9/4/2017 09:21:11	12	95.5	7.75	46070	29.81
Composite 7	B	04	9/4/2017 09:21:28	12.1	92.9	7.75	46009	29.77
Composite 7	C	04	9/4/2017 09:21:50	12.2	94.8	7.85	45901	29.7
Composite 7	D	04	9/4/2017 09:22:06	12.3	95.6	7.8	46040	29.8
Composite 7	E	04	9/4/2017 09:22:17	12.4	92.4	7.74	46023	29.79
Composite 8	A	04	9/4/2017 09:22:37	12.5	91.1	7.71	46017	29.79
Composite 8	B	04	9/4/2017 09:22:57	12.4	87.9	7.68	44778	28.9
Composite 8	C	04	9/4/2017 09:23:27	12.3	60.5	7.53	45906	29.71
Composite 8	D	04	9/4/2017 09:23:52	12.3	79.3	7.59	45955	29.74
Composite 8	E	04	9/4/2017 09:24:11	12.3	89	7.65	46001	29.78

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	05	9/5/2017 12:07:58	12.3	95.6	7.74	45961	29.74
Laboratory Control	B	05	9/5/2017 12:08:14	12.3	96	7.74	46028	29.79
Laboratory Control	C	05	9/5/2017 12:08:33	12.3	95.2	7.73	46041	29.8
Laboratory Control	D	05	9/5/2017 12:08:50	12.2	93.8	7.72	46084	29.83
Laboratory Control	E	05	9/5/2017 12:09:13	12.3	96.6	7.74	45972	29.75
CLDS Reference Site	A	05	9/5/2017 12:09:31	12.3	92.8	7.73	46079	29.83
CLDS Reference Site	B	05	9/5/2017 12:10:05	12.3	61.1	7.64	46181	29.9
CLDS Reference Site	C	05	9/5/2017 12:10:42	12.3	97.1	7.77	46028	29.79
CLDS Reference Site	D	05	9/5/2017 12:11:04	12.3	84.2	7.69	46355	30.03
CLDS Reference Site	E	05	9/5/2017 12:11:26	12.3	98.7	7.81	46464	30.1
Composite 1	A	05	9/5/2017 12:11:55	12.3	91	7.74	46008	29.78
Composite 1	B	05	9/5/2017 12:12:14	12.3	94.8	7.76	46235	29.94
Composite 1	C	05	9/5/2017 12:12:36	12.3	94.4	7.77	46368	30.04
Composite 1	D	05	9/5/2017 12:12:56	12.3	99.3	7.83	46153	29.88
Composite 1	E	05	9/5/2017 12:13:18	12.3	94.9	7.78	46104	29.85
Composite 2	A	05	9/5/2017 12:13:36	12.3	92.8	7.91	46159	29.89
Composite 2	B	05	9/5/2017 12:13:58	12.2	99.1	7.96	46328	30.01
Composite 2	C	05	9/5/2017 12:14:11	12.2	99.6	7.89	46048	29.81
Composite 2	D	05	9/5/2017 12:14:31	12.2	95.9	7.95	46445	30.09
Composite 2	E	05	9/5/2017 12:14:46	12.3	96.2	7.86	46081	29.83
Composite 3	A	05	9/5/2017 12:15:05	12.3	83.7	7.74	46155	29.88
Composite 3	B	05	9/5/2017 12:15:26	12.3	95.8	7.81	46340	30.02
Composite 3	C	05	9/5/2017 12:16:10	12.3	97.3	7.95	46204	29.92
Composite 3	D	05	9/5/2017 12:16:22	12.3	95.6	7.85	46024	29.79
Composite 3	E	05	9/5/2017 12:16:37	12.3	96	7.9	46185	29.91
Composite 4	A	05	9/5/2017 12:17:00	12.3	96.2	7.8	45960	29.74
Composite 4	B	05	9/5/2017 12:17:18	12.4	91.8	7.76	46100	29.85
Composite 4	C	05	9/5/2017 12:17:39	12.3	99.3	8.03	45820	29.65
Composite 4	D	05	9/5/2017 12:18:05	12.3	99.5	7.87	45973	29.75
Composite 4	E	05	9/5/2017 12:18:27	12.3	98.9	8.04	45747	29.59
Composite 5	A	05	9/5/2017 12:18:45	12.3	94.2	7.84	46193	29.91
Composite 5	B	05	9/5/2017 12:19:05	12.3	95.5	7.8	46099	29.84
Composite 5	C	05	9/5/2017 12:19:18	12.3	98.7	7.84	46153	29.88
Composite 5	D	05	9/5/2017 12:19:28	12.3	98.1	7.83	46010	29.78
Composite 5	E	05	9/5/2017 12:20:32	12.2	97.4	7.81	46042	29.8
Composite 6	A	05	9/5/2017 12:20:54	12.1	94.3	7.94	46438	30.08
Composite 6	B	05	9/5/2017 12:21:05	12.1	91.6	7.83	46112	29.85
Composite 6	C	05	9/5/2017 12:21:19	12	81.3	7.7	46468	30.1
Composite 6	D	05	9/5/2017 12:21:38	11.9	97.3	7.84	46325	29.99
Composite 6	E	05	9/5/2017 12:21:52	11.9	96.6	7.81	46130	29.85
Composite 7	A	05	9/5/2017 12:22:21	11.8	95.1	7.76	46111	29.83
Composite 7	B	05	9/5/2017 12:22:42	12	92.2	7.76	46435	30.07
Composite 7	C	05	9/5/2017 12:23:02	12.1	94.4	7.87	46394	30.05
Composite 7	D	05	9/5/2017 12:23:22	12.2	95.5	7.8	46130	29.86
Composite 7	E	05	9/5/2017 12:23:42	12.3	90	7.71	46241	29.95
Composite 8	A	05	9/5/2017 12:24:04	12.4	91	7.71	46173	29.9
Composite 8	B	05	9/5/2017 12:24:29	12.3	84.8	7.66	46242	29.95
Composite 8	C	05	9/5/2017 12:24:52	12.3	67.4	7.55	46358	30.03
Composite 8	D	05	9/5/2017 12:25:54	12.3	69.1	7.54	46382	30.05
Composite 8	E	05	9/5/2017 12:26:14	12.3	85.4	7.62	46229	29.94

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	06	9/6/2017 10:42:43	12.3	93.6	7.7	45211	29.21
Laboratory Control	B	06	9/6/2017 10:43:09	12.3	96.2	7.71	45209	29.2
Laboratory Control	C	06	9/6/2017 10:43:29	12.3	94.8	7.69	45189	29.19
Laboratory Control	D	06	9/6/2017 10:43:50	12.2	93.9	7.67	45242	29.23
Laboratory Control	E	06	9/6/2017 10:44:13	12.2	98.1	7.7	45191	29.19
CLDS Reference Site	A	06	9/6/2017 10:44:32	12.2	93.3	7.69	45249	29.23
CLDS Reference Site	B	06	9/6/2017 10:44:52	12.3	94.4	7.69	45223	29.21
CLDS Reference Site	C	06	9/6/2017 10:45:27	12.3	98.3	7.73	45180	29.19
CLDS Reference Site	D	06	9/6/2017 10:46:06	12.3	97.2	7.73	45196	29.2
CLDS Reference Site	E	06	9/6/2017 10:46:28	12.3	98.9	7.76	45464	29.39
Composite 1	A	06	9/6/2017 10:46:57	12.3	91.9	7.7	45194	29.2
Composite 1	B	06	9/6/2017 10:47:17	12.3	95.5	7.7	45227	29.22
Composite 1	C	06	9/6/2017 10:47:38	12.3	96.5	7.72	45256	29.24
Composite 1	D	06	9/6/2017 10:47:59	12.3	99.4	7.77	45245	29.23
Composite 1	E	06	9/6/2017 10:48:20	12.3	95.1	7.73	45269	29.25
Composite 2	A	06	9/6/2017 10:48:42	12.3	94.9	7.79	45333	29.29
Composite 2	B	06	9/6/2017 10:49:02	12.3	98.1	7.81	45264	29.24
Composite 2	C	06	9/6/2017 10:49:27	12.3	98.9	7.79	45229	29.22
Composite 2	D	06	9/6/2017 10:49:47	12.3	96.4	7.77	45309	29.28
Composite 2	E	06	9/6/2017 10:50:02	12.3	97	7.75	45213	29.21
Composite 3	A	06	9/6/2017 10:50:25	12.3	89.4	7.69	45352	29.31
Composite 3	B	06	9/6/2017 10:50:43	12.3	96.2	7.72	45245	29.23
Composite 3	C	06	9/6/2017 10:54:41	12.3	99.5	7.74	45291	29.27
Composite 3	D	06	9/6/2017 10:54:57	12.3	97.7	7.72	45228	29.22
Composite 3	E	06	9/6/2017 10:55:18	12.3	98	7.74	45226	29.22
Composite 4	A	06	9/6/2017 10:55:38	12.3	99.3	7.72	45149	29.16
Composite 4	B	06	9/6/2017 10:55:59	12.4	92.9	7.69	45294	29.27
Composite 4	C	06	9/6/2017 10:56:22	12.3	99.6	7.83	45281	29.26
Composite 4	D	06	9/6/2017 10:56:53	12.3	99.8	7.79	45182	29.19
Composite 4	E	06	9/6/2017 10:57:17	12.3	98.8	7.9	45272	29.25
Composite 5	A	06	9/6/2017 10:57:40	12.3	95.3	7.76	45311	29.28
Composite 5	B	06	9/6/2017 10:57:51	12.3	96.5	7.75	45238	29.23
Composite 5	C	06	9/6/2017 10:58:10	12.3	99.3	7.78	45348	29.3
Composite 5	D	06	9/6/2017 10:58:25	12.3	97.4	7.77	45210	29.21
Composite 5	E	06	9/6/2017 10:59:14	12.2	98.5	7.76	45211	29.2
Composite 6	A	06	9/6/2017 10:59:30	12.1	96.3	7.77	45388	29.33
Composite 6	B	06	9/6/2017 10:59:48	12.1	90.2	7.69	45290	29.26
Composite 6	C	06	9/6/2017 11:00:05	12.1	89	7.66	45312	29.27
Composite 6	D	06	9/6/2017 11:00:57	12	97.8	7.74	45272	29.24
Composite 6	E	06	9/6/2017 11:01:22	11.9	95.2	7.73	45313	29.27
Composite 7	A	06	9/6/2017 11:02:03	11.9	91.8	7.67	45246	29.22
Composite 7	B	06	9/6/2017 11:02:20	12	93.3	7.66	45257	29.23
Composite 7	C	06	9/6/2017 11:02:43	12.2	95.4	7.69	45266	29.24
Composite 7	D	06	9/6/2017 11:03:06	12.3	96	7.7	45286	29.26
Composite 7	E	06	9/6/2017 11:03:28	12.3	90.5	7.64	45233	29.22
Composite 8	A	06	9/6/2017 11:03:54	12.4	92.8	7.66	45223	29.22
Composite 8	B	06	9/6/2017 11:04:30	12.3	76.4	7.57	45262	29.25
Composite 8	C	06	9/6/2017 11:04:50	12.3	93.3	7.67	45483	29.4
Composite 8	D	06	9/6/2017 11:05:11	12.3	87.4	7.63	45242	29.23
Composite 8	E	06	9/6/2017 11:05:29	12.3	92.8	7.65	45212	29.21

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	07	9/7/2017 10:22:56	12.3	94.1	7.69	46664	30.25
Laboratory Control	B	07	9/7/2017 10:23:05	12.3	95	7.69	46724	30.3
Laboratory Control	C	07	9/7/2017 10:23:20	12.3	95.1	7.68	46719	30.29
Laboratory Control	D	07	9/7/2017 10:23:30	12.3	93.6	7.67	46714	30.29
Laboratory Control	E	07	9/7/2017 10:23:50	12.3	98.1	7.7	46728	30.3
CLDS Reference Site	A	07	9/7/2017 10:24:06	12.3	93.9	7.69	46712	30.29
CLDS Reference Site	B	07	9/7/2017 10:24:29	12.3	93.8	7.69	46737	30.3
CLDS Reference Site	C	07	9/7/2017 10:24:44	12.4	97.8	7.72	46752	30.32
CLDS Reference Site	D	07	9/7/2017 10:24:59	12.3	98.1	7.73	46738	30.31
CLDS Reference Site	E	07	9/7/2017 10:25:12	12.3	100	7.75	46753	30.32
Composite 1	A	07	9/7/2017 10:25:41	12.4	88.6	7.67	46712	30.29
Composite 1	B	07	9/7/2017 10:26:00	12.4	94.6	7.7	46709	30.29
Composite 1	C	07	9/7/2017 10:26:18	12.4	96.3	7.72	46713	30.29
Composite 1	D	07	9/7/2017 10:26:39	12.3	100.7	7.77	46724	30.3
Composite 1	E	07	9/7/2017 10:27:01	12.4	94.4	7.72	46742	30.31
Composite 2	A	07	9/7/2017 10:27:15	12.3	94.9	7.77	46607	30.21
Composite 2	B	07	9/7/2017 10:27:44	12.3	100	7.79	46512	30.14
Composite 2	C	07	9/7/2017 10:28:06	12.3	99.7	7.78	46743	30.31
Composite 2	D	07	9/7/2017 10:28:28	12.3	96.8	7.76	46718	30.29
Composite 2	E	07	9/7/2017 10:28:49	12.3	97.2	7.74	46741	30.31
Composite 3	A	07	9/7/2017 10:29:07	12.3	93.2	7.7	46695	30.27
Composite 3	B	07	9/7/2017 10:29:22	12.3	97	7.73	46740	30.31
Composite 3	C	07	9/7/2017 10:30:02	12.4	98.4	7.75	46737	30.31
Composite 3	D	07	9/7/2017 10:30:17	12.4	96.3	7.73	46756	30.32
Composite 3	E	07	9/7/2017 10:30:34	12.4	97.3	7.73	46741	30.31
Composite 4	A	07	9/7/2017 10:30:46	12.4	96.6	7.72	46781	30.34
Composite 4	B	07	9/7/2017 10:31:00	12.4	92.7	7.69	46680	30.27
Composite 4	C	07	9/7/2017 10:31:23	12.4	100.2	7.81	46630	30.23
Composite 4	D	07	9/7/2017 10:31:48	12.4	100.2	7.79	46757	30.32
Composite 4	E	07	9/7/2017 10:32:10	12.3	100.2	7.86	46589	30.2
Composite 5	A	07	9/7/2017 10:32:25	12.4	95.4	7.76	46764	30.33
Composite 5	B	07	9/7/2017 10:32:46	12.4	96.3	7.73	46784	30.34
Composite 5	C	07	9/7/2017 10:33:05	12.3	100.5	7.78	46757	30.32
Composite 5	D	07	9/7/2017 10:33:31	12.3	98.6	7.78	46566	30.18
Composite 5	E	07	9/7/2017 10:34:09	12.2	99.1	7.76	46766	30.32
Composite 6	A	07	9/7/2017 10:34:23	12.1	97	7.75	46742	30.3
Composite 6	B	07	9/7/2017 10:34:38	12.2	91.6	7.7	46757	30.31
Composite 6	C	07	9/7/2017 10:34:56	12.1	92.1	7.67	46744	30.3
Composite 6	D	07	9/7/2017 10:35:10	12	97.7	7.72	46754	30.3
Composite 6	E	07	9/7/2017 10:35:37	12	97.5	7.74	46743	30.29
Composite 7	A	07	9/7/2017 10:36:05	12	94.3	7.69	46807	30.34
Composite 7	B	07	9/7/2017 10:36:18	12.2	93.7	7.68	46769	30.32
Composite 7	C	07	9/7/2017 10:36:28	12.3	94.9	7.68	46725	30.29
Composite 7	D	07	9/7/2017 10:36:42	12.4	95.8	7.7	46757	30.32
Composite 7	E	07	9/7/2017 10:37:04	12.4	90.1	7.64	46768	30.33
Composite 8	A	07	9/7/2017 10:37:25	12.5	91.7	7.66	46753	30.32
Composite 8	B	07	9/7/2017 10:37:51	12.3	94.9	7.68	46720	30.29
Composite 8	C	07	9/7/2017 10:38:01	12.3	93.3	7.67	46729	30.3
Composite 8	D	07	9/7/2017 10:38:24	12.3	89.3	7.64	46774	30.33
Composite 8	E	07	9/7/2017 10:38:39	12.3	91.8	7.65	46724	30.29

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	08	9/8/2017 09:30:59	12.3	93.7	7.72	44968	29.03
Laboratory Control	B	08	9/8/2017 09:31:25	12.3	95.4	7.73	44781	28.9
Laboratory Control	C	08	9/8/2017 09:31:55	12.3	93.3	7.7	44810	28.92
Laboratory Control	D	08	9/8/2017 09:32:23	12.3	92.5	7.69	44856	28.95
Laboratory Control	E	08	9/8/2017 09:32:47	12.3	97.3	7.73	44804	28.92
CLDS Reference Site	A	08	9/8/2017 09:33:10	12.3	92	7.72	44797	28.91
CLDS Reference Site	B	08	9/8/2017 09:33:39	12.3	93.4	7.72	44791	28.91
CLDS Reference Site	C	08	9/8/2017 09:34:07	12.3	98.2	7.76	44752	28.88
CLDS Reference Site	D	08	9/8/2017 09:34:28	12.3	97.5	7.76	44754	28.88
CLDS Reference Site	E	08	9/8/2017 09:34:51	12.3	100.2	7.8	44915	29
Composite 1	A	08	9/8/2017 09:35:29	12.4	91.7	7.73	44868	28.97
Composite 1	B	08	9/8/2017 09:35:52	12.4	94.8	7.74	44836	28.94
Composite 1	C	08	9/8/2017 09:36:16	12.3	96.7	7.76	44899	28.99
Composite 1	D	08	9/8/2017 09:36:42	12.3	100	7.81	44804	28.92
Composite 1	E	08	9/8/2017 09:37:04	12.3	94.5	7.76	44833	28.94
Composite 2	A	08	9/8/2017 09:37:23	12.3	95.1	7.77	44900	28.99
Composite 2	B	08	9/8/2017 09:37:47	12.3	99.5	7.81	44869	28.96
Composite 2	C	08	9/8/2017 09:38:10	12.3	99.7	7.81	44820	28.93
Composite 2	D	08	9/8/2017 09:38:28	12.3	96.9	7.78	44864	28.96
Composite 2	E	08	9/8/2017 09:38:51	12.3	97	7.78	44774	28.9
Composite 3	A	08	9/8/2017 09:39:11	12.3	91	7.73	45027	29.08
Composite 3	B	08	9/8/2017 09:39:33	12.3	96.7	7.75	44865	28.96
Composite 3	C	08	9/8/2017 09:41:06	12.4	98.2	7.78	44814	28.93
Composite 3	D	08	9/8/2017 09:41:24	12.4	95.9	7.76	44776	28.9
Composite 3	E	08	9/8/2017 09:41:52	12.4	97.1	7.77	44821	28.93
Composite 4	A	08	9/8/2017 09:42:14	12.4	96.1	7.76	44729	28.86
Composite 4	B	08	9/8/2017 09:42:38	12.4	91	7.72	44896	28.99
Composite 4	C	08	9/8/2017 09:43:07	12.4	99.9	7.83	45142	29.16
Composite 4	D	08	9/8/2017 09:43:39	12.3	100.7	7.83	44840	28.94
Composite 4	E	08	9/8/2017 09:44:04	12.3	100.4	7.84	44926	29
Composite 5	A	08	9/8/2017 09:44:31	12.3	95.1	7.76	44727	28.86
Composite 5	B	08	9/8/2017 09:44:53	12.3	96.6	7.76	44692	28.84
Composite 5	C	08	9/8/2017 09:45:19	12.3	100.5	7.81	44866	28.96
Composite 5	D	08	9/8/2017 09:45:39	12.3	98.5	7.8	45141	29.16
Composite 5	E	08	9/8/2017 09:46:27	12.3	98.5	7.79	44817	28.93
Composite 6	A	08	9/8/2017 09:46:44	12.3	95.9	7.77	45088	29.12
Composite 6	B	08	9/8/2017 09:47:07	12.3	90.6	7.72	44948	29.02
Composite 6	C	08	9/8/2017 09:47:22	12.2	92.6	7.71	44880	28.97
Composite 6	D	08	9/8/2017 09:47:43	12.2	97.8	7.76	44975	29.03
Composite 6	E	08	9/8/2017 09:48:02	12.2	97.1	7.76	44950	29.01
Composite 7	A	08	9/8/2017 09:48:45	12.1	93.2	7.71	44873	28.96
Composite 7	B	08	9/8/2017 09:49:02	12.2	93.4	7.7	44855	28.95
Composite 7	C	08	9/8/2017 09:49:26	12.3	95.6	7.72	44895	28.98
Composite 7	D	08	9/8/2017 09:49:44	12.4	96.4	7.73	44882	28.98
Composite 7	E	08	9/8/2017 09:50:10	12.4	89.7	7.67	44869	28.97
Composite 8	A	08	9/8/2017 09:50:39	12.5	91.5	7.69	44810	28.93
Composite 8	B	08	9/8/2017 09:51:03	12.4	95.2	7.7	44891	28.98
Composite 8	C	08	9/8/2017 09:51:20	12.4	93.1	7.7	45158	29.17
Composite 8	D	08	9/8/2017 09:51:41	12.3	88.9	7.69	44776	28.9
Composite 8	E	08	9/8/2017 09:52:02	12.3	89.3	7.68	44949	29.02

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	09	9/9/2017 10:25:23	12.4	91.9	7.7	45122	29.15
Laboratory Control	B	09	9/9/2017 10:26:15	12.4	92.3	7.71	45103	29.13
Laboratory Control	C	09	9/9/2017 10:26:32	12.4	93.9	7.7	45104	29.14
Laboratory Control	D	09	9/9/2017 10:26:50	12.4	91.9	7.67	45123	29.15
Laboratory Control	E	09	9/9/2017 10:27:14	12.4	97.8	7.72	45125	29.15
CLDS Reference Site	A	09	9/9/2017 10:27:39	12.4	91.4	7.7	45118	29.15
CLDS Reference Site	B	09	9/9/2017 10:28:06	12.4	93.4	7.69	45124	29.15
CLDS Reference Site	C	09	9/9/2017 10:28:24	12.5	97.8	7.73	45126	29.15
CLDS Reference Site	D	09	9/9/2017 10:28:46	12.4	97.5	7.74	45119	29.15
CLDS Reference Site	E	09	9/9/2017 10:29:16	12.4	99.8	7.79	45142	29.16
Composite 1	A	09	9/9/2017 10:29:41	12.5	92.5	7.73	45140	29.16
Composite 1	B	09	9/9/2017 10:30:04	12.4	94.9	7.72	45123	29.15
Composite 1	C	09	9/9/2017 10:30:34	12.4	96.2	7.74	45127	29.15
Composite 1	D	09	9/9/2017 10:30:52	12.4	100	7.78	45133	29.16
Composite 1	E	09	9/9/2017 10:31:13	12.4	93.8	7.74	45131	29.16
Composite 2	A	09	9/9/2017 10:31:33	12.4	93.8	7.74	45143	29.16
Composite 2	B	09	9/9/2017 10:31:55	12.4	98.9	7.79	45147	29.16
Composite 2	C	09	9/9/2017 10:32:27	12.4	98.9	7.79	45138	29.16
Composite 2	D	09	9/9/2017 10:32:48	12.4	96.4	7.76	45141	29.16
Composite 2	E	09	9/9/2017 10:33:13	12.5	95.9	7.76	45142	29.16
Composite 3	A	09	9/9/2017 10:33:30	12.4	90.6	7.71	45218	29.22
Composite 3	B	09	9/9/2017 10:33:55	12.5	95.4	7.74	45145	29.17
Composite 3	C	09	9/9/2017 10:35:21	12.5	97.8	7.76	45147	29.17
Composite 3	D	09	9/9/2017 10:35:54	12.5	96.3	7.74	45139	29.16
Composite 3	E	09	9/9/2017 10:36:17	12.5	97.4	7.75	45142	29.17
Composite 4	A	09	9/9/2017 10:36:40	12.5	96.4	7.74	45149	29.17
Composite 4	B	09	9/9/2017 10:37:00	12.5	91	7.7	45132	29.16
Composite 4	C	09	9/9/2017 10:37:23	12.4	100	7.79	45356	29.32
Composite 4	D	09	9/9/2017 10:37:49	12.4	100.4	7.82	45151	29.17
Composite 4	E	09	9/9/2017 10:38:12	12.4	99.9	7.82	45156	29.17
Composite 5	A	09	9/9/2017 10:38:38	12.5	95.2	7.74	45151	29.17
Composite 5	B	09	9/9/2017 10:39:05	12.5	96.7	7.74	45172	29.19
Composite 5	C	09	9/9/2017 10:39:22	12.4	100	7.78	45153	29.17
Composite 5	D	09	9/9/2017 10:39:40	12.4	98.1	7.78	45341	29.3
Composite 5	E	09	9/9/2017 10:40:26	12.4	98.9	7.78	45164	29.18
Composite 6	A	09	9/9/2017 10:40:44	12.3	96.4	7.75	45285	29.26
Composite 6	B	09	9/9/2017 10:41:08	12.3	91.9	7.71	45187	29.19
Composite 6	C	09	9/9/2017 10:41:30	12.3	92	7.68	45181	29.19
Composite 6	D	09	9/9/2017 10:41:50	12.2	97.4	7.73	45214	29.2
Composite 6	E	09	9/9/2017 10:42:12	12.1	97.2	7.75	45191	29.19
Composite 7	A	09	9/9/2017 10:42:57	12.1	93.7	7.69	45199	29.19
Composite 7	B	09	9/9/2017 10:43:26	12.2	92.7	7.67	45180	29.18
Composite 7	C	09	9/9/2017 10:43:55	12.3	94.7	7.7	45170	29.18
Composite 7	D	09	9/9/2017 10:44:10	12.4	96.9	7.71	45173	29.19
Composite 7	E	09	9/9/2017 10:44:29	12.5	91.1	7.66	45172	29.19
Composite 8	A	09	9/9/2017 10:44:49	12.6	90.9	7.66	45138	29.17
Composite 8	B	09	9/9/2017 10:45:15	12.5	93.4	7.67	45164	29.18
Composite 8	C	09	9/9/2017 10:45:38	12.4	93	7.67	45350	29.31
Composite 8	D	09	9/9/2017 10:46:01	12.5	85.5	7.64	45162	29.18
Composite 8	E	09	9/9/2017 10:46:21	12.4	88.3	7.65	45176	29.19

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	10	9/10/2017 11:23:07	12.5	97.6	7.73	46098	29.85
Laboratory Control	B	10	9/10/2017 11:23:32	12.5	98.8	7.73	46100	29.85
Laboratory Control	C	10	9/10/2017 11:23:53	12.5	94.1	7.69	46118	29.87
Laboratory Control	D	10	9/10/2017 11:24:08	12.5	94.8	7.69	46135	29.88
Laboratory Control	E	10	9/10/2017 11:24:44	12.5	99.2	7.74	46111	29.86
CLDS Reference Site	A	10	9/10/2017 11:25:02	12.4	94	7.7	46186	29.91
CLDS Reference Site	B	10	9/10/2017 11:25:15	12.6	96	7.71	46107	29.86
CLDS Reference Site	C	10	9/10/2017 11:25:35	12.5	99.9	7.75	46111	29.86
CLDS Reference Site	D	10	9/10/2017 11:25:50	12.4	98.8	7.76	46185	29.91
CLDS Reference Site	E	10	9/10/2017 11:26:09	12.5	100.1	7.79	46152	29.89
Composite 1	A	10	9/10/2017 11:26:50	12.6	93.3	7.72	46149	29.89
Composite 1	B	10	9/10/2017 11:27:02	12.5	95.9	7.73	46152	29.89
Composite 1	C	10	9/10/2017 11:27:14	12.5	97.8	7.75	46178	29.91
Composite 1	D	10	9/10/2017 11:27:30	12.5	100.8	7.79	46121	29.87
Composite 1	E	10	9/10/2017 11:27:48	12.5	96.2	7.75	46142	29.88
Composite 2	A	10	9/10/2017 11:28:03	12.5	96.3	7.75	46193	29.92
Composite 2	B	10	9/10/2017 11:28:49	12.5	99.8	7.81	46142	29.88
Composite 2	C	10	9/10/2017 11:29:04	12.5	100.3	7.82	46127	29.87
Composite 2	D	10	9/10/2017 11:29:18	12.4	98	7.78	46217	29.93
Composite 2	E	10	9/10/2017 11:29:30	12.5	98.1	7.78	46153	29.89
Composite 3	A	10	9/10/2017 11:29:45	12.4	94.5	7.74	46306	30
Composite 3	B	10	9/10/2017 11:30:00	12.5	97.7	7.76	46179	29.91
Composite 3	C	10	9/10/2017 11:30:59	12.5	98.9	7.78	46135	29.88
Composite 3	D	10	9/10/2017 11:31:13	12.6	98	7.77	46102	29.86
Composite 3	E	10	9/10/2017 11:31:27	12.6	98.1	7.77	46119	29.87
Composite 4	A	10	9/10/2017 11:31:39	12.6	98.6	7.77	46073	29.84
Composite 4	B	10	9/10/2017 11:31:56	12.5	93.2	7.72	46197	29.92
Composite 4	C	10	9/10/2017 11:32:16	12.5	100.2	7.8	46406	30.07
Composite 4	D	10	9/10/2017 11:33:12	12.4	100.9	7.84	46220	29.94
Composite 4	E	10	9/10/2017 11:33:28	12.5	100.1	7.83	46197	29.92
Composite 5	A	10	9/10/2017 11:33:50	12.6	96.1	7.76	46125	29.87
Composite 5	B	10	9/10/2017 11:34:02	12.6	98	7.76	46095	29.85
Composite 5	C	10	9/10/2017 11:34:14	12.5	100.3	7.79	46164	29.9
Composite 5	D	10	9/10/2017 11:34:29	12.4	98.2	7.78	46411	30.07
Composite 5	E	10	9/10/2017 11:35:26	12.4	99.8	7.79	46143	29.88
Composite 6	A	10	9/10/2017 11:35:48	12.3	95.9	7.75	46259	29.96
Composite 6	B	10	9/10/2017 11:36:04	12.4	93.1	7.72	46183	29.91
Composite 6	C	10	9/10/2017 11:36:25	12.2	88.1	7.65	46283	29.97
Composite 6	D	10	9/10/2017 11:36:38	12.3	97.2	7.72	46135	29.87
Composite 6	E	10	9/10/2017 11:37:00	12.2	98.3	7.74	46167	29.89
Composite 7	A	10	9/10/2017 11:38:05	12.1	94.6	7.7	46198	29.91
Composite 7	B	10	9/10/2017 11:38:23	12.3	94.3	7.69	46176	29.9
Composite 7	C	10	9/10/2017 11:38:46	12.4	95.6	7.71	46168	29.9
Composite 7	D	10	9/10/2017 11:39:03	12.5	97.5	7.73	46147	29.89
Composite 7	E	10	9/10/2017 11:39:20	12.6	93.2	7.69	46155	29.89
Composite 8	A	10	9/10/2017 11:39:35	12.6	93	7.69	46131	29.88
Composite 8	B	10	9/10/2017 11:40:26	12.6	95	7.71	46116	29.87
Composite 8	C	10	9/10/2017 11:40:35	12.5	93.6	7.7	46248	29.96
Composite 8	D	10	9/10/2017 11:40:55	12.6	90.4	7.68	46106	29.86
Composite 8	E	10	9/10/2017 11:41:14	12.5	91	7.69	46164	29.9

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	11	9/11/2017 10:23:31	12.4	94.6	7.75	45096	29.13
Laboratory Control	B	11	9/11/2017 10:23:47	12.4	96	7.75	45084	29.12
Laboratory Control	C	11	9/11/2017 10:24:05	12.4	94.3	7.73	45121	29.15
Laboratory Control	D	11	9/11/2017 10:24:17	12.4	93	7.72	45173	29.18
Laboratory Control	E	11	9/11/2017 10:24:56	12.4	96.8	7.75	45101	29.13
CLDS Reference Site	A	11	9/11/2017 10:25:13	12.4	93.8	7.74	45124	29.15
CLDS Reference Site	B	11	9/11/2017 10:25:28	12.4	93.8	7.74	45079	29.12
CLDS Reference Site	C	11	9/11/2017 10:25:45	12.4	97.4	7.77	45119	29.15
CLDS Reference Site	D	11	9/11/2017 10:26:02	12.4	97.3	7.77	45051	29.1
CLDS Reference Site	E	11	9/11/2017 10:26:19	12.4	98.6	7.8	45168	29.18
Composite 1	A	11	9/11/2017 10:27:02	12.5	91	7.73	45207	29.21
Composite 1	B	11	9/11/2017 10:27:24	12.5	94	7.73	45073	29.11
Composite 1	C	11	9/11/2017 10:27:37	12.4	95.9	7.75	45239	29.23
Composite 1	D	11	9/11/2017 10:27:50	12.4	99	7.8	45138	29.16
Composite 1	E	11	9/11/2017 10:28:05	12.4	94.4	7.76	45117	29.14
Composite 2	A	11	9/11/2017 10:28:25	12.4	95.2	7.76	45113	29.14
Composite 2	B	11	9/11/2017 10:29:17	12.4	98	7.82	45104	29.13
Composite 2	C	11	9/11/2017 10:29:41	12.4	98.6	7.82	45136	29.16
Composite 2	D	11	9/11/2017 10:29:59	12.4	96	7.79	45196	29.2
Composite 2	E	11	9/11/2017 10:30:15	12.4	96.4	7.79	45134	29.16
Composite 3	A	11	9/11/2017 10:30:31	12.4	95.1	7.76	45059	29.1
Composite 3	B	11	9/11/2017 10:30:45	12.4	96.3	7.77	45183	29.19
Composite 3	C	11	9/11/2017 10:31:49	12.5	96.9	7.79	45152	29.17
Composite 3	D	11	9/11/2017 10:32:08	12.5	95.4	7.77	45097	29.13
Composite 3	E	11	9/11/2017 10:32:27	12.5	95.7	7.77	45156	29.17
Composite 4	A	11	9/11/2017 10:32:49	12.5	95.7	7.77	45070	29.11
Composite 4	B	11	9/11/2017 10:33:13	12.5	90.8	7.73	45327	29.3
Composite 4	C	11	9/11/2017 10:33:35	12.5	98.3	7.8	45356	29.32
Composite 4	D	11	9/11/2017 10:34:31	12.4	98.7	7.83	45166	29.18
Composite 4	E	11	9/11/2017 10:34:55	12.4	98.2	7.83	45631	29.51
Composite 5	A	11	9/11/2017 10:35:19	12.4	94.8	7.76	45135	29.16
Composite 5	B	11	9/11/2017 10:35:34	12.4	96	7.77	45051	29.1
Composite 5	C	11	9/11/2017 10:35:55	12.4	98.7	7.81	45151	29.17
Composite 5	D	11	9/11/2017 10:36:08	12.4	96.8	7.79	45841	29.66
Composite 5	E	11	9/11/2017 10:37:06	12.3	97.7	7.8	45164	29.17
Composite 6	A	11	9/11/2017 10:37:24	12.3	95.3	7.77	45376	29.32
Composite 6	B	11	9/11/2017 10:37:37	12.3	92.1	7.73	45197	29.2
Composite 6	C	11	9/11/2017 10:37:50	12.2	92.4	7.72	45078	29.11
Composite 6	D	11	9/11/2017 10:38:05	12.2	96.4	7.75	45123	29.14
Composite 6	E	11	9/11/2017 10:38:23	12.1	96.3	7.76	45175	29.18
Composite 7	A	11	9/11/2017 10:38:57	12.1	92	7.71	45157	29.16
Composite 7	B	11	9/11/2017 10:39:07	12.3	92.4	7.71	45086	29.12
Composite 7	C	11	9/11/2017 10:39:18	12.4	93.5	7.71	45399	29.34
Composite 7	D	11	9/11/2017 10:39:36	12.4	95.9	7.74	45134	29.16
Composite 7	E	11	9/11/2017 10:39:49	12.5	91.4	7.7	45233	29.23
Composite 8	A	11	9/11/2017 10:39:59	12.5	90.8	7.7	45181	29.2
Composite 8	B	11	9/11/2017 10:40:52	12.4	92.4	7.72	45094	29.13
Composite 8	C	11	9/11/2017 10:41:01	12.4	91.2	7.7	45467	29.4
Composite 8	D	11	9/11/2017 10:41:15	12.4	87	7.69	45067	29.11
Composite 8	E	11	9/11/2017 10:41:26	12.4	88.2	7.7	45213	29.21

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	12	9/12/2017 09:18:50	12.4	96	7.77	44880	28.97
Laboratory Control	B	12	9/12/2017 09:19:08	12.4	97.4	7.78	44860	28.96
Laboratory Control	C	12	9/12/2017 09:19:31	12.4	96.1	7.76	44881	28.97
Laboratory Control	D	12	9/12/2017 09:19:54	12.4	94.6	7.76	44855	28.96
Laboratory Control	E	12	9/12/2017 09:20:14	12.4	99.4	7.78	44853	28.95
CLDS Reference Site	A	12	9/12/2017 09:20:35	12.4	93.6	7.77	44855	28.96
CLDS Reference Site	B	12	9/12/2017 09:20:53	12.4	95.7	7.78	44924	29.01
CLDS Reference Site	C	12	9/12/2017 09:21:16	12.4	99.9	7.8	44896	28.99
CLDS Reference Site	D	12	9/12/2017 09:21:41	12.4	98.8	7.8	44903	28.99
CLDS Reference Site	E	12	9/12/2017 09:22:05	12.4	100.9	7.82	44883	28.98
Composite 1	A	12	9/12/2017 09:22:31	12.5	93.5	7.77	44802	28.92
Composite 1	B	12	9/12/2017 09:22:55	12.4	95.4	7.78	44919	29
Composite 1	C	12	9/12/2017 09:23:15	12.4	97.6	7.78	44783	28.91
Composite 1	D	12	9/12/2017 09:23:38	12.4	100.4	7.82	44860	28.96
Composite 1	E	12	9/12/2017 09:23:59	12.4	95.4	7.8	44890	28.98
Composite 2	A	12	9/12/2017 09:24:20	12.4	96.9	7.8	44667	28.82
Composite 2	B	12	9/12/2017 09:24:45	12.4	100.9	7.82	44884	28.98
Composite 2	C	12	9/12/2017 09:25:12	12.4	99.9	7.83	44837	28.94
Composite 2	D	12	9/12/2017 09:26:21	12.4	95.7	7.8	44962	29.03
Composite 2	E	12	9/12/2017 09:26:45	12.4	98.9	7.81	44851	28.95
Composite 3	A	12	9/12/2017 09:27:02	12.5	96.6	7.79	44942	29.02
Composite 3	B	12	9/12/2017 09:27:22	12.4	98.1	7.8	44926	29.01
Composite 3	C	12	9/12/2017 09:30:06	12.5	99.6	7.81	44896	28.99
Composite 3	D	12	9/12/2017 09:30:56	12.5	98.2	7.8	44935	29.02
Composite 3	E	12	9/12/2017 09:31:19	12.5	96.8	7.79	44904	28.99
Composite 4	A	12	9/12/2017 09:31:43	12.5	97.4	7.8	44983	29.05
Composite 4	B	12	9/12/2017 09:31:59	12.5	94.9	7.78	44836	28.95
Composite 4	C	12	9/12/2017 09:32:18	12.5	100.9	7.81	44831	28.94
Composite 4	D	12	9/12/2017 09:32:45	12.4	100.2	7.83	44884	28.98
Composite 4	E	12	9/12/2017 09:33:11	12.4	101	7.83	44807	28.92
Composite 5	A	12	9/12/2017 09:33:33	12.5	96.9	7.79	44982	29.05
Composite 5	B	12	9/12/2017 09:33:50	12.5	98	7.8	44990	29.06
Composite 5	C	12	9/12/2017 09:34:05	12.4	101.4	7.82	44923	29.01
Composite 5	D	12	9/12/2017 09:34:27	12.4	99.2	7.8	44972	29.04
Composite 5	E	12	9/12/2017 09:35:14	12.3	100.5	7.8	44889	28.98
Composite 6	A	12	9/12/2017 09:35:29	12.3	98.5	7.78	44848	28.95
Composite 6	B	12	9/12/2017 09:35:48	12.3	94	7.75	44919	29
Composite 6	C	12	9/12/2017 09:36:17	12.3	92.9	7.74	44967	29.03
Composite 6	D	12	9/12/2017 09:36:35	12.2	98.9	7.77	44979	29.04
Composite 6	E	12	9/12/2017 09:37:00	12.2	99.2	7.79	44963	29.03
Composite 7	A	12	9/12/2017 09:37:44	12.2	94.8	7.75	44984	29.04
Composite 7	B	12	9/12/2017 09:38:01	12.3	94.9	7.73	44984	29.04
Composite 7	C	12	9/12/2017 09:38:16	12.3	95.6	7.74	44911	28.99
Composite 7	D	12	9/12/2017 09:38:36	12.4	98.4	7.76	44964	29.04
Composite 7	E	12	9/12/2017 09:38:51	12.5	93.4	7.74	44937	29.02
Composite 8	A	12	9/12/2017 09:39:14	12.5	93.7	7.74	44920	29.01
Composite 8	B	12	9/12/2017 09:39:41	12.5	94.2	7.75	44977	29.05
Composite 8	C	12	9/12/2017 09:39:55	12.5	93	7.74	44808	28.93
Composite 8	D	12	9/12/2017 09:40:14	12.5	87.5	7.74	44999	29.06
Composite 8	E	12	9/12/2017 09:40:39	12.4	92	7.74	44887	28.98

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	13	9/13/2017 09:34:02	12.5	91.9	7.82	46302	30
Laboratory Control	B	13	9/13/2017 09:34:20	12.5	94.1	7.83	46306	30
Laboratory Control	C	13	9/13/2017 09:34:41	12.4	93.5	7.82	46291	29.99
Laboratory Control	D	13	9/13/2017 09:34:58	12.4	91.5	7.82	46297	29.99
Laboratory Control	E	13	9/13/2017 09:35:34	12.4	95.7	7.83	46309	30
CLDS Reference Site	A	13	9/13/2017 09:35:50	12.4	92.3	7.82	46293	29.99
CLDS Reference Site	B	13	9/13/2017 09:36:03	12.5	91.8	7.82	46357	30.04
CLDS Reference Site	C	13	9/13/2017 09:36:20	12.4	96.8	7.85	46303	30
CLDS Reference Site	D	13	9/13/2017 09:36:37	12.5	95.8	7.85	46328	30.02
CLDS Reference Site	E	13	9/13/2017 09:36:53	12.4	98.1	7.86	46275	29.98
Composite 1	A	13	9/13/2017 09:37:19	12.5	90	7.82	46246	29.96
Composite 1	B	13	9/13/2017 09:37:37	12.5	93.3	7.83	46333	30.02
Composite 1	C	13	9/13/2017 09:37:50	12.4	95.1	7.83	46197	29.92
Composite 1	D	13	9/13/2017 09:38:10	12.4	98.3	7.86	46292	29.99
Composite 1	E	13	9/13/2017 09:38:28	12.5	92.3	7.84	46319	30.01
Composite 2	A	13	9/13/2017 09:38:47	12.5	93.9	7.84	46309	30
Composite 2	B	13	9/13/2017 09:40:05	12.4	97.8	7.87	46331	30.02
Composite 2	C	13	9/13/2017 09:40:29	12.4	98.1	7.87	46310	30
Composite 2	D	13	9/13/2017 09:40:56	12.4	95.4	7.85	46355	30.03
Composite 2	E	13	9/13/2017 09:41:17	12.4	95.8	7.85	46273	29.97
Composite 3	A	13	9/13/2017 09:41:38	12.5	93.9	7.84	46329	30.02
Composite 3	B	13	9/13/2017 09:41:59	12.5	95	7.84	46341	30.03
Composite 3	C	13	9/13/2017 09:44:20	12.5	96.7	7.85	46271	29.98
Composite 3	D	13	9/13/2017 09:44:41	12.5	94.6	7.85	46341	30.03
Composite 3	E	13	9/13/2017 09:44:59	12.5	95.7	7.84	46300	30
Composite 4	A	13	9/13/2017 09:45:23	12.5	95.4	7.85	46346	30.03
Composite 4	B	13	9/13/2017 09:45:41	12.5	91.3	7.81	46208	29.93
Composite 4	C	13	9/13/2017 09:46:06	12.5	98.2	7.85	46172	29.9
Composite 4	D	13	9/13/2017 09:46:57	12.4	98.5	7.87	46292	29.99
Composite 4	E	13	9/13/2017 09:47:27	12.4	98	7.85	45970	29.76
Composite 5	A	13	9/13/2017 09:48:04	12.5	93.9	7.82	46323	30.01
Composite 5	B	13	9/13/2017 09:48:17	12.5	95.2	7.84	46374	30.05
Composite 5	C	13	9/13/2017 09:48:33	12.5	98.2	7.85	46331	30.02
Composite 5	D	13	9/13/2017 09:48:51	12.4	96.7	7.82	45905	29.71
Composite 5	E	13	9/13/2017 09:49:58	12.4	97	7.85	46330	30.01
Composite 6	A	13	9/13/2017 09:50:17	12.3	95	7.8	45940	29.73
Composite 6	B	13	9/13/2017 09:50:33	12.3	90.9	7.79	46326	30.01
Composite 6	C	13	9/13/2017 09:50:48	12.3	91.1	7.78	46361	30.03
Composite 6	D	13	9/13/2017 09:51:10	12.2	96.5	7.82	46370	30.04
Composite 6	E	13	9/13/2017 09:51:26	12.2	95.6	7.82	46339	30.01
Composite 7	A	13	9/13/2017 09:52:17	12.1	92	7.78	46354	30.02
Composite 7	B	13	9/13/2017 09:52:29	12.2	92.5	7.78	46347	30.02
Composite 7	C	13	9/13/2017 09:52:45	12.3	93.5	7.77	46246	29.95
Composite 7	D	13	9/13/2017 09:52:55	12.4	94.6	7.78	46346	30.03
Composite 7	E	13	9/13/2017 09:53:11	12.5	89.2	7.76	46350	30.03
Composite 8	A	13	9/13/2017 09:53:22	12.5	90	7.78	46347	30.03
Composite 8	B	13	9/13/2017 09:53:53	12.5	90.4	7.8	46330	30.02
Composite 8	C	13	9/13/2017 09:54:11	12.4	82.3	7.75	46136	29.88
Composite 8	D	13	9/13/2017 09:54:27	12.5	89.2	7.79	46383	30.06
Composite 8	E	13	9/13/2017 09:54:38	12.4	88.9	7.79	46279	29.98

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	14	9/14/2017 09:48:07	12.3	93	7.82	46013	29.78
Laboratory Control	B	14	9/14/2017 09:48:30	12.3	95.6	7.83	46023	29.79
Laboratory Control	C	14	9/14/2017 09:48:53	12.3	94.9	7.81	46019	29.79
Laboratory Control	D	14	9/14/2017 09:49:12	12.3	92	7.8	46026	29.79
Laboratory Control	E	14	9/14/2017 09:49:35	12.3	97.8	7.82	46036	29.8
CLDS Reference Site	A	14	9/14/2017 09:49:54	12.3	94	7.81	46009	29.78
CLDS Reference Site	B	14	9/14/2017 09:50:11	12.3	94.3	7.81	46038	29.8
CLDS Reference Site	C	14	9/14/2017 09:50:33	12.3	98.4	7.84	46025	29.79
CLDS Reference Site	D	14	9/14/2017 09:51:00	12.3	98.2	7.84	46030	29.8
CLDS Reference Site	E	14	9/14/2017 09:51:20	12.3	100.3	7.85	46019	29.79
Composite 1	A	14	9/14/2017 09:51:52	12.4	91.7	7.81	46026	29.8
Composite 1	B	14	9/14/2017 09:52:17	12.3	95.6	7.82	46048	29.81
Composite 1	C	14	9/14/2017 09:52:44	12.3	97.7	7.82	45952	29.74
Composite 1	D	14	9/14/2017 09:53:05	12.3	100.4	7.86	46008	29.78
Composite 1	E	14	9/14/2017 09:53:26	12.3	95.5	7.84	46046	29.81
Composite 2	A	14	9/14/2017 09:53:38	12.3	96.2	7.83	46018	29.79
Composite 2	B	14	9/14/2017 09:54:03	12.3	100.2	7.86	46049	29.81
Composite 2	C	14	9/14/2017 09:54:28	12.3	100.7	7.86	46033	29.8
Composite 2	D	14	9/14/2017 09:54:50	12.3	97.3	7.84	46055	29.81
Composite 2	E	14	9/14/2017 09:55:06	12.3	97.7	7.84	46035	29.8
Composite 3	A	14	9/14/2017 09:55:23	12.4	95.2	7.82	46037	29.8
Composite 3	B	14	9/14/2017 09:55:38	12.4	96.3	7.83	46053	29.81
Composite 3	C	14	9/14/2017 09:56:52	12.4	98.5	7.84	46050	29.81
Composite 3	D	14	9/14/2017 09:57:31	12.4	96.5	7.83	46052	29.81
Composite 3	E	14	9/14/2017 09:57:54	12.4	97.7	7.83	46052	29.81
Composite 4	A	14	9/14/2017 09:58:12	12.4	96.8	7.84	46066	29.83
Composite 4	B	14	9/14/2017 09:58:36	12.4	93.6	7.8	45977	29.76
Composite 4	C	14	9/14/2017 10:00:33	12.4	108.5	7.85	46063	29.82
Composite 4	D	14	9/14/2017 10:00:59	12.3	104.7	7.86	46063	29.82
Composite 4	E	14	9/14/2017 10:01:20	12.3	102.8	7.85	45925	29.72
Composite 5	A	14	9/14/2017 10:01:42	12.3	97.4	7.82	46061	29.82
Composite 5	B	14	9/14/2017 10:02:09	12.3	98.6	7.83	46078	29.83
Composite 5	C	14	9/14/2017 10:02:31	12.3	101.4	7.85	46074	29.83
Composite 5	D	14	9/14/2017 10:03:05	12.3	99.4	7.84	45966	29.75
Composite 5	E	14	9/14/2017 10:03:52	12.2	100.2	7.85	46097	29.84
Composite 6	A	14	9/14/2017 10:04:14	12.2	97.3	7.8	45898	29.7
Composite 6	B	14	9/14/2017 10:04:30	12.2	92.9	7.79	46106	29.85
Composite 6	C	14	9/14/2017 10:04:42	12.1	93.3	7.78	46112	29.85
Composite 6	D	14	9/14/2017 10:05:01	12.1	97.6	7.81	46105	29.84
Composite 6	E	14	9/14/2017 10:05:15	12	97.7	7.81	46082	29.82
Composite 7	A	14	9/14/2017 10:05:50	11.9	93.8	7.78	46112	29.84
Composite 7	B	14	9/14/2017 10:06:12	12.1	94.2	7.77	46108	29.84
Composite 7	C	14	9/14/2017 10:06:24	12.2	95.3	7.77	46076	29.82
Composite 7	D	14	9/14/2017 10:06:47	12.3	96.9	7.79	46097	29.84
Composite 7	E	14	9/14/2017 10:07:00	12.4	93.2	7.79	46097	29.85
Composite 8	A	14	9/14/2017 10:07:21	12.4	92.6	7.79	46087	29.84
Composite 8	B	14	9/14/2017 10:07:47	12.4	91.4	7.79	46078	29.83
Composite 8	C	14	9/14/2017 10:08:14	12.4	80.3	7.71	45919	29.72
Composite 8	D	14	9/14/2017 10:08:33	12.3	91	7.77	46101	29.85
Composite 8	E	14	9/14/2017 10:08:48	12.3	90.4	7.78	46062	29.82

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	15	9/15/2017 08:18:10	12.9	86.4	7.64	45337	29.32
Laboratory Control	B	15	9/15/2017 08:18:33	13.2	88.5	7.66	45208	29.24
Laboratory Control	C	15	9/15/2017 08:19:03	13.3	86.8	7.65	45220	29.25
Laboratory Control	D	15	9/15/2017 08:19:30	13.2	85.8	7.65	45228	29.25
Laboratory Control	E	15	9/15/2017 08:20:10	13.2	91.2	7.68	45232	29.25
CLDS Reference Site	A	15	9/15/2017 08:20:30	13.2	86.4	7.66	45234	29.25
CLDS Reference Site	B	15	9/15/2017 08:20:57	13.4	85.7	7.65	45176	29.22
CLDS Reference Site	C	15	9/15/2017 08:21:20	13.3	92.1	7.69	45229	29.26
CLDS Reference Site	D	15	9/15/2017 08:21:48	13.4	90.7	7.69	45196	29.23
CLDS Reference Site	E	15	9/15/2017 08:22:08	13	93.7	7.71	45335	29.32
Composite 1	A	15	9/15/2017 08:22:41	13	84.8	7.67	45248	29.26
Composite 1	B	15	9/15/2017 08:23:00	13.1	88.3	7.67	45215	29.24
Composite 1	C	15	9/15/2017 08:23:18	12.6	91.8	7.68	45495	29.42
Composite 1	D	15	9/15/2017 08:23:56	12.9	95.1	7.74	45284	29.28
Composite 1	E	15	9/15/2017 08:24:20	13.2	87.1	7.69	45206	29.24
Composite 2	A	15	9/15/2017 08:24:43	13.3	88.8	7.69	45225	29.25
Composite 2	B	15	9/15/2017 08:25:14	13.3	94.2	7.73	45179	29.22
Composite 2	C	15	9/15/2017 08:25:43	13.2	94.7	7.73	45249	29.27
Composite 2	D	15	9/15/2017 08:26:21	13.3	91.4	7.7	45207	29.24
Composite 2	E	15	9/15/2017 08:26:38	13.1	91.4	7.7	45308	29.31
Composite 3	A	15	9/15/2017 08:26:58	13.3	88.6	7.68	45222	29.25
Composite 3	B	15	9/15/2017 08:27:18	13.3	90	7.69	45225	29.25
Composite 3	C	15	9/15/2017 08:27:54	12.9	93.3	7.71	45248	29.26
Composite 3	D	15	9/15/2017 08:28:13	13.3	90.1	7.7	45200	29.23
Composite 3	E	15	9/15/2017 08:28:32	13.2	91.9	7.7	45255	29.27
Composite 4	A	15	9/15/2017 08:28:55	13.4	90.4	7.7	45189	29.23
Composite 4	B	15	9/15/2017 08:29:20	12.8	87.6	7.67	45484	29.42
Composite 4	C	15	9/15/2017 08:29:46	13.1	94.8	7.72	45295	29.3
Composite 4	D	15	9/15/2017 08:30:10	13.2	94.5	7.74	45254	29.27
Composite 4	E	15	9/15/2017 08:30:33	12.7	94.9	7.73	45482	29.42
Composite 5	A	15	9/15/2017 08:30:56	13.3	88.8	7.7	45247	29.27
Composite 5	B	15	9/15/2017 08:31:16	13.5	90.8	7.7	45172	29.22
Composite 5	C	15	9/15/2017 08:31:40	13.1	95.2	7.73	45292	29.29
Composite 5	D	15	9/15/2017 08:31:59	12.6	93.9	7.73	45479	29.41
Composite 5	E	15	9/15/2017 08:32:29	12.8	93.5	7.73	45285	29.28
Composite 6	A	15	9/15/2017 08:32:44	12.1	92.2	7.68	45675	29.53
Composite 6	B	15	9/15/2017 08:33:04	12.9	85.1	7.65	45267	29.27
Composite 6	C	15	9/15/2017 08:33:24	12.4	86	7.63	45453	29.38
Composite 6	D	15	9/15/2017 08:33:49	12.5	92	7.67	45305	29.28
Composite 6	E	15	9/15/2017 08:34:08	11.8	92.8	7.69	45625	29.48
Composite 7	A	15	9/15/2017 08:34:29	12.2	87.7	7.65	45305	29.27
Composite 7	B	15	9/15/2017 08:34:54	12.5	87.2	7.63	45327	29.3
Composite 7	C	15	9/15/2017 08:35:10	12.5	90.3	7.64	45390	29.34
Composite 7	D	15	9/15/2017 08:35:25	12.7	90.7	7.65	45255	29.25
Composite 7	E	15	9/15/2017 08:35:47	12.9	84.6	7.63	45185	29.21
Composite 8	A	15	9/15/2017 08:36:11	12.8	85.9	7.65	45289	29.28
Composite 8	B	15	9/15/2017 08:36:37	13.1	84.5	7.65	45286	29.29
Composite 8	C	15	9/15/2017 08:37:05	12.7	84	7.64	45511	29.44
Composite 8	D	15	9/15/2017 08:37:35	13.4	83.1	7.65	45195	29.23
Composite 8	E	15	9/15/2017 08:37:57	12.7	82.4	7.66	45443	29.39

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	16	9/16/2017 09:04:06	12.8	94.7	7.8	45373	29.34
Laboratory Control	B	16	9/16/2017 09:04:26	12.7	95.8	7.8	45311	29.3
Laboratory Control	C	16	9/16/2017 09:04:45	12.9	94.5	7.79	45355	29.33
Laboratory Control	D	16	9/16/2017 09:05:09	12.7	94.2	7.78	45345	29.32
Laboratory Control	E	16	9/16/2017 09:05:32	12.7	97	7.81	45349	29.32
CLDS Reference Site	A	16	9/16/2017 09:05:51	12.7	93.4	7.79	45351	29.32
CLDS Reference Site	B	16	9/16/2017 09:06:16	12.8	93.3	7.79	45356	29.33
CLDS Reference Site	C	16	9/16/2017 09:06:33	12.8	96.8	7.83	45349	29.32
CLDS Reference Site	D	16	9/16/2017 09:06:55	12.8	95.3	7.83	45353	29.33
CLDS Reference Site	E	16	9/16/2017 09:07:18	12.7	98.4	7.87	45368	29.34
Composite 1	A	16	9/16/2017 09:07:48	12.7	90.5	7.8	45328	29.31
Composite 1	B	16	9/16/2017 09:08:09	12.7	95	7.81	45373	29.34
Composite 1	C	16	9/16/2017 09:08:34	12.7	95.9	7.83	45337	29.31
Composite 1	D	16	9/16/2017 09:08:59	12.7	98.8	7.88	45352	29.32
Composite 1	E	16	9/16/2017 09:09:28	12.8	91	7.82	45359	29.33
Composite 2	A	16	9/16/2017 09:09:50	12.8	93.8	7.83	45374	29.34
Composite 2	B	16	9/16/2017 09:10:26	12.7	98.6	7.88	45356	29.33
Composite 2	C	16	9/16/2017 09:10:50	12.8	98.4	7.89	45341	29.32
Composite 2	D	16	9/16/2017 09:11:07	12.8	96.3	7.86	45393	29.36
Composite 2	E	16	9/16/2017 09:11:22	12.6	96.5	7.86	45320	29.3
Composite 3	A	16	9/16/2017 09:11:39	12.8	91.5	7.81	45367	29.34
Composite 3	B	16	9/16/2017 09:12:04	12.9	95.3	7.83	45378	29.35
Composite 3	C	16	9/16/2017 09:17:30	12.9	98.1	7.86	45396	29.36
Composite 3	D	16	9/16/2017 09:17:51	12.8	95.8	7.85	45354	29.33
Composite 3	E	16	9/16/2017 09:18:12	12.7	97.2	7.85	45341	29.32
Composite 4	A	16	9/16/2017 09:18:38	12.7	94.9	7.86	45337	29.31
Composite 4	B	16	9/16/2017 09:19:00	12.6	91	7.81	45380	29.34
Composite 4	C	16	9/16/2017 09:19:23	12.6	98.6	7.87	45348	29.32
Composite 4	D	16	9/16/2017 09:19:50	12.7	99.1	7.89	45357	29.33
Composite 4	E	16	9/16/2017 09:20:15	12.7	98.1	7.89	45356	29.33
Composite 5	A	16	9/16/2017 09:20:32	13	94.4	7.85	45352	29.33
Composite 5	B	16	9/16/2017 09:20:48	12.9	95	7.85	45358	29.33
Composite 5	C	16	9/16/2017 09:21:11	12.7	99	7.9	45359	29.33
Composite 5	D	16	9/16/2017 09:22:00	12.6	95.7	7.89	45376	29.34
Composite 5	E	16	9/16/2017 09:22:40	12.2	97.8	7.88	45385	29.33
Composite 6	A	16	9/16/2017 09:23:07	12.1	92.4	7.81	45483	29.39
Composite 6	B	16	9/16/2017 09:23:27	12.1	88.4	7.76	45383	29.33
Composite 6	C	16	9/16/2017 09:23:48	12.3	89.8	7.76	45404	29.34
Composite 6	D	16	9/16/2017 09:24:05	12.1	96.4	7.81	45421	29.35
Composite 6	E	16	9/16/2017 09:24:20	11.9	97.1	7.82	45419	29.34
Composite 7	A	16	9/16/2017 09:24:55	11.9	92.4	7.78	45424	29.34
Composite 7	B	16	9/16/2017 09:25:27	12.1	91.1	7.75	45392	29.33
Composite 7	C	16	9/16/2017 09:25:49	12.2	93.6	7.77	45365	29.32
Composite 7	D	16	9/16/2017 09:26:12	12.5	94.9	7.8	45380	29.33
Composite 7	E	16	9/16/2017 09:26:30	12.6	90.4	7.76	45375	29.34
Composite 8	A	16	9/16/2017 09:26:50	12.7	91.2	7.79	45384	29.35
Composite 8	B	16	9/16/2017 09:27:19	12.8	87.6	7.79	45364	29.34
Composite 8	C	16	9/16/2017 09:27:38	12.7	89.1	7.78	45354	29.33
Composite 8	D	16	9/16/2017 09:27:59	12.9	87.3	7.78	45350	29.33
Composite 8	E	16	9/16/2017 09:28:16	12.6	87.1	7.79	45363	29.33

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	17	9/17/2017 11:02:02	12.8	93.4	7.71	47140	30.61
Laboratory Control	B	17	9/17/2017 11:02:18	12.8	94.6	7.72	47086	30.57
Laboratory Control	C	17	9/17/2017 11:02:30	12.9	94.4	7.71	47133	30.61
Laboratory Control	D	17	9/17/2017 11:02:45	12.8	91.8	7.7	47105	30.59
Laboratory Control	E	17	9/17/2017 11:03:18	12.8	95.6	7.73	47133	30.61
CLDS Reference Site	A	17	9/17/2017 11:03:35	12.8	91.7	7.7	47135	30.61
CLDS Reference Site	B	17	9/17/2017 11:03:47	12.8	92.5	7.71	47106	30.59
CLDS Reference Site	C	17	9/17/2017 11:03:59	12.8	95.9	7.73	47106	30.59
CLDS Reference Site	D	17	9/17/2017 11:04:07	12.8	96.7	7.74	47111	30.59
CLDS Reference Site	E	17	9/17/2017 11:04:18	12.8	97.5	7.76	47133	30.61
Composite 1	A	17	9/17/2017 11:04:40	12.6	89.7	7.71	46975	30.49
Composite 1	B	17	9/17/2017 11:04:56	12.6	94.2	7.72	47124	30.59
Composite 1	C	17	9/17/2017 11:05:05	12.6	95.4	7.74	47077	30.56
Composite 1	D	17	9/17/2017 11:05:14	12.7	97.8	7.77	47124	30.6
Composite 1	E	17	9/17/2017 11:05:31	12.8	93.5	7.74	47139	30.61
Composite 2	A	17	9/17/2017 11:05:45	12.7	94.1	7.74	47086	30.57
Composite 2	B	17	9/17/2017 11:06:09	12.7	98.5	7.79	47126	30.6
Composite 2	C	17	9/17/2017 11:07:13	12.8	98.3	7.79	47129	30.6
Composite 2	D	17	9/17/2017 11:07:35	12.9	95.1	7.75	47155	30.63
Composite 2	E	17	9/17/2017 11:07:51	12.6	96.8	7.78	46934	30.46
Composite 3	A	17	9/17/2017 11:08:12	12.8	96.9	7.77	47106	30.59
Composite 3	B	17	9/17/2017 11:08:35	12.9	92.6	7.72	47134	30.61
Composite 3	C	17	9/17/2017 11:08:51	13	94.7	7.73	47167	30.64
Composite 3	D	17	9/17/2017 11:10:34	12.9	96.2	7.75	47159	30.63
Composite 3	E	17	9/17/2017 11:10:45	12.8	95.8	7.76	47117	30.6
Composite 4	A	17	9/17/2017 11:10:58	12.6	96.2	7.77	46993	30.5
Composite 4	B	17	9/17/2017 11:11:09	12.6	96	7.77	46971	30.48
Composite 4	C	17	9/17/2017 11:11:27	12.5	91.4	7.75	46732	30.31
Composite 4	D	17	9/17/2017 11:11:46	12.5	98.9	7.79	46936	30.46
Composite 4	E	17	9/17/2017 11:12:42	12.7	98.3	7.81	47108	30.58
Composite 5	A	17	9/17/2017 11:13:26	12.9	93.6	7.75	47182	30.65
Composite 5	B	17	9/17/2017 11:13:46	12.9	95.9	7.76	47156	30.63
Composite 5	C	17	9/17/2017 11:14:08	12.6	99.3	7.81	47080	30.56
Composite 5	D	17	9/17/2017 11:14:22	12.5	97.7	7.8	47013	30.51
Composite 5	E	17	9/17/2017 11:15:31	12.5	92.4	7.79	47145	30.6
Composite 6	A	17	9/17/2017 11:15:45	12.1	95.6	7.76	46678	30.25
Composite 6	B	17	9/17/2017 11:16:06	12.1	83	7.66	46864	30.39
Composite 6	C	17	9/17/2017 11:16:25	11.9	82	7.62	46568	30.16
Composite 6	D	17	9/17/2017 11:16:45	11.8	95	7.71	46616	30.19
Composite 6	E	17	9/17/2017 11:16:57	11.7	95.8	7.73	46587	30.17
Composite 7	A	17	9/17/2017 11:18:17	11.7	91.6	7.69	46743	30.28
Composite 7	B	17	9/17/2017 11:18:39	11.9	92.8	7.68	46713	30.27
Composite 7	C	17	9/17/2017 11:18:50	12.1	92.2	7.68	46502	30.13
Composite 7	D	17	9/17/2017 11:19:02	12.4	94.6	7.7	47124	30.58
Composite 7	E	17	9/17/2017 11:19:18	12.4	91.4	7.68	47004	30.5
Composite 8	A	17	9/17/2017 11:19:27	12.5	91.9	7.7	47174	30.63
Composite 8	B	17	9/17/2017 11:20:57	13	89.7	7.7	47185	30.65
Composite 8	C	17	9/17/2017 11:21:08	12.8	89.5	7.71	47093	30.58
Composite 8	D	17	9/17/2017 11:21:17	12.8	89.4	7.71	47136	30.61
Composite 8	E	17	9/17/2017 11:21:32	12.5	88.4	7.73	46996	30.5

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	18	9/18/2017 11:33:29	12.8	94.3	7.75	46989	30.5
Laboratory Control	B	18	9/18/2017 11:33:58	12.8	96.6	7.76	46983	30.5
Laboratory Control	C	18	9/18/2017 11:34:29	13.1	94.3	7.75	46986	30.51
Laboratory Control	D	18	9/18/2017 11:34:43	12.8	92.7	7.73	46987	30.5
Laboratory Control	E	18	9/18/2017 11:35:14	12.9	97.6	7.77	46989	30.51
CLDS Reference Site	A	18	9/18/2017 11:35:35	12.8	92.9	7.75	46982	30.5
CLDS Reference Site	B	18	9/18/2017 11:35:55	12.9	93.6	7.75	46985	30.5
CLDS Reference Site	C	18	9/18/2017 11:36:12	12.9	97.9	7.79	46978	30.5
CLDS Reference Site	D	18	9/18/2017 11:36:28	12.8	98.3	7.8	46979	30.5
CLDS Reference Site	E	18	9/18/2017 11:36:45	12.8	99.7	7.82	47000	30.51
Composite 1	A	18	9/18/2017 11:37:54	12.8	91.7	7.75	46991	30.5
Composite 1	B	18	9/18/2017 11:38:11	12.8	95.3	7.77	46995	30.51
Composite 1	C	18	9/18/2017 11:38:28	12.8	97.2	7.79	47037	30.54
Composite 1	D	18	9/18/2017 11:38:44	12.8	100.3	7.83	46973	30.49
Composite 1	E	18	9/18/2017 11:39:08	12.9	94.2	7.78	46999	30.52
Composite 2	A	18	9/18/2017 11:39:25	12.8	95.9	7.79	46961	30.48
Composite 2	B	18	9/18/2017 11:40:14	12.7	100.1	7.86	46979	30.49
Composite 2	C	18	9/18/2017 11:40:31	12.9	100.4	7.85	46990	30.51
Composite 2	D	18	9/18/2017 11:40:53	13.1	96.7	7.8	46986	30.51
Composite 2	E	18	9/18/2017 11:41:13	12.7	97.5	7.82	46882	30.42
Composite 3	A	18	9/18/2017 11:41:33	12.8	93.4	7.77	46978	30.5
Composite 3	B	18	9/18/2017 11:42:03	12.6	98	7.81	46990	30.5
Composite 3	C	18	9/18/2017 11:43:09	13.1	97.8	7.81	47000	30.52
Composite 3	D	18	9/18/2017 11:43:27	12.9	97	7.8	46974	30.49
Composite 3	E	18	9/18/2017 11:43:47	12.8	98.1	7.81	46976	30.49
Composite 4	A	18	9/18/2017 11:44:03	12.7	98.2	7.83	46955	30.48
Composite 4	B	18	9/18/2017 11:44:29	12.7	93.4	7.78	46928	30.45
Composite 4	C	18	9/18/2017 11:44:56	12.6	101.1	7.86	46921	30.45
Composite 4	D	18	9/18/2017 11:49:35	12.7	100.5	7.88	46969	30.48
Composite 4	E	18	9/18/2017 11:49:52	12.7	100.5	7.87	46972	30.49
Composite 5	A	18	9/18/2017 11:50:10	13.1	95.2	7.81	46984	30.51
Composite 5	B	18	9/18/2017 11:50:31	13	97.5	7.82	46994	30.52
Composite 5	C	18	9/18/2017 11:50:48	12.7	100.6	7.87	46975	30.49
Composite 5	D	18	9/18/2017 11:51:17	12.6	99	7.86	46964	30.48
Composite 5	E	18	9/18/2017 11:54:34	12.6	98.6	7.84	47014	30.51
Composite 6	A	18	9/18/2017 11:54:57	12.1	97.2	7.8	46700	30.27
Composite 6	B	18	9/18/2017 11:55:16	12.2	92	7.75	46927	30.44
Composite 6	C	18	9/18/2017 11:55:34	12	93.3	7.73	46724	30.28
Composite 6	D	18	9/18/2017 11:55:51	12	98.5	7.79	46959	30.45
Composite 6	E	18	9/18/2017 11:56:04	11.8	98.1	7.8	46591	30.18
Composite 7	A	18	9/18/2017 11:57:31	12	92.6	7.73	47019	30.49
Composite 7	B	18	9/18/2017 11:57:53	12	94.8	7.73	46890	30.4
Composite 7	C	18	9/18/2017 11:58:21	12.2	96.9	7.76	46858	30.39
Composite 7	D	18	9/18/2017 11:58:40	12.4	97.6	7.77	46990	30.49
Composite 7	E	18	9/18/2017 11:59:04	12.6	92.6	7.73	46999	30.5
Composite 8	A	18	9/18/2017 11:59:28	12.6	93.3	7.78	47002	30.51
Composite 8	B	18	9/18/2017 12:00:23	12.4	79.4	7.7	46922	30.44
Composite 8	C	18	9/18/2017 12:00:47	12.6	90.6	7.75	46968	30.48
Composite 8	D	18	9/18/2017 12:01:13	12.7	87.3	7.75	46990	30.5
Composite 8	E	18	9/18/2017 12:01:36	12.8	90.4	7.76	46987	30.5

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	19	9/19/2017 09:13:47	12.4	92.9	7.77	45983	29.77
Laboratory Control	B	19	9/19/2017 09:14:22	12.4	96.1	7.78	45976	29.76
Laboratory Control	C	19	9/19/2017 09:14:41	12.5	94.3	7.78	46007	29.78
Laboratory Control	D	19	9/19/2017 09:15:02	12.4	92.3	7.76	45980	29.76
Laboratory Control	E	19	9/19/2017 09:15:27	12.4	97.4	7.79	45994	29.77
CLDS Reference Site	A	19	9/19/2017 09:15:52	12.4	93.9	7.77	45963	29.75
CLDS Reference Site	B	19	9/19/2017 09:16:10	12.4	94	7.77	45983	29.77
CLDS Reference Site	C	19	9/19/2017 09:16:45	12.4	97.4	7.81	45975	29.76
CLDS Reference Site	D	19	9/19/2017 09:17:02	12.5	96.3	7.81	45958	29.75
CLDS Reference Site	E	19	9/19/2017 09:17:24	12.5	98.5	7.83	45976	29.76
Composite 1	A	19	9/19/2017 09:18:01	12.5	92.4	7.78	45993	29.78
Composite 1	B	19	9/19/2017 09:18:18	12.5	94	7.78	45964	29.75
Composite 1	C	19	9/19/2017 09:18:42	12.5	96.5	7.8	45998	29.78
Composite 1	D	19	9/19/2017 09:19:00	12.4	99.8	7.83	45990	29.77
Composite 1	E	19	9/19/2017 09:19:23	12.5	94.4	7.8	46011	29.79
Composite 2	A	19	9/19/2017 09:20:11	12.5	95.9	7.81	45998	29.78
Composite 2	B	19	9/19/2017 09:20:33	12.4	99.3	7.84	45992	29.77
Composite 2	C	19	9/19/2017 09:21:04	12.4	99.6	7.84	46018	29.79
Composite 2	D	19	9/19/2017 09:21:26	12.5	96.6	7.82	46036	29.81
Composite 2	E	19	9/19/2017 09:21:48	12.5	96	7.81	45984	29.77
Composite 3	A	19	9/19/2017 09:22:13	12.5	93.8	7.79	45987	29.77
Composite 3	B	19	9/19/2017 09:22:30	12.5	95.9	7.79	45920	29.72
Composite 3	C	19	9/19/2017 09:24:03	12.5	98.2	7.82	46055	29.82
Composite 3	D	19	9/19/2017 09:24:30	12.5	96.8	7.81	45979	29.77
Composite 3	E	19	9/19/2017 09:24:53	12.5	97.4	7.81	45988	29.77
Composite 4	A	19	9/19/2017 09:25:06	12.5	97.1	7.82	45898	29.71
Composite 4	B	19	9/19/2017 09:25:23	12.5	92.7	7.79	45875	29.69
Composite 4	C	19	9/19/2017 09:25:44	12.5	99.3	7.84	45844	29.67
Composite 4	D	19	9/19/2017 09:26:21	12.4	100.2	7.85	45989	29.77
Composite 4	E	19	9/19/2017 09:26:47	12.4	100	7.85	45944	29.74
Composite 5	A	19	9/19/2017 09:27:09	12.5	95.1	7.81	46024	29.8
Composite 5	B	19	9/19/2017 09:27:31	12.5	97.4	7.83	46034	29.81
Composite 5	C	19	9/19/2017 09:27:51	12.5	99	7.85	45995	29.78
Composite 5	D	19	9/19/2017 09:28:18	12.4	98.3	7.86	45905	29.71
Composite 5	E	19	9/19/2017 09:29:01	12.3	98.2	7.84	46017	29.79
Composite 6	A	19	9/19/2017 09:29:37	12.3	95.6	7.79	45961	29.74
Composite 6	B	19	9/19/2017 09:30:06	12.3	90.9	7.76	46005	29.77
Composite 6	C	19	9/19/2017 09:30:25	12.1	90.8	7.73	45876	29.68
Composite 6	D	19	9/19/2017 09:30:48	12.1	97.5	7.79	46021	29.78
Composite 6	E	19	9/19/2017 09:31:25	12	97	7.8	45644	29.5
Composite 7	A	19	9/19/2017 09:32:13	12	91.8	7.75	46009	29.77
Composite 7	B	19	9/19/2017 09:32:33	12.1	92.6	7.74	45942	29.72
Composite 7	C	19	9/19/2017 09:32:49	12.3	94.7	7.75	45975	29.75
Composite 7	D	19	9/19/2017 09:33:10	12.3	97.1	7.78	45966	29.75
Composite 7	E	19	9/19/2017 09:33:29	12.4	91.8	7.74	45994	29.77
Composite 8	A	19	9/19/2017 09:33:49	12.5	92.4	7.78	46029	29.8
Composite 8	B	19	9/19/2017 09:34:23	12.4	84.3	7.74	45845	29.67
Composite 8	C	19	9/19/2017 09:34:45	12.5	89.6	7.76	46012	29.79
Composite 8	D	19	9/19/2017 09:35:03	12.5	89.5	7.77	46025	29.8
Composite 8	E	19	9/19/2017 09:35:20	12.4	92	7.79	46004	29.78

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	20	9/20/2017 10:30:54	12.4	94.4	7.8	47586	30.92
Laboratory Control	B	20	9/20/2017 10:31:13	12.4	95.5	7.81	47585	30.92
Laboratory Control	C	20	9/20/2017 10:31:33	12.5	95	7.81	47594	30.93
Laboratory Control	D	20	9/20/2017 10:31:51	12.4	91.9	7.79	47589	30.92
Laboratory Control	E	20	9/20/2017 10:32:14	12.4	97.2	7.82	47594	30.93
CLDS Reference Site	A	20	9/20/2017 10:32:46	12.4	93.4	7.79	47582	30.92
CLDS Reference Site	B	20	9/20/2017 10:33:07	12.4	93.5	7.79	47589	30.92
CLDS Reference Site	C	20	9/20/2017 10:33:34	12.5	97	7.83	47591	30.93
CLDS Reference Site	D	20	9/20/2017 10:33:50	12.5	96	7.82	47578	30.92
CLDS Reference Site	E	20	9/20/2017 10:34:06	12.5	98.2	7.84	47590	30.92
Composite 1	A	20	9/20/2017 10:34:35	12.5	90.9	7.8	47603	30.94
Composite 1	B	20	9/20/2017 10:34:58	12.4	95.1	7.81	47596	30.93
Composite 1	C	20	9/20/2017 10:35:21	12.5	96.2	7.82	47621	30.95
Composite 1	D	20	9/20/2017 10:35:38	12.4	99.3	7.85	47604	30.93
Composite 1	E	20	9/20/2017 10:36:03	12.5	93.6	7.82	47603	30.93
Composite 2	A	20	9/20/2017 10:36:27	12.5	94.8	7.83	47601	30.93
Composite 2	B	20	9/20/2017 10:37:04	12.4	98.9	7.86	47591	30.92
Composite 2	C	20	9/20/2017 10:37:23	12.5	98.6	7.86	47601	30.93
Composite 2	D	20	9/20/2017 10:37:49	12.5	95.9	7.83	47614	30.94
Composite 2	E	20	9/20/2017 10:38:16	12.5	96.1	7.83	47600	30.93
Composite 3	A	20	9/20/2017 10:38:45	12.5	92.9	7.79	47603	30.94
Composite 3	B	20	9/20/2017 10:39:03	12.5	95.6	7.82	47575	30.91
Composite 3	C	20	9/20/2017 10:39:43	12.5	97.7	7.83	47613	30.94
Composite 3	D	20	9/20/2017 10:39:58	12.5	96.4	7.83	47599	30.93
Composite 3	E	20	9/20/2017 10:40:17	12.5	96.6	7.83	47597	30.93
Composite 4	A	20	9/20/2017 10:40:31	12.5	96.4	7.84	47552	30.9
Composite 4	B	20	9/20/2017 10:40:52	12.5	92.4	7.81	47499	30.86
Composite 4	C	20	9/20/2017 10:41:13	12.5	98.6	7.84	47525	30.88
Composite 4	D	20	9/20/2017 10:41:35	12.5	99	7.86	47603	30.93
Composite 4	E	20	9/20/2017 10:41:52	12.4	99	7.85	47582	30.92
Composite 5	A	20	9/20/2017 10:42:07	12.5	95.8	7.83	47660	30.98
Composite 5	B	20	9/20/2017 10:42:22	12.5	96.6	7.84	47605	30.94
Composite 5	C	20	9/20/2017 10:42:37	12.5	98.7	7.86	47615	30.94
Composite 5	D	20	9/20/2017 10:42:49	12.4	97.8	7.87	47527	30.88
Composite 5	E	20	9/20/2017 10:43:35	12.4	97.8	7.85	47633	30.95
Composite 6	A	20	9/20/2017 10:44:02	12.4	95.4	7.82	47649	30.97
Composite 6	B	20	9/20/2017 10:44:25	12.3	91.8	7.8	47636	30.95
Composite 6	C	20	9/20/2017 10:44:44	12.2	83.7	7.74	47605	30.92
Composite 6	D	20	9/20/2017 10:45:05	12	97.1	7.8	47630	30.94
Composite 6	E	20	9/20/2017 10:45:25	11.9	96.4	7.81	47518	30.85
Composite 7	A	20	9/20/2017 10:45:56	11.9	93.1	7.77	47627	30.93
Composite 7	B	20	9/20/2017 10:46:08	12.1	93.2	7.76	47617	30.93
Composite 7	C	20	9/20/2017 10:46:22	12.3	95	7.77	47617	30.94
Composite 7	D	20	9/20/2017 10:46:40	12.4	96.2	7.8	47633	30.95
Composite 7	E	20	9/20/2017 10:46:57	12.5	91.3	7.77	47625	30.95
Composite 8	A	20	9/20/2017 10:47:11	12.5	92.6	7.8	47636	30.96
Composite 8	B	20	9/20/2017 10:47:48	12.4	84.8	7.76	47520	30.87
Composite 8	C	20	9/20/2017 10:48:09	12.5	87.9	7.78	47614	30.94
Composite 8	D	20	9/20/2017 10:48:22	12.5	88.4	7.79	47613	30.94
Composite 8	E	20	9/20/2017 10:48:44	12.4	91.5	7.81	47623	30.95

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	21	9/21/2017 11:58:04	12.3	95.5	7.84	47814	31.08
Laboratory Control	B	21	9/21/2017 11:58:18	12.3	97.5	7.85	47809	31.08
Laboratory Control	C	21	9/21/2017 11:58:33	12.3	97.1	7.85	47833	31.09
Laboratory Control	D	21	9/21/2017 11:58:49	12.3	93.4	7.83	47820	31.08
Laboratory Control	E	21	9/21/2017 11:59:12	12.3	98.1	7.84	47823	31.08
CLDS Reference Site	A	21	9/21/2017 11:59:29	12.3	95.1	7.84	47819	31.08
CLDS Reference Site	B	21	9/21/2017 11:59:47	12.3	95	7.83	47820	31.08
CLDS Reference Site	C	21	9/21/2017 12:00:05	12.3	98.9	7.85	47823	31.09
CLDS Reference Site	D	21	9/21/2017 12:00:20	12.3	98.5	7.85	47811	31.08
CLDS Reference Site	E	21	9/21/2017 12:00:31	12.3	100.1	7.85	47829	31.09
Composite 1	A	21	9/21/2017 12:00:54	12.4	93	7.84	47810	31.08
Composite 1	B	21	9/21/2017 12:01:13	12.3	96.7	7.83	47813	31.08
Composite 1	C	21	9/21/2017 12:01:22	12.3	97.5	7.84	47839	31.1
Composite 1	D	21	9/21/2017 12:01:53	12.3	100.2	7.87	47838	31.1
Composite 1	E	21	9/21/2017 12:02:11	12.3	95.1	7.86	47836	31.1
Composite 2	A	21	9/21/2017 12:02:27	12.3	95.7	7.85	47811	31.08
Composite 2	B	21	9/21/2017 12:02:48	12.3	100.3	7.87	47830	31.09
Composite 2	C	21	9/21/2017 12:03:10	12.3	99.9	7.86	47839	31.1
Composite 2	D	21	9/21/2017 12:03:27	12.3	97.7	7.86	47850	31.11
Composite 2	E	21	9/21/2017 12:03:42	12.3	97.2	7.85	47822	31.09
Composite 3	A	21	9/21/2017 12:03:57	12.4	95.3	7.84	47829	31.09
Composite 3	B	21	9/21/2017 12:04:19	12.4	96.7	7.84	47809	31.08
Composite 3	C	21	9/21/2017 12:05:21	12.4	98.5	7.86	47856	31.11
Composite 3	D	21	9/21/2017 12:05:36	12.4	96.8	7.85	47819	31.09
Composite 3	E	21	9/21/2017 12:05:47	12.4	97.3	7.85	47737	31.03
Composite 4	A	21	9/21/2017 12:06:01	12.4	97.3	7.86	47806	31.08
Composite 4	B	21	9/21/2017 12:06:14	12.4	94.2	7.84	47800	31.07
Composite 4	C	21	9/21/2017 12:06:32	12.4	99.7	7.85	47804	31.08
Composite 4	D	21	9/21/2017 12:06:58	12.3	100.2	7.87	47853	31.11
Composite 4	E	21	9/21/2017 12:07:14	12.3	100.2	7.86	47808	31.08
Composite 5	A	21	9/21/2017 12:07:25	12.3	97.2	7.86	47864	31.12
Composite 5	B	21	9/21/2017 12:07:40	12.3	97.3	7.86	47848	31.11
Composite 5	C	21	9/21/2017 12:07:59	12.3	100.3	7.87	47835	31.1
Composite 5	D	21	9/21/2017 12:08:22	12.3	98.1	7.87	47768	31.05
Composite 5	E	21	9/21/2017 12:09:07	12.3	98.6	7.86	47860	31.11
Composite 6	A	21	9/21/2017 12:09:28	12.3	96.2	7.85	47877	31.13
Composite 6	B	21	9/21/2017 12:09:45	12.2	92.7	7.84	47865	31.11
Composite 6	C	21	9/21/2017 12:10:10	12.2	94.9	7.82	47868	31.11
Composite 6	D	21	9/21/2017 12:10:40	12	98.1	7.82	47835	31.08
Composite 6	E	21	9/21/2017 12:10:49	12	97.5	7.82	47773	31.04
Composite 7	A	21	9/21/2017 12:11:19	11.9	92.5	7.79	47868	31.1
Composite 7	B	21	9/21/2017 12:11:30	12	94.1	7.78	47847	31.09
Composite 7	C	21	9/21/2017 12:11:47	12.2	95.4	7.79	47847	31.1
Composite 7	D	21	9/21/2017 12:11:59	12.3	96.3	7.82	47867	31.12
Composite 7	E	21	9/21/2017 12:12:14	12.4	92.4	7.81	47869	31.12
Composite 8	A	21	9/21/2017 12:12:33	12.4	93	7.85	47844	31.11
Composite 8	B	21	9/21/2017 12:14:17	12.4	93.3	7.82	47768	31.05
Composite 8	C	21	9/21/2017 12:14:46	12.4	86.4	7.79	47779	31.06
Composite 8	D	21	9/21/2017 12:15:00	12.4	85.9	7.83	47846	31.11
Composite 8	E	21	9/21/2017 12:15:14	12.3	90.1	7.85	47844	31.1

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	22	9/22/2017 12:53:32	12.7	92.6	7.81	46569	30.2
Laboratory Control	B	22	9/22/2017 12:53:57	12.8	94.1	7.81	46536	30.18
Laboratory Control	C	22	9/22/2017 12:54:19	13	93.5	7.82	46517	30.17
Laboratory Control	D	22	9/22/2017 12:54:57	12.7	90	7.8	46557	30.19
Laboratory Control	E	22	9/22/2017 12:55:26	12.8	95.5	7.82	46547	30.19
CLDS Reference Site	A	22	9/22/2017 12:55:55	12.8	92.1	7.81	46542	30.18
CLDS Reference Site	B	22	9/22/2017 12:56:26	12.7	92.8	7.8	46558	30.19
CLDS Reference Site	C	22	9/22/2017 12:56:48	12.8	96.4	7.83	46552	30.19
CLDS Reference Site	D	22	9/22/2017 12:57:04	12.8	95.2	7.84	46558	30.19
CLDS Reference Site	E	22	9/22/2017 12:57:24	12.8	93.5	7.83	46541	30.18
Composite 1	A	22	9/22/2017 12:57:39	12.9	97.6	7.84	46558	30.2
Composite 1	B	22	9/22/2017 12:58:11	12.6	90.5	7.81	46574	30.2
Composite 1	C	22	9/22/2017 12:58:31	12.6	93	7.81	46565	30.19
Composite 1	D	22	9/22/2017 12:58:52	12.7	95.9	7.83	46544	30.18
Composite 1	E	22	9/22/2017 12:59:12	12.8	97.7	7.85	46518	30.17
Composite 2	A	22	9/22/2017 12:59:31	12.8	90.9	7.82	46532	30.18
Composite 2	B	22	9/22/2017 12:59:48	12.6	94.3	7.83	46572	30.2
Composite 2	C	22	9/22/2017 13:00:11	12.7	98.9	7.86	46475	30.13
Composite 2	D	22	9/22/2017 13:00:32	12.8	98	7.86	46543	30.18
Composite 2	E	22	9/22/2017 13:00:58	12.9	94	7.84	46555	30.2
Composite 3	A	22	9/22/2017 13:01:11	12.9	95.6	7.83	46536	30.18
Composite 3	B	22	9/22/2017 13:01:33	12.8	93.7	7.82	46550	30.19
Composite 3	C	22	9/22/2017 13:01:58	12.7	92.9	7.82	46572	30.2
Composite 3	D	22	9/22/2017 13:02:13	12.7	97.8	7.83	46559	30.19
Composite 3	E	22	9/22/2017 13:02:42	12.8	95.1	7.83	46553	30.19
Composite 4	A	22	9/22/2017 13:03:00	12.8	96.4	7.83	46543	30.18
Composite 4	B	22	9/22/2017 13:03:23	12.8	94.7	7.83	46548	30.19
Composite 4	C	22	9/22/2017 13:03:44	12.7	91.2	7.81	46541	30.18
Composite 4	D	22	9/22/2017 13:04:04	12.4	99.2	7.84	46598	30.21
Composite 4	E	22	9/22/2017 13:04:31	12.9	98.8	7.85	46550	30.19
Composite 5	A	22	9/22/2017 13:05:14	13	94	7.83	46537	30.19
Composite 5	B	22	9/22/2017 13:05:28	13	94.3	7.84	46547	30.19
Composite 5	C	22	9/22/2017 13:05:40	12.7	98.4	7.86	46595	30.21
Composite 5	D	22	9/22/2017 13:06:00	12.5	97.8	7.86	46605	30.22
Composite 5	E	22	9/22/2017 13:06:34	12.6	96.8	7.85	46586	30.21
Composite 6	A	22	9/22/2017 13:06:54	12.8	95	7.82	46544	30.18
Composite 6	B	22	9/22/2017 13:07:09	12.6	91	7.81	46596	30.21
Composite 6	C	22	9/22/2017 13:07:39	12.3	89.8	7.81	46606	30.21
Composite 6	D	22	9/22/2017 13:07:58	12.4	95.9	7.82	46564	30.18
Composite 6	E	22	9/22/2017 13:08:14	11.9	94.5	7.83	46610	30.19
Composite 7	A	22	9/22/2017 13:08:28	11.9	92.4	7.79	46618	30.2
Composite 7	B	22	9/22/2017 13:08:48	12.1	93.1	7.77	46598	30.2
Composite 7	C	22	9/22/2017 13:09:14	12.3	94.9	7.78	46579	30.19
Composite 7	D	22	9/22/2017 13:09:28	12.5	95.6	7.79	46577	30.2
Composite 7	E	22	9/22/2017 13:09:51	12.6	89.9	7.77	46612	30.22
Composite 8	A	22	9/22/2017 13:10:13	12.8	90.8	7.81	46554	30.19
Composite 8	B	22	9/22/2017 13:10:41	13	91.5	7.82	46549	30.19
Composite 8	C	22	9/22/2017 13:10:57	12.7	88.9	7.81	46569	30.2
Composite 8	D	22	9/22/2017 13:11:14	13	86.3	7.8	46549	30.19
Composite 8	E	22	9/22/2017 13:11:30	12.9	90.2	7.82	46558	30.2

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	23	9/23/2017 09:20:47	12.4	92.4	7.81	46630	30.23
Laboratory Control	B	23	9/23/2017 09:21:06	12.4	95.5	7.83	46645	30.24
Laboratory Control	C	23	9/23/2017 09:21:25	12.4	95.9	7.84	46657	30.25
Laboratory Control	D	23	9/23/2017 09:21:50	12.3	92.6	7.82	46658	30.25
Laboratory Control	E	23	9/23/2017 09:22:12	12.4	96.9	7.84	46657	30.25
CLDS Reference Site	A	23	9/23/2017 09:22:37	12.4	93.8	7.83	46653	30.24
CLDS Reference Site	B	23	9/23/2017 09:22:49	12.3	94.6	7.82	46634	30.23
CLDS Reference Site	C	23	9/23/2017 09:23:11	12.4	97.4	7.85	46646	30.24
CLDS Reference Site	D	23	9/23/2017 09:23:29	12.4	97.1	7.85	46637	30.23
CLDS Reference Site	E	23	9/23/2017 09:23:53	12.4	98.6	7.86	46684	30.27
Composite 1	A	23	9/23/2017 09:24:19	12.5	90.3	7.81	46631	30.23
Composite 1	B	23	9/23/2017 09:24:45	12.4	94.8	7.82	46661	30.25
Composite 1	C	23	9/23/2017 09:25:03	12.4	96.5	7.84	46668	30.26
Composite 1	D	23	9/23/2017 09:25:23	12.4	99.3	7.87	46686	30.27
Composite 1	E	23	9/23/2017 09:25:46	12.4	93.7	7.85	46678	30.26
Composite 2	A	23	9/23/2017 09:26:14	12.3	94.4	7.85	46639	30.23
Composite 2	B	23	9/23/2017 09:26:41	12.3	99.6	7.87	46671	30.26
Composite 2	C	23	9/23/2017 09:27:08	12.4	99.2	7.88	46693	30.27
Composite 2	D	23	9/23/2017 09:27:26	12.4	96.2	7.86	46687	30.27
Composite 2	E	23	9/23/2017 09:27:41	12.4	96.4	7.86	46669	30.26
Composite 3	A	23	9/23/2017 09:28:03	12.4	95.3	7.84	46653	30.25
Composite 3	B	23	9/23/2017 09:28:26	12.4	95.9	7.83	46664	30.26
Composite 3	C	23	9/23/2017 10:21:48	12.4	113.1	7.85	46747	30.31
Composite 3	D	23	9/23/2017 10:22:13	12.4	109.3	7.84	46738	30.31
Composite 3	E	23	9/23/2017 10:22:39	12.3	108.8	7.84	46818	30.36
Composite 4	A	23	9/23/2017 10:24:30	12.4	102.9	7.85	46753	30.32
Composite 4	B	23	9/23/2017 10:24:49	12.3	97.1	7.82	46737	30.3
Composite 4	C	23	9/23/2017 10:25:09	12.2	105.9	7.85	46732	30.3
Composite 4	D	23	9/23/2017 10:25:38	12.3	105.1	7.87	46764	30.32
Composite 4	E	23	9/23/2017 10:26:02	12.3	104.8	7.87	46721	30.29
Composite 5	A	23	9/23/2017 10:26:22	12.4	99.9	7.86	46768	30.33
Composite 5	B	23	9/23/2017 10:26:45	12.4	101.1	7.87	46754	30.32
Composite 5	C	23	9/23/2017 10:27:07	12.3	104.7	7.89	46734	30.3
Composite 5	D	23	9/23/2017 10:27:25	12.3	102.6	7.88	46704	30.28
Composite 5	E	23	9/23/2017 10:28:43	12.2	102.1	7.87	46750	30.31
Composite 6	A	23	9/23/2017 10:28:59	12.2	100.4	7.85	46760	30.32
Composite 6	B	23	9/23/2017 10:29:17	12.2	96.1	7.83	46761	30.32
Composite 6	C	23	9/23/2017 10:29:32	12.1	97.6	7.82	46755	30.31
Composite 6	D	23	9/23/2017 10:29:52	12	100.7	7.81	46714	30.27
Composite 6	E	23	9/23/2017 10:30:13	12	100.2	7.83	46701	30.26
Composite 7	A	23	9/23/2017 10:32:08	11.9	88.3	7.76	46763	30.31
Composite 7	B	23	9/23/2017 10:32:31	12	96	7.76	46725	30.28
Composite 7	C	23	9/23/2017 10:32:55	12.1	97.6	7.77	46691	30.26
Composite 7	D	23	9/23/2017 10:33:10	12.3	98.2	7.8	46745	30.31
Composite 7	E	23	9/23/2017 10:33:29	12.4	92.7	7.77	46729	30.3
Composite 8	A	23	9/23/2017 10:33:49	12.4	94.7	7.82	46707	30.29
Composite 8	B	23	9/23/2017 10:34:46	12.4	95	7.84	46749	30.32
Composite 8	C	23	9/23/2017 10:35:16	12.4	86.9	7.79	46692	30.27
Composite 8	D	23	9/23/2017 10:35:46	12.4	88	7.82	46744	30.31
Composite 8	E	23	9/23/2017 10:36:08	12.3	94	7.86	46754	30.32

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	24	9/24/2017 11:11:09	12.7	93.2	7.8	47992	31.22
Laboratory Control	B	24	9/24/2017 11:11:25	13.4	96.2	7.84	47934	31.21
Laboratory Control	C	24	9/24/2017 11:11:35	13.8	95.7	7.85	47951	31.23
Laboratory Control	D	24	9/24/2017 11:11:47	13.4	94.9	7.86	48026	31.28
Laboratory Control	E	24	9/24/2017 11:12:03	13.3	97.5	7.86	47948	31.21
CLDS Reference Site	A	24	9/24/2017 11:12:19	12.9	94	7.83	48054	31.28
CLDS Reference Site	B	24	9/24/2017 11:12:31	13	95.1	7.84	47980	31.23
CLDS Reference Site	C	24	9/24/2017 11:12:46	13.3	98.3	7.86	47930	31.2
CLDS Reference Site	D	24	9/24/2017 11:13:02	13.4	97.2	7.86	47981	31.24
CLDS Reference Site	E	24	9/24/2017 11:13:14	13.7	98.6	7.88	47925	31.21
Composite 1	A	24	9/24/2017 11:13:42	13	92.5	7.85	47988	31.23
Composite 1	B	24	9/24/2017 11:14:04	12.9	94.4	7.84	48000	31.24
Composite 1	C	24	9/24/2017 11:14:43	13.3	97.2	7.87	47983	31.24
Composite 1	D	24	9/24/2017 11:14:53	13.4	99	7.89	47965	31.23
Composite 1	E	24	9/24/2017 11:15:02	13.2	96.4	7.88	47966	31.22
Composite 2	A	24	9/24/2017 11:15:24	13	96.3	7.88	47978	31.23
Composite 2	B	24	9/24/2017 11:15:56	13.2	99.4	7.9	47972	31.23
Composite 2	C	24	9/24/2017 11:16:15	13.3	99.7	7.9	47991	31.25
Composite 2	D	24	9/24/2017 11:16:32	13.8	96.7	7.89	47977	31.25
Composite 2	E	24	9/24/2017 11:16:50	13.5	96.9	7.88	47988	31.25
Composite 3	A	24	9/24/2017 11:17:06	13.4	94.5	7.86	47979	31.24
Composite 3	B	24	9/24/2017 11:17:17	13.1	95.6	7.86	48030	31.27
Composite 3	C	24	9/24/2017 11:17:45	13	95.3	7.87	48010	31.25
Composite 3	D	24	9/24/2017 11:18:01	13.8	96.7	7.88	47975	31.25
Composite 3	E	24	9/24/2017 11:18:12	13.5	97.3	7.88	47966	31.24
Composite 4	A	24	9/24/2017 11:18:25	13.4	96.7	7.87	47985	31.25
Composite 4	B	24	9/24/2017 11:18:48	13.1	93	7.85	47990	31.24
Composite 4	C	24	9/24/2017 11:19:08	12.7	100.5	7.89	48014	31.24
Composite 4	D	24	9/24/2017 11:19:38	13.3	99.9	7.9	47977	31.24
Composite 4	E	24	9/24/2017 11:20:09	13.1	99.7	7.89	47988	31.24
Composite 5	A	24	9/24/2017 11:20:30	13.7	95	7.88	47975	31.25
Composite 5	B	24	9/24/2017 11:20:41	13.6	96.9	7.88	47984	31.25
Composite 5	C	24	9/24/2017 11:20:58	13.2	99.7	7.91	48005	31.25
Composite 5	D	24	9/24/2017 11:21:15	12.9	98.7	7.9	48000	31.24
Composite 5	E	24	9/24/2017 11:22:38	13.2	98.1	7.89	48011	31.26
Composite 6	A	24	9/24/2017 11:22:56	13.4	96.4	7.87	48014	31.26
Composite 6	B	24	9/24/2017 11:23:16	14.1	92.7	7.88	48003	31.28
Composite 6	C	24	9/24/2017 11:23:31	12.1	96.2	7.85	48103	31.28
Composite 6	D	24	9/24/2017 11:24:00	12.3	98.3	7.86	48079	31.27
Composite 6	E	24	9/24/2017 11:24:17	11.9	98.4	7.87	48073	31.25
Composite 7	A	24	9/24/2017 11:24:46	11.9	94.9	7.8	48091	31.26
Composite 7	B	24	9/24/2017 11:25:06	11.9	92.7	7.74	48077	31.25
Composite 7	C	24	9/24/2017 11:25:19	12.3	95.6	7.78	48060	31.26
Composite 7	D	24	9/24/2017 11:25:31	12.4	97.3	7.81	48047	31.25
Composite 7	E	24	9/24/2017 11:25:45	12.7	92.9	7.8	48036	31.26
Composite 8	A	24	9/24/2017 11:26:16	12.8	93.8	7.86	48023	31.25
Composite 8	B	24	9/24/2017 11:26:37	13.1	92.6	7.85	48005	31.25
Composite 8	C	24	9/24/2017 11:26:49	13.1	95.4	7.85	48011	31.25
Composite 8	D	24	9/24/2017 11:27:05	13.6	91.7	7.86	47995	31.26
Composite 8	E	24	9/24/2017 11:27:19	13.4	91.8	7.87	47988	31.25

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	25	9/25/2017 11:42:40	13.2	91.3	7.71	47666	31.01
Laboratory Control	B	25	9/25/2017 11:42:54	13.4	93.9	7.72	47651	31
Laboratory Control	C	25	9/25/2017 11:43:03	13.7	92.9	7.72	47632	31
Laboratory Control	D	25	9/25/2017 11:43:16	13.3	90.3	7.71	47676	31.02
Laboratory Control	E	25	9/25/2017 11:43:30	13.3	95.3	7.73	47633	30.99
CLDS Reference Site	A	25	9/25/2017 11:43:47	13.4	90.8	7.72	47673	31.02
CLDS Reference Site	B	25	9/25/2017 11:44:31	13.4	91.7	7.71	47651	31
CLDS Reference Site	C	25	9/25/2017 11:45:03	13.3	96.9	7.75	47720	31.05
CLDS Reference Site	D	25	9/25/2017 11:45:30	13.5	95.4	7.74	47671	31.02
CLDS Reference Site	E	25	9/25/2017 11:45:49	13.4	97.8	7.76	47657	31.01
Composite 1	A	25	9/25/2017 11:46:39	13.1	93.6	7.74	47667	31
Composite 1	B	25	9/25/2017 11:46:55	12.9	94.2	7.73	47778	31.08
Composite 1	C	25	9/25/2017 11:47:09	13.2	95.5	7.74	47687	31.02
Composite 1	D	25	9/25/2017 11:47:26	13.2	98.3	7.77	47670	31.01
Composite 1	E	25	9/25/2017 11:47:47	13.2	91.9	7.73	47703	31.03
Composite 2	A	25	9/25/2017 11:48:00	13.4	93.2	7.74	47676	31.02
Composite 2	B	25	9/25/2017 11:48:25	13.2	98.3	7.78	47713	31.04
Composite 2	C	25	9/25/2017 11:49:01	13.6	94.9	7.76	47680	31.03
Composite 2	D	25	9/25/2017 11:49:16	13.7	94.7	7.75	47667	31.02
Composite 2	E	25	9/25/2017 11:49:25	13.5	93.6	7.74	47656	31.01
Composite 3	A	25	9/25/2017 11:49:40	13.2	94.1	7.74	47741	31.06
Composite 3	B	25	9/25/2017 11:50:10	13	97.7	7.76	47741	31.05
Composite 3	C	25	9/25/2017 11:50:28	13.4	95	7.75	47665	31.01
Composite 3	D	25	9/25/2017 11:50:43	13.3	96.3	7.75	47695	31.03
Composite 3	E	25	9/25/2017 11:51:04	13.2	94.5	7.75	47713	31.04
Composite 4	A	25	9/25/2017 11:51:17	12.9	91.9	7.73	47766	31.07
Composite 4	B	25	9/25/2017 11:51:34	12.7	99	7.77	47806	31.09
Composite 4	C	25	9/25/2017 11:51:58	12.7	99.1	7.78	47820	31.1
Composite 4	D	25	9/25/2017 11:52:13	12.6	99.1	7.79	47902	31.15
Composite 4	E	25	9/25/2017 11:52:34	13	94.4	7.76	47740	31.06
Composite 5	A	25	9/25/2017 11:52:47	13.4	95.4	7.77	47672	31.02
Composite 5	B	25	9/25/2017 11:53:02	13.3	98.1	7.79	47710	31.04
Composite 5	C	25	9/25/2017 11:53:21	13.2	96.3	7.78	47678	31.02
Composite 5	D	25	9/25/2017 11:54:00	12.4	98.2	7.78	47835	31.1
Composite 5	E	25	9/25/2017 11:54:17	13	94.9	7.75	47744	31.06
Composite 6	A	25	9/25/2017 11:54:33	13.5	89	7.74	47679	31.03
Composite 6	B	25	9/25/2017 11:54:49	12	94.9	7.72	48072	31.25
Composite 6	C	25	9/25/2017 11:55:01	12.3	96.6	7.74	47765	31.04
Composite 6	D	25	9/25/2017 11:55:17	11.5	97.3	7.74	48066	31.23
Composite 6	E	25	9/25/2017 11:55:55	11.9	97	7.74	47786	31.04
Composite 7	A	25	9/25/2017 11:56:04	12	95	7.72	47826	31.08
Composite 7	B	25	9/25/2017 11:56:13	12	94.1	7.71	47903	31.13
Composite 7	C	25	9/25/2017 11:56:28	12.4	95.9	7.73	47716	31.01
Composite 7	D	25	9/25/2017 11:56:44	12.6	91.4	7.7	47742	31.04
Composite 7	E	25	9/25/2017 11:56:51	12.5	91.7	7.72	47774	31.06
Composite 8	A	25	9/25/2017 11:57:42	12.5	92.7	7.75	47792	31.07
Composite 8	B	25	9/25/2017 11:58:04	12.7	92.6	7.74	47838	31.11
Composite 8	C	25	9/25/2017 11:58:15	12.8	94.1	7.74	47910	31.17
Composite 8	D	25	9/25/2017 11:58:33	13.6	88.5	7.73	47671	31.02
Composite 8	E	25	9/25/2017 11:58:50	13	89.9	7.75	47750	31.06

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	26	9/26/2017 11:21:14	12.3	98.1	7.59	46677	30.26
Laboratory Control	B	26	9/26/2017 11:21:39	12.3	99	7.65	46694	30.27
Laboratory Control	C	26	9/26/2017 11:21:55	12.3	100.3	7.69	46692	30.27
Laboratory Control	D	26	9/26/2017 11:22:26	12.2	94.6	7.68	46692	30.27
Laboratory Control	E	26	9/26/2017 11:22:51	12.2	102.9	7.72	46694	30.27
CLDS Reference Site	A	26	9/26/2017 11:23:16	12.3	96.4	7.72	46703	30.28
CLDS Reference Site	B	26	9/26/2017 11:23:35	12.3	98.4	7.72	46693	30.27
CLDS Reference Site	C	26	9/26/2017 11:24:00	12.3	102.3	7.74	46679	30.26
CLDS Reference Site	D	26	9/26/2017 11:24:21	12.4	101.3	7.75	46695	30.28
CLDS Reference Site	E	26	9/26/2017 11:24:56	12.4	102.9	7.76	46726	30.3
Composite 1	A	26	9/26/2017 11:25:21	12.4	99.8	7.75	46718	30.29
Composite 1	B	26	9/26/2017 11:25:51	12.3	100.6	7.74	46699	30.28
Composite 1	C	26	9/26/2017 11:26:16	12.3	102	7.76	46711	30.28
Composite 1	D	26	9/26/2017 11:26:38	12.3	103.2	7.77	46722	30.29
Composite 1	E	26	9/26/2017 11:27:09	12.3	97.6	7.75	46716	30.29
Composite 2	A	26	9/26/2017 11:27:33	12.3	99.2	7.77	46726	30.3
Composite 2	B	26	9/26/2017 11:28:01	12.3	103.3	7.79	46740	30.31
Composite 2	C	26	9/26/2017 11:28:26	12.3	102.7	7.79	46746	30.31
Composite 2	D	26	9/26/2017 11:28:47	12.4	101.3	7.78	46745	30.31
Composite 2	E	26	9/26/2017 11:29:12	12.4	100.7	7.78	46735	30.31
Composite 3	A	26	9/26/2017 11:29:28	12.4	100.2	7.77	46728	30.3
Composite 3	B	26	9/26/2017 11:29:50	12.4	100.3	7.77	46737	30.31
Composite 3	C	26	9/26/2017 11:30:51	12.4	101.7	7.76	46748	30.31
Composite 3	D	26	9/26/2017 11:31:11	12.4	100.3	7.76	46736	30.31
Composite 3	E	26	9/26/2017 11:31:29	12.4	100.6	7.75	46761	30.32
Composite 4	A	26	9/26/2017 11:31:50	12.5	98.6	7.77	46737	30.31
Composite 4	B	26	9/26/2017 11:32:19	12.4	96.7	7.75	46742	30.31
Composite 4	C	26	9/26/2017 11:32:42	12.4	102.9	7.76	46750	30.31
Composite 4	D	26	9/26/2017 11:33:24	12.3	103.1	7.77	46760	30.32
Composite 4	E	26	9/26/2017 11:33:43	12.3	102.6	7.76	46793	30.34
Composite 5	A	26	9/26/2017 11:34:06	12.4	98.1	7.76	46729	30.3
Composite 5	B	26	9/26/2017 11:34:29	12.4	101	7.79	46751	30.32
Composite 5	C	26	9/26/2017 11:34:56	12.4	103.1	7.79	46778	30.34
Composite 5	D	26	9/26/2017 11:35:15	12.3	101.5	7.79	46762	30.32
Composite 5	E	26	9/26/2017 11:36:22	12.1	101.4	7.78	46776	30.32
Composite 6	A	26	9/26/2017 11:36:46	12	99.2	7.74	46778	30.32
Composite 6	B	26	9/26/2017 11:37:06	12	95.5	7.75	46784	30.33
Composite 6	C	26	9/26/2017 11:37:29	11.8	96.7	7.72	46912	30.41
Composite 6	D	26	9/26/2017 11:37:52	11.7	100.8	7.73	46789	30.32
Composite 6	E	26	9/26/2017 11:38:09	11.6	100.7	7.74	46869	30.37
Composite 7	A	26	9/26/2017 11:38:32	11.6	101.3	7.74	46803	30.32
Composite 7	B	26	9/26/2017 11:38:43	11.8	99.9	7.72	46796	30.32
Composite 7	C	26	9/26/2017 11:39:03	11.9	97.7	7.69	46776	30.31
Composite 7	D	26	9/26/2017 11:39:26	12.1	99.3	7.72	46739	30.3
Composite 7	E	26	9/26/2017 11:40:31	12.2	94.2	7.67	46737	30.3
Composite 8	A	26	9/26/2017 11:40:52	12.3	96.3	7.74	46753	30.32
Composite 8	B	26	9/26/2017 11:41:49	12.3	94.3	7.74	46767	30.33
Composite 8	C	26	9/26/2017 11:42:14	12.3	97.1	7.75	46808	30.35
Composite 8	D	26	9/26/2017 11:42:34	12.4	93.2	7.76	46763	30.33
Composite 8	E	26	9/26/2017 11:42:57	12.2	90.8	7.76	46746	30.31

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	27	9/27/2017 09:23:53	12.6	92.9	7.37	47911	31.16
Laboratory Control	B	27	9/27/2017 09:24:11	12.7	96.4	7.49	47902	31.16
Laboratory Control	C	27	9/27/2017 09:24:29	12.9	93.6	7.54	47891	31.16
Laboratory Control	D	27	9/27/2017 09:24:44	12.8	91	7.55	47898	31.16
Laboratory Control	E	27	9/27/2017 09:25:06	12.8	97.3	7.59	47907	31.17
CLDS Reference Site	A	27	9/27/2017 09:25:23	12.8	91.7	7.59	47940	31.19
CLDS Reference Site	B	27	9/27/2017 09:25:33	12.8	93	7.59	47915	31.17
CLDS Reference Site	C	27	9/27/2017 09:25:43	12.9	96.1	7.61	47911	31.17
CLDS Reference Site	D	27	9/27/2017 09:25:58	12.9	96.6	7.62	47933	31.19
CLDS Reference Site	E	27	9/27/2017 09:26:06	13	97	7.63	47933	31.19
Composite 1	A	27	9/27/2017 09:26:28	12.6	95	7.62	47965	31.2
Composite 1	B	27	9/27/2017 09:26:43	12.4	96.3	7.62	47961	31.19
Composite 1	C	27	9/27/2017 09:26:55	12.7	96.6	7.63	48085	31.29
Composite 1	D	27	9/27/2017 09:27:09	12.8	99.5	7.66	47955	31.2
Composite 1	E	27	9/27/2017 09:27:25	12.6	94.2	7.65	47980	31.21
Composite 2	A	27	9/27/2017 09:27:37	12.8	94.7	7.66	47940	31.19
Composite 2	B	27	9/27/2017 09:28:01	12.7	100	7.68	47951	31.2
Composite 2	C	27	9/27/2017 09:28:14	12.9	100	7.68	47930	31.19
Composite 2	D	27	9/27/2017 09:28:30	12.9	96.7	7.67	47971	31.22
Composite 2	E	27	9/27/2017 09:28:44	13.1	95.2	7.67	47927	31.19
Composite 3	A	27	9/27/2017 09:28:56	12.9	95.4	7.67	47940	31.2
Composite 3	B	27	9/27/2017 09:29:04	12.8	95.3	7.66	47947	31.2
Composite 3	C	27	9/27/2017 09:29:28	12.6	98.9	7.67	48008	31.23
Composite 3	D	27	9/27/2017 09:29:42	12.7	96.8	7.67	47978	31.21
Composite 3	E	27	9/27/2017 09:29:56	12.8	97	7.67	47963	31.21
Composite 4	A	27	9/27/2017 09:30:10	13	96.1	7.68	47946	31.2
Composite 4	B	27	9/27/2017 09:30:25	12.7	93.4	7.66	47985	31.22
Composite 4	C	27	9/27/2017 09:30:45	12.7	100	7.69	47980	31.21
Composite 4	D	27	9/27/2017 09:31:15	12.8	100.3	7.7	47955	31.2
Composite 4	E	27	9/27/2017 09:31:26	12.6	100.4	7.7	47987	31.22
Composite 5	A	27	9/27/2017 09:31:42	12.7	95.1	7.69	48013	31.24
Composite 5	B	27	9/27/2017 09:31:50	12.9	96.6	7.69	47959	31.21
Composite 5	C	27	9/27/2017 09:31:59	12.9	98.4	7.7	47972	31.22
Composite 5	D	27	9/27/2017 09:32:20	12.6	98.1	7.71	48057	31.27
Composite 5	E	27	9/27/2017 09:33:34	12.4	99	7.7	48008	31.22
Composite 6	A	27	9/27/2017 09:33:47	12.2	97.5	7.67	48040	31.24
Composite 6	B	27	9/27/2017 09:34:05	12.5	91	7.68	47993	31.22
Composite 6	C	27	9/27/2017 09:34:28	11.8	92	7.61	48226	31.36
Composite 6	D	27	9/27/2017 09:35:04	11.7	99.7	7.65	48111	31.27
Composite 6	E	27	9/27/2017 09:35:16	11.6	98.2	7.65	48177	31.31
Composite 7	A	27	9/27/2017 09:35:47	11.8	99	7.67	48070	31.24
Composite 7	B	27	9/27/2017 09:36:09	12.2	93.1	7.65	48000	31.21
Composite 7	C	27	9/27/2017 09:36:37	12	95.7	7.61	48059	31.24
Composite 7	D	27	9/27/2017 09:36:47	12.3	96.5	7.64	48030	31.24
Composite 7	E	27	9/27/2017 09:37:07	12.4	92.1	7.62	48013	31.23
Composite 8	A	27	9/27/2017 09:37:22	12.5	92.6	7.67	48007	31.23
Composite 8	B	27	9/27/2017 09:38:02	12.5	92.8	7.67	48013	31.23
Composite 8	C	27	9/27/2017 09:38:18	12.4	97.3	7.69	48065	31.27
Composite 8	D	27	9/27/2017 09:38:35	12.9	90	7.69	47961	31.21
Composite 8	E	27	9/27/2017 09:38:55	12.5	90.6	7.69	48007	31.23

STUDY: 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: 28-Day Survival and Bioaccumulation Evaluation
TASK: Daily Water Qualities
Species: *Nereis virens*

	Temp	DO	pH	SpCond	Salinity
Mean:	12.4	95.52		45614	29.50
Minimum:	11.8	60.50	7.53	44024	28.36
Maximum:	12.6	102.20	8.04	46807	30.34

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO % Saturation	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	28	9/28/2017 07:54:08	12.3	91.7	7.61	47507	30.86
Laboratory Control	B	28	9/28/2017 07:54:19	12.4	92.8	7.65	47447	30.82
Laboratory Control	C	28	9/28/2017 07:54:33	12.4	90.3	7.66	47423	30.8
Laboratory Control	D	28	9/28/2017 07:54:42	12.4	89.2	7.67	47436	30.81
Laboratory Control	E	28	9/28/2017 07:55:03	12.4	95.5	7.71	47441	30.82
CLDS Reference Site	A	28	9/28/2017 07:55:20	12.4	90	7.7	47437	30.81
CLDS Reference Site	B	28	9/28/2017 07:55:29	12.4	90.8	7.69	47460	30.83
CLDS Reference Site	C	28	9/28/2017 07:55:46	12.4	96.3	7.73	47446	30.82
CLDS Reference Site	D	28	9/28/2017 07:56:00	12.4	95.2	7.73	47458	30.83
CLDS Reference Site	E	28	9/28/2017 07:56:11	12.4	96.7	7.75	47444	30.82
Composite 1	A	28	9/28/2017 07:56:35	12.4	92.3	7.73	47467	30.83
Composite 1	B	28	9/28/2017 07:56:45	12.3	93.6	7.72	47542	30.88
Composite 1	C	28	9/28/2017 07:56:56	12.4	94.7	7.74	47515	30.87
Composite 1	D	28	9/28/2017 07:57:15	12.4	98.5	7.78	47451	30.82
Composite 1	E	28	9/28/2017 07:57:33	12.4	91.3	7.74	47504	30.86
Composite 2	A	28	9/28/2017 07:57:52	12.4	93.9	7.77	47467	30.83
Composite 2	B	28	9/28/2017 07:58:15	12.4	98.4	7.8	47493	30.85
Composite 2	C	28	9/28/2017 07:58:30	12.4	99.2	7.8	47457	30.83
Composite 2	D	28	9/28/2017 07:58:47	12.5	95.3	7.78	47489	30.85
Composite 2	E	28	9/28/2017 07:59:01	12.5	94	7.77	47447	30.82
Composite 3	A	28	9/28/2017 07:59:17	12.5	93.3	7.77	47452	30.83
Composite 3	B	28	9/28/2017 07:59:28	12.4	93.6	7.76	47476	30.84
Composite 3	C	28	9/28/2017 07:59:55	12.4	97.6	7.79	47510	30.86
Composite 3	D	28	9/28/2017 08:00:14	12.4	95.4	7.78	47503	30.86
Composite 3	E	28	9/28/2017 08:00:28	12.4	96	7.78	47502	30.86
Composite 4	A	28	9/28/2017 08:00:41	12.5	94.6	7.78	47456	30.83
Composite 4	B	28	9/28/2017 08:01:15	12.4	90.6	7.75	47547	30.89
Composite 4	C	28	9/28/2017 08:01:33	12.4	98.7	7.8	47519	30.87
Composite 4	D	28	9/28/2017 08:01:55	12.4	99.1	7.82	47504	30.86
Composite 4	E	28	9/28/2017 08:02:14	12.4	98.9	7.82	47561	30.9
Composite 5	A	28	9/28/2017 08:02:29	12.4	94.7	7.8	47569	30.91
Composite 5	B	28	9/28/2017 08:02:42	12.5	95.7	7.81	47499	30.86
Composite 5	C	28	9/28/2017 08:02:59	12.5	99.2	7.83	47487	30.85
Composite 5	D	28	9/28/2017 08:03:19	12.4	96.9	7.83	47551	30.89
Composite 5	E	28	9/28/2017 08:03:59	12.1	97.6	7.82	47490	30.84
Composite 6	A	28	9/28/2017 08:04:14	12	95.9	7.78	47659	30.95
Composite 6	B	28	9/28/2017 08:04:35	12.2	88.9	7.77	47512	30.86
Composite 6	C	28	9/28/2017 08:04:50	11.9	89.7	7.71	47856	31.09
Composite 6	D	28	9/28/2017 08:05:14	11.8	97.5	7.77	47689	30.97
Composite 6	E	28	9/28/2017 08:05:28	11.7	96.6	7.77	47776	31.03
Composite 7	A	28	9/28/2017 08:06:03	11.8	97.3	7.78	47611	30.91
Composite 7	B	28	9/28/2017 08:06:44	12.1	91	7.73	47506	30.85
Composite 7	C	28	9/28/2017 08:06:54	12	93.6	7.72	47664	30.96
Composite 7	D	28	9/28/2017 08:07:04	12.2	95.3	7.74	47515	30.86
Composite 7	E	28	9/28/2017 08:07:22	12.2	90.1	7.7	47588	30.91
Composite 8	A	28	9/28/2017 08:07:39	12.3	91.4	7.76	47546	30.89
Composite 8	B	28	9/28/2017 08:08:07	12.2	89.7	7.76	47608	30.93
Composite 8	C	28	9/28/2017 08:08:25	12.2	94.9	7.79	47691	30.98
Composite 8	D	28	9/28/2017 08:08:47	12.4	87.3	7.78	47507	30.86
Composite 8	E	28	9/28/2017 08:08:59	12.2	87.6	7.77	47594	30.92

Nereis virens Day 28 Recovery Record

DATE: 09/28/17 **ESI STUDY:** 29525

CLIENT: AECOM **PROJECT:** New Haven

SAMPLE ID	REP	# LIVE	Initials	SAMPLE ID	REP	# LIVE	Initials
Laboratory Control Sediment	A	18	JTP	Composite 2	A	20	JTP
Laboratory Control Sediment	B	19	DD	Composite 2	B	20	BG
Laboratory Control Sediment	C	19	JTP	Composite 2	C	19	CFS
Laboratory Control Sediment	D	17	DD	Composite 2	D	19	DD
Laboratory Control Sediment	E	19	JTP	Composite 2	E	20	BG
CLDS Reference Sediment	A	19	DD	Composite 3	A	19	DD
CLDS Reference Sediment	B	19	BG	Composite 3	B	20	GRS
CLDS Reference Sediment	C	20	DD	Composite 3	C	19	CFS
CLDS Reference Sediment	D	19	BG	Composite 3	D	20	BG
CLDS Reference Sediment	E	20	DD	Composite 3	E	20	GRS
Composite 1	A	20	BG	Composite 4	A	17	DD
Composite 1	B	17	DD	Composite 4	B	20	BG
Composite 1	C	20	JTP	Composite 4	C	19	JTP
Composite 1	D	20	BG	Composite 4	D	19	DD
Composite 1	E	19	DD	Composite 4	E	20	BG

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Bioaccumulation Assay Recovery Record Mn.wpd

Nereis virens Day 28 Recovery Record

DATE: 09/28/17 **ESI STUDY:** 29525

CLIENT: AECOM **PROJECT:** New Haven

SAMPLE ID	REP	# LIVE	Initials	SAMPLE ID	REP	# LIVE	Initials
Composite 5	A	20	GRS	Composite 7	A	19	JTP
Composite 5	B	19	JTP	Composite 7	B	19	BG
Composite 5	C	18	DJ	Composite 7	C	20	DJ
Composite 5	D	19	GRS	Composite 7	D	20	JTP
Composite 5	E	20	JTP	Composite 7	E	19	GRS
Composite 6	A	19	GRS	Composite 8	A	19	BG
Composite 6	B	19	JTP	Composite 8	B	20	BG
Composite 6	C	18	BG	Composite 8	C	21	GRS
Composite 6	D	18	JTP	Composite 8	D	19	BG
Composite 6	E	19	GRS	Composite 8	E	19	GRS

(10) GRS 0928
Discarded worm found on table.

P:\General Projects\RPT-Active\DSE AECOM - New Haven Harbor FNP\Bioaccumulation Assay Recovery Record Mn.wpd

28 day *Nereis virens* Sediment Bioaccumulation Evaluation

Statistical Analysis Reports

Survival

CETIS Test Data Worksheet

Report Date: 29 Sep-17 09:53 (p 1 of 2)
Test Code/ID: 18-2782-6607/29525Nv

Bioaccumulation Evaluation - Survival Endpoint **EnviroSystems, Inc.**

Start Date: 31 Aug-17 **Species:** Nereis virens **Sample Code:** 29525-000
End Date: 28 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 31 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29525

Sample	Rep	Pos	# Exposed	# Survived	Notes
29525-000	1	9	20	18	
29525-000	2	13	20	19	
29525-000	3	26	20	19	
29525-000	4	40	20	17	
29525-000	5	44	20	19	
29517-009	1	2	20	19	
29517-009	2	20	20	19	
29517-009	3	23	20	20	
29517-009	4	37	20	19	
29517-009	5	41	20	20	
29517-001	1	4	20	20	
29517-001	2	12	20	17	
29517-001	3	24	20	20	
29517-001	4	31	20	20	
29517-001	5	43	20	19	
29517-002	1	10	20	20	
29517-002	2	16	20	20	
29517-002	3	21	20	19	
29517-002	4	34	20	19	
29517-002	5	49	20	20	
29517-003	1	8	20	19	
29517-003	2	19	20	20	
29517-003	3	22	20	19	
29517-003	4	35	20	20	
29517-003	5	46	20	20	
29517-004	1	5	20	17	
29517-004	2	14	20	20	
29517-004	3	28	20	19	
29517-004	4	38	20	19	
29517-004	5	50	20	20	
29517-005	1	6	20	20	
29517-005	2	17	20	19	
29517-005	3	30	20	18	
29517-005	4	36	20	19	
29517-005	5	47	20	20	
29517-006	1	3	20	19	
29517-006	2	18	20	19	
29517-006	3	27	20	18	
29517-006	4	39	20	18	
29517-006	5	48	20	19	
59517-007	1	7	20	19	
59517-007	2	15	20	19	
59517-007	3	29	20	20	
59517-007	4	32	20	20	
59517-007	5	42	20	19	
29517-008	1	1	20	19	
29517-008	2	11	20	20	

Sample	Rep	Pos	# Exposed	# Survived	Notes
29517-008	3	25	21	21	
29517-008	4	33	20	19	
29517-008	5	45	20	19	

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Batch ID:	04-0939-0565	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	31 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	28 Sep-17	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29525-000	10-8256-4737	31 Aug-17	31 Aug-17	n/a	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h		
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29525-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29525	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
21-0544-2683	Proportion Survived	Equal Variance t Two-Sample Test	0.9713	29517-009 passed proportion survived
04-0974-0371	Proportion Survived	Equal Variance t Two-Sample Test	0.4278	29517-001 passed proportion survived
20-8050-7921	Proportion Survived	Equal Variance t Two-Sample Test	0.7102	29517-002 passed proportion survived
05-5357-1455	Proportion Survived	Equal Variance t Two-Sample Test	0.7102	29517-003 passed proportion survived
17-8693-4210	Proportion Survived	Equal Variance t Two-Sample Test	0.2886	29517-004 passed proportion survived
11-6517-3414	Proportion Survived	Equal Variance t Two-Sample Test	0.3509	29517-005 passed proportion survived
07-0012-5470	Proportion Survived	Equal Variance t Two-Sample Test	0.0252	29517-006 failed proportion survived
10-9249-9353	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.7381	59517-007 passed proportion survived
04-4959-2982	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.7381	29517-008 passed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29525-000	LC	5	0.920	0.864	0.976	0.850	0.950	0.020	0.045	4.86%	0.00%
29517-009	RS	5	0.970	0.936	1.000	0.950	1.000	0.012	0.027	2.82%	-5.43%
29517-001		5	0.960	0.879	1.000	0.850	1.000	0.029	0.065	6.79%	-4.35%
29517-002		5	0.980	0.946	1.000	0.950	1.000	0.012	0.027	2.79%	-6.52%
29517-003		5	0.980	0.946	1.000	0.950	1.000	0.012	0.027	2.79%	-6.52%
29517-004		5	0.950	0.874	1.000	0.850	1.000	0.027	0.061	6.45%	-3.26%
29517-005		5	0.960	0.908	1.000	0.900	1.000	0.019	0.042	4.36%	-4.35%
29517-006		5	0.930	0.896	0.964	0.900	0.950	0.012	0.027	2.94%	-1.09%
59517-007		5	0.970	0.936	1.000	0.950	1.000	0.012	0.027	2.82%	-5.43%
29517-008		5	0.970	0.936	1.000	0.950	1.000	0.012	0.027	2.82%	-5.43%

Bioaccumulation Evaluation - Survival Endpoint **EnviroSystems, Inc.**

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29525-000	LC	0.900	0.950	0.950	0.850	0.950
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-001		1.000	0.850	1.000	1.000	0.950
29517-002		1.000	1.000	0.950	0.950	1.000
29517-003		0.950	1.000	0.950	1.000	1.000
29517-004		0.850	1.000	0.950	0.950	1.000
29517-005		1.000	0.950	0.900	0.950	1.000
29517-006		0.950	0.950	0.900	0.900	0.950
59517-007		0.950	0.950	1.000	1.000	0.950
29517-008		0.950	1.000	1.000	0.950	0.950

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	21-0544-2683	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 9:54	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29525-000	10-8256-4737	31 Aug-17	31 Aug-17	n/a	AECOM	Dredged Sediment Evalu
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29525-000	Laboratory Control Sediment	New Haven Harbor FNP -2017	Laboratory Control - 29525	
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-009 passed proportion survived	4.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	-2.22	1.86	0.083	8	CDF	0.9713	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5337	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0245396	0.0245396	1	4.91	0.0575	Non-Significant Effect
Error	0.0399515	0.0049939	8			
Total	0.0644911		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.59	23.2	0.6661	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29525-000	LC	5	0.920	0.864	0.976	0.950	0.850	0.950	0.020	4.86%	0.00%
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	-5.43%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29525-000	LC	5	1.29	1.19	1.39	1.35	1.17	1.35	0.035	6.06%	0.00%
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	-7.67%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29525-000	LC	0.900	0.950	0.950	0.850	0.950
29517-009	RS	0.950	0.950	1.000	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29525-000	LC	1.25	1.35	1.35	1.17	1.35
29517-009	RS	1.35	1.35	1.46	1.35	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	04-0974-0371	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-001 passed proportion survived	5.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	0.188	1.86	0.116	8	CDF	0.4278	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.29	0.0825	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003447	0.0003447	1	0.0353	0.8556	Non-Significant Effect
Error	0.0780693	0.0097587	8			
Total	0.078414		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.05	23.2	0.2040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8	0.741	0.0146	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-001		5	0.960	0.879	1.000	1.000	0.850	1.000	0.029	6.79%	1.03%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-001		5	1.38	1.22	1.53	1.46	1.17	1.46	0.056	9.07%	0.84%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-001		1.000	0.850	1.000	1.000	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-001		1.46	1.17	1.46	1.46	1.35

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	20-8050-7921	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-002 passed proportion survived	3.38%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.577	1.86	0.073	8	CDF	0.7102	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	0.333	0.5796	Non-Significant Effect
Error	0.0309042	0.0038630	8			
Total	0.0321919		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-002		5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	-1.03%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-002		5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	-1.63%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-002		1.000	1.000	0.950	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-002		1.46	1.46	1.35	1.35	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	05-5357-1455	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-003 passed proportion survived	3.38%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.577	1.86	0.073	8	CDF	0.7102	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	0.333	0.5796	Non-Significant Effect
Error	0.0309042	0.0038630	8			
Total	0.0321919		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-003		5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	-1.03%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-003		5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	-1.63%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-003		0.950	1.000	0.950	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-003		1.35	1.46	1.35	1.46	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	17-8693-4210	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-004 passed proportion survived	5.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.581	1.86	0.11	8	CDF	0.2886	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.07	2.29	0.1691	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0029648	0.0029648	1	0.338	0.5772	Non-Significant Effect
Error	0.0702538	0.0087817	8			
Total	0.0732186		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.55	23.2	0.2477	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.895	0.741	0.1947	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-004		5	0.950	0.874	1.000	0.950	0.850	1.000	0.027	6.45%	2.06%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-004		5	1.36	1.21	1.5	1.35	1.17	1.46	0.0523	8.63%	2.48%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-004		0.850	1.000	0.950	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-004		1.17	1.46	1.35	1.35	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	11-6517-3414	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-005 passed proportion survived	4.26%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.397	1.86	0.090	8	CDF	0.3509	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.6976	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009262	0.0009262	1	0.157	0.7019	Non-Significant Effect
Error	0.0470499	0.0058812	8			
Total	0.0479761		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.04	23.2	0.5055	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.869	0.741	0.0980	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-005		5	0.960	0.908	1.000	0.950	0.900	1.000	0.019	4.36%	1.03%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-005		5	1.37	1.26	1.48	1.35	1.25	1.46	0.0397	6.48%	1.38%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-005		1.000	0.950	0.900	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-005		1.46	1.35	1.25	1.35	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	07-0012-5470	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-006 failed proportion survived	3.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	2.3	1.86	0.068	8	CDF	0.0252	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.25	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0175918	0.0175918	1	5.3	0.0503	Non-Significant Effect
Error	0.026566	0.0033208	8			
Total	0.0441578		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.39	23.2	0.7572	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.794	0.741	0.0122	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-006		5	0.930	0.896	0.964	0.950	0.900	0.950	0.012	2.94%	4.12%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-006		5	1.31	1.24	1.37	1.35	1.25	1.35	0.0236	4.03%	6.03%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-006		0.950	0.950	0.900	0.900	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-006		1.35	1.35	1.25	1.25	1.35

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	10-9249-9353	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:05	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	59517-007 passed proportion survived	3.38%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	27.5	n/a	3	8	Exact	0.7381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0309042	0.0038630	8			
Total	0.0309042		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.64	0.741	1.7E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
59517-007		5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
59517-007		5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
59517-007		0.950	0.950	1.000	1.000	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
59517-007		1.35	1.35	1.46	1.46	1.35

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	04-4959-2982	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Sep-17 10:05	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Marine Sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	29517-008 passed proportion survived	3.40%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	27.5	n/a	3	8	Exact	0.7381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.19	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.35E-07	7.35E-07	1	0.000188	0.9894	Non-Significant Effect
Error	0.0312792	0.0039099	8			
Total	0.03128		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.02	23.2	0.9820	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.649	0.741	2.1E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%
29517-008		5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	0.00%
29517-008		5	1.39	1.31	1.47	1.35	1.35	1.46	0.0281	4.52%	-0.04%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.950	0.950	1.000	0.950	1.000
29517-008		0.950	1.000	1.000	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.35	1.35	1.46	1.35	1.46
29517-008		1.35	1.46	1.46	1.35	1.35

28 day *Macoma nasuta* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

Trace Metals

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	3.53		3.07		3.54		3.70		2.16	
Cadmium	0.023	J	0.029	J	0.033	J	0.035	J	0.019	J
Chromium	0.165	J	0.470		0.182	J	0.314	J	0.094	J
Copper	2.27		1.70		1.75		2.38		1.24	
Lead	0.290		0.494		0.323		0.448		0.185	
Mercury	0.004	U	0.004	J	0.003	U	0.003	U	0.004	U
Nickel	0.459		0.508		0.324		0.429		0.215	
Zinc	9.66		12.30		11.00		13.70		9.30	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 1 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.36		3.73		2.89		2.12		2.07	
Cadmium	0.012	J	0.042		0.016	J	0.016	J	0.016	J
Chromium	0.067	J	0.255	J	0.208	J	0.116	J	0.085	J
Copper	0.70		2.17		1.62		0.91		1.01	
Lead	0.095		0.339		0.231		0.174		0.123	
Mercury	0.003	U	0.004	U	0.004	U	0.003	U	0.004	U
Nickel	0.141		0.326		0.273		0.222		0.174	
Zinc	5.64		14.60		9.80		6.24		5.68	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 2 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.36		2.48		1.05		1.91		2.53	
Cadmium	0.034	J	0.023	J	0.016	J	0.021	J	0.023	J
Chromium	0.218	J	0.178	J	0.131	J	0.214	J	0.401	
Copper	1.35		1.72		0.99		1.79		2.45	
Lead	0.290		0.194		0.154		0.215		0.649	
Mercury	0.004	U	0.004	U	0.004	U	0.004	U	0.006	J
Nickel	0.347		0.245		0.154		0.277		0.366	
Zinc	8.64		6.90		4.72		6.95		9.93	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 3 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.63		1.20		2.11		3.05		2.78	
Cadmium	0.030	J	0.013	J	0.029	J	0.027	J	0.025	J
Chromium	0.115	J	0.084	J	0.160	J	0.544		0.230	J
Copper	1.39		0.92		1.06		2.40		1.62	
Lead	0.243		0.171		0.231		0.514		0.265	
Mercury	0.003	U	0.004	U	0.004	U	0.004	J	0.004	J
Nickel	0.168		0.159		0.261		0.408		0.285	
Zinc	6.50		4.85		7.67		11.50		10.60	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 4 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.88		3.06		1.92		1.87		2.28	
Cadmium	0.046		0.041		0.018	J	0.069		0.050	
Chromium	0.701		0.487		0.168	J	0.424		0.299	J
Copper	3.13		2.44		1.08		3.36		2.30	
Lead	0.790		0.643		0.291		0.663		0.560	
Mercury	0.009	J	0.005	J	0.003	U	0.003	U	0.004	U
Nickel	0.480		0.422		0.238		0.301		0.320	
Zinc	12.10		11.30		6.54		14.40		16.80	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 5 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.90		2.42		2.03		2.39		2.17	
Cadmium	0.038	J	0.028	J	0.029	J	0.031	J	0.060	
Chromium	0.268	J	0.222	J	0.228	J	0.207	J	0.390	J
Copper	11.30		1.76		1.72		2.25		2.34	
Lead	0.469		0.292		0.281		0.360		0.541	
Mercury	0.004	U	0.003	U	0.004	U	0.004	U	0.004	U
Nickel	0.320		0.351		0.274		0.303		0.417	
Zinc	9.88		9.46		10.90		11.70		12.90	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 6 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.16		1.43		1.19		1.71		1.77	
Cadmium	0.070		0.056		0.050		0.079		0.058	
Chromium	0.973		0.614		0.720		0.660		0.606	
Copper	3.42		2.57		3.27		2.96		2.73	
Lead	1.040		0.685		0.911		0.795		0.691	
Mercury	0.004	U	0.004	U	0.004	U	0.004	U	0.003	U
Nickel	0.502		0.326		0.395		0.448		0.368	
Zinc	13.70		11.30		12.10		12.40		14.20	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 7 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.28		2.53		1.63		2.13		2.94	
Cadmium	0.054		0.069		0.038		0.040		0.026	J
Chromium	0.789		0.461		0.254	J	0.622		0.342	J
Copper	3.22		2.38		1.71		2.18		3.60	
Lead	0.964		0.725		0.378		0.902		0.534	
Mercury	0.004	U	0.004	U	0.003	U	0.003	U	0.005	J
Nickel	0.431		0.457		0.269		0.324		0.342	
Zinc	11.50		11.60		7.00		13.30		9.53	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 8 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.06		2.53		1.02		2.90		3.15	
Cadmium	0.034	J	0.074		0.026	J	0.039		0.036	J
Chromium	0.743		0.618		0.452		0.330	J	0.527	
Copper	2.38		3.11		2.22		2.52		2.45	
Lead	0.828		0.891		0.564		0.588		0.546	
Mercury	0.004	J	0.005	J	0.003	U	0.003	U	0.005	J
Nickel	0.404		0.411		0.288		0.332		0.523	
Zinc	8.95		12.00		8.72		13.70		12.50	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Start Date: 29 Aug-17 **Species:** Macoma nasuta **Sample Code:** 29524-000
End Date: 26 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 29 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29524

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
29524-000	1	9									
29524-000	2	19									
29524-000	3	26									
29524-000	4	38									
29524-000	5	49									
29517-009	1	2		3.53	0.023	0.165	2.27	0.29	0.004	0.459	9.66
29517-009	2	12		3.07	0.029	0.47	1.7	0.494	0.004	0.508	12.3
29517-009	3	27		3.54	0.033	0.182	1.75	0.323	0.003	0.324	11
29517-009	4	35		3.7	0.035	0.314	2.38	0.448	0.003	0.429	13.7
29517-009	5	44		2.16	0.019	0.094	1.24	0.185	0.004	0.215	9.3
29517-001	1	7		1.36	0.012	0.067	0.699	0.095	0.003	0.141	5.64
29517-001	2	13		3.73	0.042	0.255	2.17	0.339	0.004	0.326	14.6
29517-001	3	23		2.89	0.016	0.208	1.62	0.231	0.004	0.273	9.8
29517-001	4	40		2.12	0.016	0.116	0.907	0.174	0.003	0.222	6.24
29517-001	5	50		2.07	0.016	0.085	1.01	0.123	0.004	0.174	5.68
29517-002	1	3		2.36	0.034	0.218	1.35	0.29	0.004	0.347	8.64
29517-002	2	17		2.48	0.023	0.178	1.72	0.194	0.004	0.245	6.9
29517-002	3	25		1.05	0.016	0.131	0.993	0.154	0.004	0.154	4.72
29517-002	4	36		1.91	0.021	0.214	1.79	0.215	0.004	0.277	6.95
29517-002	5	41		2.53	0.023	0.401	2.45	0.649	0.006	0.366	9.93
29517-003	1	1		1.63	0.03	0.115	1.39	0.243	0.003	0.168	6.5
29517-003	2	11		1.2	0.013	0.084	0.92	0.171	0.004	0.159	4.85
29517-003	3	28		2.11	0.029	0.16	1.06	0.231	0.004	0.261	7.67
29517-003	4	33		3.05	0.027	0.544	2.4	0.514	0.004	0.408	11.5
29517-003	5	42		2.78	0.025	0.23	1.62	0.265	0.004	0.285	10.6
29517-004	1	10		2.88	0.046	0.701	3.13	0.79	0.009	0.48	12.1
29517-004	2	15		3.06	0.041	0.487	2.44	0.643	0.005	0.422	11.3
29517-004	3	22		1.92	0.018	0.168	1.08	0.291	0.003	0.238	6.54
29517-004	4	37		1.87	0.069	0.424	3.36	0.663	0.003	0.301	14.4
29517-004	5	48		2.28	0.05	0.299	2.3	0.56	0.004	0.32	16.8
29517-005	1	4		1.9	0.038	0.268	11.3	0.469	0.004	0.32	9.88
29517-005	2	14		2.42	0.028	0.222	1.76	0.292	0.003	0.351	9.46

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
29517-005	3	24		2.03	0.029	0.228	1.72	0.281	0.004	0.274	10.9
29517-005	4	39		2.39	0.031	0.207	2.25	0.36	0.004	0.303	11.7
29517-005	5	43		2.17	0.06	0.39	2.34	0.541	0.004	0.417	12.9
29517-006	1	5		2.16	0.07	0.973	3.42	1.04	0.004	0.502	13.7
29517-006	2	16		1.43	0.056	0.614	2.57	0.685	0.004	0.326	11.3
29517-006	3	30		1.19	0.05	0.72	3.27	0.911	0.004	0.395	12.1
29517-006	4	32		1.71	0.079	0.66	2.96	0.795	0.004	0.448	12.4
29517-006	5	45		1.77	0.058	0.606	2.73	0.691	0.003	0.368	14.2
59517-007	1	8		2.28	0.054	0.789	3.22	0.964	0.004	0.431	11.5
59517-007	2	20		2.53	0.069	0.461	2.38	0.725	0.004	0.457	11.6
59517-007	3	21		1.63	0.038	0.254	1.71	0.378	0.003	0.269	7
59517-007	4	34		2.13	0.04	0.622	2.18	0.902	0.003	0.324	13.3
59517-007	5	46		2.94	0.026	0.342	3.6	0.534	0.005	0.342	9.53
29517-008	1	6		2.06	0.034	0.743	2.38	0.828	0.004	0.404	8.95
29517-008	2	18		2.53	0.074	0.618	3.11	0.891	0.005	0.411	12
29517-008	3	29		1.02	0.026	0.452	2.22	0.564	0.003	0.288	8.72
29517-008	4	31		2.9	0.039	0.33	2.52	0.588	0.003	0.332	13.7
29517-008	5	47		3.15	0.036	0.527	2.45	0.546	0.005	0.523	12.5

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Batch ID:	00-9267-2798	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	29 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Sep-17	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
03-9789-2208	Arsenic	Equal Variance t Two-Sample Test	0.9209	29517-001 passed arsenic
15-7219-6448	Arsenic	Wilcoxon Rank Sum Two-Sample Test	0.9841	29517-002 passed arsenic
02-4665-5128	Arsenic	Equal Variance t Two-Sample Test	0.9767	29517-003 passed arsenic
03-6174-9470	Arsenic	Equal Variance t Two-Sample Test	0.9679	29517-004 passed arsenic
11-6568-5587	Arsenic	Equal Variance t Two-Sample Test	0.9999	29517-005 passed arsenic
13-5025-2761	Arsenic	Equal Variance t Two-Sample Test	0.9954	29517-005 passed arsenic
16-5406-3371	Arsenic	Equal Variance t Two-Sample Test	0.9993	29517-006 passed arsenic
04-4448-0551	Arsenic	Equal Variance t Two-Sample Test	0.9825	59517-007 passed arsenic
16-7942-3108	Arsenic	Equal Variance t Two-Sample Test	0.9493	29517-008 passed arsenic
11-2964-2937	Cadmium	Equal Variance t Two-Sample Test	0.8655	29517-001 passed cadmium
16-5805-6583	Cadmium	Equal Variance t Two-Sample Test	0.9958	29517-001 passed cadmium
10-7264-5174	Cadmium	Equal Variance t Two-Sample Test	0.8369	29517-002 passed cadmium
19-5402-5177	Cadmium	Equal Variance t Two-Sample Test	0.7475	29517-003 passed cadmium
07-4498-6793	Cadmium	Equal Variance t Two-Sample Test	0.0438	29517-004 failed cadmium
00-5439-8566	Cadmium	Equal Variance t Two-Sample Test	0.0984	29517-005 passed cadmium
13-8508-1911	Cadmium	Equal Variance t Two-Sample Test	0.1896	29517-005 passed cadmium
14-4636-9482	Cadmium	Equal Variance t Two-Sample Test	2.1E-04	29517-006 failed cadmium
00-3439-0780	Cadmium	Equal Variance t Two-Sample Test	0.0292	59517-007 failed cadmium
08-9273-2454	Cadmium	Equal Variance t Two-Sample Test	0.0763	29517-008 passed cadmium
18-8338-2574	Cadmium	Equal Variance t Two-Sample Test	0.0994	29517-008 passed cadmium
08-9206-1868	Chromium	Equal Variance t Two-Sample Test	0.8854	29517-001 passed chromium
17-9766-5574	Chromium	Equal Variance t Two-Sample Test	0.5788	29517-002 passed chromium
04-5638-9323	Chromium	Equal Variance t Two-Sample Test	0.5665	29517-003 passed chromium
02-8335-4885	Chromium	Equal Variance t Two-Sample Test	0.0826	29517-004 passed chromium
20-5196-6544	Chromium	Equal Variance t Two-Sample Test	0.4075	29517-005 passed chromium
20-2459-8135	Chromium	Equal Variance t Two-Sample Test	5.6E-04	29517-006 failed chromium
18-5664-9504	Chromium	Equal Variance t Two-Sample Test	0.0332	59517-007 failed chromium

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
20-2534-3836	Chromium	Equal Variance t Two-Sample Test	0.0088	29517-008 failed chromium
04-1480-6470	Copper	Equal Variance t Two-Sample Test	0.9385	29517-001 passed copper
06-5337-8561	Copper	Equal Variance t Two-Sample Test	0.7326	29517-002 passed copper
03-2532-1009	Copper	Equal Variance t Two-Sample Test	0.8621	29517-003 passed copper
07-0927-2506	Copper	Equal Variance t Two-Sample Test	0.1117	29517-004 passed copper
18-0037-4622	Copper	Equal Variance t Two-Sample Test	0.3015	29517-005 passed copper
12-5786-7257	Copper	Wilcoxon Rank Sum Two-Sample Test	0.2103	29517-005 passed copper
07-6006-3237	Copper	Equal Variance t Two-Sample Test	0.0013	29517-006 failed copper
13-1422-5304	Copper	Equal Variance t Two-Sample Test	0.0501	59517-007 passed copper
17-7436-3360	Copper	Equal Variance t Two-Sample Test	0.0158	29517-008 failed copper
00-8620-7595	Lead	Equal Variance t Two-Sample Test	0.9708	29517-001 passed lead
10-0190-2342	Lead	Equal Variance t Two-Sample Test	0.6678	29517-002 passed lead
01-0051-3876	Lead	Equal Variance t Two-Sample Test	0.7702	29517-003 passed lead
05-2982-6827	Lead	Equal Variance t Two-Sample Test	0.0212	29517-004 failed lead
07-1060-0664	Lead	Equal Variance t Two-Sample Test	0.3021	29517-005 passed lead
07-9890-7569	Lead	Equal Variance t Two-Sample Test	3.1E-04	29517-006 failed lead
05-5033-9783	Lead	Equal Variance t Two-Sample Test	0.0106	59517-007 failed lead
20-3608-2340	Lead	Equal Variance t Two-Sample Test	0.0032	29517-008 failed lead
09-1685-1691	Mercury	Wilcoxon Rank Sum Two-Sample Test	0.7381	29517-001 passed mercury
06-6464-5453	Mercury	Equal Variance t Two-Sample Test	0.0632	29517-002 passed mercury
02-5806-3695	Mercury	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-003 passed mercury
00-9845-7069	Mercury	Equal Variance t Two-Sample Test	0.1617	29517-004 passed mercury
05-9866-4620	Mercury	Equal Variance t Two-Sample Test	0.3873	29517-004 passed mercury
01-0822-3772	Mercury	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-005 passed mercury
04-2183-1904	Mercury	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-006 passed mercury
10-4946-2817	Mercury	Equal Variance t Two-Sample Test	0.3333	59517-007 passed mercury
15-9217-6955	Mercury	Equal Variance t Two-Sample Test	0.2277	29517-008 passed mercury
00-3959-6603	Nickel	Equal Variance t Two-Sample Test	0.9835	29517-001 passed nickel
08-4134-9087	Nickel	Equal Variance t Two-Sample Test	0.9346	29517-002 passed nickel
05-1112-9782	Nickel	Equal Variance t Two-Sample Test	0.9519	29517-003 passed nickel
03-0683-3610	Nickel	Equal Variance t Two-Sample Test	0.6882	29517-004 passed nickel
09-6196-3972	Nickel	Equal Variance t Two-Sample Test	0.8108	29517-005 passed nickel
09-9345-5623	Nickel	Equal Variance t Two-Sample Test	0.3707	29517-006 passed nickel
02-8445-8041	Nickel	Equal Variance t Two-Sample Test	0.6343	59517-007 passed nickel
11-3251-6430	Nickel	Equal Variance t Two-Sample Test	0.4731	29517-008 passed nickel
15-0146-5800	Zinc	Equal Variance t Two-Sample Test	0.9088	29517-001 passed zinc
16-2242-8017	Zinc	Equal Variance t Two-Sample Test	0.9929	29517-002 passed zinc
16-1228-1719	Zinc	Equal Variance t Two-Sample Test	0.9591	29517-003 passed zinc
16-8440-3977	Zinc	Equal Variance t Two-Sample Test	0.3004	29517-004 passed zinc
11-5027-7404	Zinc	Equal Variance t Two-Sample Test	0.5834	29517-005 passed zinc
04-4194-8712	Zinc	Equal Variance t Two-Sample Test	0.0761	29517-006 passed zinc
19-5054-9598	Zinc	Equal Variance t Two-Sample Test	0.6668	59517-007 passed zinc
07-1405-7297	Zinc	Equal Variance t Two-Sample Test	0.5054	29517-008 passed zinc

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98	2.16	3.7	0.28	0.627	19.60%	0.00%
29517-001		5	2.43	1.31	3.56	1.36	3.73	0.404	0.904	37.16%	23.94%
29517-002		5	2.07	1.3	2.83	1.05	2.53	0.277	0.618	29.93%	35.44%
29517-003		5	2.15	1.2	3.11	1.2	3.05	0.345	0.772	35.82%	32.69%
29517-004		5	2.4	1.72	3.08	1.87	3.06	0.244	0.546	22.72%	24.94%
29517-005		5	2.18	1.9	2.46	1.9	2.42	0.101	0.225	10.32%	31.81%
29517-006		5	1.65	1.2	2.11	1.19	2.16	0.164	0.367	22.20%	48.37%
59517-007		5	2.3	1.7	2.9	1.63	2.94	0.217	0.485	21.07%	28.06%
29517-008		5	2.33	1.29	3.38	1.02	3.15	0.376	0.841	36.05%	27.13%

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361	0.019	0.035	0.00301	0.00672	24.18%	0.00%
29517-001		5	0.0204	0.00525	0.0355	0.012	0.042	0.00546	0.0122	59.80%	26.62%
29517-002		5	0.0234	0.0152	0.0316	0.016	0.034	0.00294	0.00658	28.12%	15.83%
29517-003		5	0.0248	0.0163	0.0333	0.013	0.03	0.00307	0.00687	27.70%	10.79%
29517-004		5	0.0448	0.022	0.0676	0.018	0.069	0.00821	0.0183	40.96%	-61.15%
29517-005		5	0.0372	0.0206	0.0538	0.028	0.06	0.00596	0.0133	35.83%	-33.81%
29517-006		5	0.0626	0.0481	0.0771	0.05	0.079	0.00523	0.0117	18.68%	-125.18%
59517-007		5	0.0454	0.0249	0.0659	0.026	0.069	0.00739	0.0165	36.38%	-63.31%
29517-008		5	0.0418	0.0187	0.0649	0.026	0.074	0.00833	0.0186	44.58%	-50.36%

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43	0.094	0.47	0.0665	0.149	60.73%	0.00%
29517-001		5	0.146	0.045	0.247	0.067	0.255	0.0365	0.0815	55.76%	40.33%
29517-002		5	0.228	0.101	0.356	0.131	0.401	0.0459	0.103	44.94%	6.78%
29517-003		5	0.227	-0.00401	0.457	0.084	0.544	0.0831	0.186	81.96%	7.51%
29517-004		5	0.416	0.166	0.665	0.168	0.701	0.0899	0.201	48.33%	-69.71%
29517-005		5	0.263	0.171	0.355	0.207	0.39	0.0333	0.0745	28.32%	-7.35%
29517-006		5	0.715	0.527	0.903	0.606	0.973	0.0677	0.151	21.19%	-191.67%
59517-007		5	0.494	0.226	0.761	0.254	0.789	0.0962	0.215	43.59%	-101.47%
29517-008		5	0.534	0.339	0.729	0.33	0.743	0.0704	0.157	29.48%	-117.96%

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44	1.24	2.38	0.207	0.464	24.83%	0.00%
29517-001		5	1.28	0.532	2.03	0.699	2.17	0.27	0.604	47.11%	31.41%
29517-002		5	1.66	0.985	2.34	0.993	2.45	0.243	0.544	32.78%	11.10%
29517-003		5	1.48	0.753	2.2	0.92	2.4	0.261	0.584	39.51%	20.88%
29517-004		5	2.46	1.35	3.57	1.08	3.36	0.399	0.893	36.27%	-31.80%
29517-005		5	3.87	-1.29	9.04	1.72	11.3	1.86	4.16	107.40%	-107.39%
29517-006		5	2.99	2.55	3.43	2.57	3.42	0.159	0.356	11.92%	-60.06%
59517-007		5	2.62	1.66	3.58	1.71	3.6	0.346	0.775	29.59%	-40.15%
29517-008		5	2.54	2.11	2.96	2.22	3.11	0.152	0.34	13.39%	-35.76%

Bioaccumulation Evaluation - Metals - Macoma EnviroSystems, Inc.

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502	0.185	0.494	0.0556	0.124	35.74%	0.00%
29517-001		5	0.192	0.072	0.313	0.095	0.339	0.0434	0.097	50.41%	44.71%
29517-002		5	0.3	0.0508	0.55	0.154	0.649	0.0899	0.201	66.93%	13.68%
29517-003		5	0.285	0.12	0.45	0.171	0.514	0.0594	0.133	46.62%	18.16%
29517-004		5	0.589	0.358	0.82	0.291	0.79	0.0832	0.186	31.56%	-69.37%
29517-005		5	0.389	0.248	0.529	0.281	0.541	0.0507	0.113	29.18%	-11.67%
29517-006		5	0.824	0.636	1.01	0.685	1.04	0.0679	0.152	18.40%	-136.90%
59517-007		5	0.701	0.395	1.01	0.378	0.964	0.11	0.246	35.13%	-101.32%
29517-008		5	0.683	0.481	0.886	0.546	0.891	0.0729	0.163	23.85%	-96.38%

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428	0.003	0.004	0.000245	0.000548	15.21%	0.00%
29517-001		5	0.0036	0.00292	0.00428	0.003	0.004	0.000245	0.000548	15.21%	0.00%
29517-002		5	0.0044	0.00329	0.00551	0.004	0.006	0.0004	0.000894	20.33%	-22.22%
29517-003		5	0.0038	0.00324	0.00436	0.003	0.004	0.0002	0.000447	11.77%	-5.56%
29517-004		5	0.0048	0.00171	0.00789	0.003	0.009	0.00111	0.00249	51.87%	-33.33%
29517-005		5	0.0038	0.00324	0.00436	0.003	0.004	0.0002	0.000447	11.77%	-5.56%
29517-006		5	0.0038	0.00324	0.00436	0.003	0.004	0.0002	0.000447	11.77%	-5.56%
59517-007		5	0.0038	0.00276	0.00484	0.003	0.005	0.000374	0.000837	22.02%	-5.56%
29517-008		5	0.004	0.00276	0.00524	0.003	0.005	0.000447	0.001	25.00%	-11.11%

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533	0.215	0.508	0.0525	0.117	30.34%	0.00%
29517-001		5	0.227	0.135	0.32	0.141	0.326	0.0333	0.0744	32.75%	41.29%
29517-002		5	0.278	0.172	0.383	0.154	0.366	0.0381	0.0851	30.64%	28.22%
29517-003		5	0.256	0.13	0.382	0.159	0.408	0.0453	0.101	39.58%	33.80%
29517-004		5	0.352	0.231	0.473	0.238	0.48	0.0435	0.0973	27.64%	8.99%
29517-005		5	0.333	0.265	0.401	0.274	0.417	0.0244	0.0546	16.40%	13.95%
29517-006		5	0.408	0.322	0.493	0.326	0.502	0.0308	0.0688	16.87%	-5.37%
59517-007		5	0.365	0.268	0.461	0.269	0.457	0.0348	0.0779	21.35%	5.79%
29517-008		5	0.392	0.28	0.503	0.288	0.523	0.0401	0.0896	22.87%	-1.19%

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5	9.3	13.7	0.821	1.84	16.40%	0.00%
29517-001		5	8.39	3.58	13.2	5.64	14.6	1.73	3.88	46.18%	25.02%
29517-002		5	7.43	4.98	9.88	4.72	9.93	0.882	1.97	26.56%	33.63%
29517-003		5	8.22	4.77	11.7	4.85	11.5	1.25	2.79	33.87%	26.52%
29517-004		5	12.2	7.47	17	6.54	16.8	1.72	3.84	31.37%	-9.26%
29517-005		5	11	9.24	12.7	9.46	12.9	0.622	1.39	12.68%	2.00%
29517-006		5	12.7	11.3	14.2	11.3	14.2	0.532	1.19	9.33%	-13.83%
59517-007		5	10.6	7.6	13.6	7	13.3	1.08	2.41	22.75%	5.41%
29517-008		5	11.2	8.41	13.9	8.72	13.7	0.995	2.22	19.91%	0.16%

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-001		1.36	3.73	2.89	2.12	2.07
29517-002		2.36	2.48	1.05	1.91	2.53
29517-003		1.63	1.2	2.11	3.05	2.78
29517-004		2.88	3.06	1.92	1.87	2.28
29517-005		1.9	2.42	2.03	2.39	2.17
29517-006		2.16	1.43	1.19	1.71	1.77
59517-007		2.28	2.53	1.63	2.13	2.94
29517-008		2.06	2.53	1.02	2.9	3.15

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-001		0.012	0.042	0.016	0.016	0.016
29517-002		0.034	0.023	0.016	0.021	0.023
29517-003		0.03	0.013	0.029	0.027	0.025
29517-004		0.046	0.041	0.018	0.069	0.05
29517-005		0.038	0.028	0.029	0.031	0.06
29517-006		0.07	0.056	0.05	0.079	0.058
59517-007		0.054	0.069	0.038	0.04	0.026
29517-008		0.034	0.074	0.026	0.039	0.036

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-001		0.067	0.255	0.208	0.116	0.085
29517-002		0.218	0.178	0.131	0.214	0.401
29517-003		0.115	0.084	0.16	0.544	0.23
29517-004		0.701	0.487	0.168	0.424	0.299
29517-005		0.268	0.222	0.228	0.207	0.39
29517-006		0.973	0.614	0.72	0.66	0.606
59517-007		0.789	0.461	0.254	0.622	0.342
29517-008		0.743	0.618	0.452	0.33	0.527

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-001		0.699	2.17	1.62	0.907	1.01
29517-002		1.35	1.72	0.993	1.79	2.45
29517-003		1.39	0.92	1.06	2.4	1.62
29517-004		3.13	2.44	1.08	3.36	2.3
29517-005		11.3	1.76	1.72	2.25	2.34
29517-006		3.42	2.57	3.27	2.96	2.73
59517-007		3.22	2.38	1.71	2.18	3.6
29517-008		2.38	3.11	2.22	2.52	2.45

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-001		0.095	0.339	0.231	0.174	0.123
29517-002		0.29	0.194	0.154	0.215	0.649
29517-003		0.243	0.171	0.231	0.514	0.265
29517-004		0.79	0.643	0.291	0.663	0.56
29517-005		0.469	0.292	0.281	0.36	0.541
29517-006		1.04	0.685	0.911	0.795	0.691
59517-007		0.964	0.725	0.378	0.902	0.534
29517-008		0.828	0.891	0.564	0.588	0.546

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-001		0.003	0.004	0.004	0.003	0.004
29517-002		0.004	0.004	0.004	0.004	0.006
29517-003		0.003	0.004	0.004	0.004	0.004
29517-004		0.009	0.005	0.003	0.003	0.004
29517-005		0.004	0.003	0.004	0.004	0.004
29517-006		0.004	0.004	0.004	0.004	0.003
59517-007		0.004	0.004	0.003	0.003	0.005
29517-008		0.004	0.005	0.003	0.003	0.005

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-001		0.141	0.326	0.273	0.222	0.174
29517-002		0.347	0.245	0.154	0.277	0.366
29517-003		0.168	0.159	0.261	0.408	0.285
29517-004		0.48	0.422	0.238	0.301	0.32
29517-005		0.32	0.351	0.274	0.303	0.417
29517-006		0.502	0.326	0.395	0.448	0.368
59517-007		0.431	0.457	0.269	0.324	0.342
29517-008		0.404	0.411	0.288	0.332	0.523

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-001		5.64	14.6	9.8	6.24	5.68
29517-002		8.64	6.9	4.72	6.95	9.93
29517-003		6.5	4.85	7.67	11.5	10.6
29517-004		12.1	11.3	6.54	14.4	16.8
29517-005		9.88	9.46	10.9	11.7	12.9
29517-006		13.7	11.3	12.1	12.4	14.2
59517-007		11.5	11.6	7	13.3	9.53
29517-008		8.95	12	8.72	13.7	12.5

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-9789-2208	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed arsenic	28.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.56	1.86	0.915	8	CDF	0.9209	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5554	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.46689	1.46689	1	2.42	0.1583	Non-Significant Effect
Error	4.84512	0.60564	8			
Total	6.31201		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.08	23.2	0.4955	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6207	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-001		5	2.43	1.31	3.56		1.36	3.73	0.404	37.16%	23.94%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-001		1.36	3.73	2.89	2.12	2.07

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-7219-6448 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed arsenic	22.89%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	37	n/a	0	8	Exact	0.9841	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5466	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.21489	3.21489	1	8.29	0.0205	Significant Effect
Error	3.10272	0.38784	8			
Total	6.31761		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.03	23.2	0.9791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.776	0.741	0.0074	Non-Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-002		5	2.07	1.3	2.83		1.05	2.53	0.277	29.93%	35.44%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-002		2.36	2.48	1.05	1.91	2.53

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-4665-5128 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed arsenic	25.84%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-2.35	1.86	0.827	8	CDF	0.9767	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9857	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.73529	2.73529	1	5.53	0.0465	Significant Effect
Error	3.95432	0.49429	8			
Total	6.68961		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6976	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.741	0.4973	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-003		5	2.15	1.2	3.11		1.2	3.05	0.345	35.82%	32.69%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-003		1.63	1.2	2.11	3.05	2.78

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-6174-9470 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed arsenic	21.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-2.15	1.86	0.691	8	CDF	0.9679	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3810	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.59201	1.59201	1	4.61	0.0641	Non-Significant Effect
Error	2.76468	0.345585	8			
Total	4.35669		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	23.2	0.7944	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.921	0.741	0.3612	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-004		5	2.4	1.72	3.08		1.87	3.06	0.244	22.72%	24.94%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-004		2.88	3.06	1.92	1.87	2.28

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-5025-2761 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed arsenic	17.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.42	1.86	0.554	8	CDF	0.9954	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.34	2.29	0.0347	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.59081	2.59081	1	11.7	0.0091	Significant Effect
Error	1.77568	0.22196	8			
Total	4.36649		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.76	23.2	0.0722	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.874	0.741	0.1100	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-005		5	2.18	1.9	2.46		1.9	2.42	0.101	10.32%	31.81%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-005		1.9	2.42	2.03	2.39	2.17

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-6568-5587 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed arsenic	9.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-7.74	1.89	0.313	7	CDF	0.9999	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.62952	3.62952	1	60	1.1E-04	Significant Effect
Error	0.42368	0.0605257	7			
Total	4.0532		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.45	24.3	0.7059	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.701	0.2891	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	3.46	3.03	3.89		3.07	3.7	0.136	7.84%	0.00%
29517-005		5	2.18	1.9	2.46		1.9	2.42	0.101	10.32%	36.94%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	Outlier
29517-005		1.9	2.42	2.03	2.39	2.17

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-5406-3371 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed arsenic	18.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-4.76	1.86	0.604	8	CDF	0.9993	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.29	0.1167	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.99076	5.99076	1	22.7	0.0014	Significant Effect
Error	2.11108	0.263885	8			
Total	8.10184		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.92	23.2	0.3236	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2626	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-006		5	1.65	1.2	2.11		1.19	2.16	0.164	22.20%	48.37%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-006		2.16	1.43	1.19	1.71	1.77

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-4448-0551 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed arsenic	20.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-2.53	1.86	0.659	8	CDF	0.9825	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2678	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.01601	2.01601	1	6.42	0.0351	Significant Effect
Error	2.51368	0.31421	8			
Total	4.52969		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6306	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.3967	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
59517-007		5	2.3	1.7	2.9		1.63	2.94	0.217	21.07%	28.06%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
59517-007		2.28	2.53	1.63	2.13	2.94

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-7942-3108 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed arsenic	27.25%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-1.85	1.86	0.872	8	CDF	0.9493	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3808	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.88356	1.88356	1	3.43	0.1014	Non-Significant Effect
Error	4.39928	0.54991	8			
Total	6.28284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.8	23.2	0.5842	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.891	0.741	0.1726	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	3.2	2.42	3.98		2.16	3.7	0.28	19.60%	0.00%
29517-008		5	2.33	1.29	3.38		1.02	3.15	0.376	36.05%	27.13%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	3.53	3.07	3.54	3.7	2.16
29517-008		2.06	2.53	1.02	2.9	3.15

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-2964-2937 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed cadmium	41.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.19	1.86	0.012	8	CDF	0.8655	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.33	2.29	0.0388	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001369	0.0001369	1	1.41	0.2689	Non-Significant Effect
Error	0.000776	0.000097	8			
Total	0.0009129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.29	23.2	0.2751	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.832	0.741	0.0350	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-001		5	0.0204	0.00525	0.0355		0.012	0.042	0.00546	59.80%	26.62%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-001		0.012	0.042	0.016	0.016	0.016

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-5805-6583	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed cadmium	23.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-3.64	1.89	0.007	7	CDF	0.9958	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003641	0.0003641	1	13.2	0.0083	Significant Effect
Error	0.0001928	2.754E-05	7			
Total	0.0005569		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.3	46.2	0.0747	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.701	0.6290	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-001		4	0.015	0.0118	0.0182		0.012	0.016	0.001	13.33%	46.04%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-001		0.012	Outlier	0.016	0.016	0.016

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-7264-5174 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed cadmium	28.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-1.05	1.86	0.008	8	CDF	0.8369	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.7027	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000484	0.0000484	1	1.09	0.3262	Non-Significant Effect
Error	0.000354	4.425E-05	8			
Total	0.0004024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.04	23.2	0.9678	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.969	0.741	0.8790	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-002		5	0.0234	0.0152	0.0316		0.016	0.034	0.00294	28.12%	15.83%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-002		0.034	0.023	0.016	0.021	0.023

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-5402-5177 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed cadmium	28.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.698	1.86	0.008	8	CDF	0.7475	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.84	2.29	0.4318	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000225	0.0000225	1	0.487	0.5050	Non-Significant Effect
Error	0.0003696	0.0000462	8			
Total	0.0003921		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.04	23.2	0.9675	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.894	0.741	0.1896	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-003		5	0.0248	0.0163	0.0333		0.013	0.03	0.00307	27.70%	10.79%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-003		0.03	0.013	0.029	0.027	0.025

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-4498-6793 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed cadmium	58.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	1.95	1.86	0.016	8	CDF	0.0438	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1820	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007225	0.0007225	1	3.78	0.0876	Non-Significant Effect
Error	0.0015276	0.000191	8			
Total	0.0022501		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.45	23.2	0.0774	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.934	0.741	0.4878	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-004		5	0.0448	0.022	0.0676		0.018	0.069	0.00821	40.96%	-61.15%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-004		0.046	0.041	0.018	0.069	0.05

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-5439-8566	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed cadmium	44.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	1.41	1.86	0.012	8	CDF	0.0984	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.29	0.0497	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002209	0.0002209	1	1.98	0.1968	Non-Significant Effect
Error	0.0008916	0.0001115	8			
Total	0.0011125		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.93	23.2	0.2134	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.741	0.0686	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-005		5	0.0372	0.0206	0.0538		0.028	0.06	0.00596	35.83%	-33.81%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-005		0.038	0.028	0.029	0.031	0.06

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-8508-1911	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed cadmium	26.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.938	1.89	0.007	7	CDF	0.1896	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.042E-05	3.042E-05	1	0.881	0.3793	Non-Significant Effect
Error	0.0002418	3.454E-05	7			
Total	0.0002722		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.22	46.2	0.5377	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.95	0.701	0.6939	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-005		4	0.0315	0.0243	0.0387		0.028	0.038	0.00225	14.32%	-13.31%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-005		0.038	0.028	0.029	0.031	Outlier

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-4636-9482 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed cadmium	40.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	5.77	1.86	0.011	8	CDF	2.1E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.82	2.29	0.4594	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0030276	0.0030276	1	33.3	4.2E-04	Significant Effect
Error	0.000728	0.000091	8			
Total	0.0037556		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.03	23.2	0.3088	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.741	0.7431	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-006		5	0.0626	0.0481	0.0771		0.05	0.079	0.00523	18.68%	-125.18%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-006		0.07	0.056	0.05	0.079	0.058

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-3439-0780 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed cadmium	53.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.21	1.86	0.015	8	CDF	0.0292	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2494	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007744	0.0007744	1	4.87	0.0584	Non-Significant Effect
Error	0.001272	0.000159	8			
Total	0.0020464		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.04	23.2	0.1097	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8582	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
59517-007		5	0.0454	0.0249	0.0659		0.026	0.069	0.00739	36.38%	-63.31%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
59517-007		0.054	0.069	0.038	0.04	0.026

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-8338-2574	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed cadmium	28.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.42	1.89	0.008	7	CDF	0.0994	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.867E-05	7.867E-05	1	2.01	0.1989	Non-Significant Effect
Error	0.0002736	3.908E-05	7			
Total	0.0003522		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.46	46.2	0.7863	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.701	0.3397	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0278	0.0195	0.0361		0.019	0.035	0.00301	24.18%	0.00%
29517-008		4	0.0338	0.0249	0.0426		0.026	0.039	0.00278	16.47%	-21.40%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.023	0.029	0.033	0.035	0.019
29517-008		0.034	Outlier	0.026	0.039	0.036

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-9206-1868 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed chromium	57.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.3	1.86	0.141	8	CDF	0.8854	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2451	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0244036	0.0244036	1	1.7	0.2291	Non-Significant Effect
Error	0.115143	0.0143928	8			
Total	0.139546		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.33	23.2	0.2707	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3906	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-001		5	0.146	0.045	0.247		0.067	0.255	0.0365	55.76%	40.33%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-001		0.067	0.255	0.208	0.116	0.085

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-9766-5574 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed chromium	61.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.205	1.86	0.15	8	CDF	0.5788	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.29	0.3940	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.0422	0.8424	Non-Significant Effect
Error	0.130689	0.0163362	8			
Total	0.131378		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.1	23.2	0.4896	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2641	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-002		5	0.228	0.101	0.356		0.131	0.401	0.0459	44.94%	6.78%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-002		0.218	0.178	0.131	0.214	0.401

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-5638-9323 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed chromium	80.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.173	1.86	0.198	8	CDF	0.5665	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2336	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008464	0.0008464	1	0.0299	0.8670	Non-Significant Effect
Error	0.226535	0.0283169	8			
Total	0.227382		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.56	23.2	0.6779	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.85	0.741	0.0577	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-003		5	0.227	-0.00401	0.457		0.084	0.544	0.0831	81.96%	7.51%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-003		0.115	0.084	0.16	0.544	0.23

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-8335-4885 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed chromium	84.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.53	1.86	0.208	8	CDF	0.0826	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.29	0.6603	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0729316	0.0729316	1	2.33	0.1652	Non-Significant Effect
Error	0.250079	0.0312598	8			
Total	0.32301		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5748	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8276	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-004		5	0.416	0.166	0.665		0.168	0.701	0.0899	48.33%	-69.71%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-004		0.701	0.487	0.168	0.424	0.299

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-5196-6544 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed chromium	56.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.242	1.86	0.138	8	CDF	0.4075	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.03	2.29	0.2072	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.0585	0.8150	Non-Significant Effect
Error	0.110752	0.013844	8			
Total	0.111562		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.99	23.2	0.2088	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3884	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-005		5	0.263	0.171	0.355		0.207	0.39	0.0333	28.32%	-7.35%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-005		0.268	0.222	0.228	0.207	0.39

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-2459-8135 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed chromium	72.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.95	1.86	0.177	8	CDF	5.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.83	2.29	0.4556	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55131	0.55131	1	24.5	0.0011	Significant Effect
Error	0.180251	0.0225314	8			
Total	0.731562		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.04	23.2	0.9739	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.852	0.741	0.0607	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-006		5	0.715	0.527	0.903		0.606	0.973	0.0677	21.19%	-191.67%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-006		0.973	0.614	0.72	0.66	0.606

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-5664-9504 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed chromium	88.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.12	1.86	0.218	8	CDF	0.0332	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.6952	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.154505	0.154505	1	4.52	0.0663	Non-Significant Effect
Error	0.273757	0.0342196	8			
Total	0.428262		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.09	23.2	0.4925	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.951	0.741	0.6800	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
59517-007		5	0.494	0.226	0.761		0.254	0.789	0.0962	43.59%	-101.47%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
59517-007		0.789	0.461	0.254	0.622	0.342

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-2534-3836	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed chromium	73.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.98	1.86	0.18	8	CDF	0.0088	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.208802	0.208802	1	8.9	0.0175	Significant Effect
Error	0.187682	0.0234602	8			
Total	0.396484		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.12	23.2	0.9156	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5859	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.245	0.0603	0.43		0.094	0.47	0.0665	60.73%	0.00%
29517-008		5	0.534	0.339	0.729		0.33	0.743	0.0704	29.48%	-117.96%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.165	0.47	0.182	0.314	0.094
29517-008		0.743	0.618	0.452	0.33	0.527

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-1480-6470 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed copper	33.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.72	1.86	0.633	8	CDF	0.9385	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5823	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.860836	0.860836	1	2.97	0.1230	Non-Significant Effect
Error	2.31756	0.289695	8			
Total	3.1784		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.69	23.2	0.6221	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5179	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-001		5	1.28	0.532	2.03		0.699	2.17	0.27	47.11%	31.41%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-001		0.699	2.17	1.62	0.907	1.01

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-5337-8561 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed copper	31.84%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.648	1.86	0.595	8	CDF	0.7326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7770	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.107537	0.107537	1	0.421	0.5349	Non-Significant Effect
Error	2.04587	0.255733	8			
Total	2.1534		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.38	23.2	0.7635	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.741	0.8722	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-002		5	1.66	0.985	2.34		0.993	2.45	0.243	32.78%	11.10%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-002		1.35	1.72	0.993	1.79	2.45

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-2532-1009 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed copper	33.20%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-1.17	1.86	0.62	8	CDF	0.8621	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.85	2.29	0.4121	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.38025	0.38025	1	1.37	0.2759	Non-Significant Effect
Error	2.22436	0.278045	8			
Total	2.60461		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.59	23.2	0.6661	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.741	0.7092	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-003		5	1.48	0.753	2.2		0.92	2.4	0.261	39.51%	20.88%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-003		1.39	0.92	1.06	2.4	1.62

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-0927-2506 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed copper	44.79%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.32	1.86	0.837	8	CDF	0.1117	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1793	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.88209	0.88209	1	1.74	0.2233	Non-Significant Effect
Error	4.04956	0.506195	8			
Total	4.93165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.71	23.2	0.2324	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.741	0.5771	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-004		5	2.46	1.35	3.57		1.08	3.36	0.399	36.27%	-31.80%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-004		3.13	2.44	1.08	3.36	2.3

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-5786-7257	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed copper	186.38%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	23	n/a	0	8	Exact	0.2103	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.3E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.0601	10.0601	1	1.15	0.3152	Non-Significant Effect
Error	70.105	8.76313	8			
Total	80.1651		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	80.5	23.2	9.0E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.696	0.741	7.9E-04	Non-Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-005		5	3.87	-1.29	9.04		1.72	11.3	1.86	107.40%	-107.39%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-005		11.3	1.76	1.72	2.25	2.34

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-0037-4622	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed copper	27.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.544	1.89	0.52	7	CDF	0.3015	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0496672	0.0496672	1	0.296	0.6031	Non-Significant Effect
Error	1.17315	0.167594	7			
Total	1.22282		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.06	46.2	0.5784	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.701	0.5973	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-005		4	2.02	1.5	2.53		1.72	2.34	0.161	16.01%	-8.00%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-005		Outlier	1.76	1.72	2.25	2.34

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-6006-3237 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed copper	26.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.29	1.86	0.486	8	CDF	0.0013	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8818	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.14721	3.14721	1	18.4	0.0027	Significant Effect
Error	1.36848	0.17106	8			
Total	4.51569		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.69	23.2	0.6226	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5514	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-006		5	2.99	2.55	3.43		2.57	3.42	0.159	11.92%	-60.06%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-006		3.42	2.57	3.27	2.96	2.73

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-1422-5304 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed copper	40.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	1.86	1.86	0.751	8	CDF	0.0501	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.40625	1.40625	1	3.45	0.1003	Non-Significant Effect
Error	3.25996	0.407495	8			
Total	4.66621		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.79	23.2	0.3443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8354	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
59517-007		5	2.62	1.66	3.58		1.71	3.6	0.346	29.59%	-40.15%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
59517-007		3.22	2.38	1.71	2.18	3.6

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-7436-3360 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed copper	25.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.6	1.86	0.478	8	CDF	0.0158	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8151	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.11556	1.11556	1	6.75	0.0317	Significant Effect
Error	1.3216	0.1652	8			
Total	2.43716		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.86	23.2	0.5609	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3567	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.87	1.29	2.44		1.24	2.38	0.207	24.83%	0.00%
29517-008		5	2.54	2.11	2.96		2.22	3.11	0.152	13.39%	-35.76%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	2.27	1.7	1.75	2.38	1.24
29517-008		2.38	3.11	2.22	2.52	2.45

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-8620-7595 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed lead	37.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-2.21	1.86	0.131	8	CDF	0.9708	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.55	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0605284	0.0605284	1	4.87	0.0584	Non-Significant Effect
Error	0.0994972	0.0124371	8			
Total	0.160026		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.64	23.2	0.6416	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.741	0.5743	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-001		5	0.192	0.072	0.313		0.095	0.339	0.0434	50.41%	44.71%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-001		0.095	0.339	0.231	0.174	0.123

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-0190-2342 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed lead	56.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.45	1.86	0.197	8	CDF	0.6678	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.29	0.0816	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0056644	0.0056644	1	0.203	0.6645	Non-Significant Effect
Error	0.223551	0.0279439	8			
Total	0.229216		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.61	23.2	0.3748	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.884	0.741	0.1440	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-002		5	0.3	0.0508	0.55		0.154	0.649	0.0899	66.93%	13.68%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-002		0.29	0.194	0.154	0.215	0.649

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-0051-3876 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed lead	43.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.777	1.86	0.151	8	CDF	0.7702	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.29	0.3628	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0099856	0.0099856	1	0.603	0.4596	Non-Significant Effect
Error	0.132391	0.0165488	8			
Total	0.142376		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.14	23.2	0.9022	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.921	0.741	0.3656	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-003		5	0.285	0.12	0.45		0.171	0.514	0.0594	46.62%	18.16%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-003		0.243	0.171	0.231	0.514	0.265

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-2982-6827 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed lead	53.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	2.41	1.86	0.186	8	CDF	0.0212	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2341	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.145685	0.145685	1	5.82	0.0424	Significant Effect
Error	0.200311	0.0250389	8			
Total	0.345996		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.24	23.2	0.4546	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.741	0.7393	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-004		5	0.589	0.358	0.82		0.291	0.79	0.0832	31.56%	-69.37%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-004		0.79	0.643	0.291	0.663	0.56

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-1060-0664 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed lead	40.22%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.539	1.86	0.14	8	CDF	0.3021	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0041209	0.0041209	1	0.291	0.6043	Non-Significant Effect
Error	0.113291	0.0141614	8			
Total	0.117412		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.2	23.2	0.8619	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.3973	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-005		5	0.389	0.248	0.529		0.281	0.541	0.0507	29.18%	-11.67%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-005		0.469	0.292	0.281	0.36	0.541

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-9890-7569 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed lead	46.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	5.43	1.86	0.163	8	CDF	3.1E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7931	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.567392	0.567392	1	29.5	6.2E-04	Significant Effect
Error	0.153949	0.0192436	8			
Total	0.721342		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.49	23.2	0.7095	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4814	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-006		5	0.824	0.636	1.01		0.685	1.04	0.0679	18.40%	-136.90%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-006		1.04	0.685	0.911	0.795	0.691

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-5033-9783 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed lead	65.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.86	1.86	0.229	8	CDF	0.0106	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5766	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.310817	0.310817	1	8.17	0.0212	Significant Effect
Error	0.304237	0.0380297	8			
Total	0.615054		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.92	23.2	0.2145	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9391	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
59517-007		5	0.701	0.395	1.01		0.378	0.964	0.11	35.13%	-101.32%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
59517-007		0.964	0.725	0.378	0.902	0.534

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-3608-2340 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed lead	48.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	3.66	1.86	0.17	8	CDF	0.0032	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.281233	0.281233	1	13.4	0.0064	Significant Effect
Error	0.168117	0.0210146	8			
Total	0.44935		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.72	23.2	0.6133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.894	0.741	0.1896	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.348	0.194	0.502		0.185	0.494	0.0556	35.74%	0.00%
29517-008		5	0.683	0.481	0.886		0.546	0.891	0.0729	23.85%	-96.38%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.29	0.494	0.323	0.448	0.185
29517-008		0.828	0.891	0.564	0.588	0.546

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-1685-1691 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed mercury	17.89%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	27.5	n/a	2	8	Exact	0.7381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0000024	0.0000003	8			
Total	0.0000024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.64	0.741	1.7E-04	Non-Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-001		5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-001		0.003	0.004	0.004	0.003	0.004

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-6464-5453 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed mercury	24.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1.71	1.86	0.0009	8	CDF	0.0632	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.29	0.0506	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000016	0.0000016	1	2.91	0.1265	Non-Significant Effect
Error	0.0000044	5.5E-07	8			
Total	0.000006		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.787	0.741	0.0101	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-002		5	0.0044	0.00329	0.00551		0.004	0.006	0.0004	20.33%	-22.22%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-002		0.004	0.004	0.004	0.004	0.006

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5806-3695 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed mercury	16.33%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	25	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000001	0.0000001	1	0.4	0.5447	Non-Significant Effect
Error	0.000002	2.5E-07	8			
Total	0.0000021		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.759	0.741	0.0045	Non-Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-003		5	0.0038	0.00324	0.00436		0.003	0.004	0.0002	11.77%	-5.56%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-003		0.003	0.004	0.004	0.004	0.004

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-9866-4620	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 Nov-17 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed mercury	26.52%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.298	1.89	0.001	7	CDF	0.3873	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5E-08	5E-08	1	0.0886	0.7746	Non-Significant Effect
Error	3.95E-06	5.643E-07	7			
Total	0.000004		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.06	24.3	0.3088	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.701	0.0969	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-004		4	0.00375	0.00223	0.00527		0.003	0.005	0.000479	25.53%	-4.17%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-004		Outlier	0.005	0.003	0.003	0.004

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-0822-3772 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed mercury	16.33%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	25	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000001	0.0000001	1	0.4	0.5447	Non-Significant Effect
Error	0.000002	2.5E-07	8			
Total	0.0000021		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.759	0.741	0.0045	Non-Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-005		5	0.0038	0.00324	0.00436		0.003	0.004	0.0002	11.77%	-5.56%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-005		0.004	0.003	0.004	0.004	0.004

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-2183-1904 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed mercury	16.33%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	25	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000001	0.0000001	1	0.4	0.5447	Non-Significant Effect
Error	0.000002	2.5E-07	8			
Total	0.0000021		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.759	0.741	0.0045	Non-Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-006		5	0.0038	0.00324	0.00436		0.003	0.004	0.0002	11.77%	-5.56%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-006		0.004	0.004	0.004	0.004	0.003

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-4946-2817 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed mercury	23.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.447	1.86	0.0008	8	CDF	0.3333	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4974	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-07	1E-07	1	0.2	0.6666	Non-Significant Effect
Error	0.000004	0.0000005	8			
Total	0.0000041		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.33	23.2	0.4320	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1411	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
59517-007		5	0.0038	0.00276	0.00484		0.003	0.005	0.000374	22.02%	-5.56%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
59517-007		0.004	0.004	0.003	0.003	0.005

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-9217-6955 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed mercury	26.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	0.784	1.86	0.0009	8	CDF	0.2277	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.32	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000004	0.0000004	1	0.615	0.4554	Non-Significant Effect
Error	0.0000052	6.5E-07	8			
Total	0.0000056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.33	23.2	0.2704	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.896	0.741	0.1980	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0036	0.00292	0.00428		0.003	0.004	0.000245	15.21%	0.00%
29517-008		5	0.004	0.00276	0.00524		0.003	0.005	0.000447	25.00%	-11.11%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.004	0.004	0.003	0.003	0.004
29517-008		0.004	0.005	0.003	0.003	0.005

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-3959-6603 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed nickel	29.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-2.57	1.86	0.116	8	CDF	0.9835	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.4100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0638401	0.0638401	1	6.61	0.0331	Significant Effect
Error	0.0772888	0.0096611	8			
Total	0.141129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.49	23.2	0.3985	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7494	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-001		5	0.227	0.135	0.32		0.141	0.326	0.0333	32.75%	41.29%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-001		0.141	0.326	0.273	0.222	0.174

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-4134-9087 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed nickel	31.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-1.68	1.86	0.121	8	CDF	0.9346	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5327	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0298116	0.0298116	1	2.84	0.1307	Non-Significant Effect
Error	0.0841128	0.0105141	8			
Total	0.113924		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.9	23.2	0.5483	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.939	0.741	0.5405	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-002		5	0.278	0.172	0.383		0.154	0.366	0.0381	30.64%	28.22%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-002		0.347	0.245	0.154	0.277	0.366

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-1112-9782 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed nickel	33.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-1.89	1.86	0.129	8	CDF	0.9519	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7606	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0427716	0.0427716	1	3.55	0.0961	Non-Significant Effect
Error	0.0962648	0.0120331	8			
Total	0.139036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.34	23.2	0.7831	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.971	0.741	0.9005	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-003		5	0.256	0.13	0.382		0.159	0.408	0.0453	39.58%	33.80%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-003		0.168	0.159	0.261	0.408	0.285

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-0683-3610 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed nickel	32.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.51	1.86	0.127	8	CDF	0.6882	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.6997	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0030276	0.0030276	1	0.26	0.6237	Non-Significant Effect
Error	0.0930468	0.0116308	8			
Total	0.0960744		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.45	23.2	0.7253	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5816	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-004		5	0.352	0.231	0.473		0.238	0.48	0.0435	27.64%	8.99%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-004		0.48	0.422	0.238	0.301	0.32

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-6196-3972 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed nickel	27.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-0.932	1.86	0.108	8	CDF	0.8108	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2419	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00729	0.00729	1	0.87	0.3784	Non-Significant Effect
Error	0.067072	0.008384	8			
Total	0.074362		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.62	23.2	0.1673	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8576	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-005		5	0.333	0.265	0.401		0.274	0.417	0.0244	16.40%	13.95%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-005		0.32	0.351	0.274	0.303	0.417

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-9345-5623 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed nickel	29.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.342	1.86	0.113	8	CDF	0.3707	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3545	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0010816	0.0010816	1	0.117	0.7413	Non-Significant Effect
Error	0.0740708	0.0092589	8			
Total	0.0751524		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.91	23.2	0.3251	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8215	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-006		5	0.408	0.322	0.493		0.326	0.502	0.0308	16.87%	-5.37%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-006		0.502	0.326	0.395	0.448	0.368

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-8445-8041 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed nickel	30.27%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.356	1.86	0.117	8	CDF	0.6343	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.83	2.29	0.4471	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012544	0.0012544	1	0.126	0.7314	Non-Significant Effect
Error	0.0793872	0.0099234	8			
Total	0.0806416		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.27	23.2	0.4457	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.95	0.741	0.6674	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
59517-007		5	0.365	0.268	0.461		0.269	0.457	0.0348	21.35%	5.79%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
59517-007		0.431	0.457	0.269	0.324	0.342

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-3251-6430 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed nickel	31.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	0.0697	1.86	0.123	8	CDF	0.4731	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5903	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.00485	0.9462	Non-Significant Effect
Error	0.0872232	0.0109029	8			
Total	0.0872761		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.72	23.2	0.6127	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.962	0.741	0.8066	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.387	0.241	0.533		0.215	0.508	0.0525	30.34%	0.00%
29517-008		5	0.392	0.28	0.503		0.288	0.523	0.0401	22.87%	-1.19%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.459	0.508	0.324	0.429	0.215
29517-008		0.404	0.411	0.288	0.332	0.523

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-0146-5800 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed zinc	31.86%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.46	1.86	3.57	8	CDF	0.9088	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.29	0.1026	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19.6	19.6	1	2.13	0.1824	Non-Significant Effect
Error	73.5626	9.19532	8			
Total	93.1626		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.46	23.2	0.1769	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1283	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-001		5	8.39	3.58	13.2		5.64	14.6	1.73	46.18%	25.02%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-001		5.64	14.6	9.8	6.24	5.68

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-2242-8017 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed zinc	20.02%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-3.12	1.86	2.24	8	CDF	0.9929	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	35.4192	35.4192	1	9.75	0.0142	Significant Effect
Error	29.0508	3.63135	8			
Total	64.47		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.15	23.2	0.8924	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.945	0.741	0.6055	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-002		5	7.43	4.98	9.88		4.72	9.93	0.882	26.56%	33.63%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-002		8.64	6.9	4.72	6.95	9.93

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-1228-1719 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed zinc	24.79%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-1.99	1.86	2.77	8	CDF	0.9591	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	22.0226	22.0226	1	3.96	0.0819	Non-Significant Effect
Error	44.5218	5.56523	8			
Total	66.5444		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.3	23.2	0.4391	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5891	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-003		5	8.22	4.77	11.7		4.85	11.5	1.25	33.87%	26.52%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-003		6.5	4.85	7.67	11.5	10.6

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-8440-3977 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed zinc	31.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.545	1.86	3.54	8	CDF	0.3004	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.29	0.2279	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.68324	2.68324	1	0.297	0.6008	Non-Significant Effect
Error	72.3329	9.04162	8			
Total	75.0162		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.37	23.2	0.1825	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.971	0.741	0.8992	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-004		5	12.2	7.47	17		6.54	16.8	1.72	31.37%	-9.26%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-004		12.1	11.3	6.54	14.4	16.8

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-5027-7404 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed zinc	17.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-0.218	1.86	1.92	8	CDF	0.5834	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8270	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.12544	0.12544	1	0.0473	0.8333	Non-Significant Effect
Error	21.2122	2.65152	8			
Total	21.3376		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.74	23.2	0.6033	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.741	0.4971	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-005		5	11	9.24	12.7		9.46	12.9	0.622	12.68%	2.00%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-005		9.88	9.46	10.9	11.7	12.9

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-4194-8712 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed zinc	16.25%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.58	1.86	1.82	8	CDF	0.0761	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6421	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.99076	5.99076	1	2.5	0.1522	Non-Significant Effect
Error	19.1333	2.39166	8			
Total	25.124		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4205	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6359	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-006		5	12.7	11.3	14.2		11.3	14.2	0.532	9.33%	-13.83%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-006		13.7	11.3	12.1	12.4	14.2

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-5054-9598 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed zinc	22.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.447	1.86	2.52	8	CDF	0.6668	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5380	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.91809	0.91809	1	0.2	0.6664	Non-Significant Effect
Error	36.6852	4.58565	8			
Total	37.6033		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.72	23.2	0.6118	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7553	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
59517-007		5	10.6	7.6	13.6		7	13.3	1.08	22.75%	5.41%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
59517-007		11.5	11.6	7	13.3	9.53

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-1405-7297 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 10 Nov-17 12:22 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed zinc	21.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.014	1.86	2.4	8	CDF	0.5054	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.31	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008100	0.0008100	1	0.000195	0.9892	Non-Significant Effect
Error	33.2708	4.15885	8			
Total	33.2716		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.47	23.2	0.7190	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.899	0.741	0.2127	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	8.91	13.5		9.3	13.7	0.821	16.40%	0.00%
29517-008		5	11.2	8.41	13.9		8.72	13.7	0.995	19.91%	0.16%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.66	12.3	11	13.7	9.3
29517-008		8.95	12	8.72	13.7	12.5

28 day *Nereis virens* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

Trace Metals

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.94		2.32		2.39		1.60		2.04	
Cadmium	0.037	J	0.048		0.039		0.023	J	0.022	J
Chromium	0.053	J	0.048	J	0.040	J	0.081	J	0.063	J
Copper	0.89		1.02		1.13		0.96		1.11	
Lead	0.160		0.205		0.122		0.072		0.076	
Mercury	0.007	J	0.006	J	0.008	J	0.014		0.014	
Nickel	0.094	J	0.063	J	0.125		0.171		0.102	
Zinc	6.01		6.64		6.14		5.40		6.10	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 1									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.17		2.28		2.02		2.01		2.36	
Cadmium	0.038	J	0.043		0.056		0.024	J	0.033	J
Chromium	0.049	J	0.051	J	0.079	J	0.051	J	0.044	J
Copper	0.68		0.91		0.80		0.99		0.88	
Lead	0.087		0.140		0.140		0.059		0.066	
Mercury	0.008	J	0.008	J	0.007	J	0.019		0.011	J
Nickel	0.088	J	0.084	J	0.093	J	0.073	J	0.086	J
Zinc	5.79		6.40		5.78		7.30		6.88	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 2									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.95		2.32		2.46		2.20		2.56	
Cadmium	0.042		0.046		0.055		0.036	J	0.043	
Chromium	0.066	J	0.050	J	0.040	J	0.038	J	0.035	U
Copper	1.05		1.00		0.92		0.93		1.53	
Lead	0.083		0.136		0.146		0.119		0.205	
Mercury	0.016		0.006	J	0.006	J	0.006	J	0.007	J
Nickel	0.132		0.082	J	0.051	J	0.065	J	0.073	J
Zinc	6.41		6.80		7.08		5.87		7.22	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 3									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.14		2.07		2.29		2.40		1.81	
Cadmium	0.034	J	0.030	J	0.038	J	0.031	J	0.044	
Chromium	0.042	J	0.051	J	0.035	U	0.040	J	0.066	J
Copper	0.97		0.91		1.20		0.64		1.10	
Lead	0.115		0.057		0.134		0.091		0.115	
Mercury	0.010	J	0.015		0.007	J	0.006	J	0.018	
Nickel	0.095	J	0.088	J	0.079	J	0.106		0.097	J
Zinc	7.09		7.06		6.32		6.54		6.17	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 4									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.99		1.86		2.15		1.90		2.43	
Cadmium	0.042		0.028	J	0.053		0.028	J	0.049	
Chromium	0.040	J	0.058	J	0.035	U	0.068	J	0.035	J
Copper	1.13		1.26		1.26		1.45		1.08	
Lead	0.126		0.087		0.165		0.094		0.150	
Mercury	0.013		0.014		0.008	J	0.015		0.008	J
Nickel	0.063	J	0.085	J	0.063	J	0.106		0.086	J
Zinc	6.37		6.66		6.22		7.26		7.08	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 5									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.14		2.37		2.18		2.25		2.21	
Cadmium	0.038	J	0.041		0.039		0.041		0.033	J
Chromium	0.036	U	0.044	J	0.035	U	0.035	U	0.055	J
Copper	0.68		0.80		1.20		0.88		0.91	
Lead	0.146		0.113		0.173		0.121		0.139	
Mercury	0.006	J	0.007	J	0.006	J	0.008	J	0.008	J
Nickel	0.062	J	0.075	J	0.086	J	0.069	J	0.067	J
Zinc	5.65		6.40		7.09		5.74		6.36	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 6									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.12		1.95		2.04		2.19		1.89	
Cadmium	0.036	J	0.036	J	0.035	J	0.035	J	0.037	J
Chromium	0.128	J	0.042	J	0.078	J	0.053	J	0.098	J
Copper	0.89		1.04		1.08		1.02		1.22	
Lead	0.132		0.064		0.086		0.067		0.128	
Mercury	0.004	J	0.013		0.011	J	0.012	J	0.013	
Nickel	0.087	J	0.087	J	0.128		0.151		0.124	
Zinc	6.23		7.05		6.77		6.59		7.16	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 7									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.02		2.09		2.03		2.02		2.53	
Cadmium	0.038	J	0.035	J	0.033	J	0.042		0.040	
Chromium	0.048	J	0.035	U	0.036	U	0.038	J	0.054	J
Copper	0.94		0.77		0.90		1.10		0.99	
Lead	0.104		0.125		0.087		0.120		0.145	
Mercury	0.016		0.008	J	0.012	J	0.013		0.010	J
Nickel	0.102		0.076	J	0.104		0.109		0.135	
Zinc	7.72		17.00		6.38		6.86		7.28	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 8									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.40		2.58		2.13		2.22		2.26	
Cadmium	0.041		0.049		0.037	J	0.039	J	0.037	J
Chromium	0.041	J	0.038	J	0.036	U	0.036	U	0.042	J
Copper	0.85		0.82		0.83		0.78		0.84	
Lead	0.185		0.121		0.117		0.159		0.122	
Mercury	0.008	J	0.008	J	0.006	J	0.007	J	0.008	J
Nickel	0.140		0.131		0.101		0.082	J	0.078	J
Zinc	7.16		7.18		6.84		5.87		5.58	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Start Date: 31 Aug-17 **Species:** Nereis virens **Sample Code:** 29525-000
End Date: 28 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 31 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29525

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
29517-009	1	37		1.94	0.037	0.053	0.889	0.16	0.007	0.094	6.01
29517-009	2	20		2.32	0.048	0.048	1.02	0.205	0.006	0.063	6.64
29517-009	3	13		2.39	0.039	0.04	1.13	0.122	0.008	0.125	6.14
29517-009	4	21		1.6	0.023	0.081	0.96	0.072	0.014	0.171	5.4
29517-009	5	24		2.04	0.022	0.063	1.11	0.076	0.014	0.102	6.1
29517-001	1	38		2.17	0.038	0.049	0.682	0.087	0.008	0.088	5.79
29517-001	2	31		2.28	0.043	0.051	0.909	0.14	0.008	0.084	6.4
29517-001	3	30		2.02	0.056	0.079	0.798	0.14	0.007	0.093	5.78
29517-001	4	45		2.01	0.024	0.051	0.987	0.059	0.019	0.073	7.3
29517-001	5	41		2.36	0.033	0.044	0.884	0.066	0.011	0.086	6.88
29517-002	1	28		1.95	0.042	0.066	1.05	0.083	0.016	0.132	6.41
29517-002	2	22		2.32	0.046	0.05	1	0.136	0.006	0.082	6.8
29517-002	3	32		2.46	0.055	0.04	0.917	0.146	0.006	0.051	7.08
29517-002	4	7		2.2	0.036	0.038	0.93	0.119	0.006	0.065	5.87
29517-002	5	2		2.56	0.043	0.035	1.53	0.205	0.007	0.073	7.22
29517-003	1	1		2.14	0.034	0.042	0.967	0.115	0.01	0.095	7.09
29517-003	2	35		2.07	0.03	0.051	0.912	0.057	0.015	0.088	7.06
29517-003	3	19		2.29	0.038	0.035	1.2	0.134	0.007	0.079	6.32
29517-003	4	36		2.4	0.031	0.04	0.641	0.091	0.006	0.106	6.54
29517-003	5	5		1.81	0.044	0.066	1.1	0.115	0.018	0.097	6.17
29517-004	1	11		1.99	0.042	0.04	1.13	0.126	0.013	0.063	6.37
29517-004	2	23		1.86	0.028	0.058	1.26	0.087	0.014	0.085	6.66
29517-004	3	3		2.15	0.053	0.035	1.26	0.165	0.008	0.063	6.22
29517-004	4	33		1.9	0.028	0.068	1.45	0.094	0.015	0.106	7.26
29517-004	5	8		2.43	0.049	0.035	1.08	0.15	0.008	0.086	7.08
29517-005	1	18		2.14	0.038	0.036	0.677	0.146	0.006	0.062	5.65
29517-005	2	27		2.37	0.041	0.044	0.801	0.113	0.007	0.075	6.4
29517-005	3	39		2.18	0.039	0.035	1.2	0.173	0.006	0.086	7.09
29517-005	4	34		2.25	0.041	0.035	0.876	0.121	0.008	0.069	5.74
29517-005	5	26		2.21	0.033	0.055	0.906	0.139	0.008	0.067	6.36
29517-006	1	44		2.12	0.036	0.128	0.888	0.132	0.004	0.087	6.23
29517-006	2	6		1.95	0.036	0.042	1.04	0.064	0.013	0.087	7.05

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
29517-006	3	43		2.04	0.035	0.078	1.08	0.086	0.011	0.128	6.77
29517-006	4	15		2.19	0.035	0.053	1.02	0.067	0.012	0.151	6.59
29517-006	5	12		1.89	0.037	0.098	1.22	0.128	0.013	0.124	7.16
59517-007	1	42		2.02	0.038	0.048	0.936	0.104	0.016	0.102	7.72
59517-007	2	14		2.09	0.035	0.035	0.773	0.125	0.008	0.076	17
59517-007	3	16		2.03	0.033	0.036	0.902	0.087	0.012	0.104	6.38
59517-007	4	29		2.02	0.042	0.038	1.1	0.12	0.013	0.109	6.86
59517-007	5	25		2.53	0.04	0.054	0.99	0.145	0.01	0.135	7.28
29517-008	1	40		2.4	0.041	0.041	0.851	0.185	0.008	0.14	7.16
29517-008	2	17		2.58	0.049	0.038	0.818	0.121	0.008	0.131	7.18
29517-008	3	9		2.13	0.037	0.036	0.827	0.117	0.006	0.101	6.84
29517-008	4	4		2.22	0.039	0.036	0.78	0.159	0.007	0.082	5.87
29517-008	5	10		2.26	0.037	0.042	0.842	0.122	0.008	0.078	5.58

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Batch ID:	05-2235-9305	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	31 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	28 Sep-17	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
14-3473-7858	Arsenic	Equal Variance t Two-Sample Test	0.2530	29517-001 passed arsenic
13-3837-1527	Arsenic	Equal Variance t Two-Sample Test	0.1065	29517-002 passed arsenic
07-0757-8613	Arsenic	Equal Variance t Two-Sample Test	0.3213	29517-003 passed arsenic
02-3377-8417	Arsenic	Equal Variance t Two-Sample Test	0.4824	29517-004 passed arsenic
15-3228-4658	Arsenic	Equal Variance t Two-Sample Test	0.1383	29517-005 passed arsenic
03-8978-9763	Arsenic	Equal Variance t Two-Sample Test	0.5507	29517-006 passed arsenic
18-8343-9589	Arsenic	Equal Variance t Two-Sample Test	0.3280	59517-007 passed arsenic
19-3601-1818	Arsenic	Equal Variance t Two-Sample Test	0.0739	29517-008 passed arsenic
20-1126-4322	Cadmium	Equal Variance t Two-Sample Test	0.2560	29517-001 passed cadmium
17-0787-3508	Cadmium	Equal Variance t Two-Sample Test	0.0542	29517-002 passed cadmium
12-0530-5439	Cadmium	Equal Variance t Two-Sample Test	0.3911	29517-003 passed cadmium
20-7911-8945	Cadmium	Equal Variance t Two-Sample Test	0.2071	29517-004 passed cadmium
06-0841-4744	Cadmium	Equal Variance t Two-Sample Test	0.2005	29517-005 passed cadmium
08-1856-7647	Cadmium	Unequal Variance t Two-Sample Test	0.3545	29517-006 passed cadmium
11-2725-1457	Cadmium	Equal Variance t Two-Sample Test	0.2443	59517-007 passed cadmium
16-0394-0333	Cadmium	Equal Variance t Two-Sample Test	0.1237	29517-008 passed cadmium
17-4466-2530	Chromium	Equal Variance t Two-Sample Test	0.5897	29517-001 passed chromium
19-5325-3546	Chromium	Equal Variance t Two-Sample Test	0.8747	29517-002 passed chromium
10-2372-0166	Chromium	Equal Variance t Two-Sample Test	0.8569	29517-003 passed chromium
18-6039-5970	Chromium	Equal Variance t Two-Sample Test	0.8281	29517-004 passed chromium
19-5228-9713	Chromium	Equal Variance t Two-Sample Test	0.9588	29517-005 passed chromium
19-2147-6407	Chromium	Equal Variance t Two-Sample Test	0.1088	29517-006 passed chromium
20-0343-4048	Chromium	Equal Variance t Two-Sample Test	0.9493	59517-007 passed chromium
18-6109-4320	Chromium	Unequal Variance t Two-Sample Test	0.9688	29517-008 passed chromium
13-7770-5762	Copper	Equal Variance t Two-Sample Test	0.9804	29517-001 passed copper
05-1904-0311	Copper	Equal Variance t Two-Sample Test	0.3087	29517-002 passed copper
14-8134-4566	Copper	Equal Variance t Two-Sample Test	0.7798	29517-002 passed copper

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
01-5645-7586	Copper	Equal Variance t Two-Sample Test	0.7008	29517-003 passed copper
07-1243-4232	Copper	Equal Variance t Two-Sample Test	0.0130	29517-004 failed copper
07-2591-3701	Copper	Equal Variance t Two-Sample Test	0.8898	29517-005 passed copper
08-0985-7420	Copper	Equal Variance t Two-Sample Test	0.3508	29517-006 passed copper
00-2191-2886	Copper	Equal Variance t Two-Sample Test	0.8609	59517-007 passed copper
12-0615-8558	Copper	Equal Variance t Two-Sample Test	0.9986	29517-008 passed copper
10-8058-4285	Lead	Equal Variance t Two-Sample Test	0.8096	29517-001 passed lead
19-8897-8515	Lead	Equal Variance t Two-Sample Test	0.3731	29517-002 passed lead
16-0752-5741	Lead	Equal Variance t Two-Sample Test	0.7928	29517-003 passed lead
18-6088-9979	Lead	Equal Variance t Two-Sample Test	0.5340	29517-004 passed lead
00-9709-4805	Lead	Equal Variance t Two-Sample Test	0.3442	29517-005 passed lead
19-9032-3186	Lead	Equal Variance t Two-Sample Test	0.8443	29517-006 passed lead
09-1924-5278	Lead	Equal Variance t Two-Sample Test	0.6494	59517-007 passed lead
07-0292-4525	Lead	Equal Variance t Two-Sample Test	0.3215	29517-008 passed lead
12-4019-0699	Mercury	Equal Variance t Two-Sample Test	0.3916	29517-001 passed mercury
07-9003-6964	Mercury	Equal Variance t Two-Sample Test	0.7206	29517-002 passed mercury
10-3832-7473	Mercury	Equal Variance t Two-Sample Test	0.3208	29517-003 passed mercury
21-3736-4915	Mercury	Equal Variance t Two-Sample Test	0.2284	29517-004 passed mercury
15-9620-4479	Mercury	Equal Variance t Two-Sample Test	0.9208	29517-005 passed mercury
05-5931-5524	Mercury	Equal Variance t Two-Sample Test	0.3752	29517-006 passed mercury
15-9073-4161	Mercury	Equal Variance t Two-Sample Test	0.1959	59517-007 passed mercury
11-8375-7480	Mercury	Equal Variance t Two-Sample Test	0.8917	29517-008 passed mercury
05-0728-5929	Nickel	Unequal Variance t Two-Sample Test	0.8874	29517-001 passed nickel
19-2274-6710	Nickel	Equal Variance t Two-Sample Test	0.8915	29517-002 passed nickel
03-1934-1023	Nickel	Equal Variance t Two-Sample Test	0.8199	29517-003 passed nickel
11-4888-2439	Nickel	Equal Variance t Two-Sample Test	0.9191	29517-004 passed nickel
10-7881-4784	Nickel	Equal Variance t Two-Sample Test	0.9668	29517-005 passed nickel
06-2299-2077	Nickel	Equal Variance t Two-Sample Test	0.4229	29517-006 passed nickel
06-5331-5990	Nickel	Equal Variance t Two-Sample Test	0.6089	59517-007 passed nickel
07-9157-6566	Nickel	Equal Variance t Two-Sample Test	0.5804	29517-008 passed nickel
06-2347-4571	Zinc	Equal Variance t Two-Sample Test	0.1651	29517-001 passed zinc
06-6406-1179	Zinc	Equal Variance t Two-Sample Test	0.0425	29517-002 failed zinc
01-9125-9301	Zinc	Equal Variance t Two-Sample Test	0.0337	29517-003 failed zinc
17-4229-7757	Zinc	Equal Variance t Two-Sample Test	0.0234	29517-004 failed zinc
15-0624-1674	Zinc	Equal Variance t Two-Sample Test	0.2888	29517-005 passed zinc
17-4188-4908	Zinc	Equal Variance t Two-Sample Test	0.0132	29517-006 failed zinc
07-5285-5694	Zinc	Equal Variance t Two-Sample Test	0.0104	59517-007 failed zinc
06-1460-6432	Zinc	Wilcoxon Rank Sum Two-Sample Test	0.0079	59517-007 failed zinc
03-8506-5515	Zinc	Equal Variance t Two-Sample Test	0.1320	29517-008 passed zinc

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	1.6	2.39	0.142	0.317	15.42%	0.00%
29517-001		5	2.17	1.98	2.36	2.01	2.36	0.0694	0.155	7.16%	-5.34%
29517-002		5	2.3	2	2.59	1.95	2.56	0.106	0.238	10.35%	-11.66%
29517-003		5	2.14	1.86	2.42	1.81	2.4	0.101	0.226	10.54%	-4.08%
29517-004		5	2.07	1.78	2.35	1.86	2.43	0.104	0.232	11.23%	-0.39%
29517-005		5	2.23	2.12	2.34	2.14	2.37	0.0394	0.088	3.95%	-8.36%
29517-006		5	2.04	1.89	2.19	1.89	2.19	0.0545	0.122	5.98%	0.97%
59517-007		5	2.14	1.86	2.41	2.02	2.53	0.0989	0.221	10.34%	-3.89%
29517-008		5	2.32	2.1	2.54	2.13	2.58	0.0786	0.176	7.59%	-12.63%

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.022	0.048	0.00497	0.0111	32.91%	0.00%
29517-001		5	0.0388	0.024	0.0536	0.024	0.056	0.00532	0.0119	30.68%	-14.79%
29517-002		5	0.0444	0.0358	0.053	0.036	0.055	0.00311	0.00695	15.65%	-31.36%
29517-003		5	0.0354	0.0283	0.0425	0.03	0.044	0.00256	0.00573	16.18%	-4.73%
29517-004		5	0.04	0.0255	0.0545	0.028	0.053	0.00521	0.0116	29.10%	-18.34%
29517-005		5	0.0384	0.0343	0.0425	0.033	0.041	0.00147	0.00329	8.56%	-13.61%
29517-006		5	0.0358	0.0348	0.0368	0.035	0.037	0.000374	0.000837	2.34%	-5.92%
59517-007		5	0.0376	0.0331	0.0421	0.033	0.042	0.00163	0.00365	9.70%	-11.24%
29517-008		5	0.0406	0.0344	0.0468	0.037	0.049	0.00223	0.00498	12.27%	-20.12%

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.04	0.081	0.00706	0.0158	27.71%	0.00%
29517-001		5	0.0548	0.0376	0.072	0.044	0.079	0.00618	0.0138	25.23%	3.86%
29517-002		5	0.0458	0.0301	0.0615	0.035	0.066	0.00564	0.0126	27.55%	19.65%
29517-003		5	0.0468	0.0317	0.0619	0.035	0.066	0.00545	0.0122	26.06%	17.89%
29517-004		5	0.0472	0.0286	0.0658	0.035	0.068	0.0067	0.015	31.76%	17.19%
29517-005		5	0.041	0.0302	0.0518	0.035	0.055	0.00389	0.00869	21.19%	28.07%
29517-006		5	0.0798	0.0368	0.123	0.042	0.128	0.0155	0.0347	43.43%	-40.00%
59517-007		5	0.0422	0.0318	0.0526	0.035	0.054	0.00375	0.00838	19.85%	25.96%
29517-008		5	0.0386	0.0351	0.0421	0.036	0.042	0.00125	0.00279	7.24%	32.28%

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	0.889	1.13	0.0452	0.101	9.90%	0.00%
29517-001		5	0.852	0.707	0.997	0.682	0.987	0.0521	0.117	13.68%	16.62%
29517-002		5	1.09	0.77	1.4	0.917	1.53	0.114	0.254	23.43%	-6.22%
29517-003		5	0.964	0.7	1.23	0.641	1.2	0.0952	0.213	22.08%	5.66%
29517-004		5	1.24	1.06	1.41	1.08	1.45	0.0642	0.144	11.62%	-20.96%
29517-005		5	0.892	0.652	1.13	0.677	1.2	0.0866	0.194	21.70%	12.70%
29517-006		5	1.05	0.901	1.2	0.888	1.22	0.0534	0.119	11.38%	-2.72%
59517-007		5	0.94	0.791	1.09	0.773	1.1	0.0536	0.12	12.75%	7.99%
29517-008		5	0.824	0.789	0.858	0.78	0.851	0.0123	0.0275	3.34%	19.40%

Bioaccumulation Evaluation - Metals - Nereis virens EnviroSystems, Inc.

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.072	0.205	0.0253	0.0566	44.58%	0.00%
29517-001		5	0.0984	0.0495	0.147	0.059	0.14	0.0176	0.0393	39.99%	22.52%
29517-002		5	0.138	0.0825	0.193	0.083	0.205	0.0199	0.0446	32.34%	-8.50%
29517-003		5	0.102	0.0656	0.139	0.057	0.134	0.0132	0.0296	28.92%	19.37%
29517-004		5	0.124	0.0822	0.167	0.087	0.165	0.0152	0.034	27.35%	2.05%
29517-005		5	0.138	0.109	0.168	0.113	0.173	0.0105	0.0235	16.96%	-8.98%
29517-006		5	0.0954	0.0548	0.136	0.064	0.132	0.0146	0.0327	34.30%	24.88%
59517-007		5	0.116	0.089	0.143	0.087	0.145	0.00981	0.0219	18.87%	8.50%
29517-008		5	0.141	0.104	0.178	0.117	0.185	0.0134	0.03	21.30%	-10.87%

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.006	0.014	0.00174	0.0039	39.78%	0.00%
29517-001		5	0.0106	0.00448	0.0167	0.007	0.019	0.0022	0.00493	46.50%	-8.16%
29517-002		5	0.0082	0.00276	0.0136	0.006	0.016	0.00196	0.00438	53.44%	16.33%
29517-003		5	0.0112	0.00478	0.0176	0.006	0.018	0.00231	0.00517	46.14%	-14.29%
29517-004		5	0.0116	0.00743	0.0158	0.008	0.015	0.0015	0.00336	28.98%	-18.37%
29517-005		5	0.007	0.00576	0.00824	0.006	0.008	0.000447	0.001	14.29%	28.57%
29517-006		5	0.0106	0.0059	0.0153	0.004	0.013	0.00169	0.00378	35.67%	-8.16%
59517-007		5	0.0118	0.00803	0.0156	0.008	0.016	0.00136	0.00303	25.70%	-20.41%
29517-008		5	0.0074	0.00629	0.00851	0.006	0.008	0.0004	0.000894	12.09%	24.49%

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.063	0.171	0.018	0.0402	36.23%	0.00%
29517-001		5	0.0848	0.0756	0.094	0.073	0.093	0.00331	0.0074	8.72%	23.60%
29517-002		5	0.0806	0.0422	0.119	0.051	0.132	0.0138	0.0309	38.35%	27.39%
29517-003		5	0.093	0.0804	0.106	0.079	0.106	0.00453	0.0101	10.89%	16.22%
29517-004		5	0.0806	0.0581	0.103	0.063	0.106	0.0081	0.0181	22.48%	27.39%
29517-005		5	0.0718	0.0604	0.0832	0.062	0.086	0.00412	0.0092	12.82%	35.32%
29517-006		5	0.115	0.0808	0.15	0.087	0.151	0.0125	0.0279	24.18%	-3.96%
59517-007		5	0.105	0.0791	0.131	0.076	0.135	0.0094	0.021	19.98%	5.23%
29517-008		5	0.106	0.0715	0.141	0.078	0.14	0.0126	0.0281	26.44%	4.14%

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	5.4	6.64	0.198	0.442	7.30%	0.00%
29517-001		5	6.43	5.6	7.26	5.78	7.3	0.299	0.669	10.41%	-6.14%
29517-002		5	6.68	6	7.35	5.87	7.22	0.244	0.547	8.19%	-10.20%
29517-003		5	6.64	6.11	7.16	6.17	7.09	0.189	0.422	6.36%	-9.54%
29517-004		5	6.72	6.16	7.27	6.22	7.26	0.2	0.446	6.65%	-10.89%
29517-005		5	6.25	5.52	6.97	5.65	7.09	0.261	0.583	9.33%	-3.14%
29517-006		5	6.76	6.3	7.22	6.23	7.16	0.166	0.372	5.51%	-11.59%
59517-007		5	9.05	3.49	14.6	6.38	17	2	4.47	49.44%	-49.36%
29517-008		5	6.53	5.59	7.46	5.58	7.18	0.336	0.751	11.50%	-7.73%

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-001		2.17	2.28	2.02	2.01	2.36
29517-002		1.95	2.32	2.46	2.2	2.56
29517-003		2.14	2.07	2.29	2.4	1.81
29517-004		1.99	1.86	2.15	1.9	2.43
29517-005		2.14	2.37	2.18	2.25	2.21
29517-006		2.12	1.95	2.04	2.19	1.89
59517-007		2.02	2.09	2.03	2.02	2.53
29517-008		2.4	2.58	2.13	2.22	2.26

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-001		0.038	0.043	0.056	0.024	0.033
29517-002		0.042	0.046	0.055	0.036	0.043
29517-003		0.034	0.03	0.038	0.031	0.044
29517-004		0.042	0.028	0.053	0.028	0.049
29517-005		0.038	0.041	0.039	0.041	0.033
29517-006		0.036	0.036	0.035	0.035	0.037
59517-007		0.038	0.035	0.033	0.042	0.04
29517-008		0.041	0.049	0.037	0.039	0.037

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-001		0.049	0.051	0.079	0.051	0.044
29517-002		0.066	0.05	0.04	0.038	0.035
29517-003		0.042	0.051	0.035	0.04	0.066
29517-004		0.04	0.058	0.035	0.068	0.035
29517-005		0.036	0.044	0.035	0.035	0.055
29517-006		0.128	0.042	0.078	0.053	0.098
59517-007		0.048	0.035	0.036	0.038	0.054
29517-008		0.041	0.038	0.036	0.036	0.042

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-001		0.682	0.909	0.798	0.987	0.884
29517-002		1.05	1	0.917	0.93	1.53
29517-003		0.967	0.912	1.2	0.641	1.1
29517-004		1.13	1.26	1.26	1.45	1.08
29517-005		0.677	0.801	1.2	0.876	0.906
29517-006		0.888	1.04	1.08	1.02	1.22
59517-007		0.936	0.773	0.902	1.1	0.99
29517-008		0.851	0.818	0.827	0.78	0.842

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-001		0.087	0.14	0.14	0.059	0.066
29517-002		0.083	0.136	0.146	0.119	0.205
29517-003		0.115	0.057	0.134	0.091	0.115
29517-004		0.126	0.087	0.165	0.094	0.15
29517-005		0.146	0.113	0.173	0.121	0.139
29517-006		0.132	0.064	0.086	0.067	0.128
59517-007		0.104	0.125	0.087	0.12	0.145
29517-008		0.185	0.121	0.117	0.159	0.122

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-001		0.008	0.008	0.007	0.019	0.011
29517-002		0.016	0.006	0.006	0.006	0.007
29517-003		0.01	0.015	0.007	0.006	0.018
29517-004		0.013	0.014	0.008	0.015	0.008
29517-005		0.006	0.007	0.006	0.008	0.008
29517-006		0.004	0.013	0.011	0.012	0.013
59517-007		0.016	0.008	0.012	0.013	0.01
29517-008		0.008	0.008	0.006	0.007	0.008

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-001		0.088	0.084	0.093	0.073	0.086
29517-002		0.132	0.082	0.051	0.065	0.073
29517-003		0.095	0.088	0.079	0.106	0.097
29517-004		0.063	0.085	0.063	0.106	0.086
29517-005		0.062	0.075	0.086	0.069	0.067
29517-006		0.087	0.087	0.128	0.151	0.124
59517-007		0.102	0.076	0.104	0.109	0.135
29517-008		0.14	0.131	0.101	0.082	0.078

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-001		5.79	6.4	5.78	7.3	6.88
29517-002		6.41	6.8	7.08	5.87	7.22
29517-003		7.09	7.06	6.32	6.54	6.17
29517-004		6.37	6.66	6.22	7.26	7.08
29517-005		5.65	6.4	7.09	5.74	6.36
29517-006		6.23	7.05	6.77	6.59	7.16
59517-007		7.72	17	6.38	6.86	7.28
29517-008		7.16	7.18	6.84	5.87	5.58

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	14-3473-7858	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:50	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed arsenic	14.27%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	0.696	1.86	0.294	8	CDF	0.2530	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.2939	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03025	0.03025	1	0.485	0.5060	Non-Significant Effect
Error	0.49916	0.062395	8			
Total	0.52941		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.18	23.2	0.1945	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8196	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-001		5	2.17	1.98	2.36	2.17	2.01	2.36	0.0694	7.16%	-5.34%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-001		2.17	2.28	2.02	2.01	2.36

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	13-3837-1527	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed arsenic	16.02%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1.35	1.86	0.33	8	CDF	0.1065	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6180	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.144	0.144	1	1.83	0.2129	Non-Significant Effect
Error	0.62896	0.07862	8			
Total	0.77296		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.78	23.2	0.5895	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5524	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-002		5	2.3	2	2.59	2.32	1.95	2.56	0.106	10.35%	-11.66%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-002		1.95	2.32	2.46	2.2	2.56

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 07-0757-8613 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed arsenic	15.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.482	1.86	0.324	8	CDF	0.3213	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5597	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01764	0.01764	1	0.233	0.6425	Non-Significant Effect
Error	0.60676	0.075845	8			
Total	0.6244		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.98	23.2	0.5257	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.741	0.6003	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-003		5	2.14	1.86	2.42	2.14	1.81	2.4	0.101	10.54%	-4.08%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-003		2.14	2.07	2.29	2.4	1.81

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 02-3377-8417 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed arsenic	15.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.0455	1.86	0.327	8	CDF	0.4824	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5896	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001600	0.0001600	1	0.00207	0.9648	Non-Significant Effect
Error	0.6182	0.077275	8			
Total	0.61836		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.87	23.2	0.5589	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.741	0.7009	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-004		5	2.07	1.78	2.35	1.99	1.86	2.43	0.104	11.23%	-0.39%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-004		1.99	1.86	2.15	1.9	2.43

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 15-3228-4658 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed arsenic	13.31%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	1.17	1.86	0.274	8	CDF	0.1383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1589	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07396	0.07396	1	1.36	0.2765	Non-Significant Effect
Error	0.43388	0.054235	8			
Total	0.50784		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	13	23.2	0.0292	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4772	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-005		5	2.23	2.12	2.34	2.21	2.14	2.37	0.0394	3.95%	-8.36%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-005		2.14	2.37	2.18	2.25	2.21

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	03-8978-9763	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed arsenic	13.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.132	1.86	0.283	8	CDF	0.5507	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2142	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0173	0.8986	Non-Significant Effect
Error	0.46236	0.057795	8			
Total	0.46336		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.77	23.2	0.0908	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8317	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-006		5	2.04	1.89	2.19	2.04	1.89	2.19	0.0545	5.98%	0.97%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-006		2.12	1.95	2.04	2.19	1.89

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-8343-9589	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed arsenic	15.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.463	1.86	0.322	8	CDF	0.3280	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5378	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	0.214	0.6560	Non-Significant Effect
Error	0.59836	0.074795	8			
Total	0.61436		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.06	23.2	0.5009	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.895	0.741	0.1933	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
59517-007		5	2.14	1.86	2.41	2.03	2.02	2.53	0.0989	10.34%	-3.89%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
59517-007		2.02	2.09	2.03	2.02	2.53

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-3601-1818	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed arsenic	14.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.6	1.86	0.302	8	CDF	0.0739	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.29	0.3578	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.169	0.169	1	2.57	0.1477	Non-Significant Effect
Error	0.52656	0.06582	8			
Total	0.69556		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.26	23.2	0.2792	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6419	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.06	1.66	2.45	2.04	1.6	2.39	0.142	15.42%	0.00%
29517-008		5	2.32	2.1	2.54	2.26	2.13	2.58	0.0786	7.59%	-12.63%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.94	2.32	2.39	1.6	2.04
29517-008		2.4	2.58	2.13	2.22	2.26

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 20-1126-4322 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:50 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed cadmium	40.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	0.686	1.86	0.014	8	CDF	0.2560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.29	0.9481	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000625	0.0000625	1	0.471	0.5119	Non-Significant Effect
Error	0.0010616	0.0001327	8			
Total	0.0011241		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.15	23.2	0.8984	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6492	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-001		5	0.0388	0.024	0.0536	0.038	0.024	0.056	0.00532	30.68%	-14.79%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-001		0.038	0.043	0.056	0.024	0.033

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	17-0787-3508	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed cadmium	32.27%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1.81	1.86	0.011	8	CDF	0.0542	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.62	2.29	0.8493	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002809	0.0002809	1	3.27	0.1083	Non-Significant Effect
Error	0.000688	0.000086	8			
Total	0.0009689		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.56	23.2	0.3846	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.958	0.741	0.7685	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-002		5	0.0444	0.0358	0.053	0.043	0.036	0.055	0.00311	15.65%	-31.36%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-002		0.042	0.046	0.055	0.036	0.043

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	12-0530-5439	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed cadmium	30.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.286	1.86	0.010	8	CDF	0.3911	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6770	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000064	0.0000064	1	0.0818	0.7822	Non-Significant Effect
Error	0.000626	7.825E-05	8			
Total	0.0006324		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.77	23.2	0.2267	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.972	0.741	0.9067	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-003		5	0.0354	0.0283	0.0425	0.034	0.03	0.044	0.00256	16.18%	-4.73%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-003		0.034	0.03	0.038	0.031	0.044

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 20-7911-8945 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed cadmium	39.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.861	1.86	0.013	8	CDF	0.2071	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.32	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000961	0.0000961	1	0.742	0.4142	Non-Significant Effect
Error	0.0010368	0.0001296	8			
Total	0.0011329		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.1	23.2	0.9318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.852	0.741	0.0619	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-004		5	0.04	0.0255	0.0545	0.042	0.028	0.053	0.00521	29.10%	-18.34%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-004		0.042	0.028	0.053	0.028	0.049

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	06-0841-4744	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed cadmium	28.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.887	1.86	0.01	8	CDF	0.2005	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.84	2.29	0.4390	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.787	0.4010	Non-Significant Effect
Error	0.000538	6.725E-05	8			
Total	0.0005909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.5	23.2	0.0366	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.939	0.741	0.5381	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-005		5	0.0384	0.0343	0.0425	0.039	0.033	0.041	0.00147	8.56%	-13.61%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-005		0.038	0.041	0.039	0.041	0.033

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	08-1856-7647	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed cadmium	31.46%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.401	2.13	0.011	4	CDF	0.3545	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3366	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.161	0.6989	Non-Significant Effect
Error	0.0004976	0.0000622	8			
Total	0.0005076		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	177	23.2	1.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.741	0.2831	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-006		5	0.0358	0.0348	0.0368	0.036	0.035	0.037	0.000374	2.34%	-5.92%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-006		0.036	0.036	0.035	0.035	0.037

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	11-2725-1457	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed cadmium	28.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.726	1.86	0.01	8	CDF	0.2443	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.82	2.29	0.4652	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000361	0.0000361	1	0.527	0.4886	Non-Significant Effect
Error	0.000548	0.0000685	8			
Total	0.0005841		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.3	23.2	0.0529	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7522	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
59517-007		5	0.0376	0.0331	0.0421	0.038	0.033	0.042	0.00163	9.70%	-11.24%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
59517-007		0.038	0.035	0.033	0.042	0.04

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	16-0394-0333	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed cadmium	29.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.25	1.86	0.010	8	CDF	0.1237	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5889	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001156	0.0001156	1	1.56	0.2474	Non-Significant Effect
Error	0.000594	7.425E-05	8			
Total	0.0007096		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.99	23.2	0.1487	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.972	0.741	0.9127	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0338	0.02	0.0476	0.037	0.022	0.048	0.00497	32.91%	0.00%
29517-008		5	0.0406	0.0344	0.0468	0.039	0.037	0.049	0.00223	12.27%	-20.12%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.037	0.048	0.039	0.023	0.022
29517-008		0.041	0.049	0.037	0.039	0.037

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	17-4466-2530	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:50	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed chromium	30.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.234	1.86	0.018	8	CDF	0.5897	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6244	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000121	0.0000121	1	0.0549	0.8206	Non-Significant Effect
Error	0.0017628	0.0002204	8			
Total	0.0017749		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.3	23.2	0.8027	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.843	0.741	0.0482	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-001		5	0.0548	0.0376	0.072	0.051	0.044	0.079	0.00618	25.23%	3.86%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-001		0.049	0.051	0.079	0.051	0.044

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-5325-3546	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed chromium	29.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-1.24	1.86	0.017	8	CDF	0.8747	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003136	0.0003136	1	1.53	0.2505	Non-Significant Effect
Error	0.0016348	0.0002044	8			
Total	0.0019484		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.57	23.2	0.6740	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2534	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-002		5	0.0458	0.0301	0.0615	0.04	0.035	0.066	0.00564	27.55%	19.65%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-002		0.066	0.05	0.04	0.038	0.035

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	10-2372-0166	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed chromium	29.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-1.14	1.86	0.017	8	CDF	0.8569	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4906	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	1.31	0.2861	Non-Significant Effect
Error	0.0015928	0.0001991	8			
Total	0.0018529		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.68	23.2	0.6284	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3725	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-003		5	0.0468	0.0317	0.0619	0.042	0.035	0.066	0.00545	26.06%	17.89%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-003		0.042	0.051	0.035	0.04	0.066

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-6039-5970	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed chromium	31.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-1.01	1.86	0.018	8	CDF	0.8281	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7826	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002401	0.0002401	1	1.01	0.3437	Non-Significant Effect
Error	0.0018968	0.0002371	8			
Total	0.0021369		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9216	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.898	0.741	0.2099	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-004		5	0.0472	0.0286	0.0658	0.04	0.035	0.068	0.0067	31.76%	17.19%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-004		0.04	0.058	0.035	0.068	0.035

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-5228-9713	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed chromium	26.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-1.98	1.86	0.015	8	CDF	0.9588	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2373	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00064	0.00064	1	3.94	0.0825	Non-Significant Effect
Error	0.0013	0.0001625	8			
Total	0.00194		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.3	23.2	0.2737	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.932	0.741	0.4667	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-005		5	0.041	0.0302	0.0518	0.036	0.035	0.055	0.00389	21.19%	28.07%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-005		0.036	0.044	0.035	0.035	0.055

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-2147-6407	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed chromium	55.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.34	1.86	0.032	8	CDF	0.1088	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3515	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012996	0.0012996	1	1.79	0.2175	Non-Significant Effect
Error	0.0058028	0.0007254	8			
Total	0.0071024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.81	23.2	0.1571	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.983	0.741	0.9792	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-006		5	0.0798	0.0368	0.123	0.078	0.042	0.128	0.0155	43.43%	-40.00%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-006		0.128	0.042	0.078	0.053	0.098

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	20-0343-4048	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed chromium	26.09%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-1.85	1.86	0.015	8	CDF	0.9493	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.29	0.2211	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005476	0.0005476	1	3.43	0.1013	Non-Significant Effect
Error	0.0012788	0.0001599	8			
Total	0.0018264		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.55	23.2	0.2469	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5560	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
59517-007		5	0.0422	0.0318	0.0526	0.038	0.035	0.054	0.00375	19.85%	25.96%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
59517-007		0.048	0.035	0.036	0.038	0.054

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-6109-4320	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed chromium	26.83%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-2.56	2.13	0.015	4	CDF	0.9688	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.24	2.29	0.0671	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008464	0.0008464	1	6.58	0.0334	Significant Effect
Error	0.0010292	0.0001287	8			
Total	0.0018756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	32	23.2	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3403	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.057	0.0374	0.0766	0.053	0.04	0.081	0.00706	27.71%	0.00%
29517-008		5	0.0386	0.0351	0.0421	0.038	0.036	0.042	0.00125	7.24%	32.28%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.053	0.048	0.04	0.081	0.063
29517-008		0.041	0.038	0.036	0.036	0.042

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 13-7770-5762 **Endpoint:** Copper **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:50 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed copper	12.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-2.46	1.86	0.128	8	CDF	0.9804	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7843	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0720801	0.0720801	1	6.05	0.0393	Significant Effect
Error	0.0952588	0.0119074	8			
Total	0.167339		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.33	23.2	0.7909	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7117	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-001		5	0.852	0.707	0.997	0.884	0.682	0.987	0.0521	13.68%	16.62%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-001		0.682	0.909	0.798	0.987	0.884

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	14-8134-4566	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:50	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed copper	10.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.818	1.89	0.11	7	CDF	0.7798	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0050245	0.0050245	1	0.669	0.4404	Non-Significant Effect
Error	0.0525815	0.0075117	7			
Total	0.057606		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.64	46.2	0.4514	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.95	0.701	0.6922	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-002		4	0.974	0.875	1.07	0.965	0.917	1.05	0.0311	6.39%	4.65%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-002		1.05	1	0.917	0.93	Outlier

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-1904-0311	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed copper	22.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.52	1.86	0.228	8	CDF	0.3087	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.44	2.29	0.0157	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0101124	0.0101124	1	0.27	0.6174	Non-Significant Effect
Error	0.299668	0.0374585	8			
Total	0.30978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.32	23.2	0.1018	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.741	0.0288	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-002		5	1.09	0.77	1.4	1	0.917	1.53	0.114	23.43%	-6.22%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-002		1.05	1	0.917	0.93	1.53

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	01-5645-7586	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed copper	19.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.548	1.86	0.196	8	CDF	0.7008	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1831	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0083521	0.0083521	1	0.301	0.5984	Non-Significant Effect
Error	0.222179	0.0277724	8			
Total	0.230531		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.43	23.2	0.1787	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.965	0.741	0.8386	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-003		5	0.964	0.7	1.23	0.967	0.641	1.2	0.0952	22.08%	5.66%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-003		0.967	0.912	1.2	0.641	1.1

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	07-1243-4232	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed copper	14.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	2.73	1.86	0.146	8	CDF	0.0130	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.83	2.29	0.4537	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.114704	0.114704	1	7.43	0.0260	Significant Effect
Error	0.123465	0.0154331	8			
Total	0.238169		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.02	23.2	0.5140	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8157	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-004		5	1.24	1.06	1.41	1.26	1.08	1.45	0.0642	11.62%	-20.96%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-004		1.13	1.26	1.26	1.45	1.08

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	07-2591-3701	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed copper	17.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-1.33	1.86	0.182	8	CDF	0.8898	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1374	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0421201	0.0421201	1	1.77	0.2205	Non-Significant Effect
Error	0.190767	0.0238459	8			
Total	0.232887		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.66	23.2	0.2369	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.959	0.741	0.7693	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-005		5	0.892	0.652	1.13	0.876	0.677	1.2	0.0866	21.70%	12.70%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-005		0.677	0.801	1.2	0.876	0.906

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	08-0985-7420	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed copper	12.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.397	1.86	0.13	8	CDF	0.3508	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8284	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0019321	0.0019321	1	0.158	0.7016	Non-Significant Effect
Error	0.097988	0.0122485	8			
Total	0.0999201		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.39	23.2	0.7558	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.978	0.741	0.9543	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-006		5	1.05	0.901	1.2	1.04	0.888	1.22	0.0534	11.38%	-2.72%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-006		0.888	1.04	1.08	1.02	1.22

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	00-2191-2886	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed copper	12.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-1.16	1.86	0.13	8	CDF	0.8609	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9096	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0166464	0.0166464	1	1.35	0.2782	Non-Significant Effect
Error	0.0983936	0.0122992	8			
Total	0.11504		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.4	23.2	0.7508	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9425	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
59517-007		5	0.94	0.791	1.09	0.936	0.773	1.1	0.0536	12.75%	7.99%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
59517-007		0.936	0.773	0.902	1.1	0.99

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	12-0615-8558	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed copper	8.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-4.23	1.86	0.087	8	CDF	0.9986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3495	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0982081	0.0982081	1	17.9	0.0029	Significant Effect
Error	0.043978	0.0054973	8			
Total	0.142186		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	13.5	23.2	0.0272	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.965	0.741	0.8389	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	1.02	0.896	1.15	1.02	0.889	1.13	0.0452	9.90%	0.00%
29517-008		5	0.824	0.789	0.858	0.827	0.78	0.851	0.0123	3.34%	19.40%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.889	1.02	1.13	0.96	1.11
29517-008		0.851	0.818	0.827	0.78	0.842

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 10-8058-4285 **Endpoint:** Lead **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:50 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed lead	45.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.927	1.86	0.057	8	CDF	0.8096	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6888	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0020449	0.0020449	1	0.86	0.3808	Non-Significant Effect
Error	0.0190172	0.0023772	8			
Total	0.0210621		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.07	23.2	0.4982	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3740	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-001		5	0.0984	0.0495	0.147	0.087	0.059	0.14	0.0176	39.99%	22.52%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-001		0.087	0.14	0.14	0.059	0.066

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-8897-8515	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed lead	47.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.335	1.86	0.06	8	CDF	0.3731	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.62	2.29	0.8501	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.112	0.7461	Non-Significant Effect
Error	0.0207668	0.0025959	8			
Total	0.0210584		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.61	23.2	0.6539	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.916	0.741	0.3213	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-002		5	0.138	0.0825	0.193	0.136	0.083	0.205	0.0199	32.34%	-8.50%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-002		0.083	0.136	0.146	0.119	0.205

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 16-0752-5741 **Endpoint:** Lead **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed lead	41.84%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.861	1.86	0.053	8	CDF	0.7928	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.83	2.29	0.4475	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0015129	0.0015129	1	0.741	0.4144	Non-Significant Effect
Error	0.0163312	0.0020414	8			
Total	0.0178441		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.66	23.2	0.2371	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5863	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-003		5	0.102	0.0656	0.139	0.115	0.057	0.134	0.0132	28.92%	19.37%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-003		0.115	0.057	0.134	0.091	0.115

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-6088-9979	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed lead	43.25%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.088	1.86	0.055	8	CDF	0.5340	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5466	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000169	0.0000169	1	0.00775	0.9320	Non-Significant Effect
Error	0.0174532	0.0021817	8			
Total	0.0174701		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.77	23.2	0.3475	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.949	0.741	0.6517	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-004		5	0.124	0.0822	0.167	0.126	0.087	0.165	0.0152	27.35%	2.05%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-004		0.126	0.087	0.165	0.094	0.15

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 00-9709-4805 **Endpoint:** Lead **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed lead	40.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.416	1.86	0.051	8	CDF	0.3442	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3377	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003249	0.0003249	1	0.173	0.6884	Non-Significant Effect
Error	0.0150272	0.0018784	8			
Total	0.0153521		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.82	23.2	0.1164	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8159	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-005		5	0.138	0.109	0.168	0.139	0.113	0.173	0.0105	16.96%	-8.98%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-005		0.146	0.113	0.173	0.121	0.139

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-9032-3186	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed lead	42.82%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-1.08	1.86	0.054	8	CDF	0.8443	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5157	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0024964	0.0024964	1	1.17	0.3114	Non-Significant Effect
Error	0.0171072	0.0021384	8			
Total	0.0196036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.99	23.2	0.3133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5178	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-006		5	0.0954	0.0548	0.136	0.086	0.064	0.132	0.0146	34.30%	24.88%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-006		0.132	0.064	0.086	0.067	0.128

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	09-1924-5278	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed lead	39.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.398	1.86	0.051	8	CDF	0.6494	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.93	2.29	0.3151	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.158	0.7012	Non-Significant Effect
Error	0.0147468	0.0018434	8			
Total	0.0150384		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.67	23.2	0.0931	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.965	0.741	0.8425	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
59517-007		5	0.116	0.089	0.143	0.12	0.087	0.145	0.00981	18.87%	8.50%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
59517-007		0.104	0.125	0.087	0.12	0.145

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 07-0292-4525 **Endpoint:** Lead **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed lead	41.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	0.482	1.86	0.053	8	CDF	0.3215	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.83	2.29	0.4553	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0004761	0.0004761	1	0.232	0.6430	Non-Significant Effect
Error	0.0164208	0.0020526	8			
Total	0.0168969		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.57	23.2	0.2458	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6896	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.127	0.0567	0.197	0.122	0.072	0.205	0.0253	44.58%	0.00%
29517-008		5	0.141	0.104	0.178	0.122	0.117	0.185	0.0134	21.30%	-10.87%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.16	0.205	0.122	0.072	0.076
29517-008		0.185	0.121	0.117	0.159	0.122

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	12-4019-0699	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:50	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed mercury	53.33%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	0.285	1.86	0.005	8	CDF	0.3916	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2295	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000016	0.0000016	1	0.081	0.7832	Non-Significant Effect
Error	0.000158	1.975E-05	8			
Total	0.0001596		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6605	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.832	0.741	0.0355	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-001		5	0.0106	0.00448	0.0167	0.008	0.007	0.019	0.0022	46.50%	-8.16%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-001		0.008	0.008	0.007	0.019	0.011

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 07-9003-6964 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed mercury	49.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.61	1.86	0.005	8	CDF	0.7206	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2394	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000064	0.0000064	1	0.372	0.5588	Non-Significant Effect
Error	0.0001376	0.0000172	8			
Total	0.000144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.26	23.2	0.8264	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.796	0.741	0.0131	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-002		5	0.0082	0.00276	0.0136	0.006	0.006	0.016	0.00196	53.44%	16.33%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-002		0.016	0.006	0.006	0.006	0.007

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 10-3832-7473 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed mercury	54.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.484	1.86	0.005	8	CDF	0.3208	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.29	0.9682	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000049	0.0000049	1	0.234	0.6416	Non-Significant Effect
Error	0.0001676	2.095E-05	8			
Total	0.0001725		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.76	23.2	0.5986	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1596	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-003		5	0.0112	0.00478	0.0176	0.01	0.006	0.018	0.00231	46.14%	-14.29%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-003		0.01	0.015	0.007	0.006	0.018

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 21-3736-4915 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed mercury	43.68%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.782	1.86	0.004	8	CDF	0.2284	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.22	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000081	0.0000081	1	0.611	0.4568	Non-Significant Effect
Error	0.000106	1.325E-05	8			
Total	0.0001141		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7808	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.838	0.741	0.0414	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-004		5	0.0116	0.00743	0.0158	0.013	0.008	0.015	0.0015	28.98%	-18.37%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-004		0.013	0.014	0.008	0.015	0.008

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	15-9620-4479	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed mercury	34.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-1.56	1.86	0.003	8	CDF	0.9208	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9954	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000196	0.0000196	1	2.42	0.1584	Non-Significant Effect
Error	0.0000648	0.0000081	8			
Total	0.0000844		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.2	23.2	0.0219	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.934	0.741	0.4851	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-005		5	0.007	0.00576	0.00824	0.007	0.006	0.008	0.000447	14.29%	28.57%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-005		0.006	0.007	0.006	0.008	0.008

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-5931-5524	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed mercury	46.09%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.329	1.86	0.005	8	CDF	0.3752	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.82	2.29	0.4606	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000016	0.0000016	1	0.108	0.7503	Non-Significant Effect
Error	0.000118	1.475E-05	8			
Total	0.0001196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.06	23.2	0.9543	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.934	0.741	0.4886	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-006		5	0.0106	0.0059	0.0153	0.012	0.004	0.013	0.00169	35.67%	-8.16%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-006		0.004	0.013	0.011	0.012	0.013

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	15-9073-4161	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed mercury	41.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.905	1.86	0.004	8	CDF	0.1959	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.28	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00001	0.00001	1	0.82	0.3917	Non-Significant Effect
Error	0.0000976	0.0000122	8			
Total	0.0001076		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.65	23.2	0.6386	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.741	0.0798	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
59517-007		5	0.0118	0.00803	0.0156	0.012	0.008	0.016	0.00136	25.70%	-20.41%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
59517-007		0.016	0.008	0.012	0.013	0.01

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	11-8375-7480	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed mercury	33.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-1.34	1.86	0.003	8	CDF	0.8917	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9702	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000144	0.0000144	1	1.8	0.2165	Non-Significant Effect
Error	0.000064	0.000008	8			
Total	0.0000784		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19	23.2	0.0145	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.3972	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.0098	0.00496	0.0146	0.008	0.006	0.014	0.00174	39.78%	0.00%
29517-008		5	0.0074	0.00629	0.00851	0.008	0.006	0.008	0.0004	12.09%	24.49%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.007	0.006	0.008	0.014	0.014
29517-008		0.008	0.008	0.006	0.007	0.008

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-0728-5929	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:50	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed nickel	35.12%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.43	2.13	0.039	4	CDF	0.8874	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.29	0.0870	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0017161	0.0017161	1	2.05	0.1899	Non-Significant Effect
Error	0.0066888	0.0008361	8			
Total	0.0084049		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	29.6	23.2	0.0063	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.741	0.2820	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-001		5	0.0848	0.0756	0.094	0.086	0.073	0.093	0.00331	8.72%	23.60%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-001		0.088	0.084	0.093	0.073	0.086

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-2274-6710	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed nickel	38.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-1.34	1.86	0.042	8	CDF	0.8915	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5412	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0023104	0.0023104	1	1.8	0.2170	Non-Significant Effect
Error	0.0102912	0.0012864	8			
Total	0.0126016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.69	23.2	0.6224	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3719	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-002		5	0.0806	0.0422	0.119	0.073	0.051	0.132	0.0138	38.35%	27.39%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-002		0.132	0.082	0.051	0.065	0.073

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	03-1934-1023	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed nickel	31.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.97	1.86	0.035	8	CDF	0.8199	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.29	0.1033	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.942	0.3602	Non-Significant Effect
Error	0.00688	0.00086	8			
Total	0.00769		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.8	23.2	0.0205	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4110	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-003		5	0.093	0.0804	0.106	0.095	0.079	0.106	0.00453	10.89%	16.22%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-003		0.095	0.088	0.079	0.106	0.097

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	11-4888-2439	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed nickel	33.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-1.54	1.86	0.037	8	CDF	0.9191	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1964	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0023104	0.0023104	1	2.37	0.1619	Non-Significant Effect
Error	0.0077832	0.0009729	8			
Total	0.0100936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.93	23.2	0.1516	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7155	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-004		5	0.0806	0.0581	0.103	0.085	0.063	0.106	0.0081	22.48%	27.39%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-004		0.063	0.085	0.063	0.106	0.086

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	10-7881-4784	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed nickel	30.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-2.12	1.86	0.034	8	CDF	0.9668	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.29	0.0971	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0038416	0.0038416	1	4.51	0.0664	Non-Significant Effect
Error	0.0068088	0.0008511	8			
Total	0.0106504		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19.1	23.2	0.0144	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.741	0.3126	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-005		5	0.0718	0.0604	0.0832	0.069	0.062	0.086	0.00412	12.82%	35.32%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-005		0.062	0.075	0.086	0.069	0.067

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	06-2299-2077	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed nickel	36.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.201	1.86	0.041	8	CDF	0.4229	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.84	2.29	0.4358	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000484	0.0000484	1	0.0404	0.8457	Non-Significant Effect
Error	0.0095832	0.0011979	8			
Total	0.0096316		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.08	23.2	0.4961	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.971	0.741	0.8963	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-006		5	0.115	0.0808	0.15	0.124	0.087	0.151	0.0125	24.18%	-3.96%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-006		0.087	0.087	0.128	0.151	0.124

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	06-5331-5990	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed nickel	34.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.286	1.86	0.038	8	CDF	0.6089	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2513	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000841	0.0000841	1	0.0817	0.7823	Non-Significant Effect
Error	0.0082368	0.0010296	8			
Total	0.0083209		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.66	23.2	0.2366	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9412	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
59517-007		5	0.105	0.0791	0.131	0.104	0.076	0.135	0.0094	19.98%	5.23%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
59517-007		0.102	0.076	0.104	0.109	0.135

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 07-9157-6566 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed nickel	36.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.21	1.86	0.041	8	CDF	0.5804	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.83	2.29	0.4434	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.0439	0.8392	Non-Significant Effect
Error	0.0096352	0.0012044	8			
Total	0.0096881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.04	23.2	0.5057	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9149	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.111	0.0611	0.161	0.102	0.063	0.171	0.018	36.23%	0.00%
29517-008		5	0.106	0.0715	0.141	0.101	0.078	0.14	0.0126	26.44%	4.14%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.094	0.063	0.125	0.171	0.102
29517-008		0.14	0.131	0.101	0.082	0.078

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 06-2347-4571 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:50 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed zinc	11.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.04	1.86	0.667	8	CDF	0.1651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8436	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.34596	0.34596	1	1.07	0.3302	Non-Significant Effect
Error	2.57488	0.32186	8			
Total	2.92084		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.29	23.2	0.4418	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.741	0.3125	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-001		5	6.43	5.6	7.26	6.4	5.78	7.3	0.299	10.41%	-6.14%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-001		5.79	6.4	5.78	7.3	6.88

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 06-6406-1179 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed zinc	9.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	1.97	1.86	0.585	8	CDF	0.0425	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6432	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.95481	0.95481	1	3.86	0.0849	Non-Significant Effect
Error	1.9774	0.247175	8			
Total	2.93221		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.53	23.2	0.6917	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4752	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-002		5	6.68	6	7.35	6.8	5.87	7.22	0.244	8.19%	-10.20%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-002		6.41	6.8	7.08	5.87	7.22

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 01-9125-9301 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed zinc	8.39%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	2.11	1.86	0.508	8	CDF	0.0337	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8718	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.83521	0.83521	1	4.47	0.0674	Non-Significant Effect
Error	1.4946	0.186825	8			
Total	2.32981		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.1	23.2	0.9294	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.96	0.741	0.7914	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-003		5	6.64	6.11	7.16	6.54	6.17	7.09	0.189	6.36%	-9.54%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-003		7.09	7.06	6.32	6.54	6.17

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 17-4229-7757 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed zinc	8.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	2.35	1.86	0.523	8	CDF	0.0234	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9817	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.089	1.089	1	5.51	0.0468	Significant Effect
Error	1.57976	0.19747	8			
Total	2.66876		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.02	23.2	0.9859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6954	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-004		5	6.72	6.16	7.27	6.66	6.22	7.26	0.2	6.65%	-10.89%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-004		6.37	6.66	6.22	7.26	7.08

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	15-0624-1674	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed zinc	10.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.58	1.86	0.609	8	CDF	0.2888	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6313	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0902501	0.0902501	1	0.337	0.5776	Non-Significant Effect
Error	2.14276	0.267845	8			
Total	2.23301		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.74	23.2	0.6053	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4456	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-005		5	6.25	5.52	6.97	6.36	5.65	7.09	0.261	9.33%	-3.14%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-005		5.65	6.4	7.09	5.74	6.36

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 17-4188-4908 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed zinc	7.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	2.72	1.86	0.481	8	CDF	0.0132	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.29	0.6671	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.23201	1.23201	1	7.37	0.0264	Significant Effect
Error	1.33648	0.16706	8			
Total	2.56849		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.41	23.2	0.7461	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.961	0.741	0.7953	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-006		5	6.76	6.3	7.22	6.77	6.23	7.16	0.166	5.51%	-11.59%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-006		6.23	7.05	6.77	6.59	7.16

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	07-5285-5694	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed zinc	10.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.97	1.89	0.639	7	CDF	0.0104	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.23112	2.23112	1	8.83	0.0208	Significant Effect
Error	1.76888	0.252697	7			
Total	4		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.68	24.3	0.6145	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.701	0.5373	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
59517-007		4	7.06	6.15	7.97	7.07	6.38	7.72	0.287	8.12%	-16.54%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
59517-007		7.72	Outlier	6.38	6.86	7.28

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	06-1460-6432	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:51	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed zinc	61.70%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	16	n/a	0	8	Exact	0.0079	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	8.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	22.3503	22.3503	1	2.21	0.1752	Non-Significant Effect
Error	80.8118	10.1015	8			
Total	103.162		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	102	23.2	5.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.713	0.741	0.0013	Non-Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
59517-007		5	9.05	3.49	14.6	7.28	6.38	17	2	49.44%	-49.36%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
59517-007		7.72	17	6.38	6.86	7.28

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 03-8506-5515 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:51 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed zinc	11.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.2	1.86	0.725	8	CDF	0.1320	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8384	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.54756	0.54756	1	1.44	0.2640	Non-Significant Effect
Error	3.036	0.3795	8			
Total	3.58356		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.88	23.2	0.3301	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.902	0.741	0.2276	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	6.06	5.51	6.61	6.1	5.4	6.64	0.198	7.30%	0.00%
29517-008		5	6.53	5.59	7.46	6.84	5.58	7.18	0.336	11.50%	-7.73%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	6.01	6.64	6.14	5.4	6.1
29517-008		7.16	7.18	6.84	5.87	5.58

28 day *Macoma nasuta* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

PCB Congeners

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 18	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 28	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 44	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 52	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 66	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 87	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 101	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 105	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 118	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 128	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 138	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 153	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 170	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 180	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 187	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 195	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 206	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
PCB 209	0.965	U	0.901	U	0.906	U	0.865	U	0.94	U
Total PCBs	36.67		34.24		34.43		32.87		35.72	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 1 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 18	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 28	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 44	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 52	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 66	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 87	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 101	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 105	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 118	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 128	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 138	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 153	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 170	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 180	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 187	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 195	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 206	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
PCB 209	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
Total PCBs	33.74		32.15		33.21		36.18		35.49	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 2 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 18	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 28	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 44	0.888	U	0.942	U	0.871	U	0.973	U	2.65	
PCB 52	0.888	U	1.1	J	0.878	J	0.973	U	1.06	J
PCB 66	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 87	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 101	2.01		0.942	U	1.62	J	1.96		2.68	
PCB 105	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 118	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 128	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 138	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 153	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 170	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 180	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 187	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 195	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 206	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
PCB 209	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
Total PCBs	35.99		36.11		34.61		38.95		40.91	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 3 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 18	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 28	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 44	2.06		2.35		1.73		2.27		2.41	
PCB 52	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 66	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 87	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 101	1.8	J	2.23		1.93		2.16		1.6	J
PCB 105	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 118	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 128	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 138	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 153	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 170	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 180	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 187	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 195	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 206	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
PCB 209	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
Total PCBs	39.75		40.07		36.12		42.59		39.91	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 4 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 18	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 28	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 44	2.12		2.58		2.89		3.48		0.986	U
PCB 52	0.865	J	0.874	U	0.958	J	0.846	U	0.986	U
PCB 66	0.846	U	0.874	U	0.97	J	0.846	U	0.986	U
PCB 87	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 101	2.38		2.98		2.39		3.21		2.42	
PCB 105	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 118	0.846	U	0.968	J	0.942	U	0.997	J	0.986	U
PCB 128	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 138	0.846	U	1.22	J	0.942	U	1.14	J	0.986	U
PCB 153	0.897	J	1.14	J	0.942	U	1.21	J	0.986	U
PCB 170	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 180	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 187	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 195	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 206	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
PCB 209	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
Total PCBs	37.90		42.25		42.68		43.76		40.34	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 5 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 18	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 28	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 44	2.41		3.62		2.32		2.66		2.34	
PCB 52	0.865	J	1.24	J	1.05	J	1.42	J	1.56	J
PCB 66	0.852	U	0.843	U	0.836	U	1.04	J	0.97	J
PCB 87	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 101	2.64		2.56		3.13		3.01		2.43	
PCB 105	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 118	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 128	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 138	0.853	J	0.843	U	0.993	J	1.26	J	1.3	J
PCB 153	0.852	U	0.843	U	1.16	J	1.49	J	0.885	J
PCB 170	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 180	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 187	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 195	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 206	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
PCB 209	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
Total PCBs	39.10		41.82		40.71		44.72		40.71	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 6 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 18	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 28	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 44	2.44		2.39		2.57		2.68		1.85	
PCB 52	3.16		2.79		2.8		2.41		2.27	
PCB 66	1.59	J	1.43	J	1.56	J	1.42	J	1.18	J
PCB 87	0.914	U	0.906	U	1.09	J	0.983	J	0.921	U
PCB 101	4.2		2.83		3.23		3.08		2.74	
PCB 105	1.32	J	0.906	U	1.63	J	1.3	J	0.921	U
PCB 118	1.22	J	1.28	J	1.48	J	1.28	J	1.03	J
PCB 128	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 138	1.65	J	1.66	J	2.14		1.65	J	1.7	J
PCB 153	1.58	J	1.3	J	1.34	J	1.49	J	1.41	J
PCB 170	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 180	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 187	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 195	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 206	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
PCB 209	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
Total PCBs	54.43		49.10		53.04		51.31		46.46	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 7 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	2.66		0.864	U	0.877	U	0.947	U	0.934	U
PCB 18	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 28	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 44	2.24		2.93		2.76		2.05		0.97	J
PCB 52	2.87		3.14		3.45		2.97		2.3	
PCB 66	1.46	J	1.17	J	1.37	J	1.25	J	1.12	J
PCB 87	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 101	2.54		2.47		2.52		1.87	J	2.1	
PCB 105	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 118	1.17	J	0.864	U	0.951	J	0.947	U	0.934	U
PCB 128	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 138	1.38	J	1.29	J	1.27	J	1.21	J	1.07	J
PCB 153	1.32	J	1.6	J	1.1	J	1.1	J	0.934	U
PCB 170	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 180	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 187	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 195	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 206	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
PCB 209	0.84	U	0.864	U	0.877	U	0.947	U	0.934	U
Total PCBs	49.76		47.66		47.89		45.52		41.27	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 8 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 18	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 28	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 44	2.04		3.16		0.976	J	0.843	U	3.07	
PCB 52	2.1		3.31		2.08		2.66		2.9	
PCB 66	0.94	J	0.901	U	1.11	J	0.843	U	0.917	U
PCB 87	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 101	2.14		2.39		0.938	U	1.95		2.78	
PCB 105	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 118	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 128	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 138	1.5	J	1.5	J	0.938	U	0.843	U	1.08	J
PCB 153	0.888	U	1.38	J	1.24	J	0.843	U	0.928	J
PCB 170	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 180	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 187	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 195	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 206	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
PCB 209	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
Total PCBs	42.30		48.71		38.95		37.88		47.19	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below F
NA Not Analyzed

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

Start Date: 29 Aug-17 **Species:** Macoma nasuta **Sample Code:** 29524-000
End Date: 26 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 29 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29524

Sample	Rep	Pos	PBC 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087
29524-000	1	9																			
29524-000	2	20																			
29524-000	3	22																			
29524-000	4	31																			
29524-000	5	41																			
29517-009	1	8	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965	0.965
29517-009	2	13	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901	0.901
29517-009	3	26	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906	0.906
29517-009	4	38	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865	0.865
29517-009	5	42	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
29517-001	1	4	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888
29517-001	2	17	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846	0.846
29517-001	3	21	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874	0.874
29517-001	4	35	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952	0.952
29517-001	5	44	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
29517-002	1	6	0.888	0.888	0.888	0.888	0.888	0.888	2.01	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888
29517-002	2	15	0.942	0.942	0.942	0.942	1.1	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
29517-002	3	29	0.871	0.871	0.871	0.871	0.878	0.871	1.62	0.871	0.871	0.871	0.871	0.871	0.871	0.871	0.871	0.871	0.871	0.871	0.871
29517-002	4	37	0.973	0.973	0.973	0.973	0.973	0.973	1.96	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973
29517-002	5	48	0.879	0.879	0.879	2.65	1.06	0.879	2.68	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879	0.879
29517-003	1	10	0.942	0.942	0.942	2.06	0.942	0.942	1.8	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
29517-003	2	12	0.909	0.909	0.909	2.35	0.909	0.909	2.23	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909	0.909
29517-003	3	30	0.847	0.847	0.847	1.73	0.847	0.847	1.93	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847	0.847
29517-003	4	40	0.992	0.992	0.992	2.27	0.992	0.992	2.16	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
29517-003	5	47	0.938	0.938	0.938	2.41	0.938	0.938	1.6	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938	0.938
29517-004	1	7	0.846	0.846	0.846	2.12	0.865	0.846	2.38	0.846	0.846	0.846	0.846	0.897	0.846	0.846	0.846	0.846	0.846	0.846	0.846
29517-004	2	14	0.874	0.874	0.874	2.58	0.874	0.874	2.98	0.874	0.968	0.874	1.22	1.14	0.874	0.874	0.874	0.874	0.874	0.874	0.874
29517-004	3	28	0.942	0.942	0.942	2.89	0.958	0.97	2.39	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
29517-004	4	39	0.846	0.846	0.846	3.48	0.846	0.846	3.21	0.846	0.997	0.846	1.14	1.21	0.846	0.846	0.846	0.846	0.846	0.846	0.846
29517-004	5	46	0.986	0.986	0.986	0.986	0.986	0.986	2.42	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986	0.986
29517-005	1	3	0.852	0.852	0.852	2.41	0.865	0.852	2.64	0.852	0.852	0.852	0.853	0.852	0.852	0.852	0.852	0.852	0.852	0.852	0.852
29517-005	2	18	0.843	0.843	0.843	3.62	1.24	0.843	2.56	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843

Sample	Rep	Pos	PBC 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087
29517-005	3	23	0.836	0.836	0.836	2.32	1.05	0.836	3.13	0.836	0.836	0.836	0.993	1.16	0.836	0.836	0.836	0.836	0.836	0.836	0.836
29517-005	4	32	0.883	0.883	0.883	2.66	1.42	1.04	3.01	0.883	0.883	0.883	1.26	1.49	0.883	0.883	0.883	0.883	0.883	0.883	0.883
29517-005	5	50	0.836	0.836	0.836	2.34	1.56	0.97	2.43	0.836	0.836	0.836	1.3	0.885	0.836	0.836	0.836	0.836	0.836	0.836	0.836
29517-006	1	1	0.914	0.914	0.914	2.44	3.16	1.59	4.2	1.32	1.22	0.914	1.65	1.58	0.914	0.914	0.914	0.914	0.914	0.914	0.914
29517-006	2	16	0.906	0.906	0.906	2.39	2.79	1.43	2.83	0.906	1.28	0.906	1.66	1.3	0.906	0.906	0.906	0.906	0.906	0.906	0.906
29517-006	3	25	0.868	0.868	0.868	2.57	2.8	1.56	3.23	1.63	1.48	0.868	2.14	1.34	0.868	0.868	0.868	0.868	0.868	0.868	1.09
29517-006	4	36	0.936	0.936	0.936	2.68	2.41	1.42	3.08	1.3	1.28	0.936	1.65	1.49	0.936	0.936	0.936	0.936	0.936	0.936	0.983
29517-006	5	43	0.921	0.921	0.921	1.85	2.27	1.18	2.74	0.921	1.03	0.921	1.7	1.41	0.921	0.921	0.921	0.921	0.921	0.921	0.921
59517-007	1	2	2.66	0.84	0.84	2.24	2.87	1.46	2.54	0.84	1.17	0.84	1.38	1.32	0.84	0.84	0.84	0.84	0.84	0.84	0.84
59517-007	2	19	0.864	0.864	0.864	2.93	3.14	1.17	2.47	0.864	0.864	0.864	1.29	1.6	0.864	0.864	0.864	0.864	0.864	0.864	0.864
59517-007	3	27	0.877	0.877	0.877	2.76	3.45	1.37	2.52	0.877	0.951	0.877	1.27	1.1	0.877	0.877	0.877	0.877	0.877	0.877	0.877
59517-007	4	33	0.947	0.947	0.947	2.05	2.97	1.25	1.87	0.947	0.947	0.947	1.21	1.1	0.947	0.947	0.947	0.947	0.947	0.947	0.947
59517-007	5	49	0.934	0.934	0.934	0.97	2.3	1.12	2.1	0.934	0.934	0.934	1.07	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934
29517-008	1	5	0.888	0.888	0.888	2.04	2.1	0.94	2.14	0.888	0.888	0.888	1.5	0.888	0.888	0.888	0.888	0.888	0.888	0.888	0.888
29517-008	2	11	0.901	0.901	0.901	3.16	3.31	0.901	2.39	0.901	0.901	0.901	1.5	1.38	0.901	0.901	0.901	0.901	0.901	0.901	0.901
29517-008	3	24	0.938	0.938	0.938	0.976	2.08	1.11	0.938	0.938	0.938	0.938	0.938	1.24	0.938	0.938	0.938	0.938	0.938	0.938	0.938
29517-008	4	34	0.843	0.843	0.843	0.843	2.66	0.843	1.95	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843	0.843
29517-008	5	45	0.917	0.917	0.917	3.07	2.9	0.917	2.78	0.917	0.917	0.917	1.08	0.928	0.917	0.917	0.917	0.917	0.917	0.917	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Batch ID:	09-0341-0484	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	29 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Sep-17	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
01-3401-4341	PCB 008	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 008
21-2528-7785	PCB 008	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 008
19-9808-0285	PCB 008	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 008
02-6465-7867	PCB 008	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 008
01-4882-7274	PCB 008	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 008
13-8550-0244	PCB 008	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 008
07-1997-1631	PCB 008	Equal Variance t Two-Sample Test	0.6398	59517-007 passed pcb 008
21-0670-6662	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.5000	59517-007 passed pcb 008
20-4076-6263	PCB 008	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 008
21-3023-5965	PCB 018	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 018
14-9964-6066	PCB 018	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 018
21-0946-8079	PCB 018	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 018
17-8232-3401	PCB 018	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 018
03-9480-3809	PCB 018	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 018
05-4216-9156	PCB 018	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 018
14-0021-2062	PCB 018	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 018
00-7251-8032	PCB 018	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 018
17-2065-7433	PCB 028	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 028
19-2514-6271	PCB 028	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 028
13-7996-2806	PCB 028	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 028
01-2630-5410	PCB 028	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 028
07-6582-4051	PCB 028	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 028
13-6601-6668	PCB 028	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 028
11-9886-0205	PCB 028	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 028
02-5307-1438	PCB 028	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 028
05-5292-2215	PCB 044	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 044
07-3882-5706	PCB 044	Equal Variance t Two-Sample Test	0.4582	29517-002 passed pcb 044

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-7153-7399	PCB 044	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-002 passed pcb 044
05-2342-4213	PCB 044	Equal Variance t Two-Sample Test	1.2E-07	29517-003 failed pcb 044
03-4402-6865	PCB 044	Unequal Variance t Two-Sample Test	2.8E-04	29517-003 failed pcb 044
13-9562-3016	PCB 044	Unequal Variance t Two-Sample Test	0.0117	29517-004 failed pcb 044
15-3174-0055	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 044
07-1923-5882	PCB 044	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed pcb 044
17-5085-1048	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 044
16-5018-6623	PCB 044	Unequal Variance t Two-Sample Test	2.6E-04	29517-006 failed pcb 044
01-8719-0908	PCB 044	Unequal Variance t Two-Sample Test	0.0105	59517-007 failed pcb 044
08-2503-1595	PCB 044	Unequal Variance t Two-Sample Test	0.0024	59517-007 failed pcb 044
15-3055-2889	PCB 044	Unequal Variance t Two-Sample Test	0.0448	29517-008 failed pcb 044
10-5448-6022	PCB 052	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 052
06-7469-2984	PCB 052	Equal Variance t Two-Sample Test	0.1072	29517-002 passed pcb 052
19-1560-2528	PCB 052	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 052
04-7524-7097	PCB 052	Equal Variance t Two-Sample Test	0.6119	29517-004 passed pcb 052
20-0616-5307	PCB 052	Unequal Variance t Two-Sample Test	0.0342	29517-005 failed pcb 052
20-6503-3479	PCB 052	Unequal Variance t Two-Sample Test	1.8E-04	29517-006 failed pcb 052
13-5223-4322	PCB 052	Unequal Variance t Two-Sample Test	2.2E-04	59517-007 failed pcb 052
03-5172-5461	PCB 052	Unequal Variance t Two-Sample Test	0.0010	29517-008 failed pcb 052
02-1757-7072	PCB 066	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 066
05-8822-8317	PCB 066	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 066
00-6409-9308	PCB 066	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 066
13-2918-5234	PCB 066	Equal Variance t Two-Sample Test	0.6191	29517-004 passed pcb 066
03-4852-4410	PCB 066	Equal Variance t Two-Sample Test	0.5622	29517-005 passed pcb 066
01-6291-2853	PCB 066	Equal Variance t Two-Sample Test	5.7E-05	29517-006 failed pcb 066
11-5047-0504	PCB 066	Equal Variance t Two-Sample Test	1.4E-06	29517-006 failed pcb 066
03-8859-8275	PCB 066	Equal Variance t Two-Sample Test	2.8E-04	59517-007 failed pcb 066
15-9657-3880	PCB 066	Equal Variance t Two-Sample Test	0.2963	29517-008 passed pcb 066
20-0653-8923	PCB 066	Equal Variance t Two-Sample Test	0.7063	29517-008 passed pcb 066
20-3611-6407	PCB 087	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 087
09-7834-9527	PCB 087	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 087
09-1900-5977	PCB 087	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 087
17-9182-0322	PCB 087	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 087
07-3049-6531	PCB 087	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 087
14-0485-2257	PCB 087	Equal Variance t Two-Sample Test	0.1273	29517-006 passed pcb 087
08-3902-9788	PCB 087	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 087
07-2970-8696	PCB 087	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 087
05-0648-4173	PCB 101	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 101
03-7762-8840	PCB 101	Unequal Variance t Two-Sample Test	0.0154	29517-002 failed pcb 101
05-6612-3814	PCB 101	Unequal Variance t Two-Sample Test	4.6E-04	29517-003 failed pcb 101
20-1685-4348	PCB 101	Unequal Variance t Two-Sample Test	2.8E-04	29517-004 failed pcb 101
16-0903-8644	PCB 101	Unequal Variance t Two-Sample Test	8.6E-05	29517-005 failed pcb 101
01-0112-9608	PCB 101	Unequal Variance t Two-Sample Test	1.9E-04	29517-006 failed pcb 101
00-7077-2914	PCB 101	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-006 failed pcb 101
10-5204-8366	PCB 101	Unequal Variance t Two-Sample Test	2.6E-04	59517-007 failed pcb 101
13-1547-9736	PCB 101	Unequal Variance t Two-Sample Test	0.0022	29517-008 failed pcb 101
13-2449-8693	PCB 101	Unequal Variance t Two-Sample Test	0.0110	29517-008 failed pcb 101
00-0984-8163	PCB 105	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 105
04-1967-8768	PCB 105	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 105
05-9782-9917	PCB 105	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 105
02-4976-4389	PCB 105	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 105
18-1691-5781	PCB 105	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 105
02-6743-3737	PCB 105	Unequal Variance t Two-Sample Test	0.0473	29517-006 failed pcb 105

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
20-3850-4485	PCB 105	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 105
07-8509-7582	PCB 105	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 105
20-8410-8833	PCB 118	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 118
00-0851-8724	PCB 118	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 118
07-7001-9350	PCB 118	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 118
08-7717-0058	PCB 118	Equal Variance t Two-Sample Test	0.1711	29517-004 passed pcb 118
12-2603-9870	PCB 118	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 118
09-9395-2424	PCB 118	Equal Variance t Two-Sample Test	8.5E-04	29517-006 failed pcb 118
05-2067-9518	PCB 118	Equal Variance t Two-Sample Test	0.1597	59517-007 passed pcb 118
06-8698-4166	PCB 118	Equal Variance t Two-Sample Test	0.3772	59517-007 passed pcb 118
07-3834-0018	PCB 118	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 118
03-3086-4818	PCB 128	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 128
09-0541-6358	PCB 128	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 128
00-5938-4069	PCB 128	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 128
00-0419-2043	PCB 128	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 128
05-6289-3555	PCB 128	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 128
15-7189-8105	PCB 128	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 128
10-8038-7954	PCB 128	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 128
08-2368-8301	PCB 128	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 128
20-4530-2369	PCB 138	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 138
00-3453-4037	PCB 138	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 138
08-2206-8682	PCB 138	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 138
18-9554-1230	PCB 138	Equal Variance t Two-Sample Test	0.0747	29517-004 passed pcb 138
19-7358-6580	PCB 138	Unequal Variance t Two-Sample Test	0.1238	29517-005 passed pcb 138
18-3545-5667	PCB 138	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 138
05-4509-5581	PCB 138	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-006 failed pcb 138
14-1160-2788	PCB 138	Equal Variance t Two-Sample Test	1.5E-04	59517-007 failed pcb 138
07-6723-2150	PCB 138	Unequal Variance t Two-Sample Test	0.0704	29517-008 passed pcb 138
19-2105-8838	PCB 153	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 153
01-0124-0300	PCB 153	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 153
19-0204-3929	PCB 153	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 153
16-7535-8103	PCB 153	Equal Variance t Two-Sample Test	0.0456	29517-004 failed pcb 153
01-9757-3208	PCB 153	Equal Variance t Two-Sample Test	0.3925	29517-005 passed pcb 153
16-7410-5026	PCB 153	Unequal Variance t Two-Sample Test	0.1804	29517-005 passed pcb 153
01-8584-6062	PCB 153	Equal Variance t Two-Sample Test	6.2E-06	29517-006 failed pcb 153
08-5281-6886	PCB 153	Unequal Variance t Two-Sample Test	0.0320	59517-007 failed pcb 153
10-7209-8627	PCB 153	Unequal Variance t Two-Sample Test	0.1323	29517-008 passed pcb 153
15-2501-9075	PCB 170	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 170
16-3352-8632	PCB 170	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 170
19-2937-2513	PCB 170	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 170
08-3555-4550	PCB 170	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 170
09-1907-9441	PCB 170	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 170
00-9695-6323	PCB 170	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 170
20-9300-6327	PCB 170	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 170
12-3902-4391	PCB 170	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 170
20-3703-3316	PCB 180	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 180
14-3485-5081	PCB 180	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 180
13-8012-5530	PCB 180	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 180
20-8925-5370	PCB 180	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 180
12-6402-5998	PCB 180	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 180
21-1513-3208	PCB 180	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 180
18-7120-3478	PCB 180	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 180
03-3907-5820	PCB 180	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 180

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
05-9836-8791	PCB 187	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 187
06-4836-2137	PCB 187	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 187
05-2123-4958	PCB 187	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 187
10-5407-9303	PCB 187	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 187
16-2700-1510	PCB 187	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 187
04-2599-8611	PCB 187	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 187
18-3725-2830	PCB 187	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 187
17-9305-4908	PCB 187	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 187
18-0081-8947	PCB 195	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 195
14-1729-6498	PCB 195	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 195
02-2131-4115	PCB 195	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 195
17-8286-1230	PCB 195	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 195
13-8950-6518	PCB 195	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 195
00-9400-8386	PCB 195	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 195
02-3983-7416	PCB 195	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 195
04-2466-2886	PCB 195	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 195
06-4652-5142	PCB 206	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 206
07-7381-9859	PCB 206	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 206
18-8397-2866	PCB 206	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 206
10-0614-6581	PCB 206	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 206
16-4544-5935	PCB 206	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 206
18-9064-4310	PCB 206	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 206
02-0679-3604	PCB 206	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 206
14-7762-4505	PCB 206	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 206
08-5245-6528	PCB 209	Equal Variance t Two-Sample Test	0.7297	29517-001 passed pcb 209
17-0258-0581	PCB 209	Equal Variance t Two-Sample Test	0.5701	29517-002 passed pcb 209
09-7983-6093	PCB 209	Equal Variance t Two-Sample Test	0.3684	29517-003 passed pcb 209
01-7881-8570	PCB 209	Equal Variance t Two-Sample Test	0.6866	29517-004 passed pcb 209
18-7488-8642	PCB 209	Equal Variance t Two-Sample Test	0.9953	29517-005 passed pcb 209
04-9352-2417	PCB 209	Equal Variance t Two-Sample Test	0.6180	29517-006 passed pcb 209
15-9322-5661	PCB 209	Equal Variance t Two-Sample Test	0.7918	59517-007 passed pcb 209
03-7461-2719	PCB 209	Equal Variance t Two-Sample Test	0.7676	29517-008 passed pcb 209

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PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	1.26	0.281	2.23	0.864	2.66	0.351	0.785	62.52%	-37.25%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	1.26	0.302	2.23	0.871	2.65	0.347	0.775	61.31%	-38.17%
29517-003		5	2.16	1.82	2.51	1.73	2.41	0.124	0.276	12.77%	-136.40%
29517-004		5	2.41	1.25	3.58	0.986	3.48	0.419	0.938	38.88%	-163.40%
29517-005		5	2.67	1.99	3.35	2.32	3.62	0.245	0.548	20.53%	-191.68%
29517-006		5	2.39	1.99	2.78	1.85	2.68	0.143	0.32	13.43%	-160.65%
59517-007		5	2.19	1.23	3.15	0.97	2.93	0.345	0.772	35.24%	-139.24%
29517-008		5	2.02	0.647	3.39	0.843	3.16	0.494	1.1	54.73%	-120.43%

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PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.98	0.856	1.1	0.878	1.1	0.0446	0.0996	10.17%	-7.04%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.906	0.829	0.983	0.846	0.986	0.0278	0.0621	6.85%	1.05%
29517-005		5	1.23	0.881	1.57	0.865	1.56	0.125	0.279	22.71%	-34.04%
29517-006		5	2.69	2.25	3.12	2.27	3.16	0.158	0.353	13.13%	-193.42%
59517-007		5	2.95	2.42	3.47	2.3	3.45	0.189	0.423	14.35%	-221.83%
29517-008		5	2.61	1.95	3.27	2.08	3.31	0.236	0.529	20.25%	-185.12%

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.904	0.819	0.989	0.846	0.986	0.0306	0.0684	7.56%	1.20%
29517-005		5	0.908	0.794	1.02	0.836	1.04	0.0411	0.0919	10.12%	0.79%
29517-006		5	1.44	1.23	1.64	1.18	1.59	0.0724	0.162	11.28%	-56.87%
59517-007		5	1.27	1.1	1.45	1.12	1.46	0.0628	0.14	11.03%	-39.17%
29517-008		5	0.942	0.818	1.07	0.843	1.11	0.0449	0.1	10.66%	-2.93%

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.963	0.867	1.06	0.906	1.09	0.0346	0.0774	8.04%	-5.18%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	1.84	1.06	2.63	0.942	2.68	0.283	0.633	34.37%	-101.27%
29517-003		5	1.94	1.62	2.27	1.6	2.23	0.116	0.259	13.31%	-112.37%
29517-004		5	2.68	2.19	3.16	2.38	3.21	0.175	0.391	14.62%	-192.33%
29517-005		5	2.75	2.38	3.13	2.43	3.13	0.135	0.301	10.93%	-200.85%
29517-006		5	3.22	2.49	3.94	2.74	4.2	0.261	0.584	18.15%	-251.32%
59517-007		5	2.3	1.93	2.67	1.87	2.54	0.134	0.3	13.04%	-151.26%
29517-008		5	2.04	1.18	2.9	0.938	2.78	0.308	0.69	33.81%	-122.81%

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	1.22	0.837	1.59	0.906	1.63	0.136	0.305	25.10%	-32.77%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.948	0.873	1.02	0.846	0.997	0.0271	0.0606	6.39%	-3.54%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	1.26	1.06	1.46	1.03	1.48	0.072	0.161	12.80%	-37.43%
59517-007		5	0.973	0.83	1.12	0.864	1.17	0.0517	0.116	11.87%	-6.31%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	1.03	0.839	1.21	0.846	1.22	0.0677	0.151	14.74%	-12.17%
29517-005		5	1.05	0.778	1.32	0.843	1.3	0.0979	0.219	20.84%	-14.68%
29517-006		5	1.76	1.49	2.03	1.65	2.14	0.0954	0.213	12.13%	-92.27%
59517-007		5	1.24	1.1	1.39	1.07	1.38	0.0513	0.115	9.23%	-35.90%
29517-008		5	1.17	0.786	1.56	0.843	1.5	0.139	0.311	26.52%	-28.05%

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	1.04	0.869	1.2	0.897	1.21	0.0599	0.134	12.94%	-13.07%
29517-005		5	1.05	0.698	1.39	0.843	1.49	0.125	0.281	26.82%	-14.27%
29517-006		5	1.42	1.28	1.56	1.3	1.58	0.0507	0.113	7.95%	-55.56%
59517-007		5	1.21	0.891	1.53	0.934	1.6	0.115	0.257	21.24%	-32.27%
29517-008		5	1.06	0.759	1.35	0.843	1.38	0.107	0.239	22.65%	-15.34%

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		2.66	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	2.65
29517-003		2.06	2.35	1.73	2.27	2.41
29517-004		2.12	2.58	2.89	3.48	0.986
29517-005		2.41	3.62	2.32	2.66	2.34
29517-006		2.44	2.39	2.57	2.68	1.85
59517-007		2.24	2.93	2.76	2.05	0.97
29517-008		2.04	3.16	0.976	0.843	3.07

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	1.1	0.878	0.973	1.06
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.865	0.874	0.958	0.846	0.986
29517-005		0.865	1.24	1.05	1.42	1.56
29517-006		3.16	2.79	2.8	2.41	2.27
59517-007		2.87	3.14	3.45	2.97	2.3
29517-008		2.1	3.31	2.08	2.66	2.9

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.97	0.846	0.986
29517-005		0.852	0.843	0.836	1.04	0.97
29517-006		1.59	1.43	1.56	1.42	1.18
59517-007		1.46	1.17	1.37	1.25	1.12
29517-008		0.94	0.901	1.11	0.843	0.917

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	1.09	0.983	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		2.01	0.942	1.62	1.96	2.68
29517-003		1.8	2.23	1.93	2.16	1.6
29517-004		2.38	2.98	2.39	3.21	2.42
29517-005		2.64	2.56	3.13	3.01	2.43
29517-006		4.2	2.83	3.23	3.08	2.74
59517-007		2.54	2.47	2.52	1.87	2.1
29517-008		2.14	2.39	0.938	1.95	2.78

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		1.32	0.906	1.63	1.3	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.968	0.942	0.997	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		1.22	1.28	1.48	1.28	1.03
59517-007		1.17	0.864	0.951	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	1.22	0.942	1.14	0.986
29517-005		0.853	0.843	0.993	1.26	1.3
29517-006		1.65	1.66	2.14	1.65	1.7
59517-007		1.38	1.29	1.27	1.21	1.07
29517-008		1.5	1.5	0.938	0.843	1.08

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.897	1.14	0.942	1.21	0.986
29517-005		0.852	0.843	1.16	1.49	0.885
29517-006		1.58	1.3	1.34	1.49	1.41
59517-007		1.32	1.6	1.1	1.1	0.934
29517-008		0.888	1.38	1.24	0.843	0.928

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-3401-4341 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 008	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-2528-7785 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 008	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-9808-0285 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 008	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-6465-7867 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 008	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-4882-7274 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 008	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-8550-0244 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 008	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-0670-6662	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 008	71.44%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	27	n/a	0	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	5.0E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.290703	0.290703	1	0.94	0.3606	Non-Significant Effect
Error	2.47359	0.309198	8			
Total	2.76429		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	418	23.2	3.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.667	0.741	3.5E-04	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	1.26	0.281	2.23		0.864	2.66	0.351	62.52%	-37.25%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		2.66	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-1997-1631 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 008	5.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.373	1.89	0.050	7	CDF	0.6398	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002178	0.0002178	1	0.139	0.7203	Non-Significant Effect
Error	0.0109702	0.0015672	7			
Total	0.011188		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.15	24.3	0.8649	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.701	0.4438	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		4	0.906	0.84	0.971		0.864	0.947	0.0206	4.54%	1.08%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		Outlier	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-4076-6263 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 008	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-3023-5965 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 018	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-9964-6066 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 018	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-0946-8079 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 018	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-8232-3401 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 018	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-9480-3809 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 018	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-4216-9156 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 018	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-0021-2062 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 018	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-7251-8032 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 018	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-2065-7433 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 028	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-2514-6271 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 028	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-7996-2806 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 028	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-2630-5410 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 028	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-6582-4051 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 028	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-6601-6668 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 028	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-9886-0205 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 028	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5307-1438 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 028	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-5292-2215 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 044	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-3882-5706 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 044	5.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.109	1.89	0.054	7	CDF	0.4582	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.136E-05	2.136E-05	1	0.0119	0.9164	Non-Significant Effect
Error	0.0126102	0.0018015	7			
Total	0.0126315		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	24.3	0.6791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.921	0.701	0.3997	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		4	0.918	0.843	0.994		0.871	0.973	0.0236	5.15%	-0.34%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	Outlier

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-2342-4213	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 044	14.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.4	1.89	0.132	7	CDF	1.2E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.09271	4.09271	1	377	2.4E-07	Significant Effect
Error	0.0759762	0.0108537	7			
Total	4.16869		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.8	24.3	0.0220	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.701	0.3400	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		4	2.27	2.03	2.52		2.06	2.41	0.0764	6.73%	-148.25%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		2.06	2.35	Outlier	2.27	2.41

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-9562-3016	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 044	97.73%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	3.56	2.13	0.895	4	CDF	0.0117	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.28	2.29	0.0541	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.59354	5.59354	1	12.7	0.0074	Significant Effect
Error	3.52197	0.440246	8			
Total	9.11551		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	596	23.2	1.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0763	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	2.41	1.25	3.58		0.986	3.48	0.419	38.88%	-163.40%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		2.12	2.58	2.89	3.48	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-3174-0055 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 044	14.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	21.2	1.89	0.135	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.11465	5.11465	1	451	1.3E-07	Significant Effect
Error	0.0793763	0.0113395	7			
Total	5.19403		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.6	24.3	0.0202	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.867	0.701	0.1142	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		4	2.43	2.18	2.68		2.32	2.66	0.0782	6.43%	-165.73%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		2.41	Outlier	2.32	2.66	2.34

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-5018-6623 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 044	33.60%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	10.2	2.13	0.308	4	CDF	2.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.49	2.29	0.0090	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.40666	5.40666	1	104	7.4E-06	Significant Effect
Error	0.416421	0.0520527	8			
Total	5.82308		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	69.6	23.2	0.0012	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.797	0.741	0.0133	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	2.39	1.99	2.78		1.85	2.68	0.143	13.43%	-160.65%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		2.44	2.39	2.57	2.68	1.85

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-2503-1595	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 044	53.83%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	7.54	2.35	0.493	3	CDF	0.0024	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.54475	5.54475	1	73.5	5.9E-05	Significant Effect
Error	0.528401	0.0754859	7			
Total	6.07315		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	118	24.3	4.7E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.701	0.7393	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		4	2.5	1.83	3.16		2.05	2.93	0.209	16.73%	-172.56%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		2.24	2.93	2.76	2.05	Outlier

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-3055-2889 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 044	115.08%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.23	2.13	1.05	4	CDF	0.0448	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9202	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.03821	3.03821	1	4.98	0.0562	Non-Significant Effect
Error	4.88364	0.610455	8			
Total	7.92186		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	827	23.2	8.8E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.857	0.741	0.0701	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	2.02	0.647	3.39		0.843	3.16	0.494	54.73%	-120.43%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		2.04	3.16	0.976	0.843	3.07

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-5448-6022 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 052	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-7469-2984 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 052	9.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	1.35	1.86	0.089	8	CDF	0.1072	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.7065	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0103684	0.0103684	1	1.82	0.2144	Non-Significant Effect
Error	0.045618	0.0057023	8			
Total	0.0559864		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.73	23.2	0.0917	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.969	0.741	0.8839	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.98	0.856	1.1		0.878	1.1	0.0446	10.17%	-7.04%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	1.1	0.878	0.973	1.06

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-1560-2528 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 052	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-7524-7097 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 052	6.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.294	1.86	0.061	8	CDF	0.6119	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7938	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002304	0.0002304	1	0.0865	0.7762	Non-Significant Effect
Error	0.02131	0.0026638	8			
Total	0.0215404		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.61	23.2	0.3752	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.927	0.741	0.4222	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.906	0.829	0.983		0.846	0.986	0.0278	6.85%	1.05%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.865	0.874	0.958	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-0616-5307 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 052	29.30%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	2.48	2.13	0.268	4	CDF	0.0342	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.93	2.29	0.3112	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.242736	0.242736	1	6.13	0.0383	Significant Effect
Error	0.316581	0.0395726	8			
Total	0.559318		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	52.6	23.2	0.0021	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6344	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	1.23	0.881	1.57		0.865	1.56	0.125	22.71%	-34.04%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.865	1.24	1.05	1.42	1.56

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-6503-3479 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 052	36.96%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	11.2	2.13	0.338	4	CDF	1.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2305	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.83756	7.83756	1	124	3.7E-06	Significant Effect
Error	0.503621	0.0629527	8			
Total	8.34118		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	84.3	23.2	8.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.921	0.741	0.3692	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	2.69	2.25	3.12		2.27	3.16	0.158	13.13%	-193.42%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		3.16	2.79	2.8	2.41	2.27

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-5223-4322 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 052	44.22%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	10.7	2.13	0.405	4	CDF	2.2E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.28	2.29	0.0527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.3083	10.3083	1	114	5.1E-06	Significant Effect
Error	0.721221	0.0901527	8			
Total	11.0296		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	121	23.2	4.0E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.835	0.741	0.0387	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	2.95	2.42	3.47		2.3	3.45	0.189	14.35%	-221.83%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		2.87	3.14	3.45	2.97	2.3

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-5172-5461 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 052	55.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	7.15	2.13	0.505	4	CDF	0.0010	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2535	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.17917	7.17917	1	51.1	9.7E-05	Significant Effect
Error	1.1235	0.140438	8			
Total	8.30267		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	189	23.2	1.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.741	0.1667	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	2.61	1.95	3.27		2.08	3.31	0.236	20.25%	-185.12%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		2.1	3.31	2.08	2.66	2.9

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-1757-7072 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 066	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-8822-8317 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 066	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-6409-9308	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 066	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-2918-5234	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 066	7.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.314	1.86	0.065	8	CDF	0.6191	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003025	0.0003025	1	0.0983	0.7619	Non-Significant Effect
Error	0.0246084	0.0030761	8			
Total	0.0249109		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.17	23.2	0.2899	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.908	0.741	0.2692	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.904	0.819	0.989		0.846	0.986	0.0306	7.56%	1.20%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.97	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-4852-4410 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 066	9.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-0.162	1.86	0.083	8	CDF	0.5622	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2504	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001296	0.0001296	1	0.0261	0.8756	Non-Significant Effect
Error	0.039714	0.0049643	8			
Total	0.0398436		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.73	23.2	0.1194	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3380	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.908	0.794	1.02		0.836	1.04	0.0411	10.12%	0.79%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	1.04	0.97

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-6291-2853 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 066	15.12%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	6.99	1.86	0.138	8	CDF	5.7E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.31	2.29	0.0445	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.677561	0.677561	1	48.9	1.1E-04	Significant Effect
Error	0.110821	0.0138527	8			
Total	0.788382		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17.8	23.2	0.0164	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.876	0.741	0.1175	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	1.44	1.23	1.64		1.18	1.59	0.0724	11.28%	-56.87%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		1.59	1.43	1.56	1.42	1.18

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-8859-8275 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 066	13.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	5.51	1.86	0.121	8	CDF	2.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.321485	0.321485	1	30.3	5.7E-04	Significant Effect
Error	0.0848212	0.0106027	8			
Total	0.406306		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	13.4	23.2	0.0277	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.981	0.741	0.9703	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	1.27	1.1	1.45		1.12	1.46	0.0628	11.03%	-39.17%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		1.46	1.17	1.37	1.25	1.12

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-9657-3880 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 066	9.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	0.557	1.86	0.089	8	CDF	0.2963	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.34	2.29	0.0348	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0017956	0.0017956	1	0.311	0.5925	Non-Significant Effect
Error	0.046236	0.0057795	8			
Total	0.0480316		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.84	23.2	0.0894	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1837	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.942	0.818	1.07		0.843	1.11	0.0449	10.66%	-2.93%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.94	0.901	1.11	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-3611-6407 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 087	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7834-9527 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 087	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-1900-5977 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 087	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-9182-0322 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 087	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-3049-6531 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 087	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-0485-2257 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 087	7.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.23	1.86	0.072	8	CDF	0.1273	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.29	0.0830	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0056169	0.0056169	1	1.51	0.2547	Non-Significant Effect
Error	0.029844	0.0037305	8			
Total	0.0354609		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.06	23.2	0.2037	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1286	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.963	0.867	1.06		0.906	1.09	0.0346	8.04%	-5.18%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	1.09	0.983	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-3902-9788 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 087	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-2970-8696 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 087	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-0648-4173 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 101	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-7762-8840 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 101	66.07%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	3.27	2.13	0.605	4	CDF	0.0154	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1283	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.14832	2.14832	1	10.7	0.0114	Significant Effect
Error	1.60958	0.201197	8			
Total	3.7579		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	272	23.2	8.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.851	0.741	0.0604	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	1.84	1.06	2.63		0.942	2.68	0.283	34.37%	-101.27%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		2.01	0.942	1.62	1.96	2.68

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-6612-3814 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 101	27.24%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	8.79	2.13	0.249	4	CDF	4.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2623	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.64504	2.64504	1	77.3	2.2E-05	Significant Effect
Error	0.273621	0.0342027	8			
Total	2.91867		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	45.4	23.2	0.0028	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5175	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	1.94	1.62	2.27		1.6	2.23	0.116	13.31%	-112.37%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		1.8	2.23	1.93	2.16	1.6

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-1685-4348 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 101	40.95%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	10	2.13	0.375	4	CDF	2.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1992	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.74928	7.74928	1	100	8.4E-06	Significant Effect
Error	0.618421	0.0773026	8			
Total	8.3677		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	104	23.2	5.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.898	0.741	0.2080	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	2.68	2.19	3.16		2.38	3.21	0.175	14.62%	-192.33%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		2.38	2.98	2.39	3.21	2.42

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-0903-8644	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 101	31.61%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	13.5	2.13	0.289	4	CDF	8.6E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.4066	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.45113	8.45113	1	184	8.5E-07	Significant Effect
Error	0.368421	0.0460527	8			
Total	8.81955		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	61.4	23.2	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.958	0.741	0.7636	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	2.75	2.38	3.13		2.43	3.13	0.135	10.93%	-200.85%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		2.64	2.56	3.13	3.01	2.43

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-7077-2914	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 101	53.14%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.52	2.29	0.0063	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	13.2319	13.2319	1	77.4	2.2E-05	Significant Effect
Error	1.36842	0.171053	8			
Total	14.6003		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	231	23.2	1.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.765	0.741	0.0055	Non-Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	3.22	2.49	3.94		2.74	4.2	0.261	18.15%	-251.32%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		4.2	2.83	3.23	3.08	2.74

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-5204-8366	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 101	31.49%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	10.2	2.13	0.288	4	CDF	2.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1257	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.79279	4.79279	1	105	7.1E-06	Significant Effect
Error	0.365701	0.0457126	8			
Total	5.15849		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	61	23.2	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.917	0.741	0.3308	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	2.3	1.93	2.67		1.87	2.54	0.134	13.04%	-151.26%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		2.54	2.47	2.52	1.87	2.1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-1547-9736 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 101	46.30%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	7.77	2.35	0.424	3	CDF	0.0022	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.35307	4.35307	1	77.8	4.9E-05	Significant Effect
Error	0.391601	0.055943	7			
Total	4.74467		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	87.1	24.3	8.5E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.899	0.701	0.2437	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		4	2.32	1.74	2.89		1.95	2.78	0.179	15.49%	-152.89%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		2.14	2.39	Outlier	1.95	2.78

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-0984-8163 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 105	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-1967-8768 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 105	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-9782-9917 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 105	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-4976-4389 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 105	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-1691-5781 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 105	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-6743-3737 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 105	32.03%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	2.18	2.13	0.293	4	CDF	0.0473	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2128	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.225	0.225	1	4.76	0.0607	Non-Significant Effect
Error	0.378292	0.0472865	8			
Total	0.603292		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	63.1	23.2	0.0014	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2423	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	1.22	0.837	1.59		0.906	1.63	0.136	25.10%	-32.77%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		1.32	0.906	1.63	1.3	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-3850-4485	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 105	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-8509-7582 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 105	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-8410-8833 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 118	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-0851-8724 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 118	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-7001-9350 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 118	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-7717-0058 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 118	6.52%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.01	1.86	0.06	8	CDF	0.1711	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	1.02	0.3421	Non-Significant Effect
Error	0.020586	0.0025733	8			
Total	0.0232104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.49	23.2	0.3988	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9	0.741	0.2193	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.948	0.873	1.02		0.846	0.997	0.0271	6.39%	-3.54%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.968	0.942	0.997	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-2603-9870 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 118	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-9395-2424	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 118	15.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.63	1.86	0.138	8	CDF	8.5E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.07	2.29	0.1744	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.293437	0.293437	1	21.4	0.0017	Significant Effect
Error	0.109581	0.0136977	8			
Total	0.403018		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17.6	23.2	0.0168	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.741	0.1244	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	1.26	1.06	1.46		1.03	1.48	0.072	12.80%	-37.43%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		1.22	1.28	1.48	1.28	1.03

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-2067-9518	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 118	11.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	1.06	1.86	0.101	8	CDF	0.1597	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.43	2.29	0.0175	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0083521	0.0083521	1	1.13	0.3194	Non-Significant Effect
Error	0.059272	0.007409	8			
Total	0.0676241		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.04	23.2	0.0555	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.85	0.741	0.0587	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.973	0.83	1.12		0.864	1.17	0.0517	11.87%	-6.31%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		1.17	0.864	0.951	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-3834-0018 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 118	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-3086-4818 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 128	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-0541-6358 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 128	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-5938-4069 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 128	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-0419-2043 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 128	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-6289-3555 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 128	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-7189-8105 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 128	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-8038-7954	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 128	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-2368-8301 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 128	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-4530-2369 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 138	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-3453-4037 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 138	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-2206-8682	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 138	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-9554-1230	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 138	14.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.59	1.86	0.13	8	CDF	0.0747	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.4110	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0310249	0.0310249	1	2.54	0.1494	Non-Significant Effect
Error	0.097586	0.0121982	8			
Total	0.128611		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.5	23.2	0.0211	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.981	0.741	0.9692	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	1.03	0.839	1.21		0.846	1.22	0.0677	14.74%	-12.17%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	1.22	0.942	1.14	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-7358-6580	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 138	23.14%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	1.35	2.13	0.212	4	CDF	0.1238	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.7043	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0451584	0.0451584	1	1.83	0.2131	Non-Significant Effect
Error	0.197408	0.024676	8			
Total	0.242566		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	32.5	23.2	0.0053	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4403	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	1.05	0.778	1.32		0.843	1.3	0.0979	20.84%	-14.68%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.853	0.843	0.993	1.26	1.3

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-4509-5581	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 138	19.70%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	2.29	0.0014	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.78337	1.78337	1	75.8	2.4E-05	Significant Effect
Error	0.188101	0.0235127	8			
Total	1.97147		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	30.9	23.2	0.0058	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.72	0.741	0.0015	Non-Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	1.76	1.49	2.03		1.65	2.14	0.0954	12.13%	-92.27%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		1.65	1.66	2.14	1.65	1.7

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-1160-2788 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 138	11.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	6.07	1.86	0.101	8	CDF	1.5E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1115	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.269945	0.269945	1	36.8	3.0E-04	Significant Effect
Error	0.0586212	0.0073277	8			
Total	0.328566		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.93	23.2	0.0567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5075	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	1.24	1.1	1.39		1.07	1.38	0.0513	9.23%	-35.90%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		1.38	1.29	1.27	1.21	1.07

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-6723-2150 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 138	32.63%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.83	2.13	0.299	4	CDF	0.0704	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.29	0.9668	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.164866	0.164866	1	3.36	0.1041	Non-Significant Effect
Error	0.39253	0.0490662	8			
Total	0.557396		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	65.5	23.2	0.0013	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3746	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	1.17	0.786	1.56		0.843	1.5	0.139	26.52%	-28.05%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		1.5	1.5	0.938	0.843	1.08

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-2105-8838 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 153	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-0124-0300 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 153	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-0204-3929 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 153	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-7535-8103	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 153	12.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	1.92	1.86	0.116	8	CDF	0.0456	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3704	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0357604	0.0357604	1	3.68	0.0912	Non-Significant Effect
Error	0.0776452	0.0097057	8			
Total	0.113406		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	12.2	23.2	0.0329	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9450	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	1.04	0.869	1.2		0.897	1.21	0.0599	12.94%	-13.07%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.897	1.14	0.942	1.21	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-9757-3208 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 153	14.31%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.283	1.89	0.131	7	CDF	0.3925	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008537	0.0008537	1	0.0803	0.7850	Non-Significant Effect
Error	0.0743792	0.0106256	7			
Total	0.0752329		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.5	24.3	0.0230	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.829	0.701	0.0436	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		4	0.935	0.695	1.18		0.843	1.16	0.0755	16.16%	-2.14%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	1.16	Outlier	0.885

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-8584-6062 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 153	10.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	9.51	1.86	0.1	8	CDF	6.2E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2805	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.646685	0.646685	1	90.4	1.2E-05	Significant Effect
Error	0.0572212	0.0071527	8			
Total	0.703906		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.7	23.2	0.0594	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9444	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	1.42	1.28	1.56		1.3	1.58	0.0507	7.95%	-55.56%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		1.58	1.3	1.34	1.49	1.41

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-5281-6886	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 153	27.08%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.54	2.13	0.248	4	CDF	0.0320	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.25	2.29	0.0668	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.218153	0.218153	1	6.45	0.0347	Significant Effect
Error	0.270474	0.0338093	8			
Total	0.488627		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	44.8	23.2	0.0028	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3396	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	1.21	0.891	1.53		0.934	1.6	0.115	21.24%	-32.27%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		1.32	1.6	1.1	1.1	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-7209-8627 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 153	25.23%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.3	2.13	0.231	4	CDF	0.1323	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.29	0.2268	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0492804	0.0492804	1	1.68	0.2311	Non-Significant Effect
Error	0.23471	0.0293388	8			
Total	0.28399		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	38.8	23.2	0.0037	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6267	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	1.06	0.759	1.35		0.843	1.38	0.107	22.65%	-15.34%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	1.38	1.24	0.843	0.928

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-2501-9075 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 170	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-3352-8632	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 170	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-2937-2513	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 170	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-3555-4550 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 170	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-1907-9441 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 170	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-9695-6323 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 170	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-9300-6327 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 170	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-3902-4391 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 170	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-3703-3316 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 180	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-3485-5081 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 180	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-8012-5530 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 180	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-8925-5370 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 180	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-6402-5998 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 180	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-1513-3208 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 180	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-7120-3478	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 180	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-3907-5820 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 180	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-9836-8791 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 187	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-4836-2137 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 187	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-2123-4958 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 187	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-5407-9303 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 187	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-2700-1510	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 187	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-2599-8611 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 187	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-3725-2830	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 187	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-9305-4908 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 187	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-0081-8947 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:29 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 195	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-1729-6498 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 195	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-2131-4115 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 195	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-8286-1230	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 195	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-8950-6518 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 195	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-9400-8386 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 195	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-3983-7416 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 195	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-2466-2886	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 195	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-4652-5142 **Endpoint:** PCB 206 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 206	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-7381-9859	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 206	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-8397-2866	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 206	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-0614-6581	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 206	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-4544-5935	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 206	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-9064-4310	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 206	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-0679-3604 **Endpoint:** PCB 206 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 206	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-7762-4505	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 13:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 206	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-5245-6528 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 209	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953		0.846	0.952	0.0195	4.85%	1.81%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-0258-0581 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 209	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966		0.871	0.973	0.0199	4.90%	0.52%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7983-6093 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 209	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992		0.847	0.992	0.0238	5.74%	-1.11%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-7881-8570 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 209	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976		0.846	0.986	0.028	6.96%	1.81%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-7488-8642 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 209	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874		0.836	0.883	0.00876	2.30%	7.14%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-9352-2417 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:30 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed pcb 209	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941		0.868	0.936	0.0114	2.80%	0.70%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-9322-5661 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed pcb 209	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95		0.84	0.947	0.0206	5.17%	2.51%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-7461-2719 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 13:31 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed pcb 209	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963		0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942		0.843	0.938	0.016	3.98%	1.97%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

28 day *Nereis virens* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

PCB Congeners

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 18	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 28	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 44	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 52	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 66	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 87	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 101	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 105	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 118	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 128	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 138	0.438	U	0.499	J	0.507	J	0.793	J	0.805	J
PCB 153	0.534	J	0.594	J	0.972		1.12		1.14	
PCB 170	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 180	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 187	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 195	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 206	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
PCB 209	0.438	U	0.466	U	0.444	U	0.45	U	0.494	U
Total PCBs	16.84		18.03		18.05		19.13		20.69	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 1									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 18	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 28	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 44	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 52	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 66	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 87	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 101	0.474	U	0.457	U	0.486	U	0.476	U	0.784	J
PCB 105	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 118	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 128	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 138	0.72	J	0.54	J	0.732	J	0.795	J	1	
PCB 153	1.08		0.65	J	1.05		1.48		1.53	
PCB 170	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 180	0.474	U	0.457	U	0.486	U	0.632	J	0.745	J
PCB 187	0.474	U	0.457	U	0.486	U	0.541	J	0.669	J
PCB 195	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 206	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
PCB 209	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Total PCBs	19.72		17.92		20.09		21.18		22.67	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 2									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 18	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 28	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 44	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 52	0.971	U	0.919	U	0.858	J	0.976	U	0.871	U
PCB 66	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 87	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 101	0.971	U	0.919	U	0.842	U	0.976	U	1.04	J
PCB 105	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 118	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 128	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 138	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 153	0.971	U	0.919	U	0.914	J	0.976	U	1.05	J
PCB 170	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 180	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 187	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 195	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 206	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
PCB 209	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
Total PCBs	36.90		34.92		32.17		37.09		33.79	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 3									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 18	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 28	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 44	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 52	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 66	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 87	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 101	0.896	U	0.904	J	0.992	U	0.958	U	0.973	U
PCB 105	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 118	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 128	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 138	0.896	U	0.912	J	0.992	U	0.958	U	0.973	U
PCB 153	0.953	J	1.33	J	0.992	U	0.958	U	1.23	J
PCB 170	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 180	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 187	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 195	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 206	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
PCB 209	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
Total PCBs	34.16		34.26		37.70		36.40		37.49	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 4									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 18	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 28	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 44	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 52	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 66	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 87	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 101	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 105	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 118	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 128	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 138	0.956	U	1.06	J	0.868	U	1.15	J	0.922	U
PCB 153	1.23	J	1.42	J	0.868	U	1.48	J	0.922	U
PCB 170	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 180	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 187	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 195	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 206	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
PCB 209	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
Total PCBs	36.88		34.13		32.98		37.02		35.04	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 5									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 18	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 28	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 44	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 52	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 66	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 87	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 101	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 105	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 118	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 128	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 138	0.929	U	0.936	J	0.919	U	0.886	U	0.973	U
PCB 153	0.929	U	1.54	J	1.36	J	1.09	J	0.992	J
PCB 170	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 180	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 187	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 195	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 206	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
PCB 209	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
Total PCBs	35.30		36.78		35.80		34.08		37.01	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 6									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 18	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 28	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 44	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 52	2.2		1.51	J	2.66		1.85	J	2.04	
PCB 66	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 87	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 101	1.47	J	0.98	U	2.18		0.934	U	0.994	U
PCB 105	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 118	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 128	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 138	0.853	U	1.46	J	1.52	J	2.06		0.994	U
PCB 153	0.923	J	2.45		2.01		2.92		2.07	
PCB 170	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 180	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 187	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 195	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 206	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
PCB 209	0.853	U	0.98	U	0.976	U	0.934	U	0.994	U
Total PCBs	36.48		42.20		46.02		43.55		42.02	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 7									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 18	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 28	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 44	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 52	2.63		3.05		0.866	U	0.929	U	3.42	
PCB 66	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 87	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 101	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 105	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 118	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 128	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 138	1.99		1.05	J	1.16	J	1.79	J	1.16	J
PCB 153	2.43		2.23		1.87		2.42		1.98	
PCB 170	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 180	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 187	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 195	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 206	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
PCB 209	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
Total PCBs	44.63		42.07		35.50		40.01		43.01	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 8									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PCB Congeners (ng/g wet wt.)										
PCB 8	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 18	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 28	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 44	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 52	0.914	U	0.978	U	0.838	U	0.853	U	4.3	
PCB 66	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 87	0.914	U	2.29		0.838	U	0.853	U	0.883	U
PCB 101	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 105	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 118	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 128	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 138	0.914	U	1.44	J	1.34	J	1.27	J	1.84	
PCB 153	1.8	J	1.76	J	1.48	J	1.7	J	1.93	
PCB 170	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 180	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 187	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 195	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 206	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
PCB 209	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
Total PCBs	36.50		42.28		34.13		34.94		44.40	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

Start Date: 31 Aug-17 **Species:** Nereis virens **Sample Code:** 29525-000
End Date: 28 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 31 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29525

Sample	Rep	Pos	PCB 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087
29517-009	1	16	0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.534	0.438	0.438	0.438	0.438	0.438	0.438	0.438
29517-009	2	28	0.466	0.466	0.466	0.466	0.466	0.466	0.466	0.466	0.466	0.466	0.499	0.594	0.466	0.466	0.466	0.466	0.466	0.466	0.466
29517-009	3	6	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.507	0.972	0.444	0.444	0.444	0.444	0.444	0.444	0.444
29517-009	4	45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.793	1.12	0.45	0.45	0.45	0.45	0.45	0.45	0.45
29517-009	5	26	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.805	1.14	0.494	0.494	0.494	0.494	0.494	0.494	0.494
29517-001	1	12	0.474	0.474	0.474	0.474	0.474	0.474	0.474	0.474	0.474	0.474	0.72	1.08	0.474	0.474	0.474	0.474	0.474	0.474	0.474
29517-001	2	42	0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.54	0.65	0.457	0.457	0.457	0.457	0.457	0.457	0.457
29517-001	3	3	0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.732	1.05	0.486	0.486	0.486	0.486	0.486	0.486	0.486
29517-001	4	24	0.476	0.476	0.476	0.476	0.476	0.476	0.476	0.476	0.476	0.476	0.795	1.48	0.476	0.632	0.541	0.476	0.476	0.476	0.476
29517-001	5	20	0.472	0.472	0.472	0.472	0.472	0.472	0.784	0.472	0.472	0.472	1	1.53	0.472	0.745	0.669	0.472	0.472	0.472	0.472
29517-002	1	5	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971	0.971
29517-002	2	23	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919
29517-002	3	13	0.842	0.842	0.842	0.842	0.858	0.842	0.842	0.842	0.842	0.842	0.842	0.914	0.842	0.842	0.842	0.842	0.842	0.842	0.842
29517-002	4	29	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976	0.976
29517-002	5	7	0.871	0.871	0.871	0.871	0.871	0.871	1.04	0.871	0.871	0.871	0.871	1.05	0.871	0.871	0.871	0.871	0.871	0.871	0.871
29517-003	1	30	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.896	0.953	0.896	0.896	0.896	0.896	0.896	0.896	0.896
29517-003	2	33	0.874	0.874	0.874	0.874	0.874	0.874	0.904	0.874	0.874	0.874	0.912	1.33	0.874	0.874	0.874	0.874	0.874	0.874	0.874
29517-003	3	25	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992	0.992
29517-003	4	44	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958	0.958
29517-003	5	2	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	1.23	0.973	0.973	0.973	0.973	0.973	0.973	0.973
29517-004	1	21	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	0.956	1.23	0.956	0.956	0.956	0.956	0.956	0.956	0.956
29517-004	2	8	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	0.858	1.06	1.42	0.858	0.858	0.858	0.858	0.858	0.858	0.858
29517-004	3	10	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868	0.868
29517-004	4	9	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	0.934	1.15	1.48	0.934	0.934	0.934	0.934	0.934	0.934	0.934
29517-004	5	36	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922
29517-005	1	4	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929
29517-005	2	32	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	1.54	0.936	0.936	0.936	0.936	0.936	0.936	0.936
29517-005	3	1	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	0.919	1.36	0.919	0.919	0.919	0.919	0.919	0.919	0.919
29517-005	4	34	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	0.886	1.09	0.886	0.886	0.886	0.886	0.886	0.886	0.886
29517-005	5	38	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.973	0.992	0.973	0.973	0.973	0.973	0.973	0.973	0.973
29517-006	1	41	0.853	0.853	0.853	0.853	2.2	0.853	1.47	0.853	0.853	0.853	0.853	0.923	0.853	0.853	0.853	0.853	0.853	0.853	0.853
29517-006	2	19	0.98	0.98	0.98	0.98	1.51	0.98	0.98	0.98	0.98	0.98	1.46	2.45	0.98	0.98	0.98	0.98	0.98	0.98	0.98

Sample	Rep	Pos	PCB 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087
29517-006	3	37	0.976	0.976	0.976	0.976	2.66	0.976	2.18	0.976	0.976	0.976	1.52	2.01	0.976	0.976	0.976	0.976	0.976	0.976	0.976
29517-006	4	15	0.934	0.934	0.934	0.934	1.85	0.934	0.934	0.934	0.934	0.934	2.06	2.92	0.934	0.934	0.934	0.934	0.934	0.934	0.934
29517-006	5	31	0.994	0.994	0.994	0.994	2.04	0.994	0.994	0.994	0.994	0.994	0.994	2.07	0.994	0.994	0.994	0.994	0.994	0.994	0.994
59517-007	1	43	0.954	0.954	0.954	0.954	2.63	0.954	0.954	0.954	0.954	0.954	1.99	2.43	0.954	0.954	0.954	0.954	0.954	0.954	0.954
59517-007	2	14	0.919	0.919	0.919	0.919	3.05	0.919	0.919	0.919	0.919	0.919	1.05	2.23	0.919	0.919	0.919	0.919	0.919	0.919	0.919
59517-007	3	35	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	0.866	1.16	1.87	0.866	0.866	0.866	0.866	0.866	0.866	0.866
59517-007	4	27	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	0.929	1.79	2.42	0.929	0.929	0.929	0.929	0.929	0.929	0.929
59517-007	5	11	0.934	0.934	0.934	0.934	3.42	0.934	0.934	0.934	0.934	0.934	1.16	1.98	0.934	0.934	0.934	0.934	0.934	0.934	0.934
29517-008	1	22	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	0.914	1.8	0.914	0.914	0.914	0.914	0.914	0.914	0.914
29517-008	2	18	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	0.978	1.44	1.76	0.978	0.978	0.978	0.978	0.978	0.978	2.29
29517-008	3	17	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	0.838	1.34	1.48	0.838	0.838	0.838	0.838	0.838	0.838	0.838
29517-008	4	40	0.853	0.853	0.853	0.853	0.853	0.853	0.853	0.853	0.853	0.853	1.27	1.7	0.853	0.853	0.853	0.853	0.853	0.853	0.853
29517-008	5	39	0.883	0.883	0.883	0.883	4.3	0.883	0.883	0.883	0.883	0.883	1.84	1.93	0.883	0.883	0.883	0.883	0.883	0.883	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Batch ID:	01-0630-5849	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	31 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	28 Sep-17	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
16-0613-5518	PCB 008	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 008
17-6756-8372	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 008
17-0597-0935	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 008
05-1613-4403	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 008
18-7611-5594	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 008
02-1119-5619	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 008
16-5771-1532	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 008
19-5950-2937	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 008
01-0556-5395	PCB 008	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 008
16-9209-4513	PCB 018	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 018
01-0522-2078	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 018
10-9337-3645	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 018
15-5941-7832	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 018
15-6957-9169	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 018
04-4399-2392	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 018
08-6271-5865	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 018
14-7374-8668	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 018
18-3056-7282	PCB 018	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 018
03-5749-0591	PCB 028	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 028
11-5530-2642	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 028
15-8036-5041	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 028
07-2244-5223	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 028
21-4451-6002	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 028
02-2196-1948	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 028
06-1125-8769	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 028
13-6128-0494	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 028
15-9122-9598	PCB 028	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 028

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
14-8454-7852	PCB 044	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 044
06-0268-4534	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 044
16-7893-4926	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 044
08-0851-1884	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 044
07-8430-8697	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 044
03-6764-0006	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 044
20-9217-7209	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 044
03-2007-0178	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 044
04-4758-3958	PCB 044	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 044
07-9901-6205	PCB 052	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 052
02-4852-8844	PCB 052	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 052
03-6384-3535	PCB 052	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 052
10-8956-0999	PCB 052	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 052
03-9520-7809	PCB 052	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 052
01-0560-7466	PCB 052	Unequal Variance t Two-Sample Test	5.6E-04	29517-006 failed pcb 052
03-8792-3988	PCB 052	Unequal Variance t Two-Sample Test	0.0165	59517-007 failed pcb 052
18-6520-8046	PCB 052	Equal Variance t Two-Sample Test	9.1E-07	29517-008 failed pcb 052
09-1297-1642	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-008 failed pcb 052
02-8191-5524	PCB 066	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 066
10-3013-0798	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 066
20-6760-7430	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 066
21-4141-2879	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 066
18-9002-0716	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 066
00-4885-4498	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 066
06-4012-6978	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 066
12-5670-6647	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 066
17-0040-7233	PCB 066	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 066
01-3247-8687	PCB 087	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 087
13-4190-6599	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 087
02-3005-9631	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 087
21-1628-0423	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 087
01-1645-3432	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 087
01-0917-7673	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 087
12-0119-5650	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 087
06-4035-4079	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 087
02-9800-7996	PCB 087	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 087
10-0344-3515	PCB 087	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-008 failed pcb 087
05-2378-8552	PCB 101	Equal Variance t Two-Sample Test	0.1378	29517-001 passed pcb 101
07-8866-1829	PCB 101	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-001 passed pcb 101
00-2527-2583	PCB 101	Equal Variance t Two-Sample Test	2.9E-07	29517-002 failed pcb 101
07-8618-1712	PCB 101	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 101
18-5908-9095	PCB 101	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 101
20-1138-6335	PCB 101	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 101
10-7005-4620	PCB 101	Unequal Variance t Two-Sample Test	0.0075	29517-006 failed pcb 101
10-8314-4340	PCB 101	Unequal Variance t Two-Sample Test	0.0116	29517-006 failed pcb 101
16-1052-1194	PCB 101	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 101
06-9948-0141	PCB 101	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 101
16-4034-4707	PCB 105	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 105
01-9206-5359	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 105
11-3035-6733	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 105
07-6266-9869	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 105
03-8786-8636	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 105
07-8450-8169	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 105

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
17-3990-1349	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 105
09-6006-0834	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 105
08-0632-2137	PCB 105	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 105
04-8716-1906	PCB 118	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 118
16-4088-3116	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 118
11-9195-8724	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 118
15-4313-3167	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 118
13-6133-2160	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 118
17-5776-6118	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 118
19-0429-0128	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 118
10-1236-7275	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 118
06-3033-6151	PCB 118	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 118
02-5737-0298	PCB 128	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 128
15-4775-9778	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 128
19-6207-1702	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 128
01-3434-6142	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 128
11-4900-6926	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 128
08-0886-4387	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 128
15-8506-1169	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 128
00-5778-4654	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 128
17-9677-3299	PCB 128	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 128
04-9740-9851	PCB 138	Equal Variance t Two-Sample Test	0.1027	29517-001 passed pcb 138
13-1277-2004	PCB 138	Equal Variance t Two-Sample Test	0.0030	29517-002 failed pcb 138
12-3099-0959	PCB 138	Equal Variance t Two-Sample Test	0.0015	29517-003 failed pcb 138
15-8529-4262	PCB 138	Equal Variance t Two-Sample Test	0.0017	29517-004 failed pcb 138
20-5581-0318	PCB 138	Unequal Variance t Two-Sample Test	0.0080	29517-005 failed pcb 138
04-4799-9024	PCB 138	Equal Variance t Two-Sample Test	0.0049	29517-006 failed pcb 138
13-6069-1449	PCB 138	Equal Variance t Two-Sample Test	0.0021	59517-007 failed pcb 138
00-4287-6676	PCB 138	Equal Variance t Two-Sample Test	0.0011	29517-008 failed pcb 138
01-8998-8966	PCB 153	Equal Variance t Two-Sample Test	0.1017	29517-001 passed pcb 153
07-2235-8129	PCB 153	Unequal Variance t Two-Sample Test	0.2574	29517-002 passed pcb 153
13-3207-5425	PCB 153	Equal Variance t Two-Sample Test	0.0915	29517-003 passed pcb 153
07-6705-5152	PCB 153	Equal Variance t Two-Sample Test	0.0607	29517-004 passed pcb 153
10-0517-3846	PCB 153	Equal Variance t Two-Sample Test	0.0560	29517-005 passed pcb 153
00-2910-6203	PCB 153	Equal Variance t Two-Sample Test	0.0048	29517-006 failed pcb 153
18-1427-6420	PCB 153	Equal Variance t Two-Sample Test	3.1E-05	59517-007 failed pcb 153
11-7231-0027	PCB 153	Equal Variance t Two-Sample Test	2.1E-04	29517-008 failed pcb 153
00-8994-8619	PCB 170	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 170
17-2177-9764	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 170
10-1126-7395	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 170
13-2392-1960	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 170
09-1385-1641	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 170
03-3443-9892	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 170
06-4372-1164	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 170
07-4615-9026	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 170
00-2593-1113	PCB 170	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 170
09-2659-7674	PCB 180	Unequal Variance t Two-Sample Test	0.0764	29517-001 passed pcb 180
09-5619-8563	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 180
16-1535-3322	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 180
20-0223-4935	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 180
05-9388-4155	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 180
11-4608-1877	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 180
18-7881-8337	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 180

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-4180-2119	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 180
05-5753-4171	PCB 180	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 180
02-4111-8704	PCB 187	Equal Variance t Two-Sample Test	0.0656	29517-001 passed pcb 187
09-4640-3444	PCB 187	Equal Variance t Two-Sample Test	0.0784	29517-001 passed pcb 187
00-8255-1260	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 187
09-4984-4694	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 187
01-3314-7699	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 187
15-3686-9127	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 187
09-4508-7521	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 187
17-1949-8779	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 187
16-5677-7992	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 187
05-0248-1773	PCB 187	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 187
06-5208-0328	PCB 195	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 195
06-2640-5689	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 195
01-0733-5200	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 195
06-9628-9360	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 195
17-8118-0209	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 195
02-3589-3159	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 195
18-7439-2630	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 195
08-3386-4409	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 195
03-8039-1021	PCB 195	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 195
08-1274-7560	PCB 206	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 206
08-0212-3041	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 206
14-3345-2953	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 206
04-9630-7087	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 206
03-6799-8162	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 206
00-8148-4772	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 206
01-8490-4117	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 206
21-2024-2215	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 206
08-8974-1994	PCB 206	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 206
15-4246-0456	PCB 209	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pcb 209
10-1786-4127	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pcb 209
10-6439-3323	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pcb 209
00-6485-7848	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed pcb 209
04-7436-9949	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pcb 209
02-8785-8597	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 209
13-4169-0123	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed pcb 209
14-8272-5796	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed pcb 209
10-2243-3903	PCB 209	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pcb 209

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PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

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PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.919	0.851	0.987	0.858	0.976	0.0245	0.0547	5.95%	-100.48%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	2.05	1.52	2.58	1.51	2.66	0.191	0.426	20.77%	-347.64%
59517-007		5	2.18	0.685	3.67	0.866	3.42	0.538	1.2	55.21%	-375.35%
29517-008		5	1.58	-0.315	3.47	0.838	4.3	0.681	1.52	96.63%	-243.94%

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	1.16	0.367	1.94	0.838	2.29	0.284	0.635	54.93%	-152.09%

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.535	0.362	0.708	0.457	0.784	0.0623	0.139	26.03%	-16.80%
29517-002		5	0.95	0.858	1.04	0.842	1.04	0.033	0.0739	7.78%	-107.16%
29517-003		5	0.945	0.892	0.997	0.896	0.992	0.019	0.0426	4.50%	-106.06%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	1.31	0.651	1.97	0.934	2.18	0.238	0.532	40.57%	-186.13%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

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PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.438	0.805	0.0787	0.176	28.94%	0.00%
29517-001		5	0.757	0.552	0.963	0.54	1	0.074	0.166	21.85%	-24.49%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-50.53%
29517-003		5	0.946	0.896	0.997	0.896	0.992	0.0182	0.0408	4.31%	-55.52%
29517-004		5	0.991	0.851	1.13	0.868	1.15	0.0506	0.113	11.41%	-62.92%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-52.63%
29517-006		5	1.38	0.784	1.97	0.853	2.06	0.214	0.478	34.72%	-126.40%
59517-007		5	1.43	0.898	1.96	1.05	1.99	0.191	0.428	29.94%	-135.04%
29517-008		5	1.36	0.947	1.77	0.914	1.84	0.149	0.333	24.49%	-123.67%

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PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.534	1.14	0.129	0.289	33.18%	0.00%
29517-001		5	1.16	0.711	1.6	0.65	1.53	0.161	0.36	31.07%	-32.80%
29517-002		5	0.966	0.898	1.03	0.914	1.05	0.0246	0.055	5.69%	-10.78%
29517-003		5	1.09	0.875	1.31	0.953	1.33	0.0784	0.175	16.05%	-25.30%
29517-004		5	1.18	0.836	1.53	0.868	1.48	0.125	0.28	23.66%	-35.78%
29517-005		5	1.18	0.861	1.5	0.929	1.54	0.116	0.259	21.91%	-35.57%
29517-006		5	2.07	1.16	2.99	0.923	2.92	0.331	0.739	35.63%	-137.91%
59517-007		5	2.19	1.87	2.5	1.87	2.43	0.114	0.254	11.63%	-150.69%
29517-008		5	1.73	1.53	1.94	1.48	1.93	0.0739	0.165	9.53%	-98.85%

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.559	0.403	0.714	0.457	0.745	0.0561	0.125	22.44%	-21.90%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.525	0.418	0.632	0.457	0.669	0.0386	0.0862	16.41%	-14.62%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

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PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	-99.78%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-104.76%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	-97.99%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-102.57%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-106.68%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-100.79%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	-94.85%

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.858	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		2.2	1.51	2.66	1.85	2.04
59517-007		2.63	3.05	0.866	0.929	3.42
29517-008		0.914	0.978	0.838	0.853	4.3

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	2.29	0.838	0.853	0.883

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.784
29517-002		0.971	0.919	0.842	0.976	1.04
29517-003		0.896	0.904	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		1.47	0.98	2.18	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-001		0.72	0.54	0.732	0.795	1
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.912	0.992	0.958	0.973
29517-004		0.956	1.06	0.868	1.15	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	1.46	1.52	2.06	0.994
59517-007		1.99	1.05	1.16	1.79	1.16
29517-008		0.914	1.44	1.34	1.27	1.84

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-001		1.08	0.65	1.05	1.48	1.53
29517-002		0.971	0.919	0.914	0.976	1.05
29517-003		0.953	1.33	0.992	0.958	1.23
29517-004		1.23	1.42	0.868	1.48	0.922
29517-005		0.929	1.54	1.36	1.09	0.992
29517-006		0.923	2.45	2.01	2.92	2.07
59517-007		2.43	2.23	1.87	2.42	1.98
29517-008		1.8	1.76	1.48	1.7	1.93

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.632	0.745
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.541	0.669
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-0613-5518	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 008	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6756-8372	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 008	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-0597-0935	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 008	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-1613-4403 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 008	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-7611-5594	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 008	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-5771-1532	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 008	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-5950-2937	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 008	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-0556-5395 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:41 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 008	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-9209-4513	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 018	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-0522-2078 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 018	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-9337-3645 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 018	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-5941-7832	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 018	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6957-9169	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 018	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-6271-5865	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 018	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-7374-8668	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 018	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-3056-7282	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 018	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-5749-0591 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 028	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 11-5530-2642 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 028	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-8036-5041	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 028	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-2244-5223 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 028	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-4451-6002 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 028	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-2196-1948	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 028	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-1125-8769	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 028	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6128-0494	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 028	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-9122-9598	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 028	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-8454-7852 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 044	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-0268-4534 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 044	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7893-4926	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 044	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-0851-1884 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 044	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-8430-8697 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 044	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-6764-0006	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 044	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-2007-0178	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 044	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-4758-3958 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:41 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 044	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-9901-6205 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 052	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-4852-8844 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 052	10.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	17.4	1.86	0.049	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.55	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.530381	0.530381	1	303	1.2E-07	Significant Effect
Error	0.0139972	0.0017497	8			
Total	0.544378		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.93	23.2	0.1129	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.741	0.7316	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.919	0.851	0.987	0.919	0.858	0.976	0.0245	5.95%	-100.48%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.858	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-6384-3535 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 052	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-8956-0999	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 052	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-9520-7809 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 052	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-0560-7466 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:40 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 052	88.75%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	8.35	2.13	0.407	4	CDF	5.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.29	0.1230	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.3489	6.3489	1	69.7	3.2E-05	Significant Effect
Error	0.728299	0.0910374	8			
Total	7.0772		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	360	23.2	4.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.741	0.0692	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	2.05	1.52	2.58	2.04	1.51	2.66	0.191	20.77%	-347.64%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		2.2	1.51	2.66	1.85	2.04

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-8792-3988	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 052	250.24%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	3.2	2.13	1.15	4	CDF	0.0165	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8195	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.40116	7.40116	1	10.2	0.0127	Significant Effect
Error	5.79061	0.723826	8			
Total	13.1918		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2870	23.2	7.3E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.891	0.741	0.1719	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	2.18	0.685	3.67	2.63	0.866	3.42	0.538	55.21%	-375.35%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		2.63	3.05	0.866	0.929	3.42

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1297-1642	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 052	276.41%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.12593	3.12593	1	2.69	0.1394	Non-Significant Effect
Error	9.28542	1.16068	8			
Total	12.4113		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4600	23.2	2.8E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.648	0.741	2.1E-04	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	1.58	-0.315	3.47	0.914	0.838	4.3	0.681	96.63%	-243.94%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	4.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-8191-5524 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 066	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3013-0798	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 066	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-6760-7430 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 066	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-4141-2879 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 066	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-9002-0716	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 066	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4012-6978	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 066	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-5670-6647	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 066	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-0040-7233	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 066	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-3247-8687 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 087	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-4190-6599	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 087	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-3005-9631	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 087	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1628-0423	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 087	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-1645-3432 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 087	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-0119-5650	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 087	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-0917-7673	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 087	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4035-4079	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 087	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-9800-7996	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 087	7.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	22.2	1.89	0.035	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.380144	0.380144	1	491	<1.0E-37	Significant Effect
Error	0.0054212	0.0007745	7			
Total	0.385566		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	24.3	0.4503	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.701	0.4643	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		4	0.872	0.818	0.926	0.868	0.838	0.914	0.0168	3.86%	-90.23%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	Outlier	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-8866-1829	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 101	25.61%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.64	2.29	0.0011	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0148225	0.0148225	1	1.49	0.2573	Non-Significant Effect
Error	0.0797064	0.0099633	8			
Total	0.0945289		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	38.5	23.2	0.0038	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.718	0.741	0.0014	Non-Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.535	0.362	0.708	0.476	0.457	0.784	0.0623	26.03%	-16.80%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.784

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-2527-2583 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 101	14.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	14.2	1.86	0.064	8	CDF	2.9E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1560	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.603194	0.603194	1	202	5.8E-07	Significant Effect
Error	0.0238604	0.0029826	8			
Total	0.627054		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10.8	23.2	0.0405	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.949	0.741	0.6514	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.95	0.858	1.04	0.971	0.842	1.04	0.033	7.78%	-107.16%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	1.04

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-8618-1712	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 101	8.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	22.6	1.86	0.04	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.590976	0.590976	1	510	<1.0E-37	Significant Effect
Error	0.0092624	0.0011578	8			
Total	0.600239		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.59	23.2	0.2437	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8657	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.945	0.892	0.997	0.958	0.896	0.992	0.019	4.50%	-106.06%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.904	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-5908-9095	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 101	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-1138-6335 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 101	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7005-4620	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 101	64.80%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	5.04	2.35	0.297	3	CDF	0.0075	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.899163	0.899163	1	32.8	7.2E-04	Significant Effect
Error	0.19199	0.0274272	7			
Total	1.09115		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	125	24.3	4.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.779	0.701	0.0118	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	1.09	0.694	1.49	0.987	0.934	1.47	0.126	22.99%	-138.77%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		1.47	0.98	Outlier	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-1052-1194	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 101	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-9948-0141 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:41 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 101	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-4034-4707	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 105	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-9206-5359 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 105	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-3035-6733	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 105	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-6266-9869	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 105	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-8786-8636	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 105	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-8450-8169	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 105	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-6006-0834	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 105	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-0632-2137	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 105	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-8716-1906 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 118	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-4088-3116	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 118	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9195-8724	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 118	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4313-3167	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 118	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6133-2160	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 118	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-5776-6118	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 118	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-0429-0128	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 118	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1236-7275	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 118	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-3033-6151	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 118	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-5737-0298 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 128	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4775-9778	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 128	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-6207-1702	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 128	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-3434-6142	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 128	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-4900-6926	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 128	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-8506-1169	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 128	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-5778-4654 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:40 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 128	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-9677-3299	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 128	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-9740-9851	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 138	33.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.38	1.86	0.201	8	CDF	0.1027	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0555025	0.0555025	1	1.9	0.2053	Non-Significant Effect
Error	0.23359	0.0291988	8			
Total	0.289093		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.13	23.2	0.9074	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4143	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-001		5	0.757	0.552	0.963	0.732	0.54	1	0.074	21.85%	-24.49%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-001		0.72	0.54	0.732	0.795	1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-1277-2004	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 138	25.40%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	3.7	1.86	0.155	8	CDF	0.0030	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9401	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.236237	0.236237	1	13.7	0.0061	Significant Effect
Error	0.13815	0.0172687	8			
Total	0.374387		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.77	23.2	0.0585	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5138	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-50.53%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-3099-0959	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 138	24.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	4.18	1.86	0.15	8	CDF	0.0015	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8316	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.285272	0.285272	1	17.5	0.0031	Significant Effect
Error	0.13066	0.0163325	8			
Total	0.415932		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	18.7	23.2	0.0150	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.741	0.5332	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-003		5	0.946	0.896	0.997	0.958	0.896	0.992	0.0182	4.31%	-55.52%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-003		0.896	0.912	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-8529-4262	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 138	28.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	4.09	1.86	0.174	8	CDF	0.0017	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.41	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.36634	0.36634	1	16.7	0.0035	Significant Effect
Error	0.175172	0.0218965	8			
Total	0.541512		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.42	23.2	0.4121	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1150	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-004		5	0.991	0.851	1.13	0.956	0.868	1.15	0.0506	11.41%	-62.92%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-004		0.956	1.06	0.868	1.15	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-5581-0318 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 138	28.03%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	4	2.13	0.171	4	CDF	0.0080	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.25632	0.25632	1	16	0.0039	Significant Effect
Error	0.127948	0.0159935	8			
Total	0.384268		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	31.5	23.2	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4538	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-52.63%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-4799-9024	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 138	69.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	3.37	1.86	0.424	8	CDF	0.0049	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.29	0.2255	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.4784	1.4784	1	11.4	0.0097	Significant Effect
Error	1.03911	0.129888	8			
Total	2.51751		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.38	23.2	0.0787	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.958	0.741	0.7620	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-006		5	1.38	0.784	1.97	1.46	0.853	2.06	0.214	34.72%	-126.40%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-006		0.853	1.46	1.52	2.06	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6069-1449	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 138	63.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	3.97	1.86	0.385	8	CDF	0.0021	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.81	2.29	0.4740	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.68757	1.68757	1	15.7	0.0041	Significant Effect
Error	0.857415	0.107177	8			
Total	2.54498		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.91	23.2	0.1134	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.3987	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
59517-007		5	1.43	0.898	1.96	1.16	1.05	1.99	0.191	29.94%	-135.04%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
59517-007		1.99	1.05	1.16	1.79	1.16

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-4287-6676	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 138	51.52%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	4.46	1.86	0.313	8	CDF	0.0011	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3400	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.41526	1.41526	1	19.9	0.0021	Significant Effect
Error	0.568228	0.0710285	8			
Total	1.98349		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.58	23.2	0.2442	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8269	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.608	0.39	0.827	0.507	0.438	0.805	0.0787	28.94%	0.00%
29517-008		5	1.36	0.947	1.77	1.34	0.914	1.84	0.149	24.49%	-123.67%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.499	0.507	0.793	0.805
29517-008		0.914	1.44	1.34	1.27	1.84

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-8998-8966 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 153	44.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.39	1.86	0.384	8	CDF	0.1017	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7889	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.20449	0.20449	1	1.92	0.2034	Non-Significant Effect
Error	0.852736	0.106592	8			
Total	1.05723		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.55	23.2	0.6830	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4345	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-001		5	1.16	0.711	1.6	1.08	0.65	1.53	0.161	31.07%	-32.80%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-001		1.08	0.65	1.05	1.48	1.53

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-2235-8129	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed pcb 153	32.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.714	2.13	0.281	4	CDF	0.2574	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6393	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02209	0.02209	1	0.509	0.4957	Non-Significant Effect
Error	0.34695	0.0433688	8			
Total	0.36904		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	27.7	23.2	0.0071	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.741	0.4994	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-002		5	0.966	0.898	1.03	0.971	0.914	1.05	0.0246	5.69%	-10.78%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-002		0.971	0.919	0.914	0.976	1.05

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-3207-5425	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pcb 153	32.26%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	1.46	1.86	0.281	8	CDF	0.0915	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.121661	0.121661	1	2.13	0.1829	Non-Significant Effect
Error	0.457819	0.0572274	8			
Total	0.57948		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.72	23.2	0.3553	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2361	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-003		5	1.09	0.875	1.31	0.992	0.953	1.33	0.0784	16.05%	-25.30%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-003		0.953	1.33	0.992	0.958	1.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-6705-5152	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed pcb 153	38.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.73	1.86	0.335	8	CDF	0.0607	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.26	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.24336	0.24336	1	3	0.1215	Non-Significant Effect
Error	0.648784	0.081098	8			
Total	0.892144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.07	23.2	0.9516	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0297	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-004		5	1.18	0.836	1.53	1.23	0.868	1.48	0.125	23.66%	-35.78%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-004		1.23	1.42	0.868	1.48	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-0517-3846	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed pcb 153	37.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	1.79	1.86	0.323	8	CDF	0.0560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.38	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.24056	0.24056	1	3.19	0.1119	Non-Significant Effect
Error	0.603277	0.0754096	8			
Total	0.843837		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.25	23.2	0.8355	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2520	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-005		5	1.18	0.861	1.5	1.09	0.929	1.54	0.116	21.91%	-35.57%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-005		0.929	1.54	1.36	1.09	0.992

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2910-6203	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 153	75.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	3.39	1.86	0.66	8	CDF	0.0048	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.29	0.1001	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.61562	3.61562	1	11.5	0.0095	Significant Effect
Error	2.52086	0.315107	8			
Total	6.13648		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.53	23.2	0.0965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5619	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-006		5	2.07	1.16	2.99	2.07	0.923	2.92	0.331	35.63%	-137.91%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-006		0.923	2.45	2.01	2.92	2.07

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-1427-6420	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 153	36.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	7.63	1.86	0.32	8	CDF	3.1E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.32	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.31649	4.31649	1	58.2	6.1E-05	Significant Effect
Error	0.593376	0.074172	8			
Total	4.90987		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.3	23.2	0.8081	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.829	0.741	0.0326	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
59517-007		5	2.19	1.87	2.5	2.23	1.87	2.43	0.114	11.63%	-150.69%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
59517-007		2.43	2.23	1.87	2.42	1.98

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-7231-0027	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 153	31.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	5.79	1.86	0.277	8	CDF	2.1E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.85761	1.85761	1	33.5	4.1E-04	Significant Effect
Error	0.443976	0.055497	8			
Total	2.30159		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.07	23.2	0.3031	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2732	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.872	0.513	1.23	0.972	0.534	1.14	0.129	33.18%	0.00%
29517-008		5	1.73	1.53	1.94	1.76	1.48	1.93	0.0739	9.53%	-98.85%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.534	0.594	0.972	1.12	1.14
29517-008		1.8	1.76	1.48	1.7	1.93

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8994-8619	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 170	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2177-9764	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 170	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1126-7395	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 170	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-2392-1960	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 170	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1385-1641	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 170	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-3443-9892	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 170	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-4615-9026	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 170	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2593-1113	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 170	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-2659-7674	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 180	26.49%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.76	2.13	0.121	4	CDF	0.0764	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.19	2.29	0.0911	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0252004	0.0252004	1	3.11	0.1160	Non-Significant Effect
Error	0.064902	0.0081128	8			
Total	0.0901024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	31.1	23.2	0.0057	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3425	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.559	0.403	0.714	0.486	0.457	0.745	0.0561	22.44%	-21.90%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.632	0.745

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-5619-8563	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 180	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-1535-3322	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 180	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0223-4935	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 180	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-9388-4155	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 180	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-4608-1877	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 180	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-4180-2119	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 180	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-5753-4171	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 180	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-4111-8704	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 187	16.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.68	1.86	0.074	8	CDF	0.0656	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.42	2.29	0.0187	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0112225	0.0112225	1	2.83	0.1312	Non-Significant Effect
Error	0.0317564	0.0039696	8			
Total	0.0429789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	14.7	23.2	0.0232	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.741	0.0868	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.525	0.418	0.632	0.486	0.457	0.669	0.0386	16.41%	-14.62%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.541	0.669

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-8255-1260 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 10:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 187	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-4984-4694	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 187	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-3314-7699	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 187	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-3686-9127	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 187	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-4508-7521	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 187	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-5677-7992	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 187	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-0248-1773	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 187	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-5208-0328	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 195	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-2640-5689	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 195	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-0733-5200	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 195	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-9628-9360	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 195	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-8118-0209	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 195	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-7439-2630	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 195	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3386-4409	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 195	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-8039-1021	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 195	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-1274-7560	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 206	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-0212-3041	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 206	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3345-2953	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 206	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-9630-7087	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 206	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-6799-8162	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 206	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-8490-4117	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 206	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8148-4772	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 206	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.031	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.583908	0.583908	1	1020	<1.0E-37	Significant Effect
Error	0.0040232	0.0005747	7			
Total	0.587932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		4	0.971	0.93	1.01	0.978	0.934	0.994	0.0129	2.66%	-111.82%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		Outlier	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-2024-2215	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 206	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-8974-1994	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 206	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4246-0456	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pcb 209	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1786-4127	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pcb 209	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.053	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.523037	0.523037	1	259	2.2E-07	Significant Effect
Error	0.016154	0.0020193	8			
Total	0.539191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	-99.78%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-6439-3323	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pcb 209	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.046	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.57648	0.57648	1	371	<1.0E-37	Significant Effect
Error	0.0124184	0.0015523	8			
Total	0.588899		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-104.76%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-6485-7848	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pcb 209	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.040	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.504452	0.504452	1	434	<1.0E-37	Significant Effect
Error	0.0092944	0.0011618	8			
Total	0.513746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	-97.99%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-7436-9949	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pcb 209	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.032	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.55272	0.55272	1	743	<1.0E-37	Significant Effect
Error	0.0059524	0.0007441	8			
Total	0.558673		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-102.57%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-4169-0123	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pcb 209	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.051	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.597803	0.597803	1	315	<1.0E-37	Significant Effect
Error	0.0151624	0.0018953	8			
Total	0.612965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-106.68%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-8272-5796	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pcb 209	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.033	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.53361	0.53361	1	670	<1.0E-37	Significant Effect
Error	0.0063684	0.0007961	8			
Total	0.539978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-100.79%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-2243-3903	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 10:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pcb 209	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.05	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.472628	0.472628	1	262	2.1E-07	Significant Effect
Error	0.01441	0.0018013	8			
Total	0.487038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	-94.85%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.914	0.978	0.838	0.853	0.883

28 day *Macoma nasuta* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

PAHs

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Acenaphthylene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Anthracene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Benzo(a)anthracene	9.65	U	9.01	U	9.06	U	19.00		9.40	U
Benzo(a)pyrene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Benzo(b)fluoranthene	9.65	U	9.01	U	9.06	U	11.70	J	9.40	U
Benzo(k)fluoranthene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Benzo(g,h,i)perylene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Chrysene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Dibenzo(a,h)anthracene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Fluoranthene	9.65	U	9.01	U	9.06	U	13.60	J	9.40	U
Fluorene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Indeno(1,2,3-c,d)pyrene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Naphthalene	9.65	U	9.01	U	9.06	U	8.65	U	9.40	U
Phenanthrene	9.65	U	9.01	U	9.06	U	9.37	J	9.40	U
Pyrene	9.65	U	9.01	U	9.06	U	14.60	J	9.40	U
PAH Total	154.40		144.16		144.96		163.42		150.40	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 1 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Acenaphthylene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Anthracene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Benzo(a)anthracene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Benzo(a)pyrene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Benzo(b)fluoranthene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Benzo(k)fluoranthene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Benzo(g,h,i)perylene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Chrysene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Dibenzo(a,h)anthracene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Fluoranthene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Fluorene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Indeno(1,2,3-c,d)pyrene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Naphthalene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Phenanthrene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
Pyrene	8.88	U	8.46	U	8.74	U	9.52	U	9.34	U
PAH Total	142.08		135.36		139.84		152.32		149.44	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 2 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Acenaphthylene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Anthracene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Benzo(a)anthracene	8.88	U	10.20	J	8.71	U	10.20	J	28.30	
Benzo(a)pyrene	8.88	U	9.42	U	8.71	U	9.73	U	9.64	J
Benzo(b)fluoranthene	8.88	U	9.42	U	8.71	U	9.73	U	15.40	J
Benzo(k)fluoranthene	8.88	U	9.42	U	8.71	U	9.73	U	9.21	J
Benzo(g,h,i)perylene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Chrysene	8.88	U	9.42	U	8.71	U	10.10	J	16.90	J
Dibenzo(a,h)anthracene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Fluoranthene	20.20		20.10		16.80	J	23.50		36.90	
Fluorene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Indeno(1,2,3-c,d)pyrene	17.10	J	18.20	J	17.10	J	19.00	J	20.00	
Naphthalene	8.88	U	9.42	U	8.71	U	9.73	U	8.79	U
Phenanthrene	8.88	U	9.42	U	8.71	U	9.73	U	13.10	J
Pyrene	19.50		20.60		17.50		24.40		36.80	
PAH Total	172.24		182.14		164.63		194.23		247.78	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 3 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Acenaphthylene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Anthracene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Benzo(a)anthracene	9.42	U	12.00	J	9.55	J	9.92	U	15.30	J
Benzo(a)pyrene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Benzo(b)fluoranthene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Benzo(k)fluoranthene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Benzo(g,h,i)perylene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Chrysene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Dibenzo(a,h)anthracene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Fluoranthene	9.42	U	10.20	J	13.00	J	12.70	J	13.50	J
Fluorene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Indeno(1,2,3-c,d)pyrene	16.80	J	9.09	U	16.20	J	18.00	J	17.40	J
Naphthalene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Phenanthrene	9.42	U	9.09	U	8.47	U	9.92	U	9.38	U
Pyrene	9.42	U	10.00	J	12.80	J	12.60	J	11.40	J
PAH Total	158.10		150.37		153.19		172.26		170.16	

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NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 4 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	8.46	U	8.74	U	9.42	U	8.46	U	9.86	U
Acenaphthylene	8.46	U	8.74	U	9.42	U	8.46	U	9.86	U
Anthracene	8.46	U	8.74	U	9.42	U	8.46	U	9.86	U
Benzo(a)anthracene	31.70		36.80		26.70		42.20		44.00	
Benzo(a)pyrene	13.50	J	16.40	J	9.42	U	20.00		21.50	
Benzo(b)fluoranthene	21.30		25.90		15.10	J	30.40		31.40	
Benzo(k)fluoranthene	12.30	J	16.10	J	9.69	J	17.30		18.70	J
Benzo(g,h,i)perylene	8.46	U	8.74	U	9.42	U	10.40	J	10.50	J
Chrysene	24.80		29.60		17.20	J	35.20		37.70	
Dibenzo(a,h)anthracene	8.46	U	8.74	U	9.42	U	8.46	U	9.86	U
Fluoranthene	46.60		57.40		35.90		77.20		64.50	
Fluorene	8.46	U	8.74	U	9.42	U	8.46	U	9.86	U
Indeno(1,2,3-c,d)pyrene	19.90		21.70		19.20		23.10		25.50	
Naphthalene	8.46	U	8.74	U	9.42	U	8.46	U	9.86	U
Phenanthrene	8.46	U	9.23	J	9.42	U	13.00	J	9.86	U
Pyrene	54.80		59.80		41.00		87.30		73.30	
PAH Total	292.58		334.11		249.57		406.86		396.12	

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NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 5 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Acenaphthylene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Anthracene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Benzo(a)anthracene	21.90		25.80		24.50		30.00		22.30	
Benzo(a)pyrene	8.52	U	8.43	U	8.54	J	10.70	J	8.36	U
Benzo(b)fluoranthene	13.90	J	14.40	J	14.80	J	17.80		14.10	J
Benzo(k)fluoranthene	8.52	U	9.06	J	8.36	U	9.85	J	8.36	U
Benzo(g,h,i)perylene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Chrysene	15.60	J	17.30		18.10		23.60		15.40	J
Dibenzo(a,h)anthracene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Fluoranthene	37.20		40.00		41.70		53.60		35.70	
Fluorene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Indeno(1,2,3-c,d)pyrene	18.30		18.90		18.70		20.10		18.50	
Naphthalene	8.52	U	8.43	U	8.36	U	8.83	U	8.36	U
Phenanthrene	9.22	J	9.83	J	9.12	J	14.20	J	8.36	U
Pyrene	33.90		33.90		37.50		50.20		32.00	
PAH Total	226.70		236.63		239.84		291.86		221.60	

* = Qualifiers
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NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 6 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	11.20	J	9.06	U	8.68	U	9.36	U	9.21	U
Acenaphthylene	9.14	U	9.06	U	8.68	U	9.36	U	9.21	U
Anthracene	9.14	U	9.06	U	8.68	U	9.36	U	9.21	U
Benzo(a)anthracene	41.50		34.90		42.60		47.00		33.00	
Benzo(a)pyrene	17.60	J	12.70	J	16.50	J	16.30	J	11.60	J
Benzo(b)fluoranthene	27.50		22.50		26.90		29.30		22.10	
Benzo(k)fluoranthene	13.10	J	11.50	J	11.30	J	14.90	J	9.34	J
Benzo(g,h,i)perylene	9.14	U	9.06	U	9.38	J	10.90	J	9.21	U
Chrysene	39.30		31.80		34.90		39.40		25.80	
Dibenzo(a,h)anthracene	9.14	U	9.06	U	8.68	U	9.36	U	9.21	U
Fluoranthene	82.40		66.20		78.80		92.60		62.30	
Fluorene	9.14	U	9.06	U	8.68	U	9.36	U	9.21	U
Indeno(1,2,3-c,d)pyrene	15.60	J	9.06	U	8.68	U	9.36	U	9.21	U
Naphthalene	9.14	U	9.06	U	8.68	U	9.36	U	9.21	U
Phenanthrene	23.10		16.40	J	21.40		23.80		15.60	J
Pyrene	68.40		56.00		67.30		80.50		52.80	
PAH Total	394.54		324.48		369.84		420.22		306.22	

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NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 7 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	11.60	J	8.64	U	8.77	U	9.47	U	9.34	U
Acenaphthylene	8.40	U	8.64	U	8.77	U	9.47	U	9.34	U
Anthracene	8.40	U	8.64	U	8.77	U	9.47	U	9.34	U
Benzo(a)anthracene	46.70		36.80		33.70		34.30		30.00	
Benzo(a)pyrene	15.50	J	13.00	J	12.50	J	10.00	J	9.34	U
Benzo(b)fluoranthene	30.10		25.60		23.80		21.60		15.80	J
Benzo(k)fluoranthene	11.80	J	10.60	J	10.20	J	9.77	J	9.34	U
Benzo(g,h,i)perylene	8.75	J	8.64	U	8.77	U	9.47	U	9.34	U
Chrysene	36.20		29.60		29.20		25.50		22.70	
Dibenzo(a,h)anthracene	8.40	U	8.64	U	8.77	U	9.47	U	9.34	U
Fluoranthene	89.20		71.10		68.80		60.80		56.90	
Fluorene	8.40	U	8.64	U	8.77	U	9.47	U	9.34	U
Indeno(1,2,3-c,d)pyrene	8.40	U	8.64	U	8.77	U	9.47	U	19.20	
Naphthalene	8.40	U	8.64	U	8.77	U	9.47	U	9.34	U
Phenanthrene	18.70		16.90	J	17.10	J	14.40	J	14.50	J
Pyrene	74.40		60.10		58.60		50.00		46.60	
PAH Total	393.35		332.82		324.06		302.13		289.76	

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J Analyte estimated; detection below R
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

CONTAMINANT	Composite 8 REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Acenaphthylene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Anthracene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Benzo(a)anthracene	37.60		45.70		36.40		32.60		41.00	
Benzo(a)pyrene	10.90	J	12.90	J	10.70	J	10.60	J	11.00	J
Benzo(b)fluoranthene	21.90		26.20		18.50	J	18.30		23.90	
Benzo(k)fluoranthene	11.10	J	12.30	J	12.40	J	9.01	J	9.94	J
Benzo(g,h,i)perylene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Chrysene	26.80		32.50		29.80		27.00		25.70	
Dibenzo(a,h)anthracene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Fluoranthene	87.30		99.70		94.20		83.10		97.20	
Fluorene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Indeno(1,2,3-c,d)pyrene	19.70		9.01	U	19.90		18.40		9.17	U
Naphthalene	8.88	U	9.01	U	9.38	U	8.43	U	9.17	U
Phenanthrene	20.80		23.80		19.90		20.60		25.80	
Pyrene	72.50		79.30		74.60		65.80		77.80	
PAH Total	370.76		404.48		382.06		344.42		385.70	

* = Qualifiers
U Analyte not detected; below Method
J Analyte estimated; detection below R
NA Not Analyzed

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Start Date: 29 Aug-17 **Species:** Macoma nasuta **Sample Code:** 29524-000
End Date: 26 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 29 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29524

Sample	Rep	Pos	Aceneaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,I)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
29524-000	1	1																
29524-000	2	15																
29524-000	3	25																
29524-000	4	31																
29524-000	5	47																
29517-009	1	2	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65	9.65
29517-009	2	18	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01	9.01
29517-009	3	22	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06	9.06
29517-009	4	34	8.65	8.65	8.65	19	8.65	11.7	8.65	8.65	8.65	8.65	13.6	8.65	8.65	8.65	9.37	14.6
29517-009	5	46	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
29517-001	1	7	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88
29517-001	2	12	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46	8.46
29517-001	3	27	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74
29517-001	4	39	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52	9.52
29517-001	5	50	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34
29517-002	1	9	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	8.88	20.2	8.88	17.1	8.88	8.88	19.5
29517-002	2	13	9.42	9.42	9.42	10.2	9.42	9.42	9.42	9.42	9.42	9.42	20.1	9.42	18.2	9.42	9.42	20.6
29517-002	3	21	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	16.8	8.71	17.1	8.71	8.71	17.5
29517-002	4	40	9.73	9.73	9.73	10.2	9.73	9.73	9.73	9.73	10.1	9.73	23.5	9.73	19	9.73	9.73	24.4
29517-002	5	42	8.79	8.79	8.79	28.3	9.64	15.4	8.79	9.21	16.9	8.79	36.9	8.79	20	8.79	13.1	36.8
29517-003	1	8	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	9.42	16.8	9.42	9.42	9.42
29517-003	2	17	9.09	9.09	9.09	12	9.09	9.09	9.09	9.09	9.09	9.09	10.2	9.09	9.09	9.09	9.09	10
29517-003	3	24	8.47	8.47	8.47	9.55	8.47	8.47	8.47	8.47	8.47	8.47	13	8.47	16.2	8.47	8.47	12.8
29517-003	4	35	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	12.7	9.92	18	9.92	9.92	12.6
29517-003	5	48	9.38	9.38	9.38	15.3	9.38	9.38	9.38	9.38	9.38	9.38	13.5	9.38	17.4	9.38	9.38	11.4
29517-004	1	4	8.46	8.46	8.46	31.7	13.5	21.3	8.46	12.3	24.8	8.46	46.6	8.46	19.9	8.46	8.46	54.8
29517-004	2	16	8.74	8.74	8.74	36.8	16.4	25.9	8.74	16.1	29.6	8.74	57.4	8.74	21.7	8.74	9.23	59.8

Sample	Rep	Pos	Aceneaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,I)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
29517-004	3	30	9.42	9.42	9.42	26.7	9.42	15.1	9.42	9.69	17.2	9.42	35.9	9.42	19.2	9.42	9.42	41
29517-004	4	32	8.46	8.46	8.46	42.2	20	30.4	10.4	17.3	35.2	8.46	77.2	8.46	23.1	8.46	13	87.3
29517-004	5	43	9.86	9.86	9.86	44	21.5	31.4	10.5	18.7	37.7	9.86	64.5	9.86	25.5	9.86	9.86	73.3
29517-005	1	5	8.52	8.52	8.52	21.9	8.52	13.9	8.52	8.52	15.6	8.52	37.2	8.52	18.3	8.52	9.22	33.9
29517-005	2	14	8.43	8.43	8.43	25.8	8.43	14.4	8.43	9.06	17.3	8.43	40	8.43	18.9	8.43	9.83	33.9
29517-005	3	26	8.36	8.36	8.36	24.5	8.54	14.8	8.36	8.36	18.1	8.36	41.7	8.36	18.7	8.36	9.12	37.5
29517-005	4	36	8.83	8.83	8.83	30	10.7	17.8	8.83	9.85	23.6	8.83	53.6	8.83	20.1	8.83	14.2	50.2
29517-005	5	44	8.36	8.36	8.36	22.3	8.36	14.1	8.36	8.36	15.4	8.36	35.7	8.36	18.5	8.36	8.36	32
29517-006	1	10	11.2	9.14	9.14	41.5	17.6	27.5	9.14	13.1	39.3	9.14	82.4	9.14	15.6	9.14	23.1	68.4
29517-006	2	19	9.06	9.06	9.06	34.9	12.7	22.5	9.06	11.5	31.8	9.06	66.2	9.06	9.06	9.06	16.4	56
29517-006	3	23	8.68	8.68	8.68	42.6	16.5	26.9	9.38	11.3	34.9	8.68	78.8	8.68	8.68	8.68	21.4	67.3
29517-006	4	37	9.36	9.36	9.36	47	16.3	29.3	10.9	14.9	39.4	9.36	92.6	9.36	9.36	9.36	23.8	80.5
29517-006	5	45	9.21	9.21	9.21	33	11.6	22.1	9.21	9.34	25.8	9.21	62.3	9.21	9.21	9.21	15.6	52.8
59517-007	1	6	11.6	8.4	8.4	46.7	15.5	30.1	8.75	11.8	36.2	8.4	89.2	8.4	8.4	8.4	18.7	74.4
59517-007	2	11	8.64	8.64	8.64	36.8	13	25.6	8.64	10.6	29.6	8.64	71.1	8.64	8.64	8.64	16.9	60.1
59517-007	3	29	8.77	8.77	8.77	33.7	12.5	23.8	8.77	10.2	29.2	8.77	68.8	8.77	8.77	8.77	17.1	58.6
59517-007	4	33	9.47	9.47	9.47	34.3	10	21.6	9.47	9.77	25.5	9.47	60.8	9.47	9.47	9.47	14.4	50
59517-007	5	49	9.34	9.34	9.34	30	9.34	15.8	9.34	9.34	22.7	9.34	56.9	9.34	19.2	9.34	14.5	46.6
29517-008	1	3	8.88	8.88	8.88	37.6	10.9	21.9	8.88	11.1	26.8	8.88	87.3	8.88	19.7	8.88	20.8	72.5
29517-008	2	20	9.01	9.01	9.01	45.7	12.9	26.2	9.01	12.3	32.5	9.01	99.7	9.01	9.01	9.01	23.8	79.3
29517-008	3	28	9.38	9.38	9.38	36.4	10.7	18.5	9.38	12.4	29.8	9.38	94.2	9.38	19.9	9.38	19.9	74.6
29517-008	4	38	8.43	8.43	8.43	32.6	10.6	18.3	8.43	9.01	27	8.43	83.1	8.43	18.4	8.43	20.6	65.8
29517-008	5	41	9.17	9.17	9.17	41	11	23.9	9.17	9.94	25.7	9.17	97.2	9.17	9.17	9.17	25.8	77.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Batch ID:	04-1697-7794	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	29 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Sep-17	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
16-9515-5409	Acenaphthene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed acenaphthene
12-2779-6796	Acenaphthene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed acenaphthene
06-9634-6984	Acenaphthene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed acenaphthene
10-4803-7441	Acenaphthene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed acenaphthene
00-7594-0287	Acenaphthene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed acenaphthene
09-6488-0173	Acenaphthene	Equal Variance t Two-Sample Test	0.2409	29517-006 passed acenaphthene
20-8756-6940	Acenaphthene	Equal Variance t Two-Sample Test	0.6238	29517-006 passed acenaphthene
06-9249-4977	Acenaphthene	Equal Variance t Two-Sample Test	0.2426	59517-007 passed acenaphthene
14-9382-3316	Acenaphthene	Equal Variance t Two-Sample Test	0.6398	59517-007 passed acenaphthene
06-1527-6389	Acenaphthene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed acenaphthene
21-0457-5701	Acenaphthylene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed acenaphthylene
17-8534-1696	Acenaphthylene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed acenaphthylene
19-3716-4424	Acenaphthylene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed acenaphthylene
08-7059-8276	Acenaphthylene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed acenaphthylene
05-9861-2043	Acenaphthylene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed acenaphthylene
00-6098-6597	Acenaphthylene	Equal Variance t Two-Sample Test	0.6180	29517-006 passed acenaphthylene
09-3350-6410	Acenaphthylene	Equal Variance t Two-Sample Test	0.7918	59517-007 passed acenaphthylene
03-9641-8777	Acenaphthylene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed acenaphthylene
16-8991-8554	Anthracene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed anthracene
00-8137-9676	Anthracene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed anthracene
15-5458-9354	Anthracene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed anthracene
19-0122-7028	Anthracene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed anthracene
07-5066-6347	Anthracene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed anthracene
01-2549-6482	Anthracene	Equal Variance t Two-Sample Test	0.6180	29517-006 passed anthracene
12-8899-1779	Anthracene	Equal Variance t Two-Sample Test	0.7918	59517-007 passed anthracene
21-3037-5802	Anthracene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed anthracene
18-5901-9404	Benzo(a)anthracene	Equal Variance t Two-Sample Test	0.8529	29517-001 passed benzo(a)anthracene

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
10-9626-6928	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.9524	29517-001 passed benzo(a)anthracene
02-9019-3522	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.4762	29517-002 passed benzo(a)anthracene
04-0814-4420	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.7222	29517-002 passed benzo(a)anthracene
17-6304-1167	Benzo(a)anthracene	Unequal Variance t Two-Sample Test	0.0787	29517-003 passed benzo(a)anthracene
05-5753-1683	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.1548	29517-003 passed benzo(a)anthracene
13-8287-1898	Benzo(a)anthracene	Equal Variance t Two-Sample Test	8.0E-05	29517-004 failed benzo(a)anthracene
10-7792-2123	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed benzo(a)anthracene
15-3988-3158	Benzo(a)anthracene	Equal Variance t Two-Sample Test	1.1E-05	29517-006 failed benzo(a)anthracene
09-3278-6524	Benzo(a)anthracene	Equal Variance t Two-Sample Test	4.1E-05	59517-007 failed benzo(a)anthracene
05-4800-7414	Benzo(a)anthracene	Equal Variance t Two-Sample Test	7.2E-06	29517-008 failed benzo(a)anthracene
20-6853-4667	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed benzo(a)pyrene
14-9355-4713	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.3300	29517-002 passed benzo(a)pyrene
10-1685-8812	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed benzo(a)pyrene
20-6734-3713	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	0.0166	29517-004 failed benzo(a)pyrene
14-8449-9241	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.9949	29517-005 passed benzo(a)pyrene
17-8402-0018	Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.9524	29517-005 passed benzo(a)pyrene
19-7899-3430	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	0.0041	29517-006 failed benzo(a)pyrene
01-0817-6730	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	0.0301	59517-007 failed benzo(a)pyrene
19-4461-0143	Benzo(a)pyrene	Equal Variance t Two-Sample Test	5.3E-05	29517-008 failed benzo(a)pyrene
19-6729-6684	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.0010	29517-008 failed benzo(a)pyrene
00-9593-5742	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.8529	29517-001 passed benzo(b)fluoranthene
02-6558-6344	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.9076	29517-001 passed benzo(b)fluoranthene
00-5633-1059	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.8161	29517-002 passed benzo(b)fluoranthene
00-0406-4428	Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.5794	29517-002 passed benzo(b)fluoranthene
06-8784-8246	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.5307	29517-003 passed benzo(b)fluoranthene
08-3079-0295	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.8080	29517-003 passed benzo(b)fluoranthene
03-7623-5597	Benzo(b)fluoranthene	Unequal Variance t Two-Sample Test	0.0040	29517-004 failed benzo(b)fluoranthene
14-4387-9109	Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed benzo(b)fluoranthene
19-4812-1210	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	2.9E-06	29517-006 failed benzo(b)fluoranthene
08-9055-5743	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	2.4E-04	59517-007 failed benzo(b)fluoranthene
19-3497-9679	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	3.6E-05	29517-008 failed benzo(b)fluoranthene
05-6508-1143	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed benzo(g,h,i)perylene
07-4984-3120	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed benzo(g,h,i)perylene
12-1137-3709	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed benzo(g,h,i)perylene
08-3671-6446	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.2300	29517-004 passed benzo(g,h,i)perylene
12-7825-4816	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed benzo(g,h,i)perylene
07-7216-7909	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.4185	29517-006 passed benzo(g,h,i)perylene
11-1171-4918	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.1739	29517-006 passed benzo(g,h,i)perylene
04-8996-7419	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.7364	59517-007 passed benzo(g,h,i)perylene
17-8740-1125	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed benzo(g,h,i)perylene
05-0490-8675	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed benzo(k)fluoranthene
20-4905-2854	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.4448	29517-002 passed benzo(k)fluoranthene
01-6804-5974	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed benzo(k)fluoranthene
15-0045-7303	Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	0.0139	29517-004 failed benzo(k)fluoranthene
15-2706-2427	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.8203	29517-005 passed benzo(k)fluoranthene
03-9805-4327	Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	0.0194	29517-006 failed benzo(k)fluoranthene
07-8296-6415	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.0155	59517-007 failed benzo(k)fluoranthene
11-2403-4562	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.0151	29517-008 failed benzo(k)fluoranthene
13-4267-3141	Chrysene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed chrysene
21-0201-8219	Chrysene	Equal Variance t Two-Sample Test	0.3624	29517-002 passed chrysene
15-3461-0374	Chrysene	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-002 passed chrysene
04-6891-0016	Chrysene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed chrysene
07-6121-4354	Chrysene	Unequal Variance t Two-Sample Test	0.0029	29517-004 failed chrysene

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
19-5865-9720	Chrysene	Equal Variance t Two-Sample Test	2.8E-06	29517-005 failed chrysene
19-8323-7882	Chrysene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed chrysene
12-6851-1792	Chrysene	Unequal Variance t Two-Sample Test	3.0E-04	29517-006 failed chrysene
04-9502-1458	Chrysene	Unequal Variance t Two-Sample Test	5.2E-04	59517-007 failed chrysene
00-9801-6006	Chrysene	Unequal Variance t Two-Sample Test	5.2E-05	29517-008 failed chrysene
10-8624-8798	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed dibenz(a,h)anthracene
06-5869-5271	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed dibenz(a,h)anthracene
13-6783-6994	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed dibenz(a,h)anthracene
01-4831-3854	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed dibenz(a,h)anthracene
03-4889-0797	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed dibenz(a,h)anthracene
05-6423-3203	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.6180	29517-006 passed dibenz(a,h)anthracene
13-0173-9061	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.7918	59517-007 passed dibenz(a,h)anthracene
12-0304-2249	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed dibenz(a,h)anthracene
09-2738-7841	Fluoranthene	Equal Variance t Two-Sample Test	0.8529	29517-001 passed fluoranthene
07-9428-5176	Fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.9524	29517-001 passed fluoranthene
03-2789-6060	Fluoranthene	Equal Variance t Two-Sample Test	1.8E-04	29517-002 failed fluoranthene
09-9260-8810	Fluoranthene	Equal Variance t Two-Sample Test	0.0031	29517-002 failed fluoranthene
20-8651-4021	Fluoranthene	Equal Variance t Two-Sample Test	0.1061	29517-003 passed fluoranthene
20-9876-3152	Fluoranthene	Unequal Variance t Two-Sample Test	0.0015	29517-004 failed fluoranthene
04-6922-2007	Fluoranthene	Equal Variance t Two-Sample Test	1.7E-07	29517-005 failed fluoranthene
07-0158-3824	Fluoranthene	Equal Variance t Two-Sample Test	5.8E-06	29517-005 failed fluoranthene
17-0314-9022	Fluoranthene	Unequal Variance t Two-Sample Test	1.4E-04	29517-006 failed fluoranthene
10-8463-8045	Fluoranthene	Equal Variance t Two-Sample Test	2.4E-07	59517-007 failed fluoranthene
02-9245-9539	Fluoranthene	Unequal Variance t Two-Sample Test	2.4E-04	59517-007 failed fluoranthene
16-0117-7362	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed fluoranthene
18-6802-8294	Fluorene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed fluorene
12-0670-9540	Fluorene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed fluorene
20-7290-5171	Fluorene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed fluorene
19-3189-0067	Fluorene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed fluorene
11-2347-9163	Fluorene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed fluorene
11-4482-3711	Fluorene	Equal Variance t Two-Sample Test	0.6180	29517-006 passed fluorene
06-2480-7162	Fluorene	Equal Variance t Two-Sample Test	0.7918	59517-007 passed fluorene
17-4222-9425	Fluorene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed fluorene
19-9254-9506	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed indeno(1,2,3-cd)pyrene
02-0356-2574	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	1.4E-07	29517-002 failed indeno(1,2,3-cd)pyrene
21-2503-9784	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed indeno(1,2,3-cd)pyrene
07-2625-2056	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.0159	29517-003 failed indeno(1,2,3-cd)pyrene
12-3588-9906	Indeno(1,2,3-cd)pyrene	Unequal Variance t Two-Sample Test	1.9E-04	29517-004 failed indeno(1,2,3-cd)pyrene
15-7064-5030	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed indeno(1,2,3-cd)pyrene
01-3289-3734	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.6238	29517-006 passed indeno(1,2,3-cd)pyrene
20-0669-2424	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.3651	29517-006 passed indeno(1,2,3-cd)pyrene
10-0582-4791	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.8637	59517-007 passed indeno(1,2,3-cd)pyrene
09-4134-7940	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.7262	59517-007 passed indeno(1,2,3-cd)pyrene
03-7275-1878	Indeno(1,2,3-cd)pyrene	Unequal Variance t Two-Sample Test	0.0370	29517-008 failed indeno(1,2,3-cd)pyrene
06-6900-0045	Naphthalene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed naphthalene
17-6686-9220	Naphthalene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed naphthalene
21-2907-0969	Naphthalene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed naphthalene
18-8260-8490	Naphthalene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed naphthalene
08-3902-2578	Naphthalene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed naphthalene
14-8886-0995	Naphthalene	Equal Variance t Two-Sample Test	0.6180	29517-006 passed naphthalene
04-6944-0917	Naphthalene	Equal Variance t Two-Sample Test	0.7918	59517-007 passed naphthalene
04-9697-9453	Naphthalene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed naphthalene
06-1712-5598	Phenanthrene	Equal Variance t Two-Sample Test	0.8947	29517-001 passed phenanthrene

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
08-7953-5621	Phenanthrene	Equal Variance t Two-Sample Test	0.6693	29517-002 passed phenanthrene
10-5061-1957	Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	0.4206	29517-002 passed phenanthrene
05-4209-7990	Phenanthrene	Equal Variance t Two-Sample Test	0.5609	29517-003 passed phenanthrene
03-6471-4737	Phenanthrene	Equal Variance t Two-Sample Test	0.5733	29517-004 passed phenanthrene
06-4034-2246	Phenanthrene	Unequal Variance t Two-Sample Test	0.2150	29517-004 passed phenanthrene
17-7984-5595	Phenanthrene	Equal Variance t Two-Sample Test	0.7028	29517-005 passed phenanthrene
19-9541-5648	Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	0.4206	29517-005 passed phenanthrene
00-9333-4825	Phenanthrene	Unequal Variance t Two-Sample Test	0.0016	29517-006 failed phenanthrene
03-9062-1316	Phenanthrene	Unequal Variance t Two-Sample Test	5.4E-04	59517-007 failed phenanthrene
04-9348-4257	Phenanthrene	Unequal Variance t Two-Sample Test	1.7E-04	29517-008 failed phenanthrene
03-4324-1565	Pyrene	Equal Variance t Two-Sample Test	0.8529	29517-001 passed pyrene
10-8598-1946	Pyrene	Wilcoxon Rank Sum Two-Sample Test	0.9524	29517-001 passed pyrene
07-2007-3505	Pyrene	Equal Variance t Two-Sample Test	0.0030	29517-002 failed pyrene
07-2366-4360	Pyrene	Equal Variance t Two-Sample Test	3.4E-04	29517-002 failed pyrene
03-7332-3826	Pyrene	Equal Variance t Two-Sample Test	0.2487	29517-003 passed pyrene
15-0730-7850	Pyrene	Unequal Variance t Two-Sample Test	0.0014	29517-004 failed pyrene
05-6447-5409	Pyrene	Equal Variance t Two-Sample Test	2.5E-05	29517-005 failed pyrene
21-4041-5436	Pyrene	Equal Variance t Two-Sample Test	6.5E-07	29517-005 failed pyrene
11-0209-4356	Pyrene	Equal Variance t Two-Sample Test	2.3E-06	29517-006 failed pyrene
11-3519-9950	Pyrene	Equal Variance t Two-Sample Test	5.7E-06	59517-007 failed pyrene
08-6210-6732	Pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed pyrene

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	8.99	8.21	9.76	8.46	9.86	0.28	0.626	6.96%	1.81%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.5	8.28	10.7	8.68	11.2	0.439	0.982	10.34%	-3.80%
59517-007		5	9.56	8.08	11	8.64	11.6	0.533	1.19	12.47%	-4.48%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	8.99	8.21	9.76	8.46	9.86	0.28	0.626	6.96%	1.81%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.09	8.77	9.41	8.68	9.36	0.114	0.254	2.80%	0.70%
59517-007		5	8.92	8.35	9.5	8.4	9.47	0.206	0.461	5.17%	2.51%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	8.99	8.21	9.76	8.46	9.86	0.28	0.626	6.96%	1.81%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.09	8.77	9.41	8.68	9.36	0.114	0.254	2.80%	0.70%
59517-007		5	8.92	8.35	9.5	8.4	9.47	0.206	0.461	5.17%	2.51%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6	9.01	19	1.95	4.35	38.80%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	19.92%
29517-002		5	13.3	2.78	23.7	8.71	28.3	3.77	8.44	63.65%	-18.12%
29517-003		5	11.2	8.14	14.3	9.42	15.3	1.12	2.5	22.23%	-0.12%
29517-004		5	36.3	27.3	45.2	26.7	44	3.22	7.21	19.86%	-223.24%
29517-005		5	24.9	20.8	29	21.9	30	1.46	3.27	13.13%	-121.85%
29517-006		5	39.8	32.6	47	33	47	2.58	5.76	14.48%	-254.60%
59517-007		5	36.3	28.5	44.1	30	46.7	2.82	6.3	17.36%	-223.41%
29517-008		5	38.7	32.5	44.8	32.6	45.7	2.21	4.95	12.80%	-244.44%

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.28	8.71	9.84	8.71	9.73	0.205	0.457	4.93%	-1.33%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	16.2	10.1	22.2	9.42	21.5	2.19	4.89	30.28%	-76.58%
29517-005		5	8.91	7.66	10.2	8.36	10.7	0.449	1	11.26%	2.67%
29517-006		5	14.9	11.7	18.2	11.6	17.6	1.17	2.62	17.56%	-63.21%
59517-007		5	12.1	8.99	15.1	9.34	15.5	1.11	2.48	20.53%	-31.83%
29517-008		5	11.2	10	12.4	10.6	12.9	0.426	0.952	8.49%	-22.57%

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1	9.01	11.7	0.498	1.11	11.40%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	7.95%
29517-002		5	10.4	6.94	13.9	8.71	15.4	1.26	2.81	26.94%	-6.80%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	5.20%
29517-004		5	24.8	16.4	33.2	15.1	31.4	3.02	6.75	27.21%	-154.20%
29517-005		5	15	13	17	13.9	17.8	0.716	1.6	10.68%	-53.63%
29517-006		5	25.7	21.7	29.6	22.1	29.3	1.43	3.19	12.45%	-162.80%
59517-007		5	23.4	16.8	29.9	15.8	30.1	2.35	5.27	22.52%	-139.45%
29517-008		5	21.8	17.5	26	18.3	26.2	1.53	3.42	15.74%	-122.86%

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	9.5	8.35	10.7	8.46	10.5	0.417	0.932	9.81%	-3.82%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.54	8.58	10.5	9.06	10.9	0.345	0.77	8.08%	-4.19%
59517-007		5	8.99	8.52	9.47	8.64	9.47	0.17	0.381	4.24%	1.75%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.19	8.68	9.7	8.71	9.73	0.183	0.41	4.46%	-0.39%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	14.8	10.2	19.4	9.69	18.7	1.67	3.73	25.14%	-61.87%
29517-005		5	8.83	8.04	9.62	8.36	9.85	0.286	0.639	7.23%	3.54%
29517-006		5	12	9.44	14.6	9.34	14.9	0.934	2.09	17.36%	-31.40%
59517-007		5	10.3	9.17	11.5	9.34	11.8	0.421	0.941	9.10%	-12.98%
29517-008		5	11	9.12	12.8	9.01	12.4	0.661	1.48	13.49%	-19.62%

Bioaccumulation Evaluation - PAHs - Macoma EnviroSystems, Inc.

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	10.8	6.52	15.1	8.71	16.9	1.54	3.45	31.95%	-18.00%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	28.9	18.7	39.1	17.2	37.7	3.68	8.24	28.50%	-215.71%
29517-005		5	18	13.9	22.1	15.4	23.6	1.49	3.33	18.51%	-96.64%
29517-006		5	34.2	27.2	41.3	25.8	39.4	2.55	5.7	16.64%	-274.04%
59517-007		5	28.6	22.3	35	22.7	36.2	2.28	5.09	17.76%	-212.87%
29517-008		5	28.4	24.9	31.8	25.7	32.5	1.24	2.76	9.75%	-209.81%

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	8.99	8.21	9.76	8.46	9.86	0.28	0.626	6.96%	1.81%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.09	8.77	9.41	8.68	9.36	0.114	0.254	2.80%	0.70%
59517-007		5	8.92	8.35	9.5	8.4	9.47	0.206	0.461	5.17%	2.51%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6	9.01	13.6	0.872	1.95	19.22%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	11.40%
29517-002		5	23.5	13.7	33.3	16.8	36.9	3.51	7.86	33.43%	-131.66%
29517-003		5	11.8	9.49	14	9.42	13.5	0.817	1.83	15.53%	-15.97%
29517-004		5	56.3	36.5	76.1	35.9	77.2	7.13	15.9	28.29%	-455.21%
29517-005		5	41.6	32.8	50.4	35.7	53.6	3.17	7.08	17.01%	-310.49%
29517-006		5	76.5	61.2	91.8	62.3	92.6	5.51	12.3	16.11%	-653.75%
59517-007		5	69.4	53.8	84.9	56.9	89.2	5.59	12.5	18.03%	-583.75%
29517-008		5	92.3	83.7	101	83.1	99.7	3.1	6.93	7.51%	-809.90%

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	8.99	8.21	9.76	8.46	9.86	0.28	0.626	6.96%	1.81%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.09	8.77	9.41	8.68	9.36	0.114	0.254	2.80%	0.70%
59517-007		5	8.92	8.35	9.5	8.4	9.47	0.206	0.461	5.17%	2.51%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Bioaccumulation Evaluation - PAHs - Macoma EnviroSystems, Inc.

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	18.3	16.7	19.8	17.1	20	0.56	1.25	6.85%	-99.69%
29517-003		5	15.5	11	20	9.09	18	1.63	3.64	23.52%	-69.30%
29517-004		5	21.9	18.7	25	19.2	25.5	1.13	2.54	11.59%	-139.02%
29517-005		5	18.9	18	19.8	18.3	20.1	0.316	0.707	3.74%	-106.47%
29517-006		5	10.4	6.75	14	8.68	15.6	1.31	2.93	28.20%	-13.41%
59517-007		5	10.9	5.11	16.7	8.4	19.2	2.08	4.66	42.76%	-19.03%
29517-008		5	15.2	8.23	22.2	9.01	19.9	2.52	5.64	37.02%	-66.44%

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63	8.65	9.65	0.172	0.384	4.20%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	1.81%
29517-002		5	9.11	8.55	9.66	8.71	9.73	0.199	0.446	4.90%	0.52%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	-1.11%
29517-004		5	8.99	8.21	9.76	8.46	9.86	0.28	0.626	6.96%	1.81%
29517-005		5	8.5	8.26	8.74	8.36	8.83	0.0876	0.196	2.30%	7.14%
29517-006		5	9.09	8.77	9.41	8.68	9.36	0.114	0.254	2.80%	0.70%
59517-007		5	8.92	8.35	9.5	8.4	9.47	0.206	0.461	5.17%	2.51%
29517-008		5	8.97	8.53	9.42	8.43	9.38	0.16	0.357	3.98%	1.97%

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63	9.01	9.65	0.118	0.264	2.84%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	3.33%
29517-002		5	9.97	7.74	12.2	8.71	13.1	0.804	1.8	18.04%	-7.21%
29517-003		5	9.26	8.6	9.92	8.47	9.92	0.238	0.531	5.74%	0.45%
29517-004		5	9.99	7.81	12.2	8.46	13	0.785	1.76	17.56%	-7.49%
29517-005		5	10.1	7.26	13	8.36	14.2	1.04	2.33	22.92%	-9.12%
29517-006		5	20.1	15.3	24.8	15.6	23.8	1.71	3.82	19.03%	-115.75%
59517-007		5	16.3	14	18.6	14.4	18.7	0.825	1.84	11.30%	-75.52%
29517-008		5	22.2	19.1	25.3	19.9	25.8	1.13	2.52	11.35%	-138.55%

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3	9.01	14.6	1.07	2.39	23.14%	0.00%
29517-001		5	8.99	8.45	9.53	8.46	9.52	0.195	0.436	4.85%	13.11%
29517-002		5	23.8	14.2	33.3	17.5	36.8	3.45	7.71	32.45%	-129.70%
29517-003		5	11.2	9.37	13.1	9.42	12.8	0.677	1.51	13.46%	-8.70%
29517-004		5	63.2	41.2	85.3	41	87.3	7.93	17.7	28.04%	-511.37%
29517-005		5	37.5	28.3	46.7	32	50.2	3.3	7.37	19.66%	-262.53%
29517-006		5	65	51.3	78.7	52.8	80.5	4.93	11	16.97%	-528.38%
59517-007		5	57.9	44.5	71.4	46.6	74.4	4.84	10.8	18.66%	-460.13%
29517-008		5	74	67.4	80.6	65.8	79.3	2.37	5.3	7.16%	-615.39%

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	8.46	9.86
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		11.2	9.06	8.68	9.36	9.21
59517-007		11.6	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	8.46	9.86
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		9.14	9.06	8.68	9.36	9.21
59517-007		8.4	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	8.46	9.86
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		9.14	9.06	8.68	9.36	9.21
59517-007		8.4	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	10.2	8.71	10.2	28.3
29517-003		9.42	12	9.55	9.92	15.3
29517-004		31.7	36.8	26.7	42.2	44
29517-005		21.9	25.8	24.5	30	22.3
29517-006		41.5	34.9	42.6	47	33
59517-007		46.7	36.8	33.7	34.3	30
29517-008		37.6	45.7	36.4	32.6	41

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	9.64
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		13.5	16.4	9.42	20	21.5
29517-005		8.52	8.43	8.54	10.7	8.36
29517-006		17.6	12.7	16.5	16.3	11.6
59517-007		15.5	13	12.5	10	9.34
29517-008		10.9	12.9	10.7	10.6	11

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	11.7	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	15.4
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		21.3	25.9	15.1	30.4	31.4
29517-005		13.9	14.4	14.8	17.8	14.1
29517-006		27.5	22.5	26.9	29.3	22.1
59517-007		30.1	25.6	23.8	21.6	15.8
29517-008		21.9	26.2	18.5	18.3	23.9

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	10.4	10.5
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		9.14	9.06	9.38	10.9	9.21
59517-007		8.75	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	9.21
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		12.3	16.1	9.69	17.3	18.7
29517-005		8.52	9.06	8.36	9.85	8.36
29517-006		13.1	11.5	11.3	14.9	9.34
59517-007		11.8	10.6	10.2	9.77	9.34
29517-008		11.1	12.3	12.4	9.01	9.94

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	10.1	16.9
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		24.8	29.6	17.2	35.2	37.7
29517-005		15.6	17.3	18.1	23.6	15.4
29517-006		39.3	31.8	34.9	39.4	25.8
59517-007		36.2	29.6	29.2	25.5	22.7
29517-008		26.8	32.5	29.8	27	25.7

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	8.46	9.86
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		9.14	9.06	8.68	9.36	9.21
59517-007		8.4	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		20.2	20.1	16.8	23.5	36.9
29517-003		9.42	10.2	13	12.7	13.5
29517-004		46.6	57.4	35.9	77.2	64.5
29517-005		37.2	40	41.7	53.6	35.7
29517-006		82.4	66.2	78.8	92.6	62.3
59517-007		89.2	71.1	68.8	60.8	56.9
29517-008		87.3	99.7	94.2	83.1	97.2

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	8.46	9.86
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		9.14	9.06	8.68	9.36	9.21
59517-007		8.4	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		17.1	18.2	17.1	19	20
29517-003		16.8	9.09	16.2	18	17.4
29517-004		19.9	21.7	19.2	23.1	25.5
29517-005		18.3	18.9	18.7	20.1	18.5
29517-006		15.6	9.06	8.68	9.36	9.21
59517-007		8.4	8.64	8.77	9.47	19.2
29517-008		19.7	9.01	19.9	18.4	9.17

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	8.79
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	8.74	9.42	8.46	9.86
29517-005		8.52	8.43	8.36	8.83	8.36
29517-006		9.14	9.06	8.68	9.36	9.21
59517-007		8.4	8.64	8.77	9.47	9.34
29517-008		8.88	9.01	9.38	8.43	9.17

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		8.88	9.42	8.71	9.73	13.1
29517-003		9.42	9.09	8.47	9.92	9.38
29517-004		8.46	9.23	9.42	13	9.86
29517-005		9.22	9.83	9.12	14.2	8.36
29517-006		23.1	16.4	21.4	23.8	15.6
59517-007		18.7	16.9	17.1	14.4	14.5
29517-008		20.8	23.8	19.9	20.6	25.8

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-001		8.88	8.46	8.74	9.52	9.34
29517-002		19.5	20.6	17.5	24.4	36.8
29517-003		9.42	10	12.8	12.6	11.4
29517-004		54.8	59.8	41	87.3	73.3
29517-005		33.9	33.9	37.5	50.2	32
29517-006		68.4	56	67.3	80.5	52.8
59517-007		74.4	60.1	58.6	50	46.6
29517-008		72.5	79.3	74.6	65.8	77.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-9515-5409	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed acenaphthene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-2779-6796	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed acenaphthene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-9634-6984	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed acenaphthene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-4803-7441	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed acenaphthene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.611	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	0.256	0.6268	Non-Significant Effect
Error	2.1562	0.269525	8			
Total	2.22509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	8.99	8.21	9.76		8.46	9.86	0.28	6.96%	1.81%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	8.46	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-7594-0287 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed acenaphthene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-6488-0173	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed acenaphthene	9.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.738	1.86	0.877	8	CDF	0.2409	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.41	2.29	0.0191	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.30276	0.30276	1	0.544	0.4817	Non-Significant Effect
Error	4.4498	0.556225	8			
Total	4.75256		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.54	23.2	0.0962	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.852	0.741	0.0606	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.5	8.28	10.7		8.68	11.2	0.439	10.34%	-3.80%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		11.2	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-8756-6940	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed acenaphthene	4.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.328	1.89	0.442	7	CDF	0.6238	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0130049	0.0130049	1	0.108	0.7525	Non-Significant Effect
Error	0.845794	0.120828	7			
Total	0.858799		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	46.2	0.6803	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.701	0.9323	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		4	9.08	8.61	9.54		8.68	9.36	0.146	3.22%	0.84%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		Outlier	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-9249-4977	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed acenaphthene	11.38%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.732	1.86	1.04	8	CDF	0.2426	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.44	2.29	0.0155	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.420251	0.420251	1	0.535	0.4852	Non-Significant Effect
Error	6.27864	0.78483	8			
Total	6.69889		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.64	23.2	0.0497	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.843	0.741	0.0486	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	9.56	8.08	11		8.64	11.6	0.533	12.47%	-4.48%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		11.6	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-1527-6389	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed acenaphthene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-0457-5701 **Endpoint:** Acenaphthylene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed acenaphthylene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-8534-1696	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed acenaphthylene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-3716-4424	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed acenaphthylene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-7059-8276	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed acenaphthylene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.611	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	0.256	0.6268	Non-Significant Effect
Error	2.1562	0.269525	8			
Total	2.22509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	8.99	8.21	9.76		8.46	9.86	0.28	6.96%	1.81%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	8.46	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-9861-2043	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed acenaphthylene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-6098-6597	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed acenaphthylene	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.383	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102399	0.0102399	1	0.0965	0.7640	Non-Significant Effect
Error	0.848919	0.106115	8			
Total	0.859159		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.09	8.77	9.41		8.68	9.36	0.114	2.80%	0.70%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		9.14	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-3350-6410 **Endpoint:** Acenaphthylene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed acenaphthylene	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.499	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.13225	0.13225	1	0.735	0.4163	Non-Significant Effect
Error	1.44024	0.18003	8			
Total	1.57249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	8.92	8.35	9.5		8.4	9.47	0.206	5.17%	2.51%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.4	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-9641-8777 **Endpoint:** Acenaphthylene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed acenaphthylene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-8991-8554 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed anthracene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-8137-9676	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed anthracene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-5458-9354	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed anthracene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-0122-7028	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed anthracene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.611	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	0.256	0.6268	Non-Significant Effect
Error	2.1562	0.269525	8			
Total	2.22509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	8.99	8.21	9.76		8.46	9.86	0.28	6.96%	1.81%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	8.46	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-5066-6347 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed anthracene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-2549-6482 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed anthracene	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.383	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102399	0.0102399	1	0.0965	0.7640	Non-Significant Effect
Error	0.848919	0.106115	8			
Total	0.859159		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.09	8.77	9.41		8.68	9.36	0.114	2.80%	0.70%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		9.14	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-8899-1779	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed anthracene	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.499	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.13225	0.13225	1	0.735	0.4163	Non-Significant Effect
Error	1.44024	0.18003	8			
Total	1.57249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	8.92	8.35	9.5		8.4	9.47	0.206	5.17%	2.51%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.4	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-3037-5802	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed anthracene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-9626-6928	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(a)anthracene	32.43%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	35	n/a	0	8	Exact	0.9524	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	6.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.4992	12.4992	1	1.31	0.2863	Non-Significant Effect
Error	76.6142	9.57677	8			
Total	89.1134		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	100	23.2	5.8E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.691	0.741	6.9E-04	Non-Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	19.92%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-0814-4420	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed benzo(a)anthracene	37.76%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	22	n/a	0	7	Exact	0.7222	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.62401	6.62401	1	0.596	0.4655	Non-Significant Effect
Error	77.8438	11.1205	7			
Total	84.4678		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	28.6	46.2	0.0201	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.704	0.701	0.0016	Non-Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
29517-002		4	9.5	8.2	10.8		8.71	10.2	0.407	8.57%	15.38%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-002		8.88	10.2	8.71	10.2	Outlier

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-6304-1167	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed benzo(a)anthracene	25.90%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	1.74	2.13	2.4	4	CDF	0.0787	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.51948	8.51948	1	2.36	0.1682	Non-Significant Effect
Error	25.2447	3.60638	7			
Total	33.7642		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	68.7	46.2	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.848	0.701	0.0712	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	9.28	8.8	9.76		9.01	9.65	0.151	3.25%	0.00%
29517-003		5	11.2	8.14	14.3		9.42	15.3	1.12	22.23%	-21.10%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	Outlier	9.4
29517-003		9.42	12	9.55	9.92	15.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-8287-1898	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(a)anthracene	62.38%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	6.65	1.86	7	8	CDF	8.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.29	0.6685	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1569.51	1569.51	1	44.3	1.6E-04	Significant Effect
Error	283.523	35.4404	8			
Total	1853.03		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.74	23.2	0.3529	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3004	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
29517-004		5	36.3	27.3	45.2		26.7	44	3.22	19.86%	-223.24%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-004		31.7	36.8	26.7	42.2	44

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-7792-2123	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(a)anthracene	40.34%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.29	0.1200	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	467.582	467.582	1	31.5	5.0E-04	Significant Effect
Error	118.595	14.8244	8			
Total	586.178		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.77	23.2	0.5920	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.779	0.741	0.0080	Non-Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
29517-005		5	24.9	20.8	29		21.9	30	1.46	13.13%	-121.85%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-005		21.9	25.8	24.5	30	22.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-3988-3158	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(a)anthracene	53.52%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	8.85	1.86	6.01	8	CDF	1.1E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8712	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2041.47	2041.47	1	78.3	2.1E-05	Significant Effect
Error	208.675	26.0844	8			
Total	2250.14		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.75	23.2	0.6007	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4114	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
29517-006		5	39.8	32.6	47		33	47	2.58	14.48%	-254.60%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-006		41.5	34.9	42.6	47	33

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-3278-6524	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(a)anthracene	56.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	7.32	1.86	6.37	8	CDF	4.1E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1998	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1572.01	1572.01	1	53.6	8.2E-05	Significant Effect
Error	234.715	29.3394	8			
Total	1806.73		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.09	23.2	0.4917	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.794	0.741	0.0124	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
59517-007		5	36.3	28.5	44.1		30	46.7	2.82	17.36%	-223.41%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
59517-007		46.7	36.8	33.7	34.3	30

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-4800-7414 **Endpoint:** Benzo(a)anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(a)anthracene	48.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	9.31	1.86	5.48	8	CDF	7.2E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5501	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1881.84	1881.84	1	86.6	1.4E-05	Significant Effect
Error	173.847	21.7309	8			
Total	2055.68		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8100	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.845	0.741	0.0504	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.2	5.82	16.6		9.01	19	1.95	38.80%	0.00%
29517-008		5	38.7	32.5	44.8		32.6	45.7	2.21	12.80%	-244.44%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	19	9.4
29517-008		37.6	45.7	36.4	32.6	41

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-6853-4667	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(a)pyrene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-9355-4713 **Endpoint:** Benzo(a)pyrene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed benzo(a)pyrene	5.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.457	1.86	0.497	8	CDF	0.3300	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.42	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0372101	0.0372101	1	0.209	0.6600	Non-Significant Effect
Error	1.42664	0.17833	8			
Total	1.46385		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.42	23.2	0.7435	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.741	0.3454	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.28	8.71	9.84		8.71	9.73	0.205	4.93%	-1.33%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	9.64

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-1685-8812	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed benzo(a)pyrene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-6734-3713	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(a)pyrene	51.13%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	3.19	2.13	4.68	4	CDF	0.0166	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1791	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	122.85	122.85	1	10.2	0.0128	Significant Effect
Error	96.412	12.0515	8			
Total	219.262		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	162	23.2	2.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2524	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	16.2	10.1	22.2		9.42	21.5	2.19	30.28%	-76.58%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		13.5	16.4	9.42	20	21.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-8449-9241	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed benzo(a)pyrene	4.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.49	1.89	0.375	7	CDF	0.9949	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.0626	1.0626	1	12.2	0.0101	Significant Effect
Error	0.610995	0.087285	7			
Total	1.6736		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	21.2	46.2	0.0309	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.958	0.701	0.7810	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		4	8.46	8.33	8.6		8.36	8.54	0.0417	0.99%	7.55%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.54	Outlier	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-7899-3430	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(a)pyrene	27.62%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.88	2.13	2.53	4	CDF	0.0041	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.29	0.3631	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	83.6945	83.6945	1	23.8	0.0012	Significant Effect
Error	28.1221	3.51526	8			
Total	111.817		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	46.7	23.2	0.0026	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.741	0.7355	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	14.9	11.7	18.2		11.6	17.6	1.17	17.56%	-63.21%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		17.6	12.7	16.5	16.3	11.6

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-0817-6730 **Endpoint:** Benzo(a)pyrene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(a)pyrene	26.11%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.6	2.13	2.39	4	CDF	0.0301	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1851	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	21.2285	21.2285	1	6.75	0.0317	Significant Effect
Error	25.1426	3.14282	8			
Total	46.3711		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	41.6	23.2	0.0033	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3907	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	12.1	8.99	15.1		9.34	15.5	1.11	20.53%	-31.83%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		15.5	13	12.5	10	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-4461-0143	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(a)pyrene	4.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	7.81	1.89	0.399	7	CDF	5.3E-05	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.0207	6.0207	1	61.1	1.1E-04	Significant Effect
Error	0.69012	0.0985885	7			
Total	6.71082		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.43	46.2	0.2518	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.701	0.9371	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		4	10.8	10.5	11.1		10.6	11	0.0913	1.69%	-17.98%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		10.9	Outlier	10.7	10.6	11

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-9593-5742	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(b)fluoranthene	5.26%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.13	1.89	0.488	7	CDF	0.8529	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.189475	0.189475	1	1.29	0.2942	Non-Significant Effect
Error	1.03148	0.147354	7			
Total	1.22096		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.09	46.2	0.5716	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.701	0.5439	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	9.28	8.8	9.76		9.01	9.65	0.151	3.25%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	3.15%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	Outlier	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-0406-4428	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed benzo(b)fluoranthene	25.74%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	28	n/a	0	8	Exact	0.5794	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.47	2.29	0.0116	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.10224	1.10224	1	0.241	0.6364	Non-Significant Effect
Error	36.5296	4.5662	8			
Total	37.6318		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.37	23.2	0.1005	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.747	0.741	0.0033	Non-Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1		9.01	11.7	0.498	11.40%	0.00%
29517-002		5	10.4	6.94	13.9		8.71	15.4	1.26	26.94%	-6.80%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	11.7	9.4
29517-002		8.88	9.42	8.71	9.73	15.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-8784-8246	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed benzo(b)fluoranthene	6.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.08	1.89	0.569	7	CDF	0.5307	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00128	0.00128	1	0.00639	0.9385	Non-Significant Effect
Error	1.40112	0.20016	7			
Total	1.4024		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.1	46.2	0.3790	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.701	0.8799	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	9.28	8.8	9.76		9.01	9.65	0.151	3.25%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	0.26%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	Outlier	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-7623-5597	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(b)fluoranthene	66.84%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	4.92	2.13	6.53	4	CDF	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1277	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	566.708	566.708	1	24.2	0.0012	Significant Effect
Error	187.426	23.4282	8			
Total	754.134		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	36.8	23.2	0.0041	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.741	0.3804	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1		9.01	11.7	0.498	11.40%	0.00%
29517-004		5	24.8	16.4	33.2		15.1	31.4	3.02	27.21%	-154.20%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	11.7	9.4
29517-004		21.3	25.9	15.1	30.4	31.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-4387-9109	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(b)fluoranthene	16.61%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.29	0.1131	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	68.5392	68.5392	1	36	3.2E-04	Significant Effect
Error	15.2177	1.90221	8			
Total	83.757		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.07	23.2	0.4985	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.75	0.741	0.0036	Non-Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1		9.01	11.7	0.498	11.40%	0.00%
29517-005		5	15	13	17		13.9	17.8	0.716	10.68%	-53.63%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	11.7	9.4
29517-005		13.9	14.4	14.8	17.8	14.1

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-4812-1210	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(b)fluoranthene	28.82%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	10.5	1.86	2.81	8	CDF	2.9E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8739	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	631.707	631.707	1	110	5.9E-06	Significant Effect
Error	45.7897	5.72371	8			
Total	677.497		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.24	23.2	0.0653	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.741	0.7247	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1		9.01	11.7	0.498	11.40%	0.00%
29517-006		5	25.7	21.7	29.6		22.1	29.3	1.43	12.45%	-162.80%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	11.7	9.4
29517-006		27.5	22.5	26.9	29.3	22.1

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-9055-5743	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(b)fluoranthene	45.84%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	5.66	1.86	4.48	8	CDF	2.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.11	2.29	0.1394	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	463.489	463.489	1	32	4.8E-04	Significant Effect
Error	115.846	14.4807	8			
Total	579.334		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	22.4	23.2	0.0107	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.741	0.2544	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1		9.01	11.7	0.498	11.40%	0.00%
59517-007		5	23.4	16.8	29.9		15.8	30.1	2.35	22.52%	-139.45%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	11.7	9.4
59517-007		30.1	25.6	23.8	21.6	15.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-3497-9679	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(b)fluoranthene	30.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	7.45	1.86	2.99	8	CDF	3.6E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.85	2.29	0.4197	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	359.76	359.76	1	55.5	7.3E-05	Significant Effect
Error	51.8697	6.48372	8			
Total	411.63		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.46	23.2	0.0513	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.741	0.6031	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.76	8.38	11.1		9.01	11.7	0.498	11.40%	0.00%
29517-008		5	21.8	17.5	26		18.3	26.2	1.53	15.74%	-122.86%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	11.7	9.4
29517-008		21.9	26.2	18.5	18.3	23.9

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-6508-1143	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(g,h,i)perylene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-4984-3120	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed benzo(g,h,i)perylene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-1137-3709	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed benzo(g,h,i)perylene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-3671-6446	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed benzo(g,h,i)perylene	9.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.776	1.86	0.838	8	CDF	0.2300	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.55	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.30625	0.30625	1	0.603	0.4599	Non-Significant Effect
Error	4.06564	0.508205	8			
Total	4.37189		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.89	23.2	0.1142	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.963	0.741	0.8239	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	9.5	8.35	10.7		8.46	10.5	0.417	9.81%	-3.82%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	10.4	10.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-7825-4816	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed benzo(g,h,i)perylene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-1171-4918	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed benzo(g,h,i)perylene	7.82%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.997	1.86	0.716	8	CDF	0.1739	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.37	2.29	0.0272	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.36864	0.36864	1	0.995	0.3478	Non-Significant Effect
Error	2.9646	0.370575	8			
Total	3.33324		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.02	23.2	0.2062	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0247	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.54	8.58	10.5		9.06	10.9	0.345	8.08%	-4.19%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		9.14	9.06	9.38	10.9	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-8996-7419	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed benzo(g,h,i)perylene	4.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.661	1.86	0.45	8	CDF	0.7364	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.4	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0639997	0.0639997	1	0.437	0.5271	Non-Significant Effect
Error	1.17144	0.14643	8			
Total	1.23544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.02	23.2	0.9887	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.911	0.741	0.2867	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	8.99	8.52	9.47		8.64	9.47	0.17	4.24%	1.75%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.75	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-8740-1125	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed benzo(g,h,i)perylene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-0490-8675	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(k)fluoranthene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-4905-2854	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed benzo(k)fluoranthene	5.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.143	1.86	0.467	8	CDF	0.4448	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.44	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0032400	0.0032400	1	0.0205	0.8896	Non-Significant Effect
Error	1.26152	0.15769	8			
Total	1.26476		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.14	23.2	0.9035	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5675	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.19	8.68	9.7		8.71	9.73	0.183	4.46%	-0.39%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-6804-5974	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed benzo(k)fluoranthene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-0045-7303	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(k)fluoranthene	39.00%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	3.38	2.13	3.57	4	CDF	0.0139	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1846	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	80.2022	80.2022	1	11.4	0.0096	Significant Effect
Error	56.1006	7.01258	8			
Total	136.303		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	94.1	23.2	6.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6338	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	14.8	10.2	19.4		9.69	18.7	1.67	25.14%	-61.87%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		12.3	16.1	9.69	17.3	18.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-2706-2427	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed benzo(k)fluoranthene	6.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-0.972	1.86	0.62	8	CDF	0.8203	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1853	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.26244	0.26244	1	0.945	0.3594	Non-Significant Effect
Error	2.22132	0.277665	8			
Total	2.48376		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.76	23.2	0.3485	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9	0.741	0.2190	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.83	8.04	9.62		8.36	9.85	0.286	7.23%	3.54%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	9.06	8.36	9.85	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-9805-4327	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(k)fluoranthene	22.11%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	3.03	2.13	2.02	4	CDF	0.0194	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.03	2.29	0.2060	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20.6497	20.6497	1	9.17	0.0164	Significant Effect
Error	18.0218	2.25272	8			
Total	38.6715		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	29.5	23.2	0.0063	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4553	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	12	9.44	14.6		9.34	14.9	0.934	17.36%	-31.40%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		13.1	11.5	11.3	14.9	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-8296-6415	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(k)fluoranthene	9.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.61	1.86	0.845	8	CDF	0.0155	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.29	0.1143	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.52836	3.52836	1	6.83	0.0310	Significant Effect
Error	4.1338	0.516725	8			
Total	7.66216		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.01	23.2	0.1106	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.741	0.6027	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	10.3	9.17	11.5		9.34	11.8	0.421	9.10%	-12.98%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		11.8	10.6	10.2	9.77	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-2403-4562	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(k)fluoranthene	13.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.63	1.86	1.27	8	CDF	0.0151	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3411	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.06404	8.06404	1	6.92	0.0301	Significant Effect
Error	9.32132	1.16516	8			
Total	17.3854		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	14.8	23.2	0.0230	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.961	0.741	0.7996	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	11	9.12	12.8		9.01	12.4	0.661	13.49%	-19.62%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		11.1	12.3	12.4	9.01	9.94

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-4267-3141	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed chrysene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-3461-0374	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed chrysene	31.55%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	24	n/a	0	8	Exact	0.2738	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	2.29	0.0012	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.78976	6.78976	1	1.13	0.3197	Non-Significant Effect
Error	48.249	6.03112	8			
Total	55.0388		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	80.8	23.2	8.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.729	0.741	0.0020	Non-Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	10.8	6.52	15.1		8.71	16.9	1.54	31.95%	-18.00%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	10.1	16.9

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-6891-0016 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed chrysene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-6121-4354	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed chrysene	85.87%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	5.36	2.13	7.86	4	CDF	0.0029	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1286	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	974.761	974.761	1	28.7	6.8E-04	Significant Effect
Error	271.91	33.9888	8			
Total	1246.67		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	460	23.2	2.8E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.887	0.741	0.1581	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	28.9	18.7	39.1		17.2	37.7	3.68	28.50%	-215.71%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		24.8	29.6	17.2	35.2	37.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-8323-7882	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed chrysene	30.46%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.51	2.29	0.0078	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	195.629	195.629	1	34.8	3.6E-04	Significant Effect
Error	44.9701	5.62127	8			
Total	240.599		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	75.2	23.2	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.784	0.741	0.0092	Non-Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	18	13.9	22.1		15.4	23.6	1.49	18.51%	-96.64%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		15.6	17.3	18.1	23.6	15.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-6851-1792	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed chrysene	59.48%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	9.82	2.13	5.44	4	CDF	3.0E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.29	0.0792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1573.27	1573.27	1	96.5	9.7E-06	Significant Effect
Error	130.442	16.3053	8			
Total	1703.71		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	220	23.2	1.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.863	0.741	0.0833	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	34.2	27.2	41.3		25.8	39.4	2.55	16.64%	-274.04%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		39.3	31.8	34.9	39.4	25.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-9502-1458	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed chrysene	53.14%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	8.54	2.13	4.86	4	CDF	5.2E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.29	0.0766	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	949.261	949.261	1	72.9	2.7E-05	Significant Effect
Error	104.122	13.0153	8			
Total	1053.38		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	175	23.2	1.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.851	0.741	0.0600	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	28.6	22.3	35		22.7	36.2	2.28	17.76%	-212.87%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		36.2	29.6	29.2	25.5	22.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-9801-6006 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed chrysene	29.07%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	15.4	2.13	2.66	4	CDF	5.2E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.29	0.0756	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	922.176	922.176	1	237	3.2E-07	Significant Effect
Error	31.1621	3.89526	8			
Total	953.338		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	51.8	23.2	0.0021	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4368	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	28.4	24.9	31.8		25.7	32.5	1.24	9.75%	-209.81%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		26.8	32.5	29.8	27	25.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-8624-8798	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed dibenz(a,h)anthracene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-5869-5271	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed dibenz(a,h)anthracene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-6783-6994	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed dibenz(a,h)anthracene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-4831-3854	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed dibenz(a,h)anthracene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.611	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	0.256	0.6268	Non-Significant Effect
Error	2.1562	0.269525	8			
Total	2.22509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	8.99	8.21	9.76		8.46	9.86	0.28	6.96%	1.81%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	8.46	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-4889-0797	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed dibenz(a,h)anthracene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-6423-3203	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed dibenz(a,h)anthracene	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.383	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102399	0.0102399	1	0.0965	0.7640	Non-Significant Effect
Error	0.848919	0.106115	8			
Total	0.859159		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.09	8.77	9.41		8.68	9.36	0.114	2.80%	0.70%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		9.14	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-0173-9061 **Endpoint:** Dibenz(a,h)anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed dibenz(a,h)anthracene	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.499	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.13225	0.13225	1	0.735	0.4163	Non-Significant Effect
Error	1.44024	0.18003	8			
Total	1.57249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	8.92	8.35	9.5		8.4	9.47	0.206	5.17%	2.51%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.4	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-0304-2249	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed dibenz(a,h)anthracene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-9428-5176	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed fluoranthene	16.38%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	35	n/a	0	8	Exact	0.9524	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.6	2.29	0.0024	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.34084	3.34084	1	1.67	0.2318	Non-Significant Effect
Error	15.9614	1.99518	8			
Total	19.3022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	20	23.2	0.0131	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.751	0.741	0.0036	Non-Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	11.40%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-9260-8810	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed fluoranthene	66.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	3.69	1.86	6.73	8	CDF	0.0031	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.48	2.29	0.0099	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	445.957	445.957	1	13.6	0.0061	Significant Effect
Error	262.103	32.7628	8			
Total	708.059		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.2	23.2	0.0194	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.812	0.741	0.0202	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-002		5	23.5	13.7	33.3		16.8	36.9	3.51	33.43%	-131.66%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-002		20.2	20.1	16.8	23.5	36.9

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-8651-4021	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed fluoranthene	21.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	1.36	1.86	2.22	8	CDF	0.1061	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.2994	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.561	6.561	1	1.84	0.2122	Non-Significant Effect
Error	28.5604	3.57006	8			
Total	35.1214		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.14	23.2	0.9033	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.939	0.741	0.5443	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-003		5	11.8	9.49	14		9.42	13.5	0.817	15.53%	-15.97%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-003		9.42	10.2	13	12.7	13.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-9876-3152	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed fluoranthene	150.87%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	6.43	2.13	15.3	4	CDF	0.0015	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.95	2.29	0.2865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5330.56	5330.56	1	41.4	2.0E-04	Significant Effect
Error	1030.71	128.839	8			
Total	6361.27		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	66.8	23.2	0.0013	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.741	0.3820	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-004		5	56.3	36.5	76.1		35.9	77.2	7.13	28.29%	-455.21%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-004		46.6	57.4	35.9	77.2	64.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-6922-2007	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed fluoranthene	28.86%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	18.5	1.89	2.93	7	CDF	1.7E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1805.76	1805.76	1	340	3.4E-07	Significant Effect
Error	37.1325	5.30465	7			
Total	1842.89		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.92	24.3	0.5348	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.899	0.701	0.2478	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-005		4	38.7	34.3	43		35.7	41.7	1.35	7.00%	-281.01%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-005		37.2	40	41.7	Outlier	35.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-0314-9022	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed fluoranthene	117.22%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	11.9	2.13	11.9	4	CDF	1.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.2982	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10994.5	10994.5	1	141	2.3E-06	Significant Effect
Error	622.235	77.7793	8			
Total	11616.8		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	39.9	23.2	0.0035	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5045	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-006		5	76.5	61.2	91.8		62.3	92.6	5.51	16.11%	-653.75%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-006		82.4	66.2	78.8	92.6	62.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-9245-9539 **Endpoint:** Fluoranthene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed fluoranthene	118.95%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	10.5	2.13	12.1	4	CDF	2.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.35	2.29	0.0322	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8766.34	8766.34	1	109	6.1E-06	Significant Effect
Error	640.694	80.0868	8			
Total	9407.03		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	41.1	23.2	0.0033	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.839	0.741	0.0425	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
59517-007		5	69.4	53.8	84.9		56.9	89.2	5.59	18.03%	-583.75%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
59517-007		89.2	71.1	68.8	60.8	56.9

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-8463-8045	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed fluoranthene	57.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	17.6	1.89	5.86	7	CDF	2.4E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6541.59	6541.59	1	308	4.8E-07	Significant Effect
Error	148.663	21.2375	7			
Total	6690.25		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.7	24.3	0.0379	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.701	0.7513	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
59517-007		4	64.4	53.8	75		56.9	71.1	3.33	10.36%	-534.86%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
59517-007		Outlier	71.1	68.8	60.8	56.9

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-0117-7362	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed fluoranthene	59.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	25.5	1.86	5.99	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3270	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	16874	16874	1	651	<1.0E-37	Significant Effect
Error	207.222	25.9028	8			
Total	17081.2		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	12.6	23.2	0.0307	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.965	0.741	0.8406	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.1	7.72	12.6		9.01	13.6	0.872	19.22%	0.00%
29517-008		5	92.3	83.7	101		83.1	99.7	3.1	7.51%	-809.90%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	13.6	9.4
29517-008		87.3	99.7	94.2	83.1	97.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-6802-8294	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed fluorene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-0670-9540	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed fluorene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-7290-5171 **Endpoint:** Fluorene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed fluorene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-3189-0067 **Endpoint:** Fluorene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed fluorene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.611	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	0.256	0.6268	Non-Significant Effect
Error	2.1562	0.269525	8			
Total	2.22509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	8.99	8.21	9.76		8.46	9.86	0.28	6.96%	1.81%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	8.46	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-2347-9163	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed fluorene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-4482-3711 **Endpoint:** Fluorene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed fluorene	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.383	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102399	0.0102399	1	0.0965	0.7640	Non-Significant Effect
Error	0.848919	0.106115	8			
Total	0.859159		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.09	8.77	9.41		8.68	9.36	0.114	2.80%	0.70%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		9.14	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-2480-7162 **Endpoint:** Fluorene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed fluorene	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.499	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.13225	0.13225	1	0.735	0.4163	Non-Significant Effect
Error	1.44024	0.18003	8			
Total	1.57249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	8.92	8.35	9.5		8.4	9.47	0.206	5.17%	2.51%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.4	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-4222-9425	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed fluorene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-9254-9506	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed indeno(1,2,3-cd)pyrene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-0356-2574	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed indeno(1,2,3-cd)pyrene	11.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	15.6	1.86	1.09	8	CDF	1.4E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2651	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	208.21	208.21	1	243	2.9E-07	Significant Effect
Error	6.85812	0.857265	8			
Total	215.068		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10.6	23.2	0.0419	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.949	0.741	0.6608	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	18.3	16.7	19.8		17.1	20	0.56	6.85%	-99.69%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		17.1	18.2	17.1	19	20

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-2503-9784	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed indeno(1,2,3-cd)pyrene	8.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	20.3	1.89	0.743	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	140.309	140.309	1	411	1.8E-07	Significant Effect
Error	2.39012	0.341446	7			
Total	142.699		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.07	24.3	0.2088	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.992	0.701	0.9983	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		4	17.1	15.9	18.3		16.2	18	0.387	4.53%	-86.80%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		16.8	Outlier	16.2	18	17.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-3588-9906	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed indeno(1,2,3-cd)pyrene	26.72%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	11.1	2.13	2.45	4	CDF	1.9E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1365	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	404.878	404.878	1	123	3.9E-06	Significant Effect
Error	26.3181	3.28976	8			
Total	431.196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	43.6	23.2	0.0030	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4066	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	21.9	18.7	25		19.2	25.5	1.13	11.59%	-139.02%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		19.9	21.7	19.2	23.1	25.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-7064-5030	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed indeno(1,2,3-cd)pyrene	7.31%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.1	1.86	0.669	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.24	2.29	0.0703	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	237.461	237.461	1	733	<1.0E-37	Significant Effect
Error	2.59012	0.323765	8			
Total	240.051		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.39	23.2	0.2641	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9	0.741	0.2184	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	18.9	18	19.8		18.3	20.1	0.316	3.74%	-106.47%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		18.3	18.9	18.7	20.1	18.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-3289-3734	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed indeno(1,2,3-cd)pyrene	4.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.328	1.89	0.442	7	CDF	0.6238	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0130049	0.0130049	1	0.108	0.7525	Non-Significant Effect
Error	0.845794	0.120828	7			
Total	0.858799		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	46.2	0.6803	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.701	0.9323	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		4	9.08	8.61	9.54		8.68	9.36	0.146	3.22%	0.84%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		Outlier	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-0582-4791	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed indeno(1,2,3-cd)pyrene	5.81%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-1.19	1.89	0.531	7	CDF	0.8637	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.247902	0.247902	1	1.42	0.2726	Non-Significant Effect
Error	1.22392	0.174846	7			
Total	1.47182		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.43	24.3	0.7157	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.701	0.5298	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		4	8.82	8.09	9.55		8.4	9.47	0.23	5.21%	3.65%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.4	8.64	8.77	9.47	Outlier

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-7275-1878	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed indeno(1,2,3-cd)pyrene	58.88%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.41	2.13	5.39	4	CDF	0.0370	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7853	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	92.4768	92.4768	1	5.79	0.0428	Significant Effect
Error	127.841	15.9801	8			
Total	220.317		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	216	23.2	1.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1215	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	15.2	8.23	22.2		9.01	19.9	2.52	37.02%	-66.44%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		19.7	9.01	19.9	18.4	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-6900-0045	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed naphthalene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.483	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0688898	0.0688898	1	0.409	0.5406	Non-Significant Effect
Error	1.349	0.168625	8			
Total	1.41789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	1.81%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-6686-9220	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed naphthalene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.489	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0333	0.8598	Non-Significant Effect
Error	1.38584	0.17323	8			
Total	1.3916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-002		5	9.11	8.55	9.66		8.71	9.73	0.199	4.90%	0.52%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-002		8.88	9.42	8.71	9.73	8.79

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-2907-0969	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed naphthalene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.545	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0260101	0.0260101	1	0.121	0.7369	Non-Significant Effect
Error	1.71864	0.21483	8			
Total	1.74465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	-1.11%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-8260-8490	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed naphthalene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.611	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	0.256	0.6268	Non-Significant Effect
Error	2.1562	0.269525	8			
Total	2.22509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-004		5	8.99	8.21	9.76		8.46	9.86	0.28	6.96%	1.81%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-004		8.46	8.74	9.42	8.46	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-3902-2578	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed naphthalene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.359	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	11.5	0.0095	Significant Effect
Error	0.74352	0.09294	8			
Total	1.81281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-005		5	8.5	8.26	8.74		8.36	8.83	0.0876	2.30%	7.14%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-005		8.52	8.43	8.36	8.83	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-8886-0995	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed naphthalene	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.383	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102399	0.0102399	1	0.0965	0.7640	Non-Significant Effect
Error	0.848919	0.106115	8			
Total	0.859159		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-006		5	9.09	8.77	9.41		8.68	9.36	0.114	2.80%	0.70%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-006		9.14	9.06	8.68	9.36	9.21

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-6944-0917	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed naphthalene	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.499	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.13225	0.13225	1	0.735	0.4163	Non-Significant Effect
Error	1.44024	0.18003	8			
Total	1.57249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
59517-007		5	8.92	8.35	9.5		8.4	9.47	0.206	5.17%	2.51%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
59517-007		8.4	8.64	8.77	9.47	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-9697-9453	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed naphthalene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.436	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0809998	0.0809998	1	0.589	0.4647	Non-Significant Effect
Error	1.09944	0.13743	8			
Total	1.18044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.15	8.68	9.63		8.65	9.65	0.172	4.20%	0.00%
29517-008		5	8.97	8.53	9.42		8.43	9.38	0.16	3.98%	1.97%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	8.65	9.4
29517-008		8.88	9.01	9.38	8.43	9.17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-1712-5598	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed phenanthrene	4.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.36	1.86	0.424	8	CDF	0.8947	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9920	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.24025	0.24025	1	1.85	0.2107	Non-Significant Effect
Error	1.03796	0.129745	8			
Total	1.27821		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.72	23.2	0.3560	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.741	0.7421	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	3.33%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-5061-1957	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed phenanthrene	16.25%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	26	n/a	0	8	Exact	0.4206	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.59	2.29	0.0028	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.12225	1.12225	1	0.68	0.4336	Non-Significant Effect
Error	13.2118	1.65147	8			
Total	14.334		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	46.3	23.2	0.0026	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.763	0.741	0.0052	Non-Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-002		5	9.97	7.74	12.2		8.71	13.1	0.804	18.04%	-7.21%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-002		8.88	9.42	8.71	9.73	13.1

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-4209-7990	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed phenanthrene	5.31%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	-0.158	1.86	0.493	8	CDF	0.5609	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2469	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00441	0.00441	1	0.0251	0.8781	Non-Significant Effect
Error	1.4076	0.17595	8			
Total	1.41201		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.04	23.2	0.2047	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.965	0.741	0.8398	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-003		5	9.26	8.6	9.92		8.47	9.92	0.238	5.74%	0.45%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-003		9.42	9.09	8.47	9.92	9.38

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-6471-4737	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed phenanthrene	5.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.192	1.89	0.549	7	CDF	0.5733	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0068450	0.0068450	1	0.0367	0.8534	Non-Significant Effect
Error	1.30435	0.186336	7			
Total	1.3112		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.9	24.3	0.1589	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.97	0.701	0.8958	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-004		4	9.24	8.31	10.2		8.46	9.86	0.292	6.33%	0.60%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-004		8.46	9.23	9.42	Outlier	9.86

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-9541-5648	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed phenanthrene	20.93%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	26	n/a	0	8	Exact	0.4206	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.6	2.29	0.0023	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.79776	1.79776	1	0.656	0.4413	Non-Significant Effect
Error	21.9138	2.73922	8			
Total	23.7116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	77.5	23.2	9.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.757	0.741	0.0044	Non-Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-005		5	10.1	7.26	13		8.36	14.2	1.04	22.92%	-9.12%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-005		9.22	9.83	9.12	14.2	8.36

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-9333-4825	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed phenanthrene	39.24%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	6.29	2.13	3.65	4	CDF	0.0016	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5888	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	289.552	289.552	1	39.5	2.4E-04	Significant Effect
Error	58.5911	7.32388	8			
Total	348.143		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	209	23.2	1.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.917	0.741	0.3350	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-006		5	20.1	15.3	24.8		15.6	23.8	1.71	19.03%	-115.75%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-006		23.1	16.4	21.4	23.8	15.6

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-9062-1316	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed phenanthrene	19.11%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	8.43	2.13	1.78	4	CDF	5.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	123.271	123.271	1	71	3.0E-05	Significant Effect
Error	13.8871	1.73589	8			
Total	137.158		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	48.8	23.2	0.0024	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3909	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
59517-007		5	16.3	14	18.6		14.4	18.7	0.825	11.30%	-75.52%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
59517-007		18.7	16.9	17.1	14.4	14.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-9348-4257	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed phenanthrene	25.94%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	11.4	2.13	2.41	4	CDF	1.7E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.29	0.1175	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	414.865	414.865	1	130	3.2E-06	Significant Effect
Error	25.6071	3.20088	8			
Total	440.472		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	90.8	23.2	7.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4086	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	9.3	8.97	9.63		9.01	9.65	0.118	2.84%	0.00%
29517-008		5	22.2	19.1	25.3		19.9	25.8	1.13	11.35%	-138.55%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	9.37	9.4
29517-008		20.8	23.8	19.9	20.6	25.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-8598-1946	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pyrene	19.56%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	35	n/a	0	8	Exact	0.9524	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.62	2.29	0.0015	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.59684	4.59684	1	1.55	0.2479	Non-Significant Effect
Error	23.6734	2.95918	8			
Total	28.2702		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	30.2	23.2	0.0060	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.733	0.741	0.0022	Non-Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-001		5	8.99	8.45	9.53		8.46	9.52	0.195	4.85%	13.11%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-001		8.88	8.46	8.74	9.52	9.34

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-2366-4360	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pyrene	32.22%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	5.77	1.89	3.33	7	CDF	3.4E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	229.21	229.21	1	33.3	6.8E-04	Significant Effect
Error	48.1345	6.87636	7			
Total	277.344		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.47	24.3	0.6999	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.817	0.701	0.0321	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-002		4	20.5	15.9	25.1		17.5	24.4	1.45	14.14%	-98.18%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-002		19.5	20.6	17.5	24.4	Outlier

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-7332-3826 **Endpoint:** Pyrene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed pyrene	22.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.711	1.86	2.35	8	CDF	0.2487	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.25	2.29	0.0630	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.025	2.025	1	0.505	0.4975	Non-Significant Effect
Error	32.0732	4.00916	8			
Total	34.0982		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3961	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.839	0.741	0.0427	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-003		5	11.2	9.37	13.1		9.42	12.8	0.677	13.46%	-8.70%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-003		9.42	10	12.8	12.6	11.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-0730-7850	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pyrene	164.92%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	6.61	2.13	17.1	4	CDF	0.0014	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2178	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6994.97	6994.97	1	43.7	1.7E-04	Significant Effect
Error	1280.69	160.086	8			
Total	8275.65		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	54.9	23.2	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3872	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-004		5	63.2	41.2	85.3		41	87.3	7.93	28.04%	-511.37%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-004		54.8	59.8	41	87.3	73.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-6447-5409	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pyrene	62.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	7.83	1.86	6.45	8	CDF	2.5E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.46	2.29	0.0129	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1843.62	1843.62	1	61.4	5.1E-05	Significant Effect
Error	240.375	30.0468	8			
Total	2084		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.49	23.2	0.0511	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.803	0.741	0.0156	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-005		5	37.5	28.3	46.7		32	50.2	3.3	19.66%	-262.53%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-005		33.9	33.9	37.5	50.2	32

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-4041-5436	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pyrene	28.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15.2	1.89	2.99	7	CDF	6.5E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1277.97	1277.97	1	231	1.3E-06	Significant Effect
Error	38.762	5.53743	7			
Total	1316.74		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.08	46.2	0.9864	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.796	0.701	0.0185	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-005		4	34.3	30.7	38		32	37.5	1.15	6.70%	-231.83%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-005		33.9	33.9	37.5	Outlier	32

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-0209-4356	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pyrene	90.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	10.8	1.86	9.39	8	CDF	2.3E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1801	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7468.2	7468.2	1	117	4.7E-06	Significant Effect
Error	509.855	63.7318	8			
Total	7978.05		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	21.3	23.2	0.0118	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.4012	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-006		5	65	51.3	78.7		52.8	80.5	4.93	16.97%	-528.38%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-006		68.4	56	67.3	80.5	52.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-3519-9950 **Endpoint:** Pyrene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pyrene	89.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	9.61	1.86	9.21	8	CDF	5.7E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.23	2.29	0.0735	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5663.45	5663.45	1	92.4	1.1E-05	Significant Effect
Error	490.587	61.3233	8			
Total	6154.03		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	20.4	23.2	0.0127	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.895	0.741	0.1950	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
59517-007		5	57.9	44.5	71.4		46.6	74.4	4.84	18.66%	-460.13%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
59517-007		74.4	60.1	58.6	50	46.6

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-6210-6732	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pyrene	46.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	24.5	1.86	4.84	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.11	2.29	0.1379	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10130.2	10130.2	1	599	<1.0E-37	Significant Effect
Error	135.295	16.9118	8			
Total	10265.5		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.9	23.2	0.1527	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.891	0.741	0.1748	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	10.3	7.37	13.3		9.01	14.6	1.07	23.14%	0.00%
29517-008		5	74	67.4	80.6		65.8	79.3	2.37	7.16%	-615.39%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	9.65	9.01	9.06	14.6	9.4
29517-008		72.5	79.3	74.6	65.8	77.8

28 day *Nereis virens* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

PAHs

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	7.31	J	4.66	U	14.90		4.50	U	4.94	U
Acenaphthylene	4.38	U	4.66	U	41.20		4.50	U	4.94	U
Anthracene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Benzo(a)anthracene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Benzo(a)pyrene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Benzo(b)fluoranthene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Benzo(k)fluoranthene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Benzo(g,h,i)perylene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Chrysene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Dibenzo(a,h)anthracene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Fluoranthene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Fluorene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Indeno(1,2,3-c,d)pyrene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
Naphthalene	5.12	J	4.66	U	4.44	U	4.50	U	4.94	U
Phenanthrene	4.38	U	4.66	U	8.38	J	7.10	J	4.94	U
Pyrene	4.38	U	4.66	U	4.44	U	4.50	U	4.94	U
PAH Total	73.75		74.56		122.20		74.60		79.04	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 1									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	14.20		5.40	J	8.27	J	4.76	U	6.82	J
Acenaphthylene	5.28	J	4.57	U	4.86	U	4.76	U	4.72	U
Anthracene	4.92	J	4.57	U	4.86	U	4.76	U	4.72	U
Benzo(a)anthracene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Benzo(a)pyrene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Benzo(b)fluoranthene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Benzo(k)fluoranthene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Benzo(g,h,i)perylene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Chrysene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Dibenzo(a,h)anthracene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Fluoranthene	5.55	J	4.57	U	4.86	U	4.76	U	4.72	U
Fluorene	16.40		4.57	U	4.86	U	4.76	U	4.72	U
Indeno(1,2,3-c,d)pyrene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
Naphthalene	4.74	U	4.57	U	4.86	U	5.09	J	6.04	J
Phenanthrene	28.20		4.57	U	5.82	J	6.01	J	7.90	J
Pyrene	4.74	U	4.57	U	4.86	U	4.76	U	4.72	U
PAH Total	121.95		73.95		82.13		77.74		82.12	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 2									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Acenaphthylene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Anthracene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Benzo(a)anthracene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Benzo(a)pyrene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Benzo(b)fluoranthene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Benzo(k)fluoranthene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Benzo(g,h,i)perylene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Chrysene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Dibenzo(a,h)anthracene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Fluoranthene	9.71	U	9.19	U	8.93	J	9.76	U	9.87	J
Fluorene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Indeno(1,2,3-c,d)pyrene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Naphthalene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Phenanthrene	9.71	U	9.19	U	8.42	U	9.76	U	8.71	U
Pyrene	9.71	U	9.19	U	8.42	U	9.76	U	9.30	J
PAH Total	155.36		147.04		135.23		156.16		141.11	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 3									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Acenaphthylene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Anthracene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Benzo(a)anthracene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Benzo(a)pyrene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Benzo(b)fluoranthene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Benzo(k)fluoranthene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Benzo(g,h,i)perylene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Chrysene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Dibenzo(a,h)anthracene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Fluoranthene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Fluorene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Indeno(1,2,3-c,d)pyrene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Naphthalene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Phenanthrene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
Pyrene	8.96	U	8.74	U	9.92	U	9.58	U	9.73	U
PAH Total	143.36		139.84		158.72		153.28		155.68	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 4									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Acenaphthylene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Anthracene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Benzo(a)anthracene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Benzo(a)pyrene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Benzo(b)fluoranthene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Benzo(k)fluoranthene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Benzo(g,h,i)perylene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Chrysene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Dibenzo(a,h)anthracene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Fluoranthene	11.40	J	8.58	U	23.50		9.34	U	12.20	J
Fluorene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Indeno(1,2,3-c,d)pyrene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Naphthalene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Phenanthrene	9.56	U	8.58	U	8.68	U	9.34	U	9.22	U
Pyrene	12.80	J	8.58	U	25.20		9.34	U	15.00	J
PAH Total	158.04		137.28		170.22		149.44		156.28	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 5									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Acenaphthylene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Anthracene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Benzo(a)anthracene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Benzo(a)pyrene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Benzo(b)fluoranthene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Benzo(k)fluoranthene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Benzo(g,h,i)perylene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Chrysene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Dibenzo(a,h)anthracene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Fluoranthene	15.80	J	9.36	U	9.96	J	8.86	U	9.73	U
Fluorene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Indeno(1,2,3-c,d)pyrene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Naphthalene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Phenanthrene	9.29	U	9.36	U	9.19	U	8.86	U	9.73	U
Pyrene	14.00	J	9.36	U	9.19	U	8.86	U	9.73	U
PAH Total	159.86		149.76		147.81		141.76		155.68	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 6									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	8.53	U	9.80	U	12.20	J	9.34	U	9.94	U
Acenaphthylene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Anthracene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Benzo(a)anthracene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Benzo(a)pyrene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Benzo(b)fluoranthene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Benzo(k)fluoranthene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Benzo(g,h,i)perylene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Chrysene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Dibenzo(a,h)anthracene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Fluoranthene	20.30		10.60	J	26.90		14.20	J	12.80	J
Fluorene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Indeno(1,2,3-c,d)pyrene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Naphthalene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Phenanthrene	8.53	U	9.80	U	9.76	U	9.34	U	9.94	U
Pyrene	15.20	J	9.80	U	20.30		10.20	J	9.94	U
PAH Total	154.92		157.60		186.28		155.16		161.90	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 7									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	12.60	J	11.50	J	11.10	J	9.29	U	10.80	J
Acenaphthylene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Anthracene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Benzo(a)anthracene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Benzo(a)pyrene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Benzo(b)fluoranthene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Benzo(k)fluoranthene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Benzo(g,h,i)perylene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Chrysene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Dibenzo(a,h)anthracene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Fluoranthene	24.00		31.20		14.50	J	14.80	J	23.90	
Fluorene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Indeno(1,2,3-c,d)pyrene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Naphthalene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Phenanthrene	9.54	U	9.19	U	8.66	U	9.29	U	9.34	U
Pyrene	15.70	J	21.50		10.60	J	10.90	J	19.40	
PAH Total	176.32		183.67		148.78		155.76		175.52	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 8									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
PAHs (ng/g wet weight)										
Acenaphthene	11.90	J	9.81	J	14.10	J	14.60	J	16.20	J
Acenaphthylene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Anthracene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Benzo(a)anthracene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Benzo(a)pyrene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Benzo(b)fluoranthene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Benzo(k)fluoranthene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Benzo(g,h,i)perylene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Chrysene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Dibenzo(a,h)anthracene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Fluoranthene	32.60		33.20		25.50		27.10		49.10	
Fluorene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Indeno(1,2,3-c,d)pyrene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Naphthalene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Phenanthrene	9.14	U	9.78	U	8.38	U	8.53	U	8.83	U
Pyrene	24.10		26.10		18.00		16.70	J	36.20	
PAH Total	187.42		196.25		166.54		169.29		216.29	

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Bioaccumulation Evaluation - PAHs - Nereis | **EnviroSystems, Inc.**

Start Date: 31 Aug-17 | **Species:** Nereis virens | **Sample Code:** 29525-000
End Date: 28 Sep-17 | **Protocol:** US ACE NED RIM (2004) | **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 31 Aug-17 | **Material:** Laboratory Control Sediment | **Sample Station:** Laboratory Control - 29525

Sample	Rep	Pos	Aceneaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,I)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
29517-009	1	10	7.31	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	5.12	4.38	4.38
29517-009	2	9	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66
29517-009	3	1	14.9	41.2	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44	8.38	4.44
29517-009	4	2	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	7.1	4.5
29517-009	5	27	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94
29517-001	1	37	14.2	5.28	4.92	4.74	4.74	4.74	4.74	4.74	4.74	4.74	5.55	16.4	4.74	4.74	28.2	4.74
29517-001	2	19	5.4	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
29517-001	3	42	8.27	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	5.82	4.86
29517-001	4	16	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	5.09	6.01	4.76
29517-001	5	14	6.82	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	6.04	7.9	4.72
29517-002	1	40	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71	9.71
29517-002	2	35	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19
29517-002	3	18	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.42	8.93	8.42	8.42	8.42	8.42	8.42
29517-002	4	5	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76
29517-002	5	38	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	9.87	8.71	8.71	8.71	8.71	9.3
29517-003	1	23	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96	8.96
29517-003	2	3	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74	8.74
29517-003	3	24	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92	9.92
29517-003	4	29	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58
29517-003	5	39	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73
29517-004	1	11	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	9.56	11.4	9.56	9.56	9.56	9.56	12.8
29517-004	2	41	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58	8.58
29517-004	3	4	8.68	8.68	8.68	8.68	8.68	8.68	8.68	8.68	8.68	8.68	23.5	8.68	8.68	8.68	8.68	25.2
29517-004	4	15	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34
29517-004	5	13	9.22	9.22	9.22	9.22	9.22	9.22	9.22	9.22	9.22	9.22	12.2	9.22	9.22	9.22	9.22	15
29517-005	1	31	9.29	9.29	9.29	9.29	9.29	9.29	9.29	9.29	9.29	9.29	15.8	9.29	9.29	9.29	9.29	14
29517-005	2	6	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36	9.36

Sample	Rep	Pos	Aceneaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,I)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
29517-005	3	20	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.96	9.19	9.19	9.19	9.19	9.19
29517-005	4	7	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86	8.86
29517-005	5	21	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73	9.73
29517-006	1	45	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53	20.3	8.53	8.53	8.53	8.53	15.2
29517-006	2	44	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	10.6	9.8	9.8	9.8	9.8	9.8
29517-006	3	8	12.2	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	9.76	26.9	9.76	9.76	9.76	9.76	20.3
29517-006	4	25	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	14.2	9.34	9.34	9.34	9.34	10.2
29517-006	5	28	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	9.94	12.8	9.94	9.94	9.94	9.94	9.94
59517-007	1	33	12.6	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	9.54	24	9.54	9.54	9.54	9.54	15.7
59517-007	2	12	11.5	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	9.19	31.2	9.19	9.19	9.19	9.19	21.5
59517-007	3	17	11.1	8.66	8.66	8.66	8.66	8.66	8.66	8.66	8.66	8.66	14.5	8.66	8.66	8.66	8.66	10.6
59517-007	4	30	9.29	9.29	9.29	9.29	9.29	9.29	9.29	9.29	9.29	9.29	14.8	9.29	9.29	9.29	9.29	10.9
59517-007	5	34	10.8	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	23.9	9.34	9.34	9.34	9.34	19.4
29517-008	1	36	11.9	9.14	9.14	9.14	9.14	9.14	9.14	9.14	9.14	9.14	32.6	9.14	9.14	9.14	9.14	24.1
29517-008	2	32	9.81	9.78	9.78	9.78	9.78	9.78	9.78	9.78	9.78	9.78	33.2	9.78	9.78	9.78	9.78	26.1
29517-008	3	22	14.1	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	8.38	25.5	8.38	8.38	8.38	8.38	18
29517-008	4	43	14.6	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53	8.53	27.1	8.53	8.53	8.53	8.53	16.7
29517-008	5	26	16.2	8.83	8.83	8.83	8.83	8.83	8.83	8.83	8.83	8.83	49.1	8.83	8.83	8.83	8.83	36.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Batch ID:	17-8079-5131	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	31 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	28 Sep-17	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
10-5299-0228	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-001 passed acenaphthene
16-6757-4829	Acenaphthene	Equal Variance t Two-Sample Test	3.2E-04	29517-002 failed acenaphthene
13-7757-7383	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-002 passed acenaphthene
02-8390-9203	Acenaphthene	Equal Variance t Two-Sample Test	1.9E-04	29517-003 failed acenaphthene
12-1893-0753	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-003 passed acenaphthene
17-8498-4689	Acenaphthene	Equal Variance t Two-Sample Test	2.6E-04	29517-004 failed acenaphthene
16-9114-1844	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-004 passed acenaphthene
14-7722-2434	Acenaphthene	Equal Variance t Two-Sample Test	1.6E-04	29517-005 failed acenaphthene
00-1886-2470	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-005 passed acenaphthene
04-0879-1386	Acenaphthene	Equal Variance t Two-Sample Test	0.1141	29517-006 passed acenaphthene
08-9565-0987	Acenaphthene	Equal Variance t Two-Sample Test	7.0E-04	29517-006 failed acenaphthene
01-7451-1087	Acenaphthene	Equal Variance t Two-Sample Test	0.0505	59517-007 passed acenaphthene
12-0104-7796	Acenaphthene	Equal Variance t Two-Sample Test	1.3E-04	59517-007 failed acenaphthene
06-0051-4626	Acenaphthene	Equal Variance t Two-Sample Test	0.0142	29517-008 failed acenaphthene
03-4185-7544	Acenaphthylene	Equal Variance t Two-Sample Test	0.1236	29517-001 passed acenaphthylene
08-1043-3720	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.3452	29517-001 passed acenaphthylene
18-5601-3321	Acenaphthylene	Equal Variance t Two-Sample Test	1.0E-06	29517-002 failed acenaphthylene
00-7191-9259	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-002 passed acenaphthylene
03-6939-6381	Acenaphthylene	Equal Variance t Two-Sample Test	2.9E-07	29517-003 failed acenaphthylene
06-9291-7232	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-003 passed acenaphthylene
12-8728-6106	Acenaphthylene	Equal Variance t Two-Sample Test	1.7E-07	29517-004 failed acenaphthylene
05-7835-7847	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-004 passed acenaphthylene
11-4453-4381	Acenaphthylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed acenaphthylene
20-5769-4790	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-005 passed acenaphthylene
17-6222-0194	Acenaphthylene	Equal Variance t Two-Sample Test	5.2E-07	29517-006 failed acenaphthylene
08-7830-6893	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-006 passed acenaphthylene
20-8138-3441	Acenaphthylene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed acenaphthylene

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
00-3406-2042	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	59517-007 passed acenaphthylene
11-9222-7407	Acenaphthylene	Equal Variance t Two-Sample Test	9.8E-07	29517-008 failed acenaphthylene
19-9607-4309	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-008 passed acenaphthylene
13-0280-0291	Anthracene	Equal Variance t Two-Sample Test	0.0796	29517-001 passed anthracene
20-5352-0000	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed anthracene
11-5677-7781	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed anthracene
14-2013-1243	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed anthracene
02-1949-8969	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed anthracene
14-1071-0012	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed anthracene
17-8061-1474	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed anthracene
16-8629-6758	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed anthracene
01-1827-7535	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed anthracene
19-6462-4023	Benzo(a)anthracene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed benzo(a)anthracene
18-2253-2676	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed benzo(a)anthracene
09-6423-2807	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed benzo(a)anthracene
15-7794-4090	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed benzo(a)anthracene
05-6390-2339	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed benzo(a)anthracene
10-5325-2633	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(a)anthracene
16-8042-7025	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(a)anthracene
01-8339-5124	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed benzo(a)anthracene
01-1045-6544	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed benzo(a)anthracene
18-9152-4781	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed benzo(a)pyrene
18-0517-2385	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed benzo(a)pyrene
19-9409-1478	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed benzo(a)pyrene
01-3634-4765	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed benzo(a)pyrene
08-9772-7056	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed benzo(a)pyrene
03-5386-5556	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(a)pyrene
06-2237-5197	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(a)pyrene
01-0924-5943	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed benzo(a)pyrene
14-6789-7954	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed benzo(a)pyrene
15-6949-9359	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed benzo(b)fluoranthene
18-4379-0932	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed benzo(b)fluoranthene
15-2157-4091	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed benzo(b)fluoranthene
19-3759-2719	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed benzo(b)fluoranthene
01-6262-5070	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed benzo(b)fluoranthene
05-4245-2634	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(b)fluoranthene
19-6687-7532	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(b)fluoranthene
09-1313-5632	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed benzo(b)fluoranthene
14-1742-3380	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed benzo(b)fluoranthene
17-2001-4762	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed benzo(g,h,i)perylene
08-2196-2152	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed benzo(g,h,i)perylene
14-3021-2009	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed benzo(g,h,i)perylene
10-5934-4498	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed benzo(g,h,i)perylene
02-5777-9492	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed benzo(g,h,i)perylene
01-4367-2342	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(g,h,i)perylene
07-1624-6934	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(g,h,i)perylene
11-9418-1244	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed benzo(g,h,i)perylene
09-5266-8177	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed benzo(g,h,i)perylene
09-8863-7222	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed benzo(k)fluoranthene
20-4318-6366	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed benzo(k)fluoranthene
10-8522-9426	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed benzo(k)fluoranthene
13-9164-6503	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed benzo(k)fluoranthene
00-6416-7783	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed benzo(k)fluoranthene

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
09-3168-8123	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(k)fluoranthene
11-5802-2284	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed benzo(k)fluoranthene
01-1417-7485	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed benzo(k)fluoranthene
10-7911-3294	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed benzo(k)fluoranthene
10-3841-3600	Chrysene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed chrysene
19-7484-2271	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed chrysene
02-0357-1416	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed chrysene
00-5672-3832	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed chrysene
03-7758-8799	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed chrysene
00-5976-7344	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed chrysene
07-3749-1043	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed chrysene
10-1611-6278	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed chrysene
09-2492-8362	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed chrysene
12-4117-8612	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed dibenz(a,h)anthracene
19-2155-3401	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed dibenz(a,h)anthracene
19-2036-8215	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed dibenz(a,h)anthracene
07-0316-3228	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed dibenz(a,h)anthracene
06-7464-1862	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed dibenz(a,h)anthracene
10-2627-2605	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed dibenz(a,h)anthracene
14-4003-7230	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed dibenz(a,h)anthracene
10-1698-3498	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed dibenz(a,h)anthracene
09-6401-0589	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed dibenz(a,h)anthracene
12-3987-5863	Fluoranthene	Equal Variance t Two-Sample Test	0.0795	29517-001 passed fluoranthene
06-4786-3633	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed fluoranthene
14-0295-9796	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed fluoranthene
15-6244-7095	Fluoranthene	Unequal Variance t Two-Sample Test	0.0033	29517-004 failed fluoranthene
11-1062-0627	Fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-004 failed fluoranthene
02-8070-8066	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed fluoranthene
00-9857-7239	Fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed fluoranthene
19-9821-2372	Fluoranthene	Unequal Variance t Two-Sample Test	0.0070	29517-006 failed fluoranthene
08-3636-4681	Fluoranthene	Unequal Variance t Two-Sample Test	0.0028	59517-007 failed fluoranthene
17-7159-6831	Fluoranthene	Unequal Variance t Two-Sample Test	5.0E-04	29517-008 failed fluoranthene
20-0728-2848	Fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-008 failed fluoranthene
20-6209-2465	Fluorene	Equal Variance t Two-Sample Test	0.1454	29517-001 passed fluorene
05-4807-9346	Fluorene	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-001 passed fluorene
11-0615-1610	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed fluorene
10-9594-6057	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed fluorene
17-7373-8514	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed fluorene
08-9952-6363	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed fluorene
07-8117-0672	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed fluorene
20-1783-5045	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed fluorene
10-7201-0592	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed fluorene
04-3307-5370	Fluorene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed fluorene
14-1908-4100	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed indeno(1,2,3-cd)pyrene
18-4452-9181	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed indeno(1,2,3-cd)pyrene
16-1555-2532	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed indeno(1,2,3-cd)pyrene
00-7807-7060	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed indeno(1,2,3-cd)pyrene
13-9115-5813	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed indeno(1,2,3-cd)pyrene
11-5376-6293	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed indeno(1,2,3-cd)pyrene
11-6028-4005	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed indeno(1,2,3-cd)pyrene
00-8626-6117	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed indeno(1,2,3-cd)pyrene
18-1341-8881	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-008 failed indeno(1,2,3-cd)pyrene
21-0414-6064	Naphthalene	Equal Variance t Two-Sample Test	0.1454	29517-001 passed naphthalene

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
18-4306-2187	Naphthalene	Equal Variance t Two-Sample Test	2.0E-07	29517-002 failed naphthalene
18-6453-7712	Naphthalene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed naphthalene
13-2938-3098	Naphthalene	Equal Variance t Two-Sample Test	<1.0E-37	29517-004 failed naphthalene
02-1343-5399	Naphthalene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed naphthalene
08-8611-7711	Naphthalene	Equal Variance t Two-Sample Test	<1.0E-37	29517-006 failed naphthalene
20-7517-4359	Naphthalene	Equal Variance t Two-Sample Test	<1.0E-37	59517-007 failed naphthalene
14-5335-0672	Naphthalene	Equal Variance t Two-Sample Test	2.0E-07	29517-008 failed naphthalene
02-4158-0021	Phenanthrene	Equal Variance t Two-Sample Test	0.4349	29517-001 passed phenanthrene
09-3752-3177	Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-001 passed phenanthrene
17-5516-3715	Phenanthrene	Equal Variance t Two-Sample Test	0.0022	29517-002 failed phenanthrene
16-3492-9587	Phenanthrene	Equal Variance t Two-Sample Test	0.0014	29517-003 failed phenanthrene
04-4956-1628	Phenanthrene	Equal Variance t Two-Sample Test	0.0022	29517-004 failed phenanthrene
02-9547-4609	Phenanthrene	Unequal Variance t Two-Sample Test	0.0066	29517-005 failed phenanthrene
03-2196-6390	Phenanthrene	Equal Variance t Two-Sample Test	0.0013	29517-006 failed phenanthrene
15-5079-5927	Phenanthrene	Unequal Variance t Two-Sample Test	0.0072	59517-007 failed phenanthrene
14-0380-9589	Phenanthrene	Equal Variance t Two-Sample Test	0.0031	29517-008 failed phenanthrene
14-1192-8276	Pyrene	Equal Variance t Two-Sample Test	0.1120	29517-001 passed pyrene
08-5971-1730	Pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-002 failed pyrene
13-9989-0423	Pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-003 failed pyrene
12-1861-8216	Pyrene	Unequal Variance t Two-Sample Test	0.0100	29517-004 failed pyrene
17-4162-9228	Pyrene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-004 failed pyrene
20-4401-4400	Pyrene	Equal Variance t Two-Sample Test	<1.0E-37	29517-005 failed pyrene
14-4231-0676	Pyrene	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed pyrene
10-7707-8220	Pyrene	Unequal Variance t Two-Sample Test	0.0074	29517-006 failed pyrene
15-9030-3785	Pyrene	Wilcoxon Rank Sum Two-Sample Test	0.0079	29517-006 failed pyrene
21-1365-1844	Pyrene	Unequal Variance t Two-Sample Test	0.0037	59517-007 failed pyrene
02-9696-3730	Pyrene	Unequal Variance t Two-Sample Test	0.0024	29517-008 failed pyrene
05-8326-2423	Pyrene	Unequal Variance t Two-Sample Test	0.0027	29517-008 failed pyrene

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Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7	4.5	14.9	1.98	4.42	60.86%	0.00%
29517-001		5	7.89	3.2	12.6	4.76	14.2	1.69	3.78	47.89%	-8.65%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-26.11%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-29.25%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-24.98%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-27.87%
29517-006		5	9.96	8.26	11.7	8.53	12.2	0.611	1.37	13.72%	-37.18%
59517-007		5	11.1	9.57	12.5	9.29	12.6	0.537	1.2	10.86%	-52.27%
29517-008		5	13.3	10.2	16.4	9.81	16.2	1.12	2.49	18.72%	-83.45%

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3	4.38	41.2	7.32	16.4	137.07%	0.00%
29517-001		5	4.84	4.51	5.17	4.57	5.28	0.12	0.268	5.54%	59.47%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	23.27%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	21.36%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	23.96%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	22.20%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	20.63%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	22.89%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	25.17%

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.77	4.6	4.93	4.57	4.92	0.0605	0.135	2.84%	-3.97%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

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Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

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Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.89	4.42	5.37	4.57	5.55	0.171	0.382	7.82%	-6.72%
29517-002		5	9.49	8.98	10	8.93	9.87	0.183	0.409	4.31%	-107.07%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	13	5.49	20.5	8.58	23.5	2.71	6.05	46.52%	-183.68%
29517-005		5	10.7	7.19	14.3	8.86	15.8	1.28	2.86	26.61%	-134.34%
29517-006		5	17	8.74	25.2	10.6	26.9	2.96	6.62	39.04%	-269.98%
59517-007		5	21.7	12.9	30.5	14.5	31.2	3.16	7.07	32.60%	-372.95%
29517-008		5	33.5	21.9	45.1	25.5	49.1	4.18	9.34	27.89%	-630.80%

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	7.06	0.579	13.5	4.57	16.4	2.33	5.22	73.93%	-54.06%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-99.78%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-97.99%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-102.57%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-106.68%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-100.79%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-94.85%

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09	4.44	5.12	0.13	0.291	6.14%	0.00%
29517-001		5	5.06	4.34	5.78	4.57	6.04	0.259	0.58	11.45%	-6.93%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-93.53%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-98.35%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-91.80%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-96.24%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-100.21%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-94.51%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-88.76%

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07	4.38	8.38	0.786	1.76	29.83%	0.00%
29517-001		5	10.5	-1.87	22.9	4.57	28.2	4.46	9.97	94.91%	-78.21%
29517-002		5	9.16	8.42	9.9	8.42	9.76	0.266	0.594	6.49%	-55.43%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-59.30%
29517-004		5	9.08	8.55	9.61	8.58	9.56	0.191	0.426	4.70%	-54.04%
29517-005		5	9.29	8.9	9.68	8.86	9.73	0.14	0.314	3.38%	-57.60%
29517-006		5	9.47	8.76	10.2	8.53	9.94	0.256	0.573	6.05%	-60.79%
59517-007		5	9.2	8.79	9.61	8.66	9.54	0.147	0.33	3.58%	-56.21%
29517-008		5	8.93	8.24	9.62	8.38	9.78	0.249	0.557	6.23%	-51.60%

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	9.28	8.61	9.95	8.42	9.76	0.241	0.539	5.81%	-102.36%
29517-003		5	9.39	8.75	10	8.74	9.92	0.228	0.51	5.43%	-104.76%
29517-004		5	14.2	5.88	22.5	8.58	25.2	2.99	6.69	47.14%	-209.42%
29517-005		5	10.2	7.58	12.9	8.86	14	0.953	2.13	20.84%	-123.12%
29517-006		5	13.1	7.35	18.8	9.8	20.3	2.07	4.62	35.33%	-185.51%
59517-007		5	15.6	9.53	21.7	10.6	21.5	2.19	4.91	31.42%	-240.75%
29517-008		5	24.2	14.6	33.9	16.7	36.2	3.48	7.78	32.14%	-428.36%

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-001		14.2	5.4	8.27	4.76	6.82
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	12.2	9.34	9.94
59517-007		12.6	11.5	11.1	9.29	10.8
29517-008		11.9	9.81	14.1	14.6	16.2

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-001		5.28	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.92	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		5.55	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.93	9.76	9.87
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		11.4	8.58	23.5	9.34	12.2
29517-005		15.8	9.36	9.96	8.86	9.73
29517-006		20.3	10.6	26.9	14.2	12.8
59517-007		24	31.2	14.5	14.8	23.9
29517-008		32.6	33.2	25.5	27.1	49.1

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		16.4	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	5.09	6.04
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-001		28.2	4.57	5.82	6.01	7.9
29517-002		9.71	9.19	8.42	9.76	8.71
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		9.56	8.58	8.68	9.34	9.22
29517-005		9.29	9.36	9.19	8.86	9.73
29517-006		8.53	9.8	9.76	9.34	9.94
59517-007		9.54	9.19	8.66	9.29	9.34
29517-008		9.14	9.78	8.38	8.53	8.83

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		9.71	9.19	8.42	9.76	9.3
29517-003		8.96	8.74	9.92	9.58	9.73
29517-004		12.8	8.58	25.2	9.34	15
29517-005		14	9.36	9.19	8.86	9.73
29517-006		15.2	9.8	20.3	10.2	9.94
59517-007		15.7	21.5	10.6	10.9	19.4
29517-008		24.1	26.1	18	16.7	36.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-5299-0228	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed acenaphthene	66.59%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	24	n/a	0	8	Exact	0.2738	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2650	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.985961	0.985961	1	0.0583	0.8152	Non-Significant Effect
Error	135.234	16.9043	8			
Total	136.22		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7686	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.764	0.741	0.0053	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-001		5	7.89	3.2	12.6		4.76	14.2	1.69	47.89%	-8.65%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-001		14.2	5.4	8.27	4.76	6.82

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-6757-4829	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed acenaphthene	23.09%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	5.83	1.89	1.24	7	CDF	3.2E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.1818	32.1818	1	34	6.4E-04	Significant Effect
Error	6.62176	0.945965	7			
Total	38.8036		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.91	24.3	0.1582	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.701	0.0870	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	5.35	3.26	7.45		4.5	7.31	0.659	24.62%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-71.10%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	Outlier	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-7757-7383	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed acenaphthene	51.07%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.57	2.29	0.0035	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.98704	8.98704	1	0.904	0.3696	Non-Significant Effect
Error	79.5456	9.94319	8			
Total	88.5326		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	55.3	23.2	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.756	0.741	0.0042	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-26.11%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-8390-9203	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed acenaphthene	22.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	6.36	1.89	1.2	7	CDF	1.9E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	36.1536	36.1536	1	40.5	3.8E-04	Significant Effect
Error	6.2482	0.892599	7			
Total	42.4018		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.68	24.3	0.0979	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.852	0.701	0.0781	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	5.35	3.26	7.45		4.5	7.31	0.659	24.62%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-75.36%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	Outlier	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-1893-0753	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed acenaphthene	50.95%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.58	2.29	0.0032	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11.2784	11.2784	1	1.14	0.3169	Non-Significant Effect
Error	79.172	9.8965	8			
Total	90.4504		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	75.1	23.2	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.747	0.741	0.0033	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-29.25%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-8498-4689	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed acenaphthene	21.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	6.03	1.89	1.17	7	CDF	2.6E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	30.8099	30.8099	1	36.3	5.3E-04	Significant Effect
Error	5.9358	0.847971	7			
Total	36.7457		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.55	24.3	0.0540	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.845	0.701	0.0651	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	5.35	3.26	7.45		4.5	7.31	0.659	24.62%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-69.57%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	Outlier	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-9114-1844	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed acenaphthene	50.85%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.58	2.29	0.0030	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.22649	8.22649	1	0.835	0.3877	Non-Significant Effect
Error	78.8596	9.85745	8			
Total	87.0861		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	107	23.2	5.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.739	0.741	0.0026	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-24.98%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-7722-2434	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed acenaphthene	21.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	6.55	1.89	1.14	7	CDF	1.6E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	34.3832	34.3832	1	43	3.2E-04	Significant Effect
Error	5.60159	0.800228	7			
Total	39.9848		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17.7	24.3	0.0180	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.701	0.0495	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	5.35	3.26	7.45		4.5	7.31	0.659	24.62%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-73.49%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	Outlier	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-1886-2470 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:36 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed acenaphthene	50.74%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.59	2.29	0.0027	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.2414	10.2414	1	1.04	0.3369	Non-Significant Effect
Error	78.5254	9.81567	8			
Total	88.7668		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	199	23.2	1.5E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.725	0.741	0.0018	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-27.87%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-9565-0987	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed acenaphthene	31.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	5.11	1.89	1.71	7	CDF	7.0E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2166	47.2166	1	26.1	0.0014	Significant Effect
Error	12.6812	1.81159	7			
Total	59.8978		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.08	46.2	0.9917	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.832	0.701	0.0471	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	5.35	3.26	7.45		4.5	7.31	0.659	24.62%	0.00%
29517-006		5	9.96	8.26	11.7		8.53	12.2	0.611	13.72%	-86.12%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	Outlier	4.5	4.94
29517-006		8.53	9.8	12.2	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-0879-1386	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed acenaphthene	52.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.31	1.86	3.85	8	CDF	0.1141	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.48	2.29	0.0106	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.225	18.225	1	1.7	0.2282	Non-Significant Effect
Error	85.605	10.7006	8			
Total	103.83		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10.5	23.2	0.0431	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.797	0.741	0.0132	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-006		5	9.96	8.26	11.7		8.53	12.2	0.611	13.72%	-37.18%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-006		8.53	9.8	12.2	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-0104-7796	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed acenaphthene	29.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	6.79	1.89	1.59	7	CDF	1.3E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	72.3394	72.3394	1	46.1	2.5E-04	Significant Effect
Error	10.9756	1.56794	7			
Total	83.315		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.2	24.3	0.8309	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.701	0.7453	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	5.35	3.26	7.45		4.5	7.31	0.659	24.62%	0.00%
59517-007		5	11.1	9.57	12.5		9.29	12.6	0.537	10.86%	-106.60%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	Outlier	4.5	4.94
59517-007		12.6	11.5	11.1	9.29	10.8

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-7451-1087 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed acenaphthene	52.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	1.85	1.86	3.81	8	CDF	0.0505	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.5	2.29	0.0081	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	36.024	36.024	1	3.43	0.1010	Non-Significant Effect
Error	83.8994	10.4874	8			
Total	119.923		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	13.5	23.2	0.0271	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.793	0.741	0.0120	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
59517-007		5	11.1	9.57	12.5		9.29	12.6	0.537	10.86%	-52.27%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
59517-007		12.6	11.5	11.1	9.29	10.8

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-0051-4626	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed acenaphthene	58.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.67	1.86	4.22	8	CDF	0.0142	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.26	2.29	0.0617	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	91.809	91.809	1	7.13	0.0284	Significant Effect
Error	103.01	12.8762	8			
Total	194.819		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.14	23.2	0.2936	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.88	0.741	0.1322	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	7.26	1.77	12.7		4.5	14.9	1.98	60.86%	0.00%
29517-008		5	13.3	10.2	16.4		9.81	16.2	1.12	18.72%	-83.45%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	7.31	4.66	14.9	4.5	4.94
29517-008		11.9	9.81	14.1	14.6	16.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-4185-7544	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed acenaphthylene	7.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.26	1.89	0.327	7	CDF	0.1236	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.105609	0.105609	1	1.59	0.2471	Non-Significant Effect
Error	0.46368	0.06624	7			
Total	0.569289		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.23	46.2	0.9030	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.896	0.701	0.2299	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-001		5	4.84	4.51	5.17		4.57	5.28	0.12	5.54%	-4.72%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-001		5.28	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-1043-3720	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed acenaphthylene	114.00%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	25	n/a	0	8	Exact	0.3452	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	125.954	125.954	1	0.941	0.3605	Non-Significant Effect
Error	1070.94	133.868	8			
Total	1196.89		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3720	23.2	4.3E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.638	0.741	1.6E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-001		5	4.84	4.51	5.17		4.57	5.28	0.12	5.54%	59.47%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-001		5.28	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-5601-3321	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed acenaphthylene	13.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	14.2	1.89	0.606	7	CDF	1.0E-06	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	45.7632	45.7632	1	202	2.0E-06	Significant Effect
Error	1.58948	0.227069	7			
Total	47.3527		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.02	46.2	0.1720	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.701	0.8608	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-98.23%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-7191-9259	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed acenaphthylene	114.06%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19.2932	19.2932	1	0.144	0.7142	Non-Significant Effect
Error	1072.07	134.008	8			
Total	1091.36		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	757	23.2	1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.646	0.741	2.0E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	23.27%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-6939-6381	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed acenaphthylene	11.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	17	1.89	0.53	7	CDF	2.9E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4772	50.4772	1	291	5.9E-07	Significant Effect
Error	1.21592	0.173703	7			
Total	51.6932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.43	46.2	0.2514	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.701	0.8812	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-103.16%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-9291-7232	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed acenaphthylene	114.04%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.5E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	16.2563	16.2563	1	0.121	0.7366	Non-Significant Effect
Error	1071.69	133.962	8			
Total	1087.95		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1030	23.2	5.6E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.644	0.741	1.9E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	21.36%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-8728-6106	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed acenaphthylene	9.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	18.5	1.89	0.457	7	CDF	1.7E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	44.1243	44.1243	1	342	3.4E-07	Significant Effect
Error	0.90352	0.129074	7			
Total	45.0278		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.1	46.2	0.3796	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.701	0.8550	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-96.45%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-7835-7847	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed acenaphthylene	114.03%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.5E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20.449	20.449	1	0.153	0.7062	Non-Significant Effect
Error	1071.38	133.923	8			
Total	1091.83		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1470	23.2	2.8E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.642	0.741	1.8E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	23.96%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-4453-4381	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed acenaphthylene	7.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	24.4	1.89	0.362	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	48.3812	48.3812	1	595	<1.0E-37	Significant Effect
Error	0.56932	0.0813314	7			
Total	48.9505		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.68	46.2	0.7000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.701	0.9352	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-101.00%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-5769-4790	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed acenaphthylene	114.01%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	17.5563	17.5563	1	0.131	0.7266	Non-Significant Effect
Error	1071.05	133.881	8			
Total	1088.6		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2720	23.2	8.1E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.639	0.741	1.6E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	22.20%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6222-0194	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed acenaphthylene	12.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	15.7	1.89	0.586	7	CDF	5.2E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3585	52.3585	1	246	1.0E-06	Significant Effect
Error	1.49032	0.212903	7			
Total	53.8488		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.6	46.2	0.1885	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.701	0.1401	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-105.06%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-7830-6893	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed acenaphthylene	114.06%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.1536	15.1536	1	0.113	0.7453	Non-Significant Effect
Error	1071.97	133.996	8			
Total	1087.12		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	815	23.2	9.0E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.644	0.741	1.9E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	20.63%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-8138-3441	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed acenaphthylene	8.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	23.1	1.89	0.375	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	46.6957	46.6957	1	535	<1.0E-37	Significant Effect
Error	0.61092	0.0872743	7			
Total	47.3066		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	46.2	0.6395	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.945	0.701	0.6367	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-99.22%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-3406-2042	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed acenaphthylene	114.01%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.6596	18.6596	1	0.139	0.7186	Non-Significant Effect
Error	1071.09	133.886	8			
Total	1089.75		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2460	23.2	9.9E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.639	0.741	1.6E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	22.89%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9222-7407	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed acenaphthylene	12.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	14.3	1.89	0.571	7	CDF	9.8E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	41.3185	41.3185	1	204	1.9E-06	Significant Effect
Error	1.41508	0.202154	7			
Total	42.7336		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.28	46.2	0.2029	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.701	0.7405	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	4.62	4.23	5.01		4.38	4.94	0.121	5.24%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-93.33%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	Outlier	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-9607-4309	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed acenaphthylene	114.05%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	22.56	22.56	1	0.168	0.6923	Non-Significant Effect
Error	1071.89	133.987	8			
Total	1094.45		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	864	23.2	8.0E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.646	0.741	1.9E-04	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	11.9	-8.38	32.3		4.38	41.2	7.32	137.07%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	25.17%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	41.2	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-0280-0291	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed anthracene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.55	1.86	0.218	8	CDF	0.0796	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1998	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0828101	0.0828101	1	2.41	0.1593	Non-Significant Effect
Error	0.27504	0.03438	8			
Total	0.35785		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.76	23.2	0.3489	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5621	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.77	4.6	4.93		4.57	4.92	0.0605	2.84%	-3.97%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.92	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-5352-0000 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed anthracene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-5677-7781	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed anthracene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-2013-1243	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed anthracene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-1949-8969 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:36 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed anthracene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-8061-1474	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed anthracene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-1071-0012	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed anthracene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8629-6758	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed anthracene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-1827-7535 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed anthracene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-6462-4023	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(a)anthracene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-2253-2676	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed benzo(a)anthracene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-6423-2807	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed benzo(a)anthracene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-7794-4090	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(a)anthracene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-6390-2339	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(a)anthracene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-5325-2633	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(a)anthracene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8042-7025	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(a)anthracene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-8339-5124	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(a)anthracene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-1045-6544	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(a)anthracene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-9152-4781	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(a)pyrene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-0517-2385	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed benzo(a)pyrene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 19-9409-1478 **Endpoint:** Benzo(a)pyrene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed benzo(a)pyrene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-3634-4765	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(a)pyrene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-9772-7056	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(a)pyrene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-5386-5556	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(a)pyrene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-2237-5197	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(a)pyrene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-0924-5943	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(a)pyrene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-6789-7954	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(a)pyrene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6949-9359	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(b)fluoranthene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-4379-0932	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed benzo(b)fluoranthene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-2157-4091	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed benzo(b)fluoranthene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-3759-2719	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(b)fluoranthene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-6262-5070	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(b)fluoranthene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-6687-7532	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(b)fluoranthene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-4245-2634	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(b)fluoranthene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1313-5632	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(b)fluoranthene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-1742-3380	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(b)fluoranthene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2001-4762	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(g,h,i)perylene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-2196-2152	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed benzo(g,h,i)perylene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3021-2009	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed benzo(g,h,i)perylene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-5934-4498	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(g,h,i)perylene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-5777-9492	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(g,h,i)perylene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-4367-2342	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(g,h,i)perylene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-1624-6934	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(g,h,i)perylene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9418-1244	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(g,h,i)perylene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-5266-8177	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(g,h,i)perylene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-8863-7222	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed benzo(k)fluoranthene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-4318-6366	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed benzo(k)fluoranthene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-8522-9426	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed benzo(k)fluoranthene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-9164-6503	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed benzo(k)fluoranthene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-6416-7783	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed benzo(k)fluoranthene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-5802-2284	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(k)fluoranthene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-3168-8123	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed benzo(k)fluoranthene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-1417-7485	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed benzo(k)fluoranthene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7911-3294	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed benzo(k)fluoranthene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-3841-3600 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed chrysene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 19-7484-2271 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed chrysene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-0357-1416 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed chrysene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-5672-3832	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed chrysene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-7758-8799 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:36 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed chrysene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-5976-7344	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed chrysene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-3749-1043 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed chrysene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1611-6278	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed chrysene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-2492-8362 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.2
Analyzed: 27 Nov-17 20:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed chrysene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-4117-8612	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed dibenz(a,h)anthracene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-2155-3401	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed dibenz(a,h)anthracene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-2036-8215	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed dibenz(a,h)anthracene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-0316-3228	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed dibenz(a,h)anthracene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-7464-1862	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed dibenz(a,h)anthracene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4003-7230	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed dibenz(a,h)anthracene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-2627-2605	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed dibenz(a,h)anthracene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1698-3498	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed dibenz(a,h)anthracene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-6401-0589	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed dibenz(a,h)anthracene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-3987-5863	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed fluoranthene	8.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.55	1.86	0.369	8	CDF	0.0795	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.23	2.29	0.0752	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.23716	0.23716	1	2.41	0.1590	Non-Significant Effect
Error	0.7866	0.098325	8			
Total	1.02376		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.9	23.2	0.3277	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.845	0.741	0.0507	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.89	4.42	5.37		4.57	5.55	0.171	7.82%	-6.72%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		5.55	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4786-3633	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed fluoranthene	8.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	23.5	1.86	0.388	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.81	2.29	0.4869	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	60.2212	60.2212	1	553	<1.0E-37	Significant Effect
Error	0.8712	0.1089	8			
Total	61.0924		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.31	23.2	0.2725	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6205	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.49	8.98	10		8.93	9.87	0.183	4.31%	-107.07%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.93	9.76	9.87

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-0295-9796	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed fluoranthene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6244-7095	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed fluoranthene	43.95%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	6.77	2.35	2.01	3	CDF	0.0033	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	74.6525	74.6525	1	58.9	1.2E-04	Significant Effect
Error	8.87632	1.26805	7			
Total	83.5288		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	57.3	24.3	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.701	0.8749	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		4	10.4	7.67	13.1		8.58	12.2	0.85	16.38%	-126.44%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		11.4	8.58	Outlier	9.34	12.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-1062-0627	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed fluoranthene	109.82%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.6	2.29	0.0022	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	177.241	177.241	1	9.67	0.0144	Significant Effect
Error	146.584	18.323	8			
Total	323.825		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	725	23.2	1.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.728	0.741	0.0019	Non-Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	13	5.49	20.5		8.58	23.5	2.71	46.52%	-183.68%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		11.4	8.58	23.5	9.34	12.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-8070-8066	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed fluoranthene	9.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	20.4	1.89	0.454	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.2141	53.2141	1	417	1.7E-07	Significant Effect
Error	0.893595	0.127656	7			
Total	54.1077		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.57	24.3	0.1764	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.96	0.701	0.7962	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		4	9.48	8.71	10.2		8.86	9.96	0.24	5.07%	-106.75%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		Outlier	9.36	9.96	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-9857-7239	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed fluoranthene	52.01%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	9.7E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	94.8024	94.8024	1	23.1	0.0013	Significant Effect
Error	32.8728	4.1091	8			
Total	127.675		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	162	23.2	2.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.723	0.741	0.0017	Non-Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	10.7	7.19	14.3		8.86	15.8	1.28	26.61%	-134.34%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		15.8	9.36	9.96	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-9821-2372	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed fluoranthene	137.78%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.18	2.13	6.32	4	CDF	0.0070	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.25	2.29	0.0645	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	382.913	382.913	1	17.5	0.0031	Significant Effect
Error	175.534	21.9417	8			
Total	558.447		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	868	23.2	7.9E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1856	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	17	8.74	25.2		10.6	26.9	2.96	39.04%	-269.98%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		20.3	10.6	26.9	14.2	12.8

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3636-4681	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed fluoranthene	147.08%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	5.41	2.13	6.74	4	CDF	0.0028	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2155	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	730.683	730.683	1	29.2	6.4E-04	Significant Effect
Error	200.03	25.0037	8			
Total	930.713		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	990	23.2	6.1E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.87	0.741	0.1011	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	21.7	12.9	30.5		14.5	31.2	3.16	32.60%	-372.95%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		24	31.2	14.5	14.8	23.9

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7159-6831	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed fluoranthene	99.57%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	12.9	2.35	4.56	3	CDF	5.0E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1390.67	1390.67	1	215	1.6E-06	Significant Effect
Error	45.2219	6.46027	7			
Total	1435.89		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	297	24.3	7.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.701	0.3877	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		4	29.6	23.4	35.8		25.5	33.2	1.94	13.09%	-545.72%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		32.6	33.2	25.5	27.1	Outlier

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0728-2848	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed fluoranthene	169.56%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.5	2.29	0.0079	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2090.34	2090.34	1	47.9	1.2E-04	Significant Effect
Error	349.422	43.6777	8			
Total	2439.76		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1730	23.2	2.0E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.733	0.741	0.0022	Non-Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	33.5	21.9	45.1		25.5	49.1	4.18	27.89%	-630.80%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		32.6	33.2	25.5	27.1	49.1

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-6209-2465	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed fluorene	5.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.14	1.89	0.238	7	CDF	0.1454	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0457606	0.0457606	1	1.31	0.2908	Non-Significant Effect
Error	0.245395	0.0350564	7			
Total	0.291156		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.48	46.2	0.3332	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.701	0.5058	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		4	4.73	4.54	4.92		4.57	4.86	0.0602	2.55%	-3.13%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		Outlier	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-4807-9346	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed fluorene	94.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.7E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.3512	15.3512	1	1.12	0.3200	Non-Significant Effect
Error	109.243	13.6554	8			
Total	124.594		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	540	23.2	2.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.653	0.741	2.4E-04	Non-Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	7.06	0.579	13.5		4.57	16.4	2.33	73.93%	-54.06%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		16.4	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-0615-1610	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed fluorene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-9594-6057	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed fluorene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7373-8514	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed fluorene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-9952-6363	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed fluorene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-1783-5045	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed fluorene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-8117-0672	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed fluorene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7201-0592	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed fluorene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-3307-5370	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed fluorene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-1908-4100	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed indeno(1,2,3-cd)pyrene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-4452-9181	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed indeno(1,2,3-cd)pyrene	11.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	16.1	1.86	0.528	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.3037	52.3037	1	259	2.2E-07	Significant Effect
Error	1.6154	0.201925	8			
Total	53.9191		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7	23.2	0.0859	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8556	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-99.78%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-1555-2532	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed indeno(1,2,3-cd)pyrene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-7807-7060	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed indeno(1,2,3-cd)pyrene	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	20.8	1.86	0.401	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	50.4452	50.4452	1	434	<1.0E-37	Significant Effect
Error	0.92944	0.11618	8			
Total	51.3746		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.6	23.2	0.2422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9294	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-97.99%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-9115-5813	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed indeno(1,2,3-cd)pyrene	7.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	27.3	1.86	0.321	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.272	55.272	1	743	<1.0E-37	Significant Effect
Error	0.59524	0.074405	8			
Total	55.8672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7561	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-102.57%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-5376-6293	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed indeno(1,2,3-cd)pyrene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	31.9	1.89	0.305	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	58.3908	58.3908	1	1020	<1.0E-37	Significant Effect
Error	0.40232	0.0574742	7			
Total	58.7932		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	24.3	0.7676	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.701	0.9868	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	9.71	9.3	10.1		9.34	9.94	0.129	2.66%	-111.82%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		Outlier	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-6028-4005	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed indeno(1,2,3-cd)pyrene	11.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	17.8	1.86	0.512	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0467	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7803	59.7803	1	315	<1.0E-37	Significant Effect
Error	1.51624	0.18953	8			
Total	61.2965		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.51	23.2	0.0970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1146	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-106.68%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8626-6117	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed indeno(1,2,3-cd)pyrene	7.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	25.9	1.86	0.332	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1922	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.361	53.361	1	670	<1.0E-37	Significant Effect
Error	0.63684	0.079605	8			
Total	53.9978		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6879	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-100.79%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-1341-8881	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed indeno(1,2,3-cd)pyrene	10.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	16.2	1.86	0.499	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1349	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.2628	47.2628	1	262	2.1E-07	Significant Effect
Error	1.441	0.180125	8			
Total	48.7038		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.14	23.2	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6414	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-94.85%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-0414-6064	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed naphthalene	11.40%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.13	1.86	0.539	8	CDF	0.1454	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.27	2.29	0.0582	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.26896	0.26896	1	1.28	0.2908	Non-Significant Effect
Error	1.68188	0.210235	8			
Total	1.95084		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.97	23.2	0.2099	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.886	0.741	0.1530	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-001		5	5.06	4.34	5.78		4.57	6.04	0.259	11.45%	-6.93%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	5.09	6.04

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-4306-2187	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed naphthalene	11.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	15	1.86	0.55	8	CDF	2.0E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.67	2.29	0.7393	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	48.9737	48.9737	1	224	3.9E-07	Significant Effect
Error	1.75156	0.218945	8			
Total	50.7253		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.18	23.2	0.1948	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8656	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-93.53%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-6453-7712	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed naphthalene	10.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	17.7	1.86	0.488	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7876	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	54.1493	54.1493	1	314	<1.0E-37	Significant Effect
Error	1.378	0.17225	8			
Total	55.5273		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.08	23.2	0.3021	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.741	0.7005	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-98.35%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-2938-3098	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed naphthalene	9.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	18.8	1.86	0.429	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.44	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.1758	47.1758	1	354	<1.0E-37	Significant Effect
Error	1.0656	0.1332	8			
Total	48.2414		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.15	23.2	0.4762	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.741	0.5781	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-91.80%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-1343-5399	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed naphthalene	7.51%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	23.8	1.86	0.356	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	51.8473	51.8473	1	567	<1.0E-37	Significant Effect
Error	0.7314	0.091425	8			
Total	52.5787		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8869	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8635	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-96.24%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-8611-7711	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed naphthalene	11.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	16.5	1.86	0.535	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.29	0.0859	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	56.2164	56.2164	1	272	1.8E-07	Significant Effect
Error	1.6524	0.20655	8			
Total	57.8688		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.89	23.2	0.2169	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1853	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-100.21%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-7517-4359	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed naphthalene	7.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	22.7	1.86	0.366	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.4097	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	49.997	49.997	1	517	<1.0E-37	Significant Effect
Error	0.773	0.096625	8			
Total	50.77		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8131	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.741	0.8747	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-94.51%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-5335-0672	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed naphthalene	11.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	15	1.86	0.522	8	CDF	2.0E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.03	2.29	0.2096	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	44.1	44.1	1	224	3.9E-07	Significant Effect
Error	1.57716	0.197145	8			
Total	45.6772		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.67	23.2	0.2363	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6950	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.73	4.37	5.09		4.44	5.12	0.13	6.14%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-88.76%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	5.12	4.66	4.44	4.5	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-4158-0021	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed phenanthrene	34.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	0.17	1.89	2.04	7	CDF	0.4349	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0744201	0.0744201	1	0.0289	0.8698	Non-Significant Effect
Error	18.0246	2.57494	7			
Total	18.099		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.64	46.2	0.7148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.701	0.1937	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-001		4	6.08	3.89	8.26		4.57	7.9	0.687	22.62%	-3.11%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-001		Outlier	4.57	5.82	6.01	7.9

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-3752-3177	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed phenanthrene	142.83%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	24	n/a	0	8	Exact	0.2738	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.62	2.29	0.0015	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53.0842	53.0842	1	1.04	0.3384	Non-Significant Effect
Error	409.637	51.2046	8			
Total	462.721		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	32.1	23.2	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.735	0.741	0.0023	Non-Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-001		5	10.5	-1.87	22.9		4.57	28.2	4.46	94.91%	-78.21%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-001		28.2	4.57	5.82	6.01	7.9

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-5516-3715	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed phenanthrene	26.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	3.94	1.86	1.54	8	CDF	0.0022	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.29	0.2233	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	26.6669	26.6669	1	15.5	0.0043	Significant Effect
Error	13.7732	1.72164	8			
Total	40.44		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.74	23.2	0.0589	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.945	0.741	0.6133	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-002		5	9.16	8.42	9.9		8.42	9.76	0.266	6.49%	-55.43%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-002		9.71	9.19	8.42	9.76	8.71

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-3492-9587	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed phenanthrene	25.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	4.27	1.86	1.52	8	CDF	0.0014	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1975	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	30.5201	30.5201	1	18.2	0.0027	Significant Effect
Error	13.3996	1.67495	8			
Total	43.9197		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.9	23.2	0.0343	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6348	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-59.30%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-4956-1628	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed phenanthrene	25.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	3.94	1.86	1.5	8	CDF	0.0022	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1769	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25.3446	25.3446	1	15.5	0.0043	Significant Effect
Error	13.0872	1.6359	8			
Total	38.4318		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17	23.2	0.0179	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6323	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-004		5	9.08	8.55	9.61		8.58	9.56	0.191	4.70%	-54.04%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-004		9.56	8.58	8.68	9.34	9.22

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-9547-4609	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed phenanthrene	28.89%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	4.25	2.13	1.7	4	CDF	0.0066	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1557	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	28.7981	28.7981	1	18.1	0.0028	Significant Effect
Error	12.753	1.59413	8			
Total	41.5511		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	31.4	23.2	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5520	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-005		5	9.29	8.9	9.68		8.86	9.73	0.14	3.38%	-57.60%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-005		9.29	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-2196-6390	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed phenanthrene	26.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.33	1.86	1.54	8	CDF	0.0013	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2163	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.0768	32.0768	1	18.8	0.0025	Significant Effect
Error	13.674	1.70925	8			
Total	45.7508		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.4	23.2	0.0519	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.934	0.741	0.4914	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-006		5	9.47	8.76	10.2		8.53	9.94	0.256	6.05%	-60.79%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-006		8.53	9.8	9.76	9.34	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-5079-5927	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed phenanthrene	28.94%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	4.14	2.13	1.71	4	CDF	0.0072	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1583	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	27.4234	27.4234	1	17.1	0.0032	Significant Effect
Error	12.7946	1.59933	8			
Total	40.218		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	28.4	23.2	0.0068	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5125	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
59517-007		5	9.2	8.79	9.61		8.66	9.54	0.147	3.58%	-56.21%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
59517-007		9.54	9.19	8.66	9.29	9.34

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-0380-9589	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed phenanthrene	26.02%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	3.69	1.86	1.53	8	CDF	0.0031	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2111	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	23.104	23.104	1	13.6	0.0062	Significant Effect
Error	13.5988	1.69984	8			
Total	36.7028		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.97	23.2	0.0468	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6339	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	5.89	3.71	8.07		4.38	8.38	0.786	29.83%	0.00%
29517-008		5	8.93	8.24	9.62		8.38	9.78	0.249	6.23%	-51.60%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	8.38	7.1	4.94
29517-008		9.14	9.78	8.38	8.53	8.83

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-1192-8276	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed pyrene	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86		4.57	4.86	0.0467	2.21%	-3.18%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-5971-1730	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 failed pyrene	10.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002*	18	1.86	0.486	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.29	0.0885	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.0372	55.0372	1	323	<1.0E-37	Significant Effect
Error	1.36524	0.170655	8			
Total	56.4024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.76	23.2	0.1183	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-002		5	9.28	8.61	9.95		8.42	9.76	0.241	5.81%	-102.36%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		9.71	9.19	8.42	9.76	9.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-9989-0423	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 failed pyrene	10.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003*	19.3	1.86	0.463	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.648	57.648	1	371	<1.0E-37	Significant Effect
Error	1.24184	0.15523	8			
Total	58.8898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.741	0.9228	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-003		5	9.39	8.75	10		8.74	9.92	0.228	5.43%	-104.76%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		8.96	8.74	9.92	9.58	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-1861-8216	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pyrene	77.34%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	4.54	2.35	3.55	3	CDF	0.0100	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	104.15	104.15	1	26.7	0.0013	Significant Effect
Error	27.3143	3.90205	7			
Total	131.465		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	179	24.3	2.0E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.927	0.701	0.4574	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		4	11.4	6.65	16.2		8.58	15	1.5	26.30%	-149.35%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		12.8	8.58	Outlier	9.34	15

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-4162-9228	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 failed pyrene	121.36%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.47	2.29	0.0113	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	230.4	230.4	1	10.3	0.0124	Significant Effect
Error	179.005	22.3756	8			
Total	409.405		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	886	23.2	7.6E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.779	0.741	0.0080	Non-Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-004		5	14.2	5.88	22.5		8.58	25.2	2.99	47.14%	-209.42%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		12.8	8.58	25.2	9.34	15

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-4401-4400	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pyrene	8.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	24	1.89	0.371	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	49.1098	49.1098	1	578	<1.0E-37	Significant Effect
Error	0.59522	0.0850314	7			
Total	49.705		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.6	24.3	0.3791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.701	0.7326	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		4	9.28	8.71	9.86		8.86	9.73	0.181	3.90%	-102.55%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		Outlier	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4231-0676	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:36	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed pyrene	38.89%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.64	2.29	0.0011	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	79.6368	79.6368	1	34.7	3.7E-04	Significant Effect
Error	18.3802	2.29753	8			
Total	98.017		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	90	23.2	7.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.73	0.741	0.0020	Non-Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-005		5	10.2	7.58	12.9		8.86	14	0.953	20.84%	-123.12%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		14	9.36	9.19	8.86	9.73

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-9030-3785	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pyrene	47.70%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	10	n/a	0	7	Exact	0.0079	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	99.7853	99.7853	1	33.7	6.6E-04	Significant Effect
Error	20.7206	2.96009	7			
Total	120.506		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	135	24.3	3.5E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.761	0.701	0.0073	Non-Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		4	11.3	7.12	15.4		9.8	15.2	1.31	23.17%	-146.18%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		15.2	9.8	Outlier	10.2	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7707-8220	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed pyrene	96.29%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.11	2.13	4.41	4	CDF	0.0074	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.34	2.29	0.0360	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	180.795	180.795	1	16.9	0.0034	Significant Effect
Error	85.7368	10.7171	8			
Total	266.532		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	424	23.2	3.3E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.741	0.0442	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-006		5	13.1	7.35	18.8		9.8	20.3	2.07	35.33%	-185.51%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		15.2	9.8	20.3	10.2	9.94

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1365-1844	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed pyrene	102.18%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	5.02	2.13	4.68	4	CDF	0.0037	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.5053	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	304.483	304.483	1	25.2	0.0010	Significant Effect
Error	96.5499	12.0687	8			
Total	401.033		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	477	23.2	2.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1216	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
59517-007		5	15.6	9.53	21.7		10.6	21.5	2.19	31.42%	-240.75%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		15.7	21.5	10.6	10.9	19.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-8326-2423	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	No

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pyrene	117.66%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	7.26	2.35	5.39	3	CDF	0.0027	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	615.384	615.384	1	68.3	7.4E-05	Significant Effect
Error	63.1094	9.01563	7			
Total	678.494		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	415	24.3	3.8E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.701	0.4419	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		4	21.2	13.9	28.5		16.7	26.1	2.29	21.57%	-363.02%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		24.1	26.1	18	16.7	Outlier

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-9696-3730	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.2
Analyzed:	27 Nov-17 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed pyrene	161.94%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	5.64	2.13	7.42	4	CDF	0.0024	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.31	2.29	0.0442	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	963.931	963.931	1	31.8	4.9E-04	Significant Effect
Error	242.51	30.3137	8			
Total	1206.44		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1200	23.2	4.2E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.808	0.741	0.0183	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86		4.38	4.94	0.1	4.90%	0.00%
29517-008		5	24.2	14.6	33.9		16.7	36.2	3.48	32.14%	-428.36%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		24.1	26.1	18	16.7	36.2

28 day *Macoma nasuta* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

Pesticides

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
cis-Chlordane	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
trans-Chlordane	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
cis-Nonachlor	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
trans-Nonachlor	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
Oxychlordane	0.965	U	0.901	U	0.906	U	0.865	U	0.940	U
Total Chlordanes	2.897		2.701		2.718		2.593		2.820	
4,4'-DDT	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
4,4'-DDD	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
4,4'-DDE	0.483	U	0.458		0.453	U	0.466		0.470	U
Total DDT	1.449		1.358		1.359		1.330		1.410	
Dieldrin	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
alpha-Endosulfan	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
beta-Endosulfan	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
Endosulfans	0.966		0.900		0.906		0.864		0.940	
Endrin	1.970		0.480		1.720		0.503		6.140	
Heptachlor	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
Heptachlor epoxide	0.965	U	0.901	U	0.906	U	0.865	U	0.940	U
Hexachlorobenzene	0.965	U	0.901	U	0.906	U	0.865	U	0.940	U
Lindane	0.483	U	0.450	U	0.453	U	0.432	U	0.470	U
Methoxychlor	4.830	U	4.500	U	4.530	U	4.320	U	4.700	U
Toxaphene	24.20	U	22.60	U	22.70	U	21.70	U	23.60	U

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 1									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
cis-Chlordane	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
trans-Chlordane	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
cis-Nonachlor	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
trans-Nonachlor	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
Oxychlordane	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
Total Chlordanes	2.664		2.538		2.622		2.856		2.802	
4,4'-DDT	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
4,4'-DDD	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
4,4'-DDE	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
Total DDT	1.332		1.269		1.311		1.428		1.401	
Dieldrin	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
alpha-Endosulfan	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
beta-Endosulfan	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
Endosulfans	0.888		0.846		0.874		0.952		0.934	
Endrin	0.775		0.677		0.732		6.860		0.771	
Heptachlor	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
Heptachlor epoxide	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
Hexachlorobenzene	0.888	U	0.846	U	0.874	U	0.952	U	0.934	U
Lindane	0.444	U	0.423	U	0.437	U	0.476	U	0.467	U
Methoxychlor	4.440	U	4.230	U	4.370	U	4.760	U	4.670	U
Toxaphene	22.30	U	21.20	U	21.90	U	23.90	U	23.40	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 2									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
cis-Chlordane	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
trans-Chlordane	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
cis-Nonachlor	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
trans-Nonachlor	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
Oxychlordane	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
Total Chlordanes	2.664		2.826		2.615		2.917		2.635	
4,4'-DDT	1.330		0.471	U	0.436	U	0.486	U	0.439	U
4,4'-DDD	1.960		0.471	U	0.436	U	0.486	U	0.439	U
4,4'-DDE	2.110		0.560		0.436	U	0.486	U	0.729	
Total DDT	5.400		1.502		1.308		1.458		1.607	
Dieldrin	1.260		0.471	U	0.436	U	0.486	U	0.439	U
alpha-Endosulfan	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
beta-Endosulfan	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
Endosulfans	0.888		0.942		0.872		0.972		0.878	
Endrin	1.710		0.610		0.438		1.900		0.688	
Heptachlor	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
Heptachlor epoxide	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
Hexachlorobenzene	0.888	U	0.942	U	0.871	U	0.973	U	0.879	U
Lindane	0.444	U	0.471	U	0.436	U	0.486	U	0.439	U
Methoxychlor	4.440	U	4.710	U	4.360	U	4.860	U	4.390	U
Toxaphene	22.30	U	23.60	U	21.90	U	24.40	U	22.00	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 3									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
cis-Chlordane	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
trans-Chlordane	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
cis-Nonachlor	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
trans-Nonachlor	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
Oxychlordane	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
Total Chlordanes	2.826		2.725		2.543		2.976		2.814	
4,4'-DDT	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
4,4'-DDD	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
4,4'-DDE	0.471	U	0.454	U	0.512		0.688		0.469	U
Total DDT	1.413		1.362		1.360		1.680		1.407	
Dieldrin	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
alpha-Endosulfan	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
beta-Endosulfan	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
Endosulfans	0.942		0.908		0.848		0.992		0.938	
Endrin	0.761		0.454	U	2.160		1.780		21.500	
Heptachlor	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
Heptachlor epoxide	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
Hexachlorobenzene	0.942	U	0.909	U	0.847	U	0.992	U	0.938	U
Lindane	0.471	U	0.454	U	0.424	U	0.496	U	0.469	U
Methoxychlor	4.710	U	4.540	U	4.240	U	4.960	U	4.690	U
Toxaphene	23.60	U	22.80	U	21.30	U	24.90	U	23.50	U

* = Qualifiers
U Analyte not detected; below Metho
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 4									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
cis-Chlordane	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
trans-Chlordane	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
cis-Nonachlor	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
trans-Nonachlor	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
Oxychlordane	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
Total Chlordanes	2.538		2.622		2.826		2.538		2.958	
4,4'-DDT	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
4,4'-DDD	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
4,4'-DDE	0.494		0.437	U	0.565		0.700		0.493	U
Total DDT	1.340		1.311		1.507		1.546		1.479	
Dieldrin	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
alpha-Endosulfan	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
beta-Endosulfan	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
Endosulfans	0.846		0.874		0.942		0.846		0.986	
Endrin	0.678		5.600		0.471	U	6.340		0.993	
Heptachlor	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
Heptachlor epoxide	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
Hexachlorobenzene	0.846	U	0.874	U	0.942	U	0.846	U	0.986	U
Lindane	0.423	U	0.437	U	0.471	U	0.423	U	0.493	U
Methoxychlor	4.230	U	4.370	U	4.710	U	4.230	U	4.930	U
Toxaphene	21.20	U	21.90	U	23.60	U	21.20	U	24.80	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 5									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
cis-Chlordane	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
trans-Chlordane	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
cis-Nonachlor	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
trans-Nonachlor	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
Oxychlordane	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
Total Chlordanes	2.556		2.531		2.508		2.651		2.508	
4,4'-DDT	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
4,4'-DDD	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
4,4'-DDE	0.620		0.659		0.718		1.180		0.732	
Total DDT	1.472		1.503		1.554		2.064		1.568	
Dieldrin	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
alpha-Endosulfan	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
beta-Endosulfan	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
Endosulfans	0.852		0.844		0.836		0.884		0.836	
Endrin	0.536		0.957		0.818		0.670		0.561	
Heptachlor	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
Heptachlor epoxide	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
Hexachlorobenzene	0.852	U	0.843	U	0.836	U	0.883	U	0.836	U
Lindane	0.426	U	0.422	U	0.418	U	0.442	U	0.418	U
Methoxychlor	4.260	U	4.220	U	4.180	U	4.420	U	4.180	U
Toxaphene	21.40	U	21.20	U	21.00	U	22.20	U	21.00	U

* = Qualifiers
U Analyte not detected; below Metho
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 6									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.457	U	0.453	U	0.434	U	0.468	U	0.460	U
cis-Chlordane	0.492		0.458		0.835		0.468	U	0.792	
trans-Chlordane	0.457	U	0.453	U	0.434	U	0.468	U	0.460	U
cis-Nonachlor	0.457	U	0.453	U	0.434	U	0.468	U	0.460	U
trans-Nonachlor	0.457	U	0.453	U	0.434	U	0.468	U	0.865	
Oxychlordane	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
Total Chlordanes	2.777		2.723		3.005		2.808		3.498	
4,4'-DDT	0.848		0.478		0.547		1.520		0.987	
4,4'-DDD	0.553		0.453	U	0.492		0.468	U	0.460	U
4,4'-DDE	1.500		1.300		1.690		1.790		1.450	
Total DDT	2.901		2.231		2.729		3.778		2.897	
Dieldrin	0.743		0.666		0.853		0.772		0.536	
alpha-Endosulfan	0.457	U	0.453	U	0.434	U	0.468	U	0.460	U
beta-Endosulfan	1.580		0.453	U	0.434	U	0.468	U	1.280	
Endosulfans	2.037		0.906		0.868		0.936		1.740	
Endrin	0.847		0.907		1.710		0.781		0.544	
Heptachlor	0.457	U	0.453	U	0.434	U	0.468	U	0.460	U
Heptachlor epoxide	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
Hexachlorobenzene	0.914	U	0.906	U	0.868	U	0.936	U	0.921	U
Lindane	0.457	U	0.453	U	0.434	U	0.468	U	0.460	U
Methoxychlor	4.570	U	4.530	U	4.340	U	4.680	U	4.600	U
Toxaphene	22.90	U	22.70	U	21.80	U	23.50	U	23.10	U

* = Qualifiers
U Analyte not detected; below Metho
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 7									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.420	U	0.432	U	0.438	U	0.473	U	0.467	U
cis-Chlordane	0.586		0.432	U	1.160		0.473	U	0.467	U
trans-Chlordane	0.420	U	0.432	U	0.438	U	0.473	U	0.467	U
cis-Nonachlor	0.420	U	0.432	U	0.438	U	0.473	U	0.467	U
trans-Nonachlor	0.625		0.432	U	0.438	U	1.580		0.674	
Oxychlordane	0.840	U	0.864	U	0.877	U	0.947	U	0.934	U
Total Chlordanes	2.891		2.592		3.351		3.946		3.009	
4,4'-DDT	0.950		0.820		0.597		1.340		0.848	
4,4'-DDD	0.484		0.432	U	0.438	U	0.473	U	0.467	U
4,4'-DDE	1.570		1.180		1.190		1.360		1.170	
Total DDT	3.004		2.432		2.225		3.173		2.485	
Dieldrin	0.865		0.568		0.438	U	0.722		0.552	
alpha-Endosulfan	0.420	U	0.432	U	0.438	U	0.473	U	0.467	U
beta-Endosulfan	1.480		0.432	U	1.840		2.180		0.467	U
Endosulfans	1.900		0.864		2.278		2.653		0.934	
Endrin	0.529		0.522		1.120		12.100		3.740	
Heptachlor	0.420	U	0.432	U	0.438	U	0.473	U	0.467	U
Heptachlor epoxide	0.840	U	0.864	U	0.877	U	0.947	U	0.934	U
Hexachlorobenzene	0.840	U	0.864	U	0.877	U	0.947	U	0.934	U
Lindane	0.420	U	0.432	U	0.438	U	0.473	U	0.467	U
Methoxychlor	4.200	U	4.320	U	4.380	U	4.730	U	4.670	U
Toxaphene	21.10	U	21.70	U	22.00	U	23.80	U	23.40	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below l
NA Not Analyzed

Concentrations of COCs in *M. nasuta*
New Haven Harbor FNP, New Haven, C

	Composite 8									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.444	U	0.450	U	0.469	U	0.422	U	0.459	U
cis-Chlordane	0.500		0.450	U	0.542		0.422	U	0.459	U
trans-Chlordane	0.444	U	0.450	U	0.469	U	0.422	U	0.459	U
cis-Nonachlor	0.444	U	0.450	U	0.469	U	0.422	U	0.459	U
trans-Nonachlor	1.310		1.620		1.600		0.422	U	0.459	U
Oxychlordane	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
Total Chlordanes	3.586		3.871		4.018		2.531		2.753	
4,4'-DDT	1.090		0.450	U	1.320		0.746		0.908	
4,4'-DDD	0.444	U	3.270		0.469	U	1.380		0.459	U
4,4'-DDE	1.220		1.410		0.916		0.852		0.767	
Total DDT	2.754		5.130		2.705		2.978		2.134	
Dieldrin	0.446		0.487		0.498		0.435		0.651	
alpha-Endosulfan	0.444	U	0.450	U	0.469	U	0.422	U	0.459	U
beta-Endosulfan	0.444	U	1.400		0.469	U	0.422	U	0.459	U
Endosulfans	0.888		1.850		0.938		0.844		0.918	
Endrin	7.810		2.520		1.260		4.620		12.400	
Heptachlor	0.444	U	0.450	U	0.469	U	0.422	U	0.459	U
Heptachlor epoxide	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
Hexachlorobenzene	0.888	U	0.901	U	0.938	U	0.843	U	0.917	U
Lindane	0.444	U	0.450	U	0.469	U	0.422	U	0.459	U
Methoxychlor	4.440	U	4.500	U	4.690	U	4.220	U	4.590	U
Toxaphene	22.30	U	22.60	U	23.50	U	21.20	U	23.00	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below l
NA Not Analyzed

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Start Date: 29 Aug-17 **Species:** Macoma nasuta **Sample Code:** 29524-000
End Date: 26 Sep-17 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 29 Aug-17 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control - 29524

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor
29524-000	1	5																						
29524-000	2	18																						
29524-000	3	26																						
29524-000	4	31																						
29524-000	5	49																						
29517-009	1	7	0.483	0.483	0.483	0.483	0.483			0.483		0.483	0.483	0.483	1.97	0.483	0.483	0.483	0.965	0.965	4.83	0.965	24.2	0.483
29517-009	2	11	0.45	0.458	0.45	0.45	0.45			0.45		0.45	0.45	0.45	0.48	0.45	0.45	0.45	0.901	0.901	4.5	0.901	22.6	0.45
29517-009	3	29	0.453	0.453	0.453	0.453	0.453			0.453		0.453	0.453	0.453	1.72	0.453	0.453	0.453	0.906	0.906	4.53	0.906	22.7	0.453
29517-009	4	34	0.432	0.466	0.432	0.432	0.432			0.432		0.432	0.432	0.432	0.503	0.432	0.432	0.432	0.865	0.865	4.32	0.865	21.7	0.432
29517-009	5	44	0.47	0.47	0.47	0.47	0.47			0.47		0.47	0.47	0.47	6.14	0.47	0.47	0.47	0.94	0.94	4.7	0.94	23.6	0.47
29517-001	1	9	0.444	0.444	0.444	0.444	0.444			0.444		0.444	0.444	0.444	0.775	0.444	0.444	0.444	0.888	0.888	4.44	0.888	22.3	0.444
29517-001	2	16	0.423	0.423	0.423	0.423	0.423			0.423		0.423	0.423	0.423	0.677	0.423	0.423	0.423	0.846	0.846	4.23	0.846	21.2	0.423
29517-001	3	24	0.437	0.437	0.437	0.437	0.437			0.437		0.437	0.437	0.437	0.732	0.437	0.437	0.437	0.874	0.874	4.37	0.874	21.9	0.437
29517-001	4	35	0.476	0.476	0.476	0.476	0.476			0.476		0.476	0.476	0.476	6.86	0.476	0.476	0.476	0.952	0.952	4.76	0.952	23.9	0.476
29517-001	5	47	0.467	0.467	0.467	0.467	0.467			0.467		0.467	0.467	0.467	0.771	0.467	0.467	0.467	0.934	0.934	4.67	0.934	23.4	0.467
29517-002	1	1	1.96	2.11	1.33	0.444	0.444			0.444		1.26	0.444	0.444	1.71	0.444	0.444	0.444	0.888	0.888	4.44	0.888	22.3	0.444
29517-002	2	15	0.471	0.56	0.471	0.471	0.471			0.471		0.471	0.471	0.471	0.61	0.471	0.471	0.471	0.942	0.942	4.71	0.942	23.6	0.471
29517-002	3	21	0.436	0.436	0.436	0.436	0.436			0.436		0.436	0.436	0.436	0.438	0.436	0.436	0.436	0.871	0.871	4.36	0.871	21.9	0.436
29517-002	4	38	0.486	0.486	0.486	0.486	0.486			0.486		0.486	0.486	0.486	1.9	0.486	0.486	0.486	0.973	0.973	4.86	0.973	24.4	0.486
29517-002	5	42	0.439	0.729	0.439	0.439	0.439			0.439		0.439	0.439	0.439	0.688	0.439	0.439	0.439	0.879	0.879	4.39	0.879	22	0.439
29517-003	1	3	0.471	0.471	0.471	0.471	0.471			0.471		0.471	0.471	0.471	0.761	0.471	0.471	0.471	0.942	0.942	4.71	0.942	23.6	0.471
29517-003	2	17	0.454	0.454	0.454	0.454	0.454			0.454		0.454	0.454	0.454	0.454	0.454	0.454	0.454	0.909	0.909	4.54	0.909	22.8	0.454
29517-003	3	28	0.424	0.512	0.424	0.424	0.424			0.424		0.424	0.424	0.424	2.16	0.424	0.424	0.424	0.847	0.847	4.24	0.847	21.3	0.424
29517-003	4	37	0.496	0.688	0.496	0.496	0.496			0.496		0.496	0.496	0.496	1.78	0.496	0.496	0.496	0.992	0.992	4.96	0.992	24.9	0.496
29517-003	5	48	0.469	0.469	0.469	0.469	0.469			0.469		0.469	0.469	0.469	21.5	0.469	0.469	0.469	0.938	0.938	4.69	0.938	23.5	0.469
29517-004	1	6	0.423	0.494	0.423	0.423	0.423			0.423		0.423	0.423	0.423	0.678	0.423	0.423	0.423	0.846	0.846	4.23	0.846	21.2	0.423
29517-004	2	13	0.437	0.437	0.437	0.437	0.437			0.437		0.437	0.437	0.437	5.6	0.437	0.437	0.437	0.874	0.874	4.37	0.874	21.9	0.437
29517-004	3	23	0.471	0.565	0.471	0.471	0.471			0.471		0.471	0.471	0.471	0.471	0.471	0.471	0.471	0.942	0.942	4.71	0.942	23.6	0.471
29517-004	4	33	0.423	0.7	0.423	0.423	0.423			0.423		0.423	0.423	0.423	6.34	0.423	0.423	0.423	0.846	0.846	4.23	0.846	21.2	0.423

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor
29517-004	5	43	0.493	0.493	0.493	0.493	0.493			0.493		0.493	0.493	0.493	0.993	0.493	0.493	0.493	0.986	0.986	4.93	0.986	24.8	0.493
29517-005	1	4	0.426	0.62	0.426	0.426	0.426			0.426		0.426	0.426	0.426	0.536	0.426	0.426	0.426	0.852	0.852	4.26	0.852	21.4	0.426
29517-005	2	12	0.422	0.659	0.422	0.422	0.422			0.422		0.422	0.422	0.422	0.957	0.422	0.422	0.422	0.843	0.843	4.22	0.843	21.2	0.422
29517-005	3	30	0.418	0.718	0.418	0.418	0.418			0.418		0.418	0.418	0.418	0.818	0.418	0.418	0.418	0.836	0.836	4.18	0.836	21	0.418
29517-005	4	39	0.442	1.18	0.442	0.442	0.442			0.442		0.442	0.442	0.442	0.67	0.442	0.442	0.442	0.883	0.883	4.42	0.883	22.2	0.442
29517-005	5	41	0.418	0.732	0.418	0.418	0.418			0.418		0.418	0.418	0.418	0.561	0.418	0.418	0.418	0.836	0.836	4.18	0.836	21	0.418
29517-006	1	2	0.553	1.5	0.848	0.457	0.492			0.457		0.743	0.457	1.58	0.847	0.457	0.457	0.457	0.914	0.914	4.57	0.914	22.9	0.457
29517-006	2	14	0.453	1.3	0.478	0.453	0.458			0.453		0.666	0.453	0.453	0.907	0.453	0.453	0.453	0.906	0.906	4.53	0.906	22.7	0.453
29517-006	3	25	0.492	1.69	0.547	0.434	0.835			0.434		0.853	0.434	0.434	1.71	0.434	0.434	0.434	0.868	0.868	4.34	0.868	21.8	0.434
29517-006	4	40	0.468	1.79	1.52	0.468	0.468			0.468		0.772	0.468	0.468	0.781	0.468	0.468	0.468	0.936	0.936	4.68	0.936	23.5	0.468
29517-006	5	46	0.46	1.45	0.987	0.46	0.792			0.46		0.536	0.46	1.28	0.544	0.46	0.46	0.46	0.921	0.921	4.6	0.921	23.1	0.865
59517-007	1	8	0.484	1.57	0.95	0.42	0.586			0.42		0.865	0.42	1.48	0.529	0.42	0.42	0.42	0.84	0.84	4.2	0.84	21.1	0.625
59517-007	2	20	0.432	1.18	0.82	0.432	0.432			0.432		0.568	0.432	0.432	0.522	0.432	0.432	0.432	0.864	0.864	4.32	0.864	21.7	0.432
59517-007	3	27	0.438	1.19	0.597	0.438	1.16			0.438		0.438	0.438	1.84	1.12	0.438	0.438	0.438	0.877	0.877	4.38	0.877	22	0.438
59517-007	4	32	0.473	1.36	1.34	0.473	0.473			0.473		0.722	0.473	2.18	12.1	0.473	0.473	0.473	0.947	0.947	4.73	0.947	23.8	1.58
59517-007	5	45	0.467	1.17	0.848	0.467	0.467			0.467		0.552	0.467	0.467	3.74	0.467	0.467	0.467	0.934	0.934	4.67	0.934	23.4	0.674
29517-008	1	10	0.444	1.22	1.09	0.444	0.5			0.444		0.446	0.444	0.444	7.81	0.444	0.444	0.444	0.888	0.888	4.44	0.888	22.3	1.31
29517-008	2	19	3.27	1.41	0.45	0.45	0.45			0.45		0.487	0.45	1.4	2.52	0.45	0.45	0.45	0.901	0.901	4.5	0.901	22.6	1.62
29517-008	3	22	0.469	0.916	1.32	0.469	0.542			0.469		0.498	0.469	0.469	1.26	0.469	0.469	0.469	0.938	0.938	4.69	0.938	23.5	1.6
29517-008	4	36	1.38	0.852	0.746	0.422	0.422			0.422		0.435	0.422	0.422	4.62	0.422	0.422	0.422	0.843	0.843	4.22	0.843	21.2	0.422
29517-008	5	50	0.459	0.767	0.908	0.459	0.459			0.459		0.651	0.459	0.459	12.4	0.459	0.459	0.459	0.917	0.917	4.59	0.917	23	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Batch ID:	07-3726-1456	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	29 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	26 Sep-17	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
07-5731-0910	4-4'-DDD	Equal Variance t Two-Sample Test	0.7257	29517-001 passed 4-4'-ddd
14-0978-4036	4-4'-DDD	Equal Variance t Two-Sample Test	0.4895	29517-002 passed 4-4'-ddd
17-8214-1190	4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-002 passed 4-4'-ddd
03-0362-9347	4-4'-DDD	Equal Variance t Two-Sample Test	0.3664	29517-003 passed 4-4'-ddd
12-3288-2343	4-4'-DDD	Equal Variance t Two-Sample Test	0.6837	29517-004 passed 4-4'-ddd
09-7259-8830	4-4'-DDD	Equal Variance t Two-Sample Test	0.9946	29517-005 passed 4-4'-ddd
06-1438-5616	4-4'-DDD	Equal Variance t Two-Sample Test	0.1043	29517-006 passed 4-4'-ddd
17-9822-8769	4-4'-DDD	Equal Variance t Two-Sample Test	0.4654	59517-007 passed 4-4'-ddd
05-9116-7370	4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	0.3651	29517-008 passed 4-4'-ddd
12-9044-6075	4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	0.2103	29517-008 passed 4-4'-ddd
12-0436-4722	4-4'-DDE	Equal Variance t Two-Sample Test	0.9146	29517-001 passed 4-4'-dde
00-6306-0103	4-4'-DDE	Unequal Variance t Two-Sample Test	0.1349	29517-002 passed 4-4'-dde
20-2130-6773	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.0754	29517-002 passed 4-4'-dde
09-7203-5606	4-4'-DDE	Equal Variance t Two-Sample Test	0.2125	29517-003 passed 4-4'-dde
19-4286-7874	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.1548	29517-003 passed 4-4'-dde
19-3726-3478	4-4'-DDE	Equal Variance t Two-Sample Test	0.1150	29517-004 passed 4-4'-dde
16-9770-7142	4-4'-DDE	Unequal Variance t Two-Sample Test	0.0954	29517-004 passed 4-4'-dde
05-6941-3364	4-4'-DDE	Equal Variance t Two-Sample Test	1.9E-05	29517-005 failed 4-4'-dde
08-8320-0156	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.0040	29517-005 failed 4-4'-dde
13-9514-8455	4-4'-DDE	Unequal Variance t Two-Sample Test	1.2E-04	29517-006 failed 4-4'-dde
15-3323-4326	4-4'-DDE	Unequal Variance t Two-Sample Test	2.3E-04	59517-007 failed 4-4'-dde
20-3664-0525	4-4'-DDE	Unequal Variance t Two-Sample Test	2.2E-04	59517-007 failed 4-4'-dde
19-6607-6068	4-4'-DDE	Unequal Variance t Two-Sample Test	0.0048	29517-008 failed 4-4'-dde
05-6502-3491	4-4'-DDT	Equal Variance t Two-Sample Test	0.7257	29517-001 passed 4-4'-ddt
08-8229-8586	4-4'-DDT	Equal Variance t Two-Sample Test	0.4895	29517-002 passed 4-4'-ddt
06-1827-8726	4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-002 passed 4-4'-ddt
11-7023-9733	4-4'-DDT	Equal Variance t Two-Sample Test	0.3664	29517-003 passed 4-4'-ddt

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-7722-1007	4-4'-DDT	Equal Variance t Two-Sample Test	0.6837	29517-004 passed 4-4'-ddt
20-4213-3943	4-4'-DDT	Equal Variance t Two-Sample Test	0.9946	29517-005 passed 4-4'-ddt
13-1010-0593	4-4'-DDT	Unequal Variance t Two-Sample Test	0.0442	29517-006 failed 4-4'-ddt
19-2705-8421	4-4'-DDT	Unequal Variance t Two-Sample Test	0.0621	29517-006 passed 4-4'-ddt
02-1416-1657	4-4'-DDT	Unequal Variance t Two-Sample Test	0.0103	59517-007 failed 4-4'-ddt
17-2645-4290	4-4'-DDT	Unequal Variance t Two-Sample Test	0.0095	59517-007 failed 4-4'-ddt
11-2831-5530	4-4'-DDT	Unequal Variance t Two-Sample Test	0.0200	29517-008 failed 4-4'-ddt
01-4324-9486	aldrin	Equal Variance t Two-Sample Test	0.7257	29517-001 passed aldrin
20-1361-7608	aldrin	Equal Variance t Two-Sample Test	0.5698	29517-002 passed aldrin
02-5413-7539	aldrin	Equal Variance t Two-Sample Test	0.3664	29517-003 passed aldrin
17-5034-3586	aldrin	Equal Variance t Two-Sample Test	0.6837	29517-004 passed aldrin
03-3377-9525	aldrin	Equal Variance t Two-Sample Test	0.9946	29517-005 passed aldrin
19-5928-6541	aldrin	Equal Variance t Two-Sample Test	0.6166	29517-006 passed aldrin
00-9351-7144	aldrin	Equal Variance t Two-Sample Test	0.7926	59517-007 passed aldrin
08-4098-0609	aldrin	Equal Variance t Two-Sample Test	0.7613	29517-008 passed aldrin
18-3971-7329	alpha chlordane	Equal Variance t Two-Sample Test	0.7257	29517-001 passed alpha chlordane (trans)
01-8932-2242	alpha chlordane	Equal Variance t Two-Sample Test	0.5698	29517-002 passed alpha chlordane (trans)
17-5435-2336	alpha chlordane	Equal Variance t Two-Sample Test	0.3664	29517-003 passed alpha chlordane (trans)
06-0326-6903	alpha chlordane	Equal Variance t Two-Sample Test	0.6837	29517-004 passed alpha chlordane (trans)
00-6962-5083	alpha chlordane	Equal Variance t Two-Sample Test	0.9946	29517-005 passed alpha chlordane (trans)
16-8917-5468	alpha chlordane	Unequal Variance t Two-Sample Test	0.0736	29517-006 passed alpha chlordane (trans)
09-9714-8997	alpha chlordane	Equal Variance t Two-Sample Test	0.1687	59517-007 passed alpha chlordane (trans)
07-5313-0983	alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	0.1667	59517-007 passed alpha chlordane (trans)
12-2232-9549	alpha chlordane	Equal Variance t Two-Sample Test	0.2380	29517-008 passed alpha chlordane (trans)
01-6545-6674	cis-Nonachlor	Equal Variance t Two-Sample Test	0.7257	29517-001 passed cis-nonachlor
07-4929-3122	cis-Nonachlor	Equal Variance t Two-Sample Test	0.5698	29517-002 passed cis-nonachlor
19-0877-3797	cis-Nonachlor	Equal Variance t Two-Sample Test	0.3664	29517-003 passed cis-nonachlor
15-2866-7517	cis-Nonachlor	Equal Variance t Two-Sample Test	0.6837	29517-004 passed cis-nonachlor
08-4181-5341	cis-Nonachlor	Equal Variance t Two-Sample Test	0.9946	29517-005 passed cis-nonachlor
20-5367-3112	cis-Nonachlor	Equal Variance t Two-Sample Test	0.6166	29517-006 passed cis-nonachlor
13-7937-9170	cis-Nonachlor	Equal Variance t Two-Sample Test	0.7926	59517-007 passed cis-nonachlor
02-5147-5332	cis-Nonachlor	Equal Variance t Two-Sample Test	0.7613	29517-008 passed cis-nonachlor
06-2325-2637	Dieldrin	Equal Variance t Two-Sample Test	0.7257	29517-001 passed dieldrin
14-6259-8150	Dieldrin	Equal Variance t Two-Sample Test	0.4895	29517-002 passed dieldrin
02-9725-0639	Dieldrin	Wilcoxon Rank Sum Two-Sample Test	0.2738	29517-002 passed dieldrin
12-8236-4663	Dieldrin	Equal Variance t Two-Sample Test	0.3664	29517-003 passed dieldrin
14-5583-1727	Dieldrin	Equal Variance t Two-Sample Test	0.6837	29517-004 passed dieldrin
10-0527-9366	Dieldrin	Equal Variance t Two-Sample Test	0.9946	29517-005 passed dieldrin
12-5385-1974	Dieldrin	Unequal Variance t Two-Sample Test	0.0046	29517-006 failed dieldrin
02-4684-7912	Dieldrin	Unequal Variance t Two-Sample Test	0.0419	59517-007 failed dieldrin
07-0526-8609	Dieldrin	Equal Variance t Two-Sample Test	0.1412	29517-008 passed dieldrin
10-4485-2684	Dieldrin	Equal Variance t Two-Sample Test	0.3057	29517-008 passed dieldrin
18-3929-0494	endosulfan I	Equal Variance t Two-Sample Test	0.7257	29517-001 passed endosulfan i
20-8465-4467	endosulfan I	Equal Variance t Two-Sample Test	0.5698	29517-002 passed endosulfan i
14-5928-3008	endosulfan I	Equal Variance t Two-Sample Test	0.3664	29517-003 passed endosulfan i
04-9954-1329	endosulfan I	Equal Variance t Two-Sample Test	0.6837	29517-004 passed endosulfan i
18-1335-4980	endosulfan I	Equal Variance t Two-Sample Test	0.9946	29517-005 passed endosulfan i
21-0752-0595	endosulfan I	Equal Variance t Two-Sample Test	0.6166	29517-006 passed endosulfan i
19-8059-2222	endosulfan I	Equal Variance t Two-Sample Test	0.7926	59517-007 passed endosulfan i
16-2782-2286	endosulfan I	Equal Variance t Two-Sample Test	0.7613	29517-008 passed endosulfan i
03-8889-1693	endosulfan II	Equal Variance t Two-Sample Test	0.7257	29517-001 passed endosulfan ii
04-9033-9345	endosulfan II	Equal Variance t Two-Sample Test	0.5698	29517-002 passed endosulfan ii
08-8280-2217	endosulfan II	Equal Variance t Two-Sample Test	0.3664	29517-003 passed endosulfan ii

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-6511-0683	endosulfan II	Equal Variance t Two-Sample Test	0.6837	29517-004 passed endosulfan ii
02-5339-6442	endosulfan II	Equal Variance t Two-Sample Test	0.9946	29517-005 passed endosulfan ii
04-3587-0681	endosulfan II	Unequal Variance t Two-Sample Test	0.0951	29517-006 passed endosulfan ii
01-1583-0356	endosulfan II	Unequal Variance t Two-Sample Test	0.0413	59517-007 failed endosulfan ii
06-6664-5453	endosulfan II	Equal Variance t Two-Sample Test	0.7408	29517-008 passed endosulfan ii
14-6825-3142	endosulfan II	Wilcoxon Rank Sum Two-Sample Test	0.5794	29517-008 passed endosulfan ii
20-0032-7021	endrin	Wilcoxon Rank Sum Two-Sample Test	0.5000	29517-001 passed endrin
03-0037-2801	endrin	Equal Variance t Two-Sample Test	0.5774	29517-002 passed endrin
16-1859-9351	endrin	Equal Variance t Two-Sample Test	0.8287	29517-002 passed endrin
09-1749-0497	endrin	Equal Variance t Two-Sample Test	0.7494	29517-003 passed endrin
02-7612-2312	endrin	Wilcoxon Rank Sum Two-Sample Test	0.4206	29517-003 passed endrin
13-0437-1921	endrin	Equal Variance t Two-Sample Test	0.3521	29517-004 passed endrin
12-9066-5759	endrin	Equal Variance t Two-Sample Test	0.8803	29517-005 passed endrin
07-1930-9582	endrin	Wilcoxon Rank Sum Two-Sample Test	0.7262	29517-005 passed endrin
13-0373-0856	endrin	Equal Variance t Two-Sample Test	0.6872	29517-006 passed endrin
11-0938-0039	endrin	Wilcoxon Rank Sum Two-Sample Test	0.7262	29517-006 passed endrin
02-3330-1909	endrin	Equal Variance t Two-Sample Test	0.6852	59517-007 passed endrin
19-1243-7035	endrin	Equal Variance t Two-Sample Test	0.2857	59517-007 passed endrin
15-7511-5425	endrin	Equal Variance t Two-Sample Test	0.0768	29517-008 passed endrin
04-8012-3452	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.7257	29517-001 passed gamma-bhc (lindane)
21-3366-7682	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.5698	29517-002 passed gamma-bhc (lindane)
01-0616-2622	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.3664	29517-003 passed gamma-bhc (lindane)
13-4988-3304	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.6837	29517-004 passed gamma-bhc (lindane)
06-8657-2732	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.9946	29517-005 passed gamma-bhc (lindane)
09-9910-2120	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.6166	29517-006 passed gamma-bhc (lindane)
19-5805-6844	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.7926	59517-007 passed gamma-bhc (lindane)
08-9752-2524	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.7613	29517-008 passed gamma-bhc (lindane)
07-1787-6747	gamma-chlordane	Equal Variance t Two-Sample Test	0.7257	29517-001 passed gamma-chlordane (cis)
19-6447-8359	gamma-chlordane	Equal Variance t Two-Sample Test	0.5698	29517-002 passed gamma-chlordane (cis)
16-3689-0626	gamma-chlordane	Equal Variance t Two-Sample Test	0.3664	29517-003 passed gamma-chlordane (cis)
09-7228-8508	gamma-chlordane	Equal Variance t Two-Sample Test	0.6837	29517-004 passed gamma-chlordane (cis)
04-7445-6868	gamma-chlordane	Equal Variance t Two-Sample Test	0.9946	29517-005 passed gamma-chlordane (cis)
08-4012-7885	gamma-chlordane	Equal Variance t Two-Sample Test	0.6166	29517-006 passed gamma-chlordane (cis)
05-1513-1297	gamma-chlordane	Equal Variance t Two-Sample Test	0.7926	59517-007 passed gamma-chlordane (cis)
06-4264-0005	gamma-chlordane	Equal Variance t Two-Sample Test	0.7613	29517-008 passed gamma-chlordane (cis)
01-3008-0030	heptachlor	Equal Variance t Two-Sample Test	0.7257	29517-001 passed heptachlor
08-2561-8713	heptachlor	Equal Variance t Two-Sample Test	0.5698	29517-002 passed heptachlor
10-9404-1116	heptachlor	Equal Variance t Two-Sample Test	0.3664	29517-003 passed heptachlor
20-3848-5308	heptachlor	Equal Variance t Two-Sample Test	0.6837	29517-004 passed heptachlor
00-5195-4009	heptachlor	Equal Variance t Two-Sample Test	0.9946	29517-005 passed heptachlor
01-7168-6069	heptachlor	Equal Variance t Two-Sample Test	0.6166	29517-006 passed heptachlor
11-7692-8142	heptachlor	Equal Variance t Two-Sample Test	0.7926	59517-007 passed heptachlor
00-1589-3366	heptachlor	Equal Variance t Two-Sample Test	0.7613	29517-008 passed heptachlor
06-8562-7391	heptachlor epoxide	Equal Variance t Two-Sample Test	0.7297	29517-001 passed heptachlor epoxide
13-6352-3668	heptachlor epoxide	Equal Variance t Two-Sample Test	0.5701	29517-002 passed heptachlor epoxide
11-9599-4395	heptachlor epoxide	Equal Variance t Two-Sample Test	0.3684	29517-003 passed heptachlor epoxide
04-0226-7741	heptachlor epoxide	Equal Variance t Two-Sample Test	0.6866	29517-004 passed heptachlor epoxide
05-0929-4932	heptachlor epoxide	Equal Variance t Two-Sample Test	0.9953	29517-005 passed heptachlor epoxide
17-4733-9448	heptachlor epoxide	Equal Variance t Two-Sample Test	0.6180	29517-006 passed heptachlor epoxide
02-8720-6764	heptachlor epoxide	Equal Variance t Two-Sample Test	0.7918	59517-007 passed heptachlor epoxide
01-4786-7119	heptachlor epoxide	Equal Variance t Two-Sample Test	0.7676	29517-008 passed heptachlor epoxide
14-9658-9651	hexachlorobenzene	Equal Variance t Two-Sample Test	0.7297	29517-001 passed hexachlorobenzene
01-2667-0944	hexachlorobenzene	Equal Variance t Two-Sample Test	0.5701	29517-002 passed hexachlorobenzene

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
18-9712-7554	hexachlorobenzene	Equal Variance t Two-Sample Test	0.3684	29517-003 passed hexachlorobenzene
07-8793-9468	hexachlorobenzene	Equal Variance t Two-Sample Test	0.6866	29517-004 passed hexachlorobenzene
03-1340-7903	hexachlorobenzene	Equal Variance t Two-Sample Test	0.9953	29517-005 passed hexachlorobenzene
18-2844-8371	hexachlorobenzene	Equal Variance t Two-Sample Test	0.6180	29517-006 passed hexachlorobenzene
00-1833-3932	hexachlorobenzene	Equal Variance t Two-Sample Test	0.7918	59517-007 passed hexachlorobenzene
03-1732-5971	hexachlorobenzene	Equal Variance t Two-Sample Test	0.7676	29517-008 passed hexachlorobenzene
18-4857-1093	Methoxychlor	Equal Variance t Two-Sample Test	0.7257	29517-001 passed methoxychlor
14-9472-5130	Methoxychlor	Equal Variance t Two-Sample Test	0.5698	29517-002 passed methoxychlor
06-1620-0471	Methoxychlor	Equal Variance t Two-Sample Test	0.3664	29517-003 passed methoxychlor
11-3368-1608	Methoxychlor	Equal Variance t Two-Sample Test	0.6837	29517-004 passed methoxychlor
16-1834-0874	Methoxychlor	Equal Variance t Two-Sample Test	0.9946	29517-005 passed methoxychlor
09-9904-1731	Methoxychlor	Equal Variance t Two-Sample Test	0.6166	29517-006 passed methoxychlor
14-8335-7759	Methoxychlor	Equal Variance t Two-Sample Test	0.7926	59517-007 passed methoxychlor
08-4903-9448	Methoxychlor	Equal Variance t Two-Sample Test	0.7613	29517-008 passed methoxychlor
08-9371-6668	oxychlordane	Equal Variance t Two-Sample Test	0.7297	29517-001 passed oxychlordane
03-4678-9743	oxychlordane	Equal Variance t Two-Sample Test	0.5701	29517-002 passed oxychlordane
16-5511-0815	oxychlordane	Equal Variance t Two-Sample Test	0.3684	29517-003 passed oxychlordane
14-9628-8512	oxychlordane	Equal Variance t Two-Sample Test	0.6866	29517-004 passed oxychlordane
02-5041-9340	oxychlordane	Equal Variance t Two-Sample Test	0.9953	29517-005 passed oxychlordane
18-2913-9342	oxychlordane	Equal Variance t Two-Sample Test	0.6180	29517-006 passed oxychlordane
16-6674-8567	oxychlordane	Equal Variance t Two-Sample Test	0.7918	59517-007 passed oxychlordane
19-7984-2198	oxychlordane	Equal Variance t Two-Sample Test	0.7676	29517-008 passed oxychlordane
01-2348-3726	toxaphene	Equal Variance t Two-Sample Test	0.7303	29517-001 passed toxaphene
10-1694-3562	toxaphene	Equal Variance t Two-Sample Test	0.5702	29517-002 passed toxaphene
05-1936-3201	toxaphene	Equal Variance t Two-Sample Test	0.3654	29517-003 passed toxaphene
03-5721-9961	toxaphene	Equal Variance t Two-Sample Test	0.6856	29517-004 passed toxaphene
06-6851-1017	toxaphene	Equal Variance t Two-Sample Test	0.9945	29517-005 passed toxaphene
20-4811-3444	toxaphene	Equal Variance t Two-Sample Test	0.6177	29517-006 passed toxaphene
18-4480-0547	toxaphene	Equal Variance t Two-Sample Test	0.7856	59517-007 passed toxaphene
16-2951-4624	toxaphene	Equal Variance t Two-Sample Test	0.7652	29517-008 passed toxaphene
08-9575-4488	trans-nonachlor	Equal Variance t Two-Sample Test	0.7257	29517-001 passed trans-nonachlor
09-7593-9887	trans-nonachlor	Equal Variance t Two-Sample Test	0.5698	29517-002 passed trans-nonachlor
19-0987-4341	trans-nonachlor	Equal Variance t Two-Sample Test	0.3664	29517-003 passed trans-nonachlor
01-6795-7760	trans-nonachlor	Equal Variance t Two-Sample Test	0.6837	29517-004 passed trans-nonachlor
18-0820-0616	trans-nonachlor	Equal Variance t Two-Sample Test	0.9946	29517-005 passed trans-nonachlor
16-6164-9199	trans-nonachlor	Equal Variance t Two-Sample Test	0.6469	29517-006 passed trans-nonachlor
01-7212-7269	trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	0.3651	29517-006 passed trans-nonachlor
00-0986-8334	trans-nonachlor	Unequal Variance t Two-Sample Test	0.1369	59517-007 passed trans-nonachlor
15-7059-1789	trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	0.2302	59517-007 passed trans-nonachlor
08-2374-1209	trans-nonachlor	Unequal Variance t Two-Sample Test	0.0400	29517-008 failed trans-nonachlor

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4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.758	-0.0761	1.59	0.436	1.96	0.301	0.672	88.61%	-65.73%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.485	0.435	0.536	0.453	0.553	0.0182	0.0407	8.38%	-6.03%
59517-007		5	0.459	0.431	0.487	0.432	0.484	0.0101	0.0227	4.94%	-0.26%
29517-008		5	1.2	-0.313	2.72	0.444	3.27	0.546	1.22	101.45%	-163.20%

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.453	0.483	0.00519	0.0116	2.49%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	3.56%
29517-002		5	0.864	-0.0114	1.74	0.436	2.11	0.315	0.705	81.60%	-85.45%
29517-003		5	0.519	0.398	0.639	0.454	0.688	0.0434	0.097	18.70%	-11.33%
29517-004		5	0.538	0.412	0.664	0.437	0.7	0.0454	0.101	18.86%	-15.41%
29517-005		5	0.782	0.5	1.06	0.62	1.18	0.102	0.227	29.05%	-67.77%
29517-006		5	1.55	1.3	1.79	1.3	1.79	0.0872	0.195	12.61%	-231.76%
59517-007		5	1.29	1.08	1.51	1.17	1.57	0.0774	0.173	13.37%	-177.68%
29517-008		5	1.03	0.696	1.37	0.767	1.41	0.121	0.271	26.26%	-121.67%

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.632	0.147	1.12	0.436	1.33	0.175	0.391	61.76%	-38.20%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.876	0.359	1.39	0.478	1.52	0.186	0.417	47.57%	-91.43%
59517-007		5	0.911	0.573	1.25	0.597	1.34	0.122	0.272	29.88%	-99.08%
29517-008		5	0.903	0.492	1.31	0.45	1.32	0.148	0.331	36.68%	-97.29%

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.454	0.439	0.47	0.434	0.468	0.00566	0.0127	2.79%	0.70%
59517-007		5	0.446	0.418	0.474	0.42	0.473	0.0103	0.0229	5.14%	2.53%
29517-008		5	0.449	0.427	0.471	0.422	0.469	0.00792	0.0177	3.95%	1.92%

Bioaccumulation Evaluation - Pesticides - Macoma EnviroSystems, Inc.

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.609	0.376	0.842	0.458	0.835	0.0839	0.188	30.82%	-33.09%
59517-007		5	0.624	0.244	1	0.432	1.16	0.137	0.305	48.97%	-36.28%
29517-008		5	0.475	0.416	0.533	0.422	0.542	0.021	0.0469	9.88%	-3.72%

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.454	0.439	0.47	0.434	0.468	0.00566	0.0127	2.79%	0.70%
59517-007		5	0.446	0.418	0.474	0.42	0.473	0.0103	0.0229	5.14%	2.53%
29517-008		5	0.449	0.427	0.471	0.422	0.469	0.00792	0.0177	3.95%	1.92%

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.618	0.172	1.06	0.436	1.26	0.161	0.359	58.10%	-35.14%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.714	0.565	0.863	0.536	0.853	0.0536	0.12	16.79%	-56.03%
59517-007		5	0.629	0.423	0.835	0.438	0.865	0.0743	0.166	26.42%	-37.46%
29517-008		5	0.503	0.396	0.611	0.435	0.651	0.0388	0.0867	17.22%	-10.01%

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.454	0.439	0.47	0.434	0.468	0.00566	0.0127	2.79%	0.70%
59517-007		5	0.446	0.418	0.474	0.42	0.473	0.0103	0.0229	5.14%	2.53%
29517-008		5	0.449	0.427	0.471	0.422	0.469	0.00792	0.0177	3.95%	1.92%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.843	0.165	1.52	0.434	1.58	0.244	0.546	64.81%	-84.22%
59517-007		5	1.28	0.29	2.27	0.432	2.18	0.357	0.797	62.31%	-179.68%
29517-008		5	0.639	0.11	1.17	0.422	1.4	0.19	0.426	66.67%	-39.60%

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	0.48	6.14	1.04	2.33	107.55%	0.00%
29517-001		5	1.96	-1.44	5.36	0.677	6.86	1.22	2.74	139.47%	9.23%
29517-002		5	1.07	0.224	1.91	0.438	1.9	0.305	0.681	63.70%	50.56%
29517-003		5	5.33	-5.93	16.6	0.454	21.5	4.05	9.07	170.06%	-146.51%
29517-004		5	2.82	-0.78	6.41	0.471	6.34	1.3	2.9	102.85%	-30.23%
29517-005		5	0.708	0.487	0.929	0.536	0.957	0.0796	0.178	25.13%	67.24%
29517-006		5	0.958	0.408	1.51	0.544	1.71	0.198	0.442	46.20%	55.71%
59517-007		5	3.6	-2.52	9.73	0.522	12.1	2.21	4.93	136.94%	-66.57%
29517-008		5	5.72	0.158	11.3	1.26	12.4	2	4.48	78.32%	-164.59%

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.454	0.439	0.47	0.434	0.468	0.00566	0.0127	2.79%	0.70%
59517-007		5	0.446	0.418	0.474	0.42	0.473	0.0103	0.0229	5.14%	2.53%
29517-008		5	0.449	0.427	0.471	0.422	0.469	0.00792	0.0177	3.95%	1.92%

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.454	0.439	0.47	0.434	0.468	0.00566	0.0127	2.79%	0.70%
59517-007		5	0.446	0.418	0.474	0.42	0.473	0.0103	0.0229	5.14%	2.53%
29517-008		5	0.449	0.427	0.471	0.422	0.469	0.00792	0.0177	3.95%	1.92%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.454	0.439	0.47	0.434	0.468	0.00566	0.0127	2.79%	0.70%
59517-007		5	0.446	0.418	0.474	0.42	0.473	0.0103	0.0229	5.14%	2.53%
29517-008		5	0.449	0.427	0.471	0.422	0.469	0.00792	0.0177	3.95%	1.92%

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.32	4.83	0.0876	0.196	4.28%	0.00%
29517-001		5	4.49	4.22	4.76	4.23	4.76	0.0974	0.218	4.85%	1.79%
29517-002		5	4.55	4.28	4.83	4.36	4.86	0.0989	0.221	4.86%	0.52%
29517-003		5	4.63	4.3	4.96	4.24	4.96	0.118	0.264	5.71%	-1.14%
29517-004		5	4.49	4.11	4.88	4.23	4.93	0.14	0.313	6.96%	1.79%
29517-005		5	4.25	4.13	4.38	4.18	4.42	0.0445	0.0996	2.34%	7.08%
29517-006		5	4.54	4.39	4.7	4.34	4.68	0.0566	0.127	2.79%	0.70%
59517-007		5	4.46	4.18	4.74	4.2	4.73	0.103	0.229	5.14%	2.53%
29517-008		5	4.49	4.27	4.71	4.22	4.69	0.0792	0.177	3.95%	1.92%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.865	0.965	0.0172	0.0384	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.846	0.952	0.0195	0.0436	4.85%	1.81%
29517-002		5	0.911	0.855	0.966	0.871	0.973	0.0199	0.0446	4.90%	0.52%
29517-003		5	0.926	0.86	0.992	0.847	0.992	0.0238	0.0531	5.74%	-1.11%
29517-004		5	0.899	0.821	0.976	0.846	0.986	0.028	0.0626	6.96%	1.81%
29517-005		5	0.85	0.826	0.874	0.836	0.883	0.00876	0.0196	2.30%	7.14%
29517-006		5	0.909	0.877	0.941	0.868	0.936	0.0114	0.0254	2.80%	0.70%
59517-007		5	0.892	0.835	0.95	0.84	0.947	0.0206	0.0461	5.17%	2.51%
29517-008		5	0.897	0.853	0.942	0.843	0.938	0.016	0.0357	3.98%	1.97%

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	21.7	24.2	0.432	0.966	4.21%	0.00%
29517-001		5	22.5	21.2	23.9	21.2	23.9	0.493	1.1	4.89%	1.83%
29517-002		5	22.8	21.5	24.2	21.9	24.4	0.495	1.11	4.84%	0.52%
29517-003		5	23.2	21.6	24.9	21.3	24.9	0.588	1.31	5.66%	-1.13%
29517-004		5	22.5	20.6	24.5	21.2	24.8	0.715	1.6	7.10%	1.83%
29517-005		5	21.4	20.7	22	21	22.2	0.223	0.498	2.33%	6.97%
29517-006		5	22.8	22	23.6	21.8	23.5	0.283	0.632	2.77%	0.70%
59517-007		5	22.4	21	23.8	21.1	23.8	0.515	1.15	5.14%	2.44%
29517-008		5	22.5	21.4	23.6	21.2	23.5	0.387	0.864	3.84%	1.92%

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.432	0.483	0.00876	0.0196	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.423	0.476	0.00974	0.0218	4.85%	1.79%
29517-002		5	0.455	0.428	0.483	0.436	0.486	0.00989	0.0221	4.86%	0.52%
29517-003		5	0.463	0.43	0.496	0.424	0.496	0.0118	0.0264	5.71%	-1.14%
29517-004		5	0.449	0.411	0.488	0.423	0.493	0.014	0.0313	6.96%	1.79%
29517-005		5	0.425	0.413	0.438	0.418	0.442	0.00445	0.00996	2.34%	7.08%
29517-006		5	0.535	0.306	0.765	0.434	0.865	0.0826	0.185	34.49%	-17.00%
59517-007		5	0.75	0.158	1.34	0.432	1.58	0.213	0.477	63.57%	-63.85%
29517-008		5	1.08	0.339	1.83	0.422	1.62	0.268	0.599	55.32%	-136.49%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		1.96	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.553	0.453	0.492	0.468	0.46
59517-007		0.484	0.432	0.438	0.473	0.467
29517-008		0.444	3.27	0.469	1.38	0.459

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		2.11	0.56	0.436	0.486	0.729
29517-003		0.471	0.454	0.512	0.688	0.469
29517-004		0.494	0.437	0.565	0.7	0.493
29517-005		0.62	0.659	0.718	1.18	0.732
29517-006		1.5	1.3	1.69	1.79	1.45
59517-007		1.57	1.18	1.19	1.36	1.17
29517-008		1.22	1.41	0.916	0.852	0.767

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		1.33	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.848	0.478	0.547	1.52	0.987
59517-007		0.95	0.82	0.597	1.34	0.848
29517-008		1.09	0.45	1.32	0.746	0.908

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.46
59517-007		0.42	0.432	0.438	0.473	0.467
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.492	0.458	0.835	0.468	0.792
59517-007		0.586	0.432	1.16	0.473	0.467
29517-008		0.5	0.45	0.542	0.422	0.459

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.46
59517-007		0.42	0.432	0.438	0.473	0.467
29517-008		0.444	0.45	0.469	0.422	0.459

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		1.26	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.743	0.666	0.853	0.772	0.536
59517-007		0.865	0.568	0.438	0.722	0.552
29517-008		0.446	0.487	0.498	0.435	0.651

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.46
59517-007		0.42	0.432	0.438	0.473	0.467
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		1.58	0.453	0.434	0.468	1.28
59517-007		1.48	0.432	1.84	2.18	0.467
29517-008		0.444	1.4	0.469	0.422	0.459

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-001		0.775	0.677	0.732	6.86	0.771
29517-002		1.71	0.61	0.438	1.9	0.688
29517-003		0.761	0.454	2.16	1.78	21.5
29517-004		0.678	5.6	0.471	6.34	0.993
29517-005		0.536	0.957	0.818	0.67	0.561
29517-006		0.847	0.907	1.71	0.781	0.544
59517-007		0.529	0.522	1.12	12.1	3.74
29517-008		7.81	2.52	1.26	4.62	12.4

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.46
59517-007		0.42	0.432	0.438	0.473	0.467
29517-008		0.444	0.45	0.469	0.422	0.459

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.46
59517-007		0.42	0.432	0.438	0.473	0.467
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.46
59517-007		0.42	0.432	0.438	0.473	0.467
29517-008		0.444	0.45	0.469	0.422	0.459

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-001		4.44	4.23	4.37	4.76	4.67
29517-002		4.44	4.71	4.36	4.86	4.39
29517-003		4.71	4.54	4.24	4.96	4.69
29517-004		4.23	4.37	4.71	4.23	4.93
29517-005		4.26	4.22	4.18	4.42	4.18
29517-006		4.57	4.53	4.34	4.68	4.6
59517-007		4.2	4.32	4.38	4.73	4.67
29517-008		4.44	4.5	4.69	4.22	4.59

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934
29517-002		0.888	0.942	0.871	0.973	0.879
29517-003		0.942	0.909	0.847	0.992	0.938
29517-004		0.846	0.874	0.942	0.846	0.986
29517-005		0.852	0.843	0.836	0.883	0.836
29517-006		0.914	0.906	0.868	0.936	0.921
59517-007		0.84	0.864	0.877	0.947	0.934
29517-008		0.888	0.901	0.938	0.843	0.917

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-001		22.3	21.2	21.9	23.9	23.4
29517-002		22.3	23.6	21.9	24.4	22
29517-003		23.6	22.8	21.3	24.9	23.5
29517-004		21.2	21.9	23.6	21.2	24.8
29517-005		21.4	21.2	21	22.2	21
29517-006		22.9	22.7	21.8	23.5	23.1
59517-007		21.1	21.7	22	23.8	23.4
29517-008		22.3	22.6	23.5	21.2	23

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29524-000	LC					
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467
29517-002		0.444	0.471	0.436	0.486	0.439
29517-003		0.471	0.454	0.424	0.496	0.469
29517-004		0.423	0.437	0.471	0.423	0.493
29517-005		0.426	0.422	0.418	0.442	0.418
29517-006		0.457	0.453	0.434	0.468	0.865
59517-007		0.625	0.432	0.438	1.58	0.674
29517-008		1.31	1.62	1.6	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-5731-0910 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed 4-4'-ddd	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-8214-1190 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed 4-4'-ddd	122.19%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	24	n/a	0	8	Exact	0.2738	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.226202	0.226202	1	1	0.3464	Non-Significant Effect
Error	1.80813	0.226017	8			
Total	2.03434		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1180	23.2	4.3E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.652	0.741	2.3E-04	Non-Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.758	-0.0761	1.59	0.471	0.436	1.96	0.301	88.61%	-65.73%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		1.96	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-0362-9347 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed 4-4'-ddd	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-3288-2343 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed 4-4'-ddd	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7259-8830 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed 4-4'-ddd	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-1438-5616 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed 4-4'-ddd	8.20%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.37	1.86	0.038	8	CDF	0.1043	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.25	2.29	0.0632	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0019044	0.0019044	1	1.87	0.2086	Non-Significant Effect
Error	0.008144	0.001018	8			
Total	0.0100484		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.31	23.2	0.1860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1829	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.485	0.435	0.536	0.468	0.453	0.553	0.0182	8.38%	-6.03%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.553	0.453	0.492	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-9822-8769 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed 4-4'-ddd	5.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.0896	1.86	0.025	8	CDF	0.4654	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.6E-06	3.6E-06	1	0.00803	0.9308	Non-Significant Effect
Error	0.003588	0.0004485	8			
Total	0.0035916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.34	23.2	0.7835	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.741	0.2788	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.459	0.431	0.487	0.467	0.432	0.484	0.0101	4.94%	-0.26%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.484	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-9044-6075 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed 4-4'-ddd	222.09%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	23	n/a	0	8	Exact	0.2103	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.54	2.29	0.0054	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.39428	1.39428	1	1.87	0.2090	Non-Significant Effect
Error	5.97371	0.746714	8			
Total	7.36799		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3900	23.2	4.0E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.733	0.741	0.0022	Non-Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	1.2	-0.313	2.72	0.469	0.444	3.27	0.546	101.45%	-163.20%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	3.27	0.469	1.38	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-0436-4722 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed 4-4'-dde	4.40%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-1.5	1.86	0.021	8	CDF	0.9146	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.62	2.29	0.8660	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	2.26	0.1709	Non-Significant Effect
Error	0.0024352	0.0003044	8			
Total	0.0031241		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.53	23.2	0.2497	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.965	0.741	0.8362	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	3.56%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-2130-6773 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed 4-4'-dde	125.87%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	20	n/a	0	8	Exact	0.0754	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	9.1E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.396408	0.396408	1	1.59	0.2423	Non-Significant Effect
Error	1.98976	0.24872	8			
Total	2.38617		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3700	23.2	4.4E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.692	0.741	7.0E-04	Non-Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-002		5	0.864	-0.0114	1.74	0.56	0.436	2.11	0.315	81.60%	-85.45%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-002		2.11	0.56	0.436	0.486	0.729

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7203-5606 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed 4-4'-dde	5.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.847	1.89	0.024	7	CDF	0.2125	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000245	0.000245	1	0.717	0.4250	Non-Significant Effect
Error	0.002391	0.0003416	7			
Total	0.002636		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.59	24.3	0.1750	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.701	0.4125	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-003		4	0.477	0.437	0.516	0.47	0.454	0.512	0.0124	5.22%	-2.25%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-003		0.471	0.454	0.512	Outlier	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-3726-3478 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed 4-4'-dde	9.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	1.31	1.89	0.045	7	CDF	0.1150	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0021701	0.0021701	1	1.73	0.2300	Non-Significant Effect
Error	0.0087868	0.0012553	7			
Total	0.0109569		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	20.4	24.3	0.0138	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.701	0.1515	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-004		4	0.497	0.414	0.581	0.493	0.437	0.565	0.0262	10.55%	-6.71%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-004		0.494	0.437	0.565	Outlier	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-8320-0156 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 failed 4-4'-dde	40.59%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	2.29	0.0014	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.249324	0.249324	1	9.64	0.0146	Significant Effect
Error	0.206911	0.0258638	8			
Total	0.456235		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	384	23.2	4.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.728	0.741	0.0019	Non-Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-005		5	0.782	0.5	1.06	0.718	0.62	1.18	0.102	29.05%	-67.77%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-005		0.62	0.659	0.718	1.18	0.732

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-9514-8455 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed 4-4'-dde	39.97%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	12.4	2.13	0.186	4	CDF	1.2E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.29	0.3640	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.916	2.916	1	153	1.7E-06	Significant Effect
Error	0.152658	0.0190823	8			
Total	3.06866		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	283	23.2	7.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4099	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-006		5	1.55	1.3	1.79	1.5	1.3	1.79	0.0872	12.61%	-231.76%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-006		1.5	1.3	1.69	1.79	1.45

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-3664-0525 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed 4-4'-dde	35.47%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	10.7	2.13	0.165	4	CDF	2.2E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.39	2.29	0.0241	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.71396	1.71396	1	114	5.2E-06	Significant Effect
Error	0.120258	0.0150323	8			
Total	1.83422		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	223	23.2	1.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.836	0.741	0.0393	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
59517-007		5	1.29	1.08	1.51	1.19	1.17	1.57	0.0774	13.37%	-177.68%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
59517-007		1.57	1.18	1.19	1.36	1.17

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-6607-6068 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed 4-4'-dde	55.55%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	4.67	2.13	0.259	4	CDF	0.0048	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.29	0.1612	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.803723	0.803723	1	21.8	0.0016	Significant Effect
Error	0.294842	0.0368552	8			
Total	1.09856		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	547	23.2	2.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.921	0.741	0.3650	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.466	0.452	0.48	0.466	0.453	0.483	0.00519	2.49%	0.00%
29517-008		5	1.03	0.696	1.37	0.916	0.767	1.41	0.121	26.26%	-121.67%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.458	0.453	0.466	0.47
29517-008		1.22	1.41	0.916	0.852	0.767

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-6502-3491 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed 4-4'-ddt	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-8229-8586 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed 4-4'-ddt	6.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	0.0273	1.89	0.028	7	CDF	0.4895	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.555E-07	3.555E-07	1	0.000747	0.9790	Non-Significant Effect
Error	0.0033312	0.0004759	7			
Total	0.0033316		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.56	24.3	0.6594	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.701	0.3419	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		4	0.458	0.419	0.497	0.455	0.436	0.486	0.0122	5.35%	-0.09%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		Outlier	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-7023-9733 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed 4-4'-ddt	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-7722-1007 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed 4-4'-ddt	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-4213-3943 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed 4-4'-ddt	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-2705-8421	**Endpoint:**	4-4'-DDT	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed 4-4'-ddt	62.46%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	2.12	2.35	0.286	3	CDF	0.0621	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.147233	0.147233	1	5.8	0.0468	Significant Effect
Error	0.177599	0.0253713	7			
Total	0.324832		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	153	24.3	2.8E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.701	0.6143	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		4	0.715	0.33	1.1	0.697	0.478	0.987	0.121	33.88%	-56.25%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.848	0.478	0.547	Outlier	0.987

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-2645-4290 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed 4-4'-ddt	38.51%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	4.62	2.35	0.176	3	CDF	0.0095	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.266266	0.266266	1	27.5	0.0012	Significant Effect
Error	0.0678899	0.0096986	7			
Total	0.334156		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	57.7	24.3	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.841	0.701	0.0595	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		4	0.804	0.567	1.04	0.834	0.597	0.95	0.0744	18.50%	-75.64%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.95	0.82	0.597	Outlier	0.848

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-2831-5530 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed 4-4'-ddt	69.12%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	3	2.13	0.316	4	CDF	0.0200	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1903	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.495508	0.495508	1	9	0.0171	Significant Effect
Error	0.440274	0.0550343	8			
Total	0.935782		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	286	23.2	7.3E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1709	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.903	0.492	1.31	0.908	0.45	1.32	0.148	36.68%	-97.29%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		1.09	0.45	1.32	0.746	0.908

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-4324-9486 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed aldrin	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-1361-7608 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed aldrin	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5413-7539 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed aldrin	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-5034-3586 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed aldrin	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-3377-9525 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed aldrin	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-5928-6541 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed aldrin	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.019	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.560E-05	2.560E-05	1	0.0942	0.7668	Non-Significant Effect
Error	0.0021744	0.0002718	8			
Total	0.0022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.454	0.439	0.47	0.457	0.434	0.468	0.00566	2.79%	0.70%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-9351-7144 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed aldrin	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.025	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.74	0.4148	Non-Significant Effect
Error	0.0036392	0.0004549	8			
Total	0.0039756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.446	0.418	0.474	0.438	0.42	0.473	0.0103	5.14%	2.53%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.42	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-4098-0609 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed aldrin	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.022	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001936	0.0001936	1	0.556	0.4774	Non-Significant Effect
Error	0.002788	0.0003485	8			
Total	0.0029816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.449	0.427	0.471	0.45	0.422	0.469	0.00792	3.95%	1.92%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-3971-7329 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed alpha chlordane (trans)	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-8932-2242 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed alpha chlordane (trans)	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-5435-2336 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed alpha chlordane (trans)	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-0326-6903 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed alpha chlordane (trans)	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-6962-5083 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed alpha chlordane (trans)	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-8917-5468 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed alpha chlordane (trans)	39.32%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.79	2.13	0.18	4	CDF	0.0736	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.5036	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0573049	0.0573049	1	3.22	0.1106	Non-Significant Effect
Error	0.142469	0.0178086	8			
Total	0.199774		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	91.9	23.2	6.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.901	0.741	0.2220	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.609	0.376	0.842	0.492	0.458	0.835	0.0839	30.82%	-33.09%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.492	0.458	0.835	0.468	0.792

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-9714-8997	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed alpha chlordane (trans)	12.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	1.03	1.89	0.059	7	CDF	0.1687	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0022614	0.0022614	1	1.06	0.3374	Non-Significant Effect
Error	0.0149302	0.0021329	7			
Total	0.0171916		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.7	24.3	0.0382	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.701	0.1972	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		4	0.49	0.383	0.596	0.47	0.432	0.586	0.0334	13.65%	-6.97%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.586	0.432	Outlier	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-2232-9549 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed alpha chlordane (trans)	9.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	0.748	1.86	0.042	8	CDF	0.2380	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2456	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007225	0.0007225	1	0.559	0.4760	Non-Significant Effect
Error	0.0103364	0.0012921	8			
Total	0.0110589		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.74	23.2	0.1190	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8463	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.475	0.416	0.533	0.459	0.422	0.542	0.021	9.88%	-3.72%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.5	0.45	0.542	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-6545-6674 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed cis-nonachlor	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-4929-3122 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed cis-nonachlor	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-0877-3797 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed cis-nonachlor	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-2866-7517 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed cis-nonachlor	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-4181-5341 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed cis-nonachlor	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-5367-3112 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed cis-nonachlor	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.019	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.560E-05	2.560E-05	1	0.0942	0.7668	Non-Significant Effect
Error	0.0021744	0.0002718	8			
Total	0.0022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.454	0.439	0.47	0.457	0.434	0.468	0.00566	2.79%	0.70%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-7937-9170	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed cis-nonachlor	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.025	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.74	0.4148	Non-Significant Effect
Error	0.0036392	0.0004549	8			
Total	0.0039756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.446	0.418	0.474	0.438	0.42	0.473	0.0103	5.14%	2.53%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.42	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5147-5332 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed cis-nonachlor	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.022	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001936	0.0001936	1	0.556	0.4774	Non-Significant Effect
Error	0.002788	0.0003485	8			
Total	0.0029816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.449	0.427	0.471	0.45	0.422	0.469	0.00792	3.95%	1.92%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-2325-2637 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed dieldrin	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-9725-0639 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed dieldrin	65.39%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	24	n/a	0	8	Exact	0.2738	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	5.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0646416	0.0646416	1	0.999	0.3469	Non-Significant Effect
Error	0.517894	0.0647368	8			
Total	0.582536		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	337	23.2	5.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.674	0.741	4.3E-04	Non-Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.618	0.172	1.06	0.471	0.436	1.26	0.161	58.10%	-35.14%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		1.26	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-8236-4663 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed dieldrin	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-5583-1727 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed dieldrin	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-0527-9366 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed dieldrin	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-5385-1974 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 failed dieldrin	25.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006*	4.72	2.13	0.116	4	CDF	0.0046	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.29	0.0886	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.164352	0.164352	1	22.3	0.0015	Significant Effect
Error	0.0590472	0.0073809	8			
Total	0.2234		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	37.5	23.2	0.0040	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.921	0.741	0.3637	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.714	0.565	0.863	0.743	0.536	0.853	0.0536	16.79%	-56.03%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.743	0.666	0.853	0.772	0.536

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-4684-7912 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed dieldrin	34.86%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.29	2.13	0.16	4	CDF	0.0419	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1375	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0734449	0.0734449	1	5.25	0.0512	Non-Significant Effect
Error	0.112009	0.0140012	8			
Total	0.185454		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	72.1	23.2	0.0011	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.741	0.5354	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.629	0.423	0.835	0.568	0.438	0.865	0.0743	26.42%	-37.46%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.865	0.568	0.438	0.722	0.552

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-0526-8609 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed dieldrin	16.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.15	1.86	0.074	8	CDF	0.1412	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.49	2.29	0.0091	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0052441	0.0052441	1	1.33	0.2824	Non-Significant Effect
Error	0.0315904	0.0039488	8			
Total	0.0368345		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19.6	23.2	0.0137	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0246	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.503	0.396	0.611	0.487	0.435	0.651	0.0388	17.22%	-10.01%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.446	0.487	0.498	0.435	0.651

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-4485-2684	**Endpoint:**	Dieldrin	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed dieldrin	6.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	0.532	1.89	0.032	7	CDF	0.3057	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001760	0.0001760	1	0.283	0.6114	Non-Significant Effect
Error	0.0043582	0.0006226	7			
Total	0.0045342		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.46	24.3	0.4055	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.701	0.4777	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		4	0.466	0.418	0.515	0.466	0.435	0.498	0.0153	6.58%	-1.94%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.446	0.487	0.498	0.435	Outlier

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-3929-0494 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed endosulfan i	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-8465-4467 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed endosulfan i	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-5928-3008 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed endosulfan i	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-9954-1329 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed endosulfan i	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-1335-4980 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endosulfan i	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-0752-0595 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed endosulfan i	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.019	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.560E-05	2.560E-05	1	0.0942	0.7668	Non-Significant Effect
Error	0.0021744	0.0002718	8			
Total	0.0022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.454	0.439	0.47	0.457	0.434	0.468	0.00566	2.79%	0.70%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-8059-2222	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed endosulfan i	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.025	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.74	0.4148	Non-Significant Effect
Error	0.0036392	0.0004549	8			
Total	0.0039756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.446	0.418	0.474	0.438	0.42	0.473	0.0103	5.14%	2.53%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.42	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-2782-2286 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed endosulfan i	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.022	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001936	0.0001936	1	0.556	0.4774	Non-Significant Effect
Error	0.002788	0.0003485	8			
Total	0.0029816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.449	0.427	0.471	0.45	0.422	0.469	0.00792	3.95%	1.92%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-8889-1693 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed endosulfan ii	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-9033-9345 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed endosulfan ii	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-8280-2217 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed endosulfan ii	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-6511-0683 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed endosulfan ii	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5339-6442 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endosulfan ii	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-3587-0681 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed endosulfan ii	113.91%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	1.58	2.13	0.521	4	CDF	0.0951	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2130	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.371333	0.371333	1	2.48	0.1536	Non-Significant Effect
Error	1.19568	0.14946	8			
Total	1.56701		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	779	23.2	9.9E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.87	0.741	0.1010	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.843	0.165	1.52	0.468	0.434	1.58	0.244	64.81%	-84.22%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		1.58	0.453	0.434	0.468	1.28

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-1583-0356 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 failed endosulfan ii	166.19%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007*	2.3	2.13	0.761	4	CDF	0.0413	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.6973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.69003	1.69003	1	5.31	0.0501	Non-Significant Effect
Error	2.54521	0.318151	8			
Total	4.23524		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1660	23.2	2.2E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1836	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	1.28	0.29	2.27	1.48	0.432	2.18	0.357	62.31%	-179.68%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		1.48	0.432	1.84	2.18	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-6825-3142 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed endosulfan ii	77.48%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	28	n/a	0	8	Exact	0.5794	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.9E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0820836	0.0820836	1	0.903	0.3698	Non-Significant Effect
Error	0.727068	0.0908835	8			
Total	0.809152		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	473	23.2	2.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.666	0.741	3.4E-04	Non-Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.639	0.11	1.17	0.459	0.422	1.4	0.19	66.67%	-39.60%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	1.4	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-0032-7021 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed endrin	138.14%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	27	n/a	0	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1925	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0996004	0.0996004	1	0.0154	0.9042	Non-Significant Effect
Error	51.6201	6.45251	8			
Total	51.7197		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.39	23.2	0.7597	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.688	0.741	6.4E-04	Non-Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
29517-001		5	1.96	-1.44	5.36	0.771	0.677	6.86	1.22	139.47%	9.23%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-001		0.775	0.677	0.732	6.86	0.771

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-1859-9351 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed endrin	93.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-1.01	1.86	2.02	8	CDF	0.8287	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.46	2.29	0.0123	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.98881	2.98881	1	1.02	0.3426	Non-Significant Effect
Error	23.4936	2.93669	8			
Total	26.4824		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.7	23.2	0.0355	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.814	0.741	0.0217	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
29517-002		5	1.07	0.224	1.91	0.688	0.438	1.9	0.305	63.70%	50.56%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-002		1.71	0.61	0.438	1.9	0.688

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-7612-2312 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed endrin	359.92%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	26	n/a	0	8	Exact	0.4206	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.59	2.29	0.0025	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25.0969	25.0969	1	0.573	0.4708	Non-Significant Effect
Error	350.41	43.8012	8			
Total	375.506		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.2	23.2	0.0219	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.725	0.741	0.0018	Non-Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
29517-003		5	5.33	-5.93	16.6	1.78	0.454	21.5	4.05	170.06%	-146.51%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-003		0.761	0.454	2.16	1.78	21.5

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-0437-1921 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed endrin	142.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	0.394	1.86	3.09	8	CDF	0.3521	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8927	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06864	1.06864	1	0.155	0.7042	Non-Significant Effect
Error	55.2007	6.90009	8			
Total	56.2694		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.55	23.2	0.6810	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.815	0.741	0.0223	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
29517-004		5	2.82	-0.78	6.41	0.993	0.471	6.34	1.3	102.85%	-30.23%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-004		0.678	5.6	0.471	6.34	0.993

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-1930-9582 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endrin	89.70%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	30	n/a	0	8	Exact	0.7262	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.56	2.29	0.0041	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.28674	5.28674	1	1.94	0.2008	Non-Significant Effect
Error	21.7649	2.72061	8			
Total	27.0516		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	171	23.2	2.0E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.74	0.741	0.0027	Non-Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
29517-005		5	0.708	0.487	0.929	0.67	0.536	0.957	0.0796	25.13%	67.24%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-005		0.536	0.957	0.818	0.67	0.561

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-9066-5759 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endrin	58.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-1.29	1.89	0.678	7	CDF	0.8803	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.469916	0.469916	1	1.65	0.2395	Non-Significant Effect
Error	1.99021	0.284316	7			
Total	2.46013		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19.6	24.3	0.0149	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.956	0.701	0.7597	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	1.17	-0.0859	2.42	1.11	0.48	1.97	0.394	67.46%	0.00%
29517-005		5	0.708	0.487	0.929	0.67	0.536	0.957	0.0796	25.13%	39.36%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	Outlier
29517-005		0.536	0.957	0.818	0.67	0.561

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-0373-0856 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed endrin	66.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.51	1.89	0.781	7	CDF	0.6872	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0984204	0.0984204	1	0.26	0.6256	Non-Significant Effect
Error	2.64663	0.37809	7			
Total	2.74505		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.17	24.3	0.2939	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.896	0.701	0.2307	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	4	1.17	-0.0859	2.42	1.11	0.48	1.97	0.394	67.46%	0.00%
29517-006		5	0.958	0.408	1.51	0.847	0.544	1.71	0.198	46.20%	18.01%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	Outlier
29517-006		0.847	0.907	1.71	0.781	0.544

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-3330-1909	**Endpoint:**	endrin	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed endrin	118.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.504	1.89	2.57	7	CDF	0.6852	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.04227	1.04227	1	0.254	0.6296	Non-Significant Effect
Error	28.6975	4.09964	7			
Total	29.7397		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.3	46.2	0.5200	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.807	0.701	0.0243	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
59517-007		4	1.48	-0.963	3.92	0.824	0.522	3.74	0.767	103.81%	31.67%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
59517-007		0.529	0.522	1.12	Outlier	3.74

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-7511-5425 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed endrin	194.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	1.58	1.86	4.2	8	CDF	0.0768	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2506	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	31.6733	31.6733	1	2.48	0.1536	Non-Significant Effect
Error	101.97	12.7463	8			
Total	133.644		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.71	23.2	0.2320	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5058	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	2.16	-0.725	5.05	1.72	0.48	6.14	1.04	107.55%	0.00%
29517-008		5	5.72	0.158	11.3	4.62	1.26	12.4	2	78.32%	-164.59%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	1.97	0.48	1.72	0.503	6.14
29517-008		7.81	2.52	1.26	4.62	12.4

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-8012-3452 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed gamma-bhc (lindane)	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-3366-7682 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed gamma-bhc (lindane)	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-0616-2622 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed gamma-bhc (lindane)	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-4988-3304 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed gamma-bhc (lindane)	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-8657-2732 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed gamma-bhc (lindane)	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-9910-2120 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed gamma-bhc (lindane)	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.019	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.560E-05	2.560E-05	1	0.0942	0.7668	Non-Significant Effect
Error	0.0021744	0.0002718	8			
Total	0.0022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.454	0.439	0.47	0.457	0.434	0.468	0.00566	2.79%	0.70%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-5805-6844 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed gamma-bhc (lindane)	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.025	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.74	0.4148	Non-Significant Effect
Error	0.0036392	0.0004549	8			
Total	0.0039756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.446	0.418	0.474	0.438	0.42	0.473	0.0103	5.14%	2.53%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.42	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-9752-2524 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed gamma-bhc (lindane)	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.022	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001936	0.0001936	1	0.556	0.4774	Non-Significant Effect
Error	0.002788	0.0003485	8			
Total	0.0029816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.449	0.427	0.471	0.45	0.422	0.469	0.00792	3.95%	1.92%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-1787-6747 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed gamma-chlordane (cis)	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-6447-8359	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed gamma-chlordane (cis)	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-3689-0626 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed gamma-chlordane (cis)	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-7228-8508	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed gamma-chlordane (cis)	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-7445-6868 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed gamma-chlordane (cis)	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-4012-7885	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed gamma-chlordane (cis)	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.019	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.560E-05	2.560E-05	1	0.0942	0.7668	Non-Significant Effect
Error	0.0021744	0.0002718	8			
Total	0.0022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.454	0.439	0.47	0.457	0.434	0.468	0.00566	2.79%	0.70%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-1513-1297 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed gamma-chlordane (cis)	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.025	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.74	0.4148	Non-Significant Effect
Error	0.0036392	0.0004549	8			
Total	0.0039756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.446	0.418	0.474	0.438	0.42	0.473	0.0103	5.14%	2.53%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.42	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-4264-0005 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed gamma-chlordane (cis)	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.022	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001936	0.0001936	1	0.556	0.4774	Non-Significant Effect
Error	0.002788	0.0003485	8			
Total	0.0029816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.449	0.427	0.471	0.45	0.422	0.469	0.00792	3.95%	1.92%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-8562-7391 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed heptachlor epoxide	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.888	0.846	0.952	0.0195	4.85%	1.81%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-6352-3668	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed heptachlor epoxide	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966	0.888	0.871	0.973	0.0199	4.90%	0.52%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-9599-4395 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed heptachlor epoxide	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992	0.938	0.847	0.992	0.0238	5.74%	-1.11%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-0226-7741 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed heptachlor epoxide	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976	0.874	0.846	0.986	0.028	6.96%	1.81%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-0929-4932 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed heptachlor epoxide	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874	0.843	0.836	0.883	0.00876	2.30%	7.14%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-4733-9448	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed heptachlor epoxide	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941	0.914	0.868	0.936	0.0114	2.80%	0.70%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-8720-6764	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed heptachlor epoxide	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95	0.877	0.84	0.947	0.0206	5.17%	2.51%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-4786-7119 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed heptachlor epoxide	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942	0.901	0.843	0.938	0.016	3.98%	1.97%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-3008-0030 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed heptachlor	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-2561-8713 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed heptachlor	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-9404-1116 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed heptachlor	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-3848-5308 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed heptachlor	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-5195-4009 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed heptachlor	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-7168-6069 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed heptachlor	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.019	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.560E-05	2.560E-05	1	0.0942	0.7668	Non-Significant Effect
Error	0.0021744	0.0002718	8			
Total	0.0022		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.454	0.439	0.47	0.457	0.434	0.468	0.00566	2.79%	0.70%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.46

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-7692-8142 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed heptachlor	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.025	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.74	0.4148	Non-Significant Effect
Error	0.0036392	0.0004549	8			
Total	0.0039756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.446	0.418	0.474	0.438	0.42	0.473	0.0103	5.14%	2.53%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.42	0.432	0.438	0.473	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-1589-3366 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed heptachlor	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.022	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001936	0.0001936	1	0.556	0.4774	Non-Significant Effect
Error	0.002788	0.0003485	8			
Total	0.0029816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	0.449	0.427	0.471	0.45	0.422	0.469	0.00792	3.95%	1.92%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		0.444	0.45	0.469	0.422	0.459

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-9658-9651 **Endpoint:** hexachlorobenzene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed hexachlorobenzene	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.888	0.846	0.952	0.0195	4.85%	1.81%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-2667-0944	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed hexachlorobenzene	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966	0.888	0.871	0.973	0.0199	4.90%	0.52%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-9712-7554	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed hexachlorobenzene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992	0.938	0.847	0.992	0.0238	5.74%	-1.11%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-8793-9468	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed hexachlorobenzene	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976	0.874	0.846	0.986	0.028	6.96%	1.81%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-1340-7903	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed hexachlorobenzene	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874	0.843	0.836	0.883	0.00876	2.30%	7.14%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-2844-8371	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed hexachlorobenzene	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941	0.914	0.868	0.936	0.0114	2.80%	0.70%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-1833-3932	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed hexachlorobenzene	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95	0.877	0.84	0.947	0.0206	5.17%	2.51%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-1732-5971 **Endpoint:** hexachlorobenzene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed hexachlorobenzene	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942	0.901	0.843	0.938	0.016	3.98%	1.97%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-4857-1093 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed methoxychlor	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.244	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01681	0.01681	1	0.392	0.5487	Non-Significant Effect
Error	0.34304	0.04288	8			
Total	0.35985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-001		5	4.49	4.22	4.76	4.44	4.23	4.76	0.0974	4.85%	1.79%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-001		4.44	4.23	4.37	4.76	4.67

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-9472-5130 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed methoxychlor	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.246	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00144	0.00144	1	0.033	0.8603	Non-Significant Effect
Error	0.3488	0.0436	8			
Total	0.35024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-002		5	4.55	4.28	4.83	4.44	4.36	4.86	0.0989	4.86%	0.52%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-002		4.44	4.71	4.36	4.86	4.39

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-1620-0471	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed methoxychlor	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.273	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00676	0.00676	1	0.125	0.7327	Non-Significant Effect
Error	0.4324	0.05405	8			
Total	0.43916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-003		5	4.63	4.3	4.96	4.69	4.24	4.96	0.118	5.71%	-1.14%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-003		4.71	4.54	4.24	4.96	4.69

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-3368-1608	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed methoxychlor	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.307	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01681	0.01681	1	0.247	0.6327	Non-Significant Effect
Error	0.54484	0.068105	8			
Total	0.56165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-004		5	4.49	4.11	4.88	4.37	4.23	4.93	0.14	6.96%	1.79%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-004		4.23	4.37	4.71	4.23	4.93

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-1834-0874	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed methoxychlor	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.183	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.26244	0.26244	1	10.9	0.0109	Significant Effect
Error	0.193	0.024125	8			
Total	0.45544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-005		5	4.25	4.13	4.38	4.22	4.18	4.42	0.0445	2.34%	7.08%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-005		4.26	4.22	4.18	4.42	4.18

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-9904-1731	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed methoxychlor	4.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.307	1.86	0.194	8	CDF	0.6166	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7965	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00256	0.00256	1	0.0942	0.7668	Non-Significant Effect
Error	0.21744	0.02718	8			
Total	0.22		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9611	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-006		5	4.54	4.39	4.7	4.57	4.34	4.68	0.0566	2.79%	0.70%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-006		4.57	4.53	4.34	4.68	4.6

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-8335-7759 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed methoxychlor	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.86	1.86	0.251	8	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.34	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03364	0.03364	1	0.74	0.4148	Non-Significant Effect
Error	0.36392	0.04549	8			
Total	0.39756		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	23.2	0.7659	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2338	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
59517-007		5	4.46	4.18	4.74	4.38	4.2	4.73	0.103	5.14%	2.53%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
59517-007		4.2	4.32	4.38	4.73	4.67

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-4903-9448 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed methoxychlor	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.745	1.86	0.22	8	CDF	0.7613	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01936	0.01936	1	0.556	0.4774	Non-Significant Effect
Error	0.2788	0.03485	8			
Total	0.29816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.22	23.2	0.8507	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6301	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.33	4.82	4.53	4.32	4.83	0.0876	4.28%	0.00%
29517-008		5	4.49	4.27	4.71	4.5	4.22	4.69	0.0792	3.95%	1.92%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.83	4.5	4.53	4.32	4.7
29517-008		4.44	4.5	4.69	4.22	4.59

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-9371-6668 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed oxychlordane	5.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.639	1.86	0.048	8	CDF	0.7297	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.37	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.409	0.5406	Non-Significant Effect
Error	0.01349	0.0016863	8			
Total	0.0141789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8133	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3587	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-001		5	0.899	0.845	0.953	0.888	0.846	0.952	0.0195	4.85%	1.81%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-001		0.888	0.846	0.874	0.952	0.934

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-4678-9743 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed oxychlordane	5.35%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.049	8	CDF	0.5701	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9317	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.0333	0.8598	Non-Significant Effect
Error	0.0138584	0.0017323	8			
Total	0.013916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7791	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4532	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-002		5	0.911	0.855	0.966	0.888	0.871	0.973	0.0199	4.90%	0.52%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-002		0.888	0.942	0.871	0.973	0.879

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-5511-0815 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed oxychlordane	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.348	1.86	0.055	8	CDF	0.3684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4996	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002601	0.0002601	1	0.121	0.7369	Non-Significant Effect
Error	0.0171864	0.0021483	8			
Total	0.0174465		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.91	23.2	0.5455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9463	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-003		5	0.926	0.86	0.992	0.938	0.847	0.992	0.0238	5.74%	-1.11%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-003		0.942	0.909	0.847	0.992	0.938

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-9628-8512 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed oxychlordane	6.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.506	1.86	0.061	8	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006889	0.0006889	1	0.256	0.6268	Non-Significant Effect
Error	0.021562	0.0026953	8			
Total	0.0222509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3674	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3050	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-004		5	0.899	0.821	0.976	0.874	0.846	0.986	0.028	6.96%	1.81%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-004		0.846	0.874	0.942	0.846	0.986

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5041-9340 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed oxychlordane	3.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.39	1.86	0.036	8	CDF	0.9953	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5786	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0106929	0.0106929	1	11.5	0.0095	Significant Effect
Error	0.0074352	0.0009294	8			
Total	0.0181281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.85	23.2	0.2203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4805	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-005		5	0.85	0.826	0.874	0.843	0.836	0.883	0.00876	2.30%	7.14%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-005		0.852	0.843	0.836	0.883	0.836

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-2913-9342 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed oxychlordane	4.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.311	1.86	0.038	8	CDF	0.6180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8100	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001024	0.0001024	1	0.0965	0.7640	Non-Significant Effect
Error	0.0084892	0.0010612	8			
Total	0.0085916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.28	23.2	0.4443	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9440	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-006		5	0.909	0.877	0.941	0.914	0.868	0.936	0.0114	2.80%	0.70%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-006		0.914	0.906	0.868	0.936	0.921

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-6674-8567 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed oxychlordane	5.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.857	1.86	0.05	8	CDF	0.7918	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0013225	0.0013225	1	0.735	0.4163	Non-Significant Effect
Error	0.0144024	0.0018003	8			
Total	0.0157249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2722	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
59517-007		5	0.892	0.835	0.95	0.877	0.84	0.947	0.0206	5.17%	2.51%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
59517-007		0.84	0.864	0.877	0.947	0.934

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-7984-2198	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed oxychlordane	4.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.768	1.86	0.044	8	CDF	0.7676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00081	0.00081	1	0.589	0.4647	Non-Significant Effect
Error	0.0109944	0.0013743	8			
Total	0.0118044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8900	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6346	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.915	0.868	0.963	0.906	0.865	0.965	0.0172	4.20%	0.00%
29517-008		5	0.897	0.853	0.942	0.901	0.843	0.938	0.016	3.98%	1.97%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.965	0.901	0.906	0.865	0.94
29517-008		0.888	0.901	0.938	0.843	0.917

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-2348-3726 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed toxaphene	5.31%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.641	1.86	1.22	8	CDF	0.7303	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.39	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.441002	0.441002	1	0.411	0.5394	Non-Significant Effect
Error	8.584	1.073	8			
Total	9.025		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.3	23.2	0.8054	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3930	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-001		5	22.5	21.2	23.9	22.3	21.2	23.9	0.493	4.89%	1.83%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-001		22.3	21.2	21.9	23.9	23.4

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-1694-3562 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed toxaphene	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.183	1.86	1.22	8	CDF	0.5702	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9231	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0360005	0.0360005	1	0.0334	0.8595	Non-Significant Effect
Error	8.624	1.078	8			
Total	8.66		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.31	23.2	0.7995	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.927	0.741	0.4156	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-002		5	22.8	21.5	24.2	22.3	21.9	24.4	0.495	4.84%	0.52%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-002		22.3	23.6	21.9	24.4	22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-1936-3201 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed toxaphene	5.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.356	1.86	1.36	8	CDF	0.3654	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5562	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.168999	0.168999	1	0.127	0.7307	Non-Significant Effect
Error	10.64	1.33	8			
Total	10.809		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5656	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9598	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-003		5	23.2	21.6	24.9	23.5	21.3	24.9	0.588	5.66%	-1.13%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-003		23.6	22.8	21.3	24.9	23.5

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-5721-9961 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed toxaphene	6.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.503	1.86	1.55	8	CDF	0.6856	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.81	2.29	0.4739	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.441001	0.441001	1	0.253	0.6288	Non-Significant Effect
Error	13.964	1.7455	8			
Total	14.405		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.74	23.2	0.3522	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.741	0.3098	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-004		5	22.5	20.6	24.5	21.9	21.2	24.8	0.715	7.10%	1.83%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-004		21.2	21.9	23.6	21.2	24.8

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-6851-1017 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed toxaphene	3.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.29	1.86	0.904	8	CDF	0.9945	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6053	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.4	6.4	1	10.8	0.0110	Significant Effect
Error	4.724	0.5905	8			
Total	11.124		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.76	23.2	0.2275	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4523	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-005		5	21.4	20.7	22	21.2	21	22.2	0.223	2.33%	6.97%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-005		21.4	21.2	21	22.2	21

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-4811-3444 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed toxaphene	4.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	-0.31	1.86	0.96	8	CDF	0.6177	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8193	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0640005	0.0640005	1	0.096	0.7646	Non-Significant Effect
Error	5.332	0.6665	8			
Total	5.396		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.33	23.2	0.4322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9592	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-006		5	22.8	22	23.6	22.9	21.8	23.5	0.283	2.77%	0.70%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-006		22.9	22.7	21.8	23.5	23.1

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-4480-0547 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed toxaphene	5.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	-0.833	1.86	1.25	8	CDF	0.7856	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.4	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.784002	0.784002	1	0.694	0.4288	Non-Significant Effect
Error	9.03199	1.129	8			
Total	9.816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.42	23.2	0.7422	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.741	0.2839	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
59517-007		5	22.4	21	23.8	22	21.1	23.8	0.515	5.14%	2.44%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
59517-007		21.1	21.7	22	23.8	23.4

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-2951-4624 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed toxaphene	4.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.759	1.86	1.08	8	CDF	0.7652	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.53	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.484001	0.484001	1	0.576	0.4696	Non-Significant Effect
Error	6.72	0.84	8			
Total	7.204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.25	23.2	0.8346	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.741	0.6347	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.8	24.2	22.7	21.7	24.2	0.432	4.21%	0.00%
29517-008		5	22.5	21.4	23.6	22.6	21.2	23.5	0.387	3.84%	1.92%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	24.2	22.6	22.7	21.7	23.6
29517-008		22.3	22.6	23.5	21.2	23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-9575-4488	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	7d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed trans-nonachlor	5.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	-0.626	1.86	0.024	8	CDF	0.7257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.392	0.5487	Non-Significant Effect
Error	0.0034304	0.0004288	8			
Total	0.0035985		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8414	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3369	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-001		5	0.449	0.422	0.476	0.444	0.423	0.476	0.00974	4.85%	1.79%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-001		0.444	0.423	0.437	0.476	0.467

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7593-9887 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:58 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	7d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed trans-nonachlor	5.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.182	1.86	0.025	8	CDF	0.5698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	0.9973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.440E-05	1.440E-05	1	0.033	0.8603	Non-Significant Effect
Error	0.003488	0.000436	8			
Total	0.0035024		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	23.2	0.8196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4327	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-002		5	0.455	0.428	0.483	0.444	0.436	0.486	0.00989	4.86%	0.52%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-002		0.444	0.471	0.436	0.486	0.439

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-0987-4341	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	7d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed trans-nonachlor	5.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.354	1.86	0.027	8	CDF	0.3664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5486	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.76E-05	6.76E-05	1	0.125	0.7327	Non-Significant Effect
Error	0.004324	0.0005405	8			
Total	0.0043916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.977	0.741	0.9482	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-003		5	0.463	0.43	0.496	0.469	0.424	0.496	0.0118	5.71%	-1.14%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-003		0.471	0.454	0.424	0.496	0.469

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-6795-7760	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	7d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed trans-nonachlor	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.497	1.86	0.031	8	CDF	0.6837	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5452	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001681	0.0001681	1	0.247	0.6327	Non-Significant Effect
Error	0.0054484	0.0006811	8			
Total	0.0056165		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.55	23.2	0.3860	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2937	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-004		5	0.449	0.411	0.488	0.437	0.423	0.493	0.014	6.96%	1.79%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-004		0.423	0.437	0.471	0.423	0.493

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-0820-0616	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed trans-nonachlor	3.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	-3.3	1.86	0.018	8	CDF	0.9946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026244	0.0026244	1	10.9	0.0109	Significant Effect
Error	0.00193	0.0002413	8			
Total	0.0045544		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.86	23.2	0.2189	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5204	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-005		5	0.425	0.413	0.438	0.422	0.418	0.442	0.00445	2.34%	7.08%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-005		0.426	0.422	0.418	0.442	0.418

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-7212-7269	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	7d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed trans-nonachlor	33.75%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	25.5	n/a	1	8	Exact	0.3651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.0E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0151321	0.0151321	1	0.878	0.3763	Non-Significant Effect
Error	0.13793	0.0172413	8			
Total	0.153063		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	89	23.2	7.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7	0.741	8.7E-04	Non-Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-006		5	0.535	0.306	0.765	0.457	0.434	0.865	0.0826	34.49%	-17.00%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-006		0.457	0.453	0.434	0.468	0.865

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-7059-1789	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	14 Nov-17 14:59	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	7d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed trans-nonachlor	86.70%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	23.5	n/a	1	8	Exact	0.2302	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.61	2.29	0.0019	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.213452	0.213452	1	1.88	0.2080	Non-Significant Effect
Error	0.910302	0.113788	8			
Total	1.12375		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	593	23.2	1.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.718	0.741	0.0015	Non-Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
59517-007		5	0.75	0.158	1.34	0.625	0.432	1.58	0.213	63.57%	-63.85%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
59517-007		0.625	0.432	0.438	1.58	0.674

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-2374-1209 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 14 Nov-17 14:59 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	11d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	7d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 failed trans-nonachlor	124.79%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008*	2.33	2.13	0.571	4	CDF	0.0400	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7822	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.975313	0.975313	1	5.44	0.0480	Significant Effect
Error	1.43501	0.179377	8			
Total	2.41033		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	935	23.2	6.8E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1199	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.433	0.482	0.453	0.432	0.483	0.00876	4.28%	0.00%
29517-008		5	1.08	0.339	1.83	1.31	0.422	1.62	0.268	55.32%	-136.49%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.483	0.45	0.453	0.432	0.47
29517-008		1.31	1.62	1.6	0.422	0.459

28 day *Nereis virens* Sediment Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis Reports

Pesticides

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, CT

	CLDS Reference Site									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
cis-Chlordane	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
trans-Chlordane	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
cis-Nonachlor	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
trans-Nonachlor	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
Oxychlordane	0.877	U	0.931	U	0.888	U	0.901	U	0.988	U
Total Chlordanes	2.629		2.795		2.664		2.701		2.964	
4,4'-DDT	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
4,4'-DDD	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
4,4'-DDE	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
Total DDT	1.314		1.398		1.332		1.350		1.482	
Dieldrin	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
alpha-Endosulfan	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
beta-Endosulfan	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
Endosulfans	0.876		0.932		0.888		0.900		0.988	
Endrin	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
Heptachlor	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
Heptachlor epoxide	0.877	U	0.931	U	0.888	U	0.901	U	0.988	U
Hexachlorobenzene	0.877	U	0.931	U	0.888	U	0.901	U	0.988	U
Lindane	0.438	U	0.466	U	0.444	U	0.450	U	0.494	U
Methoxychlor	4.380	U	4.660	U	4.440	U	4.500	U	4.940	U
Toxaphene	22.00	U	23.40	U	22.30	U	22.60	U	24.80	U

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 1									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
cis-Chlordane	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
trans-Chlordane	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
cis-Nonachlor	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
trans-Nonachlor	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Oxychlordane	0.949	U	0.914	U	0.973	U	0.952	U	0.945	U
Total Chlordanes	2.845		2.742		2.917		2.856		2.833	
4,4'-DDT	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
4,4'-DDD	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
4,4'-DDE	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Total DDT	1.422		1.371		1.458		1.428		1.416	
Dieldrin	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
alpha-Endosulfan	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
beta-Endosulfan	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Endosulfans	0.948		0.914		0.972		0.952		0.944	
Endrin	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Heptachlor	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Heptachlor epoxide	0.949	U	0.914	U	0.973	U	0.952	U	0.945	U
Hexachlorobenzene	0.949	U	0.914	U	0.973	U	0.952	U	0.945	U
Lindane	0.474	U	0.457	U	0.486	U	0.476	U	0.472	U
Methoxychlor	4.740	U	4.570	U	4.860	U	4.760	U	4.720	U
Toxaphene	23.80	U	22.90	U	24.40	U	23.90	U	23.70	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 2									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
cis-Chlordane	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
trans-Chlordane	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
cis-Nonachlor	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
trans-Nonachlor	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
Oxychlordane	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
Total Chlordanes	2.911		2.759		2.526		2.928		2.615	
4,4'-DDT	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
4,4'-DDD	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
4,4'-DDE	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
Total DDT	1.455		1.380		1.263		1.464		1.308	
Dieldrin	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
alpha-Endosulfan	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
beta-Endosulfan	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
Endosulfans	0.970		0.920		0.842		0.976		0.872	
Endrin	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
Heptachlor	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
Heptachlor epoxide	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
Hexachlorobenzene	0.971	U	0.919	U	0.842	U	0.976	U	0.871	U
Lindane	0.485	U	0.460	U	0.421	U	0.488	U	0.436	U
Methoxychlor	4.850	U	4.600	U	4.210	U	4.880	U	4.360	U
Toxaphene	24.40	U	23.10	U	21.10	U	24.50	U	21.90	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 3									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
cis-Chlordane	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
trans-Chlordane	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
cis-Nonachlor	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
trans-Nonachlor	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
Oxychlordane	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
Total Chlordanes	2.688		2.622		2.976		2.874		2.917	
4,4'-DDT	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
4,4'-DDD	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
4,4'-DDE	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
Total DDT	1.344		1.311		1.488		1.437		1.458	
Dieldrin	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
alpha-Endosulfan	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
beta-Endosulfan	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
Endosulfans	0.896		0.874		0.992		0.958		0.972	
Endrin	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
Heptachlor	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
Heptachlor epoxide	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
Hexachlorobenzene	0.896	U	0.874	U	0.992	U	0.958	U	0.973	U
Lindane	0.448	U	0.437	U	0.496	U	0.479	U	0.486	U
Methoxychlor	4.480	U	4.370	U	4.960	U	4.790	U	4.860	U
Toxaphene	22.50	U	21.90	U	24.90	U	24.00	U	24.40	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 4									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
cis-Chlordane	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
trans-Chlordane	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
cis-Nonachlor	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
trans-Nonachlor	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
Oxychlordane	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
Total Chlordanes	2.868		2.574		2.604		2.802		2.766	
4,4'-DDT	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
4,4'-DDD	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
4,4'-DDE	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
Total DDT	1.434		1.287		1.302		1.401		1.383	
Dieldrin	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
alpha-Endosulfan	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
beta-Endosulfan	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
Endosulfans	0.956		0.858		0.868		0.934		0.922	
Endrin	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
Heptachlor	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
Heptachlor epoxide	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
Hexachlorobenzene	0.956	U	0.858	U	0.868	U	0.934	U	0.922	U
Lindane	0.478	U	0.429	U	0.434	U	0.467	U	0.461	U
Methoxychlor	4.780	U	4.290	U	4.340	U	4.670	U	4.610	U
Toxaphene	24.00	U	21.50	U	21.80	U	23.40	U	23.20	U

* = Qualifiers
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J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 5									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
cis-Chlordane	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
trans-Chlordane	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
cis-Nonachlor	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
trans-Nonachlor	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
Oxychlordane	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
Total Chlordanes	2.789		2.808		2.759		2.658		2.917	
4,4'-DDT	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
4,4'-DDD	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
4,4'-DDE	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
Total DDT	1.395		1.404		1.380		1.329		1.458	
Dieldrin	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
alpha-Endosulfan	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
beta-Endosulfan	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
Endosulfans	0.930		0.936		0.920		0.886		0.972	
Endrin	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
Heptachlor	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
Heptachlor epoxide	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
Hexachlorobenzene	0.929	U	0.936	U	0.919	U	0.886	U	0.973	U
Lindane	0.465	U	0.468	U	0.460	U	0.443	U	0.486	U
Methoxychlor	4.650	U	4.680	U	4.600	U	4.430	U	4.860	U
Toxaphene	23.30	U	23.50	U	23.10	U	22.20	U	24.40	U

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NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 6									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
cis-Chlordane	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
trans-Chlordane	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
cis-Nonachlor	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
trans-Nonachlor	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
Oxychlordane	0.853	U	0.980	U	0.976	U	0.934	U	0.994	U
Total Chlordanes	2.561		2.940		2.928		2.802		2.982	
4,4'-DDT	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
4,4'-DDD	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
4,4'-DDE	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
Total DDT	1.281		1.470		1.464		1.401		1.491	
Dieldrin	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
alpha-Endosulfan	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
beta-Endosulfan	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
Endosulfans	0.854		0.980		0.976		0.934		0.994	
Endrin	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
Heptachlor	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
Heptachlor epoxide	0.853	U	0.980	U	0.976	U	0.934	U	0.994	U
Hexachlorobenzene	0.853	U	0.980	U	0.976	U	0.934	U	0.994	U
Lindane	0.427	U	0.490	U	0.488	U	0.467	U	0.497	U
Methoxychlor	4.270	U	4.900	U	4.880	U	4.670	U	4.970	U
Toxaphene	21.40	U	24.60	U	24.50	U	23.40	U	25.00	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 7									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
cis-Chlordane	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
trans-Chlordane	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
cis-Nonachlor	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
trans-Nonachlor	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
Oxychlordane	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
Total Chlordanes	2.862		2.759		2.598		2.789		2.802	
4,4'-DDT	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
4,4'-DDD	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
4,4'-DDE	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
Total DDT	1.431		1.380		1.299		1.395		1.401	
Dieldrin	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
alpha-Endosulfan	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
beta-Endosulfan	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
Endosulfans	0.954		0.920		0.866		0.930		0.934	
Endrin	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
Heptachlor	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
Heptachlor epoxide	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
Hexachlorobenzene	0.954	U	0.919	U	0.866	U	0.929	U	0.934	U
Lindane	0.477	U	0.460	U	0.433	U	0.465	U	0.467	U
Methoxychlor	4.770	U	4.600	U	4.330	U	4.650	U	4.670	U
Toxaphene	24.00	U	23.10	U	21.80	U	23.30	U	23.40	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below F
NA Not Analyzed

Concentrations of COCs in *N. virens*
New Haven Harbor FNP, New Haven, C

	Composite 8									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Pesticides (ng/g wet weight)										
Aldrin	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
cis-Chlordane	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
trans-Chlordane	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
cis-Nonachlor	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
trans-Nonachlor	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
Oxychlordane	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
Total Chlordanes	2.742		2.934		2.514		2.561		2.651	
4,4'-DDT	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
4,4'-DDD	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
4,4'-DDE	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
Total DDT	1.371		1.467		1.257		1.281		1.326	
Dieldrin	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
alpha-Endosulfan	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
beta-Endosulfan	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
Endosulfans	0.914		0.978		0.838		0.854		0.884	
Endrin	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
Heptachlor	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
Heptachlor epoxide	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
Hexachlorobenzene	0.914	U	0.978	U	0.838	U	0.853	U	0.883	U
Lindane	0.457	U	0.489	U	0.419	U	0.427	U	0.442	U
Methoxychlor	4.570	U	4.890	U	4.190	U	4.270	U	4.420	U
Toxaphene	22.90	U	24.60	U	21.00	U	21.40	U	22.20	U

* = Qualifiers
U Analyte not detected; below Methoc
J Analyte estimated; detection below I
NA Not Analyzed

Bioaccumulation Evaluation - Pesticides - Nereis | **EnviroSystems, Inc.**

Start Date: 31 Aug-17 | **Species:** Nereis virens | **Sample Code:** 29525-000
End Date: 28 Sep-17 | **Protocol:** US ACE NED RIM (2004) | **Sample Source:** New Haven Harbor FNP -2017
Sample Date: 31 Aug-17 | **Material:** Laboratory Control Sediment | **Sample Station:** Laboratory Control - 29525

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor
29517-009	1	14	0.438	0.438	0.438	0.438	0.438			0.438		0.438	0.438	0.438	0.438	0.438	0.438	0.438	0.877	0.877	4.38	0.877	22	0.438
29517-009	2	23	0.466	0.466	0.466	0.466	0.466			0.466		0.466	0.466	0.466	0.466	0.466	0.466	0.466	0.931	0.931	4.66	0.931	23.4	0.466
29517-009	3	34	0.444	0.444	0.444	0.444	0.444			0.444		0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.888	0.888	4.44	0.888	22.3	0.444
29517-009	4	36	0.45	0.45	0.45	0.45	0.45			0.45		0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.901	0.901	4.5	0.901	22.6	0.45
29517-009	5	33	0.494	0.494	0.494	0.494	0.494			0.494		0.494	0.494	0.494	0.494	0.494	0.494	0.494	0.988	0.988	4.94	0.988	24.8	0.494
29517-001	1	16	0.474	0.474	0.474	0.474	0.474			0.474		0.474	0.474	0.474	0.474	0.474	0.474	0.474	0.949	0.949	4.74	0.949	23.8	0.474
29517-001	2	6	0.457	0.457	0.457	0.457	0.457			0.457		0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.914	0.914	4.57	0.914	22.9	0.457
29517-001	3	21	0.486	0.486	0.486	0.486	0.486			0.486		0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.973	0.973	4.86	0.973	24.4	0.486
29517-001	4	10	0.476	0.476	0.476	0.476	0.476			0.476		0.476	0.476	0.476	0.476	0.476	0.476	0.476	0.952	0.952	4.76	0.952	23.9	0.476
29517-001	5	4	0.472	0.472	0.472	0.472	0.472			0.472		0.472	0.472	0.472	0.472	0.472	0.472	0.472	0.945	0.945	4.72	0.945	23.7	0.472
29517-002	1	31	0.485	0.485	0.485	0.485	0.485			0.485		0.485	0.485	0.485	0.485	0.485	0.485	0.485	0.971	0.971	4.85	0.971	24.4	0.485
29517-002	2	5	0.46	0.46	0.46	0.46	0.46			0.46		0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.919	0.919	4.6	0.919	23.1	0.46
29517-002	3	17	0.421	0.421	0.421	0.421	0.421			0.421		0.421	0.421	0.421	0.421	0.421	0.421	0.421	0.842	0.842	4.21	0.842	21.1	0.421
29517-002	4	25	0.488	0.488	0.488	0.488	0.488			0.488		0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.976	0.976	4.88	0.976	24.5	0.488
29517-002	5	42	0.436	0.436	0.436	0.436	0.436			0.436		0.436	0.436	0.436	0.436	0.436	0.436	0.436	0.871	0.871	4.36	0.871	21.9	0.436
29517-003	1	32	0.448	0.448	0.448	0.448	0.448			0.448		0.448	0.448	0.448	0.448	0.448	0.448	0.448	0.896	0.896	4.48	0.896	22.5	0.448
29517-003	2	1	0.437	0.437	0.437	0.437	0.437			0.437		0.437	0.437	0.437	0.437	0.437	0.437	0.437	0.874	0.874	4.37	0.874	21.9	0.437
29517-003	3	41	0.496	0.496	0.496	0.496	0.496			0.496		0.496	0.496	0.496	0.496	0.496	0.496	0.496	0.992	0.992	4.96	0.992	24.9	0.496
29517-003	4	27	0.479	0.479	0.479	0.479	0.479			0.479		0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.958	0.958	4.79	0.958	24	0.479
29517-003	5	29	0.486	0.486	0.486	0.486	0.486			0.486		0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.973	0.973	4.86	0.973	24.4	0.486
29517-004	1	35	0.478	0.478	0.478	0.478	0.478			0.478		0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.956	0.956	4.78	0.956	24	0.478
29517-004	2	39	0.429	0.429	0.429	0.429	0.429			0.429		0.429	0.429	0.429	0.429	0.429	0.429	0.429	0.858	0.858	4.29	0.858	21.5	0.429
29517-004	3	28	0.434	0.434	0.434	0.434	0.434			0.434		0.434	0.434	0.434	0.434	0.434	0.434	0.434	0.868	0.868	4.34	0.868	21.8	0.434
29517-004	4	7	0.467	0.467	0.467	0.467	0.467			0.467		0.467	0.467	0.467	0.467	0.467	0.467	0.467	0.934	0.934	4.67	0.934	23.4	0.467
29517-004	5	19	0.461	0.461	0.461	0.461	0.461			0.461		0.461	0.461	0.461	0.461	0.461	0.461	0.461	0.922	0.922	4.61	0.922	23.2	0.461
29517-005	1	26	0.465	0.465	0.465	0.465	0.465			0.465		0.465	0.465	0.465	0.465	0.465	0.465	0.465	0.929	0.929	4.65	0.929	23.3	0.465
29517-005	2	15	0.468	0.468	0.468	0.468	0.468			0.468		0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.936	0.936	4.68	0.936	23.5	0.468
29517-005	3	37	0.46	0.46	0.46	0.46	0.46			0.46		0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.919	0.919	4.6	0.919	23.1	0.46
29517-005	4	3	0.443	0.443	0.443	0.443	0.443			0.443		0.443	0.443	0.443	0.443	0.443	0.443	0.443	0.886	0.886	4.43	0.886	22.2	0.443

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor
29517-005	5	9	0.486	0.486	0.486	0.486	0.486			0.486		0.486	0.486	0.486	0.486	0.486	0.486	0.486	0.973	0.973	4.86	0.973	24.4	0.486
29517-006	1	12	0.427	0.427	0.427	0.427	0.427			0.427		0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.853	0.853	4.27	0.853	21.4	0.427
29517-006	2	30	0.49	0.49	0.49	0.49	0.49			0.49		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.98	0.98	4.9	0.98	24.6	0.49
29517-006	3	18	0.488	0.488	0.488	0.488	0.488			0.488		0.488	0.488	0.488	0.488	0.488	0.488	0.488	0.976	0.976	4.88	0.976	24.5	0.488
29517-006	4	24	0.467	0.467	0.467	0.467	0.467			0.467		0.467	0.467	0.467	0.467	0.467	0.467	0.467	0.934	0.934	4.67	0.934	23.4	0.467
29517-006	5	40	0.497	0.497	0.497	0.497	0.497			0.497		0.497	0.497	0.497	0.497	0.497	0.497	0.497	0.994	0.994	4.97	0.994	25	0.497
59517-007	1	22	0.477	0.477	0.477	0.477	0.477			0.477		0.477	0.477	0.477	0.477	0.477	0.477	0.477	0.954	0.954	4.77	0.954	24	0.477
59517-007	2	13	0.46	0.46	0.46	0.46	0.46			0.46		0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.919	0.919	4.6	0.919	23.1	0.46
59517-007	3	20	0.433	0.433	0.433	0.433	0.433			0.433		0.433	0.433	0.433	0.433	0.433	0.433	0.433	0.866	0.866	4.33	0.866	21.8	0.433
59517-007	4	38	0.465	0.465	0.465	0.465	0.465			0.465		0.465	0.465	0.465	0.465	0.465	0.465	0.465	0.929	0.929	4.65	0.929	23.3	0.465
59517-007	5	8	0.467	0.467	0.467	0.467	0.467			0.467		0.467	0.467	0.467	0.467	0.467	0.467	0.467	0.934	0.934	4.67	0.934	23.4	0.467
29517-008	1	11	0.457	0.457	0.457	0.457	0.457			0.457		0.457	0.457	0.457	0.457	0.457	0.457	0.457	0.914	0.914	4.57	0.914	22.9	0.457
29517-008	2	2	0.489	0.489	0.489	0.489	0.489			0.489		0.489	0.489	0.489	0.489	0.489	0.489	0.489	0.978	0.978	4.89	0.978	24.6	0.489
29517-008	3	44	0.419	0.419	0.419	0.419	0.419			0.419		0.419	0.419	0.419	0.419	0.419	0.419	0.419	0.838	0.838	4.19	0.838	21	0.419
29517-008	4	43	0.427	0.427	0.427	0.427	0.427			0.427		0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.853	0.853	4.27	0.853	21.4	0.427
29517-008	5	45	0.442	0.442	0.442	0.442	0.442			0.442		0.442	0.442	0.442	0.442	0.442	0.442	0.442	0.883	0.883	4.42	0.883	22.2	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Batch ID:	08-4838-4372	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	31 Aug-17	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	28 Sep-17	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
07-6612-1679	4-4'-DDD	Equal Variance t Two-Sample Test	0.1120	29517-001 passed 4-4'-ddd
09-1134-1471	4-4'-DDD	Equal Variance t Two-Sample Test	0.5093	29517-002 passed 4-4'-ddd
14-1115-9157	4-4'-DDD	Equal Variance t Two-Sample Test	0.2484	29517-003 passed 4-4'-ddd
07-4287-4966	4-4'-DDD	Equal Variance t Two-Sample Test	0.6258	29517-004 passed 4-4'-ddd
17-8722-8104	4-4'-DDD	Equal Variance t Two-Sample Test	0.3180	29517-005 passed 4-4'-ddd
04-4928-6423	4-4'-DDD	Equal Variance t Two-Sample Test	0.1850	29517-006 passed 4-4'-ddd
01-1810-4593	4-4'-DDD	Equal Variance t Two-Sample Test	0.4383	59517-007 passed 4-4'-ddd
16-5127-0736	4-4'-DDD	Equal Variance t Two-Sample Test	0.7560	29517-008 passed 4-4'-ddd
01-9010-6099	4-4'-DDE	Equal Variance t Two-Sample Test	0.1120	29517-001 passed 4-4'-dde
09-8311-6076	4-4'-DDE	Equal Variance t Two-Sample Test	0.5093	29517-002 passed 4-4'-dde
08-1594-7656	4-4'-DDE	Equal Variance t Two-Sample Test	0.2484	29517-003 passed 4-4'-dde
02-2226-6567	4-4'-DDE	Equal Variance t Two-Sample Test	0.6258	29517-004 passed 4-4'-dde
00-7104-1782	4-4'-DDE	Equal Variance t Two-Sample Test	0.3180	29517-005 passed 4-4'-dde
02-6483-8603	4-4'-DDE	Equal Variance t Two-Sample Test	0.1850	29517-006 passed 4-4'-dde
00-3464-9566	4-4'-DDE	Equal Variance t Two-Sample Test	0.4383	59517-007 passed 4-4'-dde
17-4318-0611	4-4'-DDE	Equal Variance t Two-Sample Test	0.7560	29517-008 passed 4-4'-dde
04-8446-7196	4-4'-DDT	Equal Variance t Two-Sample Test	0.1120	29517-001 passed 4-4'-ddt
09-1495-6711	4-4'-DDT	Equal Variance t Two-Sample Test	0.5093	29517-002 passed 4-4'-ddt
00-1419-3166	4-4'-DDT	Equal Variance t Two-Sample Test	0.2484	29517-003 passed 4-4'-ddt
14-8649-0714	4-4'-DDT	Equal Variance t Two-Sample Test	0.6258	29517-004 passed 4-4'-ddt
08-6662-5942	4-4'-DDT	Equal Variance t Two-Sample Test	0.3180	29517-005 passed 4-4'-ddt
21-3177-2574	4-4'-DDT	Equal Variance t Two-Sample Test	0.1850	29517-006 passed 4-4'-ddt
07-2633-1733	4-4'-DDT	Equal Variance t Two-Sample Test	0.4383	59517-007 passed 4-4'-ddt
17-8780-1164	4-4'-DDT	Equal Variance t Two-Sample Test	0.7560	29517-008 passed 4-4'-ddt
00-9946-9728	aldrin	Equal Variance t Two-Sample Test	0.1120	29517-001 passed aldrin
07-5599-3600	aldrin	Equal Variance t Two-Sample Test	0.5093	29517-002 passed aldrin
14-1246-9181	aldrin	Equal Variance t Two-Sample Test	0.2484	29517-003 passed aldrin

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
17-9188-1807	aldrin	Equal Variance t Two-Sample Test	0.6258	29517-004 passed aldrin
19-3472-3680	aldrin	Equal Variance t Two-Sample Test	0.3180	29517-005 passed aldrin
19-1191-4313	aldrin	Equal Variance t Two-Sample Test	0.1850	29517-006 passed aldrin
05-5238-5212	aldrin	Equal Variance t Two-Sample Test	0.4383	59517-007 passed aldrin
01-1804-5203	aldrin	Equal Variance t Two-Sample Test	0.7560	29517-008 passed aldrin
12-7723-8685	alpha chlordane	Equal Variance t Two-Sample Test	0.1120	29517-001 passed alpha chlordane (trans)
03-3020-9872	alpha chlordane	Equal Variance t Two-Sample Test	0.5093	29517-002 passed alpha chlordane (trans)
16-2005-5106	alpha chlordane	Equal Variance t Two-Sample Test	0.2484	29517-003 passed alpha chlordane (trans)
10-4277-3326	alpha chlordane	Equal Variance t Two-Sample Test	0.6258	29517-004 passed alpha chlordane (trans)
12-2843-9606	alpha chlordane	Equal Variance t Two-Sample Test	0.3180	29517-005 passed alpha chlordane (trans)
12-2451-7516	alpha chlordane	Equal Variance t Two-Sample Test	0.1850	29517-006 passed alpha chlordane (trans)
21-0403-8548	alpha chlordane	Equal Variance t Two-Sample Test	0.4383	59517-007 passed alpha chlordane (trans)
12-7491-5550	alpha chlordane	Equal Variance t Two-Sample Test	0.7560	29517-008 passed alpha chlordane (trans)
03-3306-3705	cis-Nonachlor	Equal Variance t Two-Sample Test	0.1120	29517-001 passed cis-nonachlor
11-9156-6760	cis-Nonachlor	Equal Variance t Two-Sample Test	0.5093	29517-002 passed cis-nonachlor
11-9426-8579	cis-Nonachlor	Equal Variance t Two-Sample Test	0.2484	29517-003 passed cis-nonachlor
08-2448-6474	cis-Nonachlor	Equal Variance t Two-Sample Test	0.6258	29517-004 passed cis-nonachlor
01-2319-0414	cis-Nonachlor	Equal Variance t Two-Sample Test	0.3180	29517-005 passed cis-nonachlor
15-6505-0598	cis-Nonachlor	Equal Variance t Two-Sample Test	0.1850	29517-006 passed cis-nonachlor
06-4538-9882	cis-Nonachlor	Equal Variance t Two-Sample Test	0.4383	59517-007 passed cis-nonachlor
14-7724-2950	cis-Nonachlor	Equal Variance t Two-Sample Test	0.7560	29517-008 passed cis-nonachlor
12-5435-9965	Dieldrin	Equal Variance t Two-Sample Test	0.1120	29517-001 passed dieldrin
11-5152-3038	Dieldrin	Equal Variance t Two-Sample Test	0.5093	29517-002 passed dieldrin
10-9444-9433	Dieldrin	Equal Variance t Two-Sample Test	0.2484	29517-003 passed dieldrin
07-5418-2473	Dieldrin	Equal Variance t Two-Sample Test	0.6258	29517-004 passed dieldrin
07-4283-7085	Dieldrin	Equal Variance t Two-Sample Test	0.3180	29517-005 passed dieldrin
13-9494-7725	Dieldrin	Equal Variance t Two-Sample Test	0.1850	29517-006 passed dieldrin
15-7798-1624	Dieldrin	Equal Variance t Two-Sample Test	0.4383	59517-007 passed dieldrin
07-4733-3718	Dieldrin	Equal Variance t Two-Sample Test	0.7560	29517-008 passed dieldrin
10-7835-3313	endosulfan I	Equal Variance t Two-Sample Test	0.1120	29517-001 passed endosulfan i
06-5035-1248	endosulfan I	Equal Variance t Two-Sample Test	0.5093	29517-002 passed endosulfan i
14-1444-8568	endosulfan I	Equal Variance t Two-Sample Test	0.2484	29517-003 passed endosulfan i
20-3974-0028	endosulfan I	Equal Variance t Two-Sample Test	0.6258	29517-004 passed endosulfan i
20-9895-0283	endosulfan I	Equal Variance t Two-Sample Test	0.3180	29517-005 passed endosulfan i
21-2758-9765	endosulfan I	Equal Variance t Two-Sample Test	0.1850	29517-006 passed endosulfan i
01-6038-3885	endosulfan I	Equal Variance t Two-Sample Test	0.4383	59517-007 passed endosulfan i
03-5576-2142	endosulfan I	Equal Variance t Two-Sample Test	0.7560	29517-008 passed endosulfan i
08-4260-7045	endosulfan II	Equal Variance t Two-Sample Test	0.1120	29517-001 passed endosulfan ii
07-0125-0536	endosulfan II	Equal Variance t Two-Sample Test	0.5093	29517-002 passed endosulfan ii
12-7942-3476	endosulfan II	Equal Variance t Two-Sample Test	0.2484	29517-003 passed endosulfan ii
09-7312-7619	endosulfan II	Equal Variance t Two-Sample Test	0.6258	29517-004 passed endosulfan ii
07-2001-7781	endosulfan II	Equal Variance t Two-Sample Test	0.3180	29517-005 passed endosulfan ii
07-2788-6853	endosulfan II	Equal Variance t Two-Sample Test	0.1850	29517-006 passed endosulfan ii
18-9398-0652	endosulfan II	Equal Variance t Two-Sample Test	0.4383	59517-007 passed endosulfan ii
07-9978-0990	endosulfan II	Equal Variance t Two-Sample Test	0.7560	29517-008 passed endosulfan ii
18-4772-1635	endrin	Equal Variance t Two-Sample Test	0.1120	29517-001 passed endrin
05-9013-8391	endrin	Equal Variance t Two-Sample Test	0.5093	29517-002 passed endrin
08-3117-4619	endrin	Equal Variance t Two-Sample Test	0.2484	29517-003 passed endrin
14-7266-3558	endrin	Equal Variance t Two-Sample Test	0.6258	29517-004 passed endrin
13-9892-3944	endrin	Equal Variance t Two-Sample Test	0.3180	29517-005 passed endrin
02-7529-7262	endrin	Equal Variance t Two-Sample Test	0.1850	29517-006 passed endrin
11-5968-8083	endrin	Equal Variance t Two-Sample Test	0.4383	59517-007 passed endrin
03-7383-5567	endrin	Equal Variance t Two-Sample Test	0.7560	29517-008 passed endrin

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
20-9583-6342	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.1120	29517-001 passed gamma-bhc (lindane)
03-2995-9218	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.5093	29517-002 passed gamma-bhc (lindane)
09-1467-8639	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.2484	29517-003 passed gamma-bhc (lindane)
06-7230-9624	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.6258	29517-004 passed gamma-bhc (lindane)
18-7527-9713	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.3180	29517-005 passed gamma-bhc (lindane)
17-6000-2176	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.1850	29517-006 passed gamma-bhc (lindane)
00-3509-9804	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.4383	59517-007 passed gamma-bhc (lindane)
18-5619-3579	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.7560	29517-008 passed gamma-bhc (lindane)
19-7446-4166	gamma-chlordane	Equal Variance t Two-Sample Test	0.1120	29517-001 passed gamma-chlordane (cis)
04-9133-3917	gamma-chlordane	Equal Variance t Two-Sample Test	0.5093	29517-002 passed gamma-chlordane (cis)
01-8753-3720	gamma-chlordane	Equal Variance t Two-Sample Test	0.2484	29517-003 passed gamma-chlordane (cis)
14-8336-5840	gamma-chlordane	Equal Variance t Two-Sample Test	0.6258	29517-004 passed gamma-chlordane (cis)
03-7185-0974	gamma-chlordane	Equal Variance t Two-Sample Test	0.3180	29517-005 passed gamma-chlordane (cis)
02-8423-5902	gamma-chlordane	Equal Variance t Two-Sample Test	0.1850	29517-006 passed gamma-chlordane (cis)
01-0020-8573	gamma-chlordane	Equal Variance t Two-Sample Test	0.4383	59517-007 passed gamma-chlordane (cis)
06-4545-1797	gamma-chlordane	Equal Variance t Two-Sample Test	0.7560	29517-008 passed gamma-chlordane (cis)
14-4352-6508	heptachlor	Equal Variance t Two-Sample Test	0.1120	29517-001 passed heptachlor
04-4272-7118	heptachlor	Equal Variance t Two-Sample Test	0.5093	29517-002 passed heptachlor
18-5880-9172	heptachlor	Equal Variance t Two-Sample Test	0.2484	29517-003 passed heptachlor
10-6899-9747	heptachlor	Equal Variance t Two-Sample Test	0.6258	29517-004 passed heptachlor
17-6712-2670	heptachlor	Equal Variance t Two-Sample Test	0.3180	29517-005 passed heptachlor
13-1153-0567	heptachlor	Equal Variance t Two-Sample Test	0.1850	29517-006 passed heptachlor
13-7268-5645	heptachlor	Equal Variance t Two-Sample Test	0.4383	59517-007 passed heptachlor
09-6690-5374	heptachlor	Equal Variance t Two-Sample Test	0.7560	29517-008 passed heptachlor
17-5520-6912	heptachlor epoxide	Equal Variance t Two-Sample Test	0.1082	29517-001 passed heptachlor epoxide
09-1390-5412	heptachlor epoxide	Equal Variance t Two-Sample Test	0.5140	29517-002 passed heptachlor epoxide
21-0007-5630	heptachlor epoxide	Equal Variance t Two-Sample Test	0.2479	29517-003 passed heptachlor epoxide
17-2660-1167	heptachlor epoxide	Equal Variance t Two-Sample Test	0.6290	29517-004 passed heptachlor epoxide
20-6858-9696	heptachlor epoxide	Equal Variance t Two-Sample Test	0.3233	29517-005 passed heptachlor epoxide
02-2877-3708	heptachlor epoxide	Equal Variance t Two-Sample Test	0.1882	29517-006 passed heptachlor epoxide
16-8139-7286	heptachlor epoxide	Equal Variance t Two-Sample Test	0.4471	59517-007 passed heptachlor epoxide
00-2431-2539	heptachlor epoxide	Equal Variance t Two-Sample Test	0.7617	29517-008 passed heptachlor epoxide
03-6559-1156	hexachlorobenzene	Equal Variance t Two-Sample Test	0.1082	29517-001 passed hexachlorobenzene
06-9289-8894	hexachlorobenzene	Equal Variance t Two-Sample Test	0.5140	29517-002 passed hexachlorobenzene
00-6933-7770	hexachlorobenzene	Equal Variance t Two-Sample Test	0.2479	29517-003 passed hexachlorobenzene
07-2938-4294	hexachlorobenzene	Equal Variance t Two-Sample Test	0.6290	29517-004 passed hexachlorobenzene
09-6153-1346	hexachlorobenzene	Equal Variance t Two-Sample Test	0.3233	29517-005 passed hexachlorobenzene
11-6437-1173	hexachlorobenzene	Equal Variance t Two-Sample Test	0.1882	29517-006 passed hexachlorobenzene
07-1670-1300	hexachlorobenzene	Equal Variance t Two-Sample Test	0.4471	59517-007 passed hexachlorobenzene
18-8407-7674	hexachlorobenzene	Equal Variance t Two-Sample Test	0.7617	29517-008 passed hexachlorobenzene
14-6103-2240	Methoxychlor	Equal Variance t Two-Sample Test	0.1120	29517-001 passed methoxychlor
08-8785-2909	Methoxychlor	Equal Variance t Two-Sample Test	0.5093	29517-002 passed methoxychlor
20-2370-7603	Methoxychlor	Equal Variance t Two-Sample Test	0.2484	29517-003 passed methoxychlor
17-7588-4389	Methoxychlor	Equal Variance t Two-Sample Test	0.6258	29517-004 passed methoxychlor
05-9627-8669	Methoxychlor	Equal Variance t Two-Sample Test	0.3180	29517-005 passed methoxychlor
19-0750-9794	Methoxychlor	Equal Variance t Two-Sample Test	0.1850	29517-006 passed methoxychlor
00-2049-5795	Methoxychlor	Equal Variance t Two-Sample Test	0.4383	59517-007 passed methoxychlor
05-1492-1370	Methoxychlor	Equal Variance t Two-Sample Test	0.7560	29517-008 passed methoxychlor
16-5947-0442	oxychlordane	Equal Variance t Two-Sample Test	0.1082	29517-001 passed oxychlordane
02-2613-1593	oxychlordane	Equal Variance t Two-Sample Test	0.5140	29517-002 passed oxychlordane
21-3016-4961	oxychlordane	Equal Variance t Two-Sample Test	0.2479	29517-003 passed oxychlordane
11-1113-7859	oxychlordane	Equal Variance t Two-Sample Test	0.6290	29517-004 passed oxychlordane
00-8729-5708	oxychlordane	Equal Variance t Two-Sample Test	0.3233	29517-005 passed oxychlordane

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
07-5319-9524	oxychlordane	Equal Variance t Two-Sample Test	0.1882	29517-006 passed oxychlordane
16-2353-9255	oxychlordane	Equal Variance t Two-Sample Test	0.4471	59517-007 passed oxychlordane
21-2476-6861	oxychlordane	Equal Variance t Two-Sample Test	0.7617	29517-008 passed oxychlordane
07-6936-2362	toxaphene	Equal Variance t Two-Sample Test	0.1164	29517-001 passed toxaphene
12-8612-2120	toxaphene	Equal Variance t Two-Sample Test	0.5092	29517-002 passed toxaphene
15-0143-5572	toxaphene	Equal Variance t Two-Sample Test	0.2572	29517-003 passed toxaphene
19-6317-3383	toxaphene	Equal Variance t Two-Sample Test	0.6304	29517-004 passed toxaphene
14-2654-1881	toxaphene	Equal Variance t Two-Sample Test	0.3303	29517-005 passed toxaphene
00-2097-7125	toxaphene	Equal Variance t Two-Sample Test	0.1913	29517-006 passed toxaphene
20-8723-0427	toxaphene	Equal Variance t Two-Sample Test	0.4379	59517-007 passed toxaphene
15-6493-6900	toxaphene	Equal Variance t Two-Sample Test	0.7599	29517-008 passed toxaphene
10-7993-7853	trans-nonachlor	Equal Variance t Two-Sample Test	0.1120	29517-001 passed trans-nonachlor
16-2286-4093	trans-nonachlor	Equal Variance t Two-Sample Test	0.5093	29517-002 passed trans-nonachlor
11-4507-4212	trans-nonachlor	Equal Variance t Two-Sample Test	0.2484	29517-003 passed trans-nonachlor
07-8926-3049	trans-nonachlor	Equal Variance t Two-Sample Test	0.6258	29517-004 passed trans-nonachlor
05-1517-9197	trans-nonachlor	Equal Variance t Two-Sample Test	0.3180	29517-005 passed trans-nonachlor
12-2688-9639	trans-nonachlor	Equal Variance t Two-Sample Test	0.1850	29517-006 passed trans-nonachlor
17-8056-6285	trans-nonachlor	Equal Variance t Two-Sample Test	0.4383	59517-007 passed trans-nonachlor
15-6169-3885	trans-nonachlor	Equal Variance t Two-Sample Test	0.7560	29517-008 passed trans-nonachlor

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

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heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.877	0.988	0.0199	0.0445	4.86%	0.00%
29517-001		5	0.947	0.92	0.973	0.914	0.973	0.00948	0.0212	2.24%	-3.23%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	0.13%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-2.36%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	1.03%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-1.26%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-3.32%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-0.37%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	2.60%

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.877	0.988	0.0199	0.0445	4.86%	0.00%
29517-001		5	0.947	0.92	0.973	0.914	0.973	0.00948	0.0212	2.24%	-3.23%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	0.13%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-2.36%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	1.03%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-1.26%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-3.32%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-0.37%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	2.60%

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.38	4.94	0.1	0.225	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.57	4.86	0.0467	0.104	2.21%	-3.18%
29517-002		5	4.58	4.21	4.95	4.21	4.88	0.132	0.295	6.45%	0.09%
29517-003		5	4.69	4.38	5.01	4.37	4.96	0.114	0.254	5.42%	-2.36%
29517-004		5	4.54	4.27	4.8	4.29	4.78	0.0954	0.213	4.70%	1.00%
29517-005		5	4.64	4.45	4.84	4.43	4.86	0.0692	0.155	3.33%	-1.31%
29517-006		5	4.74	4.38	5.09	4.27	4.97	0.127	0.285	6.01%	-3.36%
59517-007		5	4.6	4.4	4.81	4.33	4.77	0.0739	0.165	3.59%	-0.44%
29517-008		5	4.47	4.12	4.81	4.19	4.89	0.124	0.277	6.20%	2.53%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.877	0.988	0.0199	0.0445	4.86%	0.00%
29517-001		5	0.947	0.92	0.973	0.914	0.973	0.00948	0.0212	2.24%	-3.23%
29517-002		5	0.916	0.842	0.99	0.842	0.976	0.0266	0.0594	6.49%	0.13%
29517-003		5	0.939	0.875	1	0.874	0.992	0.0228	0.051	5.43%	-2.36%
29517-004		5	0.908	0.855	0.961	0.858	0.956	0.0191	0.0426	4.70%	1.03%
29517-005		5	0.929	0.89	0.968	0.886	0.973	0.014	0.0314	3.38%	-1.26%
29517-006		5	0.947	0.876	1.02	0.853	0.994	0.0256	0.0573	6.05%	-3.32%
59517-007		5	0.92	0.879	0.961	0.866	0.954	0.0147	0.033	3.58%	-0.37%
29517-008		5	0.893	0.824	0.962	0.838	0.978	0.0249	0.0557	6.23%	2.60%

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22	24.8	0.502	1.12	4.88%	0.00%
29517-001		5	23.7	23.1	24.4	22.9	24.4	0.242	0.541	2.28%	-3.13%
29517-002		5	23	21.1	24.9	21.1	24.5	0.672	1.5	6.54%	0.09%
29517-003		5	23.5	21.9	25.1	21.9	24.9	0.573	1.28	5.45%	-2.26%
29517-004		5	22.8	21.4	24.1	21.5	24	0.482	1.08	4.73%	1.04%
29517-005		5	23.3	22.3	24.3	22.2	24.4	0.354	0.791	3.39%	-1.22%
29517-006		5	23.8	22	25.6	21.4	25	0.651	1.46	6.13%	-3.30%
59517-007		5	23.1	22.1	24.1	21.8	24	0.362	0.811	3.51%	-0.43%
29517-008		5	22.4	20.7	24.2	21	24.6	0.636	1.42	6.34%	2.61%

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.438	0.494	0.01	0.0225	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.457	0.486	0.00467	0.0104	2.21%	-3.18%
29517-002		5	0.458	0.421	0.495	0.421	0.488	0.0132	0.0295	6.45%	0.09%
29517-003		5	0.469	0.438	0.501	0.437	0.496	0.0114	0.0254	5.42%	-2.36%
29517-004		5	0.454	0.427	0.48	0.429	0.478	0.00954	0.0213	4.70%	1.00%
29517-005		5	0.464	0.445	0.484	0.443	0.486	0.00692	0.0155	3.33%	-1.31%
29517-006		5	0.474	0.438	0.509	0.427	0.497	0.0127	0.0285	6.01%	-3.36%
59517-007		5	0.46	0.44	0.481	0.433	0.477	0.00739	0.0165	3.59%	-0.44%
29517-008		5	0.447	0.412	0.481	0.419	0.489	0.0124	0.0277	6.20%	2.53%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-001		0.949	0.914	0.973	0.952	0.945
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-001		0.949	0.914	0.973	0.952	0.945
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72
29517-002		4.85	4.6	4.21	4.88	4.36
29517-003		4.48	4.37	4.96	4.79	4.86
29517-004		4.78	4.29	4.34	4.67	4.61
29517-005		4.65	4.68	4.6	4.43	4.86
29517-006		4.27	4.9	4.88	4.67	4.97
59517-007		4.77	4.6	4.33	4.65	4.67
29517-008		4.57	4.89	4.19	4.27	4.42

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-001		0.949	0.914	0.973	0.952	0.945
29517-002		0.971	0.919	0.842	0.976	0.871
29517-003		0.896	0.874	0.992	0.958	0.973
29517-004		0.956	0.858	0.868	0.934	0.922
29517-005		0.929	0.936	0.919	0.886	0.973
29517-006		0.853	0.98	0.976	0.934	0.994
59517-007		0.954	0.919	0.866	0.929	0.934
29517-008		0.914	0.978	0.838	0.853	0.883

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-001		23.8	22.9	24.4	23.9	23.7
29517-002		24.4	23.1	21.1	24.5	21.9
29517-003		22.5	21.9	24.9	24	24.4
29517-004		24	21.5	21.8	23.4	23.2
29517-005		23.3	23.5	23.1	22.2	24.4
29517-006		21.4	24.6	24.5	23.4	25
59517-007		24	23.1	21.8	23.3	23.4
29517-008		22.9	24.6	21	21.4	22.2

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472
29517-002		0.485	0.46	0.421	0.488	0.436
29517-003		0.448	0.437	0.496	0.479	0.486
29517-004		0.478	0.429	0.434	0.467	0.461
29517-005		0.465	0.468	0.46	0.443	0.486
29517-006		0.427	0.49	0.488	0.467	0.497
59517-007		0.477	0.46	0.433	0.465	0.467
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-6612-1679 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed 4-4'-ddd	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-1134-1471 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed 4-4'-ddd	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-1115-9157 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed 4-4'-ddd	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-4287-4966 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed 4-4'-ddd	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-8722-8104 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed 4-4'-ddd	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-4928-6423 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed 4-4'-ddd	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-1810-4593 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed 4-4'-ddd	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 16-5127-0736 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed 4-4'-ddd	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-9010-6099 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed 4-4'-dde	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-8311-6076 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed 4-4'-dde	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-1594-7656 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed 4-4'-dde	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-2226-6567 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed 4-4'-dde	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-7104-1782 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed 4-4'-dde	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-6483-8603 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed 4-4'-dde	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-3464-9566 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed 4-4'-dde	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-4318-0611	**Endpoint:**	4-4'-DDE	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed 4-4'-dde	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-8446-7196 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed 4-4'-ddt	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-1495-6711 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed 4-4'-ddt	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-1419-3166 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed 4-4'-ddt	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-8649-0714	**Endpoint:**	4-4'-DDT	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed 4-4'-ddt	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-6662-5942 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed 4-4'-ddt	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-3177-2574 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed 4-4'-ddt	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-2633-1733 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed 4-4'-ddt	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-8780-1164 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed 4-4'-ddt	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-9946-9728 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed aldrin	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-5599-3600 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed aldrin	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-1246-9181 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed aldrin	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-9188-1807 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed aldrin	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 19-3472-3680 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed aldrin	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 19-1191-4313 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed aldrin	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-5238-5212 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed aldrin	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-1804-5203 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed aldrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-7723-8685	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed alpha chlordane (trans)	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-3020-9872 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed alpha chlordane (trans)	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2005-5106	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed alpha chlordane (trans)	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-4277-3326	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed alpha chlordane (trans)	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-2843-9606	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed alpha chlordane (trans)	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-2451-7516 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed alpha chlordane (trans)	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-0403-8548 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed alpha chlordane (trans)	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-7491-5550 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed alpha chlordane (trans)	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

alpha chlordane **Summary**

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

alpha chlordane **Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-3306-3705 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed cis-nonachlor	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9156-6760	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed cis-nonachlor	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9426-8579	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed cis-nonachlor	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-2448-6474 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed cis-nonachlor	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-2319-0414 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed cis-nonachlor	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 15-6505-0598 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed cis-nonachlor	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4538-9882	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed cis-nonachlor	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-7724-2950	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed cis-nonachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-5435-9965	**Endpoint:**	Dieldrin	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed dieldrin	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 11-5152-3038 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed dieldrin	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-9444-9433	**Endpoint:**	Dieldrin	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed dieldrin	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-5418-2473 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed dieldrin	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-4283-7085 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed dieldrin	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 13-9494-7725 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed dieldrin	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 15-7798-1624 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed dieldrin	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-4733-3718 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed dieldrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-7835-3313 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed endosulfan i	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-5035-1248 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed endosulfan i	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-1444-8568 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed endosulfan i	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-3974-0028 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed endosulfan i	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-9895-0283 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endosulfan i	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-2758-9765 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed endosulfan i	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-6038-3885	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed endosulfan i	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-5576-2142 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed endosulfan i	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-4260-7045 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed endosulfan ii	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-0125-0536 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed endosulfan ii	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-7942-3476 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed endosulfan ii	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-7312-7619 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed endosulfan ii	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-2001-7781 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endosulfan ii	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-2788-6853 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed endosulfan ii	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-9398-0652	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed endosulfan ii	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-9978-0990 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed endosulfan ii	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 18-4772-1635 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed endrin	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-9013-8391 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed endrin	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-3117-4619 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed endrin	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-7266-3558 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed endrin	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 13-9892-3944 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed endrin	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-7529-7262 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed endrin	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 11-5968-8083 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed endrin	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-7383-5567 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed endrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-9583-6342 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed gamma-bhc (lindane)	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-2995-9218 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed gamma-bhc (lindane)	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-1467-8639 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed gamma-bhc (lindane)	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-7230-9624 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed gamma-bhc (lindane)	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 18-7527-9713 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed gamma-bhc (lindane)	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6000-2176	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed gamma-bhc (lindane)	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-3509-9804 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed gamma-bhc (lindane)	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-5619-3579	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed gamma-bhc (lindane)	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-7446-4166	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed gamma-chlordane (cis)	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-9133-3917 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:33 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed gamma-chlordane (cis)	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-8753-3720	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed gamma-chlordane (cis)	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-8336-5840	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed gamma-chlordane (cis)	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-7185-0974 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed gamma-chlordane (cis)	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-8423-5902	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed gamma-chlordane (cis)	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-0020-8573	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed gamma-chlordane (cis)	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-4545-1797 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed gamma-chlordane (cis)	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-5520-6912	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed heptachlor epoxide	4.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.34	1.86	0.041	8	CDF	0.1082	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1096	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0021904	0.0021904	1	1.8	0.2165	Non-Significant Effect
Error	0.0097312	0.0012164	8			
Total	0.0119216		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.41	23.2	0.1795	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4412	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-001		5	0.947	0.92	0.973	0.949	0.914	0.973	0.00948	2.24%	-3.23%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-001		0.949	0.914	0.973	0.952	0.945

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1390-5412	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed heptachlor epoxide	6.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0361	1.86	0.062	8	CDF	0.5140	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.6E-06	3.6E-06	1	0.0013	0.9721	Non-Significant Effect
Error	0.0220688	0.0027586	8			
Total	0.0220724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.78	23.2	0.5896	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5590	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	0.13%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-0007-5630 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed heptachlor epoxide	6.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.713	1.86	0.056	8	CDF	0.2479	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9750	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011664	0.0011664	1	0.509	0.4959	Non-Significant Effect
Error	0.0183332	0.0022917	8			
Total	0.0194996		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.31	23.2	0.7995	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7534	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-2.36%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2660-1167	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed heptachlor epoxide	5.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.341	1.86	0.051	8	CDF	0.6290	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6283	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002209	0.0002209	1	0.116	0.7420	Non-Significant Effect
Error	0.0152092	0.0019012	8			
Total	0.0154301		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.09	23.2	0.9351	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4508	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	1.03%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-6858-9696	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed heptachlor epoxide	4.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.476	1.86	0.045	8	CDF	0.3233	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2818	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.227	0.6467	Non-Significant Effect
Error	0.0118672	0.0014834	8			
Total	0.0122036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.02	23.2	0.5135	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5165	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-1.26%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-2877-3708	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed heptachlor epoxide	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.936	1.86	0.060	8	CDF	0.1882	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.95	2.29	0.2870	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0023104	0.0023104	1	0.877	0.3764	Non-Significant Effect
Error	0.0210772	0.0026347	8			
Total	0.0233876		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.66	23.2	0.6368	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.972	0.741	0.9119	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-3.32%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8139-7286	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed heptachlor epoxide	5.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.137	1.86	0.046	8	CDF	0.4471	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3214	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.890E-05	2.890E-05	1	0.0188	0.8943	Non-Significant Effect
Error	0.0122832	0.0015354	8			
Total	0.0123121		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5747	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9293	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-0.37%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2431-2539	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed heptachlor epoxide	6.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.747	1.86	0.059	8	CDF	0.7617	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5236	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0014161	0.0014161	1	0.557	0.4767	Non-Significant Effect
Error	0.0203248	0.0025406	8			
Total	0.0217409		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.56	23.2	0.6764	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2341	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	2.60%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4352-6508	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed heptachlor	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-4272-7118	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed heptachlor	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-5880-9172	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed heptachlor	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-6899-9747	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed heptachlor	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6712-2670	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed heptachlor	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-1153-0567	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed heptachlor	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-7268-5645	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed heptachlor	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-6690-5374	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed heptachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-6559-1156	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed hexachlorobenzene	4.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.34	1.86	0.041	8	CDF	0.1082	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1096	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0021904	0.0021904	1	1.8	0.2165	Non-Significant Effect
Error	0.0097312	0.0012164	8			
Total	0.0119216		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.41	23.2	0.1795	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4412	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-001		5	0.947	0.92	0.973	0.949	0.914	0.973	0.00948	2.24%	-3.23%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-001		0.949	0.914	0.973	0.952	0.945

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-9289-8894	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed hexachlorobenzene	6.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0361	1.86	0.062	8	CDF	0.5140	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.6E-06	3.6E-06	1	0.0013	0.9721	Non-Significant Effect
Error	0.0220688	0.0027586	8			
Total	0.0220724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.78	23.2	0.5896	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5590	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	0.13%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-6933-7770	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed hexachlorobenzene	6.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.713	1.86	0.056	8	CDF	0.2479	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9750	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011664	0.0011664	1	0.509	0.4959	Non-Significant Effect
Error	0.0183332	0.0022917	8			
Total	0.0194996		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.31	23.2	0.7995	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7534	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-2.36%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-2938-4294	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed hexachlorobenzene	5.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.341	1.86	0.051	8	CDF	0.6290	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6283	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002209	0.0002209	1	0.116	0.7420	Non-Significant Effect
Error	0.0152092	0.0019012	8			
Total	0.0154301		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.09	23.2	0.9351	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4508	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	1.03%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-6153-1346	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed hexachlorobenzene	4.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.476	1.86	0.045	8	CDF	0.3233	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2818	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.227	0.6467	Non-Significant Effect
Error	0.0118672	0.0014834	8			
Total	0.0122036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.02	23.2	0.5135	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5165	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-1.26%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-6437-1173	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed hexachlorobenzene	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.936	1.86	0.060	8	CDF	0.1882	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.95	2.29	0.2870	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0023104	0.0023104	1	0.877	0.3764	Non-Significant Effect
Error	0.0210772	0.0026347	8			
Total	0.0233876		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.66	23.2	0.6368	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.972	0.741	0.9119	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-3.32%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-1670-1300	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed hexachlorobenzene	5.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.137	1.86	0.046	8	CDF	0.4471	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3214	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.890E-05	2.890E-05	1	0.0188	0.8943	Non-Significant Effect
Error	0.0122832	0.0015354	8			
Total	0.0123121		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5747	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9293	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-0.37%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-8407-7674	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed hexachlorobenzene	6.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.747	1.86	0.059	8	CDF	0.7617	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5236	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0014161	0.0014161	1	0.557	0.4767	Non-Significant Effect
Error	0.0203248	0.0025406	8			
Total	0.0217409		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.56	23.2	0.6764	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2341	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	2.60%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-6103-2240	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed methoxychlor	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.206	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05329	0.05329	1	1.74	0.2241	Non-Significant Effect
Error	0.24552	0.03069	8			
Total	0.29881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-001		5	4.73	4.6	4.86	4.74	4.57	4.86	0.0467	2.21%	-3.18%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-001		4.74	4.57	4.86	4.76	4.72

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-8785-2909	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed methoxychlor	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.309	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.000581	0.9814	Non-Significant Effect
Error	0.55052	0.068815	8			
Total	0.55056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-002		5	4.58	4.21	4.95	4.6	4.21	4.88	0.132	6.45%	0.09%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-002		4.85	4.6	4.21	4.88	4.36

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-2370-7603 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed methoxychlor	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.282	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02916	0.02916	1	0.507	0.4967	Non-Significant Effect
Error	0.4602	0.057525	8			
Total	0.48936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-003		5	4.69	4.38	5.01	4.79	4.37	4.96	0.114	5.42%	-2.36%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-003		4.48	4.37	4.96	4.79	4.86

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7588-4389	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed methoxychlor	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.258	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00529	0.00529	1	0.11	0.7484	Non-Significant Effect
Error	0.3838	0.047975	8			
Total	0.38909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-004		5	4.54	4.27	4.8	4.61	4.29	4.78	0.0954	4.70%	1.00%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-004		4.78	4.29	4.34	4.67	4.61

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-9627-8669	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed methoxychlor	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.227	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009	0.009	1	0.242	0.6360	Non-Significant Effect
Error	0.29764	0.037205	8			
Total	0.30664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-005		5	4.64	4.45	4.84	4.65	4.43	4.86	0.0692	3.33%	-1.31%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-005		4.65	4.68	4.6	4.43	4.86

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-0750-9794	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed methoxychlor	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.302	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05929	0.05929	1	0.902	0.3700	Non-Significant Effect
Error	0.5258	0.065725	8			
Total	0.58509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-006		5	4.74	4.38	5.09	4.88	4.27	4.97	0.127	6.01%	-3.36%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-006		4.27	4.9	4.88	4.67	4.97

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2049-5795	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed methoxychlor	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.232	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0257	0.8766	Non-Significant Effect
Error	0.31104	0.03888	8			
Total	0.31204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
59517-007		5	4.6	4.4	4.81	4.65	4.33	4.77	0.0739	3.59%	-0.44%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
59517-007		4.77	4.6	4.33	4.65	4.67

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-1492-1370	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed methoxychlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.297	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03364	0.03364	1	0.529	0.4880	Non-Significant Effect
Error	0.5092	0.06365	8			
Total	0.54284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	4.58	4.31	4.86	4.5	4.38	4.94	0.1	4.90%	0.00%
29517-008		5	4.47	4.12	4.81	4.42	4.19	4.89	0.124	6.20%	2.53%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	4.38	4.66	4.44	4.5	4.94
29517-008		4.57	4.89	4.19	4.27	4.42

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-5947-0442	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed oxychlordane	4.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.34	1.86	0.041	8	CDF	0.1082	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1096	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0021904	0.0021904	1	1.8	0.2165	Non-Significant Effect
Error	0.0097312	0.0012164	8			
Total	0.0119216		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.41	23.2	0.1795	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4412	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-001		5	0.947	0.92	0.973	0.949	0.914	0.973	0.00948	2.24%	-3.23%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-001		0.949	0.914	0.973	0.952	0.945

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-2613-1593	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed oxychlordane	6.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0361	1.86	0.062	8	CDF	0.5140	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.6E-06	3.6E-06	1	0.0013	0.9721	Non-Significant Effect
Error	0.0220688	0.0027586	8			
Total	0.0220724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.78	23.2	0.5896	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5590	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-002		5	0.916	0.842	0.99	0.919	0.842	0.976	0.0266	6.49%	0.13%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-002		0.971	0.919	0.842	0.976	0.871

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-3016-4961 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed oxychlordane	6.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.713	1.86	0.056	8	CDF	0.2479	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9750	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011664	0.0011664	1	0.509	0.4959	Non-Significant Effect
Error	0.0183332	0.0022917	8			
Total	0.0194996		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.31	23.2	0.7995	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.957	0.741	0.7534	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-003		5	0.939	0.875	1	0.958	0.874	0.992	0.0228	5.43%	-2.36%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-003		0.896	0.874	0.992	0.958	0.973

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-1113-7859	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed oxychlordane	5.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.341	1.86	0.051	8	CDF	0.6290	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6283	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002209	0.0002209	1	0.116	0.7420	Non-Significant Effect
Error	0.0152092	0.0019012	8			
Total	0.0154301		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.09	23.2	0.9351	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4508	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-004		5	0.908	0.855	0.961	0.922	0.858	0.956	0.0191	4.70%	1.03%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-004		0.956	0.858	0.868	0.934	0.922

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8729-5708	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed oxychlordane	4.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.476	1.86	0.045	8	CDF	0.3233	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2818	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.227	0.6467	Non-Significant Effect
Error	0.0118672	0.0014834	8			
Total	0.0122036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.02	23.2	0.5135	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5165	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-005		5	0.929	0.89	0.968	0.929	0.886	0.973	0.014	3.38%	-1.26%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-005		0.929	0.936	0.919	0.886	0.973

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-5319-9524	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed oxychlordane	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.936	1.86	0.060	8	CDF	0.1882	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.95	2.29	0.2870	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0023104	0.0023104	1	0.877	0.3764	Non-Significant Effect
Error	0.0210772	0.0026347	8			
Total	0.0233876		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.66	23.2	0.6368	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.972	0.741	0.9119	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-006		5	0.947	0.876	1.02	0.976	0.853	0.994	0.0256	6.05%	-3.32%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-006		0.853	0.98	0.976	0.934	0.994

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2353-9255	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed oxychlordane	5.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.137	1.86	0.046	8	CDF	0.4471	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3214	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.890E-05	2.890E-05	1	0.0188	0.8943	Non-Significant Effect
Error	0.0122832	0.0015354	8			
Total	0.0123121		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.82	23.2	0.5747	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9293	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
59517-007		5	0.92	0.879	0.961	0.929	0.866	0.954	0.0147	3.58%	-0.37%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
59517-007		0.954	0.919	0.866	0.929	0.934

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-2476-6861 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:35 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed oxychlordane	6.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.747	1.86	0.059	8	CDF	0.7617	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5236	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0014161	0.0014161	1	0.557	0.4767	Non-Significant Effect
Error	0.0203248	0.0025406	8			
Total	0.0217409		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.56	23.2	0.6764	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2341	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.917	0.862	0.972	0.901	0.877	0.988	0.0199	4.86%	0.00%
29517-008		5	0.893	0.824	0.962	0.883	0.838	0.978	0.0249	6.23%	2.60%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.877	0.931	0.888	0.901	0.988
29517-008		0.914	0.978	0.838	0.853	0.883

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-6936-2362	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed toxaphene	4.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.29	1.86	1.04	8	CDF	0.1164	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.29	0.1206	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.296	1.296	1	1.67	0.2327	Non-Significant Effect
Error	6.22	0.7775	8			
Total	7.516		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.31	23.2	0.1863	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.934	0.741	0.4931	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-001		5	23.7	23.1	24.4	23.8	22.9	24.4	0.242	2.28%	-3.13%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-001		23.8	22.9	24.4	23.9	23.7

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-8612-2120	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed toxaphene	6.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0238	1.86	1.56	8	CDF	0.5092	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.000568	0.9816	Non-Significant Effect
Error	14.088	1.761	8			
Total	14.089		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.79	23.2	0.5863	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5656	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-002		5	23	21.1	24.9	23.1	21.1	24.5	0.672	6.54%	0.09%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-002		24.4	23.1	21.1	24.5	21.9

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-0143-5572	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed toxaphene	6.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.682	1.86	1.42	8	CDF	0.2572	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9921	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.676	0.676	1	0.465	0.5144	Non-Significant Effect
Error	11.62	1.4525	8			
Total	12.296		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.3	23.2	0.8044	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.741	0.7300	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-003		5	23.5	21.9	25.1	24	21.9	24.9	0.573	5.45%	-2.26%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-003		22.5	21.9	24.9	24	24.4

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-6317-3383	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed toxaphene	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.345	1.86	1.29	8	CDF	0.6304	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.29	0.6523	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.144	0.144	1	0.119	0.7392	Non-Significant Effect
Error	9.696	1.212	8			
Total	9.84		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.09	23.2	0.9382	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4765	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-004		5	22.8	21.4	24.1	23.2	21.5	24	0.482	4.73%	1.04%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-004		24	21.5	21.8	23.4	23.2

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-2654-1881	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed toxaphene	4.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.456	1.86	1.14	8	CDF	0.3303	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.2951	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.196	0.196	1	0.208	0.6607	Non-Significant Effect
Error	7.548	0.943499	8			
Total	7.744		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.02	23.2	0.5129	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.741	0.6009	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-005		5	23.3	22.3	24.3	23.3	22.2	24.4	0.354	3.39%	-1.22%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-005		23.3	23.5	23.1	22.2	24.4

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2097-7125	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed toxaphene	6.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.924	1.86	1.53	8	CDF	0.1913	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.2986	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.444	1.444	1	0.853	0.3826	Non-Significant Effect
Error	13.536	1.692	8			
Total	14.98		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.68	23.2	0.6270	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.97	0.741	0.8937	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-006		5	23.8	22	25.6	24.5	21.4	25	0.651	6.13%	-3.30%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-006		21.4	24.6	24.5	23.4	25

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-8723-0427	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed toxaphene	5.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.161	1.86	1.15	8	CDF	0.4379	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.93	2.29	0.3145	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	0.0261	0.8758	Non-Significant Effect
Error	7.676	0.9595	8			
Total	7.701		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.92	23.2	0.5428	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9196	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
59517-007		5	23.1	22.1	24.1	23.3	21.8	24	0.362	3.51%	-0.43%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
59517-007		24	23.1	21.8	23.3	23.4

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6493-6900	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed toxaphene	6.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.74	1.86	1.51	8	CDF	0.7599	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4900	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.899999	0.899999	1	0.548	0.4803	Non-Significant Effect
Error	13.136	1.642	8			
Total	14.036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6591	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2589	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	23	21.6	24.4	22.6	22	24.8	0.502	4.88%	0.00%
29517-008		5	22.4	20.7	24.2	22.2	21	24.6	0.636	6.34%	2.61%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	22	23.4	22.3	22.6	24.8
29517-008		22.9	24.6	21	21.4	22.2

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7993-7853	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-001	16-8840-0129	21 Aug-17 08:40	21 Aug-17 08:40	9d 15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-001	Marine Sediment	New Haven Harbor FNP -2017	Composite 1 (Sta C)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-001 passed trans-nonachlor	4.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-001	1.32	1.86	0.021	8	CDF	0.1120	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005329	0.0005329	1	1.74	0.2241	Non-Significant Effect
Error	0.0024552	0.0003069	8			
Total	0.0029881		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.63	23.2	0.1668	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4791	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-001		5	0.473	0.46	0.486	0.474	0.457	0.486	0.00467	2.21%	-3.18%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-001		0.474	0.457	0.486	0.476	0.472

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2286-4093	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-002	17-4180-1357	21 Aug-17 09:50	21 Aug-17 09:50	9d 14h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-002	Marine Sediment	New Haven Harbor FNP -2017	Composite 2 (Sta D,E,F)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-002 passed trans-nonachlor	6.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-002	-0.0241	1.86	0.031	8	CDF	0.5093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-07	4E-07	1	0.000581	0.9814	Non-Significant Effect
Error	0.0055052	0.0006882	8			
Total	0.0055056		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5824	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-002		5	0.458	0.421	0.495	0.46	0.421	0.488	0.0132	6.45%	0.09%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-002		0.485	0.46	0.421	0.488	0.436

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-4507-4212	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-003	21-0035-0662	21 Aug-17 14:00	21 Aug-17 14:00	9d 10h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-003	Marine Sediment	New Haven Harbor FNP -2017	Composite 3 (Sta G,H,I)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-003 passed trans-nonachlor	6.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-003	0.712	1.86	0.028	8	CDF	0.2484	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.57	2.29	0.9719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002916	0.0002916	1	0.507	0.4967	Non-Significant Effect
Error	0.004602	0.0005753	8			
Total	0.0048936		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.28	23.2	0.8172	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.954	0.741	0.7213	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-003		5	0.469	0.438	0.501	0.479	0.437	0.496	0.0114	5.42%	-2.36%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-003		0.448	0.437	0.496	0.479	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-8926-3049	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-004	00-1332-0723	21 Aug-17 14:45	21 Aug-17 14:45	9d 9h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-004	Marine Sediment	New Haven Harbor FNP -2017	Composite 4 (Sta J,K,L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-004 passed trans-nonachlor	5.62%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-004	-0.332	1.86	0.026	8	CDF	0.6258	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.11	0.7484	Non-Significant Effect
Error	0.003838	0.0004798	8			
Total	0.0038909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	23.2	0.9217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4420	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-004		5	0.454	0.427	0.48	0.461	0.429	0.478	0.00954	4.70%	1.00%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-004		0.478	0.429	0.434	0.467	0.461

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-1517-9197 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 29 Nov-17 9:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-005	02-6439-2385	21 Aug-17 15:30	21 Aug-17 15:30	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-005	Marine Sediment	New Haven Harbor FNP -2017	Composite 5 (Sta M,N,O)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-005 passed trans-nonachlor	4.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-005	0.492	1.86	0.023	8	CDF	0.3180	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.242	0.6360	Non-Significant Effect
Error	0.0029764	0.0003721	8			
Total	0.0030664		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.11	23.2	0.4875	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5584	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-005		5	0.464	0.445	0.484	0.465	0.443	0.486	0.00692	3.33%	-1.31%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-005		0.465	0.468	0.46	0.443	0.486

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-2688-9639	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-006	11-1627-5877	21 Aug-17 12:05	21 Aug-17 12:05	9d 12h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-006	Marine Sediment	New Haven Harbor FNP -2017	Composite 6 (Sta P,Q,R,S)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-006 passed trans-nonachlor	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-006	0.95	1.86	0.030	8	CDF	0.1850	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005929	0.0005929	1	0.902	0.3700	Non-Significant Effect
Error	0.005258	0.0006573	8			
Total	0.0058509		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9177	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-006		5	0.474	0.438	0.509	0.488	0.427	0.497	0.0127	6.01%	-3.36%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-006		0.427	0.49	0.488	0.467	0.497

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-8056-6285	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
59517-007	11-8750-3546	21 Aug-17 15:40	21 Aug-17 15:40	9d 8h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
59517-007	Marine Sediment	New Haven Harbor FNP -2017	Composite 7 (Sta T,U,V,W)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	59517-007 passed trans-nonachlor	5.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		59517-007	0.16	1.86	0.023	8	CDF	0.4383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.0257	0.8766	Non-Significant Effect
Error	0.0031104	0.0003888	8			
Total	0.0031204		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.85	23.2	0.5657	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.975	0.741	0.9341	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
59517-007		5	0.46	0.44	0.481	0.465	0.433	0.477	0.00739	3.59%	-0.44%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
59517-007		0.477	0.46	0.433	0.465	0.467

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6169-3885	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-17 9:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
29517-009	02-4760-4063	17 Aug-17 08:00	18 Aug-17 13:00	13d 16h	AECOM	Dredged Sediment Evalu
29517-008	15-5652-0661	21 Aug-17 11:30	21 Aug-17 11:30	9d 13h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
29517-009	Reference sediment	New Haven Harbor FNP -2017	CLDS Reference Site	
29517-008	Marine Sediment	New Haven Harbor FNP -2017	Composite 8 (Sta X,Y,Z)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	29517-008 passed trans-nonachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		29517-008	-0.727	1.86	0.03	8	CDF	0.7560	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5415	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003364	0.0003364	1	0.529	0.4880	Non-Significant Effect
Error	0.005092	0.0006365	8			
Total	0.0054284		9			

Distributional Tests

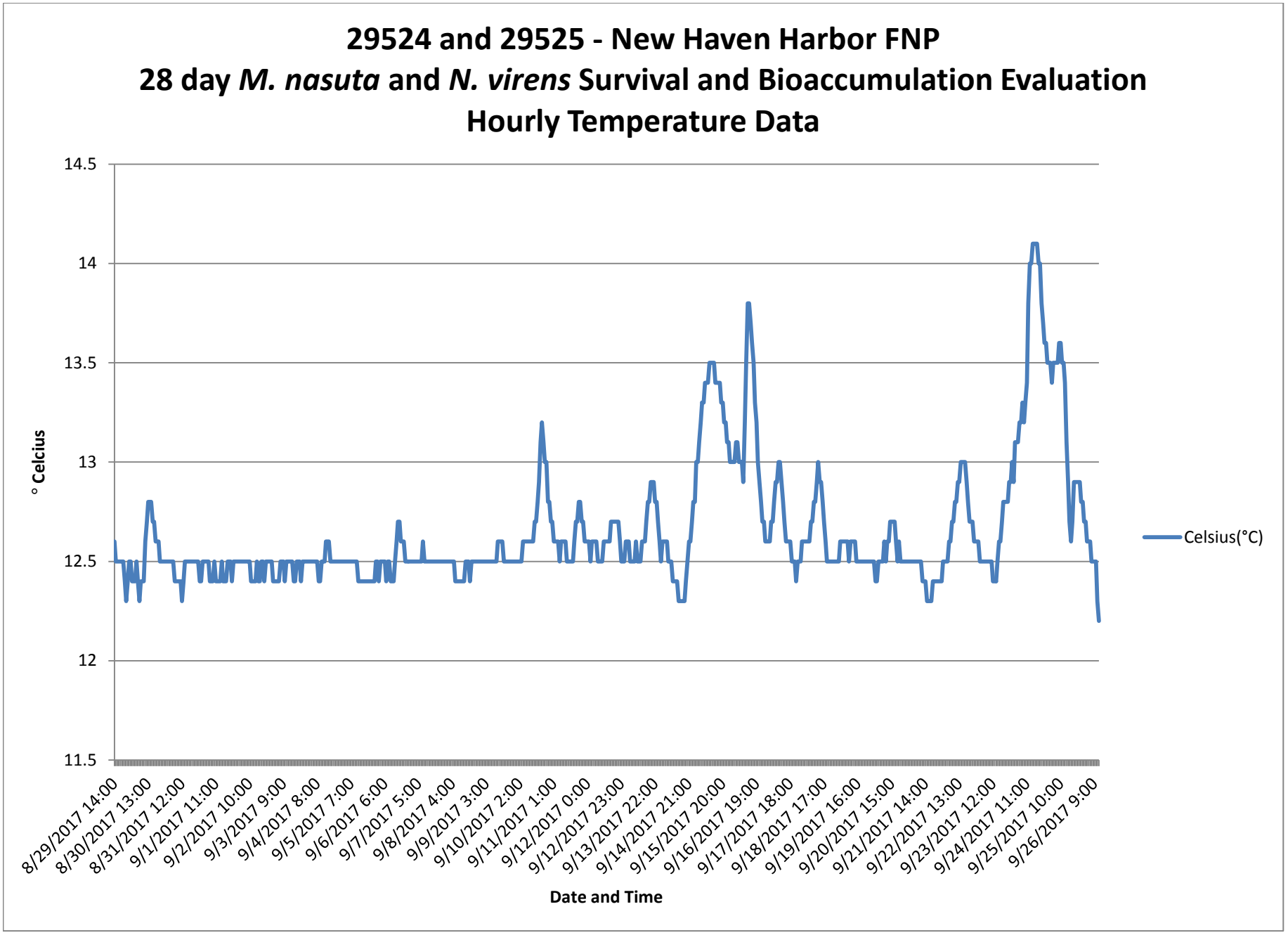
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2442	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
29517-009	RS	5	0.458	0.431	0.486	0.45	0.438	0.494	0.01	4.90%	0.00%
29517-008		5	0.447	0.412	0.481	0.442	0.419	0.489	0.0124	6.20%	2.53%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
29517-009	RS	0.438	0.466	0.444	0.45	0.494
29517-008		0.457	0.489	0.419	0.427	0.442


29524 and 29525 - New Haven Harbor FNP
28 day *M. nasuta* and *N. virens* Survival and Bioaccumulation Evaluation
Hourly Temperature Data
14.5
14
13.5
13
12.5
12
11.5
° Celcius
8/29/2017 14:00
8/30/2017 13:00
8/31/2017 12:00
9/1/2017 11:00
9/2/2017 10:00
9/3/2017 9:00
9/4/2017 8:00
9/5/2017 7:00
9/6/2017 6:00
9/7/2017 5:00
9/8/2017 4:00
9/9/2017 3:00
9/10/2017 2:00
9/11/2017 1:00
9/12/2017 0:00
9/12/2017 23:00
9/13/2017 22:00
9/14/2017 21:00
9/15/2017 20:00
9/16/2017 19:00
9/17/2017 18:00
9/18/2017 17:00
9/19/2017 16:00
9/20/2017 15:00
9/21/2017 14:00
9/22/2017 13:00
9/23/2017 12:00
9/24/2017 11:00
9/25/2017 10:00
9/26/2017 9:00
Date and Time
Celsius(°C)

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
1	8/29/2017 14:00	12.6
2	8/29/2017 15:00	12.5
3	8/29/2017 16:00	12.5
4	8/29/2017 17:00	12.5
5	8/29/2017 18:00	12.5
6	8/29/2017 19:00	12.5
7	8/29/2017 20:00	12.5
8	8/29/2017 21:00	12.4
9	8/29/2017 22:00	12.3
10	8/29/2017 23:00	12.4
11	8/30/2017 0:00	12.5
12	8/30/2017 1:00	12.5
13	8/30/2017 2:00	12.4
14	8/30/2017 3:00	12.4
15	8/30/2017 4:00	12.4
16	8/30/2017 5:00	12.5
17	8/30/2017 6:00	12.4
18	8/30/2017 7:00	12.3
19	8/30/2017 8:00	12.4
20	8/30/2017 9:00	12.4
21	8/30/2017 10:00	12.4
22	8/30/2017 11:00	12.6
23	8/30/2017 12:00	12.7
24	8/30/2017 13:00	12.8
25	8/30/2017 14:00	12.8
26	8/30/2017 15:00	12.8
27	8/30/2017 16:00	12.7
28	8/30/2017 17:00	12.7
29	8/30/2017 18:00	12.6
30	8/30/2017 19:00	12.6
31	8/30/2017 20:00	12.6
32	8/30/2017 21:00	12.5
33	8/30/2017 22:00	12.5
34	8/30/2017 23:00	12.5
35	8/31/2017 0:00	12.5
36	8/31/2017 1:00	12.5
37	8/31/2017 2:00	12.5
38	8/31/2017 3:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
39	8/31/2017 4:00	12.5
40	8/31/2017 5:00	12.5
41	8/31/2017 6:00	12.5
42	8/31/2017 7:00	12.4
43	8/31/2017 8:00	12.4
44	8/31/2017 9:00	12.4
45	8/31/2017 10:00	12.4
46	8/31/2017 11:00	12.4
47	8/31/2017 12:00	12.3
48	8/31/2017 13:00	12.4
49	8/31/2017 14:00	12.5
50	8/31/2017 15:00	12.5
51	8/31/2017 16:00	12.5
52	8/31/2017 17:00	12.5
53	8/31/2017 18:00	12.5
54	8/31/2017 19:00	12.5
55	8/31/2017 20:00	12.5
56	8/31/2017 21:00	12.5
57	8/31/2017 22:00	12.5
58	8/31/2017 23:00	12.5
59	9/1/2017 0:00	12.4
60	9/1/2017 1:00	12.4
61	9/1/2017 2:00	12.5
62	9/1/2017 3:00	12.5
63	9/1/2017 4:00	12.5
64	9/1/2017 5:00	12.5
65	9/1/2017 6:00	12.5
66	9/1/2017 7:00	12.4
67	9/1/2017 8:00	12.4
68	9/1/2017 9:00	12.4
69	9/1/2017 10:00	12.5
70	9/1/2017 11:00	12.4
71	9/1/2017 12:00	12.4
72	9/1/2017 13:00	12.4
73	9/1/2017 14:00	12.4
74	9/1/2017 15:00	12.5
75	9/1/2017 16:00	12.4
76	9/1/2017 17:00	12.4

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
77	9/1/2017 18:00	12.4
78	9/1/2017 19:00	12.5
79	9/1/2017 20:00	12.5
80	9/1/2017 21:00	12.5
81	9/1/2017 22:00	12.4
82	9/1/2017 23:00	12.5
83	9/2/2017 0:00	12.5
84	9/2/2017 1:00	12.5
85	9/2/2017 2:00	12.5
86	9/2/2017 3:00	12.5
87	9/2/2017 4:00	12.5
88	9/2/2017 5:00	12.5
89	9/2/2017 6:00	12.5
90	9/2/2017 7:00	12.5
91	9/2/2017 8:00	12.5
92	9/2/2017 9:00	12.5
93	9/2/2017 10:00	12.5
94	9/2/2017 11:00	12.4
95	9/2/2017 12:00	12.4
96	9/2/2017 13:00	12.4
97	9/2/2017 14:00	12.4
98	9/2/2017 15:00	12.5
99	9/2/2017 16:00	12.4
100	9/2/2017 17:00	12.4
101	9/2/2017 18:00	12.5
102	9/2/2017 19:00	12.5
103	9/2/2017 20:00	12.4
104	9/2/2017 21:00	12.5
105	9/2/2017 22:00	12.5
106	9/2/2017 23:00	12.5
107	9/3/2017 0:00	12.5
108	9/3/2017 1:00	12.5
109	9/3/2017 2:00	12.4
110	9/3/2017 3:00	12.4
111	9/3/2017 4:00	12.4
112	9/3/2017 5:00	12.4
113	9/3/2017 6:00	12.4
114	9/3/2017 7:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
115	9/3/2017 8:00	12.5
116	9/3/2017 9:00	12.5
117	9/3/2017 10:00	12.4
118	9/3/2017 11:00	12.5
119	9/3/2017 12:00	12.5
120	9/3/2017 13:00	12.5
121	9/3/2017 14:00	12.5
122	9/3/2017 15:00	12.5
123	9/3/2017 16:00	12.4
124	9/3/2017 17:00	12.4
125	9/3/2017 18:00	12.5
126	9/3/2017 19:00	12.5
127	9/3/2017 20:00	12.5
128	9/3/2017 21:00	12.4
129	9/3/2017 22:00	12.5
130	9/3/2017 23:00	12.5
131	9/4/2017 0:00	12.5
132	9/4/2017 1:00	12.5
133	9/4/2017 2:00	12.5
134	9/4/2017 3:00	12.5
135	9/4/2017 4:00	12.5
136	9/4/2017 5:00	12.5
137	9/4/2017 6:00	12.5
138	9/4/2017 7:00	12.5
139	9/4/2017 8:00	12.5
140	9/4/2017 9:00	12.4
141	9/4/2017 10:00	12.4
142	9/4/2017 11:00	12.5
143	9/4/2017 12:00	12.5
144	9/4/2017 13:00	12.5
145	9/4/2017 14:00	12.6
146	9/4/2017 15:00	12.6
147	9/4/2017 16:00	12.6
148	9/4/2017 17:00	12.5
149	9/4/2017 18:00	12.5
150	9/4/2017 19:00	12.5
151	9/4/2017 20:00	12.5
152	9/4/2017 21:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
153	9/4/2017 22:00	12.5
154	9/4/2017 23:00	12.5
155	9/5/2017 0:00	12.5
156	9/5/2017 1:00	12.5
157	9/5/2017 2:00	12.5
158	9/5/2017 3:00	12.5
159	9/5/2017 4:00	12.5
160	9/5/2017 5:00	12.5
161	9/5/2017 6:00	12.5
162	9/5/2017 7:00	12.5
163	9/5/2017 8:00	12.5
164	9/5/2017 9:00	12.5
165	9/5/2017 10:00	12.5
166	9/5/2017 11:00	12.5
167	9/5/2017 12:00	12.4
168	9/5/2017 13:00	12.4
169	9/5/2017 14:00	12.4
170	9/5/2017 15:00	12.4
171	9/5/2017 16:00	12.4
172	9/5/2017 17:00	12.4
173	9/5/2017 18:00	12.4
174	9/5/2017 19:00	12.4
175	9/5/2017 20:00	12.4
176	9/5/2017 21:00	12.4
177	9/5/2017 22:00	12.4
178	9/5/2017 23:00	12.4
179	9/6/2017 0:00	12.5
180	9/6/2017 1:00	12.5
181	9/6/2017 2:00	12.4
182	9/6/2017 3:00	12.5
183	9/6/2017 4:00	12.5
184	9/6/2017 5:00	12.5
185	9/6/2017 6:00	12.5
186	9/6/2017 7:00	12.4
187	9/6/2017 8:00	12.5
188	9/6/2017 9:00	12.5
189	9/6/2017 10:00	12.4
190	9/6/2017 11:00	12.4

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
191	9/6/2017 12:00	12.4
192	9/6/2017 13:00	12.5
193	9/6/2017 14:00	12.6
194	9/6/2017 15:00	12.7
195	9/6/2017 16:00	12.7
196	9/6/2017 17:00	12.6
197	9/6/2017 18:00	12.6
198	9/6/2017 19:00	12.6
199	9/6/2017 20:00	12.5
200	9/6/2017 21:00	12.5
201	9/6/2017 22:00	12.5
202	9/6/2017 23:00	12.5
203	9/7/2017 0:00	12.5
204	9/7/2017 1:00	12.5
205	9/7/2017 2:00	12.5
206	9/7/2017 3:00	12.5
207	9/7/2017 4:00	12.5
208	9/7/2017 5:00	12.5
209	9/7/2017 6:00	12.5
210	9/7/2017 7:00	12.5
211	9/7/2017 8:00	12.6
212	9/7/2017 9:00	12.5
213	9/7/2017 10:00	12.5
214	9/7/2017 11:00	12.5
215	9/7/2017 12:00	12.5
216	9/7/2017 13:00	12.5
217	9/7/2017 14:00	12.5
218	9/7/2017 15:00	12.5
219	9/7/2017 16:00	12.5
220	9/7/2017 17:00	12.5
221	9/7/2017 18:00	12.5
222	9/7/2017 19:00	12.5
223	9/7/2017 20:00	12.5
224	9/7/2017 21:00	12.5
225	9/7/2017 22:00	12.5
226	9/7/2017 23:00	12.5
227	9/8/2017 0:00	12.5
228	9/8/2017 1:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
229	9/8/2017 2:00	12.5
230	9/8/2017 3:00	12.5
231	9/8/2017 4:00	12.5
232	9/8/2017 5:00	12.5
233	9/8/2017 6:00	12.4
234	9/8/2017 7:00	12.4
235	9/8/2017 8:00	12.4
236	9/8/2017 9:00	12.4
237	9/8/2017 10:00	12.4
238	9/8/2017 11:00	12.4
239	9/8/2017 12:00	12.4
240	9/8/2017 13:00	12.5
241	9/8/2017 14:00	12.5
242	9/8/2017 15:00	12.5
243	9/8/2017 16:00	12.4
244	9/8/2017 17:00	12.5
245	9/8/2017 18:00	12.5
246	9/8/2017 19:00	12.5
247	9/8/2017 20:00	12.5
248	9/8/2017 21:00	12.5
249	9/8/2017 22:00	12.5
250	9/8/2017 23:00	12.5
251	9/9/2017 0:00	12.5
252	9/9/2017 1:00	12.5
253	9/9/2017 2:00	12.5
254	9/9/2017 3:00	12.5
255	9/9/2017 4:00	12.5
256	9/9/2017 5:00	12.5
257	9/9/2017 6:00	12.5
258	9/9/2017 7:00	12.5
259	9/9/2017 8:00	12.5
260	9/9/2017 9:00	12.5
261	9/9/2017 10:00	12.5
262	9/9/2017 11:00	12.6
263	9/9/2017 12:00	12.6
264	9/9/2017 13:00	12.6
265	9/9/2017 14:00	12.6
266	9/9/2017 15:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
267	9/9/2017 16:00	12.5
268	9/9/2017 17:00	12.5
269	9/9/2017 18:00	12.5
270	9/9/2017 19:00	12.5
271	9/9/2017 20:00	12.5
272	9/9/2017 21:00	12.5
273	9/9/2017 22:00	12.5
274	9/9/2017 23:00	12.5
275	9/10/2017 0:00	12.5
276	9/10/2017 1:00	12.5
277	9/10/2017 2:00	12.5
278	9/10/2017 3:00	12.5
279	9/10/2017 4:00	12.6
280	9/10/2017 5:00	12.6
281	9/10/2017 6:00	12.6
282	9/10/2017 7:00	12.6
283	9/10/2017 8:00	12.6
284	9/10/2017 9:00	12.6
285	9/10/2017 10:00	12.6
286	9/10/2017 11:00	12.6
287	9/10/2017 12:00	12.7
288	9/10/2017 13:00	12.7
289	9/10/2017 14:00	12.8
290	9/10/2017 15:00	12.9
291	9/10/2017 16:00	13.1
292	9/10/2017 17:00	13.2
293	9/10/2017 18:00	13.1
294	9/10/2017 19:00	13
295	9/10/2017 20:00	13
296	9/10/2017 21:00	12.8
297	9/10/2017 22:00	12.8
298	9/10/2017 23:00	12.7
299	9/11/2017 0:00	12.7
300	9/11/2017 1:00	12.6
301	9/11/2017 2:00	12.6
302	9/11/2017 3:00	12.6
303	9/11/2017 4:00	12.6
304	9/11/2017 5:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
305	9/11/2017 6:00	12.6
306	9/11/2017 7:00	12.6
307	9/11/2017 8:00	12.6
308	9/11/2017 9:00	12.6
309	9/11/2017 10:00	12.5
310	9/11/2017 11:00	12.5
311	9/11/2017 12:00	12.5
312	9/11/2017 13:00	12.5
313	9/11/2017 14:00	12.5
314	9/11/2017 15:00	12.6
315	9/11/2017 16:00	12.7
316	9/11/2017 17:00	12.7
317	9/11/2017 18:00	12.8
318	9/11/2017 19:00	12.8
319	9/11/2017 20:00	12.7
320	9/11/2017 21:00	12.7
321	9/11/2017 22:00	12.6
322	9/11/2017 23:00	12.6
323	9/12/2017 0:00	12.6
324	9/12/2017 1:00	12.6
325	9/12/2017 2:00	12.5
326	9/12/2017 3:00	12.6
327	9/12/2017 4:00	12.6
328	9/12/2017 5:00	12.6
329	9/12/2017 6:00	12.6
330	9/12/2017 7:00	12.5
331	9/12/2017 8:00	12.5
332	9/12/2017 9:00	12.5
333	9/12/2017 10:00	12.5
334	9/12/2017 11:00	12.6
335	9/12/2017 12:00	12.6
336	9/12/2017 13:00	12.6
337	9/12/2017 14:00	12.6
338	9/12/2017 15:00	12.6
339	9/12/2017 16:00	12.7
340	9/12/2017 17:00	12.7
341	9/12/2017 18:00	12.7
342	9/12/2017 19:00	12.7

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
343	9/12/2017 20:00	12.7
344	9/12/2017 21:00	12.7
345	9/12/2017 22:00	12.6
346	9/12/2017 23:00	12.5
347	9/13/2017 0:00	12.5
348	9/13/2017 1:00	12.5
349	9/13/2017 2:00	12.6
350	9/13/2017 3:00	12.6
351	9/13/2017 4:00	12.6
352	9/13/2017 5:00	12.5
353	9/13/2017 6:00	12.5
354	9/13/2017 7:00	12.5
355	9/13/2017 8:00	12.5
356	9/13/2017 9:00	12.6
357	9/13/2017 10:00	12.5
358	9/13/2017 11:00	12.5
359	9/13/2017 12:00	12.5
360	9/13/2017 13:00	12.6
361	9/13/2017 14:00	12.6
362	9/13/2017 15:00	12.6
363	9/13/2017 16:00	12.7
364	9/13/2017 17:00	12.8
365	9/13/2017 18:00	12.8
366	9/13/2017 19:00	12.9
367	9/13/2017 20:00	12.9
368	9/13/2017 21:00	12.9
369	9/13/2017 22:00	12.8
370	9/13/2017 23:00	12.8
371	9/14/2017 0:00	12.7
372	9/14/2017 1:00	12.6
373	9/14/2017 2:00	12.5
374	9/14/2017 3:00	12.6
375	9/14/2017 4:00	12.6
376	9/14/2017 5:00	12.6
377	9/14/2017 6:00	12.6
378	9/14/2017 7:00	12.5
379	9/14/2017 8:00	12.5
380	9/14/2017 9:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
381	9/14/2017 10:00	12.4
382	9/14/2017 11:00	12.4
383	9/14/2017 12:00	12.4
384	9/14/2017 13:00	12.4
385	9/14/2017 14:00	12.3
386	9/14/2017 15:00	12.3
387	9/14/2017 16:00	12.3
388	9/14/2017 17:00	12.3
389	9/14/2017 18:00	12.3
390	9/14/2017 19:00	12.4
391	9/14/2017 20:00	12.5
392	9/14/2017 21:00	12.6
393	9/14/2017 22:00	12.6
394	9/14/2017 23:00	12.7
395	9/15/2017 0:00	12.8
396	9/15/2017 1:00	12.8
397	9/15/2017 2:00	13
398	9/15/2017 3:00	13
399	9/15/2017 4:00	13.1
400	9/15/2017 5:00	13.2
401	9/15/2017 6:00	13.3
402	9/15/2017 7:00	13.3
403	9/15/2017 8:00	13.4
404	9/15/2017 9:00	13.4
405	9/15/2017 10:00	13.4
406	9/15/2017 11:00	13.5
407	9/15/2017 12:00	13.5
408	9/15/2017 13:00	13.5
409	9/15/2017 14:00	13.5
410	9/15/2017 15:00	13.4
411	9/15/2017 16:00	13.4
412	9/15/2017 17:00	13.4
413	9/15/2017 18:00	13.4
414	9/15/2017 19:00	13.3
415	9/15/2017 20:00	13.3
416	9/15/2017 21:00	13.2
417	9/15/2017 22:00	13.2
418	9/15/2017 23:00	13.1

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
419	9/16/2017 0:00	13.1
420	9/16/2017 1:00	13
421	9/16/2017 2:00	13
422	9/16/2017 3:00	13
423	9/16/2017 4:00	13
424	9/16/2017 5:00	13.1
425	9/16/2017 6:00	13.1
426	9/16/2017 7:00	13
427	9/16/2017 8:00	13
428	9/16/2017 9:00	13
429	9/16/2017 10:00	12.9
430	9/16/2017 11:00	13.2
431	9/16/2017 12:00	13.5
432	9/16/2017 13:00	13.8
433	9/16/2017 14:00	13.8
434	9/16/2017 15:00	13.7
435	9/16/2017 16:00	13.6
436	9/16/2017 17:00	13.5
437	9/16/2017 18:00	13.3
438	9/16/2017 19:00	13.2
439	9/16/2017 20:00	13
440	9/16/2017 21:00	12.9
441	9/16/2017 22:00	12.8
442	9/16/2017 23:00	12.7
443	9/17/2017 0:00	12.7
444	9/17/2017 1:00	12.6
445	9/17/2017 2:00	12.6
446	9/17/2017 3:00	12.6
447	9/17/2017 4:00	12.6
448	9/17/2017 5:00	12.7
449	9/17/2017 6:00	12.7
450	9/17/2017 7:00	12.8
451	9/17/2017 8:00	12.9
452	9/17/2017 9:00	12.9
453	9/17/2017 10:00	13
454	9/17/2017 11:00	13
455	9/17/2017 12:00	12.9
456	9/17/2017 13:00	12.8

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
457	9/17/2017 14:00	12.7
458	9/17/2017 15:00	12.6
459	9/17/2017 16:00	12.6
460	9/17/2017 17:00	12.6
461	9/17/2017 18:00	12.6
462	9/17/2017 19:00	12.5
463	9/17/2017 20:00	12.5
464	9/17/2017 21:00	12.5
465	9/17/2017 22:00	12.4
466	9/17/2017 23:00	12.5
467	9/18/2017 0:00	12.5
468	9/18/2017 1:00	12.5
469	9/18/2017 2:00	12.6
470	9/18/2017 3:00	12.6
471	9/18/2017 4:00	12.6
472	9/18/2017 5:00	12.6
473	9/18/2017 6:00	12.6
474	9/18/2017 7:00	12.6
475	9/18/2017 8:00	12.7
476	9/18/2017 9:00	12.7
477	9/18/2017 10:00	12.8
478	9/18/2017 11:00	12.8
479	9/18/2017 12:00	12.9
480	9/18/2017 13:00	13
481	9/18/2017 14:00	12.9
482	9/18/2017 15:00	12.9
483	9/18/2017 16:00	12.8
484	9/18/2017 17:00	12.7
485	9/18/2017 18:00	12.6
486	9/18/2017 19:00	12.5
487	9/18/2017 20:00	12.5
488	9/18/2017 21:00	12.5
489	9/18/2017 22:00	12.5
490	9/18/2017 23:00	12.5
491	9/19/2017 0:00	12.5
492	9/19/2017 1:00	12.5
493	9/19/2017 2:00	12.5
494	9/19/2017 3:00	12.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
495	9/19/2017 4:00	12.6
496	9/19/2017 5:00	12.6
497	9/19/2017 6:00	12.6
498	9/19/2017 7:00	12.6
499	9/19/2017 8:00	12.6
500	9/19/2017 9:00	12.6
501	9/19/2017 10:00	12.5
502	9/19/2017 11:00	12.6
503	9/19/2017 12:00	12.6
504	9/19/2017 13:00	12.6
505	9/19/2017 14:00	12.6
506	9/19/2017 15:00	12.5
507	9/19/2017 16:00	12.5
508	9/19/2017 17:00	12.5
509	9/19/2017 18:00	12.5
510	9/19/2017 19:00	12.5
511	9/19/2017 20:00	12.5
512	9/19/2017 21:00	12.5
513	9/19/2017 22:00	12.5
514	9/19/2017 23:00	12.5
515	9/20/2017 0:00	12.5
516	9/20/2017 1:00	12.5
517	9/20/2017 2:00	12.5
518	9/20/2017 3:00	12.5
519	9/20/2017 4:00	12.4
520	9/20/2017 5:00	12.4
521	9/20/2017 6:00	12.5
522	9/20/2017 7:00	12.5
523	9/20/2017 8:00	12.5
524	9/20/2017 9:00	12.5
525	9/20/2017 10:00	12.6
526	9/20/2017 11:00	12.5
527	9/20/2017 12:00	12.6
528	9/20/2017 13:00	12.6
529	9/20/2017 14:00	12.7
530	9/20/2017 15:00	12.7
531	9/20/2017 16:00	12.7
532	9/20/2017 17:00	12.7

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
533	9/20/2017 18:00	12.6
534	9/20/2017 19:00	12.5
535	9/20/2017 20:00	12.6
536	9/20/2017 21:00	12.5
537	9/20/2017 22:00	12.5
538	9/20/2017 23:00	12.5
539	9/21/2017 0:00	12.5
540	9/21/2017 1:00	12.5
541	9/21/2017 2:00	12.5
542	9/21/2017 3:00	12.5
543	9/21/2017 4:00	12.5
544	9/21/2017 5:00	12.5
545	9/21/2017 6:00	12.5
546	9/21/2017 7:00	12.5
547	9/21/2017 8:00	12.5
548	9/21/2017 9:00	12.5
549	9/21/2017 10:00	12.5
550	9/21/2017 11:00	12.5
551	9/21/2017 12:00	12.4
552	9/21/2017 13:00	12.4
553	9/21/2017 14:00	12.4
554	9/21/2017 15:00	12.3
555	9/21/2017 16:00	12.3
556	9/21/2017 17:00	12.3
557	9/21/2017 18:00	12.3
558	9/21/2017 19:00	12.4
559	9/21/2017 20:00	12.4
560	9/21/2017 21:00	12.4
561	9/21/2017 22:00	12.4
562	9/21/2017 23:00	12.4
563	9/22/2017 0:00	12.4
564	9/22/2017 1:00	12.4
565	9/22/2017 2:00	12.5
566	9/22/2017 3:00	12.5
567	9/22/2017 4:00	12.5
568	9/22/2017 5:00	12.5
569	9/22/2017 6:00	12.6
570	9/22/2017 7:00	12.6

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
571	9/22/2017 8:00	12.7
572	9/22/2017 9:00	12.7
573	9/22/2017 10:00	12.8
574	9/22/2017 11:00	12.8
575	9/22/2017 12:00	12.9
576	9/22/2017 13:00	12.9
577	9/22/2017 14:00	13
578	9/22/2017 15:00	13
579	9/22/2017 16:00	13
580	9/22/2017 17:00	13
581	9/22/2017 18:00	12.9
582	9/22/2017 19:00	12.8
583	9/22/2017 20:00	12.7
584	9/22/2017 21:00	12.7
585	9/22/2017 22:00	12.7
586	9/22/2017 23:00	12.6
587	9/23/2017 0:00	12.6
588	9/23/2017 1:00	12.6
589	9/23/2017 2:00	12.6
590	9/23/2017 3:00	12.5
591	9/23/2017 4:00	12.5
592	9/23/2017 5:00	12.5
593	9/23/2017 6:00	12.5
594	9/23/2017 7:00	12.5
595	9/23/2017 8:00	12.5
596	9/23/2017 9:00	12.5
597	9/23/2017 10:00	12.5
598	9/23/2017 11:00	12.5
599	9/23/2017 12:00	12.4
600	9/23/2017 13:00	12.4
601	9/23/2017 14:00	12.4
602	9/23/2017 15:00	12.5
603	9/23/2017 16:00	12.6
604	9/23/2017 17:00	12.6
605	9/23/2017 18:00	12.7
606	9/23/2017 19:00	12.8
607	9/23/2017 20:00	12.8
608	9/23/2017 21:00	12.8

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
609	9/23/2017 22:00	12.8
610	9/23/2017 23:00	12.9
611	9/24/2017 0:00	12.9
612	9/24/2017 1:00	13
613	9/24/2017 2:00	12.9
614	9/24/2017 3:00	13.1
615	9/24/2017 4:00	13.1
616	9/24/2017 5:00	13.1
617	9/24/2017 6:00	13.2
618	9/24/2017 7:00	13.2
619	9/24/2017 8:00	13.3
620	9/24/2017 9:00	13.2
621	9/24/2017 10:00	13.3
622	9/24/2017 11:00	13.4
623	9/24/2017 12:00	13.8
624	9/24/2017 13:00	14
625	9/24/2017 14:00	14
626	9/24/2017 15:00	14.1
627	9/24/2017 16:00	14.1
628	9/24/2017 17:00	14.1
629	9/24/2017 18:00	14.1
630	9/24/2017 19:00	14
631	9/24/2017 20:00	14
632	9/24/2017 21:00	13.8
633	9/24/2017 22:00	13.7
634	9/24/2017 23:00	13.6
635	9/25/2017 0:00	13.6
636	9/25/2017 1:00	13.5
637	9/25/2017 2:00	13.5
638	9/25/2017 3:00	13.5
639	9/25/2017 4:00	13.4
640	9/25/2017 5:00	13.5
641	9/25/2017 6:00	13.5
642	9/25/2017 7:00	13.5
643	9/25/2017 8:00	13.5
644	9/25/2017 9:00	13.6
645	9/25/2017 10:00	13.6
646	9/25/2017 11:00	13.5

STUDY: 29524 & 29525
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* and *N. virens* 28 Day Survival and Bioaccumulation Evaluatio

TASK: Hourly Temperature Data
Serial #: 10014864

	°C
Mean:	12.7
Minimum:	12.2
Maximum:	14.1

	Date and Time	Celsius(°C)
647	9/25/2017 12:00	13.5
648	9/25/2017 13:00	13.4
649	9/25/2017 14:00	13.1
650	9/25/2017 15:00	12.9
651	9/25/2017 16:00	12.7
652	9/25/2017 17:00	12.6
653	9/25/2017 18:00	12.7
654	9/25/2017 19:00	12.9
655	9/25/2017 20:00	12.9
656	9/25/2017 21:00	12.9
657	9/25/2017 22:00	12.9
658	9/25/2017 23:00	12.9
659	9/26/2017 0:00	12.8
660	9/26/2017 1:00	12.8
661	9/26/2017 2:00	12.7
662	9/26/2017 3:00	12.7
663	9/26/2017 4:00	12.6
664	9/26/2017 5:00	12.6
665	9/26/2017 6:00	12.6
666	9/26/2017 7:00	12.5
667	9/26/2017 8:00	12.5
668	9/26/2017 9:00	12.5
669	9/26/2017 10:00	12.5
670	9/26/2017 11:00	12.3
671	9/26/2017 12:00	12.2

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	See QC Summary Tables provided by Alpha Analytical
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	See QC Summary Tables provided by Alpha Analytical
15. Were the SRM/CRM analyses within acceptance criteria?	See QC Summary Tables provided by Alpha Analytical
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	See QC Summary Tables provided by Alpha Analytical
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	See QC Summary Tables provided by Alpha Analytical
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	See QC Summary Tables provided by Alpha Analytical
19. Were surrogate recoveries within the required acceptance criteria?	See QC Summary Tables provided by Alpha Analytical
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for *N. virens* daily water quality data
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	Yes
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes, except as noted for *N. virens*	Daily water quality data for *N. virens* missing for test days 27 and 28 (Appendix A).	Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; ≤ 40% clam larvae, ≤ 30% sea urchin larvae	NA		
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	Yes		Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No – PCB RLs slightly elevated; Methoxychlor
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – See Narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – See Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	N/A
19. Were surrogate recoveries within the required acceptance criteria?	No – See Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	No	CCV- opening for method blank, LCS,LCSD: Benzo(b)fluoranthene @ 20% CCV- opening for SRM: Benzo(b)fluoranthene @20% CCV- opening for L1735126-01,01D, 01MS, 01MSD: Benzo(k)fluoranthene @ 17%, dibenz(a,h)anthracene @ 20CCV – opening for L1735126-02 through-20: Benz(a)anthracene @ 17%, Dibenz(a,h)anthracene @20%, Benzo(g,h,i)perylene @ 17%, CCV – opening for L1735126-41, 41D, 41MS, 41MSD through -55: Benzo(b)fluoranthene @ 18%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes.	No	L1735126-41 MS: Naphthalene @ 48%, Acenaphthylene @ 48%, Acenaphthene @ 46%, Fluorene	In Data Package

	(Recovery Limits 50 to 120%; RPD <30%)		@ 48%, Anthracene @ 43%, Chrysene @ 42%, Benzo(k)fluoranthene @ 45% MSD: Naphthalene @ 40%, Acenaphthylene @ 41%, Acenaphthene @ 39%, Fluorene @ 41%, Phenanthrene @ 49%, Anthracene @ 38%, Fluoranthene @43%, Pyrene @ 40%,Chrysene @ 36%, Benzo(k)fluoranthene @ 37%, Benzo(a)pyrene @ 45%, Dibenz(a,h)anthracene @ 47%, Benzo(g,h,i)perylene @ 48% RPD: Benzo(a)pyrene @ 37%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV1: opening for Blank,LCS,LCSD L1735126-01, 01D, 01MS, 01MSD: Column a: gamma-BHC @ 18% Column b: gamma-BHC @ 23%, Aldrin @ 19%, Dieldrin @ 16% CCV2:opening for L1735126-02 through 20: Column a: gamma-BHC @ 19%, Aldrin @ 18%, Methoxychlor @ 20% Column b : gamma-BHC @ 22%, Heptachlor @ 16%, Aldrin @ 20%, Dieldrin @ 16%, 4,4-DDD @ 18% CCV3: opening for Blank2, LCS2, LCSD2, L1735126-21, 21D, 21MS, 21MSD: Column a : gamma-BHC @ 18%, Aldrin @ 17% Column b : gamma-BHC @ 25%, Aldrin @ 21%, heptachlor epoxide b @ 16%, Endosulfan I @ 16%, Dieldrin @ 18% CCV4: opening for L1735126-22 through -40	Retained at Lab

			Column a: gamma-BHC @ 22%, heptachlor @ 16%, Aldrin @ 20%, Dieldrin @ 16% Column b: gamma-BHC @ 20%, Aldrin @ 16% CCV5: opening for Blank3, LCS3, LCSD3, SRM: Column a : gamma-BHC @ 18%, Aldrin @ 16% CCV6: opening for L1735126-41, 41D, 41MS, 41MSD, 42-55: Column a: gamma-BHC @ 17%, Aldrin @ 16%	
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735126-01: MS: Oxychlordane @ 49% MSD: Methoxychlor @ 47%, Oxychlordane @ 47% L1735126-21: MS: Heptachlor epoxide @ 49%, Oxychlordance @ 48% MSD: Heptachlor @ 49%, Oxychlordane @ 48% L1735126-55: 4,4'-DDE (42%/35%) and cis-Nonachlor (45%-MSD only)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1735126-21D: 4,4-DDE @ 58%, endrin @ 49% L1735126-41D: 4,4-DDE @ 67%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1735126-41MSD: BZ198 @ 229% on column a	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV- opening for L1735126-01,01D, 01MS, 01MSD: Cl8-BZ#195 @ 17%, Cl9-BZ#206 @ 21%, Cl10-BZ#209 @ 16% CCV – opening for L1735126-02 through-20: Cl7-BZ#170 @ 18%, Cl8-BZ#195 @ 20%, Cl9-BZ#206 @ 21%,	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM2: Cl3-BZ#28 @ 898% SRM3: Cl3-BZ#28 @ 448%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735126-01: MS: Cl3-BZ#18 @ 131%, Cl4-BZ#49 @ 46%, Cl7-BZ#183 @ 46% MSD: Cl3-BZ#18 @ 125% L1735126-21: MS: Cl3-BZ#18 @ 135% MSD: Cl3-BZ#18 @ 124% L1735126-41: MS: Cl2-BZ#8 @ 48%, Cl4-BZ#49 @ 40%, Cl5-BZ#105 @ 42%, Cl7-BZ#180	In Data Package

			@ 49%, Cl7-BZ#183 @ 39% MSD: Cl2-BZ#8 @ 44%, Cl4-BZ#44 @ 46%, Cl4-BZ#49 @ 38%, Cl5-BZ#87 @ 47%, Cl5-BZ#101 @ 48%, Cl5-BZ#105 @ 40%, Cl5-BZ#118 @ 49%, Cl6-BZ#128 @ 47%, Cl6-BZ#138 @ 49%, Cl7-BZ#170 @ 49%, Cl7-BZ#180 @ 44%, Cl7-BZ#183 @ 37%, Cl7-BZ#184 @ 48%, Cl8-BZ#195 @ 49%, Cl10-BZ#209 @ 47%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A	Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	No	Results >3x IDL noted, on file at lab	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	L1735126-21: (Hg 77%/78%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1735126-41: (Cr 22%), L1735126-49: (Cr 42%, Cu 24%, Pb 54%, Zn 49%), L1735126-01: (Pb 41%, Zn 39%), L1735126-21: (Pb 21%, Ni 52%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No – PCB samples -21 to -55 due to matrix interference
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	No – BZ18 in blank associated to -21 to -40
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	Yes
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see Narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See Narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see Narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	No	CCV: opening for MB2, LCS/LCSD2, SRM2: Benz(a)anthracene @ 18% CCV: opening for L1735250-36 through -40: Benzo(k)fluoranthene @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735250-21MS: Naphthalene @ 34%, Acenaphthylene @ 36%, Acenaphthene @ 33%, Fluorene @ 35%, Phenanthrene @ 48%, Anthracene @ 38%, Fluoranthene @ 45%, Pyrene @ 44%, Chrysene @ 40%, Benzo(b)fluoranthene @ 47%, Benzo(k)fluoranthene @ 49%, Benzo(a)pyrene 39%, Indeno(1,2,3-cd)Pyrene @ 49%, Dibenz(a,h)anthracene @ 45%, Benzo(g,h,i)perylene @ 46% L1735250-21MSD: Naphthalene @ 41%, Acenaphthylene @ 41%, Acenaphthene @ 39%, Fluorene @ 41%, Anthracene @	In Data Package

			45%, Pyrene @ 50%, Chrysene @ 45%, Benzo(k)fluoranthene @ 43%, Benzo(a)pyrene 44% L1735250-41MS: Naphthalene @ 50%, Acenaphthene @ 50%, Anthracene @ 49%, Chrysene @ 50%, Benzo(k)fluoranthene @ 49%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV Opening for MB1, LCS/LCSD1, L1735250-01D/MS/MSD SRM1: channel A gamma-BHC @ 17% CCV opening for L1735250-02 through 20:channel A: gamma-BHC @ 18%, Aldrin @ 16% CCV opening for: MB2 Channel A: cis-nonachlor @ 16%, methoxychlor @ 18%, channel B: Methoxychlor @ 24% CCV opening for L1735250-42-50: Channel B : Methoxychlor @ 17%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	SRM3: cis-chlordane @ 32%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1735250-21MS: Hexachlorobenzene @ 42%, gamma-BHC @ 46%, Heptachlor @ 44%, Aldrin @ 46%, Heptachlor epoxide @ 36%, Oxychlordane @ 36%, trans-Chlordane @ 44%, Endosulfan I @ 42%,	In Data Package

			cis-Chlordane @ 39%, trans-Nonachlor @ 40%, 4,4'-DDE @ 43%, Dieldrin @ 43%, Endrin @ 39%, Endosulfan II @ 39%, 4,4'-DDD @ 44%, cis-Nonachlor @ 44%, 4,4'-DDT @ 36%, Methoxychlor @ 35% L1735250-21MSD: Heptachlor epoxide @ 44%, Oxychlordane @ 44, Endosulfan I @ 50%, cis-Chlordane @ 46%, trans-Nonachlor @ 47%, Endrin @ 48%, Endosulfan II @ 48%, 4,4'-DDT @ 43%, Methoxychlor @ 43% L1735250-41MS: Heptachlor epoxide @ 48%, Oxychlordane @ 46%,, cis-Chlordane @ 48%, trans-Nonachlor @ 49%, Endosulfan II @ 48% L1735250-41MSD: Heptachlor epoxide @ 44%, Oxychlordane @ 43%, Endosulfan I @ 50%,%,, cis-Chlordane @ 47%, trans-Nonachlor @ 47%, cis-Nonachlor @ 48%, 4,4'-DDT @ 48%,	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1735250-38: DBOB channel A @ 177% L1735250-42: BZ198 channel A @ 191% L1735250-41MSD: BZ198 channel B @ 23%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV opening for MB2,LCS/LCSD2, SRM2: Cl5-BZ#101 @ 53%, Cl6-BZ#138 @ 24% CCV opening for L1735250-36 through -40: Cl5-BZ#101 @ 78%, Cl6-BZ#128 @ 19% CCV opening for MB3, LCS/LCSD3, SRM3: Cl5-BZ3110 @ 57%, Cl9-BZ#206 @ 17% CCV opening for L1735250-41 through 55: Cl2-BZ#8 @ 20%, Cl5-BZ#101 @ 93%, Cl5-BZ#110 @ 38%, Cl9-BZ#206 @ 19%, Cl10-BZ#209 @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes.	No	L1735250-01MS: Cl3-BZ#18 @ 167%, Cl4-BZ#49 @ 50% L1735250-01MSD: Cl3-BZ#18 @ 144%,	In Data Package

	(Recovery Limits 50 to 120%; RPD <30%)		Cl4-BZ#49 @ 50% L1735250-21MS: Cl2-BZ#8 @ 38%, Cl3-BZ#28 @ 43%, Cl4-BZ#44 @ 40%, Cl4-BZ#49 @ 32%, Cl4-BZ#52 @ 45%, Cl4-BZ#66 @ 39%, Cl5-BZ#87 @ 40%, Cl5-BZ#101 @ 44%, Cl5-BZ#105 @ 36%, Cl5-BZ#118 @ 39%, Cl6-BZ#128 @ 43%, Cl6-BZ#138 @ 41%, Cl6-BZ#153 @ 46%, Cl7-BZ#170 @ 42%, Cl7-BZ#180 @ 40%, Cl7-BZ#180@ 40%, Cl7-BZ#183 @ 34%, Cl7-BZ#184 @ 43%, Cl7-BZ#187 @ 46%, Cl8-BZ#195 @ 43%, Cl9-BZ#206 @ 43%, Cl10-BZ#209 @ 43% L1735250-21MSD: Cl2-BZ#8 @ 46%, Cl4-BZ#44 @ 49%, Cl4-BZ#49 @ 39%, Cl4-BZ#66 @ 50%, Cl5-BZ#105 @ 44%, Cl5-BZ#118 @ 49%, Cl7-BZ#183 @ 42% L1735250-21MS/MSD RPD: Cl7-BZ#184 @ 33%, Cl5-BZ#101 @ 31% L1735250-41MS: Cl2-BZ#8 @ 50%, Cl4-BZ#49 @ 46%, Cl7-BZ#183 @ 46% L1735250-41MSD: Cl4-BZ#49 @ 49%	
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A	Performed Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1735250-53 (WG1056189-5) As(142%), Cu(142%), Zn(142%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

ASSAY REVIEW CHECKLIST

STUDY#: 29524 / 29525

CLIENT: AECOM

PROJECT: New Haven Harbor FNP Contract # W912WJ-17-D-0003

ASSAY: 28-day Survival and Bioaccumulation

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	08/21/17	JTP	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	11/02/17	GRS	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	
Water Quality Data Complete	↓	↓	
Weights Reported	NA	NA	
Assay Acceptability Review	11/02/17	GRS	

Technical Report Review	Date	Initials	Comments
Statistical Analysis			
Survival	9/28/17	NR	
Chemical	11/17+21/17	NR	
Statistical Analysis Reviewed	9/28/17	LB (Mn)	11/28+29/17 Nv body burden
Data Acceptability Review	9/29/17	NR	
Support Documentation			
Temperature Data Logger	11/2/17	NR	
Daily WQ Data	11/2/17	NR	
Overlying and/or Pore Water Chemistry	NA		
Other Chemical Analysis Data Rec'd from Alpha Analytical	11/9, 14+21/17	NR	
Draft Report	11/30/17	NR	
Final Report Reviewed	12/4/17		
QA Audit/Review Complete			
Final Report Printed - PDF	12/4/17		
	↓	↓	
Report E-mailed / Faxed			
Report Logged Out	↓	↓	

NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

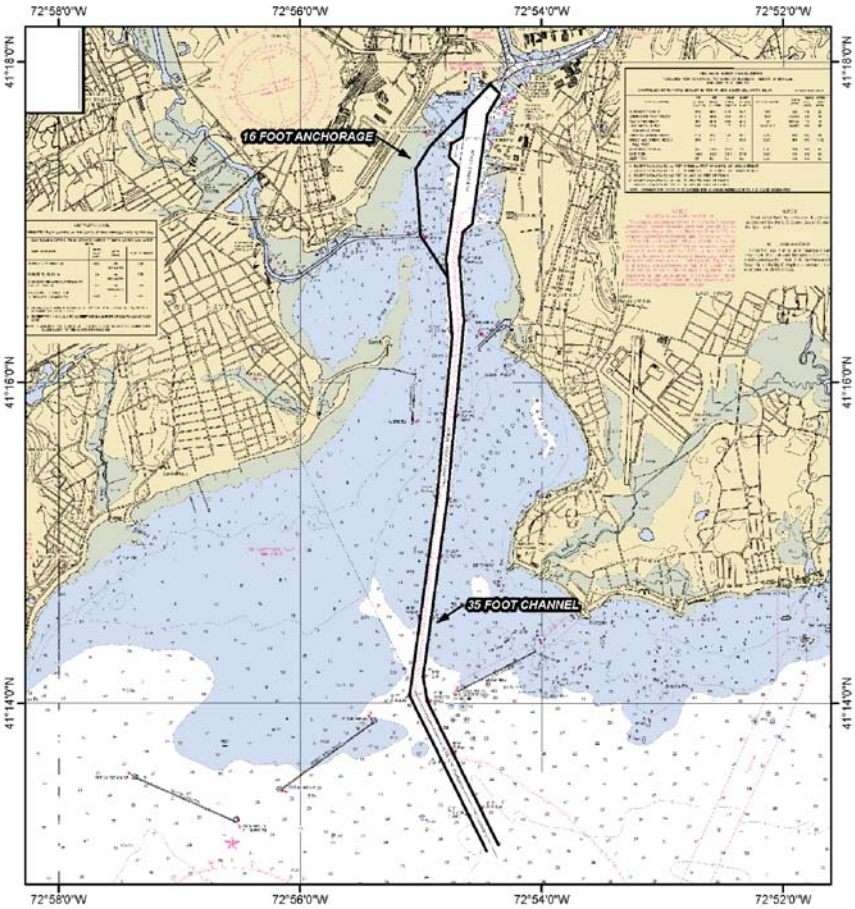
INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

SUPPORTING TECHNICAL DOCUMENT #2
DATA REPORT
HYDROACOUSTIC AND UNDERWATER VIDEO SURVEY

Data Report
Hydroacoustic and Underwater Video Survey
In Support of Project Design

Final

New Haven Harbor
Navigation Improvement Project
Feasibility Study



US Army Corps of Engineers ®
New England District

March 2018

HYDROACOUSTIC AND UNDERWATER VIDEO SURVEY

IN SUPPORT OF

PROJECT DESIGN

NEW HAVEN HARBOR

NAVIGATION IMPROVEMENT PROJECT

FEASIBILITY STUDY

NEW HAVEN, CONNECTICUT

March 2018

Prepared by:

Planning Division
Environmental Resources Section
U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

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APPENDIX C: VIDEO SURVEY TARGET DATABASE

1.0 INTRODUCTION

New Haven Harbor is located along the northern shore of Long Island Sound in the city of New Haven, CT. The harbor is a shallow embayment occupying 10.5 square miles within boundaries established by three large stone breakwaters to the south and the mouths of the West, Mill, and Quinnipiac Rivers to the north. The harbor has an irregular shoreline consisting of intertidal mud flats, salt marshes, sections of sandy beach, and developed waterfront with docks and berthing facilities. The inner harbor is fairly well protected from storm and wave action by natural land barriers allowing fine-grained sediments to accumulate in lower energy environments such as in the navigation channel north of Lighthouse Point, Morris Cove, and areas adjacent to the breakwaters. The outer harbor, except for the areas sheltered by the breakwaters, is exposed to southerly storms.

The existing Federal Navigation Project (FNP) in New Haven Harbor (Figure 1) consists of a channel and turning basin that are 35 feet deep at mean lower low water (MLLW) as well as a 16 foot MLLW anchorage located along the western side of the channel in the inner harbor. Periodic maintenance dredging of these areas has been performed since the late 1800's. The project was last dredged in 2014 when approximately 830,000 cubic yards of shoaled material was mechanically removed from the 35 foot channel and turning basin and placed at the Central Long Island Sound Disposal Site (CLDS). Pre-dredge testing performed in 2010 found the shoaled material throughout the harbor to be predominantly silt and poorly graded medium to fine sand.

The New England District (NAE) of the US Army Corps of Engineers (USACE) is currently preparing a feasibility study to evaluate improvements to the New Haven Harbor FNP. Aspects of the preliminary project design include: deepening and widening the main ship channel, widening the channel bend at Southwest Ledge, straightening the channel bend downstream of the existing turning basin, and relocating and deepening the turning basin. These combined actions would require the mechanical removal of up to 4,500,000 cubic yards of sediment and up to 32,000 cubic yards of rock depending on the selected channel alignment and dimensions.

Dredged sediments produced from the proposed improvement project are expected to be a mix of poorly graded sand and fine grained material within the existing channel profile and adjacent harbor seafloor with glaciofluvial deposits at depth. To the extent practical suitable dredged material will be beneficially reused for marsh creation, habitat restoration, and to cover historic dredged material disposal mounds at CLDS.

The purpose of the survey effort described in this report was to collect data to document surficial sediment type, sediment layering, and the presence of obstructions at or near the water-sediment interface within the proposed project area. Efforts undertaken to meet the project objectives included side scan sonar, sub-bottom profiling, and underwater video surveys.

2.0 MATERIALS AND METHODS

Staff from the NAE Environmental Resources Section conducted survey efforts in May and August 2017. Work was carried out onboard the R/V Nomad, a 25 foot SBI Defender outfitted for coastal survey operations. Vessel positioning was achieved using a Hemisphere Vector VS330™ Real Time Kinematic (RTK) position and heading system interfaced to a computer running Hypack® survey software for navigation. RTK corrections from the CTDOT/UCONN VRS network were received in real time through a cellular internet connection.

The survey effort was separated into two phases. The first phase included a combined side scan sonar and sub-bottom profiler survey to delineate surficial sediment types, and to identify potential obstructions and anthropogenic features of interest. The second phase involved an underwater video survey using a remotely operated vehicle (ROV) to investigate sonar contacts identified in side scan sonar data from the initial survey.

2.1 Side Scan Sonar and Bathymetry Survey

A side scan sonar and bathymetry survey was conducted from 1-3 August 2017 by staff from the NAE Environmental Resources Section. This survey of the proposed improvement project footprint included 22 transects (Figures 2 and 3) laid out using a line spacing of 100 feet in an orientation parallel to the channel boundary. Approximately 68.8 linear miles of high-resolution side scan sonar and bathymetry data was collected over the three day survey effort to provide full coverage of the 2.0 square mile study area. The length of transects 12 through 15 was shorted from 9.4 to 7.6 miles due to the rough sea state beyond the breakwaters which persisted throughout the survey effort.

Hydroacoustic data was collected using an Edgetech 6205 multiphase echosounder with a 230/550 kHz side-scan and 230 kHz bathymetry frequency configuration. The Edgetech 6205 was interfaced with a Teledyne DMS10 motion sensor and the Vector VS330™ position and heading system. The sonar head was fixed to an adjustable survey boom mounted along the starboard side of the vessel. The face of the sonar head was adjusted to be 16 inches below the water surface. Prior to the start of the survey effort a patch test was conducted to correct for pitch, roll, and yaw deviations resulting from sensor misalignment and to account for the latency of the system. Conductivity, temperature, and depth (CTD) profiles were collected throughout the survey using a Sontek Castaway®–CTD and were uploaded to Hypack® to correct for speed of sound variations in the water column.

Side-scan sonar and bathymetric data were viewed in real time on the survey vessel and recorded in Hypack®. The vessel operator navigated all transects at a speed of approximately 4 knots while recording data. Transects were run in opposite directions to minimize non-recording time. Transect information including the number, filename, start and stop time, direction, and pertinent observations were recorded in a field log throughout the survey.

Side-scan sonar data from the 550 kHz channel of each transect was imported to Chesapeake Technology (CTI) SonarWiz 6 software for processing and analysis. Processing included digitizing of the first signal return to remove the water column portion of the sonar record and adjustments for signal attenuation with distance using Time Varied Gain (TVG) corrections. The processed track lines were combined into a high resolution mosaic and used to interpret the surficial sediment type and to digitize features of interest within the survey area. A sonar contact report consisting of an image of each digitized feature along with position, dimensions, attributes, and other pertinent information was exported using CTI SonarWiz and is presented as Appendix A of this report.

Bathymetric data was not requested as product from this survey but the 230 kHz channel collected concurrently with the side scan sonar data from each transect was processed to provide an accurate surface for vertical alignment of sub-bottom profiler data. Bathymetric data was processed in Hypack® MBMax. Data from each transect was filtered to flag erroneous sonar returns (i.e. inaccurate bottom depth outputs resulting from acoustic artifacts, noise in the water column, or vegetation) and manually reviewed by a sonar technician for accuracy and to remove spurious points. Tide corrections were made in Hypack® by applying local tide model offsets from the NOAA Vertical Datum Transformation (VDatum) tool to the RTK orthametric heights recorded in the field. The finalized data set was exported from Hypack® MBMax as averaged soundings using a 3x3 foot grid spacing with depths referenced to Mean Lower Low Water (MLLW). This file was then used to generate depth contours and a triangular irregular network model in ESRI ArcGIS.

2.2 Sub-Bottom Profiler Survey

A sub-bottom profiler survey was conducted on 4 August 2017 by staff from the NAE Environmental Resources Section. This survey of the proposed improvement project footprint included 28 transects (Figures 4 and 5) consisting of three along channel transects laid out using a line spacing of 500 feet in an orientation parallel to the channel boundary and 25 cross channel transects laid out using a line spacing of 1000 feet in an orientation perpendicular to the channel boundary. Approximately 17.0 linear miles of survey data were collected over the one day effort to provide sub-surface information in portions of the study area where signal penetration was adequate. A more intensive sub-bottom survey was initially planned but the number of inner harbor transects was reduced due to gas charged sediments resulting in poor signal penetration. The number of transects that could be run in the outer harbor was also limited by rough sea state beyond the breakwaters.

Sub-bottom data was collected with an Edgetech 3100 sub-bottom profiler system using a SB-216S towfish operating with a chirp pulse bandwith of 2-12 kHz. The Edgetech 6205 was interfaced with the Vector VS330™ position and heading system. The towfish was fixed to an adjustable survey boom mounted along the starboard side of the vessel. The face of the transducer and hydrophone array was adjusted to be 24 inches below the water surface. Data was recorded in .JSF format to a dedicated computer running Edgetech

Discover® data acquisition software. The data from each sub-bottom transect was imported to CTI SonarWiz software for processing and analysis. Processing included adjustment of time varied gain (TVG) and digitizing the first signal return to track the seafloor as well as subsequent acoustic reflectors representing changes in sediment type at depth. The processed data from each transect was aligned to the bathymetric grid of the study area and used to generate a three dimensional intersection model to visualize the relationship of sub-bottom features between survey tracks. Scaled profiles for each sub-bottom transect were exported using SonarWiz and are presented as Appendix B of this report.

2.3 Video Survey

An underwater video survey was conducted on 1 August 2017 by staff from the NAE Environmental Resources Section. Video footage was collected at 11 stations (Figure 6) corresponding to sonar contacts of interest identified in the processed side scan mosaic. These features were selected to confirm the interpretation of side scan sonar data and to gather additional information on unidentifiable features of potential anthropogenic origin. These features were digitized in CTI SonarWiz and transferred to Hypack® for navigation in the field.

At each station the survey vessel anchored in the vicinity of the sonar target and video footage was collected using a VideoRay Pro3 GTO ROV. The ROV was piloted from the surface by NAE personnel and the video feed was recorded to a portable DVR for review and analysis. Real time observations regarding the sonar target and the ambient seafloor conditions were recorded in a field log throughout the survey.

Video files were reviewed using CyberLink PowerDirector video editing software. Representative screen captures and video clips were created from the footage collected at each video survey station. A database of screen captures paired with associated sonar target information and field notes is presented as Appendix C of this report.

3.0 DATA INTERPRETATION

3.1 Side Scan Sonar

Side scan sonar creates an image of the seafloor by measuring the travel time and intensity of reflected acoustic energy, referred to as backscatter. The reflected signal strength is very sensitive to subtle variations in seafloor hardness and texture. Materials such as rock and sand are very efficient at reflecting acoustic energy and have a high backscatter signature while fine sediments such as silt and clay absorb more energy than they reflect and therefore exhibit low backscatter. Because of these characteristics it is possible to interpret changes in backscatter as a proxy for grain size and generate a map of surficial geology. It is also possible to distinguish the size and shape of other seafloor features by examining the pattern of their acoustic reflection and shadow.

The high resolution mosaic generated from the processed 550 kHz dataset (Figures 7 and 8) was imported to CTI SonarWiz 6 for interpretation and digitization of seafloor features

as individual targets. The study area was classified into two bottom types based on acoustic backscatter properties. This classification was verified by visual characterization and grain size data from sediment cores collected throughout the proposed project area in August of 2017 (AECOM, 2017).

The first bottom type within the survey area was a substrate with low acoustic backscatter properties consisting of fine sand and silt with numerous anthropogenic features. Isolated boulders and pockets of coarser substrate corresponding to sand or shell were present in this area. This bottom type was typical of the inner harbor from a point just north of the breakwaters and represents approximately 62%, or 1.5 square miles, of the 2.4 square mile area covered by the side scan sonar mosaic.

The second bottom type in the survey area consisted of coarse to medium sand with small scale relief features and a higher frequency of isolated boulders. This bottom type was characterized by relatively uniform high backscatter and was typical of the outer harbor. Several areas with a high density of small to medium sized boulders on a coarse substrate were delineated between the breakwaters and channel marker R4. These areas exhibited complex patches of high and low backscatter with individual well defined high-backscatter targets. This bottom type represented approximately 38%, or 0.9 square miles, of the total area covered by the side scan sonar mosaic.

Analysis of individual sonar contacts in the 2017 New Haven Harbor side scan sonar mosaic resulted in the identification and classification of 242 targets into one of 11 categories (Table 1). The predominant target categories encountered during data interpretation were derelict fishing gear, moorings, and isolated boulders. The position of mooring features digitized from the side scan mosaic demonstrated excellent agreement with the known position of navigation aids and the GPS position of surface buoys marked during the survey. Other identifiable features of interest included: debris in the vicinity of the terminal facilities corresponding to discarded cables, sunken pilings, and other man-made objects; areas of drag scars associated with commercial fishing activities adjacent to the existing federal channel; a concrete pipeline located along the western side of the channel in the vicinity of Sandy Point; and a sewer outfall located along the eastern side of the channel between channel markers RN18 and RN20.

Two sonar contacts identified in the side-scan mosaic were classified as possible wreckage. The first of these, located along the western side of the channel in the vicinity of Shag Bank, was approximately 130 feet long and 20 feet wide. This target was not marked on nautical charts for the area or recorded in the register of known shipwrecks (NOAA AWOIS).

The second possible wreck, located along the western side of the channel between channel markers G1 and G3, was approximately 85 feet long and 12 feet wide. This target was located along the westernmost extent of the survey boundary and was recorded in only the starboard channel of a single survey transect. No attempt was made to collect additional hydroacoustic data in the vicinity of the target because it was well outside of the proposed project footprint.

Thirteen targets within the survey area were not definitively classified into a category due to a lack of definition or poor signal reflectance resulting from positioning on the seafloor relative to the sonar head. These targets were assigned a tentative classification as either derelict moorings, partially buried fishing gear, or areas of disturbed sediment based on their dimensions and association with adjacent targets.

TABLE 1: CLASSIFICATION OF SIDE SCAN SONAR CONTACTS

Contact Category	Count	Description
Fishing Gear	80	Feature with dimensions and characteristics consistent with commercial fishing gear. Most often observed as regularly spaced strings of three with visible line.
Rock or Rocky Areas	46	Isolated features with high backscatter and definition corresponding to individual boulders. Areas with high numbers of boulders on coarse substrate were delineated as single polygon features.
Mooring Related Features	38	Feature with dimensions and characteristics consistent with mooring blocks or anchors. Line to surface floats often visible. Includes derelict moorings in proximity to active mooring features.
Debris	35	Feature of anthropogenic origin with dimensions and characteristics consistent with sunken pilings, discarded cables, etc. Most frequently observed in proximity to terminal facilities or anchorage areas.
Isolated Sediment Features	15	Localized areas of high backscatter with low target definition corresponding pockets of coarse material, shell reefs, or disturbed sediment.
Unidentified Targets	13	Feature of apparent anthropogenic origin that could not be positively identified based on dimensions or reflectance properties. All targets in this category were tentatively classified as derelict moorings, partially buried fishing gear, or areas of disturbed sediment.
Drag Scars	8	Narrow linear depressions in the seafloor resulting from commercial fishing activities.
Wreckage	2	Features which appear to be associated with a sunken vessel or object
Containment Boom	1	Containment boom deployed around a petroleum product release in the inner harbor.
Pipeline	1	Raised linear feature extending east from Sandy Point. Possibly an inactive outfall associated with the West Haven wastewater treatment plant.
Sewer Outfall	1	Outfall associated with the New Haven wastewater treatment plant on the eastern shoreline.
Total No. Contacts	**242**	

3.2 Bathymetry

The bathymetric data from the May 2017 survey was used to create a 3x3 foot gridded matrix consisting of 1,048,576 processed output points. This matrix was exported to ArcGIS for generation of depth contours and creation of a triangular irregular network model as depicted in Figures 9 and 10. Tide corrected depths in the inner harbor ranged from -3 to -53 feet MLLW while depths in the outer harbor ranged from -14 to -55 feet MLLW. As previously discussed, bathymetric data was not requested as product of this survey but was processed to provide an accurate surface for vertical alignment of sub-bottom profiler data. As such, an in depth discussion of bathymetric features is not presented in this report.

3.3 Sub-Bottom Profiler

A sub-bottom profiler transmits low frequency acoustic energy which is able to penetrate the sea floor and reflect off sub-surface sediment layers. Changes in sediment type can be distinguished because changes in acoustic impedance reflect part of the acoustic signal. The system interprets the travel time and intensity of these signals to create a two dimensional profile of the stratigraphy along a survey transect.

Sub-bottom profiles collected in the inner harbor from lines 350+00 to 310+00 and 270+00 to 155+00 exhibited little to no signal penetration in the vicinity of the existing FNP due to the presence of gas charged organic sediments at the surface. Signal penetration in the portions of these transects outside of the existing FNP ranged from 10 to 30 feet. Interpretation of subsurface data from areas of the inner harbor with adequate signal penetration does not indicate the presence of bedrock or dense overburden such as glacial till within the proposed dredge prism.

Sub-bottom profiles collected from the outer harbor exhibited very good signal penetration ranging from 10 to 45 feet below the sediment surface. Signal returns from the area between the breakwaters in the vicinity of lines 145+00 to 135+00 displayed a well-defined infill pattern overlying a strong reflector corresponding to bedrock. At several locations this reflector was observed to rise above a depth of -42 feet MLLW. The apparent depth to bedrock throughout the remainder of the entrance channel was below the proposed dredge elevation.

3.4 Video Survey

Examination of ROV footage collected during the August 2017 survey confirmed the interpretation of May 2017 side scan sonar data and provided additional information on unclassified targets of interest in the vicinity of the proposed project. A summary of video survey targets and descriptions is presented in Table 2.

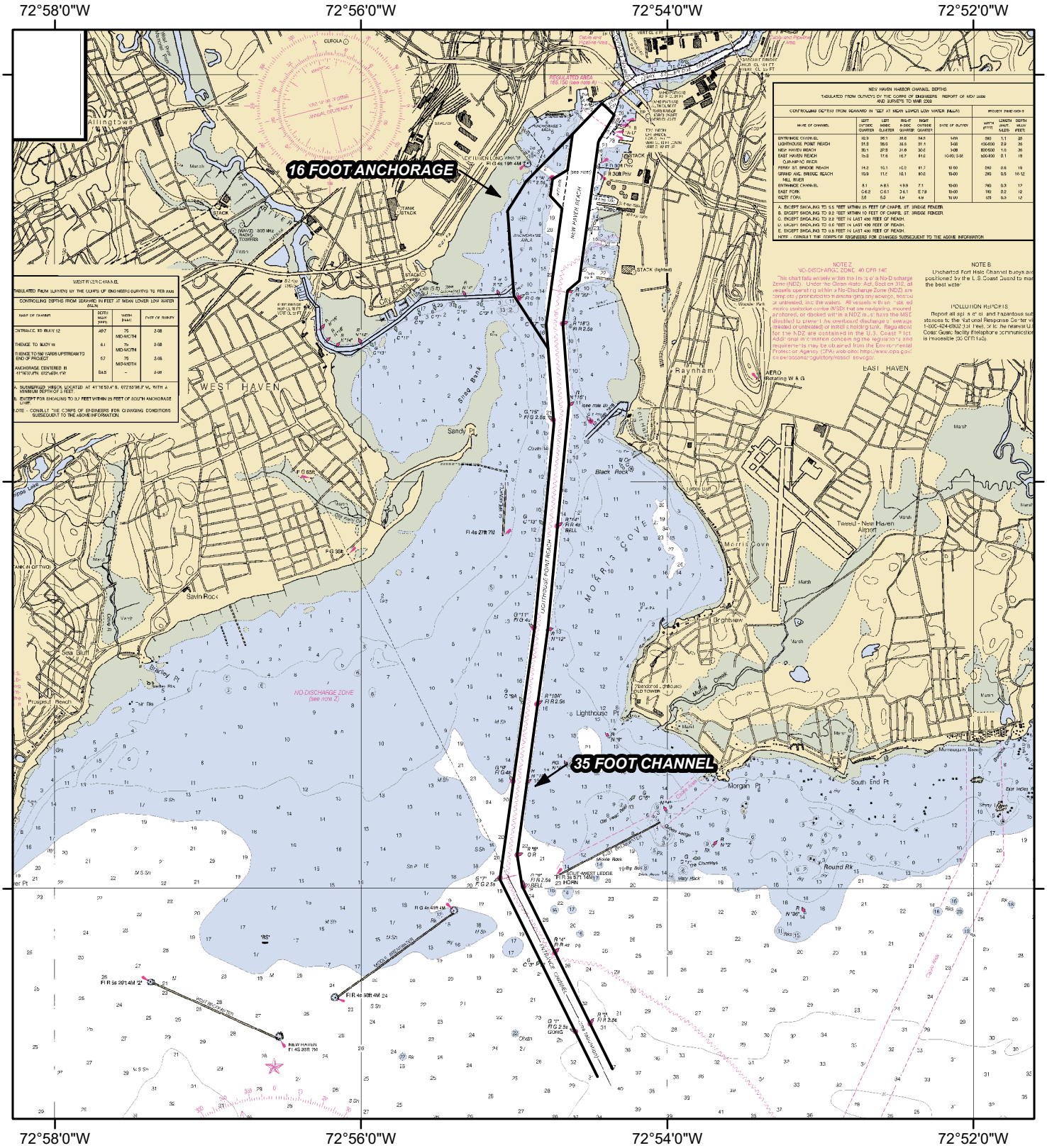
The primary features of interest documented during this survey were the two targets classified as possible wreckage during interpretation of the side scan sonar data. The first of these, NHH0176, was identified as a large and irregularly shaped metallic object with

heavy marine growth. The target was partially buried in the sediment and had no distinguishing markings. Due to limited visibility it was not possible to obtain a wide angle view of the entire target but close up video footage documented a hollow structure with an elongated and rounded form. Video footage suggests the presence of rolled metal edges but the amount of marine growth present makes this observation uncertain. Based on the information available, a classification of 'debris – possible wreckage' was assigned to the target.

The second target, NHH0019, was determined to be an elongated *Crepidula* sp. reef with a linear furrow running along the edge furthest from the channel. The shell area created a high intensity return in the side scan sonar imagery followed by a data gap in the area corresponding to the narrow depression. During side scan sonar processing this was incorrectly interpreted as a linear structure that was proud of the seafloor creating an acoustic shadow. Based on the video survey footage the classification for this target was changed to 'isolated sediment feature – shell reef'.

TABLE 2: VIDEO SURVEY TARGET SUMMARY

Target ID	Classification	Description
NHH0019	Shell Reef	Linear furrow with shell and gravel substrate on west side of channel.
NHH0153	Pipeline	Open end of exposed corrugated steel/ concrete pipeline extending west of channel. Associated debris in vicinity.
NHH0176	Debris - Possible Shipwreck	Large, irregularly shaped metallic object with heavy marine growth. Partially buried in sediment. Likely wreckage or debris. No identifying markings.
NHH0178	Fishing Gear	String of derelict fishing gear. Line and wire mesh lobster traps covered in heavy marine growth.
NHH0203	Shell Reef	Large shell and gravel reef adjacent to eastern edge of channel.
NHH0205	Disturbed Sediment	Disturbed sediment at base of existing channel slope. Partially buried macroalgae at depth suggests material slumping.
NHH0215	Coarse Substrate	Cluster of five targets on side scan mosaic in channel with high backscatter. Corresponding to isolated areas of shell and clumps of macroalgae.
NHH0217	Debris - Cable	Section of discarded cable adjacent to terminal facility on eastern shore.
NHH0221	Debris - Unidentified	Unidentifiable target with heavy marine growth in existing anchorage area. Partially buried with attached line. Ribbing or multiple lines running along the length of target.
NHH0228	Debris - Unidentified	Unidentifiable string of targets on side scan mosaic. No target found with ROV. High turbidity and location in harbor suggests reworking of sediment.
NHH0242	Debris - Piling	Fallen timber piling in vicinity of pier along eastern side of channel.


72°58'0"W
72°56'0"W
72°54'0"W
72°52'0"W
41°18'0"N
41°16'0"N
41°14'0"N
16 FOOT ANCHORAGE
35 FOOT CHANNEL
WEST HAVEN
EAST HAVEN
Morris Cove
Tweed - New Haven Airport
Savin Rock
Sandy Pt
Black Rock
Lighthouse Pt
Morgan Pt
South End Pt
Round Rk
Raynham
Brightview
Sea Bluff
Prospect Beach
Allingtown
NO-DISCHARGE ZONE (see note Z)
NEW HAVEN BEACH
LIGHTHOUSE POINT BEACH
ANCHORAGE CHANNEL
NEW HAVEN HARBOR
FI R 5s 28ft 4M 2
FI R 4s 38ft 4M 24
FI G 4s 41ft 4M
FI R 4s 27ft 7M
FI G 6s
FI G 3s
FI G 2.5s
FI R 2.5s
FI R 4s
FI G 4s
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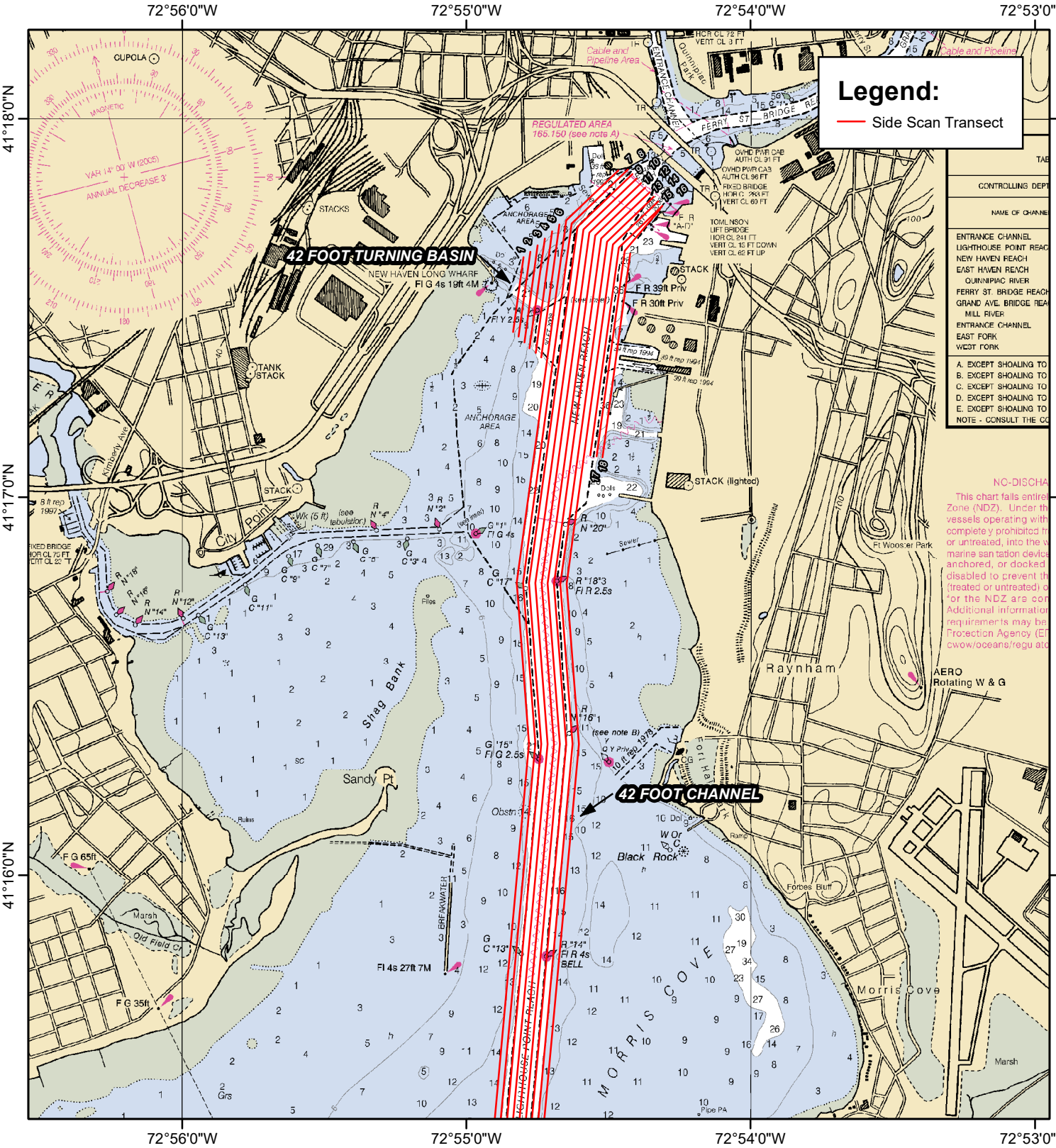
FI G 2.5s
FI R 2.5s
FI R 2.5s
FI R



US Army Corps
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New England District

FIGURE 2:
NEW HAVEN HARBOR, NEW HAVEN, CT
INNER HARBOR SIDE SCAN SURVEY

N
W E
S

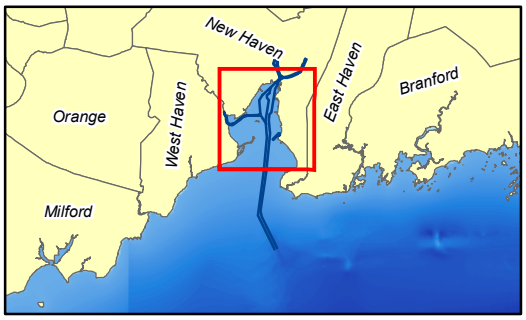
0 2,500 5,000 7,500 Feet

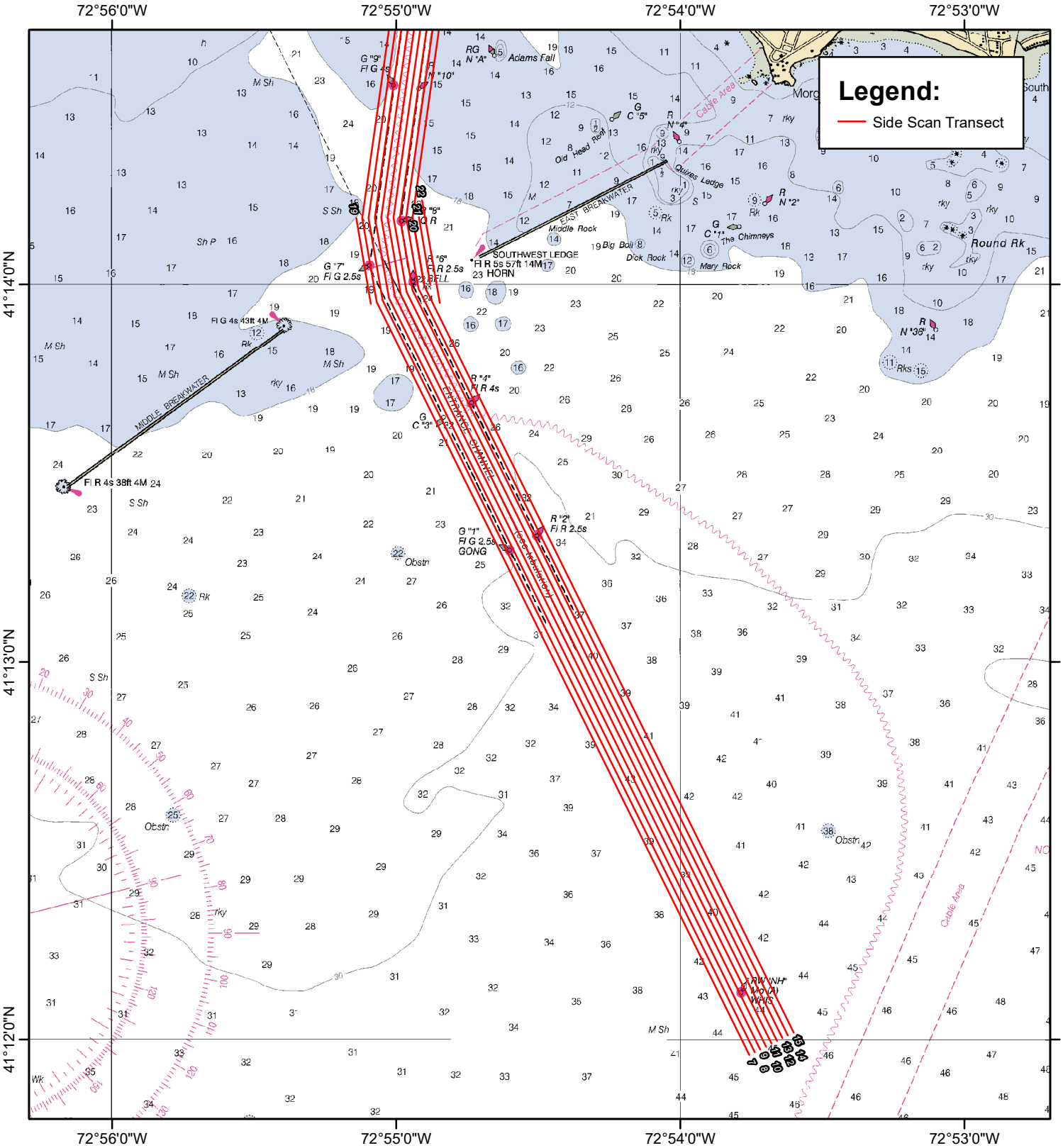
0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983





US Army Corps
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New England District

FIGURE 3:
NEW HAVEN HARBOR, NEW HAVEN, CT
OUTER HARBOR SIDE SCAN SURVEY

N
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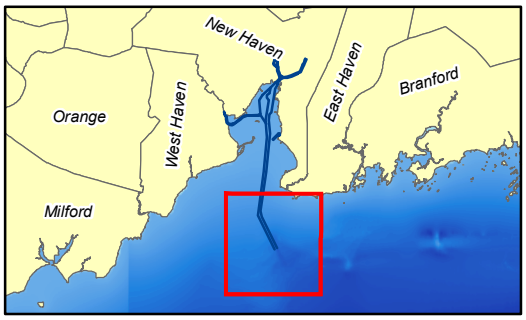
0 2,500 5,000 7,500 Feet

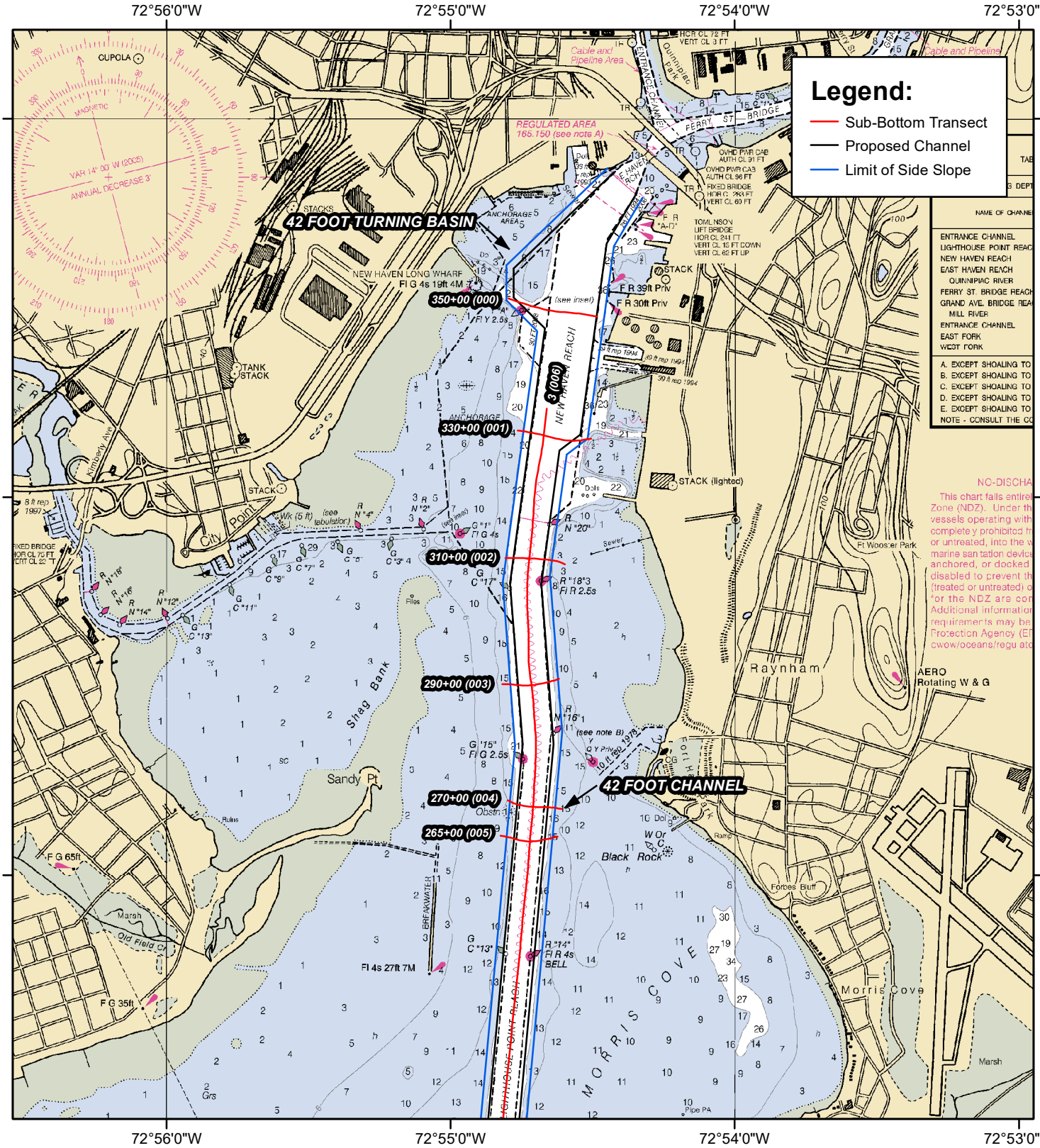
0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983





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New England District

FIGURE 4:
NEW HAVEN HARBOR, NEW HAVEN, CT
INNER HARBOR SUB-BOTTOM SURVEY

N
W E
S

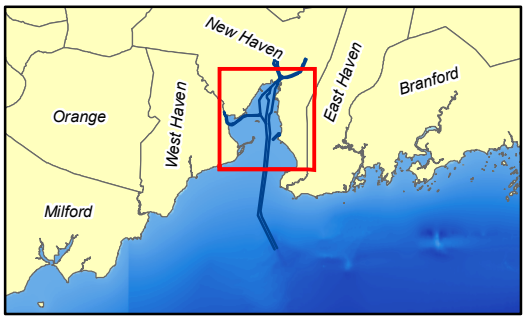
0 2,500 5,000 7,500 Feet

0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983



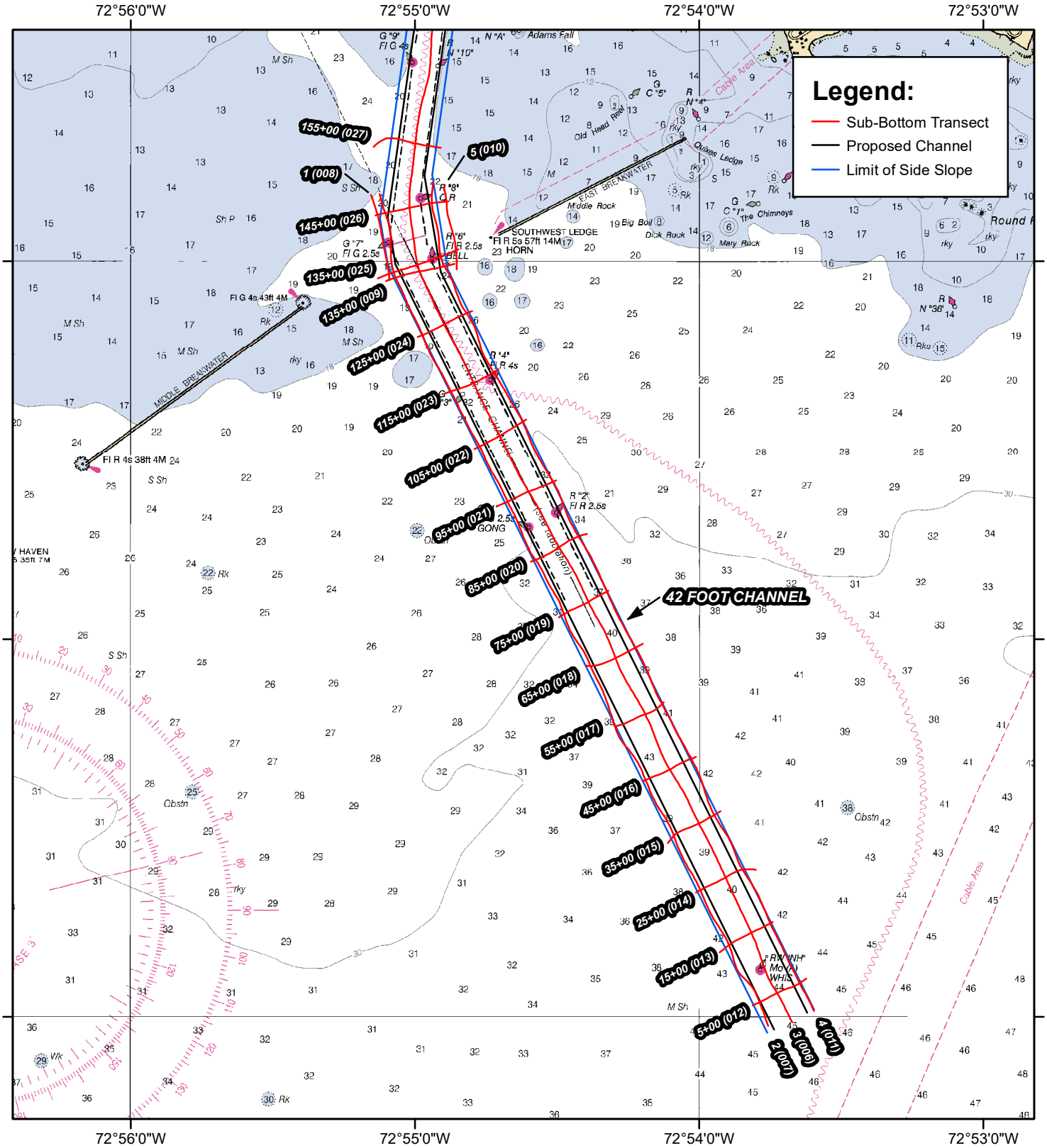


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FIGURE 5:
NEW HAVEN HARBOR, NEW HAVEN, CT
OUTER HARBOR SUB-BOTTOM SURVEY

0 2,500 5,000 7,500 Feet

0 0.25 0.5 0.75 1 Miles

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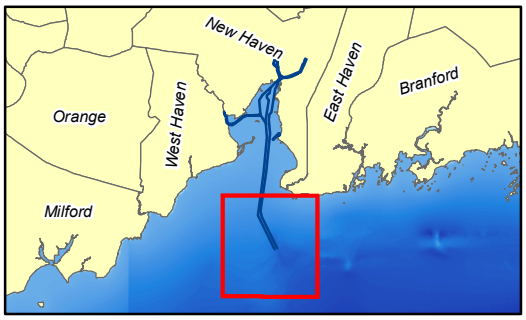
NOAA CHART 12371

GCS NAD1983



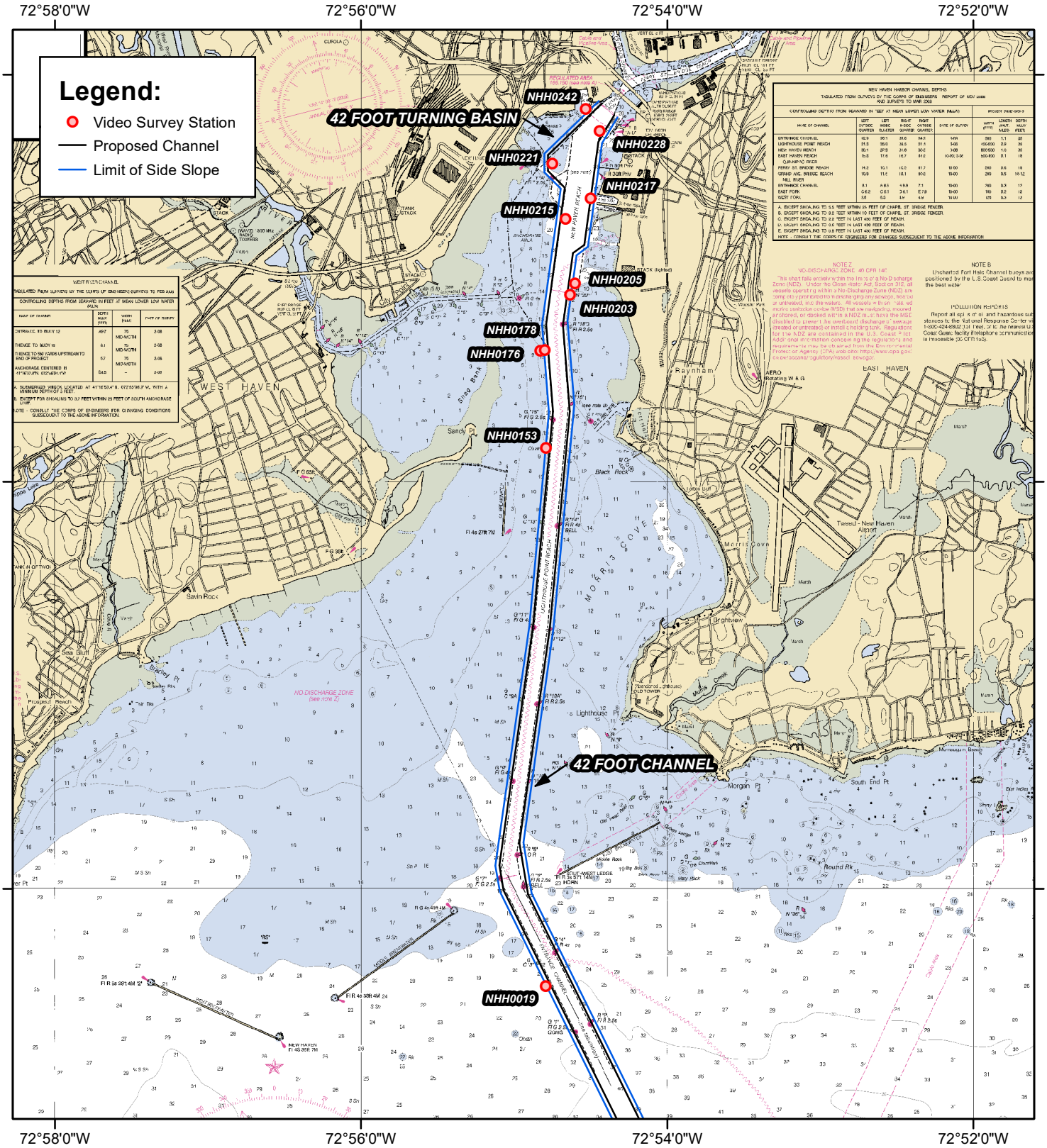


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FIGURE 6:
NEW HAVEN HARBOR, NEW HAVEN, CT
VIDEO SURVEY STATIONS

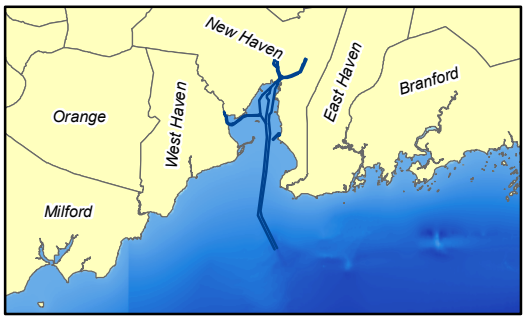
0 2,500 5,000 7,500 10,000 Feet

0 0.5 1 1.5 2 Miles

1:65,000

NOAA CHART 12371

GCS NAD1983



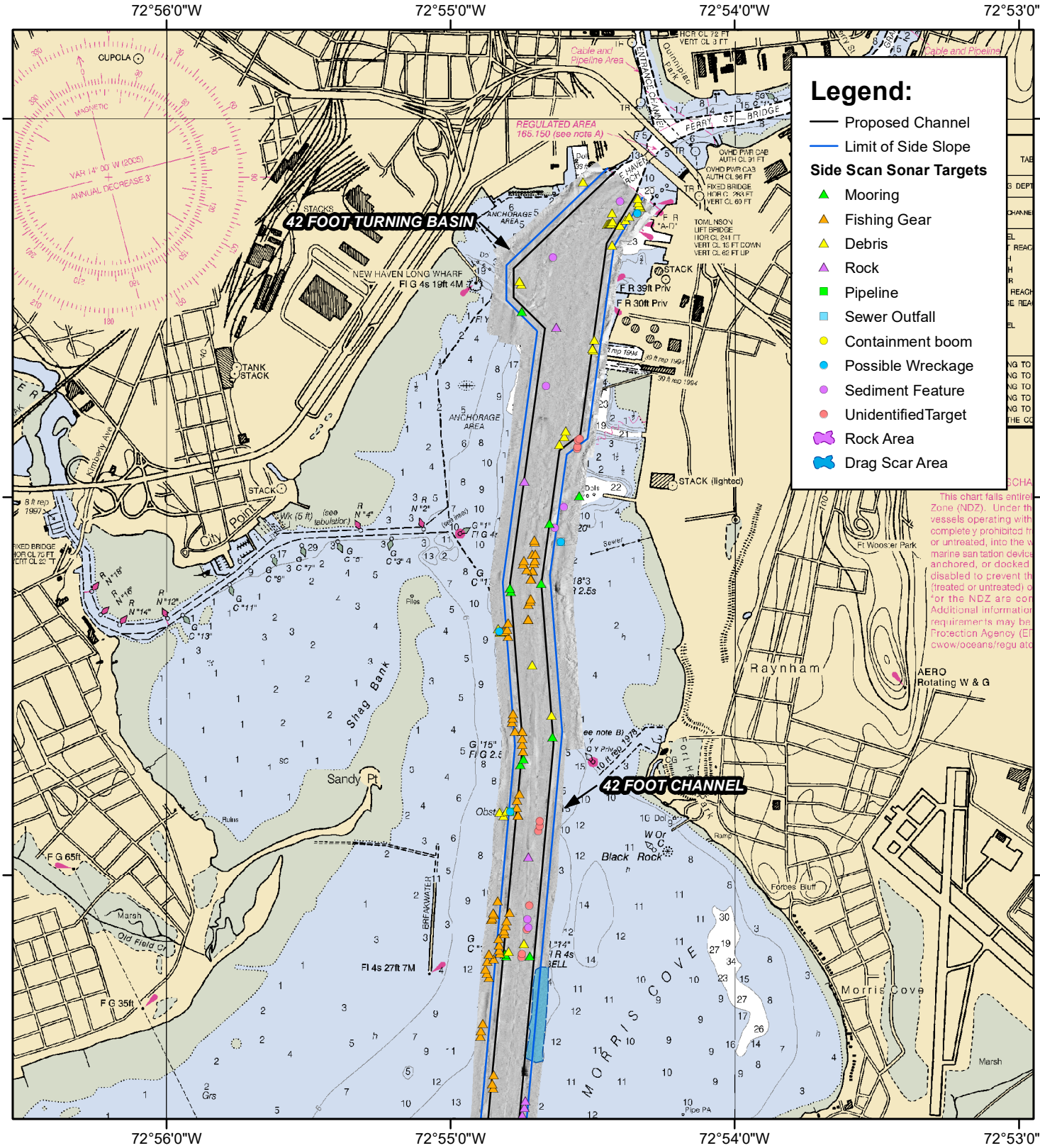


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FIGURE 7:
NEW HAVEN HARBOR, NEW HAVEN, CT
INNER HARBOR SIDE SCAN MOSAIC

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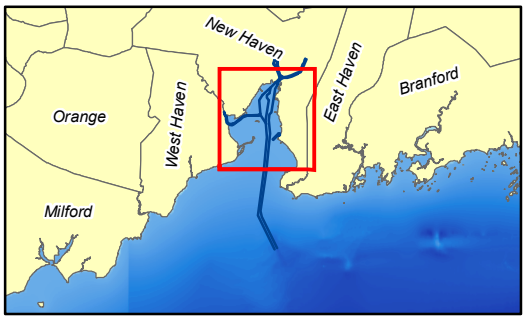
0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983



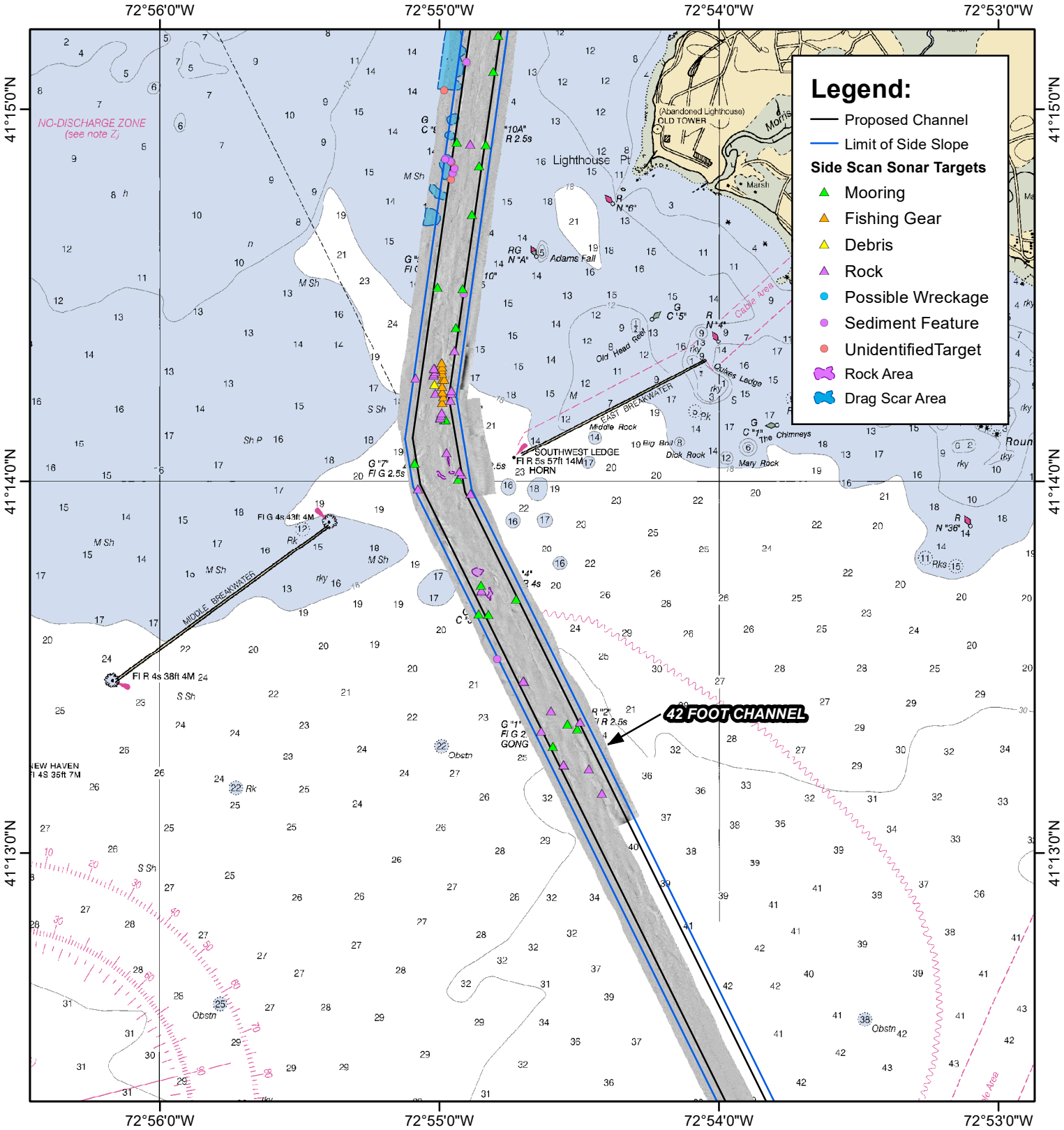


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FIGURE 8:
NEW HAVEN HARBOR, NEW HAVEN, CT
OUTER HARBOR SIDE SCAN MOSAIC

N
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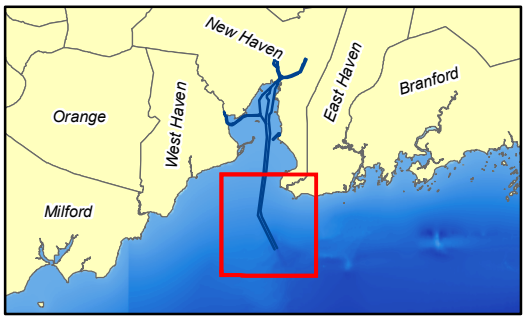
0 2,500 5,000 7,500 Feet

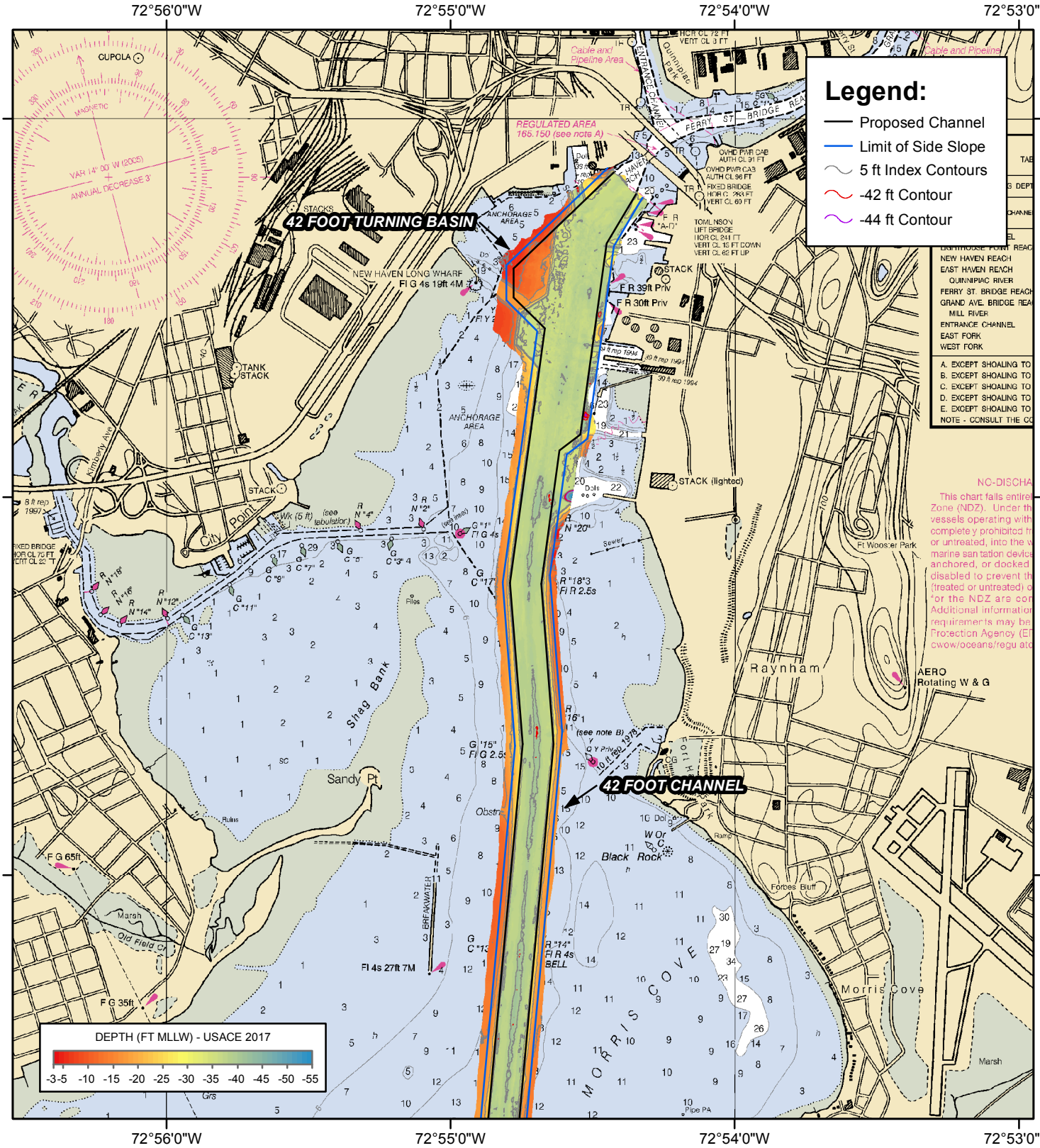
0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983





US Army Corps
of Engineers
New England District

FIGURE 7:
NEW HAVEN HARBOR FNP, NEW HAVEN, CT
INNER HARBOR BATHYMETRY

N
W E
S

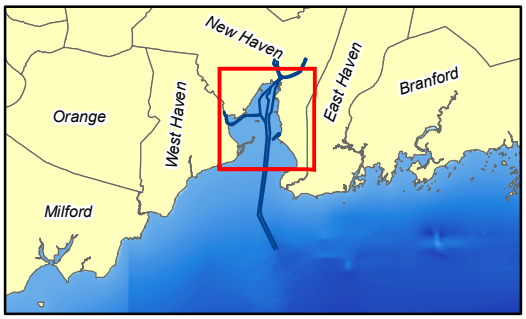
0 2,500 5,000 7,500 Feet

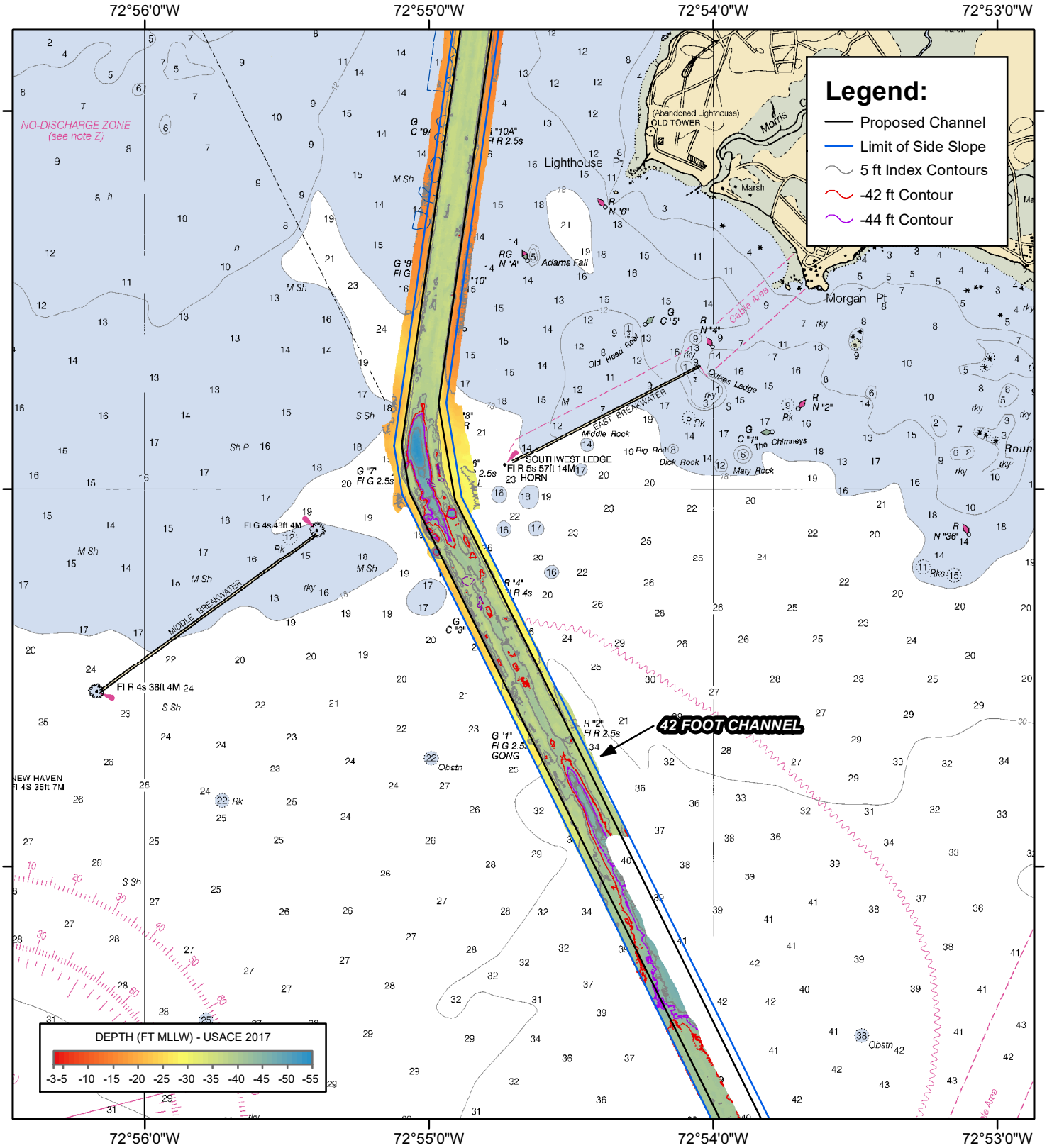
0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983





US Army Corps
of Engineers
New England District

FIGURE 10:
NEW HAVEN HARBOR, NEW HAVEN, CT
OUTER HARBOR BATHYMETRY

N
W E
S

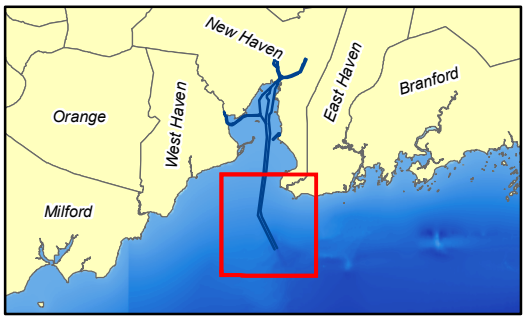
0 2,500 5,000 7,500 Feet

0 0.25 0.5 0.75 1 Miles

1:35,000

NOAA CHART 12371

GCS NAD1983



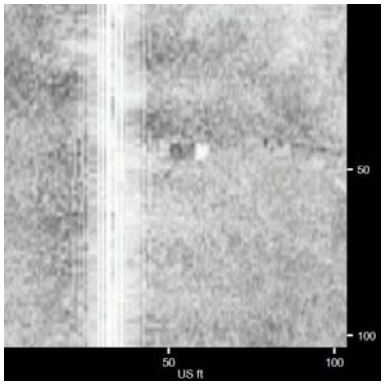
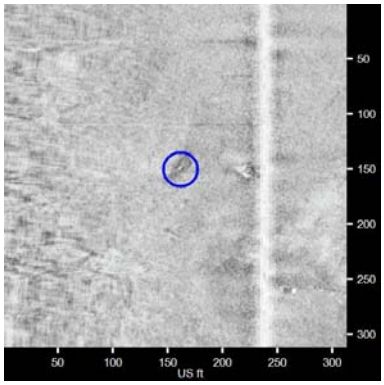
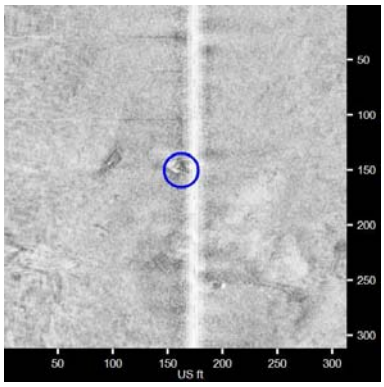
APPENDIX A

SIDE SCAN SONAR CONTACT REPORT

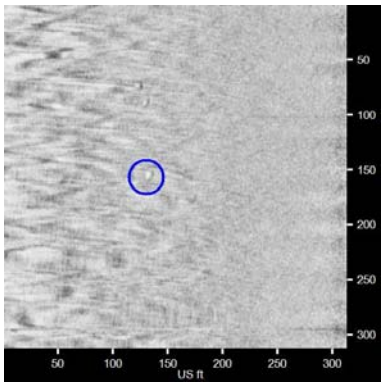
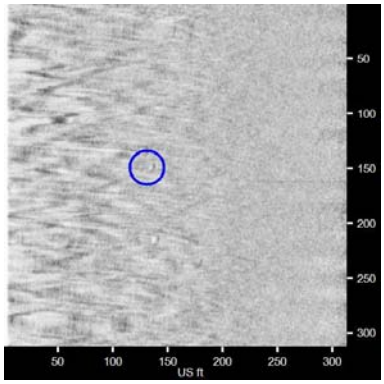
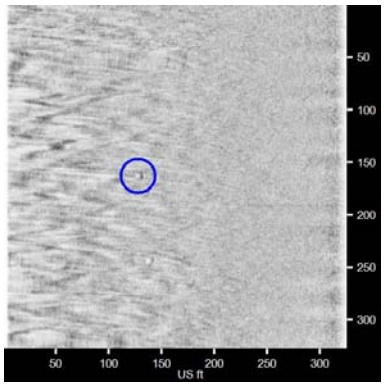
New Haven Harbor May 2017 Side Scan Sonar

Sonar Contact Report

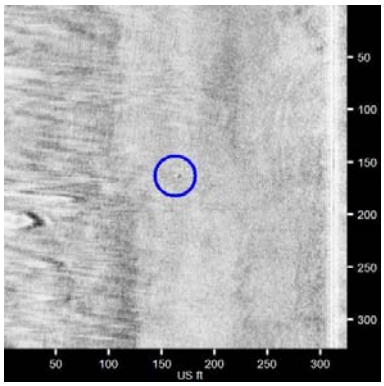
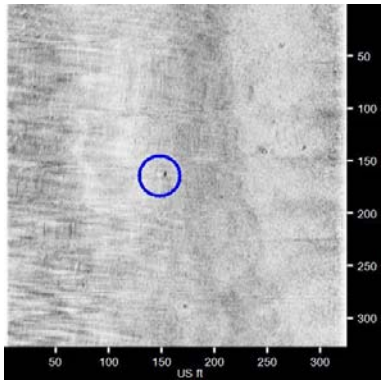
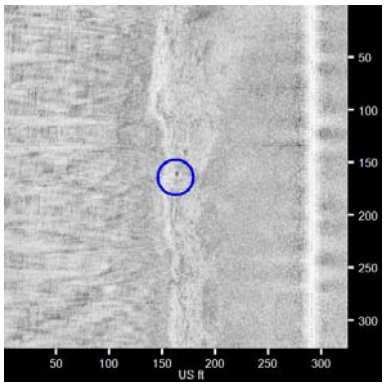
Generated on 9/7/2017 9:52:24 AM

Target Image	Target Info	User Entered Info
	**NHH0000** • Sonar Time at Target: 5/4/2017 2:56:32 PM • Click Position 41.2020785361 -72.8964777880 (WGS84) (X) 959690.99 (Y) 634390.03 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 20319 • Range to target: 26.71 US ft • Fish Height: 48.94 US ft • Heading: 336.070 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 149.93 US ft	**Dimensions and attributes** • Target Width: 5.21 US ft • Target Height: 3.68 US ft • Target Length: 5.17 US ft • Target Shadow: 4.53 US ft • Classification1: Mooring • Classification2: • Description: Mooring for RW NH. Line visible.
	**NHH0001** • Sonar Time at Target: 5/4/2017 2:56:44 PM • Click Position 41.2022270940 -72.8969900307 (WGS84) (X) 959550.12 (Y) 634444.40 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 20405 • Range to target: 75.62 US ft • Fish Height: 48.30 US ft • Heading: 337.920 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 146.65 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Unknown target near mooring for RW NH
	**NHH0002** • Sonar Time at Target: 5/4/2017 2:56:43 PM • Click Position 41.2022935471 -72.8967711137 (WGS84) (X) 959610.40 (Y) 634468.51 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 20401 • Range to target: 10.89 US ft • Fish Height: 48.62 US ft • Heading: 337.820 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 147.97 US ft	**Dimensions and attributes** • Target Width: 8.21 US ft • Target Height: 5.61 US ft • Target Length: 8.42 US ft • Target Shadow: 6.49 US ft • Classification1: Mooring • Classification2: • Description: Possible derelict mooring for RW NH. No line visible.

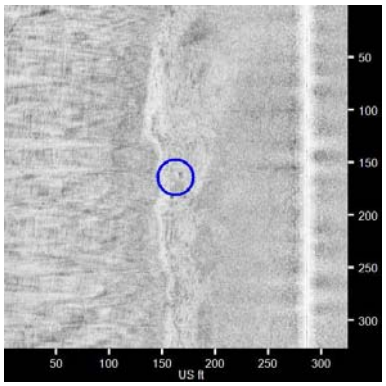
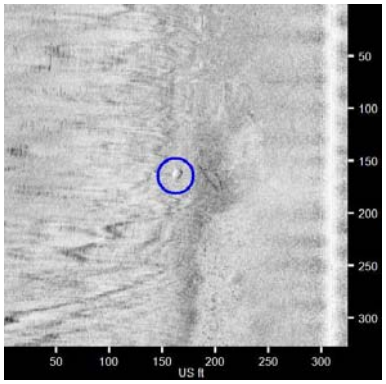
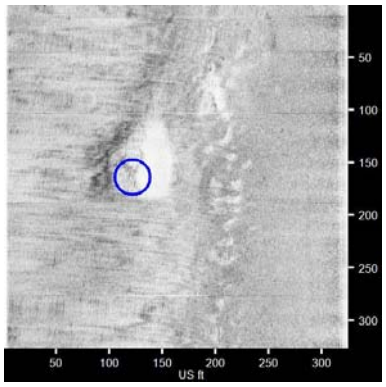
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0003** • Sonar Time at Target: 5/4/2017 2:57:11 PM • Click Position 41.2027074079 -72.8977739592 (WGS84) (X) 959334.69 (Y) 634619.78 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 20601 • Range to target: 189.04 US ft • Fish Height: 47.03 US ft • Heading: 336.230 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 141.40 US ft	**Dimensions and attributes** • Target Width: 3.31 US ft • Target Height: 0.92 US ft • Target Length: 4.54 US ft • Target Shadow: 3.90 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0004** • Sonar Time at Target: 5/4/2017 2:57:19 PM • Click Position 41.2028703964 -72.8979005801 (WGS84) (X) 959299.95 (Y) 634679.22 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 20653 • Range to target: 193.52 US ft • Fish Height: 46.39 US ft • Heading: 337.760 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 140.42 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock
	**NHH0006** • Sonar Time at Target: 5/4/2017 2:57:20 PM • Click Position 41.2029016688 -72.8979367329 (WGS84) (X) 959290.02 (Y) 634690.64 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 20664 • Range to target: 197.37 US ft • Fish Height: 46.07 US ft • Heading: 337.290 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 141.08 US ft	**Dimensions and attributes** • Target Width: 3.25 US ft • Target Height: 1.29 US ft • Target Length: 4.58 US ft • Target Shadow: 5.84 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.

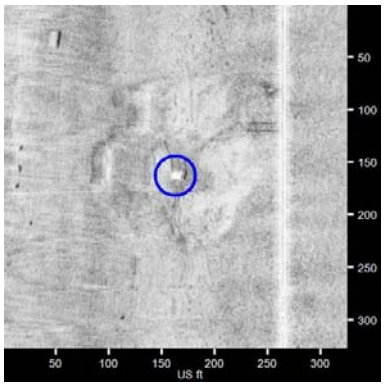
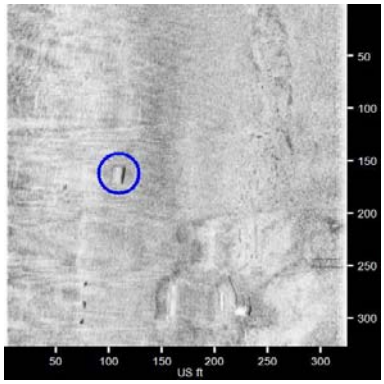
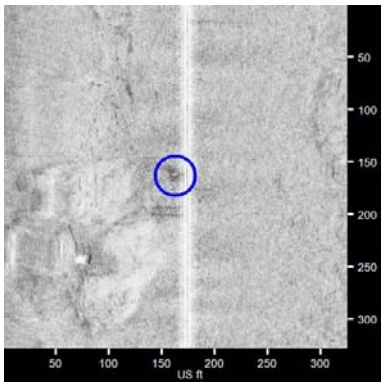
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0007** • Sonar Time at Target: 5/4/2017 4:01:17 PM • Click Position 41.2193617831 -72.9069686845 (WGS84) (X) 956815.46 (Y) 640692.46 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 48018 • Range to target: 149.31 US ft • Fish Height: 45.82 US ft • Heading: 343.540 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 127.30 US ft	**Dimensions and attributes** • Target Width: 3.82 US ft • Target Height: 0.88 US ft • Target Length: 2.42 US ft • Target Shadow: 3.06 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0008** • Sonar Time at Target: 5/4/2017 4:01:56 PM • Click Position 41.2204387364 -72.9077461311 (WGS84) (X) 956602.29 (Y) 641085.25 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 48298 • Range to target: 176.86 US ft • Fish Height: 44.55 US ft • Heading: 350.740 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 123.03 US ft	**Dimensions and attributes** • Target Width: 1.54 US ft • Target Height: 1.10 US ft • Target Length: 4.60 US ft • Target Shadow: 4.61 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0009** • Sonar Time at Target: 5/4/2017 3:10:03 PM • Click Position 41.2205909209 -72.9092472369 (WGS84) (X) 956189.42 (Y) 641141.46 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 26100 • Range to target: 127.99 US ft • Fish Height: 41.58 US ft • Heading: 346.930 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 126.97 US ft	**Dimensions and attributes** • Target Width: 2.69 US ft • Target Height: 0.00 US ft • Target Length: 2.77 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Square target on edge of channel. Likely rock.

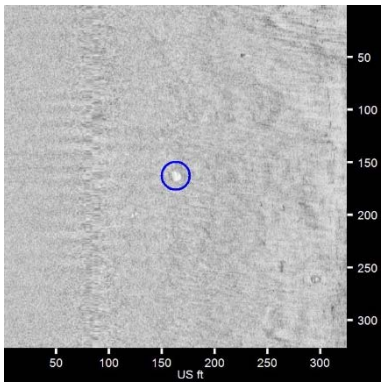
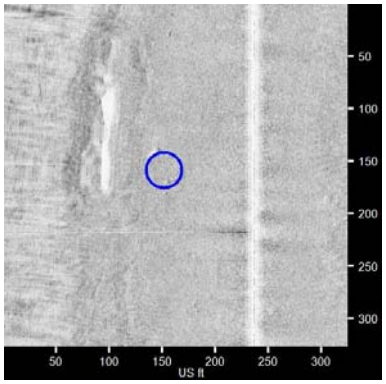
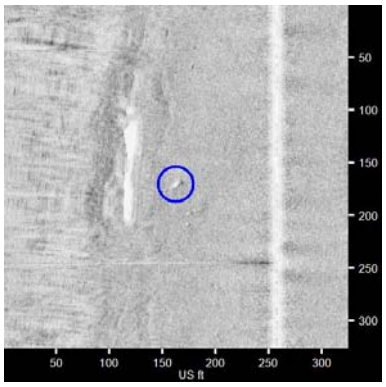
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0010** • Sonar Time at Target: 5/4/2017 3:10:05 PM • Click Position 41.2206472258 -72.9092610645 (WGS84) (X) 956185.65 (Y) 641161.98 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 26116 • Range to target: 123.37 US ft • Fish Height: 41.26 US ft • Heading: 344.420 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 125.66 US ft	**Dimensions and attributes** • Target Width: 2.77 US ft • Target Height: 1.44 US ft • Target Length: 1.50 US ft • Target Shadow: 4.71 US ft • Classification1: Rock • Classification2: • Description: Small target on edge of channel. Likely rock.
	**NHH0011** • Sonar Time at Target: 5/4/2017 3:10:42 PM • Click Position 41.2214513322 -72.9099144296 (WGS84) (X) 956006.45 (Y) 641455.30 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 26380 • Range to target: 146.75 US ft • Fish Height: 41.25 US ft • Heading: 347.730 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 124.02 US ft	**Dimensions and attributes** • Target Width: 4.51 US ft • Target Height: 0.89 US ft • Target Length: 9.33 US ft • Target Shadow: 3.36 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G1
	**NHH0012** • Sonar Time at Target: 5/4/2017 3:11:13 PM • Click Position 41.2221384992 -72.9105962612 (WGS84) (X) 955819.34 (Y) 641706.02 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 26601 • Range to target: 203.14 US ft • Fish Height: 39.99 US ft • Heading: 343.760 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 121.06 US ft	**Dimensions and attributes** • Target Width: 20.18 US ft • Target Height: 0.00 US ft • Target Length: 19.99 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Rock • Description: 20x20 target above channel with significant scour. Possible rock outcrop. Numerous small targets at base of channel slope.

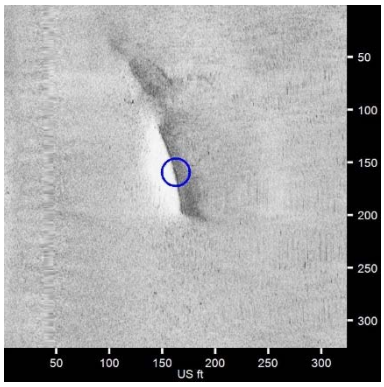
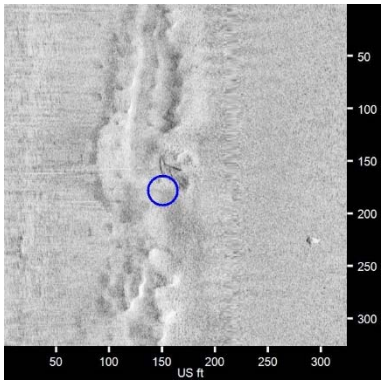
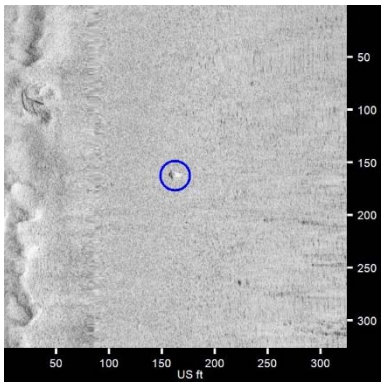
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0013** • Sonar Time at Target: 5/4/2017 4:03:00 PM • Click Position 41.2222420868 -72.9084532102 (WGS84) (X) 956408.97 (Y) 641742.68 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 48751 • Range to target: 101.25 US ft • Fish Height: 43.92 US ft • Heading: 343.830 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 123.36 US ft	**Dimensions and attributes** • Target Width: 4.79 US ft • Target Height: 3.60 US ft • Target Length: 6.45 US ft • Target Shadow: 9.85 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R2. Line visible.
	**NHH0014** • Sonar Time at Target: 5/4/2017 4:03:12 PM • Click Position 41.2224595876 -72.9090311441 (WGS84) (X) 956250.12 (Y) 641822.22 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 48838 • Range to target: 215.68 US ft • Fish Height: 42.33 US ft • Heading: 333.430 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 118.44 US ft	**Dimensions and attributes** • Target Width: 6.13 US ft • Target Height: 0.44 US ft • Target Length: 12.15 US ft • Target Shadow: 2.28 US ft • Classification1: Mooring • Classification2: • Description: Rectangular target in vicinity of R2. Possible derelict mooring. No line.
	**NHH0015** • Sonar Time at Target: 5/4/2017 4:03:07 PM • Click Position 41.2225450135 -72.9082708394 (WGS84) (X) 956459.34 (Y) 641852.96 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 48804 • Range to target: 10.89 US ft • Fish Height: 43.29 US ft • Heading: 328.850 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 119.42 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Irregular target at nadir. Likely rock or derelict mooring.

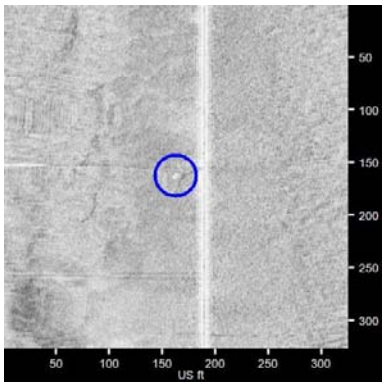
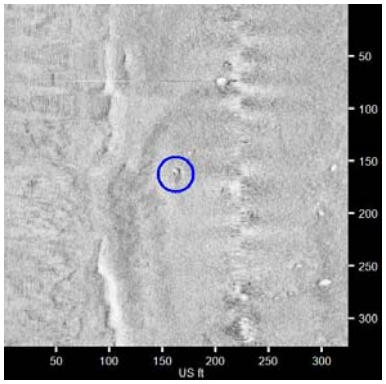
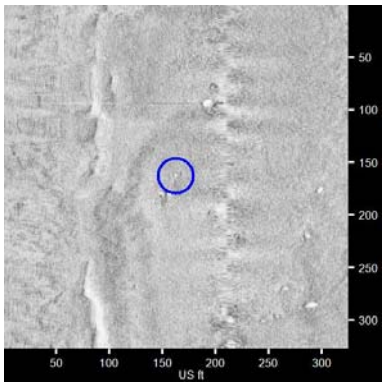
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0016** • Sonar Time at Target: 5/4/2017 3:46:10 PM • Click Position 41.2230395763 -72.9100126321 (WGS84) (X) 955980.50 (Y) 642034.04 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1531.HSX • Ping Number: 41549 • Range to target: 78.82 US ft • Fish Height: 46.79 US ft • Heading: 146.250 Degrees • Event Number: 73 • Line Name: 012_1531 • Water Depth: 132.87 US ft	**Dimensions and attributes** • Target Width: 2.70 US ft • Target Height: 3.50 US ft • Target Length: 4.73 US ft • Target Shadow: 7.42 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0017** • Sonar Time at Target: 5/4/2017 3:12:40 PM • Click Position 41.2243383973 -72.9115989108 (WGS84) (X) 955545.00 (Y) 642508.09 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 27222 • Range to target: 85.13 US ft • Fish Height: 40.30 US ft • Heading: 350.260 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 123.03 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock
	**NHH0018** • Sonar Time at Target: 5/4/2017 3:12:43 PM • Click Position 41.2243960985 -72.9116721274 (WGS84) (X) 955524.90 (Y) 642529.16 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1454.HSX • Ping Number: 27243 • Range to target: 94.84 US ft • Fish Height: 40.62 US ft • Heading: 342.450 Degrees • Event Number: 67 • Line Name: 010_1454 • Water Depth: 122.05 US ft	**Dimensions and attributes** • Target Width: 2.10 US ft • Target Height: 1.99 US ft • Target Length: 4.69 US ft • Target Shadow: 5.31 US ft • Classification1: Rock • Classification2: • Description: Irregular target on edge of channel. Likely rock.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0019** • Sonar Time at Target: 5/4/2017 2:30:46 PM • Click Position 41.2253661478 -72.9132188301 (WGS84) (X) 955100.08 (Y) 642883.41 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1415.HSX • Ping Number: 9298 • Range to target: 119.92 US ft • Fish Height: 30.26 US ft • Heading: 151.460 Degrees • Event Number: 65 • Line Name: 008_1415 • Water Depth: 76.77 US ft	**Dimensions and attributes** • Target Width: 12.13 US ft • Target Height: 0.00 US ft • Target Length: 84.83 US ft • Target Shadow: 0.00 US ft • Classification1: Linear furrow with gravel and shell on channel side • Classification2: • Description: Linear furrow with gravel and shell on channel side. Investigated with ROV.
	**NHH0020** • Sonar Time at Target: 5/4/2017 2:29:09 PM • Click Position 41.2273714519 -72.9137371155 (WGS84) (X) 954958.89 (Y) 643614.33 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1415.HSX • Ping Number: 8617 • Range to target: 65.14 US ft • Fish Height: 30.90 US ft • Heading: 145.790 Degrees • Event Number: 65 • Line Name: 008_1415 • Water Depth: 79.72 US ft	**Dimensions and attributes** • Target Width: 10.03 US ft • Target Height: 0.00 US ft • Target Length: 10.92 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G3. Line Visible.
	**NHH0021** • Sonar Time at Target: 5/4/2017 2:29:01 PM • Click Position 41.2273777163 -72.9143250631 (WGS84) (X) 954797.16 (Y) 643616.92 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1415.HSX • Ping Number: 8548 • Range to target: 76.90 US ft • Fish Height: 29.98 US ft • Heading: 147.230 Degrees • Event Number: 65 • Line Name: 008_1415 • Water Depth: 77.10 US ft	**Dimensions and attributes** • Target Width: 5.52 US ft • Target Height: 1.54 US ft • Target Length: 5.93 US ft • Target Shadow: 4.47 US ft • Classification1: Mooring • Classification2: • Description: Square target. Possible mooring for G3. Out of position, no line.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0022** • Sonar Time at Target: 5/4/2017 4:06:35 PM • Click Position 41.2280540486 -72.9121021161 (WGS84) (X) 955409.11 (Y) 643862.20 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 50283 • Range to target: 26.27 US ft • Fish Height: 37.25 US ft • Heading: 333.520 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 101.71 US ft	**Dimensions and attributes** • Target Width: 4.54 US ft • Target Height: 5.44 US ft • Target Length: 6.39 US ft • Target Shadow: 7.79 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R4. Line visible.
	**NHH0023** • Sonar Time at Target: 5/4/2017 3:19:43 PM • Click Position 41.2284092261 -72.9141756178 (WGS84) (X) 954838.98 (Y) 643992.69 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1517.HSX • Ping Number: 30235 • Range to target: 60.88 US ft • Fish Height: 41.89 US ft • Heading: 338.870 Degrees • Event Number: 71 • Line Name: 010_1517 • Water Depth: 123.69 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0024** • Sonar Time at Target: 5/4/2017 3:19:45 PM • Click Position 41.2284742107 -72.9141691572 (WGS84) (X) 954840.81 (Y) 644016.36 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1517.HSX • Ping Number: 30250 • Range to target: 48.06 US ft • Fish Height: 41.57 US ft • Heading: 342.420 Degrees • Event Number: 71 • Line Name: 010_1517 • Water Depth: 125.00 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.

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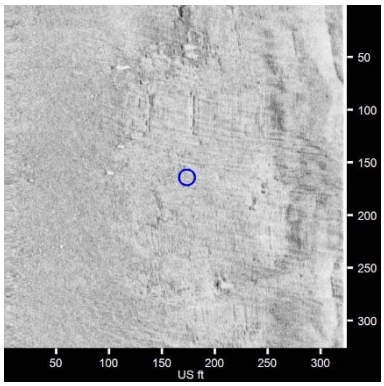
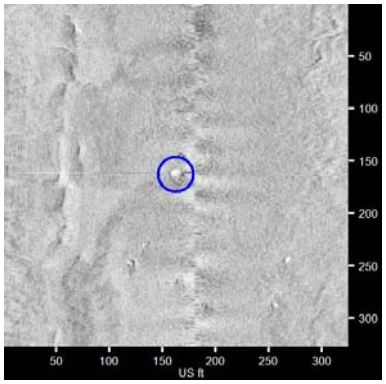
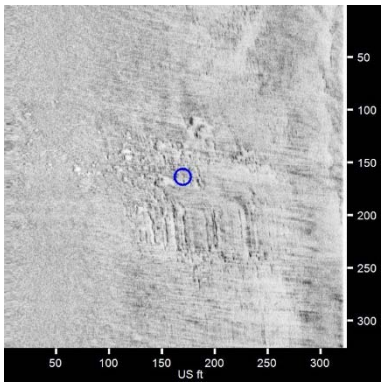
	**NHH0025** • Sonar Time at Target: 5/4/2017 3:40:57 PM • Click Position 41.2284843169 -72.9139189971 (WGS84) (X) 954909.63 (Y) 644019.91 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1531.HSX • Ping Number: 39323 • Range to target: 173.05 US ft • Fish Height: 47.40 US ft • Heading: 145.240 Degrees • Event Number: 73 • Line Name: 012_1531 • Water Depth: 136.15 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 509.93 US ft • Target Shadow: 0.00 US ft • Classification1: Rock Area • Classification2: • Description: Numerous irregular targets along edge of channel corresponding to rock.
	**NHH0026** • Sonar Time at Target: 5/4/2017 3:19:52 PM • Click Position 41.2286780349 -72.9141879448 (WGS84) (X) 954835.78 (Y) 644090.64 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1517.HSX • Ping Number: 30301 • Range to target: 17.77 US ft • Fish Height: 41.88 US ft • Heading: 341.980 Degrees • Event Number: 71 • Line Name: 010_1517 • Water Depth: 129.59 US ft	**Dimensions and attributes** • Target Width: 3.32 US ft • Target Height: 0.00 US ft • Target Length: 3.31 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Square target on edge of channel. Line visible. Likely derelict mooring.
	**NHH0027** • Sonar Time at Target: 5/4/2017 3:40:15 PM • Click Position 41.2292511942 -72.9143647428 (WGS84) (X) 954787.54 (Y) 644299.57 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1531.HSX • Ping Number: 39024 • Range to target: 168.97 US ft • Fish Height: 47.72 US ft • Heading: 149.730 Degrees • Event Number: 73 • Line Name: 012_1531 • Water Depth: 129.92 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 513.28 US ft • Target Shadow: 0.00 US ft • Classification1: Rock Area • Classification2: • Description: Numerous irregular targets along edge of channel corresponding to rock.

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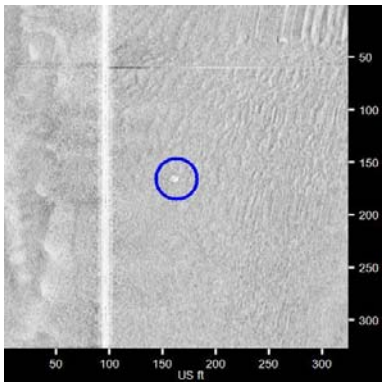
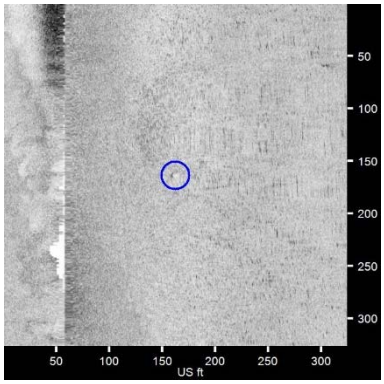
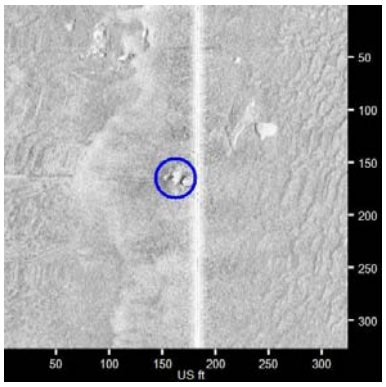
	**NHH0028** • Sonar Time at Target: 5/4/2017 4:09:27 PM • Click Position 41.2327708087 -72.9148081811 (WGS84) (X) 954668.01 (Y) 645582.21 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 51510 • Range to target: 66.64 US ft • Fish Height: 34.67 US ft • Heading: 341.800 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 93.18 US ft	**Dimensions and attributes** • Target Width: 1.73 US ft • Target Height: 0.00 US ft • Target Length: 3.28 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Irregular target outside channel. Likely rock.
	**NHH0029** • Sonar Time at Target: 5/4/2017 2:24:07 PM • Click Position 41.2329816292 -72.9179515853 (WGS84) (X) 953803.54 (Y) 645660.69 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1415.HSX • Ping Number: 6450 • Range to target: 104.61 US ft • Fish Height: 40.41 US ft • Heading: 156.990 Degrees • Event Number: 65 • Line Name: 008_1415 • Water Depth: 119.09 US ft	**Dimensions and attributes** • Target Width: 2.22 US ft • Target Height: 0.92 US ft • Target Length: 1.48 US ft • Target Shadow: 2.62 US ft • Classification1: Rock • Classification2: • Description: Irregular small target outside channel. Likely rock.
	**NHH0030** • Sonar Time at Target: 5/4/2017 4:09:55 PM • Click Position 41.2334377122 -72.9155567328 (WGS84) (X) 954462.58 (Y) 645825.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 51713 • Range to target: 20.51 US ft • Fish Height: 35.94 US ft • Heading: 357.230 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 96.46 US ft	**Dimensions and attributes** • Target Width: 5.45 US ft • Target Height: 2.98 US ft • Target Length: 5.44 US ft • Target Shadow: 3.74 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R6. Line visible

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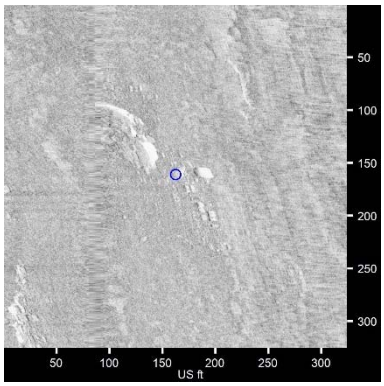
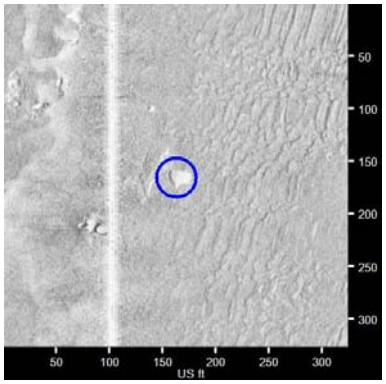
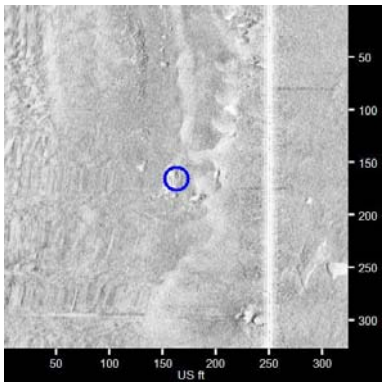
	**NHH0031** • Sonar Time at Target: 5/4/2017 3:35:15 PM • Click Position 41.2336064030 -72.9166018128 (WGS84) (X) 954175.24 (Y) 645887.62 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1531.HSX • Ping Number: 36882 • Range to target: 76.23 US ft • Fish Height: 46.08 US ft • Heading: 162.500 Degrees • Event Number: 73 • Line Name: 012_1531 • Water Depth: 127.95 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 440.15 US ft • Target Shadow: 0.00 US ft • Classification1: Rock Area • Classification2: • Description: Numerous irregular targets along edge of channel corresponding to rock.
	**NHH0032** • Sonar Time at Target: 5/4/2017 4:09:59 PM • Click Position 41.2336301840 -72.9153360957 (WGS84) (X) 954523.40 (Y) 645895.62 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 51744 • Range to target: 60.24 US ft • Fish Height: 37.20 US ft • Heading: 358.480 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 100.07 US ft	**Dimensions and attributes** • Target Width: 4.71 US ft • Target Height: 5.65 US ft • Target Length: 9.93 US ft • Target Shadow: 12.67 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0033** • Sonar Time at Target: 5/4/2017 4:10:08 PM • Click Position 41.2337360741 -72.9159436059 (WGS84) (X) 954356.38 (Y) 645934.52 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 51802 • Range to target: 87.77 US ft • Fish Height: 35.94 US ft • Heading: 354.160 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 93.83 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 226.03 US ft • Target Shadow: 0.00 US ft • Classification1: Rock Area • Classification2: • Description: Numerous irregular targets along edge of channel corresponding to rock.

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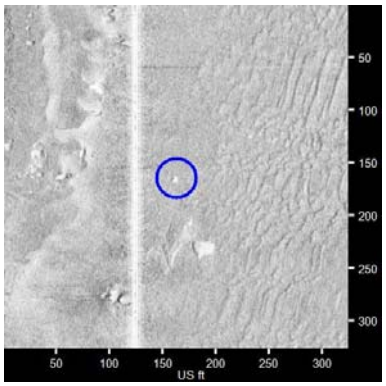
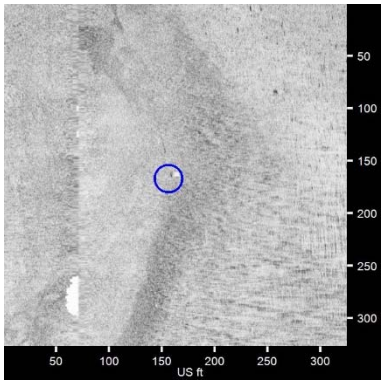
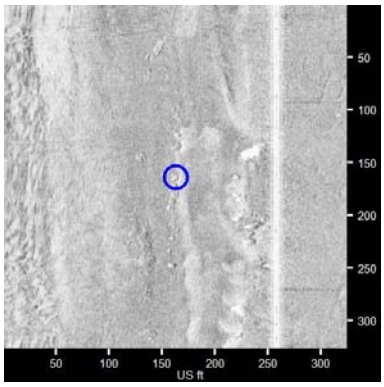
	**NHH0034** • Sonar Time at Target: 5/4/2017 4:10:06 PM • Click Position 41.2337809682 -72.9154830954 (WGS84) (X) 954483.07 (Y) 645950.63 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 51789 • Range to target: 38.45 US ft • Fish Height: 37.84 US ft • Heading: 357.320 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 96.78 US ft	**Dimensions and attributes** • Target Width: 2.23 US ft • Target Height: 1.97 US ft • Target Length: 4.50 US ft • Target Shadow: 2.97 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0035** • Sonar Time at Target: 5/4/2017 2:23:10 PM • Click Position 41.2341238481 -72.9181425275 (WGS84) (X) 953751.83 (Y) 646076.98 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1415.HSX • Ping Number: 6052 • Range to target: 84.83 US ft • Fish Height: 43.51 US ft • Heading: 166.370 Degrees • Event Number: 65 • Line Name: 008_1415 • Water Depth: 116.80 US ft	**Dimensions and attributes** • Target Width: 4.22 US ft • Target Height: 2.48 US ft • Target Length: 5.25 US ft • Target Shadow: 5.75 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G7. Line visible
	**NHH0036** • Sonar Time at Target: 5/4/2017 4:10:26 PM • Click Position 41.2342735695 -72.9161268962 (WGS84) (X) 954306.34 (Y) 646130.46 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 51933 • Range to target: 95.12 US ft • Fish Height: 34.69 US ft • Heading: 356.740 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 91.21 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 356.01 US ft • Target Shadow: 0.00 US ft • Classification1: Rock Area • Classification2: • Description: Numerous irregular targets along edge of channel corresponding to rock.

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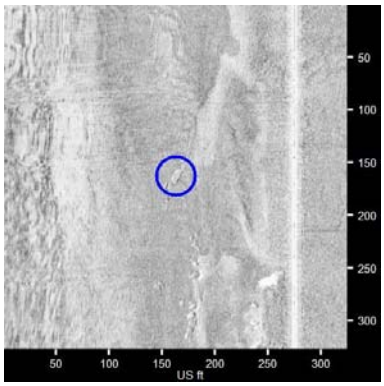
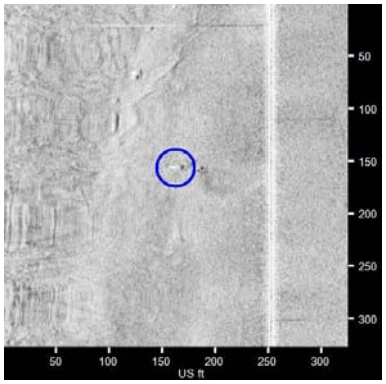
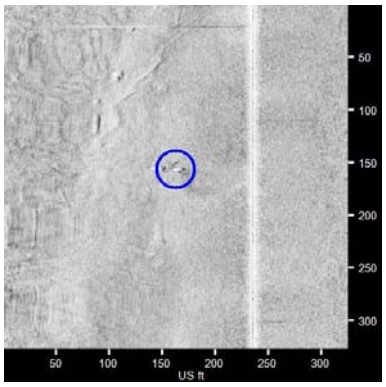
	**NHH0037** • Sonar Time at Target: 5/4/2017 4:10:38 PM • Click Position 41.2346129699 -72.9162515569 (WGS84) (X) 954272.29 (Y) 646254.19 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52017 • Range to target: 112.14 US ft • Fish Height: 35.01 US ft • Heading: 356.810 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 92.52 US ft	**Dimensions and attributes** • Target Width: 2.30 US ft • Target Height: 1.46 US ft • Target Length: 10.75 US ft • Target Shadow: 5.10 US ft • Classification1: Unknown • Classification2: Rock • Description: Irregular target in channel. Likely rock.
	**NHH0038** • Sonar Time at Target: 5/4/2017 4:11:30 PM • Click Position 41.2360826243 -72.9163711770 (WGS84) (X) 954240.42 (Y) 646789.74 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52392 • Range to target: 89.78 US ft • Fish Height: 32.51 US ft • Heading: 353.780 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 86.29 US ft	**Dimensions and attributes** • Target Width: 4.33 US ft • Target Height: 3.08 US ft • Target Length: 4.28 US ft • Target Shadow: 9.99 US ft • Classification1: Mooring • Classification2: • Description: Square target in vicinity of R8. Line visible.
	**NHH0039** • Sonar Time at Target: 5/4/2017 4:11:30 PM • Click Position 41.2360903439 -72.9163088794 (WGS84) (X) 954257.56 (Y) 646792.52 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52392 • Range to target: 72.41 US ft • Fish Height: 32.51 US ft • Heading: 353.780 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 86.29 US ft	**Dimensions and attributes** • Target Width: 4.34 US ft • Target Height: 2.43 US ft • Target Length: 4.33 US ft • Target Shadow: 6.42 US ft • Classification1: Mooring • Classification2: • Description: Square target in vicinity of R8. No line.

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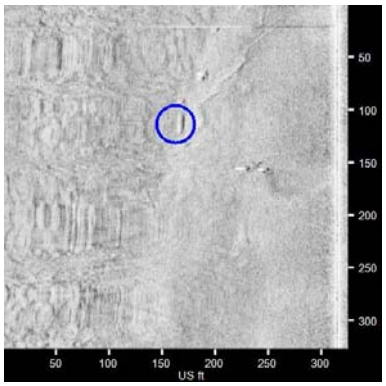
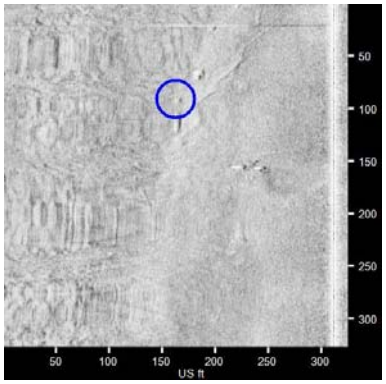
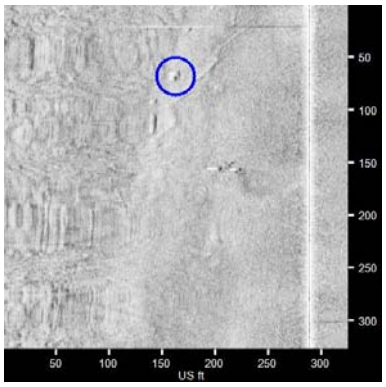
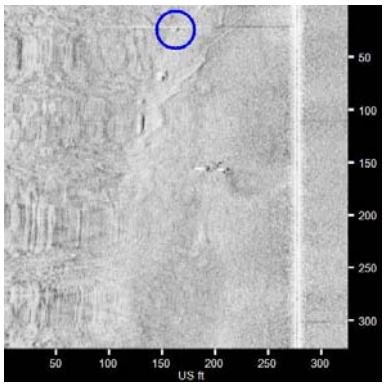
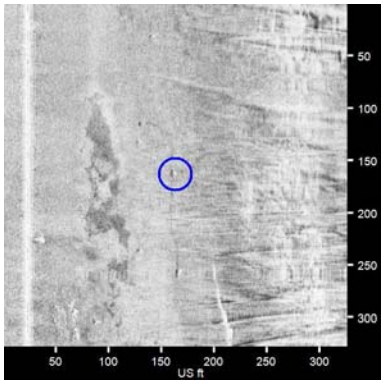
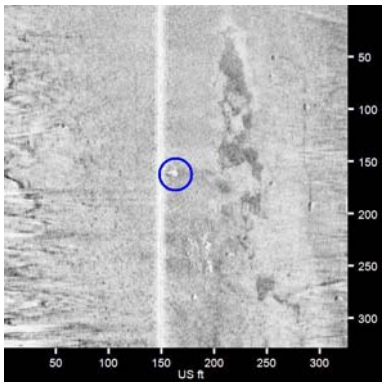
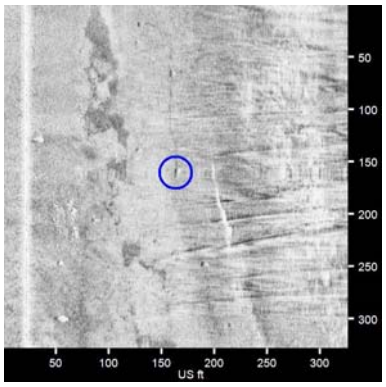
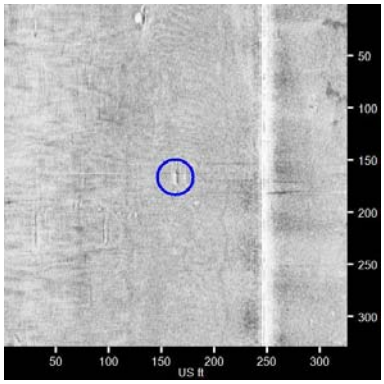
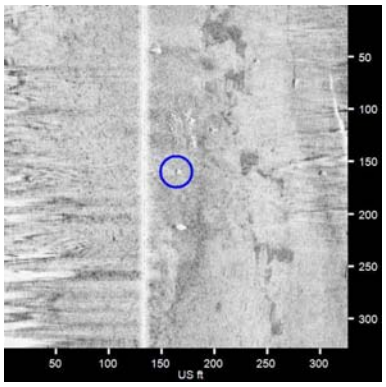
	**NHH0040** • Sonar Time at Target: 5/4/2017 4:11:35 PM • Click Position 41.2361611009 -72.9166185623 (WGS84) (X) 954172.43 (Y) 646818.46 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52422 • Range to target: 151.87 US ft • Fish Height: 32.19 US ft • Heading: 354.620 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 84.32 US ft	**Dimensions and attributes** • Target Width: 2.26 US ft • Target Height: 0.00 US ft • Target Length: 6.41 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Rock • Description: Irregular target in channel. Likely rock or debris.
	**NHH0041** • Sonar Time at Target: 5/4/2017 4:11:37 PM • Click Position 41.2362197843 -72.9166216495 (WGS84) (X) 954171.62 (Y) 646839.85 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52438 • Range to target: 148.67 US ft • Fish Height: 32.51 US ft • Heading: 348.640 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 83.01 US ft	**Dimensions and attributes** • Target Width: 2.94 US ft • Target Height: 0.60 US ft • Target Length: 2.85 US ft • Target Shadow: 2.85 US ft • Classification1: Rock • Classification2: • Description: Small irregular target in channel. Likely rock.
	**NHH0042** • Sonar Time at Target: 5/4/2017 4:11:39 PM • Click Position 41.2362904338 -72.9165549821 (WGS84) (X) 954190.01 (Y) 646865.55 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52454 • Range to target: 125.60 US ft • Fish Height: 33.14 US ft • Heading: 354.100 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 87.27 US ft	**Dimensions and attributes** • Target Width: 2.86 US ft • Target Height: 0.00 US ft • Target Length: 2.85 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Small irregular target in channel. Likely rock.

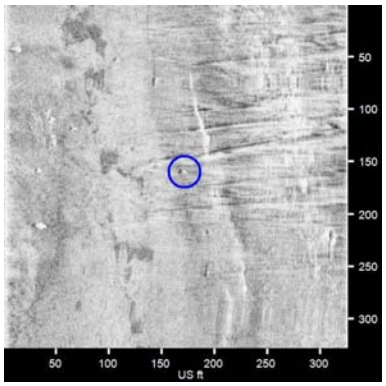
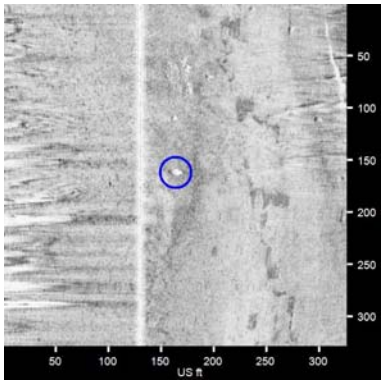
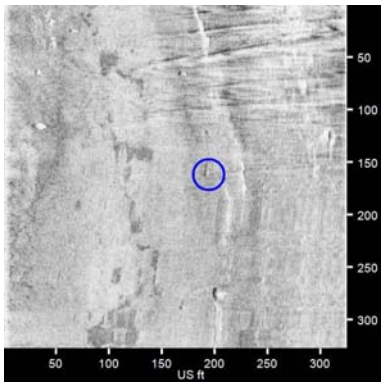
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0043** • Sonar Time at Target: 5/4/2017 4:11:43 PM • Click Position 41.2364121599 -72.9165462200 (WGS84) (X) 954192.51 (Y) 646909.90 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1600.HSX • Ping Number: 52485 • Range to target: 114.06 US ft • Fish Height: 34.41 US ft • Heading: 349.560 Degrees • Event Number: 75 • Line Name: 014_1600 • Water Depth: 90.55 US ft	**Dimensions and attributes** • Target Width: 1.43 US ft • Target Height: 0.00 US ft • Target Length: 1.42 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Small irregular target in channel. Likely rock.
	**NHH0044** • Sonar Time at Target: 5/2/2017 12:34:44 PM • Click Position 41.2368538059 -72.9164988898 (WGS84) (X) 954205.83 (Y) 647070.80 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 49198 • Range to target: 140.34 US ft • Fish Height: 28.07 US ft • Heading: 188.090 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 81.04 US ft	**Dimensions and attributes** • Target Width: 2.47 US ft • Target Height: 0.36 US ft • Target Length: 2.46 US ft • Target Shadow: 1.85 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.
	**NHH0045** • Sonar Time at Target: 5/2/2017 12:34:36 PM • Click Position 41.2369557478 -72.9160022676 (WGS84) (X) 954342.50 (Y) 647107.68 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 49146 • Range to target: 14.74 US ft • Fish Height: 28.72 US ft • Heading: 189.050 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 81.69 US ft	**Dimensions and attributes** • Target Width: 3.06 US ft • Target Height: 4.19 US ft • Target Length: 4.10 US ft • Target Shadow: 5.51 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock. Possibly derelict fishing gear.

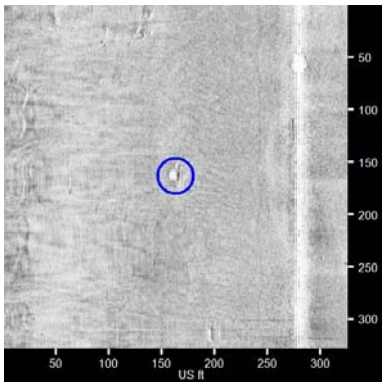
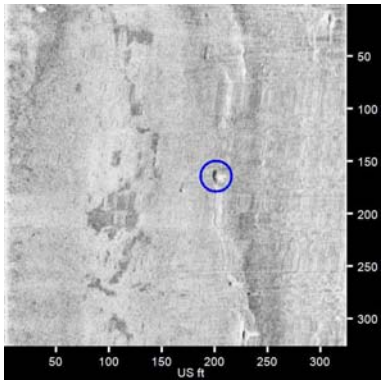
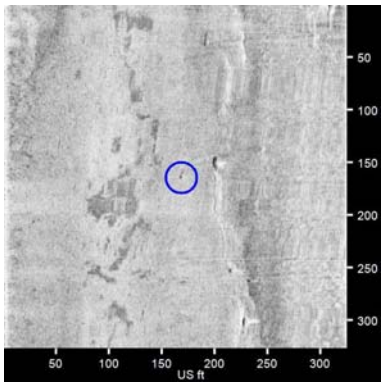
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0046** • Sonar Time at Target: 5/2/2017 12:34:33 PM • Click Position 41.2371105408 -72.9164299829 (WGS84) (X) 954224.97 (Y) 647164.30 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 49121 • Range to target: 141.62 US ft • Fish Height: 29.04 US ft • Heading: 189.050 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 81.04 US ft	**Dimensions and attributes** • Target Width: 2.51 US ft • Target Height: 0.48 US ft • Target Length: 4.91 US ft • Target Shadow: 2.44 US ft • Classification1: Fishing gear • Classification2: • Description: String of rectangular targets in channel. Line visible. Likely derelict fishing gear.
	**NHH0047** • Sonar Time at Target: 5/2/2017 11:44:02 AM • Click Position 41.2372672006 -72.9169041667 (WGS84) (X) 954094.66 (Y) 647221.64 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27516 • Range to target: 83.95 US ft • Fish Height: 36.50 US ft • Heading: 12.820 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 119.75 US ft	**Dimensions and attributes** • Target Width: 1.36 US ft • Target Height: 0.00 US ft • Target Length: 8.86 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Rock • Description: Small irregular target in channel. Likely rock or debris.
	**NHH0048** • Sonar Time at Target: 5/2/2017 12:34:23 PM • Click Position 41.2372752940 -72.9159750504 (WGS84) (X) 954350.21 (Y) 647224.09 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 49050 • Range to target: 30.12 US ft • Fish Height: 27.84 US ft • Heading: 191.720 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 73.82 US ft	**Dimensions and attributes** • Target Width: 2.47 US ft • Target Height: 2.24 US ft • Target Length: 3.05 US ft • Target Shadow: 3.59 US ft • Classification1: Rock • Classification2: • Description: Small irregular target in channel. Likely rock. Possibly derelict fishing gear.

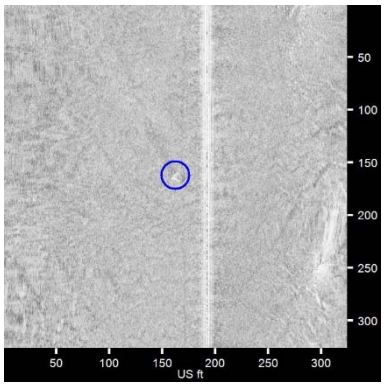
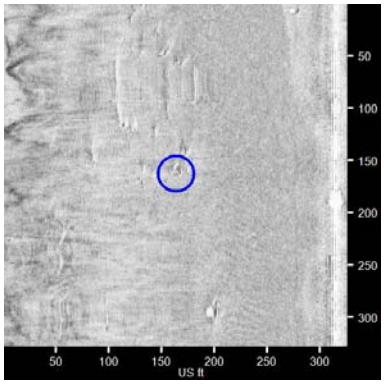
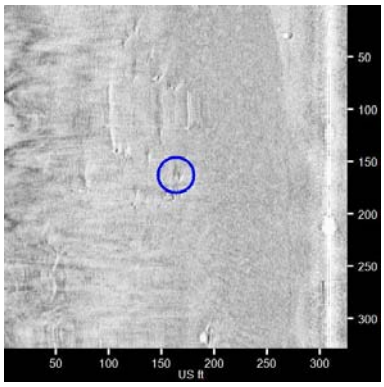
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0049** • Sonar Time at Target: 5/2/2017 12:34:23 PM • Click Position 41.2373433348 -72.9164784472 (WGS84) (X) 954211.80 (Y) 647249.15 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 49049 • Range to target: 170.77 US ft • Fish Height: 27.81 US ft • Heading: 191.850 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 74.80 US ft	**Dimensions and attributes** • Target Width: 2.47 US ft • Target Height: 0.00 US ft • Target Length: 2.46 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.
	**NHH0050** • Sonar Time at Target: 5/2/2017 12:34:17 PM • Click Position 41.2374155719 -72.9159573900 (WGS84) (X) 954355.16 (Y) 647275.20 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 49006 • Range to target: 33.32 US ft • Fish Height: 26.21 US ft • Heading: 191.400 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 75.13 US ft	**Dimensions and attributes** • Target Width: 2.65 US ft • Target Height: 4.78 US ft • Target Length: 2.65 US ft • Target Shadow: 9.46 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock. Possibly derelict fishing gear.
	**NHH0051** • Sonar Time at Target: 5/2/2017 12:34:11 PM • Click Position 41.2375949841 -72.9165113479 (WGS84) (X) 954202.93 (Y) 647340.86 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 48967 • Range to target: 193.22 US ft • Fish Height: 24.80 US ft • Heading: 191.470 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 69.88 US ft	**Dimensions and attributes** • Target Width: 2.42 US ft • Target Height: 0.22 US ft • Target Length: 2.42 US ft • Target Shadow: 1.76 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.

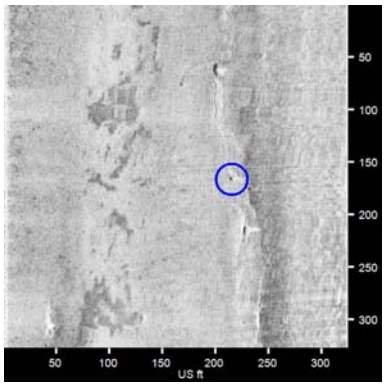
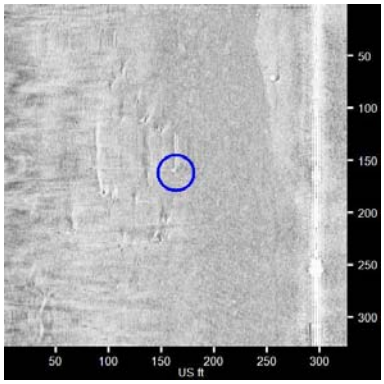
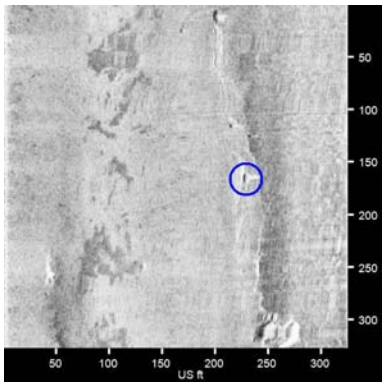
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0052** • Sonar Time at Target: 5/2/2017 11:44:18 AM • Click Position 41.2376950214 -72.9169631430 (WGS84) (X) 954078.74 (Y) 647377.55 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27627 • Range to target: 116.63 US ft • Fish Height: 36.20 US ft • Heading: 4.270 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 119.75 US ft	**Dimensions and attributes** • Target Width: 2.03 US ft • Target Height: 1.72 US ft • Target Length: 7.43 US ft • Target Shadow: 6.10 US ft • Classification1: Unknown • Classification2: Debris • Description: Irregular target in channel. Likely rock or debris.
	**NHH0053** • Sonar Time at Target: 5/2/2017 12:33:58 PM • Click Position 41.2378905175 -72.9164908731 (WGS84) (X) 954208.77 (Y) 647448.53 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 48871 • Range to target: 200.33 US ft • Fish Height: 24.81 US ft • Heading: 186.280 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 71.19 US ft	**Dimensions and attributes** • Target Width: 2.35 US ft • Target Height: 0.77 US ft • Target Length: 2.34 US ft • Target Shadow: 6.46 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.
	**NHH0054** • Sonar Time at Target: 5/2/2017 12:33:56 PM • Click Position 41.2379183771 -72.9163662690 (WGS84) (X) 954243.06 (Y) 647458.62 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 48859 • Range to target: 167.39 US ft • Fish Height: 24.50 US ft • Heading: 188.060 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 68.57 US ft	**Dimensions and attributes** • Target Width: 2.42 US ft • Target Height: 0.25 US ft • Target Length: 2.34 US ft • Target Shadow: 1.76 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0055** • Sonar Time at Target: 5/1/2017 5:34:37 PM • Click Position 41.2379625811 -72.9180785939 (WGS84) (X) 953772.13 (Y) 647475.63 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1732.HSX • Ping Number: 104723 • Range to target: 29.48 US ft • Fish Height: 30.48 US ft • Heading: 18.590 Degrees • Event Number: 59 • Line Name: 008_1732 • Water Depth: 89.24 US ft	**Dimensions and attributes** • Target Width: 7.04 US ft • Target Height: 2.74 US ft • Target Length: 6.66 US ft • Target Shadow: 4.19 US ft • Classification1: Unknown • Classification2: Rock • Description: Large square target outside channel with scour on western side. Likely rock.
	**NHH0056** • Sonar Time at Target: 5/2/2017 11:44:32 AM • Click Position 41.2380817843 -72.9170194995 (WGS84) (X) 954063.51 (Y) 647518.50 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27725 • Range to target: 151.87 US ft • Fish Height: 36.82 US ft • Heading: 9.120 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 120.73 US ft	**Dimensions and attributes** • Target Width: 3.66 US ft • Target Height: 0.63 US ft • Target Length: 5.47 US ft • Target Shadow: 2.72 US ft • Classification1: Unknown • Classification2: Rock • Description: Small irregular target in channel. Likely rock or debris.
	**NHH0057** • Sonar Time at Target: 5/2/2017 11:44:34 AM • Click Position 41.2381441949 -72.9169821726 (WGS84) (X) 954073.82 (Y) 647541.22 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27742 • Range to target: 145.46 US ft • Fish Height: 36.83 US ft • Heading: 17.810 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 121.06 US ft	**Dimensions and attributes** • Target Width: 1.36 US ft • Target Height: 0.82 US ft • Target Length: 2.72 US ft • Target Shadow: 3.40 US ft • Classification1: Unknown • Classification2: Rock • Description: Small irregular target in channel. Likely rock or debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0058** • Sonar Time at Target: 5/2/2017 12:33:45 PM • Click Position 41.2381807771 -72.9164989850 (WGS84) (X) 954206.74 (Y) 647554.29 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 48783 • Range to target: 214.52 US ft • Fish Height: 24.81 US ft • Heading: 187.040 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 67.59 US ft	**Dimensions and attributes** • Target Width: 2.45 US ft • Target Height: 0.34 US ft • Target Length: 2.97 US ft • Target Shadow: 2.97 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.
	**NHH0059** • Sonar Time at Target: 5/2/2017 11:44:38 AM • Click Position 41.2382570528 -72.9169108881 (WGS84) (X) 954093.50 (Y) 647582.31 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27773 • Range to target: 133.29 US ft • Fish Height: 36.21 US ft • Heading: 18.880 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 120.08 US ft	**Dimensions and attributes** • Target Width: 3.41 US ft • Target Height: 0.00 US ft • Target Length: 2.16 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Rock • Description: Small irregular target in channel. Likely rock or debris.
	**NHH0060** • Sonar Time at Target: 5/2/2017 12:33:39 PM • Click Position 41.2383270428 -72.9165250257 (WGS84) (X) 954199.68 (Y) 647607.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 48741 • Range to target: 228.23 US ft • Fish Height: 23.23 US ft • Heading: 193.070 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 65.94 US ft	**Dimensions and attributes** • Target Width: 1.79 US ft • Target Height: 0.93 US ft • Target Length: 4.19 US ft • Target Shadow: 9.57 US ft • Classification1: Fishing gear • Classification2: • Description: String of targets in channel. Line visible. Likely derelict fishing gear or debris.

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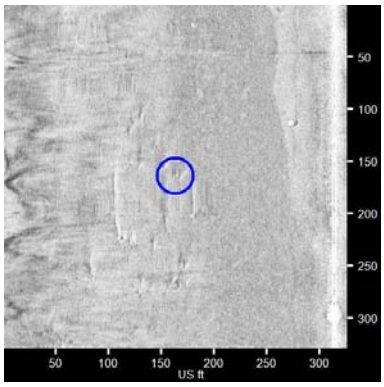
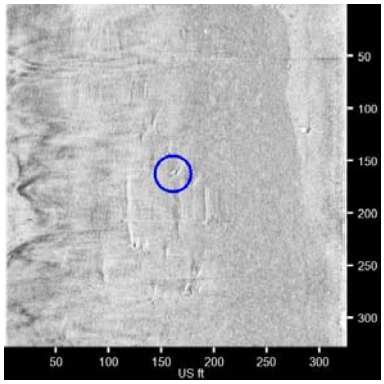
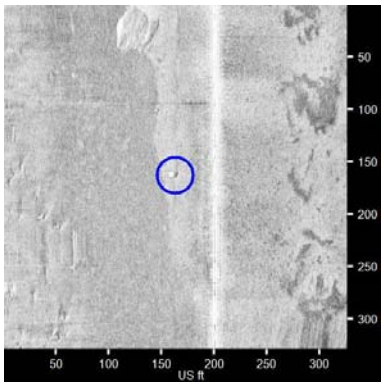
	**NHH0061** • Sonar Time at Target: 5/2/2017 11:44:43 AM • Click Position 41.2383796967 -72.9169444650 (WGS84) (X) 954084.36 (Y) 647627.01 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27803 • Range to target: 150.59 US ft • Fish Height: 35.58 US ft • Heading: 7.520 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 117.13 US ft	**Dimensions and attributes** • Target Width: 1.53 US ft • Target Height: 0.92 US ft • Target Length: 2.05 US ft • Target Shadow: 4.12 US ft • Classification1: Unknown • Classification2: Rock • Description: Small irregular target in channel. Likely rock or debris.
	**NHH0062** • Sonar Time at Target: 5/2/2017 11:44:44 AM • Click Position 41.2384097278 -72.9169890103 (WGS84) (X) 954072.13 (Y) 647637.98 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27809 • Range to target: 164.69 US ft • Fish Height: 35.90 US ft • Heading: 8.360 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 117.45 US ft	**Dimensions and attributes** • Target Width: 1.37 US ft • Target Height: 0.99 US ft • Target Length: 4.16 US ft • Target Shadow: 4.80 US ft • Classification1: Unknown • Classification2: Rock • Description: Small irregular target in channel. Likely rock or debris.
	**NHH0063** • Sonar Time at Target: 5/2/2017 11:44:48 AM • Click Position 41.2384546300 -72.9165048811 (WGS84) (X) 954205.31 (Y) 647654.08 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27839 • Range to target: 37.17 US ft • Fish Height: 36.05 US ft • Heading: 11.090 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 116.47 US ft	**Dimensions and attributes** • Target Width: 2.75 US ft • Target Height: 0.00 US ft • Target Length: 4.85 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Small irregular target in channel. Possible line. Likely derelict fishing gear.

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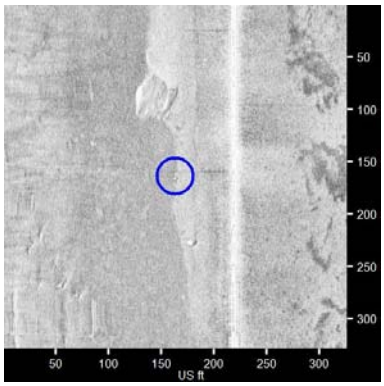
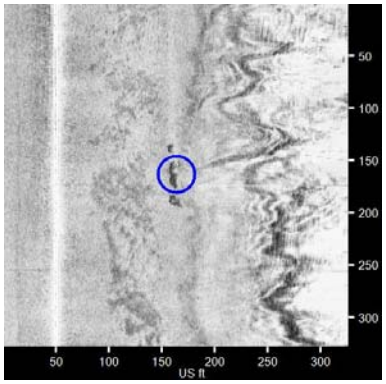
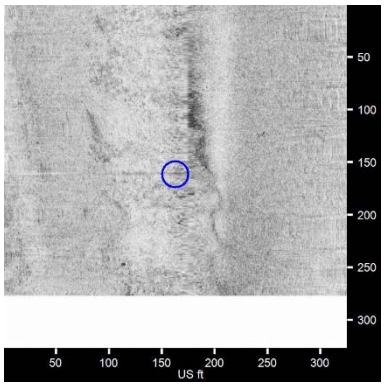
	**NHH0064** • Sonar Time at Target: 5/2/2017 11:44:54 AM • Click Position 41.2386384787 -72.9165227240 (WGS84) (X) 954200.53 (Y) 647721.08 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 27886 • Range to target: 55.11 US ft • Fish Height: 36.34 US ft • Heading: 12.280 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 115.49 US ft	**Dimensions and attributes** • Target Width: 1.38 US ft • Target Height: 1.46 US ft • Target Length: 2.06 US ft • Target Shadow: 2.76 US ft • Classification1: Fishing gear • Classification2: • Description: Small square target in channel. Likely fishing gear or debris.
	**NHH0065** • Sonar Time at Target: 5/2/2017 11:45:18 AM • Click Position 41.2391884408 -72.9157673631 (WGS84) (X) 954408.67 (Y) 647921.06 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 28053 • Range to target: 114.06 US ft • Fish Height: 36.52 US ft • Heading: 10.680 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 114.17 US ft	**Dimensions and attributes** • Target Width: 4.91 US ft • Target Height: 0.00 US ft • Target Length: 20.20 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: Area of high backscatter along edge of channel. No shadow. Likely partially buried rock or disturbed sediment.
	**NHH0066** • Sonar Time at Target: 5/2/2017 1:47:22 PM • Click Position 41.2402087675 -72.9156712882 (WGS84) (X) 954435.80 (Y) 648292.78 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 80272 • Range to target: 11.86 US ft • Fish Height: 42.60 US ft • Heading: 10.300 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 126.64 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker

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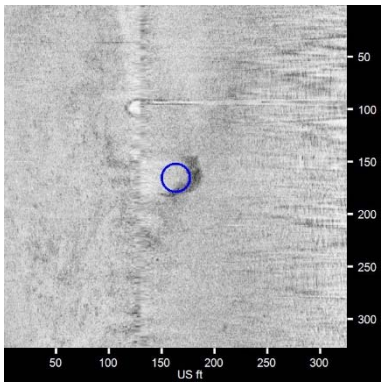
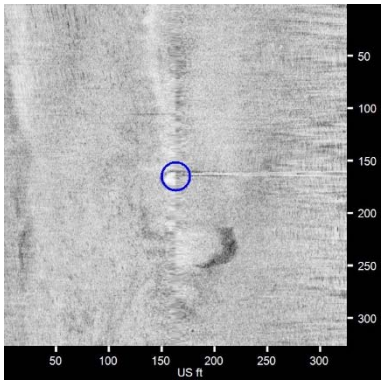
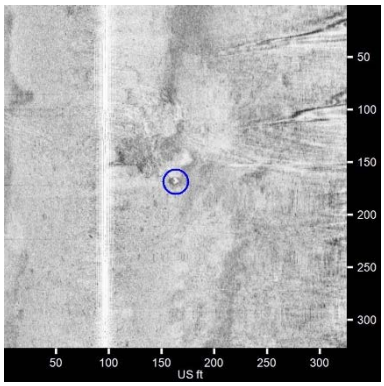
	**NHH0067** • Sonar Time at Target: 5/2/2017 1:48:39 PM • Click Position 41.2417460849 -72.9152064803 (WGS84) (X) 954564.71 (Y) 648852.68 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 80824 • Range to target: 33.31 US ft • Fish Height: 43.90 US ft • Heading: 0.350 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 125.66 US ft	**Dimensions and attributes** • Target Width: 27.54 US ft • Target Height: 0.00 US ft • Target Length: 12.88 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Area of disturbed sediment adjacent to mooring for R10. Likely previous mooring location.
	**NHH0068** • Sonar Time at Target: 5/2/2017 1:48:49 PM • Click Position 41.2419509721 -72.9152852438 (WGS84) (X) 954543.19 (Y) 648927.37 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 80889 • Range to target: 0.00 US ft • Fish Height: 43.65 US ft • Heading: 2.500 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 146.00 US ft	**Dimensions and attributes** • Target Width: 5.77 US ft • Target Height: 4.35 US ft • Target Length: 5.07 US ft • Target Shadow: 4.82 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker
	**NHH0069** • Sonar Time at Target: 5/2/2017 11:26:22 AM • Click Position 41.2420333849 -72.9167739268 (WGS84) (X) 954133.83 (Y) 648958.19 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 19958 • Range to target: 66.64 US ft • Fish Height: 40.44 US ft • Heading: 187.600 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 119.09 US ft	**Dimensions and attributes** • Target Width: 5.33 US ft • Target Height: 0.00 US ft • Target Length: 5.06 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G9. Line visible.

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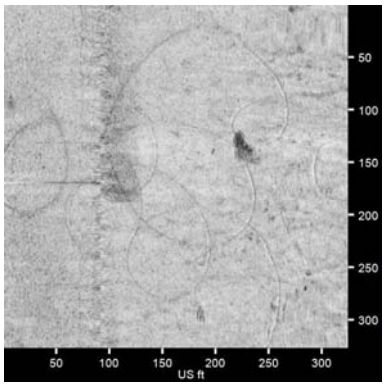
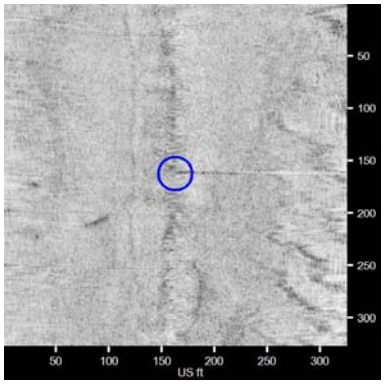
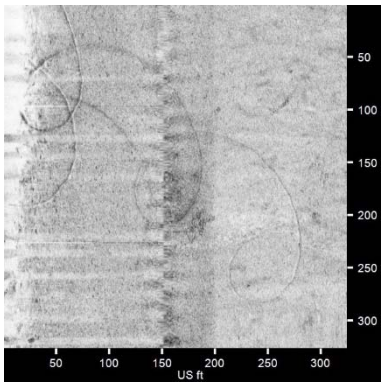
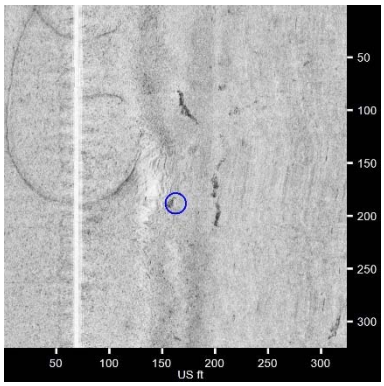
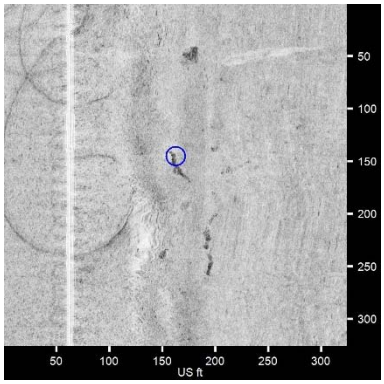
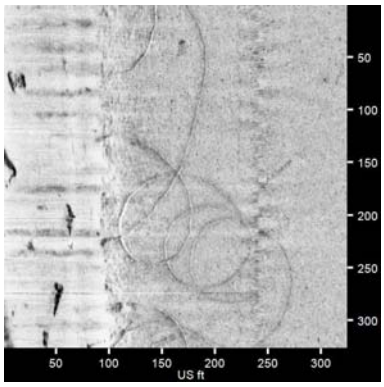
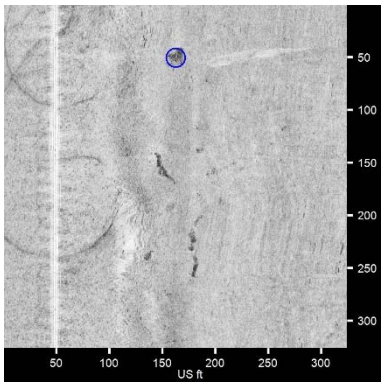
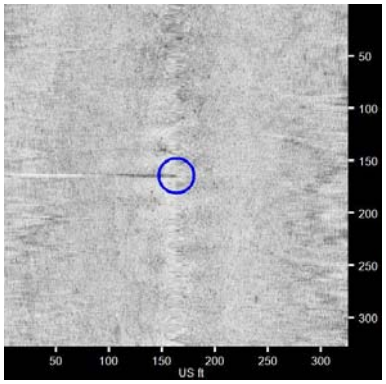
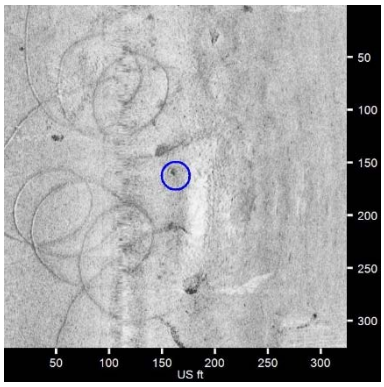
	**NHH0070** • Sonar Time at Target: 5/1/2017 5:21:31 PM • Click Position 41.2451903797 -72.9172361217 (WGS84) (X) 954008.94 (Y) 650108.72 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 99117 • Range to target: 71.22 US ft • Fish Height: 21.28 US ft • Heading: 189.940 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 61.68 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 944.38 US ft • Target Shadow: 0.00 US ft • Classification1: Drag scars • Classification2: • Description: Area with numerous drag scars. Well defined.
	**NHH0071** • Sonar Time at Target: 5/2/2017 1:51:11 PM • Click Position 41.2452865035 -72.9147346453 (WGS84) (X) 954696.93 (Y) 650142.43 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 81902 • Range to target: 0.00 US ft • Fish Height: 44.84 US ft • Heading: 7.450 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 127.30 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker
	**NHH0072** • Sonar Time at Target: 5/1/2017 5:20:40 PM • Click Position 41.2462617708 -72.9168065613 (WGS84) (X) 954127.83 (Y) 650498.87 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 98760 • Range to target: 11.33 US ft • Fish Height: 22.99 US ft • Heading: 180.370 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 61.02 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 861.81 US ft • Target Shadow: 0.00 US ft • Classification1: Drag scars • Classification2: • Description: Area with drag scars. Well defined.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0073** • Sonar Time at Target: 5/1/2017 5:41:51 PM • Click Position 41.2468657754 -72.9159642931 (WGS84) (X) 954359.88 (Y) 650718.50 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1732.HSX • Ping Number: 107815 • Range to target: 92.70 US ft • Fish Height: 25.42 US ft • Heading: 6.290 Degrees • Event Number: 59 • Line Name: 008_1732 • Water Depth: 63.98 US ft	**Dimensions and attributes** • Target Width: 3.29 US ft • Target Height: 0.60 US ft • Target Length: 8.24 US ft • Target Shadow: 2.33 US ft • Classification1: Unknown • Classification2: • Description: Irregular contact in area of drag scars
	**NHH0074** • Sonar Time at Target: 5/1/2017 5:42:09 PM • Click Position 41.2471144797 -72.9158754323 (WGS84) (X) 954384.49 (Y) 650809.07 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1732.HSX • Ping Number: 107946 • Range to target: 100.07 US ft • Fish Height: 25.10 US ft • Heading: 16.910 Degrees • Event Number: 59 • Line Name: 008_1732 • Water Depth: 66.27 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Irregular are of high backscatter at tow of channel slope. Likely Disturbed sediment.
	**NHH0075** • Sonar Time at Target: 5/1/2017 5:19:51 PM • Click Position 41.2472997769 -72.9163043240 (WGS84) (X) 954266.67 (Y) 650876.81 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 98409 • Range to target: 78.36 US ft • Fish Height: 21.97 US ft • Heading: 190.450 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 62.34 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 1001.91 US ft • Target Shadow: 0.00 US ft • Classification1: Drag scars • Classification2: • Description: Area with numerous drag scars. Well defined.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0076** • Sonar Time at Target: 5/1/2017 5:42:28 PM • Click Position 41.2473402823 -72.9157734176 (WGS84) (X) 954412.70 (Y) 650891.29 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1732.HSX • Ping Number: 108079 • Range to target: 113.96 US ft • Fish Height: 24.78 US ft • Heading: 10.030 Degrees • Event Number: 59 • Line Name: 008_1732 • Water Depth: 65.29 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Irregular are of high backscatter at tow of channel slope. Likely Disturbed sediment.
	**NHH0077** • Sonar Time at Target: 5/2/2017 1:52:36 PM • Click Position 41.2474561607 -72.9142972940 (WGS84) (X) 954818.71 (Y) 650932.74 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 82509 • Range to target: 0.00 US ft • Fish Height: 41.87 US ft • Heading: 4.620 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 127.62 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker
	**NHH0078** • Sonar Time at Target: 5/1/2017 5:48:03 PM • Click Position 41.2476216381 -72.9159623254 (WGS84) (X) 954360.95 (Y) 650993.91 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 110471 • Range to target: 49.98 US ft • Fish Height: 23.21 US ft • Heading: 16.480 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 64.30 US ft	**Dimensions and attributes** • Target Width: 3.74 US ft • Target Height: 0.00 US ft • Target Length: 4.98 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Irregular target in area of drag scars. Likely disturbed sediment or debris.

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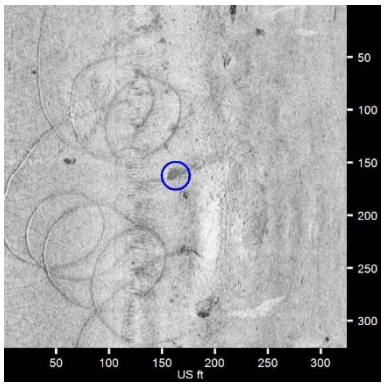
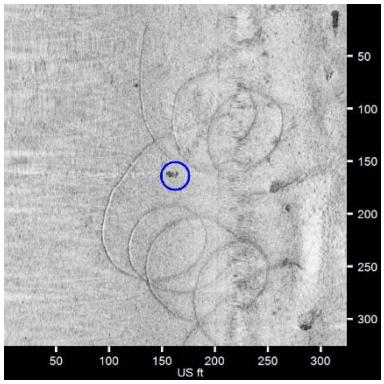
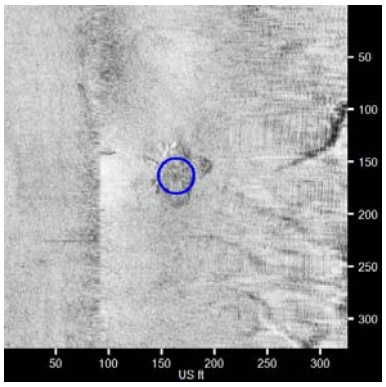
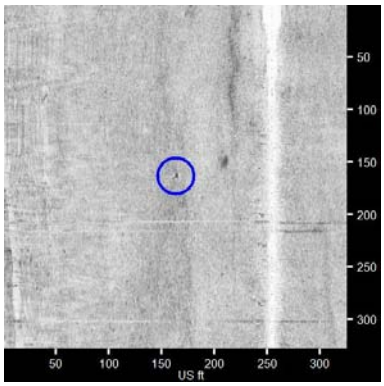
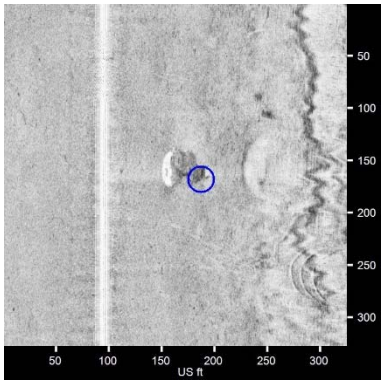
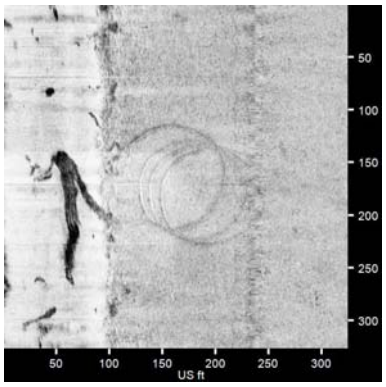
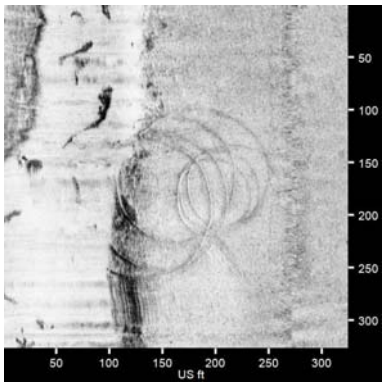
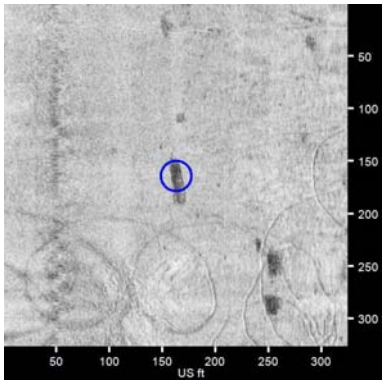
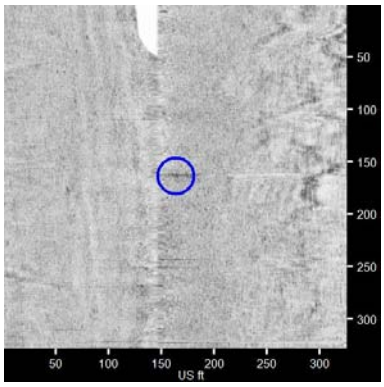
	**NHH0079** • Sonar Time at Target: 5/1/2017 5:48:06 PM • Click Position 41.2476869743 -72.9159913814 (WGS84) (X) 954353.00 (Y) 651017.73 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 110492 • Range to target: 38.45 US ft • Fish Height: 23.46 US ft • Heading: 16.680 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 63.98 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Irregular are of high backscatter at tow of channel slope. Likely Disturbed sediment.
	**NHH0080** • Sonar Time at Target: 5/1/2017 5:48:08 PM • Click Position 41.2477621004 -72.9163320406 (WGS84) (X) 954259.37 (Y) 651045.28 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 110504 • Range to target: 58.31 US ft • Fish Height: 23.60 US ft • Heading: 18.500 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 63.98 US ft	**Dimensions and attributes** • Target Width: 5.28 US ft • Target Height: 0.00 US ft • Target Length: 11.42 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Irregular are of high backscatter at tow of channel slope. Likely Disturbed sediment.
	**NHH0081** • Sonar Time at Target: 5/2/2017 1:53:14 PM • Click Position 41.2484208309 -72.9138874042 (WGS84) (X) 954932.09 (Y) 651284.01 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 82781 • Range to target: 71.83 US ft • Fish Height: 42.19 US ft • Heading: 12.020 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 125.00 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Target in vicinity of R10A. Poorly defined, possibly buried mooring. Line visible in other files.

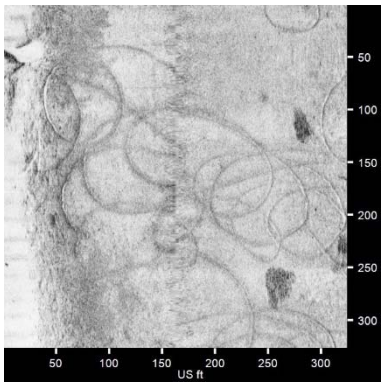
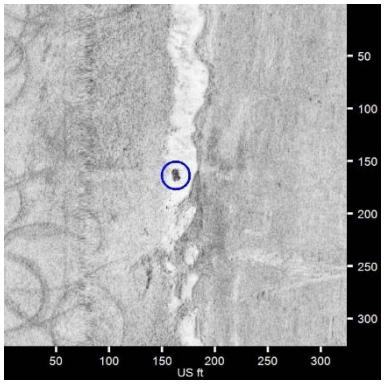
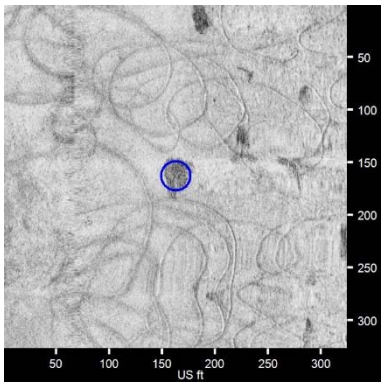
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0082** • Sonar Time at Target: 5/2/2017 11:50:56 AM • Click Position 41.2484411573 -72.9148342809 (WGS84) (X) 954671.72 (Y) 651291.92 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 30466 • Range to target: 91.41 US ft • Fish Height: 37.18 US ft • Heading: 15.210 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 119.09 US ft	**Dimensions and attributes** • Target Width: 2.84 US ft • Target Height: 0.51 US ft • Target Length: 2.75 US ft • Target Shadow: 1.38 US ft • Classification1: Rock • Classification2: • Description: Unknown square target in channel. Likely rock.
	**NHH0083** • Sonar Time at Target: 5/2/2017 11:20:40 AM • Click Position 41.2485189949 -72.9156256444 (WGS84) (X) 954454.16 (Y) 651320.69 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 17521 • Range to target: 92.42 US ft • Fish Height: 38.17 US ft • Heading: 181.980 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 113.85 US ft	**Dimensions and attributes** • Target Width: 5.87 US ft • Target Height: 1.78 US ft • Target Length: 5.36 US ft • Target Shadow: 4.88 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G9A. Scour on channel side.
	**NHH0084** • Sonar Time at Target: 5/1/2017 5:18:47 PM • Click Position 41.2487711856 -72.9160434581 (WGS84) (X) 954339.44 (Y) 651412.80 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 97954 • Range to target: 74.67 US ft • Fish Height: 23.16 US ft • Heading: 178.690 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 63.65 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 453.83 US ft • Target Shadow: 0.00 US ft • Classification1: Drag scars • Classification2: • Description: Area with drag scars. Well defined.

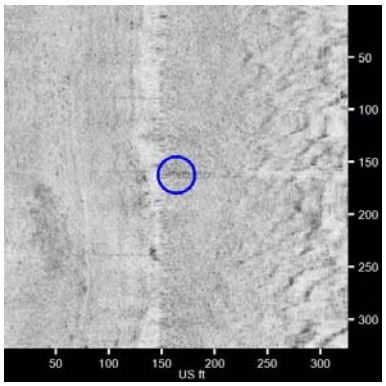
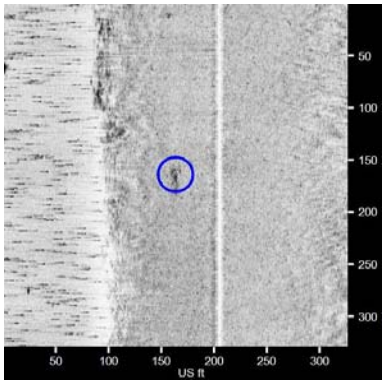
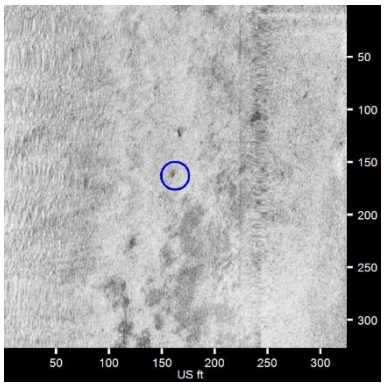
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0085** • Sonar Time at Target: 5/1/2017 5:18:17 PM • Click Position 41.2494491424 -72.9158767592 (WGS84) (X) 954385.75 (Y) 651659.74 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 97735 • Range to target: 108.99 US ft • Fish Height: 23.54 US ft • Heading: 176.020 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 66.27 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 613.07 US ft • Target Shadow: 0.00 US ft • Classification1: Drag scars • Classification2: • Description: Area with drag scars. Well defined.
	**NHH0086** • Sonar Time at Target: 5/1/2017 5:17:18 PM • Click Position 41.2508379447 -72.9163645401 (WGS84) (X) 954252.59 (Y) 652166.02 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 97313 • Range to target: 110.86 US ft • Fish Height: 24.37 US ft • Heading: 190.350 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 67.26 US ft	**Dimensions and attributes** • Target Width: 9.27 US ft • Target Height: 0.00 US ft • Target Length: 25.74 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Large rectangular target in area of drag scars.
	**NHH0087** • Sonar Time at Target: 5/2/2017 1:55:16 PM • Click Position 41.2516996115 -72.9134389756 (WGS84) (X) 955057.67 (Y) 652478.45 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 83651 • Range to target: 16.86 US ft • Fish Height: 39.49 US ft • Heading: 4.860 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 119.09 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker

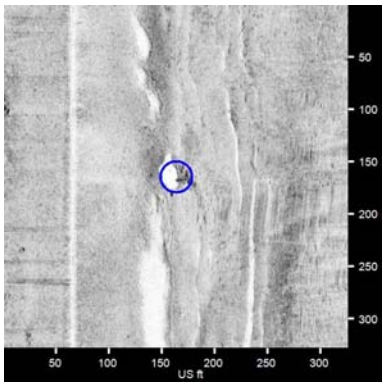
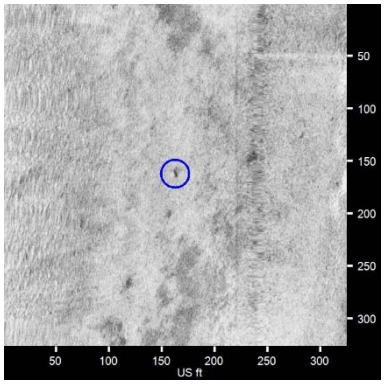
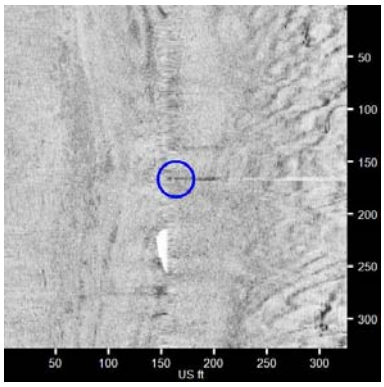
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0088** • Sonar Time at Target: 5/1/2017 5:16:27 PM • Click Position 41.2518745769 -72.9156698149 (WGS84) (X) 954444.36 (Y) 652543.37 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 96956 • Range to target: 0.00 US ft • Fish Height: 25.11 US ft • Heading: 187.890 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 69.88 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 2720.10 US ft • Target Shadow: 0.00 US ft • Classification1: Drag Scars • Classification2: • Description: Area with numerous drag scars. Well defined.
	**NHH0089** • Sonar Time at Target: 5/1/2017 5:51:43 PM • Click Position 41.2521047393 -72.9150447774 (WGS84) (X) 954616.39 (Y) 652626.90 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 112036 • Range to target: 85.15 US ft • Fish Height: 26.14 US ft • Heading: 10.340 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 75.13 US ft	**Dimensions and attributes** • Target Width: 7.46 US ft • Target Height: 0.00 US ft • Target Length: 9.10 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Area of high backscatter along channel slope and drag marks. Likely disturbed sediment.
	**NHH0090** • Sonar Time at Target: 5/1/2017 5:16:14 PM • Click Position 41.2522101827 -72.9159267635 (WGS84) (X) 954373.94 (Y) 652665.78 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 96861 • Range to target: 95.48 US ft • Fish Height: 25.42 US ft • Heading: 193.720 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 72.51 US ft	**Dimensions and attributes** • Target Width: 24.08 US ft • Target Height: 0.00 US ft • Target Length: 26.61 US ft • Target Shadow: 0.00 US ft • Classification1: Drag Scars • Classification2: • Description: Area of drag scars and disturbed sediment.

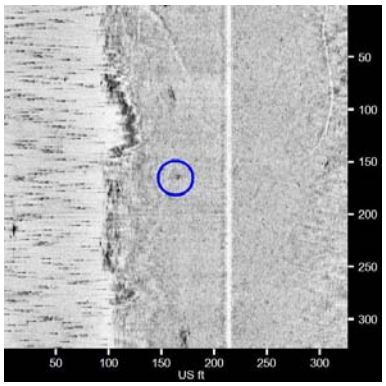
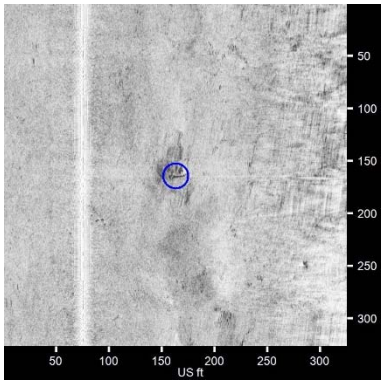
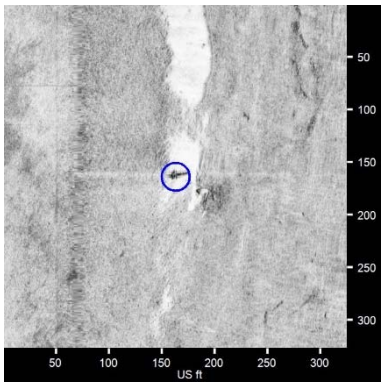
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0091** • Sonar Time at Target: 5/2/2017 1:56:16 PM • Click Position 41.2532994251 -72.9131435807 (WGS84) (X) 955140.00 (Y) 653061.21 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 84077 • Range to target: 15.57 US ft • Fish Height: 40.01 US ft • Heading: 14.000 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 124.34 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker
	**NHH0092** • Sonar Time at Target: 5/2/2017 12:49:10 PM • Click Position 41.2542063428 -72.9125399424 (WGS84) (X) 955306.60 (Y) 653391.34 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1236.HSX • Ping Number: 55374 • Range to target: 41.66 US ft • Fish Height: 16.64 US ft • Heading: 8.310 Degrees • Event Number: 80 • Line Name: 015_1236 • Water Depth: 41.99 US ft	**Dimensions and attributes** • Target Width: 1.99 US ft • Target Height: 0.24 US ft • Target Length: 3.31 US ft • Target Shadow: 0.66 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown rectangular target on edge of channel. Possible line. Likely derelict fishing gear.
	**NHH0093** • Sonar Time at Target: 5/1/2017 5:53:33 PM • Click Position 41.2544017958 -72.9151731728 (WGS84) (X) 954582.68 (Y) 653463.93 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 112826 • Range to target: 80.92 US ft • Fish Height: 26.75 US ft • Heading: 7.070 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 76.77 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Line of rectangular targets outside channel. Likely derelict fishing gear.

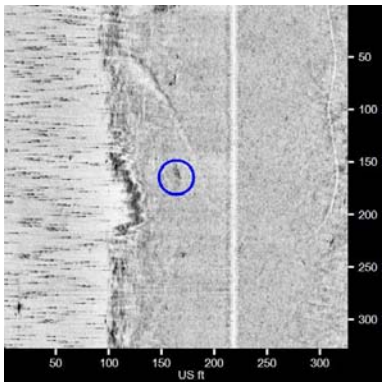
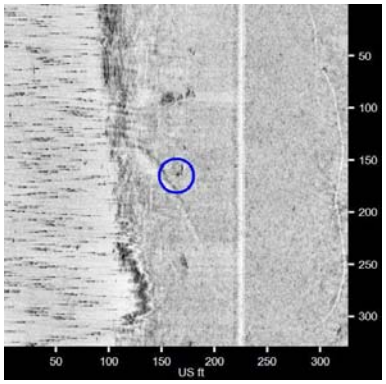
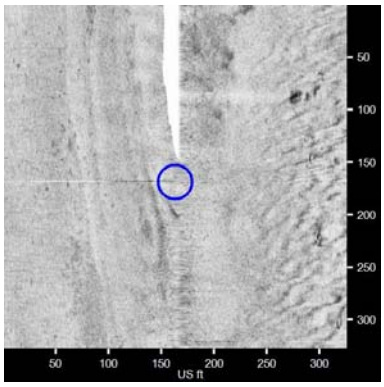
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0094** • Sonar Time at Target: 5/2/2017 12:22:07 PM • Click Position 41.2544102534 -72.9130364801 (WGS84) (X) 955170.21 (Y) 653465.90 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1209.HSX • Ping Number: 43807 • Range to target: 97.40 US ft • Fish Height: 19.64 US ft • Heading: 196.240 Degrees • Event Number: 78 • Line Name: 014_1209 • Water Depth: 46.59 US ft	**Dimensions and attributes** • Target Width: 5.96 US ft • Target Height: 0.00 US ft • Target Length: 5.35 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R12. Line visible.
	**NHH0095** • Sonar Time at Target: 5/1/2017 5:53:39 PM • Click Position 41.2545077397 -72.9151549128 (WGS84) (X) 954587.78 (Y) 653502.52 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 112864 • Range to target: 77.60 US ft • Fish Height: 26.56 US ft • Heading: 4.580 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 75.46 US ft	**Dimensions and attributes** • Target Width: 2.19 US ft • Target Height: 0.67 US ft • Target Length: 3.23 US ft • Target Shadow: 2.13 US ft • Classification1: Fishing gear • Classification2: • Description: Line of rectangular targets outside channel. Likely derelict fishing gear.
	**NHH0096** • Sonar Time at Target: 5/2/2017 1:57:02 PM • Click Position 41.2545666440 -72.9129651125 (WGS84) (X) 955189.94 (Y) 653522.84 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 84411 • Range to target: 7.73 US ft • Fish Height: 47.44 US ft • Heading: 358.110 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 132.87 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0097** • Sonar Time at Target: 5/2/2017 12:49:26 PM • Click Position 41.2546227951 -72.9124837080 (WGS84) (X) 955322.35 (Y) 653543.05 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1236.HSX • Ping Number: 55489 • Range to target: 50.41 US ft • Fish Height: 16.95 US ft • Heading: 2.290 Degrees • Event Number: 80 • Line Name: 015_1236 • Water Depth: 41.67 US ft	**Dimensions and attributes** • Target Width: 2.65 US ft • Target Height: 0.00 US ft • Target Length: 2.38 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Line of square targets outside channel. Likely derelict fishing gear.
	**NHH0098** • Sonar Time at Target: 5/2/2017 11:15:10 AM • Click Position 41.2546841252 -72.9144314702 (WGS84) (X) 954786.82 (Y) 653566.41 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 15166 • Range to target: 87.79 US ft • Fish Height: 41.15 US ft • Heading: 188.990 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.80 US ft	**Dimensions and attributes** • Target Width: 3.18 US ft • Target Height: 0.00 US ft • Target Length: 3.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Square target adjacent to GC13. Line visible. Likely derelict mooring.
	**NHH0099** • Sonar Time at Target: 5/1/2017 5:53:53 PM • Click Position 41.2547963946 -72.9145255990 (WGS84) (X) 954761.02 (Y) 653607.37 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 112968 • Range to target: 92.53 US ft • Fish Height: 26.04 US ft • Heading: 4.420 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 74.15 US ft	**Dimensions and attributes** • Target Width: 5.87 US ft • Target Height: 0.00 US ft • Target Length: 5.84 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G11. Line visible. Small targets and scour adjacent.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0100** • Sonar Time at Target: 5/2/2017 12:49:34 PM • Click Position 41.2548275864 -72.9124594760 (WGS84) (X) 955329.15 (Y) 653617.66 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1236.HSX • Ping Number: 55546 • Range to target: 55.22 US ft • Fish Height: 16.63 US ft • Heading: 7.690 Degrees • Event Number: 80 • Line Name: 015_1236 • Water Depth: 41.67 US ft	**Dimensions and attributes** • Target Width: 1.98 US ft • Target Height: 0.00 US ft • Target Length: 2.08 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Line of square targets outside channel. Likely derelict fishing gear.
	**NHH0101** • Sonar Time at Target: 5/2/2017 12:49:43 PM • Click Position 41.2550663727 -72.9124383059 (WGS84) (X) 955335.14 (Y) 653704.65 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1236.HSX • Ping Number: 55613 • Range to target: 61.88 US ft • Fish Height: 16.64 US ft • Heading: 8.500 Degrees • Event Number: 80 • Line Name: 015_1236 • Water Depth: 41.34 US ft	**Dimensions and attributes** • Target Width: 2.07 US ft • Target Height: 0.00 US ft • Target Length: 1.96 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Line of square targets outside channel. Possible derelict fishing gear.
	**NHH0102** • Sonar Time at Target: 5/2/2017 1:57:22 PM • Click Position 41.2550802345 -72.9129166134 (WGS84) (X) 955203.63 (Y) 653709.95 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 84551 • Range to target: 4.00 US ft • Fish Height: 37.60 US ft • Heading: 12.270 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 117.13 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Shellfish lease marker

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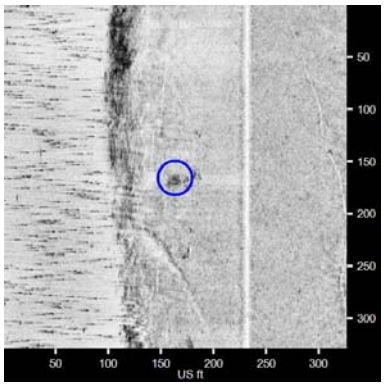
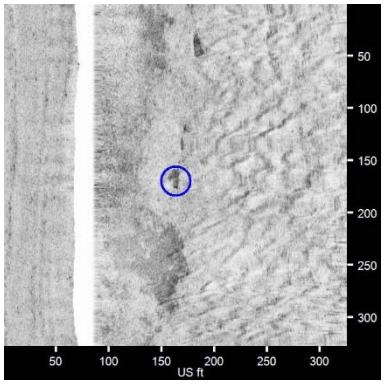
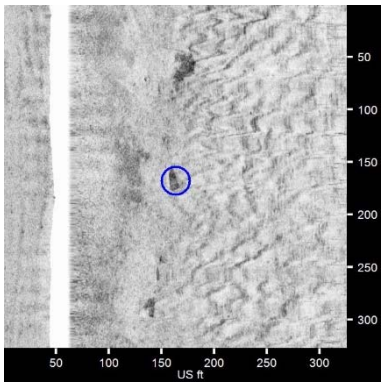
	**NHH0103** • Sonar Time at Target: 5/2/2017 12:49:52 PM • Click Position 41.2552753486 -72.9124258305 (WGS84) (X) 955338.71 (Y) 653780.79 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1236.HSX • Ping Number: 55672 • Range to target: 68.42 US ft • Fish Height: 16.96 US ft • Heading: 10.620 Degrees • Event Number: 80 • Line Name: 015_1236 • Water Depth: 41.01 US ft	**Dimensions and attributes** • Target Width: 6.64 US ft • Target Height: 2.42 US ft • Target Length: 3.50 US ft • Target Shadow: 11.72 US ft • Classification1: Disturbed sediment • Classification2: Rock • Description: Irregular target outside channel. Likely disturbed sediment or coarse material.
	**NHH0104** • Sonar Time at Target: 5/2/2017 1:58:06 PM • Click Position 41.2560782605 -72.9124642865 (WGS84) (X) 955328.69 (Y) 654073.36 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 84862 • Range to target: 77.20 US ft • Fish Height: 36.10 US ft • Heading: 352.760 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 114.17 US ft	**Dimensions and attributes** • Target Width: 8.61 US ft • Target Height: 0.00 US ft • Target Length: 15.55 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: One of three large irregular targets outside of channel. Possible boulders.
	**NHH0105** • Sonar Time at Target: 5/2/2017 1:58:22 PM • Click Position 41.2564166744 -72.9123430524 (WGS84) (X) 955362.25 (Y) 654196.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 84978 • Range to target: 100.12 US ft • Fish Height: 39.57 US ft • Heading: 357.870 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 118.77 US ft	**Dimensions and attributes** • Target Width: 8.76 US ft • Target Height: 0.00 US ft • Target Length: 14.78 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: One of three large irregular targets outside of channel. Possible boulder.

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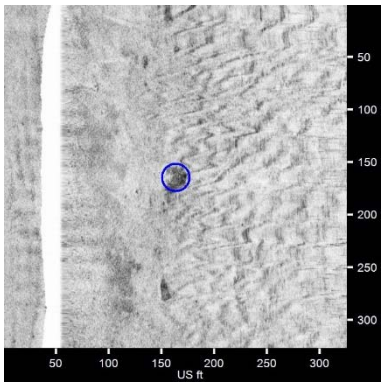
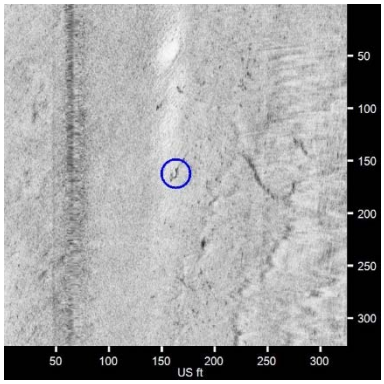
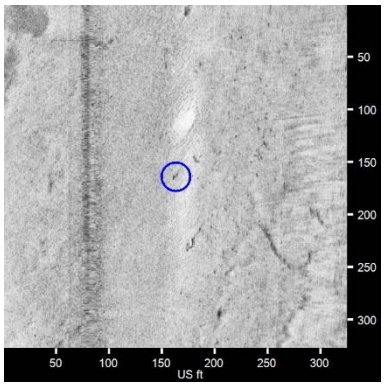
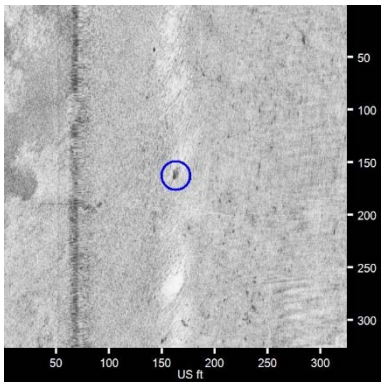
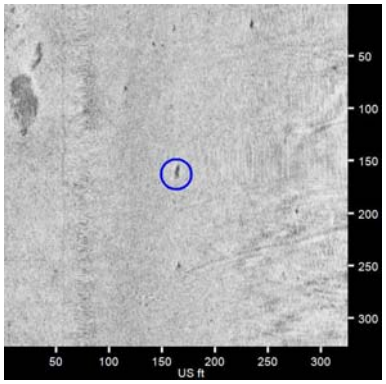
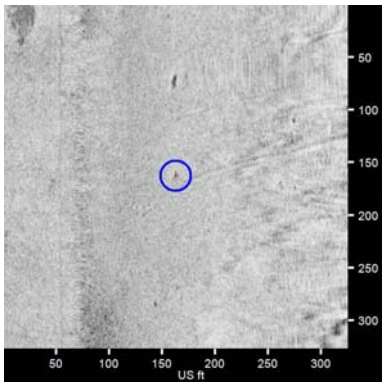
	**NHH0106** • Sonar Time at Target: 5/2/2017 1:58:37 PM • Click Position 41.2567074895 -72.9122810245 (WGS84) (X) 955379.51 (Y) 654302.53 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 85082 • Range to target: 108.26 US ft • Fish Height: 37.90 US ft • Heading: 5.780 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 119.75 US ft	**Dimensions and attributes** • Target Width: 13.19 US ft • Target Height: 0.00 US ft • Target Length: 13.00 US ft • Target Shadow: 0.00 US ft • Classification1: Rock • Classification2: • Description: One of three large irregular targets outside of channel. Possible boulders.
	**NHH0107** • Sonar Time at Target: 5/1/2017 5:55:53 PM • Click Position 41.2572766369 -72.9141699196 (WGS84) (X) 954860.53 (Y) 654510.89 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 113822 • Range to target: 96.90 US ft • Fish Height: 24.59 US ft • Heading: 4.900 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 70.87 US ft	**Dimensions and attributes** • Target Width: 5.36 US ft • Target Height: 0.00 US ft • Target Length: 5.41 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown square target on edge of channel. Possible line. Likely derelict fishing gear.
	**NHH0108** • Sonar Time at Target: 5/1/2017 5:56:01 PM • Click Position 41.2574484725 -72.9142210412 (WGS84) (X) 954846.60 (Y) 654573.53 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 113881 • Range to target: 81.60 US ft • Fish Height: 24.59 US ft • Heading: 7.110 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 68.24 US ft	**Dimensions and attributes** • Target Width: 4.85 US ft • Target Height: 0.00 US ft • Target Length: 4.47 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown square target on edge of channel. Possible line. Likely derelict fishing gear.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0109** • Sonar Time at Target: 5/1/2017 5:56:22 PM • Click Position 41.2578533611 -72.9141429123 (WGS84) (X) 954868.36 (Y) 654721.01 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 114025 • Range to target: 92.45 US ft • Fish Height: 23.87 US ft • Heading: 7.680 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 67.26 US ft	**Dimensions and attributes** • Target Width: 5.47 US ft • Target Height: 0.00 US ft • Target Length: 5.43 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown square target on edge of channel. Possible line. Likely derelict fishing gear.
	**NHH0110** • Sonar Time at Target: 5/1/2017 5:10:41 PM • Click Position 41.2595526467 -72.9149241580 (WGS84) (X) 954654.74 (Y) 655340.58 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 94484 • Range to target: 87.64 US ft • Fish Height: 21.99 US ft • Heading: 174.690 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 60.04 US ft	**Dimensions and attributes** • Target Width: 2.93 US ft • Target Height: 0.00 US ft • Target Length: 2.93 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0111** • Sonar Time at Target: 5/1/2017 5:10:30 PM • Click Position 41.2597908999 -72.9149010209 (WGS84) (X) 954661.26 (Y) 655427.38 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 94408 • Range to target: 90.36 US ft • Fish Height: 21.67 US ft • Heading: 178.330 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 59.06 US ft	**Dimensions and attributes** • Target Width: 2.37 US ft • Target Height: 0.00 US ft • Target Length: 2.30 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.

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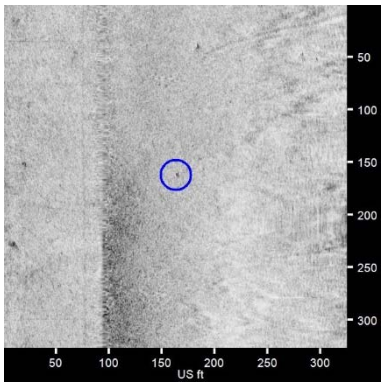
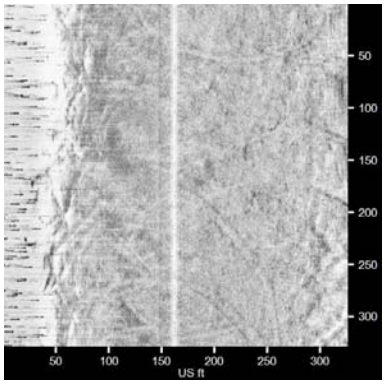
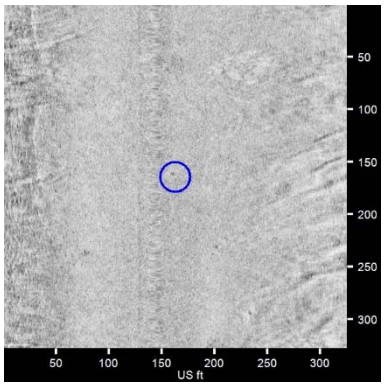
	**NHH0112** • Sonar Time at Target: 5/1/2017 5:10:15 PM • Click Position 41.2601122176 -72.9147854580 (WGS84) (X) 954693.26 (Y) 655544.39 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 94302 • Range to target: 69.05 US ft • Fish Height: 21.81 US ft • Heading: 182.640 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 59.38 US ft	**Dimensions and attributes** • Target Width: 2.29 US ft • Target Height: 0.34 US ft • Target Length: 2.36 US ft • Target Shadow: 1.15 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0113** • Sonar Time at Target: 5/2/2017 12:53:21 PM • Click Position 41.2606495392 -72.9115013081 (WGS84) (X) 955596.58 (Y) 655738.47 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1236.HSX • Ping Number: 57163 • Range to target: 1.47 US ft • Fish Height: 19.17 US ft • Heading: 356.670 Degrees • Event Number: 80 • Line Name: 015_1236 • Water Depth: 49.54 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 3414.30 US ft • Target Shadow: 0.00 US ft • Classification1: Drag scars • Classification2: • Description: Area with numerous drag scars. Fainter than those on west side of channel.
	**NHH0114** • Sonar Time at Target: 5/1/2017 5:08:43 PM • Click Position 41.2621507267 -72.9144064227 (WGS84) (X) 954798.89 (Y) 656286.95 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93644 • Range to target: 19.12 US ft • Fish Height: 20.72 US ft • Heading: 179.350 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 54.46 US ft	**Dimensions and attributes** • Target Width: 2.33 US ft • Target Height: 0.00 US ft • Target Length: 2.26 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Square target outside channel. Line visible. Likely derelict fishing gear.

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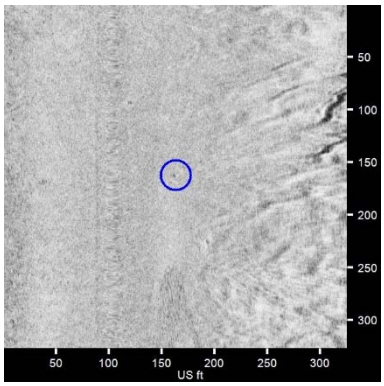
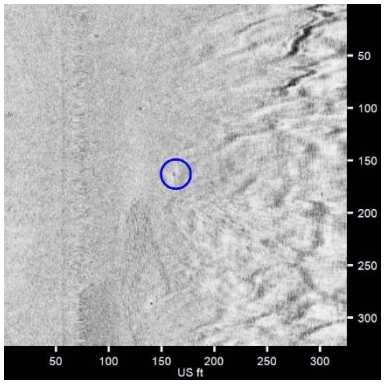
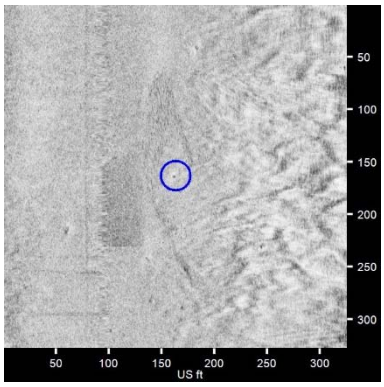
	**NHH0115** • Sonar Time at Target: 5/1/2017 5:08:35 PM • Click Position 41.2623404316 -72.9145357482 (WGS84) (X) 954763.46 (Y) 656356.14 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93585 • Range to target: 59.32 US ft • Fish Height: 20.62 US ft • Heading: 184.320 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 53.15 US ft	**Dimensions and attributes** • Target Width: 2.33 US ft • Target Height: 0.00 US ft • Target Length: 2.33 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Square target outside channel. Line visible. Likely derelict fishing gear.
	**NHH0116** • Sonar Time at Target: 5/1/2017 5:08:27 PM • Click Position 41.2625186427 -72.9146368826 (WGS84) (X) 954735.78 (Y) 656421.13 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93529 • Range to target: 91.30 US ft • Fish Height: 20.43 US ft • Heading: 179.570 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 52.82 US ft	**Dimensions and attributes** • Target Width: 2.39 US ft • Target Height: 0.00 US ft • Target Length: 2.39 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Square target outside channel. Line visible. Likely derelict fishing gear.
	**NHH0117** • Sonar Time at Target: 5/1/2017 5:08:11 PM • Click Position 41.2628501003 -72.9145289765 (WGS84) (X) 954765.68 (Y) 656541.84 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93420 • Range to target: 69.57 US ft • Fish Height: 20.07 US ft • Heading: 174.670 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 50.52 US ft	**Dimensions and attributes** • Target Width: 1.77 US ft • Target Height: 0.00 US ft • Target Length: 1.77 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Square target outside channel. Line visible. Likely derelict fishing gear.

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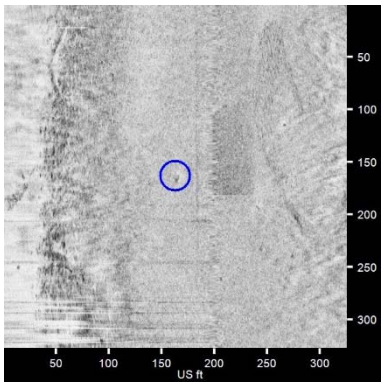
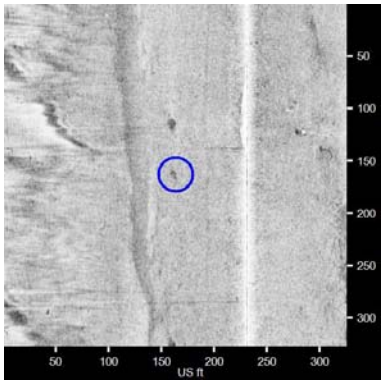
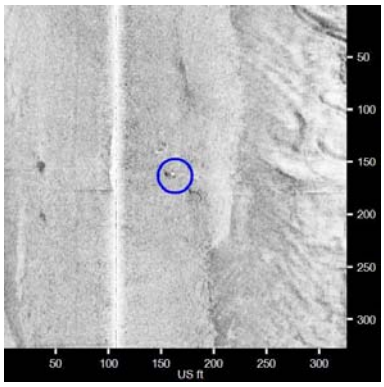
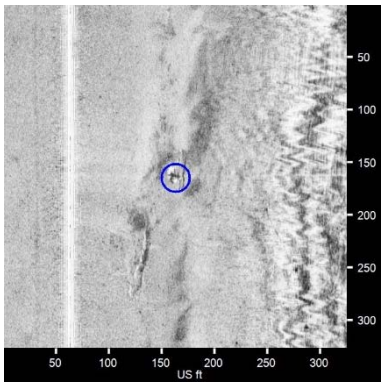
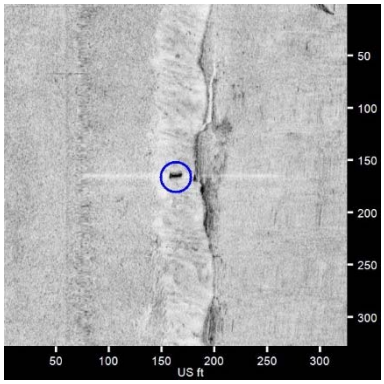
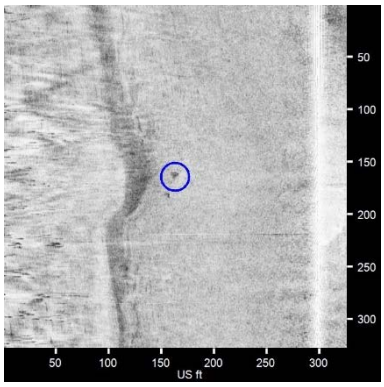
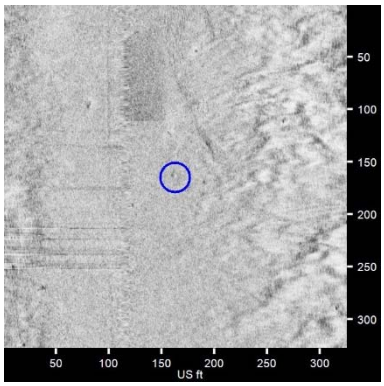
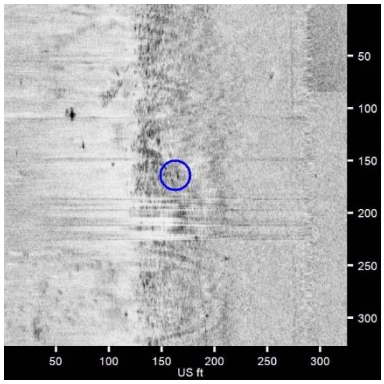
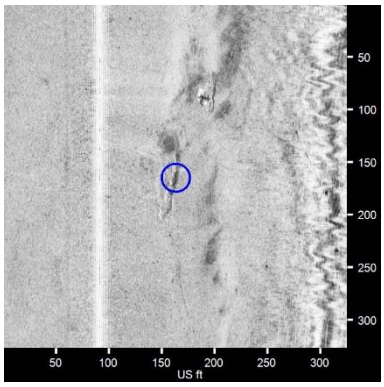
	**NHH0118** • Sonar Time at Target: 5/1/2017 5:08:05 PM • Click Position 41.2629647694 -72.9141367330 (WGS84) (X) 954873.60 (Y) 656583.42 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93376 • Range to target: 35.11 US ft • Fish Height: 19.92 US ft • Heading: 177.930 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 51.51 US ft	**Dimensions and attributes** • Target Width: 2.37 US ft • Target Height: 0.00 US ft • Target Length: 2.50 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Square target outside channel. Line visible. Likely derelict fishing gear.
	**NHH0119** • Sonar Time at Target: 5/2/2017 12:00:19 PM • Click Position 41.2630358101 -72.9124946567 (WGS84) (X) 955325.10 (Y) 656608.45 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 34477 • Range to target: 67.74 US ft • Fish Height: 40.29 US ft • Heading: 7.230 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 126.31 US ft	**Dimensions and attributes** • Target Width: 4.15 US ft • Target Height: 0.00 US ft • Target Length: 4.72 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Irregular target on edge of channel. Possible derelict mooring.
	**NHH0120** • Sonar Time at Target: 5/2/2017 12:00:23 PM • Click Position 41.2630917855 -72.9120274177 (WGS84) (X) 955453.60 (Y) 656628.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 34507 • Range to target: 56.39 US ft • Fish Height: 40.36 US ft • Heading: 6.190 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 124.02 US ft	**Dimensions and attributes** • Target Width: 5.24 US ft • Target Height: 1.81 US ft • Target Length: 5.19 US ft • Target Shadow: 3.25 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R14. Line visible.

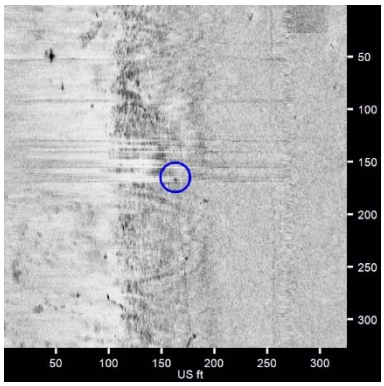
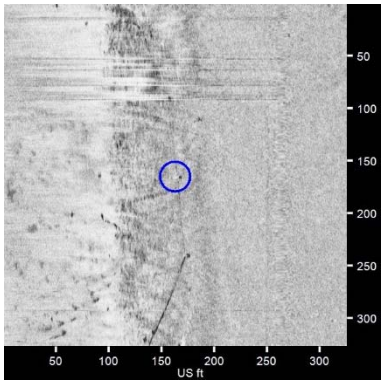
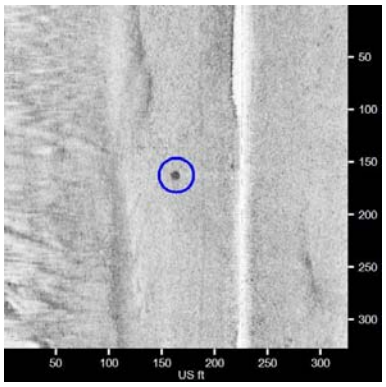
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0121** • Sonar Time at Target: 5/2/2017 11:08:02 AM • Click Position 41.2631065074 -72.9134046422 (WGS84) (X) 955074.97 (Y) 656634.68 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 12112 • Range to target: 99.97 US ft • Fish Height: 41.31 US ft • Heading: 177.510 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 119.42 US ft	**Dimensions and attributes** • Target Width: 4.82 US ft • Target Height: 0.80 US ft • Target Length: 4.78 US ft • Target Shadow: 2.13 US ft • Classification1: Mooring • Classification2: • Description: Unknown square target on edge of channel. Likely derelict mooring.
	**NHH0122** • Sonar Time at Target: 5/1/2017 6:01:06 PM • Click Position 41.2631704778 -72.9134795081 (WGS84) (X) 955054.43 (Y) 656658.03 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116050 • Range to target: 88.07 US ft • Fish Height: 20.18 US ft • Heading: 7.770 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 54.13 US ft	**Dimensions and attributes** • Target Width: 6.87 US ft • Target Height: 0.00 US ft • Target Length: 5.72 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G13
	**NHH0123** • Sonar Time at Target: 5/2/2017 2:03:43 PM • Click Position 41.2631715607 -72.9124779312 (WGS84) (X) 955329.79 (Y) 656657.90 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 87267 • Range to target: 135.18 US ft • Fish Height: 48.28 US ft • Heading: 5.960 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 136.81 US ft	**Dimensions and attributes** • Target Width: 5.96 US ft • Target Height: 0.00 US ft • Target Length: 5.35 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Irregular target on edge of channel. Possible derelict mooring.

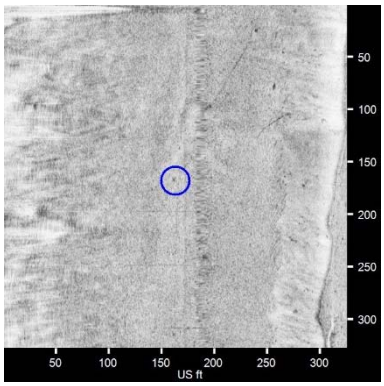
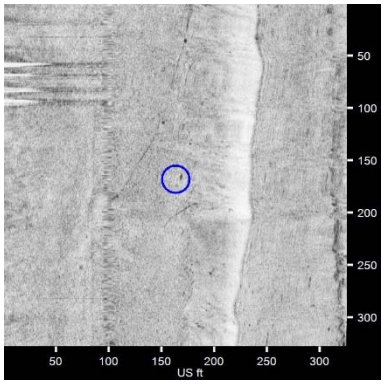
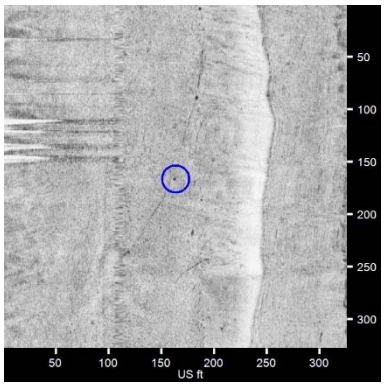
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0124** • Sonar Time at Target: 5/1/2017 5:07:56 PM • Click Position 41.2631776038 -72.9144210264 (WGS84) (X) 954795.58 (Y) 656661.12 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93312 • Range to target: 48.68 US ft • Fish Height: 19.77 US ft • Heading: 179.310 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 49.54 US ft	**Dimensions and attributes** • Target Width: 2.02 US ft • Target Height: 0.61 US ft • Target Length: 2.02 US ft • Target Shadow: 1.68 US ft • Classification1: Fishing gear • Classification2: • Description: Square target outside channel. Line visible. Likely derelict fishing gear.
	**NHH0125** • Sonar Time at Target: 5/1/2017 5:07:53 PM • Click Position 41.2632082648 -72.9137851342 (WGS84) (X) 954970.43 (Y) 656671.96 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93289 • Range to target: 124.63 US ft • Fish Height: 20.09 US ft • Heading: 178.690 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 50.20 US ft	**Dimensions and attributes** • Target Width: 2.32 US ft • Target Height: 0.00 US ft • Target Length: 2.31 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0126** • Sonar Time at Target: 5/2/2017 11:07:52 AM • Click Position 41.2633009709 -72.9132790997 (WGS84) (X) 955109.62 (Y) 656705.47 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 12043 • Range to target: 71.77 US ft • Fish Height: 41.31 US ft • Heading: 183.480 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 119.09 US ft	**Dimensions and attributes** • Target Width: 2.21 US ft • Target Height: 0.53 US ft • Target Length: 59.61 US ft • Target Shadow: 1.07 US ft • Classification1: Unknown • Classification2: Debris • Description: Linear target in channel. Likely debris.

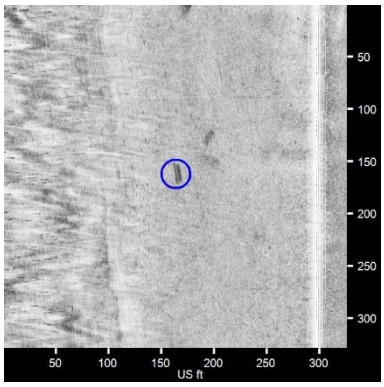
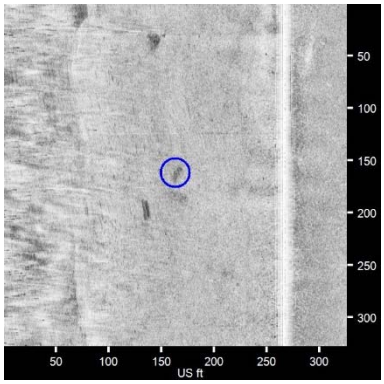
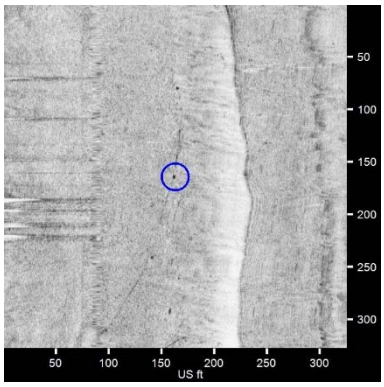
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0127** • Sonar Time at Target: 5/1/2017 5:07:46 PM • Click Position 41.2633657067 -72.9138378763 (WGS84) (X) 954956.04 (Y) 656729.35 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93238 • Range to target: 105.05 US ft • Fish Height: 20.41 US ft • Heading: 184.160 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 50.52 US ft	**Dimensions and attributes** • Target Width: 2.32 US ft • Target Height: 0.00 US ft • Target Length: 2.25 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0128** • Sonar Time at Target: 5/1/2017 5:07:36 PM • Click Position 41.2635715402 -72.9138295658 (WGS84) (X) 954958.46 (Y) 656804.34 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 93170 • Range to target: 99.56 US ft • Fish Height: 21.68 US ft • Heading: 182.250 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 49.54 US ft	**Dimensions and attributes** • Target Width: 2.28 US ft • Target Height: 0.70 US ft • Target Length: 2.27 US ft • Target Shadow: 3.42 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0129** • Sonar Time at Target: 5/2/2017 12:00:43 PM • Click Position 41.2636366800 -72.9123742903 (WGS84) (X) 955358.61 (Y) 656827.32 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 34650 • Range to target: 62.53 US ft • Fish Height: 37.78 US ft • Heading: 5.070 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 121.39 US ft	**Dimensions and attributes** • Target Width: 6.24 US ft • Target Height: 0.00 US ft • Target Length: 6.20 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Mooring • Description: Large square target on edge of channel. Possible derelict mooring.

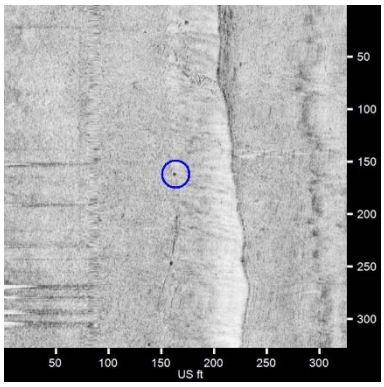
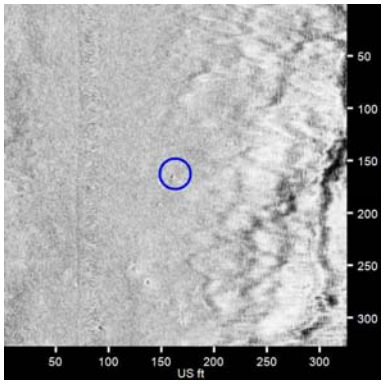
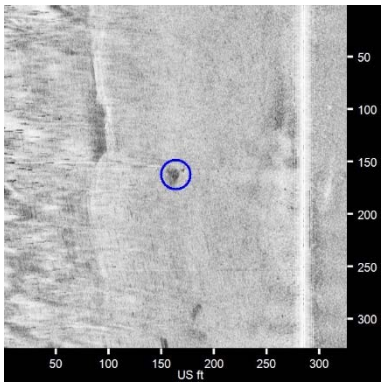
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0130** • Sonar Time at Target: 5/1/2017 6:01:36 PM • Click Position 41.2638592174 -72.9138461440 (WGS84) (X) 954954.11 (Y) 656909.17 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116268 • Range to target: 23.68 US ft • Fish Height: 19.63 US ft • Heading: 2.890 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 52.82 US ft	**Dimensions and attributes** • Target Width: 2.14 US ft • Target Height: 0.00 US ft • Target Length: 2.20 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0131** • Sonar Time at Target: 5/1/2017 6:01:48 PM • Click Position 41.2640803968 -72.9135108466 (WGS84) (X) 955046.44 (Y) 656989.59 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116350 • Range to target: 64.36 US ft • Fish Height: 19.63 US ft • Heading: 4.990 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 51.51 US ft	**Dimensions and attributes** • Target Width: 2.21 US ft • Target Height: 0.00 US ft • Target Length: 4.20 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown rectangular target adjacent to derelict fishing gear. Possible derelict fishing gear or rock.
	**NHH0132** • Sonar Time at Target: 5/1/2017 6:01:55 PM • Click Position 41.2642236336 -72.9135334153 (WGS84) (X) 955040.33 (Y) 657041.79 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116402 • Range to target: 53.55 US ft • Fish Height: 19.63 US ft • Heading: 10.620 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 51.51 US ft	**Dimensions and attributes** • Target Width: 2.13 US ft • Target Height: 0.00 US ft • Target Length: 2.06 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0133** • Sonar Time at Target: 5/2/2017 2:04:38 PM • Click Position 41.2642668885 -72.9122080765 (WGS84) (X) 955404.73 (Y) 657056.86 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 87661 • Range to target: 133.79 US ft • Fish Height: 42.38 US ft • Heading: 359.960 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 123.36 US ft	**Dimensions and attributes** • Target Width: 5.49 US ft • Target Height: 0.00 US ft • Target Length: 14.74 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Large irregular area of high backscatter. No shaddow. Likely disturbed sediment or area of coarse material.
	**NHH0134** • Sonar Time at Target: 5/2/2017 2:04:43 PM • Click Position 41.2643582994 -72.9120930311 (WGS84) (X) 955436.43 (Y) 657090.11 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 87694 • Range to target: 103.70 US ft • Fish Height: 42.70 US ft • Heading: 3.030 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 120.08 US ft	**Dimensions and attributes** • Target Width: 3.87 US ft • Target Height: 0.00 US ft • Target Length: 8.75 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Large irregular area of high backscatter. No shaddow. Likely disturbed sediment or area of coarse material.
	**NHH0135** • Sonar Time at Target: 5/1/2017 6:02:05 PM • Click Position 41.2644176529 -72.9134225352 (WGS84) (X) 955070.95 (Y) 657112.42 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116477 • Range to target: 75.01 US ft • Fish Height: 19.63 US ft • Heading: 7.820 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 49.21 US ft	**Dimensions and attributes** • Target Width: 2.11 US ft • Target Height: 0.00 US ft • Target Length: 2.05 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0136** • Sonar Time at Target: 5/1/2017 6:02:17 PM • Click Position 41.2646388309 -72.9133678532 (WGS84) (X) 955086.14 (Y) 657192.98 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116559 • Range to target: 77.66 US ft • Fish Height: 19.63 US ft • Heading: 11.000 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 51.18 US ft	**Dimensions and attributes** • Target Width: 2.13 US ft • Target Height: 0.00 US ft • Target Length: 2.13 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Line visible. Likely derelict fishing gear.
	**NHH0137** • Sonar Time at Target: 5/1/2017 5:06:49 PM • Click Position 41.2646989690 -72.9142884510 (WGS84) (X) 954833.09 (Y) 657215.38 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 92830 • Range to target: 79.10 US ft • Fish Height: 19.15 US ft • Heading: 182.230 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 47.57 US ft	**Dimensions and attributes** • Target Width: 1.31 US ft • Target Height: 0.27 US ft • Target Length: 3.42 US ft • Target Shadow: 1.17 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of rectangular targets outside channel. Possible line. Likely derelict fishing gear.
	**NHH0138** • Sonar Time at Target: 5/2/2017 2:04:59 PM • Click Position 41.2647170822 -72.9121389902 (WGS84) (X) 955424.04 (Y) 657220.86 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 87810 • Range to target: 121.71 US ft • Fish Height: 40.16 US ft • Heading: 352.880 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 121.39 US ft	**Dimensions and attributes** • Target Width: 9.07 US ft • Target Height: 0.00 US ft • Target Length: 14.70 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Large irregular area of high backscatter. No shaddow. Likely disturbed sediment or area of coarse material.

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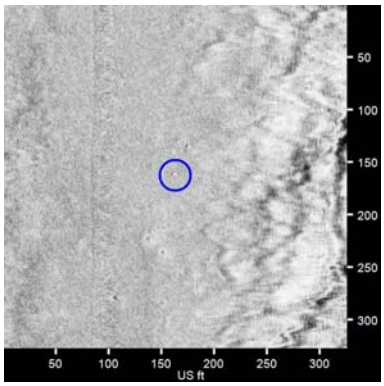
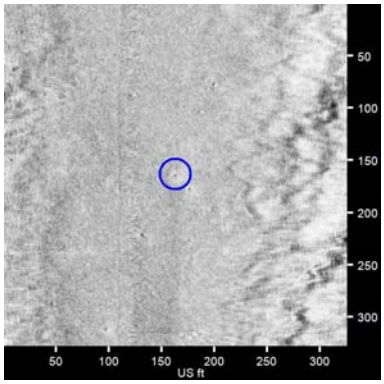
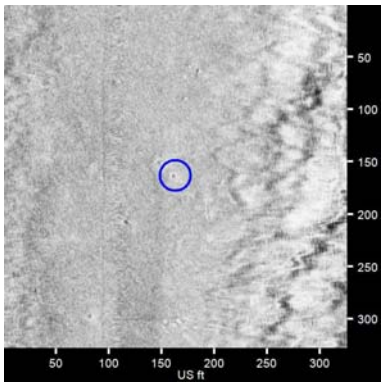
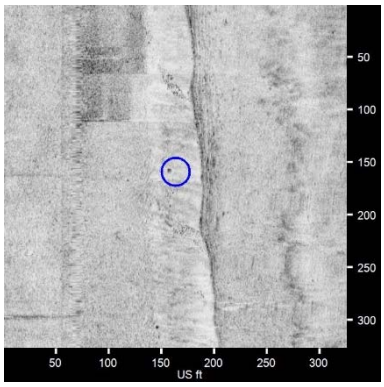
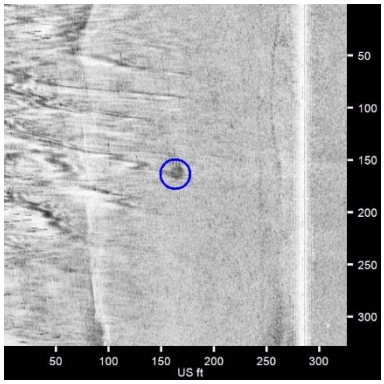
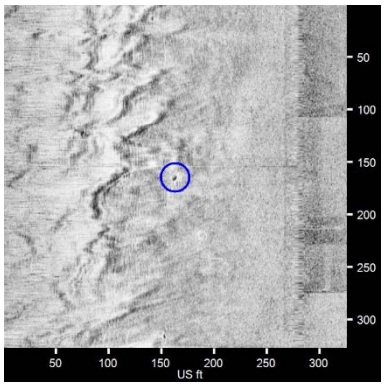
	**NHH0139** • Sonar Time at Target: 5/1/2017 5:06:45 PM • Click Position 41.2647762020 -72.9142283826 (WGS84) (X) 954849.65 (Y) 657243.49 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 92804 • Range to target: 65.26 US ft • Fish Height: 18.84 US ft • Heading: 182.170 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 47.24 US ft	**Dimensions and attributes** • Target Width: 1.76 US ft • Target Height: 0.93 US ft • Target Length: 2.93 US ft • Target Shadow: 3.52 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of rectangular targets outside channel. Possible line. Likely derelict fishing gear.
	**NHH0140** • Sonar Time at Target: 5/1/2017 5:06:38 PM • Click Position 41.2649281416 -72.9141195031 (WGS84) (X) 954879.69 (Y) 657298.79 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 92754 • Range to target: 39.70 US ft • Fish Height: 19.47 US ft • Heading: 180.460 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 46.92 US ft	**Dimensions and attributes** • Target Width: 1.75 US ft • Target Height: 0.74 US ft • Target Length: 2.92 US ft • Target Shadow: 1.75 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of rectangular targets outside channel. Possible line. Likely derelict fishing gear.
	**NHH0141** • Sonar Time at Target: 5/1/2017 5:06:36 PM • Click Position 41.2649689770 -72.9141714972 (WGS84) (X) 954865.43 (Y) 657313.70 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 92742 • Range to target: 54.97 US ft • Fish Height: 19.47 US ft • Heading: 179.160 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 46.92 US ft	**Dimensions and attributes** • Target Width: 2.41 US ft • Target Height: 0.00 US ft • Target Length: 4.09 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of rectangular targets outside channel. Possible line. Likely derelict fishing gear.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0142** • Sonar Time at Target: 5/1/2017 6:02:36 PM • Click Position 41.2650289504 -72.9132260989 (WGS84) (X) 955125.38 (Y) 657335.06 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116698 • Range to target: 94.10 US ft • Fish Height: 19.63 US ft • Heading: 8.390 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 51.84 US ft	**Dimensions and attributes** • Target Width: 2.12 US ft • Target Height: 0.22 US ft • Target Length: 2.20 US ft • Target Shadow: 1.07 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets outside channel. Possible line. Likely derelict fishing gear.
	**NHH0143** • Sonar Time at Target: 5/2/2017 2:05:25 PM • Click Position 41.2653109269 -72.9120554479 (WGS84) (X) 955447.41 (Y) 657437.19 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 87996 • Range to target: 120.25 US ft • Fish Height: 40.48 US ft • Heading: 6.510 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 121.39 US ft	**Dimensions and attributes** • Target Width: 9.04 US ft • Target Height: 0.00 US ft • Target Length: 7.90 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Large irregular target in channel.
	**NHH0144** • Sonar Time at Target: 5/1/2017 6:02:57 PM • Click Position 41.2655301908 -72.9139183355 (WGS84) (X) 954935.41 (Y) 657518.05 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 116845 • Range to target: 116.87 US ft • Fish Height: 19.87 US ft • Heading: 7.110 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 51.51 US ft	**Dimensions and attributes** • Target Width: 1.95 US ft • Target Height: 0.00 US ft • Target Length: 3.63 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Likely derelict fishing gear.

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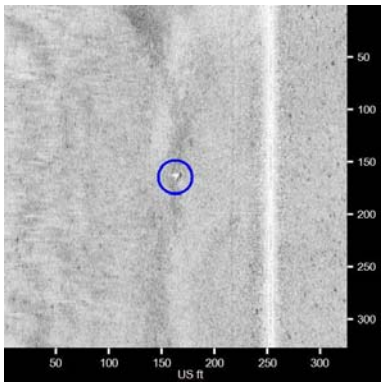
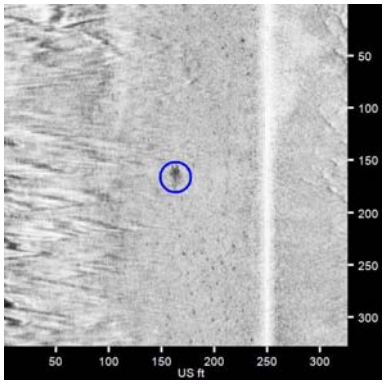
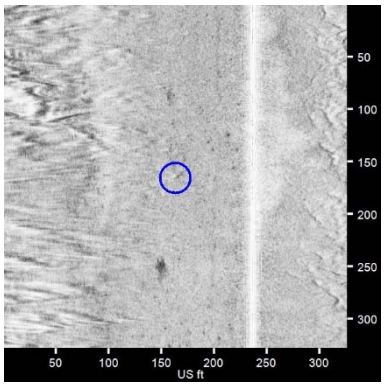
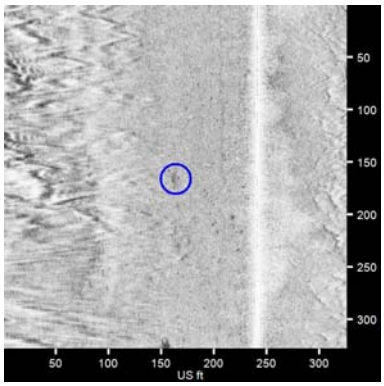
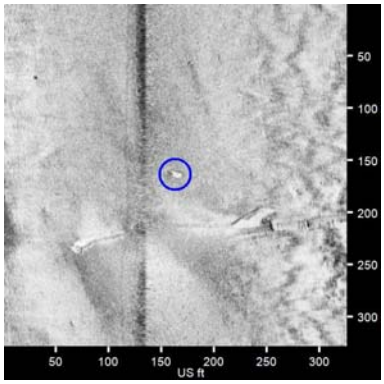
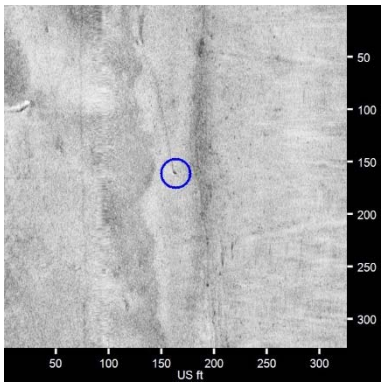
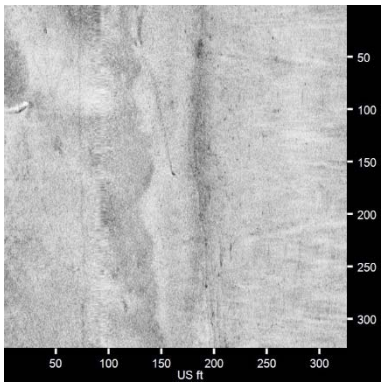
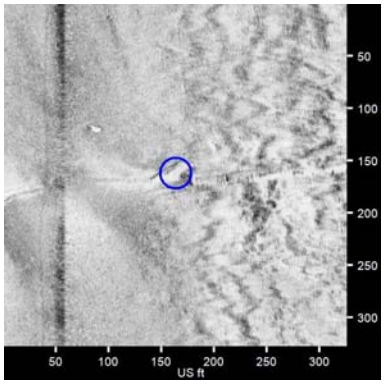
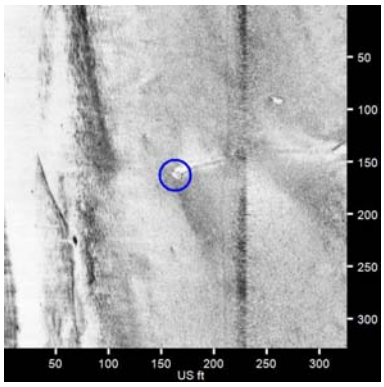
	**NHH0145** • Sonar Time at Target: 5/2/2017 12:03:13 PM • Click Position 41.2674632825 -72.9120901193 (WGS84) (X) 955439.35 (Y) 658221.45 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1141.HSX • Ping Number: 35718 • Range to target: 89.80 US ft • Fish Height: 37.72 US ft • Heading: 5.730 Degrees • Event Number: 76 • Line Name: 012_1141 • Water Depth: 119.75 US ft	**Dimensions and attributes** • Target Width: 2.87 US ft • Target Height: 2.55 US ft • Target Length: 6.31 US ft • Target Shadow: 7.06 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.
	**NHH0146** • Sonar Time at Target: 5/2/2017 2:07:53 PM • Click Position 41.2685920270 -72.9115175357 (WGS84) (X) 955597.53 (Y) 658632.43 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 89048 • Range to target: 86.63 US ft • Fish Height: 40.15 US ft • Heading: 354.210 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 114.83 US ft	**Dimensions and attributes** • Target Width: 8.09 US ft • Target Height: 0.00 US ft • Target Length: 7.44 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Unknown target on edge of channel. Flush with bottom. Possible disturbed sediment or area of coarse material.
	**NHH0147** • Sonar Time at Target: 5/2/2017 2:08:04 PM • Click Position 41.2688259897 -72.9114405087 (WGS84) (X) 955618.86 (Y) 658717.64 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 89125 • Range to target: 73.19 US ft • Fish Height: 43.67 US ft • Heading: 358.820 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 122.70 US ft	**Dimensions and attributes** • Target Width: 2.30 US ft • Target Height: 1.70 US ft • Target Length: 1.72 US ft • Target Shadow: 3.45 US ft • Classification1: Unknown • Classification2: • Description: Unknown target on edge of channel. Possible derelict fishing gear or debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0148** • Sonar Time at Target: 5/2/2017 2:08:13 PM • Click Position 41.2690351087 -72.9114381093 (WGS84) (X) 955619.66 (Y) 658793.83 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\013_1346.HSX • Ping Number: 89193 • Range to target: 77.64 US ft • Fish Height: 44.95 US ft • Heading: 5.670 Degrees • Event Number: 93 • Line Name: 013_1346 • Water Depth: 123.36 US ft	**Dimensions and attributes** • Target Width: 2.84 US ft • Target Height: 0.00 US ft • Target Length: 2.84 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Unknown target on edget of channel. Flush with bottom. Possible derelict fishing gear or debris.
	**NHH0149** • Sonar Time at Target: 5/1/2017 5:03:27 PM • Click Position 41.2692853934 -72.9135544057 (WGS84) (X) 955038.05 (Y) 658886.12 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 91395 • Range to target: 28.20 US ft • Fish Height: 24.88 US ft • Heading: 186.670 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 57.74 US ft	**Dimensions and attributes** • Target Width: 2.43 US ft • Target Height: 3.08 US ft • Target Length: 2.63 US ft • Target Shadow: 5.30 US ft • Classification1: Pipeline debris • Classification2: • Description: Target adjacent to nav obstruction outside channel. Likely derelict mooring or debris.
	**NHH0150** • Sonar Time at Target: 5/1/2017 6:05:59 PM • Click Position 41.2692915052 -72.9127143725 (WGS84) (X) 955268.99 (Y) 658887.91 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118141 • Range to target: 69.79 US ft • Fish Height: 27.41 US ft • Heading: 11.080 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 81.69 US ft	**Dimensions and attributes** • Target Width: 2.80 US ft • Target Height: 0.00 US ft • Target Length: 2.26 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of traps with line between. No surface buoy.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0151** • Sonar Time at Target: 5/1/2017 6:05:59 PM • Click Position 41.2692941173 -72.9127089566 (WGS84) (X) 955270.48 (Y) 658888.86 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118142 • Range to target: 71.13 US ft • Fish Height: 27.42 US ft • Heading: 10.740 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 79.72 US ft	**Dimensions and attributes** • Target Width: 2.75 US ft • Target Height: 0.00 US ft • Target Length: 1.74 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of traps. No surface buoy.
	**NHH0152** • Sonar Time at Target: 5/1/2017 5:03:22 PM • Click Position 41.2694319791 -72.9138080860 (WGS84) (X) 954968.42 (Y) 658939.66 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 91359 • Range to target: 105.09 US ft • Fish Height: 25.52 US ft • Heading: 187.950 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 67.59 US ft	**Dimensions and attributes** • Target Width: 1.86 US ft • Target Height: 0.00 US ft • Target Length: 30.71 US ft • Target Shadow: 0.00 US ft • Classification1: Pipeline debris • Classification2: • Description: Linear target extending west of channel. Aappears to be sections of a large pipeline. Vicinity of nav chart obstruction. Investigated with ROV.
	**NHH0153** • Sonar Time at Target: 5/1/2017 5:03:19 PM • Click Position 41.2694420143 -72.9131724286 (WGS84) (X) 955143.17 (Y) 658942.99 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 91334 • Range to target: 67.20 US ft • Fish Height: 25.20 US ft • Heading: 187.130 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 65.94 US ft	**Dimensions and attributes** • Target Width: 4.84 US ft • Target Height: 0.00 US ft • Target Length: 5.31 US ft • Target Shadow: 0.00 US ft • Classification1: Pipeline • Classification2: • Description: Head of exposed pipeline extending west of channel. Investigated with ROV.

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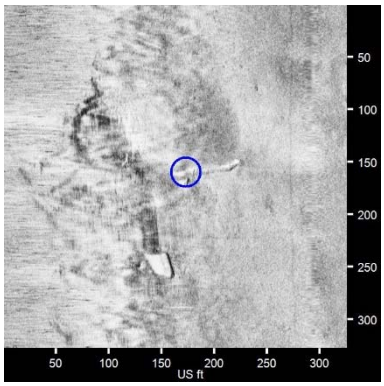
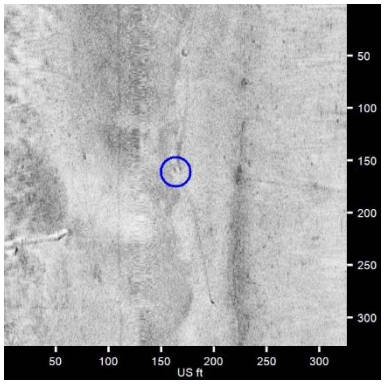
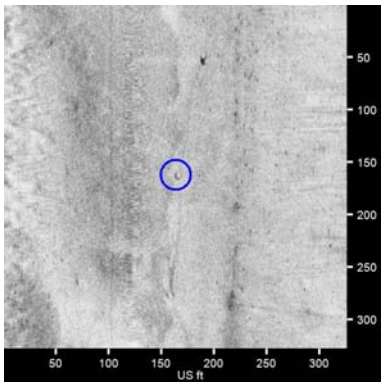
	**NHH0154** • Sonar Time at Target: 5/1/2017 6:06:06 PM • Click Position 41.2694834296 -72.9133772792 (WGS84) (X) 955086.88 (Y) 658958.18 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118185 • Range to target: 119.57 US ft • Fish Height: 27.73 US ft • Heading: 3.020 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 81.69 US ft	**Dimensions and attributes** • Target Width: 1.67 US ft • Target Height: 0.00 US ft • Target Length: 3.50 US ft • Target Shadow: 0.00 US ft • Classification1: Pipeline debris • Classification2: • Description: Irregular target associated with nav obstruction to west. Likely debris.
	**NHH0155** • Sonar Time at Target: 5/1/2017 6:06:15 PM • Click Position 41.2696506300 -72.9127985631 (WGS84) (X) 955246.09 (Y) 659018.81 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118253 • Range to target: 33.96 US ft • Fish Height: 28.16 US ft • Heading: 1.300 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 83.99 US ft	**Dimensions and attributes** • Target Width: 2.24 US ft • Target Height: 0.00 US ft • Target Length: 3.36 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of traps with line between. No surface buoy.
	**NHH0156** • Sonar Time at Target: 5/1/2017 6:06:29 PM • Click Position 41.2699707574 -72.9127505796 (WGS84) (X) 955259.50 (Y) 659135.42 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118356 • Range to target: 41.01 US ft • Fish Height: 28.46 US ft • Heading: 2.650 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 81.69 US ft	**Dimensions and attributes** • Target Width: 2.27 US ft • Target Height: 0.00 US ft • Target Length: 3.59 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of traps with line between. No surface buoy.

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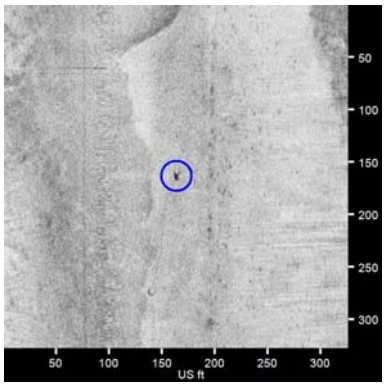
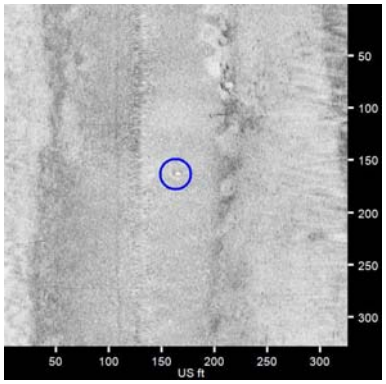
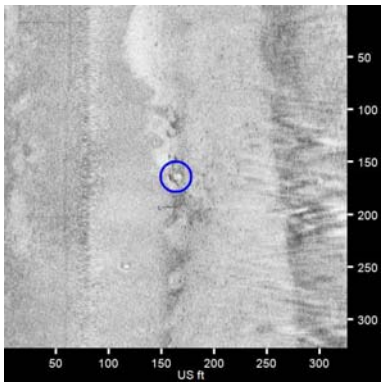
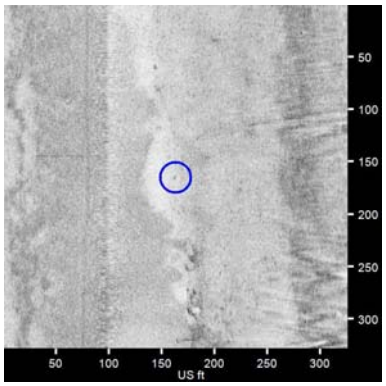
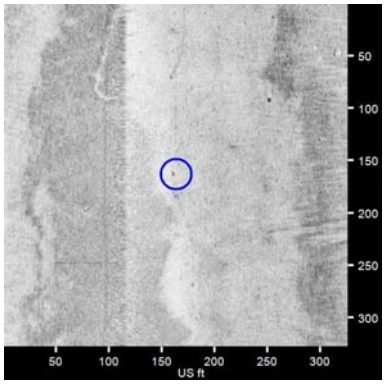
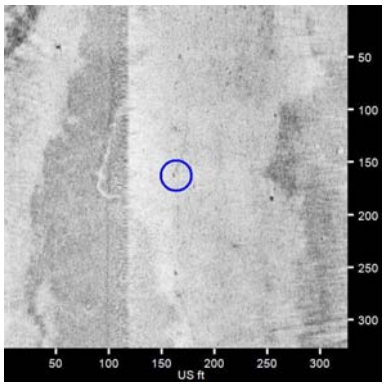
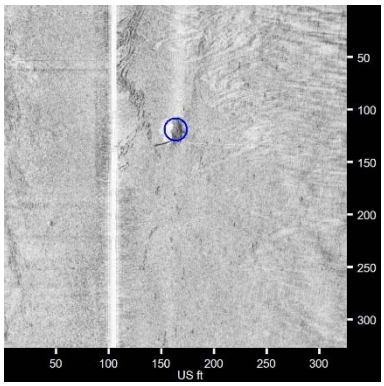
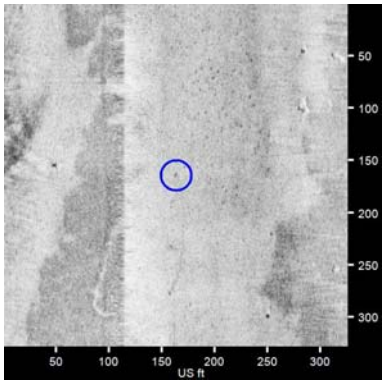
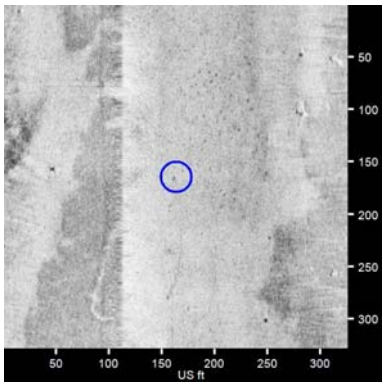
	**NHH0157** • Sonar Time at Target: 5/1/2017 6:06:42 PM • Click Position 41.2702637061 -72.9126357920 (WGS84) (X) 955291.26 (Y) 659242.10 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118452 • Range to target: 66.64 US ft • Fish Height: 27.82 US ft • Heading: 5.460 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 81.36 US ft	**Dimensions and attributes** • Target Width: 3.43 US ft • Target Height: 0.00 US ft • Target Length: 2.29 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of traps with line between. No surface buoy.
	**NHH0158** • Sonar Time at Target: 5/1/2017 6:07:39 PM • Click Position 41.2715449030 -72.9125792580 (WGS84) (X) 955307.68 (Y) 659708.90 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118858 • Range to target: 33.28 US ft • Fish Height: 31.95 US ft • Heading: 3.420 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 89.24 US ft	**Dimensions and attributes** • Target Width: 2.90 US ft • Target Height: 0.00 US ft • Target Length: 2.90 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Unknown target adjacent to channel. Possible derelict mooring.
	**NHH0159** • Sonar Time at Target: 5/1/2017 6:07:50 PM • Click Position 41.2717737076 -72.9123793709 (WGS84) (X) 955362.78 (Y) 659792.16 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 118932 • Range to target: 81.92 US ft • Fish Height: 29.73 US ft • Heading: 1.280 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 85.96 US ft	**Dimensions and attributes** • Target Width: 4.81 US ft • Target Height: 1.86 US ft • Target Length: 5.36 US ft • Target Shadow: 5.83 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G15. Line visible in other files.

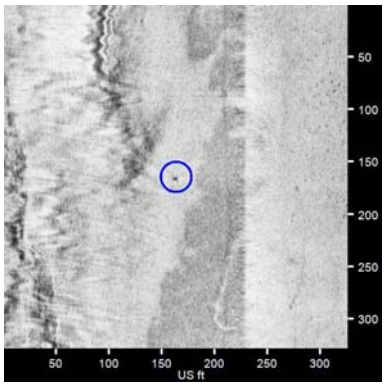
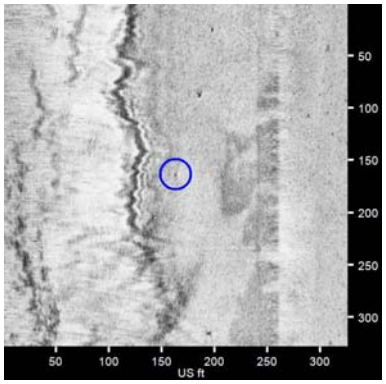
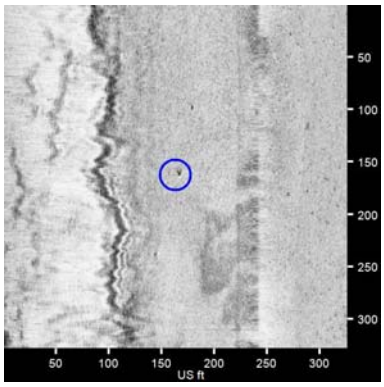
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0160** • Sonar Time at Target: 5/1/2017 6:08:05 PM • Click Position 41.2721296362 -72.9124188792 (WGS84) (X) 955352.16 (Y) 659921.87 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119041 • Range to target: 64.66 US ft • Fish Height: 32.59 US ft • Heading: 2.580 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 95.14 US ft	**Dimensions and attributes** • Target Width: 2.46 US ft • Target Height: 0.00 US ft • Target Length: 2.46 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0161** • Sonar Time at Target: 5/1/2017 6:08:18 PM • Click Position 41.2724212846 -72.9124728509 (WGS84) (X) 955337.53 (Y) 660028.16 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119131 • Range to target: 47.59 US ft • Fish Height: 32.58 US ft • Heading: 2.580 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 97.44 US ft	**Dimensions and attributes** • Target Width: 2.39 US ft • Target Height: 0.00 US ft • Target Length: 2.32 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0162** • Sonar Time at Target: 5/1/2017 6:08:29 PM • Click Position 41.2726787697 -72.9124829742 (WGS84) (X) 955334.92 (Y) 660121.99 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119211 • Range to target: 45.32 US ft • Fish Height: 34.63 US ft • Heading: 358.110 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 104.33 US ft	**Dimensions and attributes** • Target Width: 2.32 US ft • Target Height: 1.03 US ft • Target Length: 2.32 US ft • Target Shadow: 1.74 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.

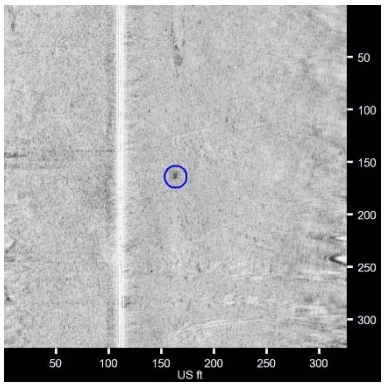
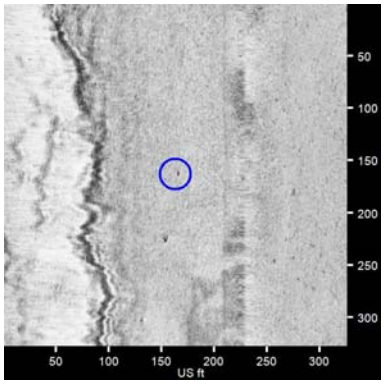
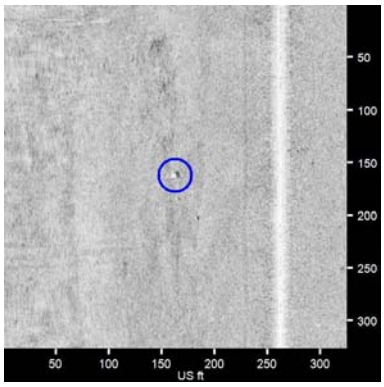
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0163** • Sonar Time at Target: 5/2/2017 3:01:12 PM • Click Position 41.2727712689 -72.9106755616 (WGS84) (X) 955831.82 (Y) 660154.76 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1440.HSX • Ping Number: 111855 • Range to target: 59.17 US ft • Fish Height: 27.77 US ft • Heading: 179.840 Degrees • Event Number: 97 • Line Name: 014_1440 • Water Depth: 80.38 US ft	**Dimensions and attributes** • Target Width: 9.30 US ft • Target Height: 0.00 US ft • Target Length: 10.52 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R16. Line visible.
	**NHH0164** • Sonar Time at Target: 5/1/2017 6:08:43 PM • Click Position 41.2729945526 -72.9124840305 (WGS84) (X) 955334.85 (Y) 660237.05 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119309 • Range to target: 49.16 US ft • Fish Height: 34.81 US ft • Heading: 355.560 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 102.36 US ft	**Dimensions and attributes** • Target Width: 2.46 US ft • Target Height: 0.00 US ft • Target Length: 2.46 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0165** • Sonar Time at Target: 5/1/2017 6:08:43 PM • Click Position 41.2730012592 -72.9124780333 (WGS84) (X) 955336.50 (Y) 660239.49 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119311 • Range to target: 50.94 US ft • Fish Height: 34.49 US ft • Heading: 355.660 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 103.35 US ft	**Dimensions and attributes** • Target Width: 1.83 US ft • Target Height: 0.64 US ft • Target Length: 1.83 US ft • Target Shadow: 1.16 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.

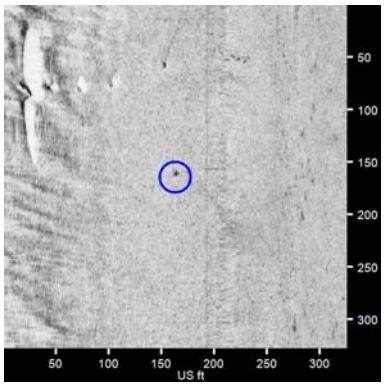
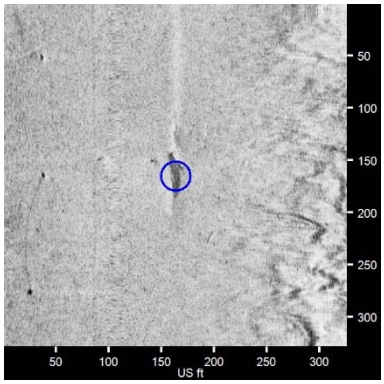
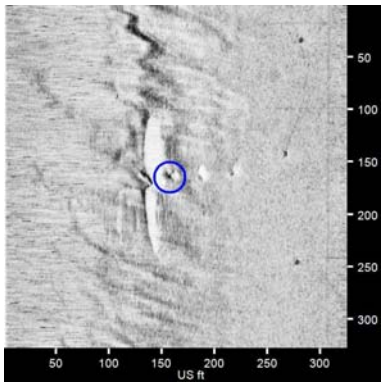
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0166** • Sonar Time at Target: 5/1/2017 6:08:44 PM • Click Position 41.2730086391 -72.9129026642 (WGS84) (X) 955219.78 (Y) 660242.40 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119319 • Range to target: 65.46 US ft • Fish Height: 33.86 US ft • Heading: 355.980 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 103.02 US ft	**Dimensions and attributes** • Target Width: 2.32 US ft • Target Height: 0.00 US ft • Target Length: 2.32 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0167** • Sonar Time at Target: 5/1/2017 6:09:02 PM • Click Position 41.2734014992 -72.9130609345 (WGS84) (X) 955176.54 (Y) 660385.62 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119448 • Range to target: 97.35 US ft • Fish Height: 34.18 US ft • Heading: 350.090 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 103.67 US ft	**Dimensions and attributes** • Target Width: 2.32 US ft • Target Height: 0.00 US ft • Target Length: 2.32 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0168** • Sonar Time at Target: 5/1/2017 6:09:11 PM • Click Position 41.2736083166 -72.9130200752 (WGS84) (X) 955187.92 (Y) 660460.96 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119512 • Range to target: 78.49 US ft • Fish Height: 33.22 US ft • Heading: 352.220 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 99.74 US ft	**Dimensions and attributes** • Target Width: 2.40 US ft • Target Height: 0.67 US ft • Target Length: 2.33 US ft • Target Shadow: 1.75 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.

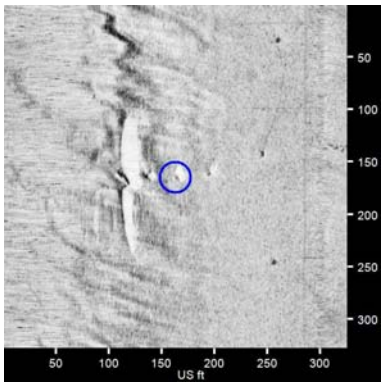
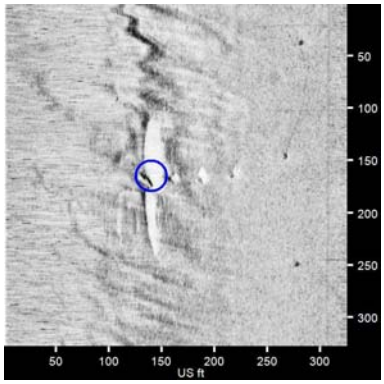
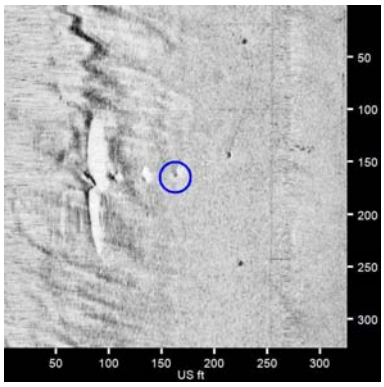
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0169** • Sonar Time at Target: 5/2/2017 3:00:16 PM • Click Position 41.2737045130 -72.9107446978 (WGS84) (X) 955813.45 (Y) 660494.84 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1440.HSX • Ping Number: 111454 • Range to target: 52.36 US ft • Fish Height: 32.30 US ft • Heading: 177.270 Degrees • Event Number: 97 • Line Name: 014_1440 • Water Depth: 95.80 US ft	**Dimensions and attributes** • Target Width: 3.39 US ft • Target Height: 0.00 US ft • Target Length: 5.46 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Debris • Description: Unkown rectangular target on edge of channel. Possibly buried of flush with bottom. Likely debris or rock.
	**NHH0170** • Sonar Time at Target: 5/1/2017 6:09:19 PM • Click Position 41.2737875006 -72.9129970421 (WGS84) (X) 955194.37 (Y) 660526.23 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 119567 • Range to target: 65.42 US ft • Fish Height: 32.50 US ft • Heading: 355.840 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 97.11 US ft	**Dimensions and attributes** • Target Width: 1.76 US ft • Target Height: 0.51 US ft • Target Length: 2.34 US ft • Target Shadow: 1.17 US ft • Classification1: Fishing gear • Classification2: • Description: String of square targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0171** • Sonar Time at Target: 5/2/2017 10:58:13 AM • Click Position 41.2759144986 -72.9118780819 (WGS84) (X) 955503.41 (Y) 661300.66 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 7914 • Range to target: 99.33 US ft • Fish Height: 39.40 US ft • Heading: 179.280 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 119.09 US ft	**Dimensions and attributes** • Target Width: 3.17 US ft • Target Height: 1.11 US ft • Target Length: 3.10 US ft • Target Shadow: 3.11 US ft • Classification1: Debris • Classification2: • Description: Unknown square target in channel with two smaller targets to the south. Likely debris or derelict fishing gear.

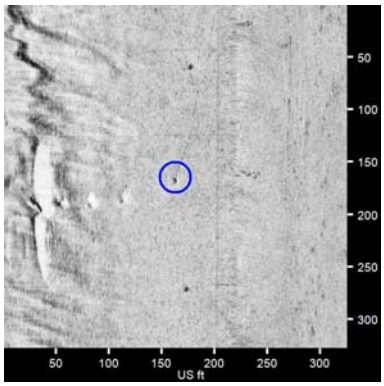
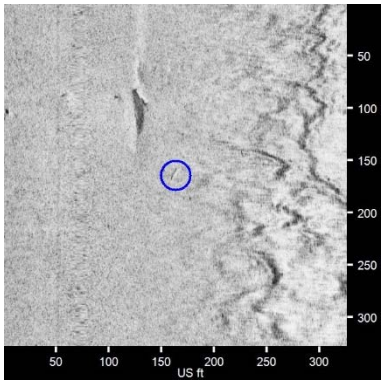
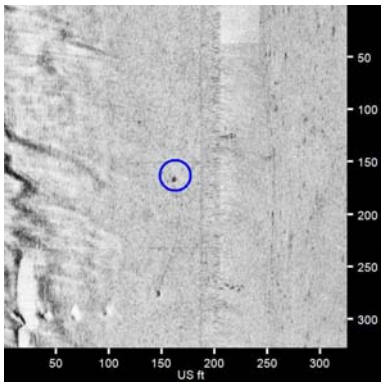
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0172** • Sonar Time at Target: 5/1/2017 6:11:47 PM • Click Position 41.2771864676 -72.9132956619 (WGS84) (X) 955114.63 (Y) 661764.85 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120621 • Range to target: 47.95 US ft • Fish Height: 28.44 US ft • Heading: 0.780 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 83.33 US ft	**Dimensions and attributes** • Target Width: 2.35 US ft • Target Height: 0.00 US ft • Target Length: 3.52 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of rectangular targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0173** • Sonar Time at Target: 5/1/2017 4:57:21 PM • Click Position 41.2773719917 -72.9137365347 (WGS84) (X) 954993.57 (Y) 661832.68 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 88782 • Range to target: 56.39 US ft • Fish Height: 25.53 US ft • Heading: 172.520 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 68.24 US ft	**Dimensions and attributes** • Target Width: 10.03 US ft • Target Height: 0.00 US ft • Target Length: 47.50 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Wreckage • Description: Large irregular target adjacent to channel. Partially buried. Likely wreckage or debris. Visible on other survey lines
	**NHH0174** • Sonar Time at Target: 5/1/2017 6:11:57 PM • Click Position 41.2774043440 -72.9137428303 (WGS84) (X) 954991.86 (Y) 661844.47 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120693 • Range to target: 167.91 US ft • Fish Height: 29.37 US ft • Heading: 356.050 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 86.94 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of unknown square targets adjacent to both fishing gear and debris. Possibly fishing gear.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0175** • Sonar Time at Target: 5/1/2017 6:11:57 PM • Click Position 41.2774072022 -72.9136432140 (WGS84) (X) 955019.25 (Y) 661845.46 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120693 • Range to target: 140.50 US ft • Fish Height: 29.37 US ft • Heading: 356.050 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 86.94 US ft	**Dimensions and attributes** • Target Width: 1.85 US ft • Target Height: 0.00 US ft • Target Length: 2.34 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of unknown square targets adjacent to both fishing gear and debris. Possibly fishing gear.
	**NHH0176** • Sonar Time at Target: 5/1/2017 6:11:57 PM • Click Position 41.2774119468 -72.9138070721 (WGS84) (X) 954974.21 (Y) 661847.27 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120696 • Range to target: 185.45 US ft • Fish Height: 29.37 US ft • Heading: 356.400 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 87.27 US ft	**Dimensions and attributes** • Target Width: 19.86 US ft • Target Height: 0.00 US ft • Target Length: 129.04 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: Possible Wreckage • Description: Large irregular target adjacent to channel. Partially buried. Likely wreckage or debris. Visible on other survey lines.
	**NHH0177** • Sonar Time at Target: 5/1/2017 6:11:57 PM • Click Position 41.2774136666 -72.9135284456 (WGS84) (X) 955050.80 (Y) 661847.75 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120694 • Range to target: 108.89 US ft • Fish Height: 29.37 US ft • Heading: 356.400 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 84.65 US ft	**Dimensions and attributes** • Target Width: 1.75 US ft • Target Height: 0.00 US ft • Target Length: 2.34 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: String of unknown square targets adjacent to both fishing gear and debris. Possibly fishing gear.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0178** • Sonar Time at Target: 5/1/2017 6:12:00 PM • Click Position 41.2774857221 -72.9133457683 (WGS84) (X) 955101.06 (Y) 661873.91 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120715 • Range to target: 57.69 US ft • Fish Height: 29.35 US ft • Heading: 355.950 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 86.29 US ft	**Dimensions and attributes** • Target Width: 2.92 US ft • Target Height: 0.00 US ft • Target Length: 3.55 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of rectangular targets adjacent to channel. Line visible. Likely fishing gear.
	**NHH0179** • Sonar Time at Target: 5/1/2017 4:57:13 PM • Click Position 41.2775215373 -72.9138916417 (WGS84) (X) 954951.04 (Y) 661887.25 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_1642.HSX • Ping Number: 88728 • Range to target: 90.68 US ft • Fish Height: 25.52 US ft • Heading: 174.350 Degrees • Event Number: 53 • Line Name: 007_1642 • Water Depth: 68.57 US ft	**Dimensions and attributes** • Target Width: 1.12 US ft • Target Height: 0.45 US ft • Target Length: 9.77 US ft • Target Shadow: 1.68 US ft • Classification1: Unknown • Classification2: Debris • Description: Linear target adjacent to several large targets. Likely debris.
	**NHH0180** • Sonar Time at Target: 5/1/2017 6:12:13 PM • Click Position 41.2777817332 -72.9133090022 (WGS84) (X) 955111.37 (Y) 661981.75 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 120808 • Range to target: 42.13 US ft • Fish Height: 29.21 US ft • Heading: 359.670 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 87.60 US ft	**Dimensions and attributes** • Target Width: 2.41 US ft • Target Height: 0.00 US ft • Target Length: 3.55 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: String of rectangular targets adjacent to channel. Line visible. Likely fishing gear.

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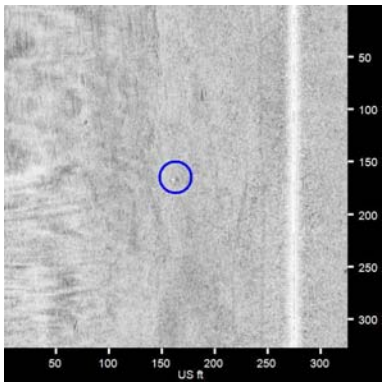
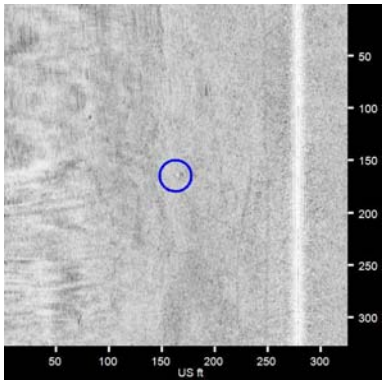
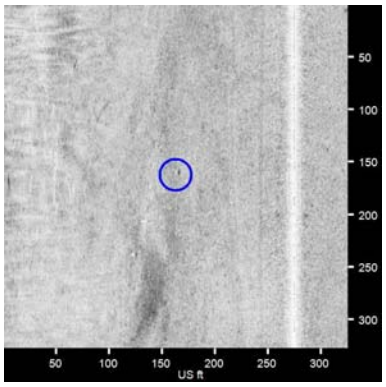
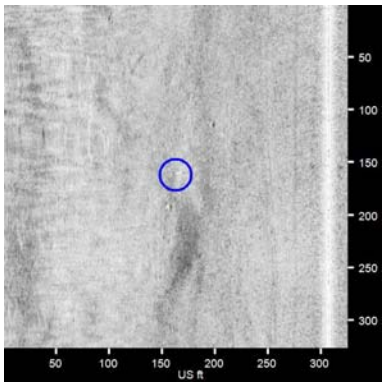
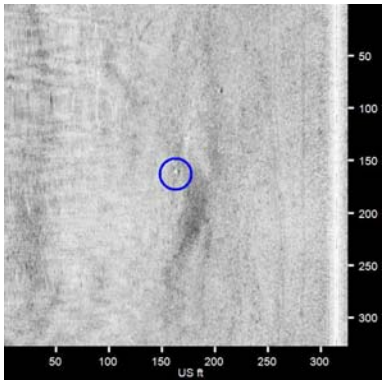
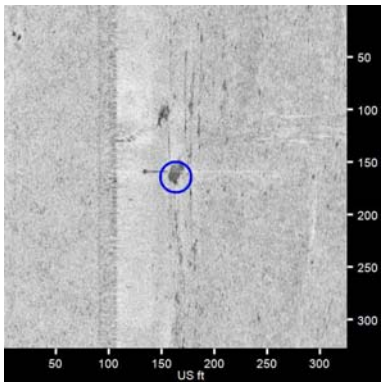
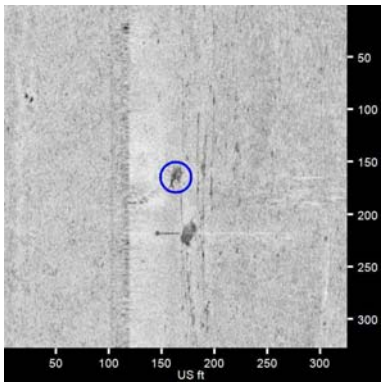
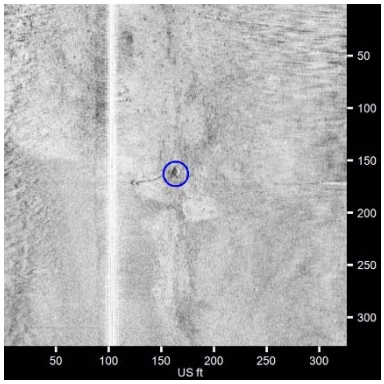
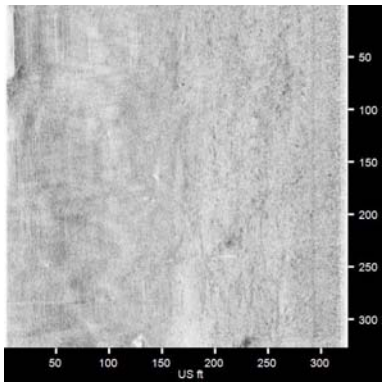
	**NHH0181** • Sonar Time at Target: 5/2/2017 10:56:47 AM • Click Position 41.2779254425 -72.9121267350 (WGS84) (X) 955436.44 (Y) 662033.50 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 7303 • Range to target: 111.35 US ft • Fish Height: 40.69 US ft • Heading: 189.610 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 114.50 US ft	**Dimensions and attributes** • Target Width: 1.80 US ft • Target Height: 1.01 US ft • Target Length: 1.90 US ft • Target Shadow: 3.01 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of square targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0182** • Sonar Time at Target: 5/2/2017 10:56:47 AM • Click Position 41.2779346689 -72.9121118816 (WGS84) (X) 955440.52 (Y) 662036.85 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 7300 • Range to target: 115.43 US ft • Fish Height: 40.69 US ft • Heading: 188.930 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 114.83 US ft	**Dimensions and attributes** • Target Width: 1.90 US ft • Target Height: 0.00 US ft • Target Length: 1.80 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of square targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0183** • Sonar Time at Target: 5/2/2017 10:56:18 AM • Click Position 41.2786076026 -72.9121072926 (WGS84) (X) 955442.25 (Y) 662282.04 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 7097 • Range to target: 111.35 US ft • Fish Height: 38.78 US ft • Heading: 173.600 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.47 US ft	**Dimensions and attributes** • Target Width: 2.40 US ft • Target Height: 0.77 US ft • Target Length: 2.39 US ft • Target Shadow: 2.40 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of square targets in channel. Proud of bottom. Likely derelict fishing gear or debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0184** • Sonar Time at Target: 5/2/2017 10:56:13 AM • Click Position 41.2787465594 -72.9119925944 (WGS84) (X) 955473.87 (Y) 662332.62 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 7059 • Range to target: 144.13 US ft • Fish Height: 38.98 US ft • Heading: 178.210 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.14 US ft	**Dimensions and attributes** • Target Width: 1.80 US ft • Target Height: 1.21 US ft • Target Length: 1.79 US ft • Target Shadow: 4.79 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of square targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0185** • Sonar Time at Target: 5/2/2017 10:56:09 AM • Click Position 41.2788446163 -72.9119728955 (WGS84) (X) 955479.35 (Y) 662368.33 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 7032 • Range to target: 151.47 US ft • Fish Height: 38.80 US ft • Heading: 177.000 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.14 US ft	**Dimensions and attributes** • Target Width: 1.79 US ft • Target Height: 0.58 US ft • Target Length: 1.88 US ft • Target Shadow: 2.39 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of square targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0186** • Sonar Time at Target: 5/1/2017 6:13:13 PM • Click Position 41.2791701454 -72.9131350107 (WGS84) (X) 955160.15 (Y) 662487.55 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 121236 • Range to target: 55.75 US ft • Fish Height: 26.75 US ft • Heading: 358.510 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 79.72 US ft	**Dimensions and attributes** • Target Width: 10.36 US ft • Target Height: 0.00 US ft • Target Length: 10.47 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for G17. Line visible.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0187** • Sonar Time at Target: 5/1/2017 6:13:20 PM • Click Position 41.2793252498 -72.9131861864 (WGS84) (X) 955146.19 (Y) 662544.09 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 121286 • Range to target: 43.99 US ft • Fish Height: 26.33 US ft • Heading: 358.180 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 75.13 US ft	**Dimensions and attributes** • Target Width: 9.43 US ft • Target Height: 0.00 US ft • Target Length: 9.43 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Rectangular target in the vicinity of G17. Possible derelict mooring.
	**NHH0188** • Sonar Time at Target: 5/2/2017 2:54:35 PM • Click Position 41.2795287035 -72.9113491532 (WGS84) (X) 955651.26 (Y) 662617.27 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\014_1440.HSX • Ping Number: 109028 • Range to target: 60.59 US ft • Fish Height: 30.71 US ft • Heading: 178.630 Degrees • Event Number: 97 • Line Name: 014_1440 • Water Depth: 95.14 US ft	**Dimensions and attributes** • Target Width: 5.30 US ft • Target Height: 0.00 US ft • Target Length: 5.24 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R18. Line visible.
	**NHH0189** • Sonar Time at Target: 5/2/2017 10:55:31 AM • Click Position 41.2796972154 -72.9119449504 (WGS84) (X) 955487.61 (Y) 662678.98 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6760 • Range to target: 182.40 US ft • Fish Height: 38.78 US ft • Heading: 181.880 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 117.13 US ft	**Dimensions and attributes** • Target Width: 1.78 US ft • Target Height: 0.85 US ft • Target Length: 2.45 US ft • Target Shadow: 4.16 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.

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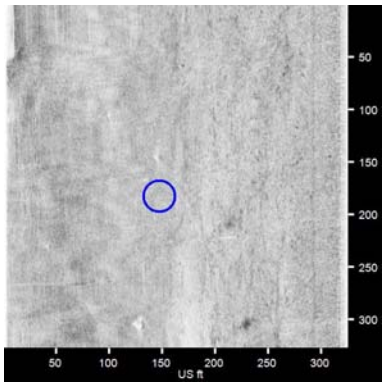
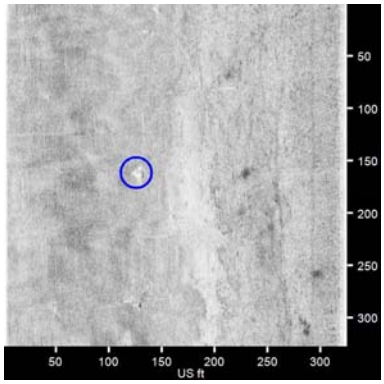
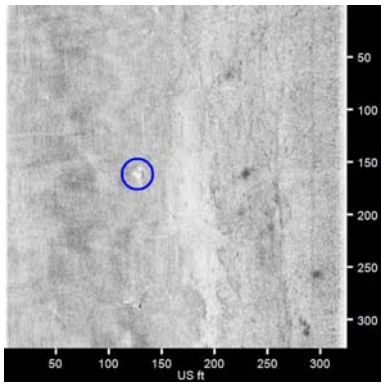
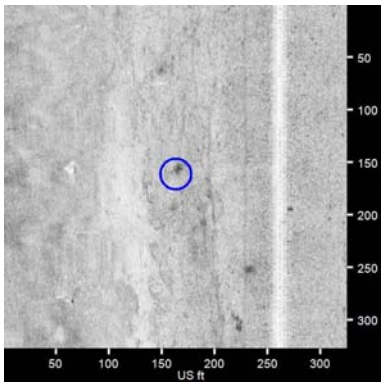
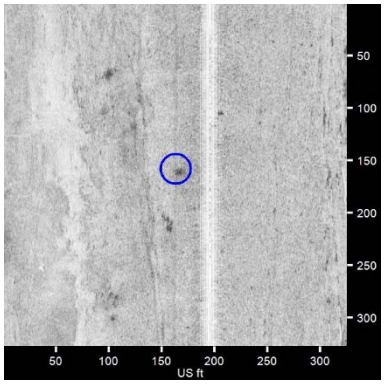
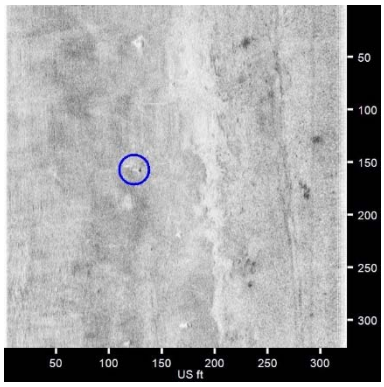
	**NHH0190** • Sonar Time at Target: 5/2/2017 10:55:29 AM • Click Position 41.2796972766 -72.9119595859 (WGS84) (X) 955483.59 (Y) 662679.01 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6760 • Range to target: 178.38 US ft • Fish Height: 38.78 US ft • Heading: 181.880 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 117.13 US ft	**Dimensions and attributes** • Target Width: 2.45 US ft • Target Height: 0.98 US ft • Target Length: 2.45 US ft • Target Shadow: 4.75 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0191** • Sonar Time at Target: 5/2/2017 10:55:13 AM • Click Position 41.2800718732 -72.9118500316 (WGS84) (X) 955513.96 (Y) 662815.44 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6627 • Range to target: 199.40 US ft • Fish Height: 38.76 US ft • Heading: 185.190 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.80 US ft	**Dimensions and attributes** • Target Width: 2.93 US ft • Target Height: 1.30 US ft • Target Length: 3.56 US ft • Target Shadow: 7.03 US ft • Classification1: Unknown • Classification2: Fishing gear • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0192** • Sonar Time at Target: 5/2/2017 10:55:12 AM • Click Position 41.2800752170 -72.9118543127 (WGS84) (X) 955512.78 (Y) 662816.66 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6626 • Range to target: 198.10 US ft • Fish Height: 38.76 US ft • Heading: 185.190 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.80 US ft	**Dimensions and attributes** • Target Width: 2.93 US ft • Target Height: 1.30 US ft • Target Length: 4.14 US ft • Target Shadow: 7.03 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0193** • Sonar Time at Target: 5/2/2017 10:55:12 AM • Click Position 41.2801182090 -72.9122129906 (WGS84) (X) 955414.23 (Y) 662832.51 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6622 • Range to target: 98.37 US ft • Fish Height: 38.76 US ft • Heading: 185.100 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.14 US ft	**Dimensions and attributes** • Target Width: 2.93 US ft • Target Height: 0.00 US ft • Target Length: 5.76 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0194** • Sonar Time at Target: 5/2/2017 10:55:01 AM • Click Position 41.2803748345 -72.9124102011 (WGS84) (X) 955360.20 (Y) 662926.12 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6547 • Range to target: 32.56 US ft • Fish Height: 38.76 US ft • Heading: 191.490 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.14 US ft	**Dimensions and attributes** • Target Width: 5.69 US ft • Target Height: 0.00 US ft • Target Length: 2.90 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0195** • Sonar Time at Target: 5/2/2017 10:54:57 AM • Click Position 41.2803950179 -72.9117859472 (WGS84) (X) 955531.79 (Y) 662933.15 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6519 • Range to target: 201.36 US ft • Fish Height: 38.76 US ft • Heading: 189.830 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 115.81 US ft	**Dimensions and attributes** • Target Width: 2.82 US ft • Target Height: 1.04 US ft • Target Length: 2.25 US ft • Target Shadow: 5.63 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.

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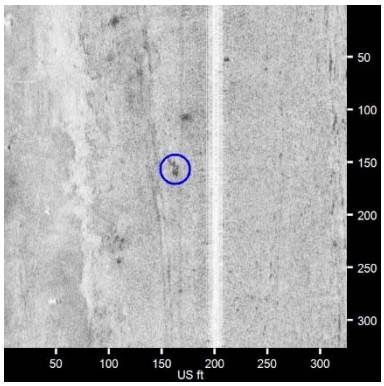
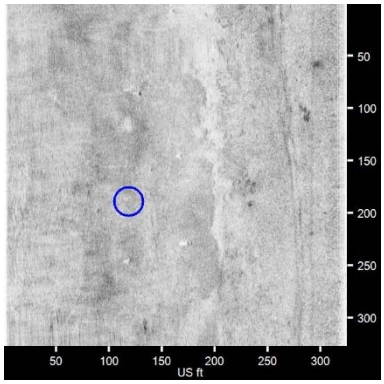
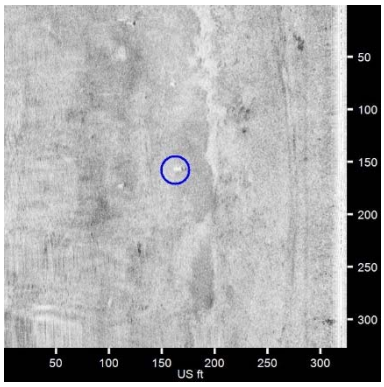
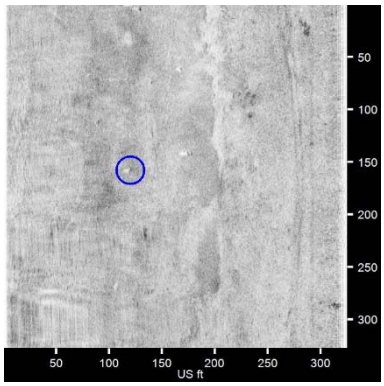
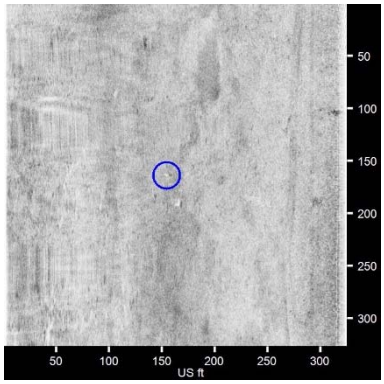
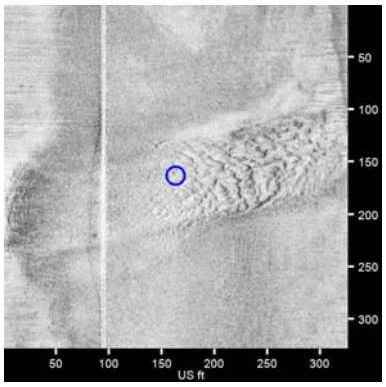
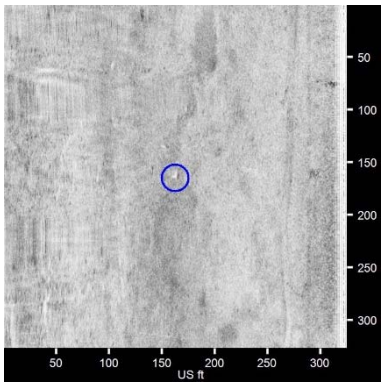
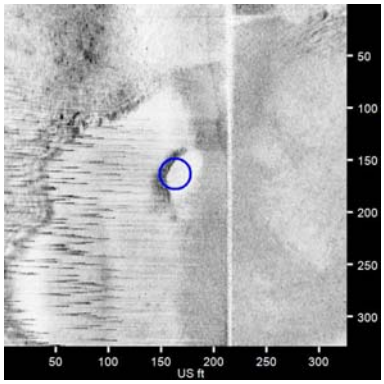
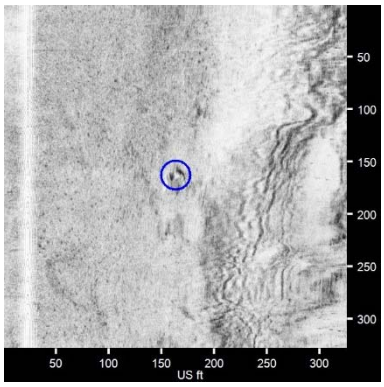
	**NHH0196** • Sonar Time at Target: 5/2/2017 10:54:55 AM • Click Position 41.2805174246 -72.9123619727 (WGS84) (X) 955373.55 (Y) 662978.05 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6500 • Range to target: 38.26 US ft • Fish Height: 38.76 US ft • Heading: 189.350 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 117.13 US ft	**Dimensions and attributes** • Target Width: 3.39 US ft • Target Height: 1.15 US ft • Target Length: 6.15 US ft • Target Shadow: 1.67 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0197** • Sonar Time at Target: 5/2/2017 10:54:48 AM • Click Position 41.2805425210 -72.9117374718 (WGS84) (X) 955545.22 (Y) 662986.87 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6470 • Range to target: 206.83 US ft • Fish Height: 39.08 US ft • Heading: 190.610 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 118.44 US ft	**Dimensions and attributes** • Target Width: 2.72 US ft • Target Height: 0.20 US ft • Target Length: 2.72 US ft • Target Shadow: 1.09 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0198** • Sonar Time at Target: 5/2/2017 10:54:39 AM • Click Position 41.2808095943 -72.9118724739 (WGS84) (X) 955508.29 (Y) 663084.25 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6386 • Range to target: 156.68 US ft • Fish Height: 39.09 US ft • Heading: 188.120 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 118.44 US ft	**Dimensions and attributes** • Target Width: 3.20 US ft • Target Height: 0.00 US ft • Target Length: 3.16 US ft • Target Shadow: 0.00 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.

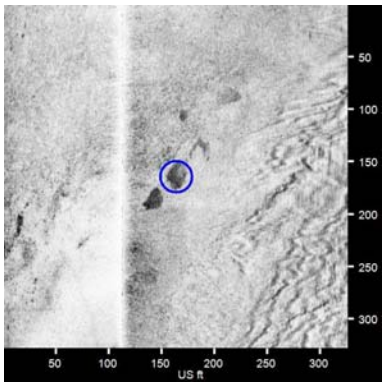
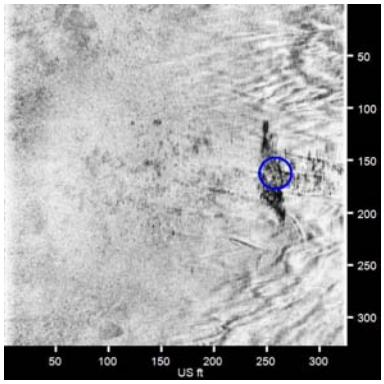
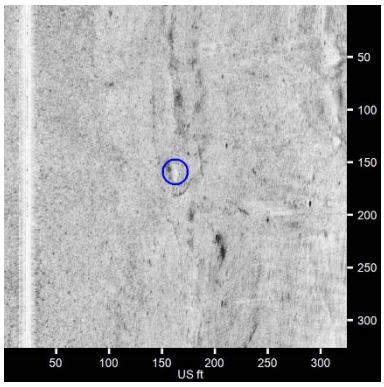
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0199** • Sonar Time at Target: 5/2/2017 10:54:37 AM • Click Position 41.2808315716 -72.9116903141 (WGS84) (X) 955558.37 (Y) 663092.16 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6372 • Range to target: 205.22 US ft • Fish Height: 39.04 US ft • Heading: 188.980 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 117.78 US ft	**Dimensions and attributes** • Target Width: 2.16 US ft • Target Height: 0.86 US ft • Target Length: 2.82 US ft • Target Shadow: 4.72 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown string of rectangular targets in channel. Proud of bottom. Likely derelict fishing gear or debris.
	**NHH0200** • Sonar Time at Target: 5/2/2017 10:54:11 AM • Click Position 41.2813368231 -72.9117241852 (WGS84) (X) 955549.41 (Y) 663276.28 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6190 • Range to target: 170.59 US ft • Fish Height: 38.75 US ft • Heading: 190.430 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.47 US ft	**Dimensions and attributes** • Target Width: 3.03 US ft • Target Height: 0.88 US ft • Target Length: 2.02 US ft • Target Shadow: 4.04 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown rectangular target in channel. Line visible. Likely derelict fishing gear.
	**NHH0201** • Sonar Time at Target: 5/2/2017 3:09:47 PM • Click Position 41.2813544982 -72.9102193871 (WGS84) (X) 955963.02 (Y) 663281.95 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1503.HSX • Ping Number: 115525 • Range to target: 68.58 US ft • Fish Height: 18.86 US ft • Heading: 6.410 Degrees • Event Number: 99 • Line Name: 015_1503 • Water Depth: 44.29 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 737.56 US ft • Target Shadow: 0.00 US ft • Classification1: Sewer Outfall • Classification2: • Description: Sewer outfall

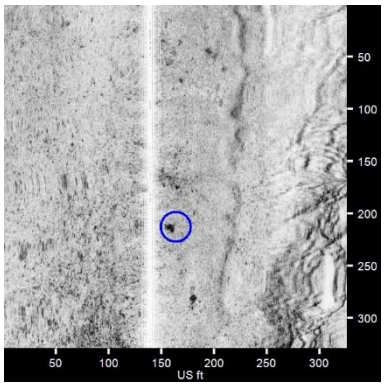
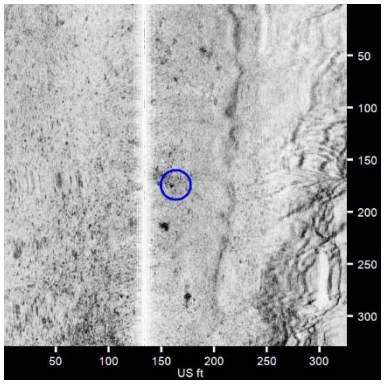
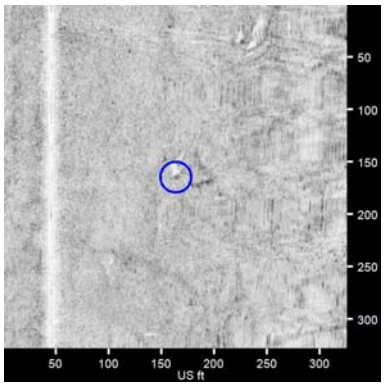
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0202** • Sonar Time at Target: 5/2/2017 10:54:07 AM • Click Position 41.2814176325 -72.9117489051 (WGS84) (X) 955542.67 (Y) 663305.73 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 6161 • Range to target: 159.40 US ft • Fish Height: 38.75 US ft • Heading: 189.940 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 116.47 US ft	**Dimensions and attributes** • Target Width: 2.02 US ft • Target Height: 0.82 US ft • Target Length: 4.07 US ft • Target Shadow: 3.54 US ft • Classification1: Fishing gear • Classification2: • Description: Unknown rectangular target in channel. Line visible. Likely derelict fishing gear.
	**NHH0203** • Sonar Time at Target: 5/2/2017 3:10:12 PM • Click Position 41.2819709821 -72.9105504236 (WGS84) (X) 955872.45 (Y) 663506.74 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1503.HSX • Ping Number: 115706 • Range to target: 51.56 US ft • Fish Height: 13.06 US ft • Heading: 7.100 Degrees • Event Number: 99 • Line Name: 015_1503 • Water Depth: 22.31 US ft	**Dimensions and attributes** • Target Width: 15.32 US ft • Target Height: 4.66 US ft • Target Length: 53.18 US ft • Target Shadow: 29.48 US ft • Classification1: Area of coarse sediment • Classification2: • Description: Large gravel/shell reef adjacent to edge of channel.
	**NHH0204** • Sonar Time at Target: 5/2/2017 2:29:05 PM • Click Position 41.2821656227 -72.9108852415 (WGS84) (X) 955780.56 (Y) 663577.83 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1422.HSX • Ping Number: 98118 • Range to target: 140.12 US ft • Fish Height: 43.59 US ft • Heading: 7.580 Degrees • Event Number: 95 • Line Name: 012_1422 • Water Depth: 131.56 US ft	**Dimensions and attributes** • Target Width: 4.71 US ft • Target Height: 1.12 US ft • Target Length: 5.62 US ft • Target Shadow: 3.86 US ft • Classification1: Mooring • Classification2: • Description: Mooring for R20. No line visible.

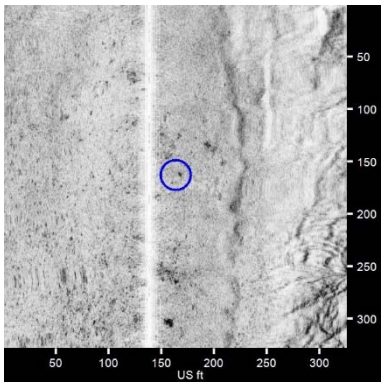
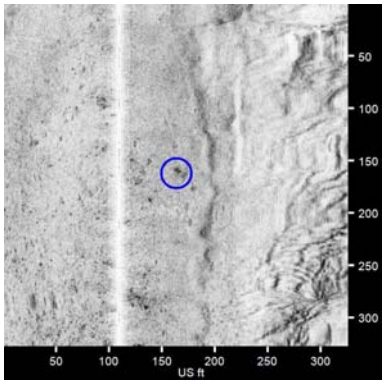
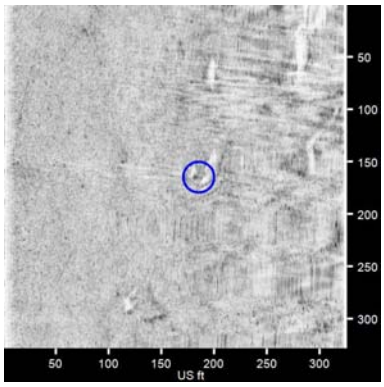
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0205** • Sonar Time at Target: 5/2/2017 3:10:53 PM • Click Position 41.2828897560 -72.9100156038 (WGS84) (X) 956020.07 (Y) 663841.24 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1503.HSX • Ping Number: 116002 • Range to target: 51.14 US ft • Fish Height: 45.67 US ft • Heading: 3.520 Degrees • Event Number: 99 • Line Name: 015_1503 • Water Depth: 132.22 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Disturbed sediment at base of channel slope. Partially buried macroalgae at depth suggesting slumped material. Investigated with ROV.
	**NHH0206** • Sonar Time at Target: 5/2/2017 3:11:20 PM • Click Position 41.2833946789 -72.9091282858 (WGS84) (X) 956264.28 (Y) 664024.76 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_1503.HSX • Ping Number: 116191 • Range to target: 257.30 US ft • Fish Height: 46.39 US ft • Heading: 10.390 Degrees • Event Number: 99 • Line Name: 015_1503 • Water Depth: 134.84 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Dolphin foundation • Classification2: • Description: Dolphins adjacent to terminal facility.
	**NHH0207** • Sonar Time at Target: 5/2/2017 10:52:01 AM • Click Position 41.2840249576 -72.9123458129 (WGS84) (X) 955380.39 (Y) 664256.06 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\010_1049.HSX • Ping Number: 5261 • Range to target: 140.04 US ft • Fish Height: 39.36 US ft • Heading: 196.750 Degrees • Event Number: 66 • Line Name: 010_1049 • Water Depth: 115.16 US ft	**Dimensions and attributes** • Target Width: 4.24 US ft • Target Height: 0.88 US ft • Target Length: 12.18 US ft • Target Shadow: 3.32 US ft • Classification1: Rock • Classification2: • Description: Irregular target in channel. Likely rock.

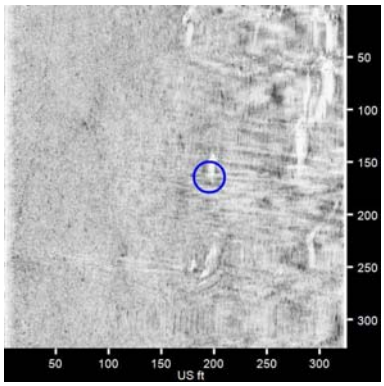
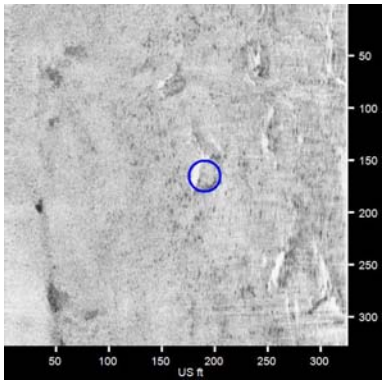
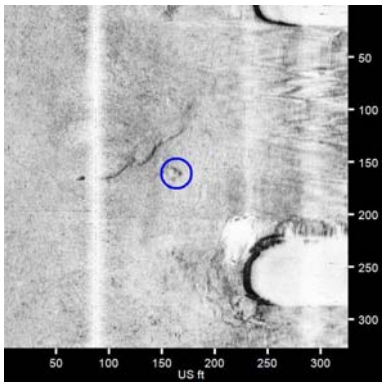
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0208** • Sonar Time at Target: 5/2/2017 3:14:58 PM • Click Position 41.2854408465 -72.9092460673 (WGS84) (X) 956233.29 (Y) 664770.37 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 117749 • Range to target: 24.12 US ft • Fish Height: 40.83 US ft • Heading: 2.750 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 122.70 US ft	**Dimensions and attributes** • Target Width: 5.15 US ft • Target Height: 0.00 US ft • Target Length: 5.24 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Unknown square target on edge of channel. Possible derelict mooring.
	**NHH0209** • Sonar Time at Target: 5/2/2017 3:15:03 PM • Click Position 41.2855449941 -72.9092165920 (WGS84) (X) 956241.46 (Y) 664808.30 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 117783 • Range to target: 29.30 US ft • Fish Height: 41.28 US ft • Heading: 4.860 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 123.69 US ft	**Dimensions and attributes** • Target Width: 3.06 US ft • Target Height: 0.00 US ft • Target Length: 2.54 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Unknown square target adjacent to channel. Possible derelict mooring. Two similar but larger targets to the south.
	**NHH0210** • Sonar Time at Target: 5/2/2017 2:31:43 PM • Click Position 41.2856540864 -72.9102938902 (WGS84) (X) 955945.45 (Y) 664848.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1422.HSX • Ping Number: 99241 • Range to target: 118.01 US ft • Fish Height: 42.99 US ft • Heading: 5.320 Degrees • Event Number: 95 • Line Name: 012_1422 • Water Depth: 129.59 US ft	**Dimensions and attributes** • Target Width: 5.01 US ft • Target Height: 0.00 US ft • Target Length: 4.47 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Likely debris or derelict fishing gear. Similar targerts to the north and south.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0211** • Sonar Time at Target: 5/2/2017 3:15:16 PM • Click Position 41.2858186221 -72.9092019447 (WGS84) (X) 956245.67 (Y) 664908.00 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 117871 • Range to target: 25.02 US ft • Fish Height: 41.78 US ft • Heading: 8.050 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 124.34 US ft	**Dimensions and attributes** • Target Width: 3.33 US ft • Target Height: 0.00 US ft • Target Length: 3.23 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Likely boulder or derelict mooring. Area of coarser sediment.
	**NHH0212** • Sonar Time at Target: 5/2/2017 3:15:19 PM • Click Position 41.2858825603 -72.9090881082 (WGS84) (X) 956277.00 (Y) 664931.23 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 117894 • Range to target: 54.04 US ft • Fish Height: 41.15 US ft • Heading: 5.160 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 125.00 US ft	**Dimensions and attributes** • Target Width: 4.61 US ft • Target Height: 0.00 US ft • Target Length: 4.46 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: • Description: Likely boulder or derelict mooring. Area of coarser sediment.
	**NHH0213** • Sonar Time at Target: 5/2/2017 2:31:58 PM • Click Position 41.2859923286 -72.9099913083 (WGS84) (X) 956028.84 (Y) 664971.69 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1422.HSX • Ping Number: 99351 • Range to target: 184.77 US ft • Fish Height: 42.89 US ft • Heading: 4.500 Degrees • Event Number: 95 • Line Name: 012_1422 • Water Depth: 129.59 US ft	**Dimensions and attributes** • Target Width: 5.25 US ft • Target Height: 0.00 US ft • Target Length: 4.27 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Likely debris or derelict fishing gear. Similar targerts to the north and south.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0214** • Sonar Time at Target: 5/2/2017 2:32:09 PM • Click Position 41.2862391942 -72.9099191155 (WGS84) (X) 956048.85 (Y) 665061.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\012_1422.HSX • Ping Number: 99427 • Range to target: 194.64 US ft • Fish Height: 42.82 US ft • Heading: 0.430 Degrees • Event Number: 95 • Line Name: 012_1422 • Water Depth: 129.59 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Likely debris or derelict fishing gear. Similar targerts to the north and south.
	**NHH0215** • Sonar Time at Target: 5/1/2017 6:19:57 PM • Click Position 41.2882266568 -72.9110636301 (WGS84) (X) 955735.65 (Y) 665786.35 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 124116 • Range to target: 189.48 US ft • Fish Height: 32.50 US ft • Heading: 12.910 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 100.07 US ft	**Dimensions and attributes** • Target Width: 13.26 US ft • Target Height: 0.97 US ft • Target Length: 20.95 US ft • Target Shadow: 5.93 US ft • Classification1: Crepidula reefs and macroalgae • Classification2: • Description: Cluster of 5 targets, all corresponding to crepidula reefs and macroalgae. Investigated with ROV.
	**NHH0216** • Sonar Time at Target: 5/2/2017 3:18:17 PM • Click Position 41.2898089178 -72.9082804076 (WGS84) (X) 956501.60 (Y) 666361.45 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 119167 • Range to target: 76.07 US ft • Fish Height: 43.83 US ft • Heading: 5.820 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 133.53 US ft	**Dimensions and attributes** • Target Width: 3.33 US ft • Target Height: 0.00 US ft • Target Length: 9.38 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Irregular target adjacent to terminal facility and line or cable like debris. Likely debris.

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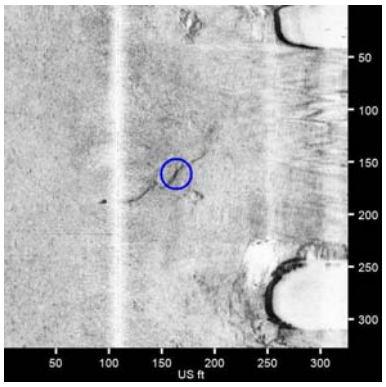
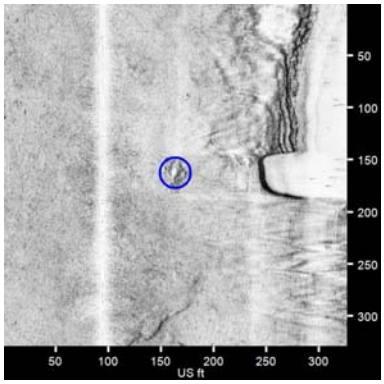
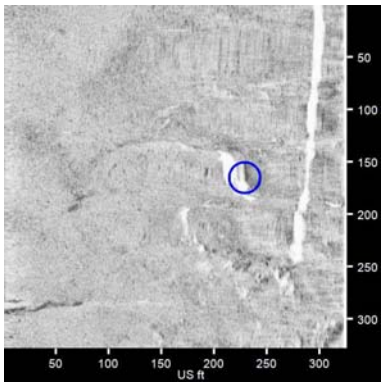
	**NHH0217** • Sonar Time at Target: 5/2/2017 3:18:20 PM • Click Position 41.2898736264 -72.9083482932 (WGS84) (X) 956482.99 (Y) 666385.06 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 119186 • Range to target: 55.38 US ft • Fish Height: 43.61 US ft • Heading: 8.700 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 128.28 US ft	**Dimensions and attributes** • Target Width: 1.28 US ft • Target Height: 0.00 US ft • Target Length: 95.55 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: Cable • Description: Long but narrow linear target adjacent to terminal facility. Likely line or cable.
	**NHH0218** • Sonar Time at Target: 5/2/2017 3:18:38 PM • Click Position 41.2902632635 -72.9082485139 (WGS84) (X) 956510.67 (Y) 666526.98 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\016_1514.HSX • Ping Number: 119311 • Range to target: 69.37 US ft • Fish Height: 43.77 US ft • Heading: 8.260 Degrees • Event Number: 101 • Line Name: 016_1514 • Water Depth: 127.30 US ft	**Dimensions and attributes** • Target Width: 17.00 US ft • Target Height: 0.00 US ft • Target Length: 29.33 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Large irregular target adjacent to terminal facility. Likely debris or rock pile.
	**NHH0219** • Sonar Time at Target: 5/1/2017 6:21:49 PM • Click Position 41.2908347094 -72.9104765222 (WGS84) (X) 955898.76 (Y) 666736.33 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 124916 • Range to target: 228.39 US ft • Fish Height: 40.61 US ft • Heading: 2.820 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 122.70 US ft	**Dimensions and attributes** • Target Width: 2.36 US ft • Target Height: 2.24 US ft • Target Length: 15.89 US ft • Target Shadow: 13.55 US ft • Classification1: Unknown • Classification2: Boulder • Description: Rectangular target. Proud of bottom. Likely boulder. Coarse sediment to the south.

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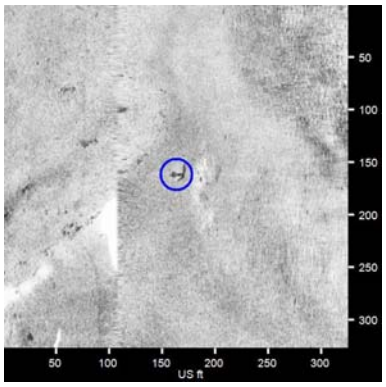
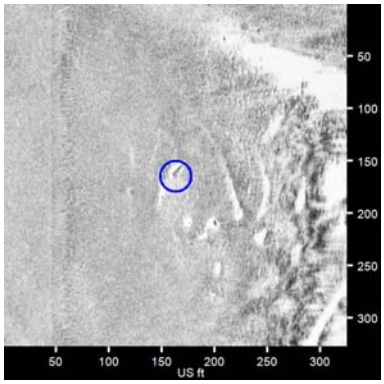
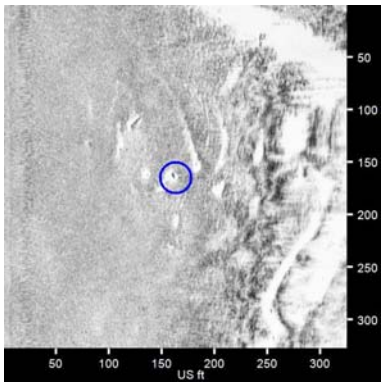
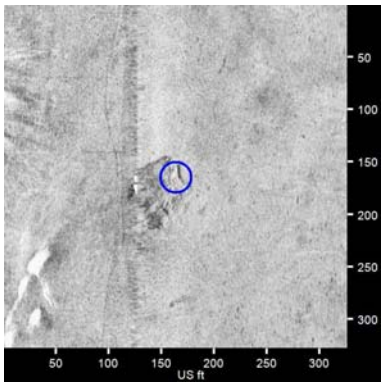
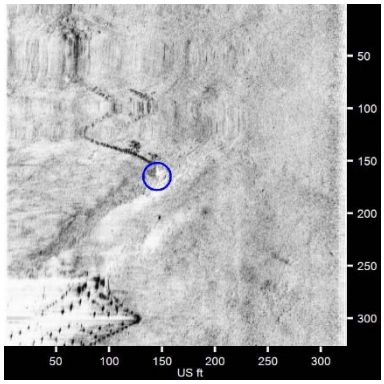
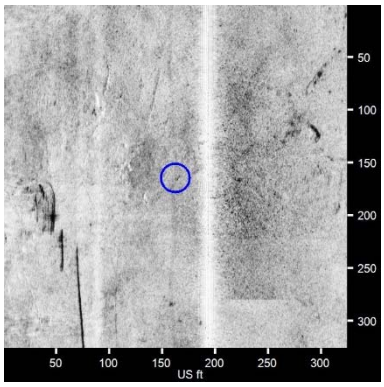
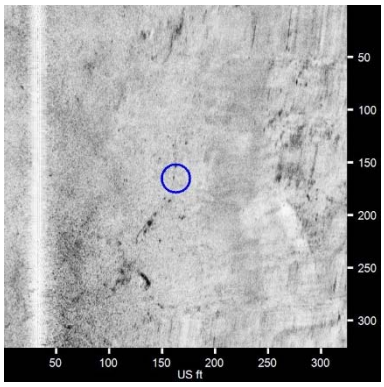
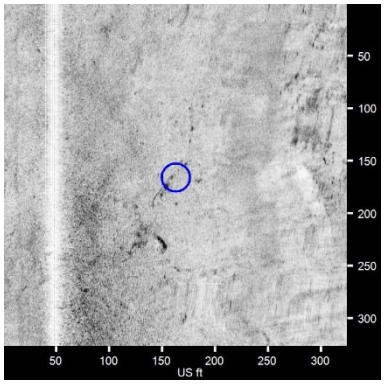
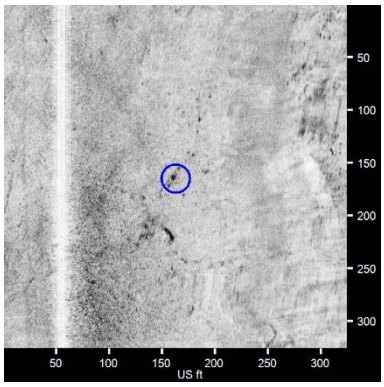
	**NHH0220** • Sonar Time at Target: 5/1/2017 2:58:09 PM • Click Position 41.2915047536 -72.9124959082 (WGS84) (X) 955344.27 (Y) 666981.50 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\005_1455.HSX • Ping Number: 37787 • Range to target: 55.11 US ft • Fish Height: 43.95 US ft • Heading: 193.350 Degrees • Event Number: 19 • Line Name: 005_1455 • Water Depth: 128.61 US ft	**Dimensions and attributes** • Target Width: 6.38 US ft • Target Height: 0.00 US ft • Target Length: 6.50 US ft • Target Shadow: 0.00 US ft • Classification1: Mooring • Classification2: • Description: Mooring for YA. Line visible.
	**NHH0221** • Sonar Time at Target: 5/1/2017 2:57:17 PM • Click Position 41.2927022965 -72.9125171839 (WGS84) (X) 955339.24 (Y) 667417.86 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\005_1455.HSX • Ping Number: 37419 • Range to target: 102.63 US ft • Fish Height: 19.44 US ft • Heading: 191.160 Degrees • Event Number: 19 • Line Name: 005_1455 • Water Depth: 50.85 US ft	**Dimensions and attributes** • Target Width: 2.49 US ft • Target Height: 0.00 US ft • Target Length: 11.63 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown target. Partially buried. Likely debris. Investigated with ROV.
	**NHH0222** • Sonar Time at Target: 5/1/2017 2:57:11 PM • Click Position 41.2928497091 -72.9126341220 (WGS84) (X) 955307.21 (Y) 667471.63 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\005_1455.HSX • Ping Number: 37379 • Range to target: 142.22 US ft • Fish Height: 19.44 US ft • Heading: 188.150 Degrees • Event Number: 19 • Line Name: 005_1455 • Water Depth: 49.87 US ft	**Dimensions and attributes** • Target Width: 2.12 US ft • Target Height: 0.00 US ft • Target Length: 3.72 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown target. Partially buried. Likely debris.

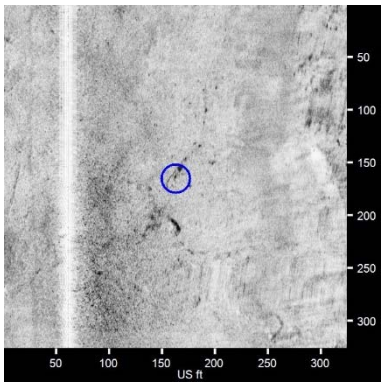
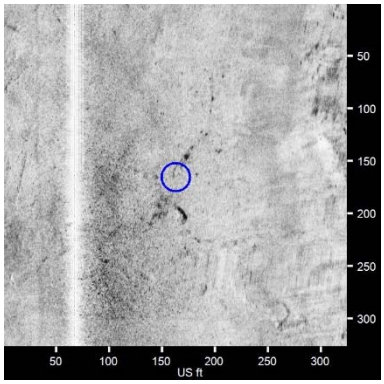
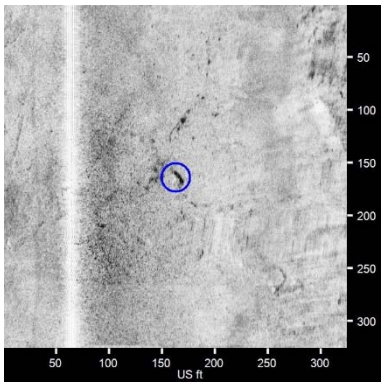
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0223** • Sonar Time at Target: 5/1/2017 6:23:59 PM • Click Position 41.2938776852 -72.9106560606 (WGS84) (X) 955851.48 (Y) 667845.17 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\008_1747.HSX • Ping Number: 125844 • Range to target: 36.36 US ft • Fish Height: 25.16 US ft • Heading: 12.840 Degrees • Event Number: 61 • Line Name: 008_1747 • Water Depth: 75.46 US ft	**Dimensions and attributes** • Target Width: 44.75 US ft • Target Height: 0.00 US ft • Target Length: 38.29 US ft • Target Shadow: 0.00 US ft • Classification1: Disturbed sediment • Classification2: • Description: Irregular large target. Adjacent rises and furrows to the southwest. Likely disturbed sediment.
	**NHH0224** • Sonar Time at Target: 5/3/2017 9:07:10 AM • Click Position 41.2944179060 -72.9071898918 (WGS84) (X) 956804.35 (Y) 668040.26 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16269 • Range to target: 179.21 US ft • Fish Height: 41.31 US ft • Heading: 241.030 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 128.61 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown target associated with adjacent pier.
	**NHH0225** • Sonar Time at Target: 5/3/2017 9:06:31 AM • Click Position 41.2953046829 -72.9067313551 (WGS84) (X) 956930.94 (Y) 668363.14 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15986 • Range to target: 30.31 US ft • Fish Height: 41.34 US ft • Heading: 228.950 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 127.30 US ft	**Dimensions and attributes** • Target Width: 2.71 US ft • Target Height: 0.00 US ft • Target Length: 2.75 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Debris • Description: Unknown rectangular target. Likely debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0226** • Sonar Time at Target: 5/3/2017 9:06:49 AM • Click Position 41.2953461075 -72.9074981985 (WGS84) (X) 956720.24 (Y) 668378.61 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16117 • Range to target: 130.16 US ft • Fish Height: 41.09 US ft • Heading: 226.590 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 127.95 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown string of targets with possible line visible. Likely debris.
	**NHH0227** • Sonar Time at Target: 5/3/2017 9:06:45 AM • Click Position 41.2953767490 -72.9073744692 (WGS84) (X) 956754.26 (Y) 668389.72 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16085 • Range to target: 114.61 US ft • Fish Height: 41.09 US ft • Heading: 228.050 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 126.64 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown string of targets with possible line visible. Likely debris.
	**NHH0228** • Sonar Time at Target: 5/3/2017 9:06:43 AM • Click Position 41.2953809466 -72.9073333270 (WGS84) (X) 956765.57 (Y) 668391.22 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16076 • Range to target: 107.78 US ft • Fish Height: 41.09 US ft • Heading: 227.720 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 125.33 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown string of targets with possible line visible. Likely debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0229** • Sonar Time at Target: 5/3/2017 9:06:42 AM • Click Position 41.2953846180 -72.9072963712 (WGS84) (X) 956775.73 (Y) 668392.54 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16068 • Range to target: 101.58 US ft • Fish Height: 41.09 US ft • Heading: 227.330 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 126.64 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown string of targets with possible line visible. Likely debris.
	**NHH0230** • Sonar Time at Target: 5/3/2017 9:06:41 AM • Click Position 41.2953902931 -72.9072564929 (WGS84) (X) 956786.69 (Y) 668394.59 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16059 • Range to target: 95.30 US ft • Fish Height: 41.16 US ft • Heading: 227.790 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 128.61 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Unknown string of targets with possible line visible. Likely debris.
	**NHH0231** • Sonar Time at Target: 5/3/2017 9:06:37 AM • Click Position 41.2954610806 -72.9071811543 (WGS84) (X) 956807.44 (Y) 668420.35 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 16027 • Range to target: 98.59 US ft • Fish Height: 41.62 US ft • Heading: 228.140 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 128.94 US ft	**Dimensions and attributes** • Target Width: 2.74 US ft • Target Height: 0.00 US ft • Target Length: 8.40 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Likely debris or rock. Adjacent coarse sediment.

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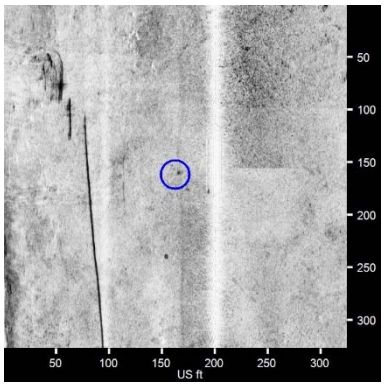
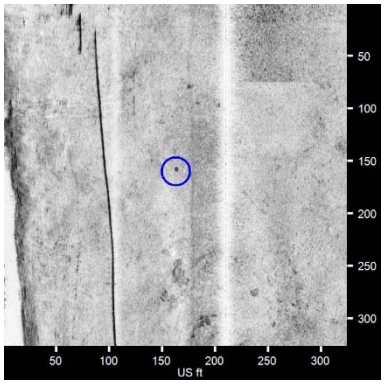
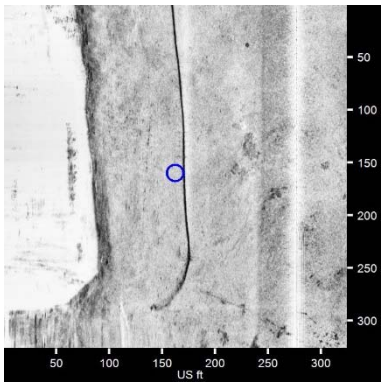
	**NHH0232** • Sonar Time at Target: 5/3/2017 9:06:15 AM • Click Position 41.2955439719 -72.9064090932 (WGS84) (X) 957019.65 (Y) 668450.16 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15873 • Range to target: 37.85 US ft • Fish Height: 39.17 US ft • Heading: 221.630 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 121.39 US ft	**Dimensions and attributes** • Target Width: 2.23 US ft • Target Height: 0.00 US ft • Target Length: 2.23 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Debris • Description: Unknown rectangular target. Likely debris.
	**NHH0233** • Sonar Time at Target: 5/3/2017 9:06:05 AM • Click Position 41.2956936037 -72.9061914324 (WGS84) (X) 957079.56 (Y) 668504.58 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15799 • Range to target: 47.37 US ft • Fish Height: 37.21 US ft • Heading: 225.630 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 115.16 US ft	**Dimensions and attributes** • Target Width: 3.21 US ft • Target Height: 0.65 US ft • Target Length: 3.25 US ft • Target Shadow: 1.07 US ft • Classification1: Unknown • Classification2: Debris • Description: Unknown rectangular target adjacent to terminal facility. Likely debris.
	**NHH0234** • Sonar Time at Target: 5/3/2017 9:05:48 AM • Click Position 41.2958248651 -72.9057192612 (WGS84) (X) 957209.40 (Y) 668552.17 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15684 • Range to target: 114.32 US ft • Fish Height: 35.93 US ft • Heading: 219.090 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 110.24 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 405.59 US ft • Target Shadow: 0.00 US ft • Classification1: Containment boom and curtain. • Classification2: • Description: Floating boom and curtain deployed around petroleum tanker.

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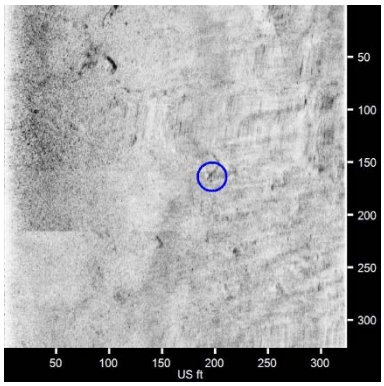
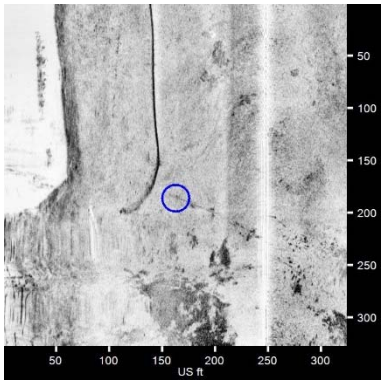
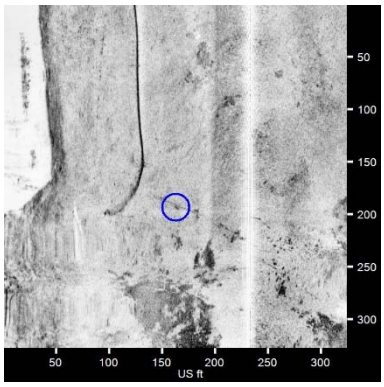
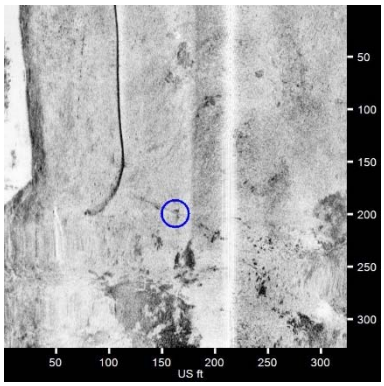
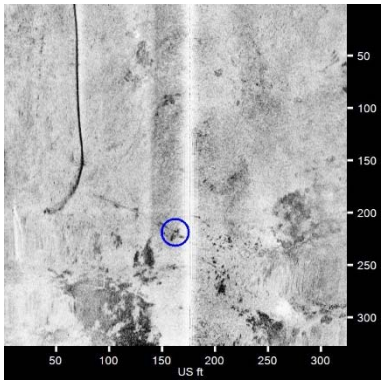
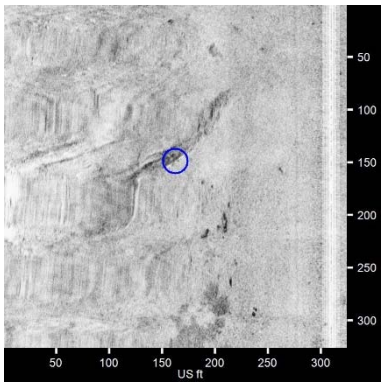
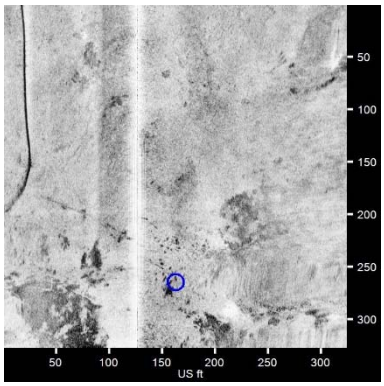
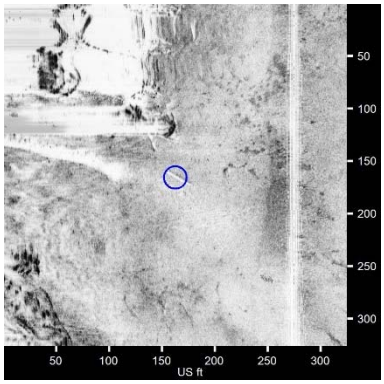
	**NHH0235** • Sonar Time at Target: 5/3/2017 9:06:22 AM • Click Position 41.2958514892 -72.9071869447 (WGS84) (X) 956806.11 (Y) 668562.60 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15927 • Range to target: 196.49 US ft • Fish Height: 40.25 US ft • Heading: 219.440 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 125.98 US ft	**Dimensions and attributes** • Target Width: 4.63 US ft • Target Height: 0.00 US ft • Target Length: 4.33 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Square target with line. Likely debris.
	**NHH0236** • Sonar Time at Target: 5/3/2017 9:05:33 AM • Click Position 41.2961084261 -72.9055305046 (WGS84) (X) 957261.46 (Y) 668655.40 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15574 • Range to target: 85.25 US ft • Fish Height: 35.32 US ft • Heading: 224.370 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 107.61 US ft	**Dimensions and attributes** • Target Width: 2.28 US ft • Target Height: 0.00 US ft • Target Length: 4.12 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: String of unknown target with possible line visible. Likely debris.
	**NHH0237** • Sonar Time at Target: 5/3/2017 9:05:32 AM • Click Position 41.2961497761 -72.9055539081 (WGS84) (X) 957255.05 (Y) 668670.47 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15567 • Range to target: 70.46 US ft • Fish Height: 35.32 US ft • Heading: 224.300 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 110.24 US ft	**Dimensions and attributes** • Target Width: 1.84 US ft • Target Height: 0.00 US ft • Target Length: 3.61 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: String of unknown target with possible line visible. Likely debris.

New Haven Harbor May 2017 Side Scan Sonar

	**NHH0238** • Sonar Time at Target: 5/3/2017 9:05:31 AM • Click Position 41.2961958625 -72.9055899647 (WGS84) (X) 957245.17 (Y) 668687.28 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15561 • Range to target: 51.92 US ft • Fish Height: 35.32 US ft • Heading: 224.240 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 110.24 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 0.00 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: String of unknown target with possible line visible. Likely debris.
	**NHH0239** • Sonar Time at Target: 5/3/2017 9:05:28 AM • Click Position 41.2963050177 -72.9056488007 (WGS84) (X) 957229.08 (Y) 668727.09 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15542 • Range to target: 13.48 US ft • Fish Height: 35.32 US ft • Heading: 225.920 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 104.33 US ft	**Dimensions and attributes** • Target Width: 1.14 US ft • Target Height: 0.00 US ft • Target Length: 4.60 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: String of unknown target with possible line visible. Likely debris.
	**NHH0240** • Sonar Time at Target: 5/3/2017 8:56:50 AM • Click Position 41.2963742857 -72.9067159304 (WGS84) (X) 956935.89 (Y) 668752.85 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\011_0856.HSX • Ping Number: 11843 • Range to target: 147.00 US ft • Fish Height: 40.62 US ft • Heading: 225.560 Degrees • Event Number: 111 • Line Name: 011_0856 • Water Depth: 122.70 US ft	**Dimensions and attributes** • Target Width: 1.32 US ft • Target Height: 0.00 US ft • Target Length: 24.53 US ft • Target Shadow: 0.00 US ft • Classification1: Unknown • Classification2: Area of disturbed sediment. • Description: Area of disturbed sediment.

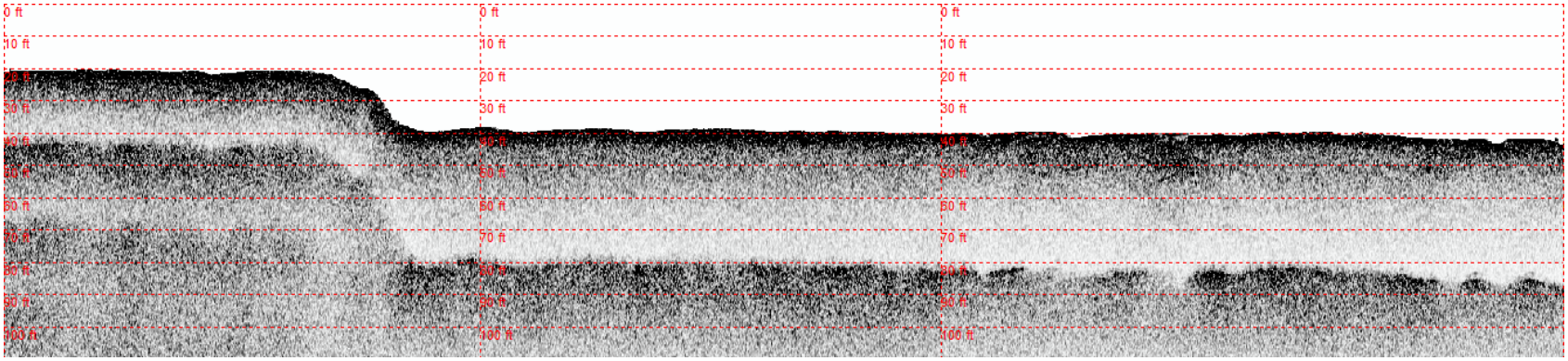
New Haven Harbor May 2017 Side Scan Sonar

	**NHH0241** • Sonar Time at Target: 5/3/2017 9:05:22 AM • Click Position 41.2964883458 -72.9056755219 (WGS84) (X) 957221.85 (Y) 668793.90 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\015_0905.HSX • Ping Number: 15497 • Range to target: 36.27 US ft • Fish Height: 35.32 US ft • Heading: 226.670 Degrees • Event Number: 115 • Line Name: 015_0905 • Water Depth: 102.36 US ft	**Dimensions and attributes** • Target Width: 0.00 US ft • Target Height: 0.00 US ft • Target Length: 241.98 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Numerous small targets adjacent to string of liner targets and terminal facility. Likely debris or rock pile.
	**NHH0242** • Sonar Time at Target: 5/3/2017 8:39:40 AM • Click Position 41.2972250439 -72.9088924248 (WGS84) (X) 956338.38 (Y) 669063.93 (Projected Coordinates) • Map Projection: CT83F • Acoustic Source File: D:\Projects\NewHaven2017\Raw\007_0834.HSX • Ping Number: 4501 • Range to target: 112.03 US ft • Fish Height: 32.42 US ft • Heading: 49.320 Degrees • Event Number: 105 • Line Name: 007_0834 • Water Depth: 85.30 US ft	**Dimensions and attributes** • Target Width: 1.35 US ft • Target Height: 0.00 US ft • Target Length: 26.08 US ft • Target Shadow: 0.00 US ft • Classification1: Debris • Classification2: • Description: Linear target in vicinity of pier. Piling. Investigated with ROV.

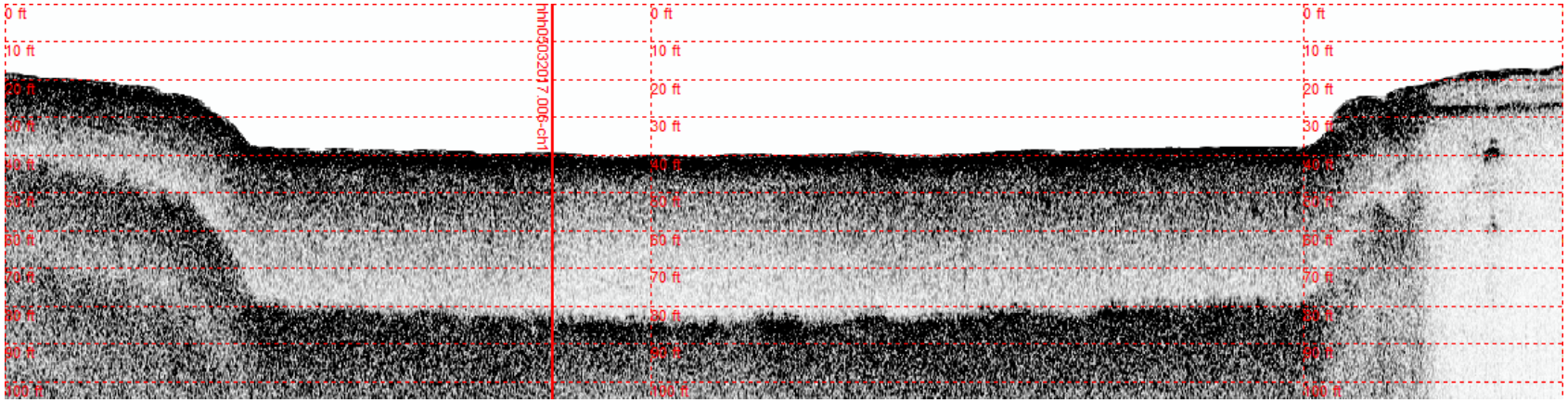
APPENDIX B

SUB-BOTTOM PROFILES

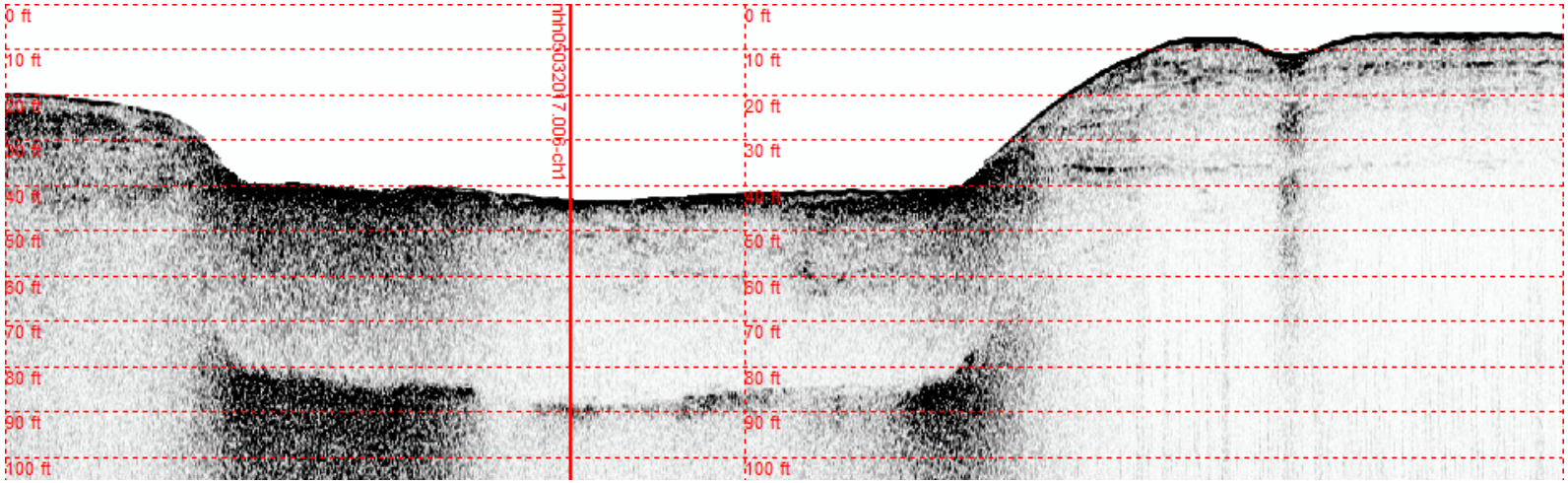
Line: 350+00	File: NHH05032017.000	Frequency: 2-12 kHz	Orientation: West to East



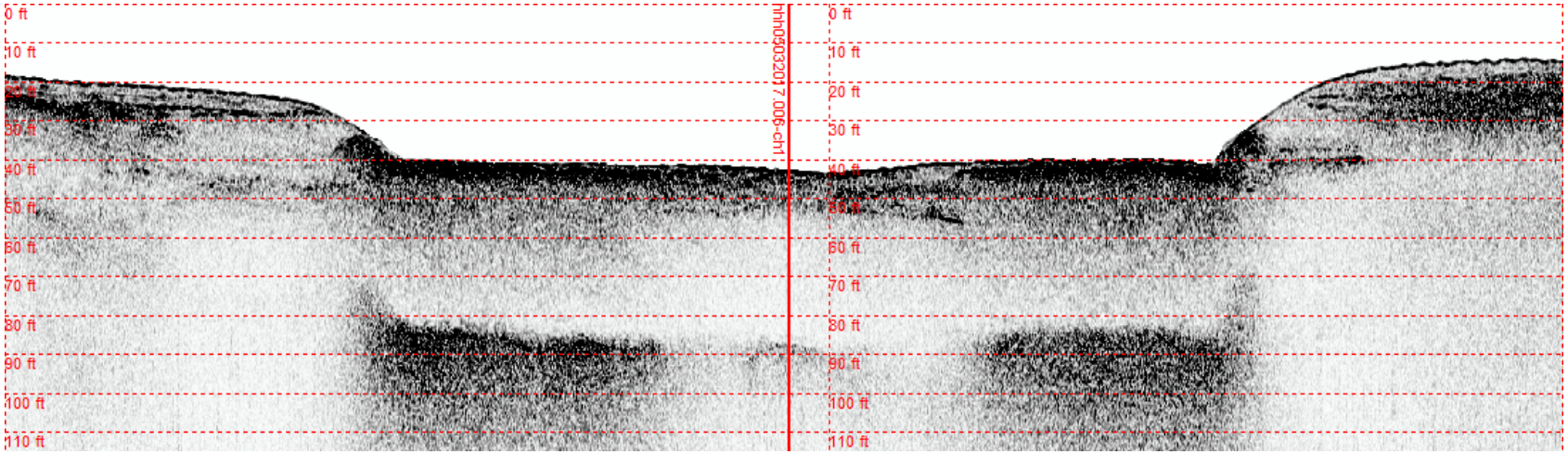
Line: 330+00	File: NHH05032017.001	Frequency: 2-12 kHz	Orientation: West to East



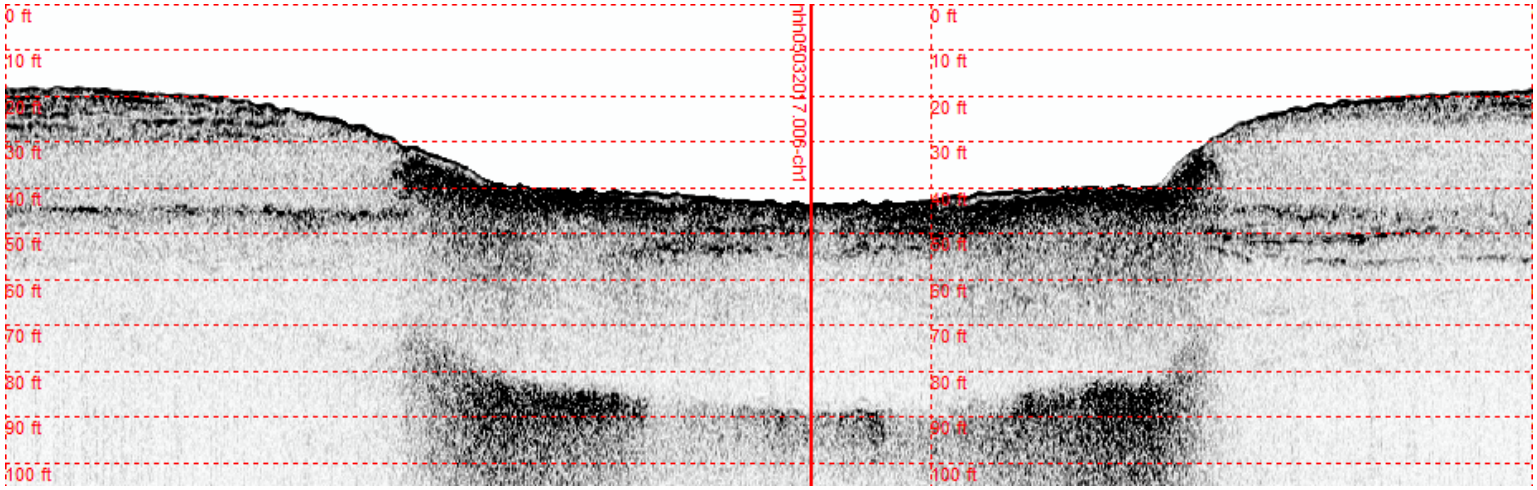
Line: 310+00	File: NHH05032017.002	Frequency: 2-12 kHz	Orientation: West to East



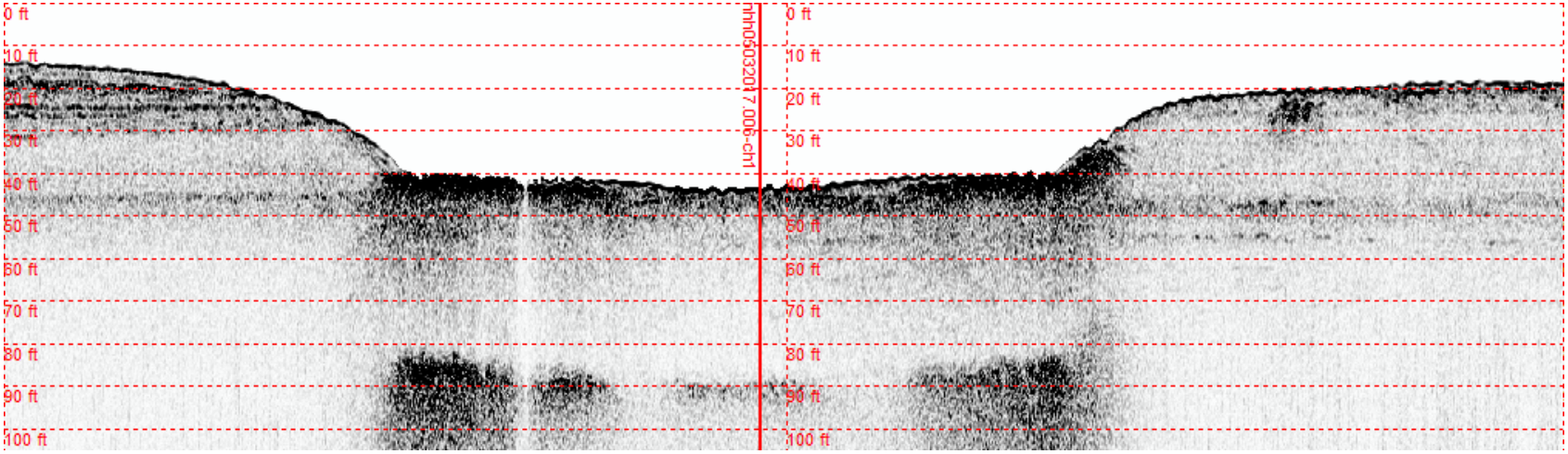
Line: 290+00	File: NHH05032017.003	Frequency: 2-12 kHz	Orientation: West to East



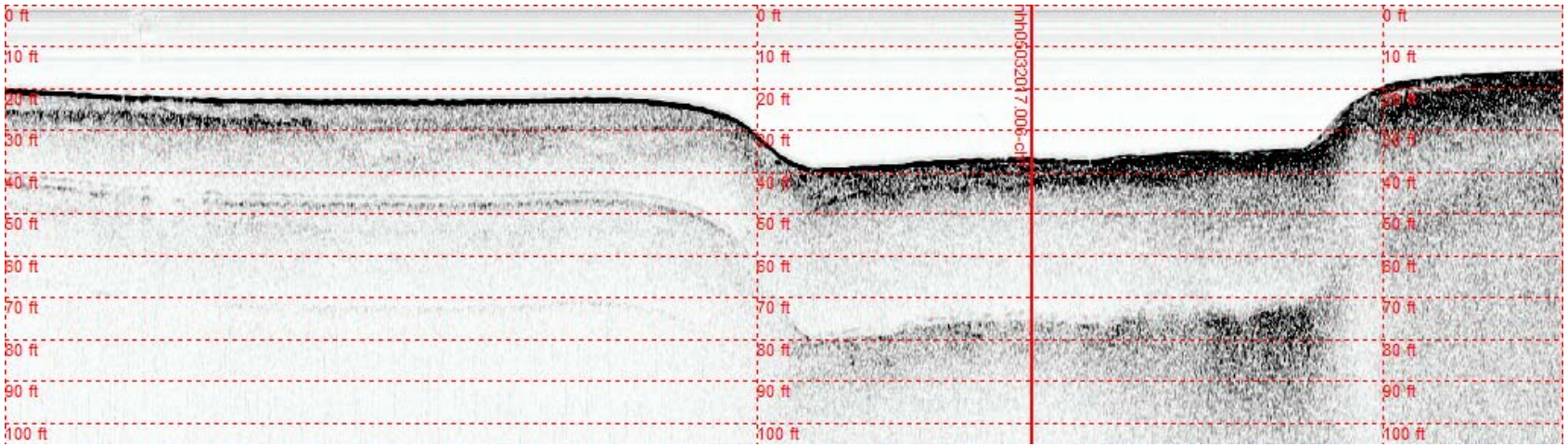
Line: 270+00	File: NHH05032017.004	Frequency: 2-12 kHz	Orientation: West to East



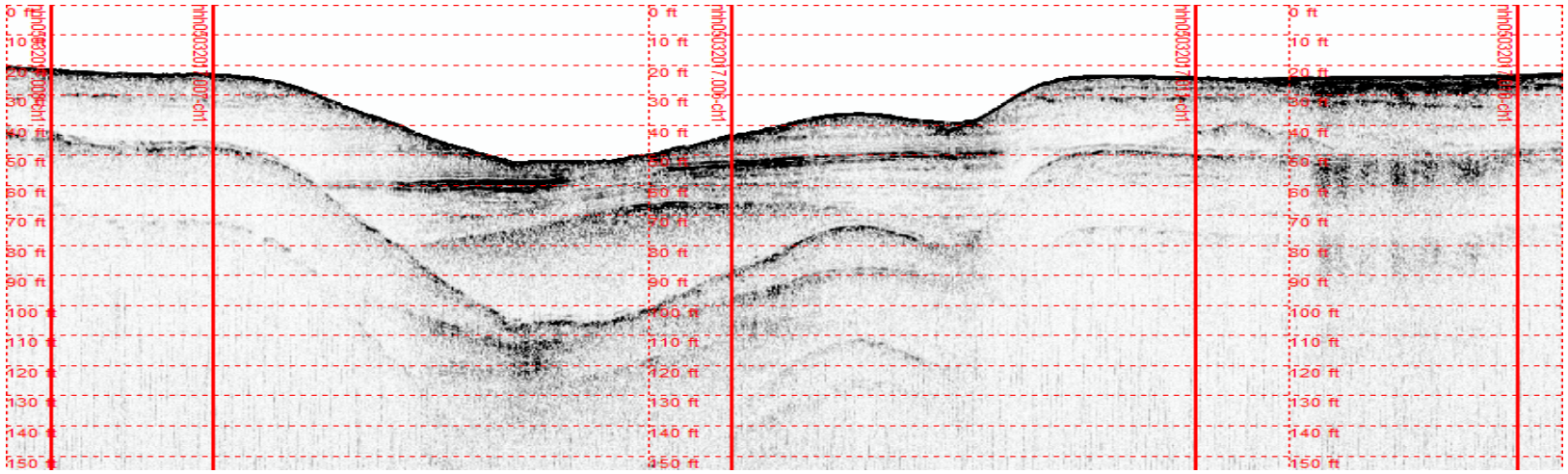
Line: 265+00	File: NHH05032017.005	Frequency: 2-12 kHz	Orientation: West to East



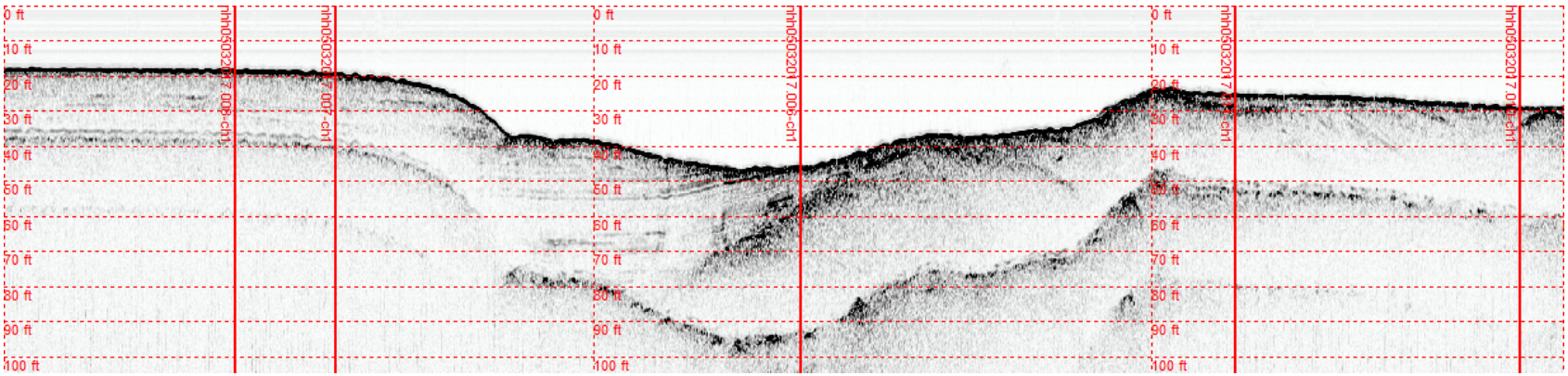
Line: 155+00	File: NHH05032017.027	Frequency: 2-12 kHz	Orientation: West to East



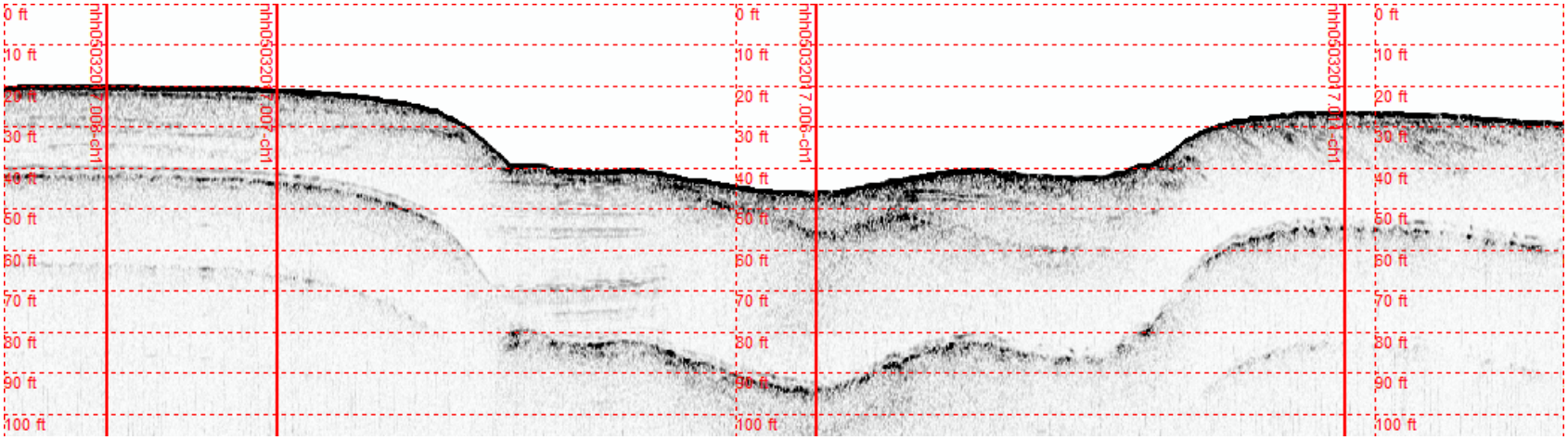
Line: 145+00	File: NHH05032017.026	Frequency: 2-12 kHz	Orientation: West to East



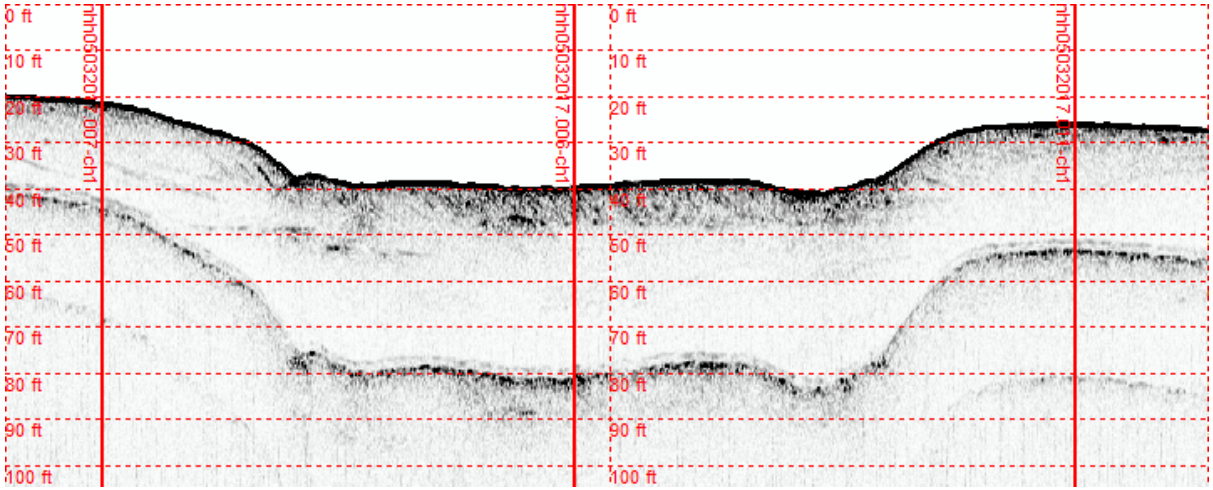
Line: 135+00	File: NHH05032017.025	Frequency: 2-12 kHz	Orientation: West to East



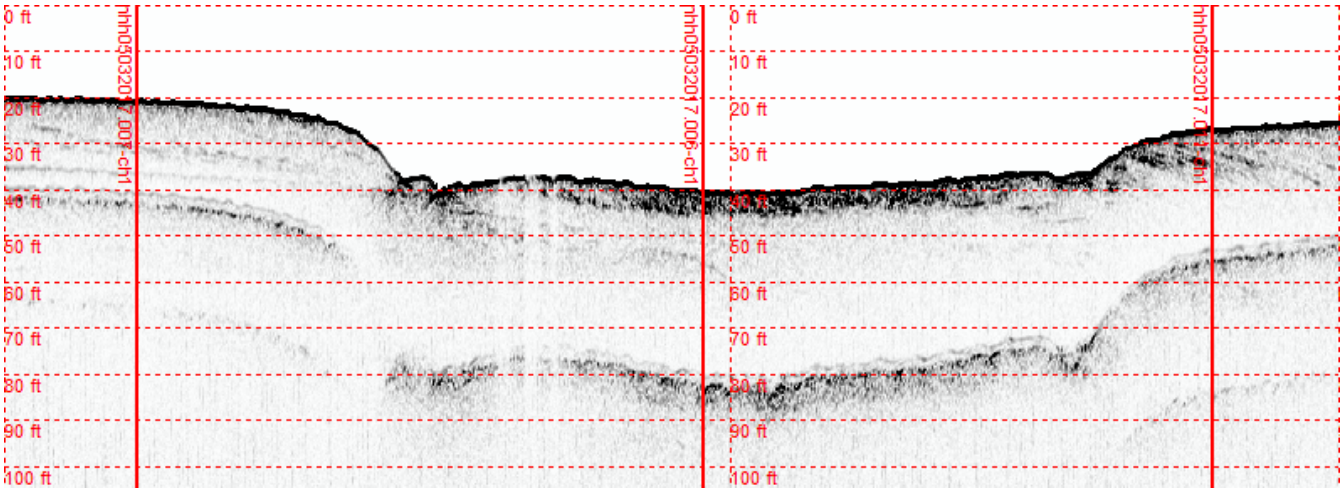
Line: 135+00	File: NHH05032017.009	Frequency: 2-12 kHz	Orientation: West to East



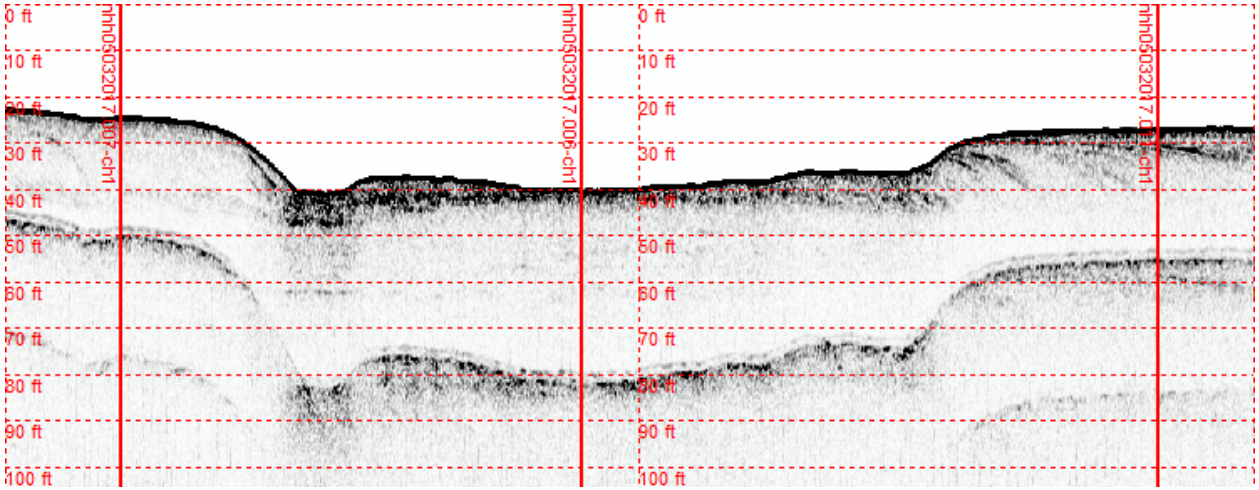
Line: 125+00	File: NHH05032017.024	Frequency: 2-12 kHz	Orientation: West to East



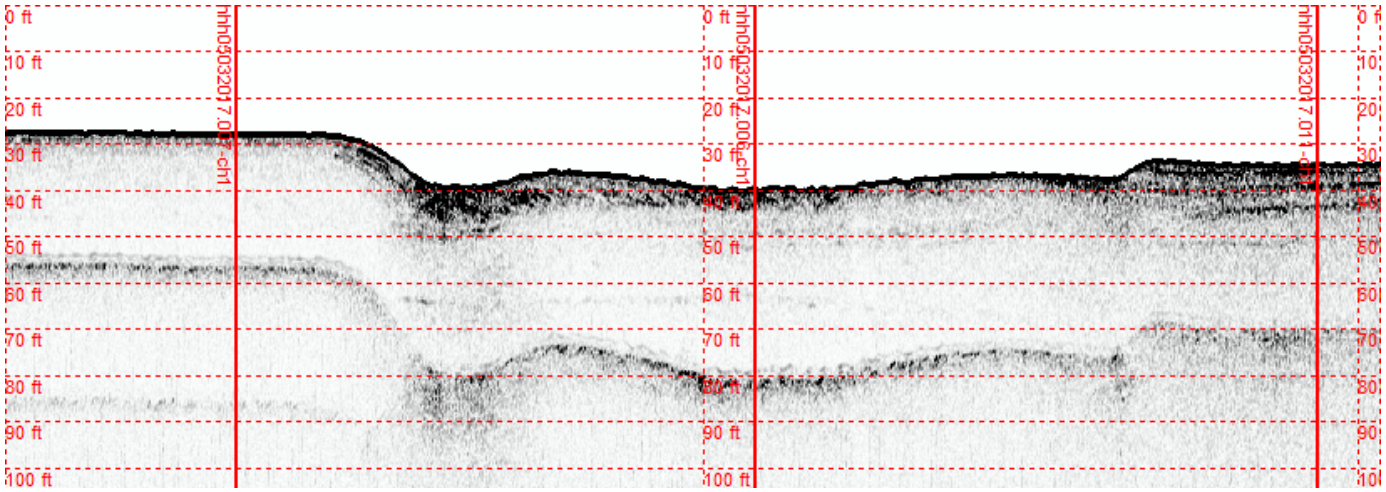
Line: 115+00	File: NHH05032017.023	Frequency: 2-12 kHz	Orientation: West to East



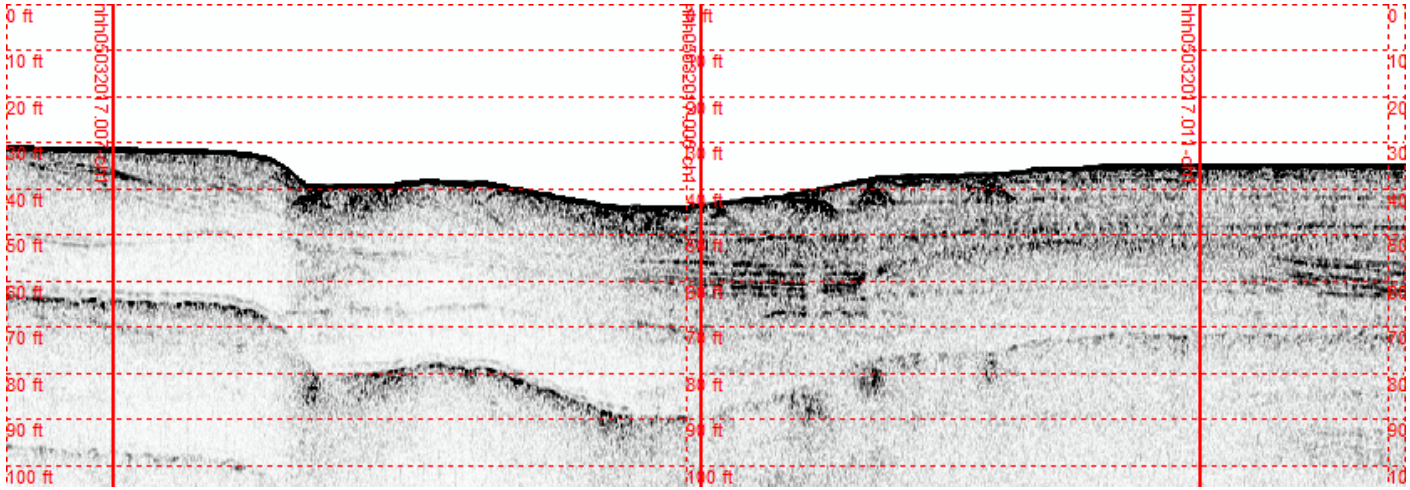
Line: 105+00	File: NHH05032017.022	Frequency: 2-12 kHz	Orientation: West to East



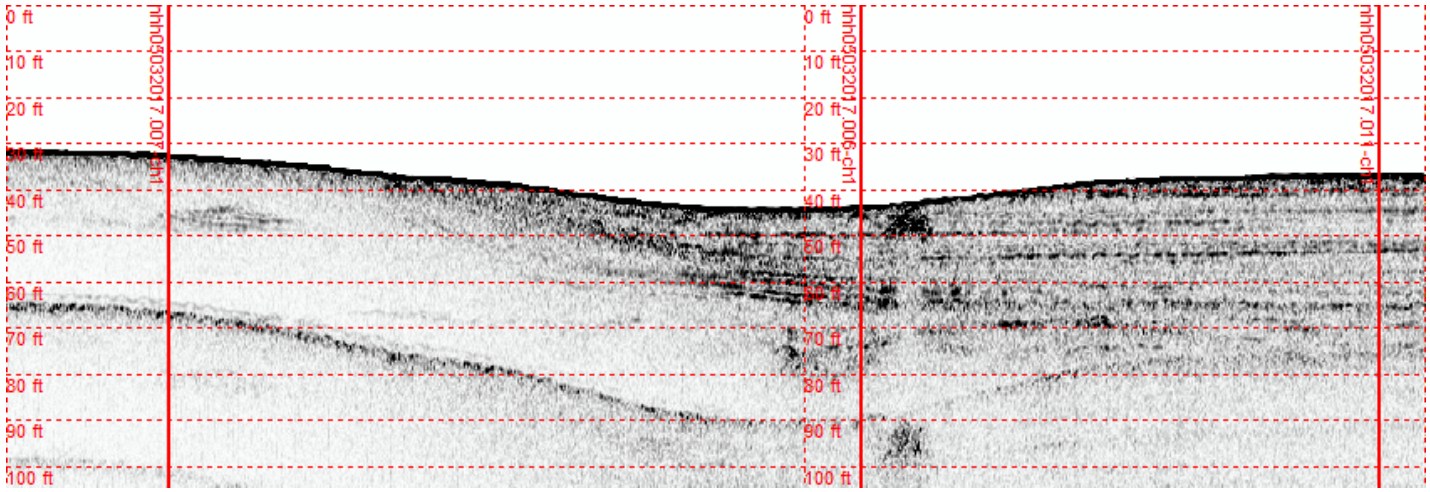
Line: 95+00	File: NHH05032017.021	Frequency: 2-12 kHz	Orientation: West to East



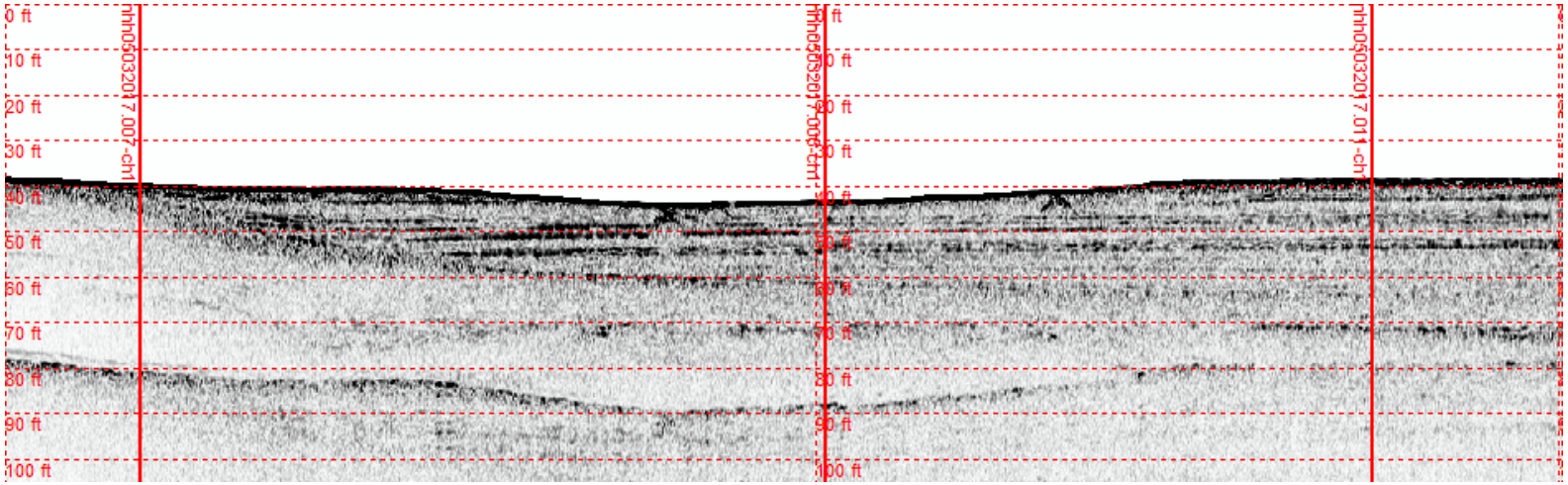
Line: 85+00	File: NHH05032017.020	Frequency: 2-12 kHz	Orientation: West to East



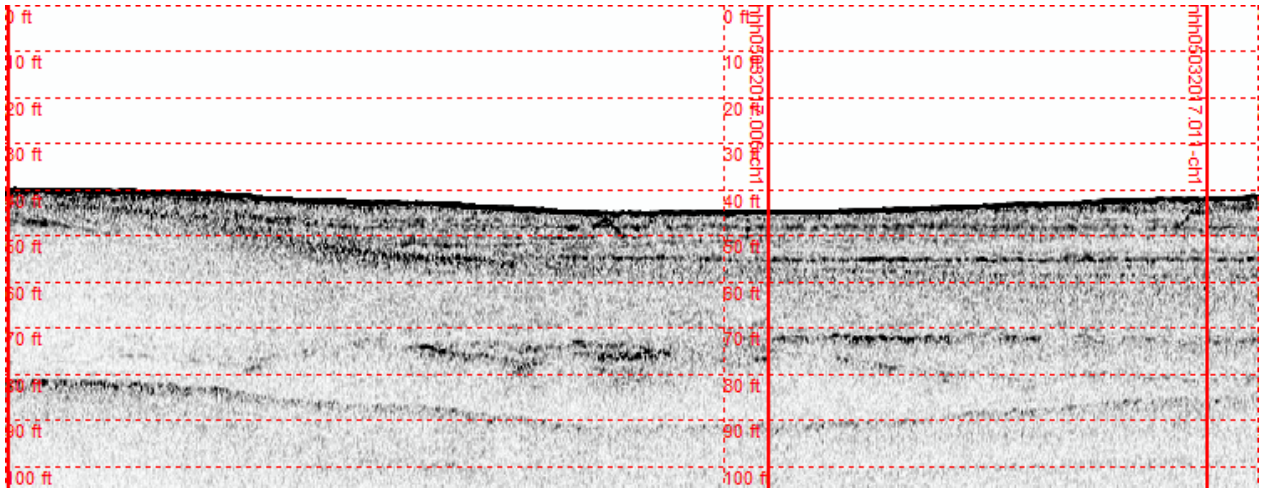
Line: 75+00	File: NHH05032017.019	Frequency: 2-12 kHz	Orientation: West to East



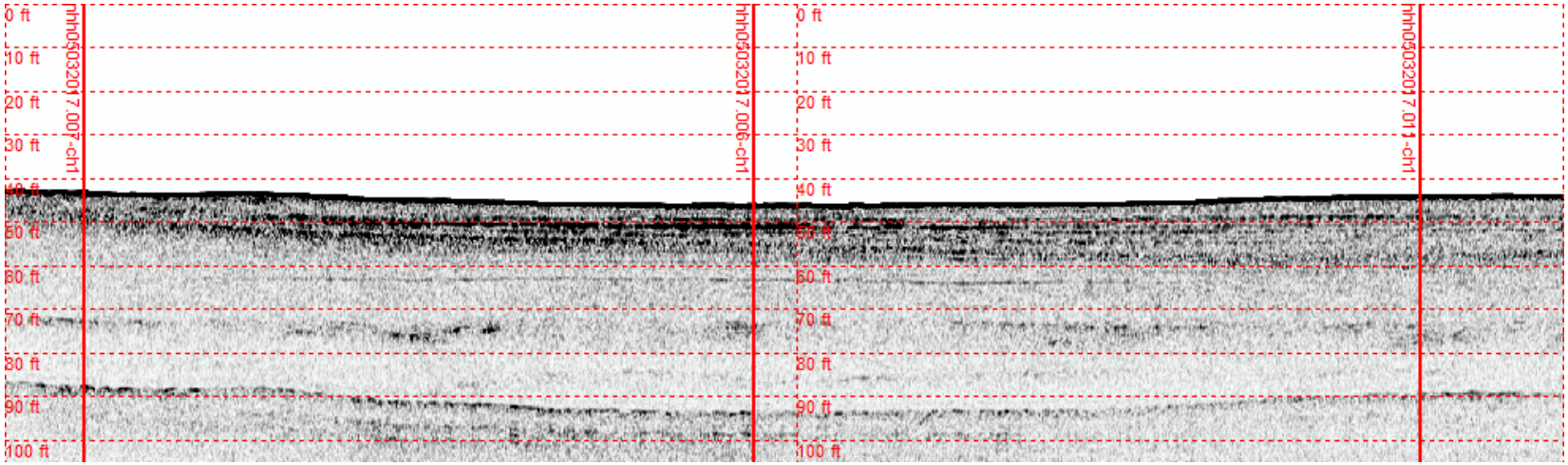
Line: 65+00	File: NHH05032017.019	Frequency: 2-12 kHz	Orientation: West to East



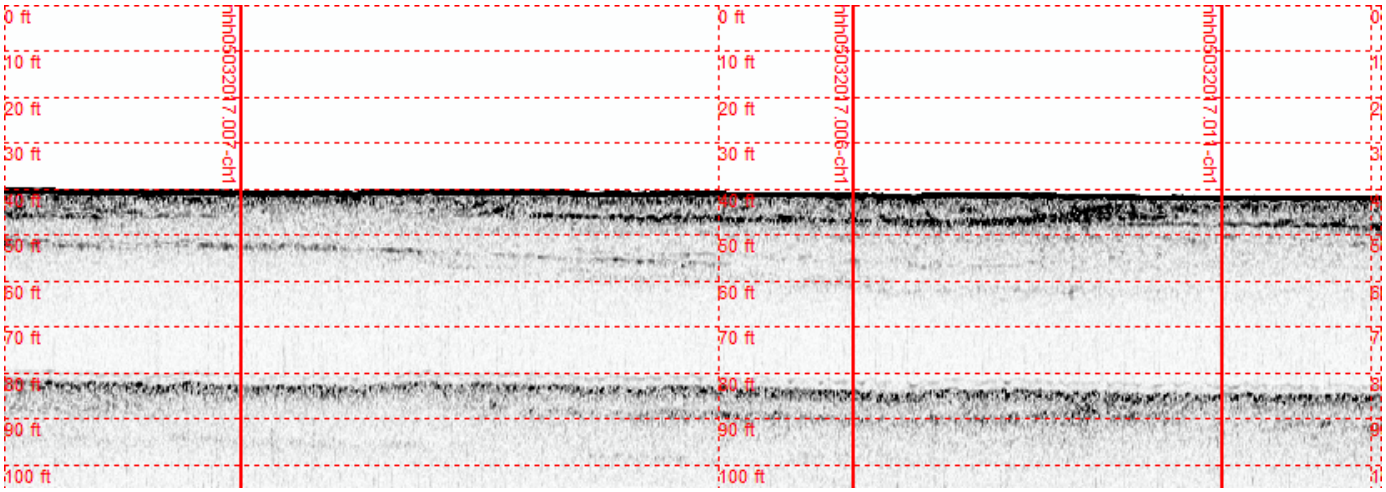
Line: 55+00	File: NHH05032017.017	Frequency: 2-12 kHz	Orientation: West to East



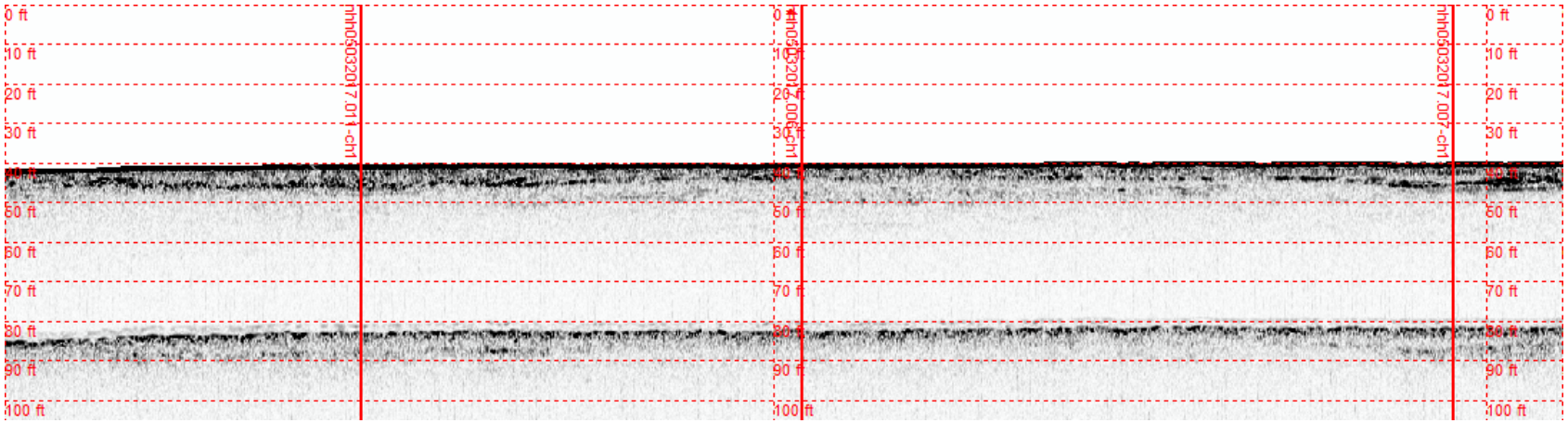
Line: 45+00	File: NHH05032017.016	Frequency: 2-12 kHz	Orientation: West to East



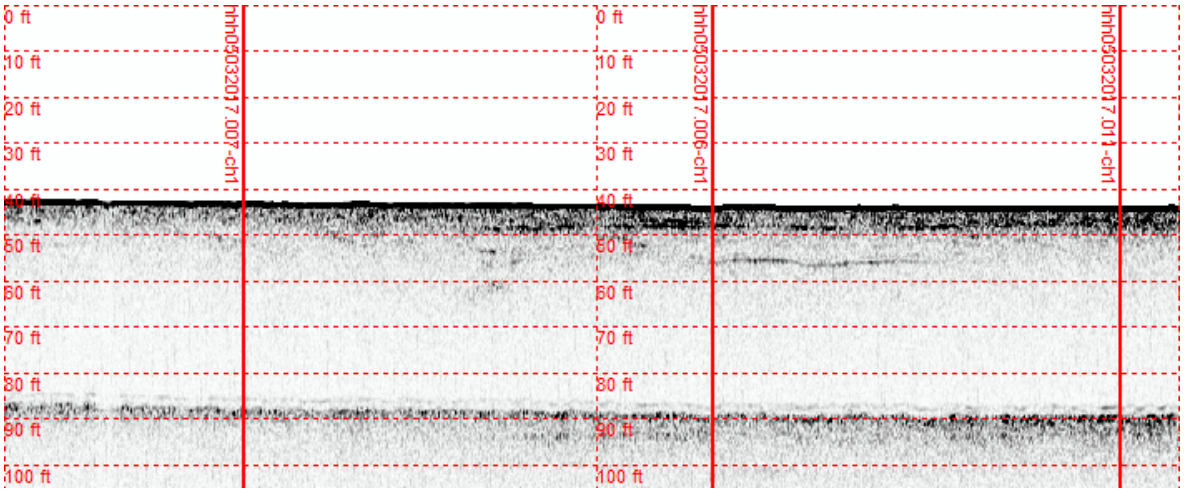
Line: 35+00	File: NHH05032017.015	Frequency: 2-12 kHz	Orientation: West to East



Line: 25+00	File: NHH05032017.014	Frequency: 2-12 kHz	Orientation: West to East

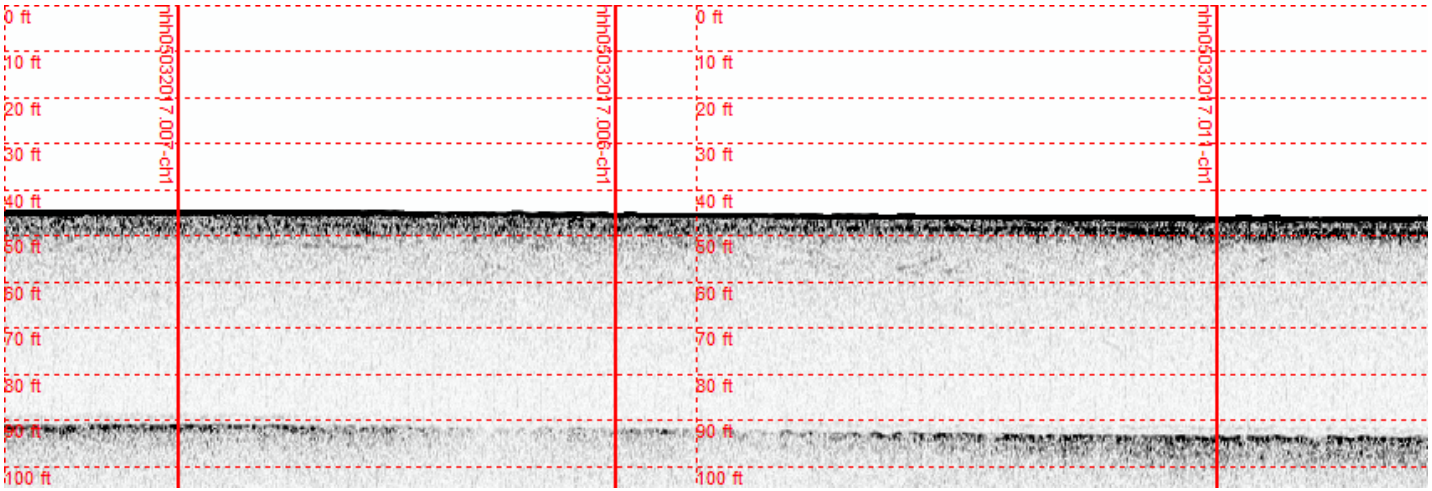


Line: 15+00	File: NHH05032017.013	Frequency: 2-12 kHz	Orientation: West to East

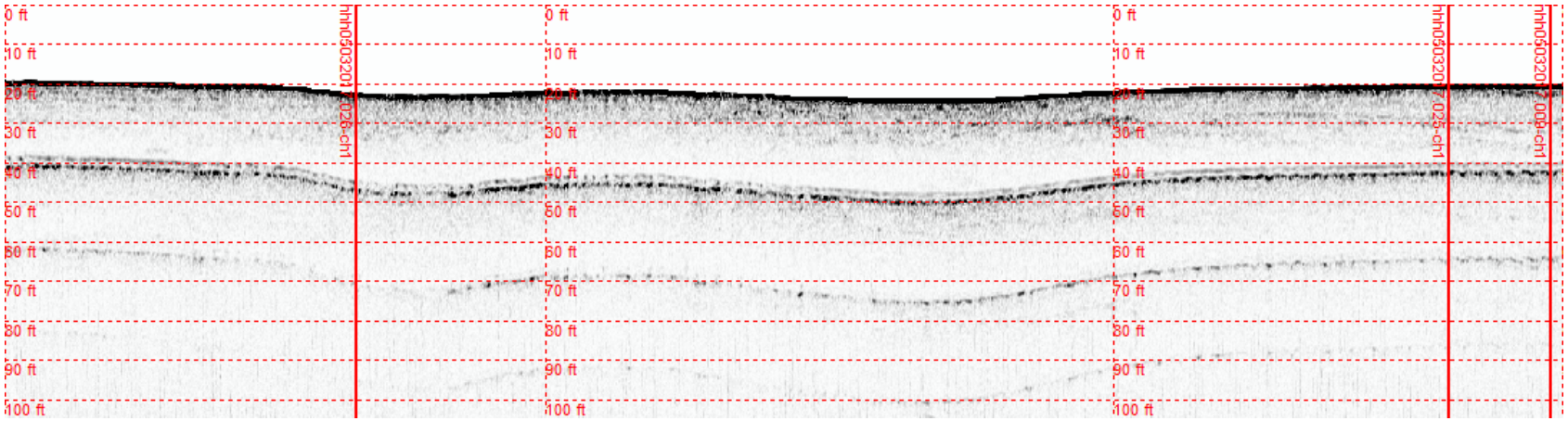


Appendix B: Sub-Bottom Profiles

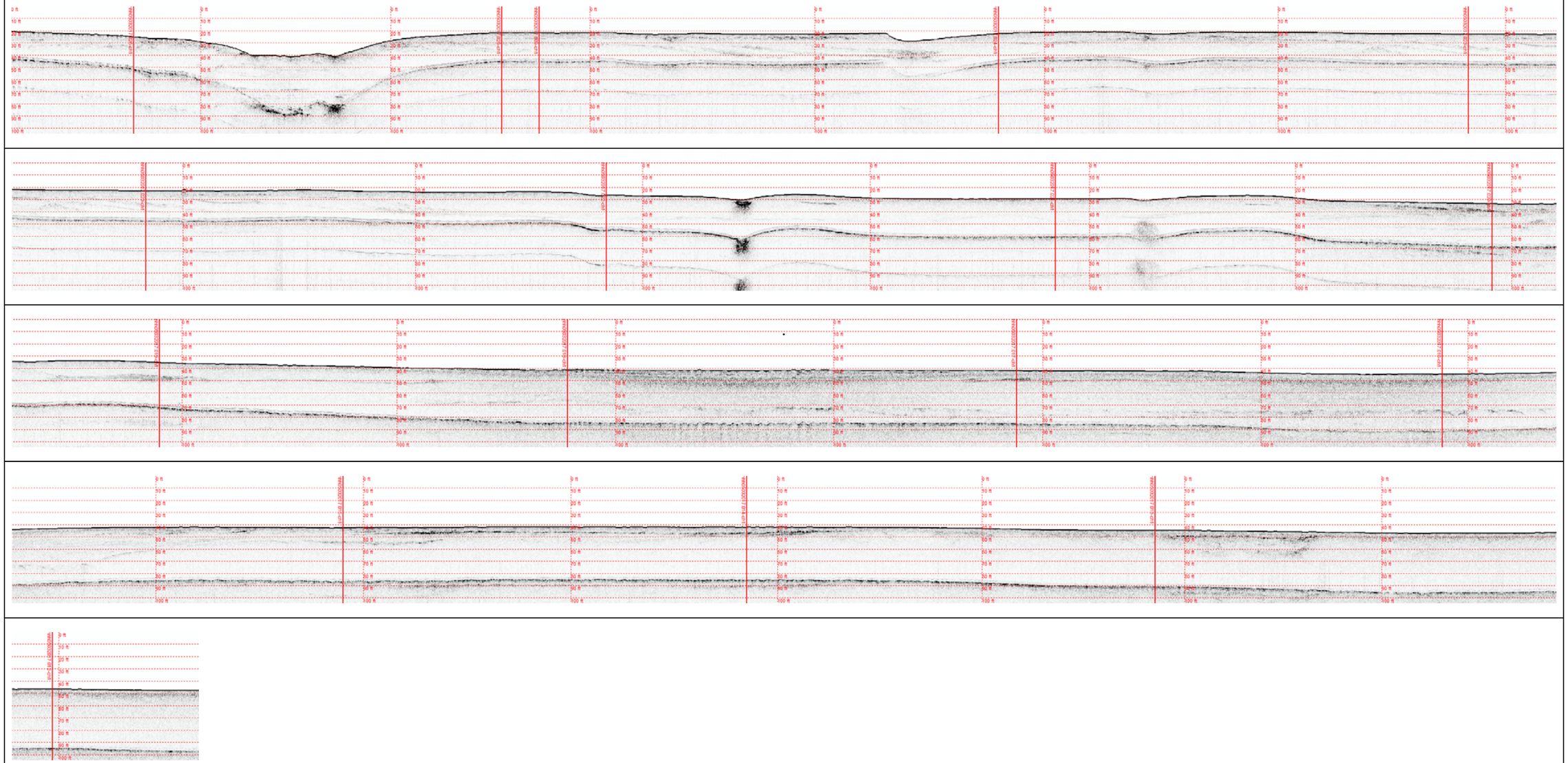
Line: 5+00	File: NHH05032017.012	Frequency: 2-12 kHz	Orientation: West to East



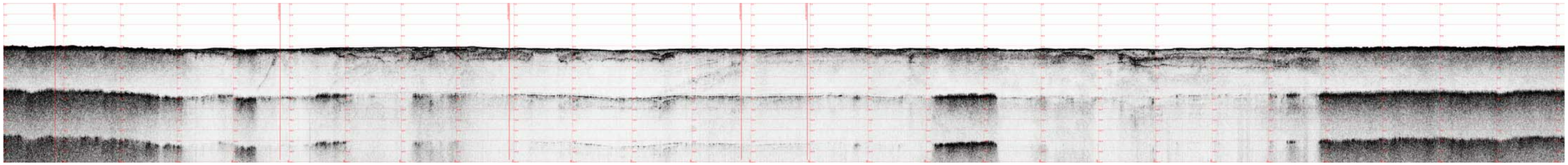
Line: 1	File: NHH05032017.008	Frequency: 2-12 kHz	Orientation: North to South

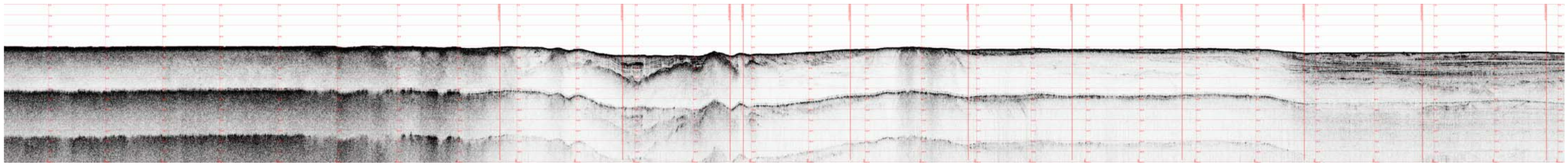


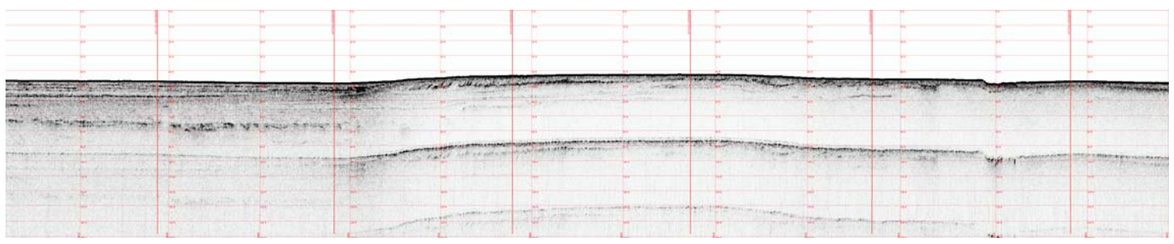
Line: 2	File: NHH05032017.007	Frequency: 2-12 kHz	Orientation: North to South



Line: 3	File: NHH05032017.006	Frequency: 2-12 kHz	Orientation: North to South







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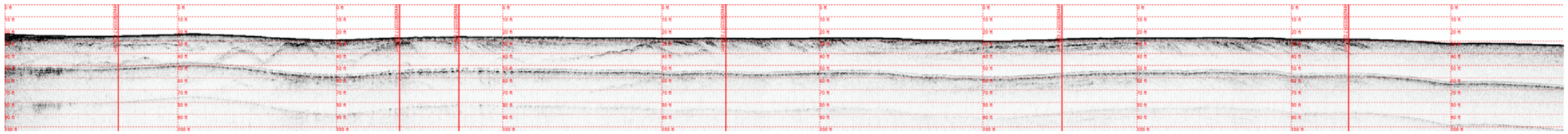

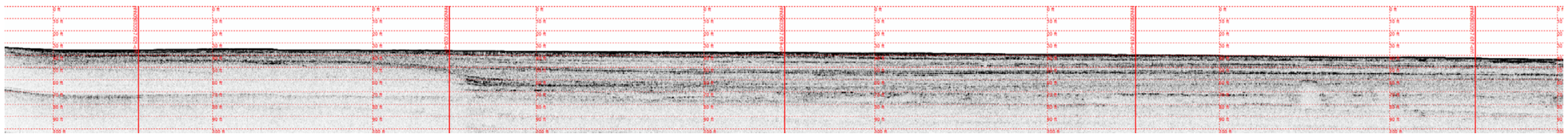

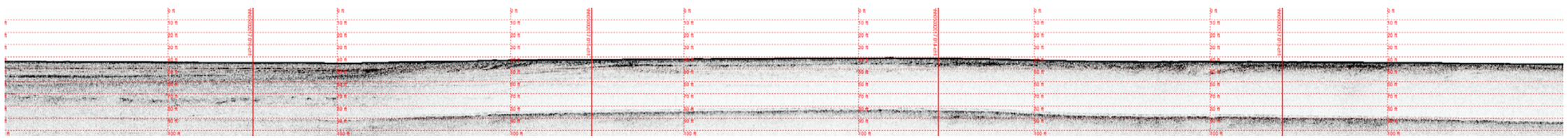

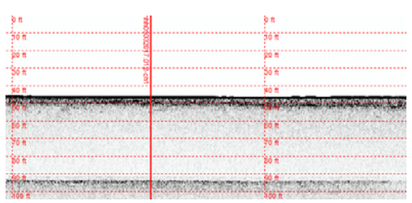

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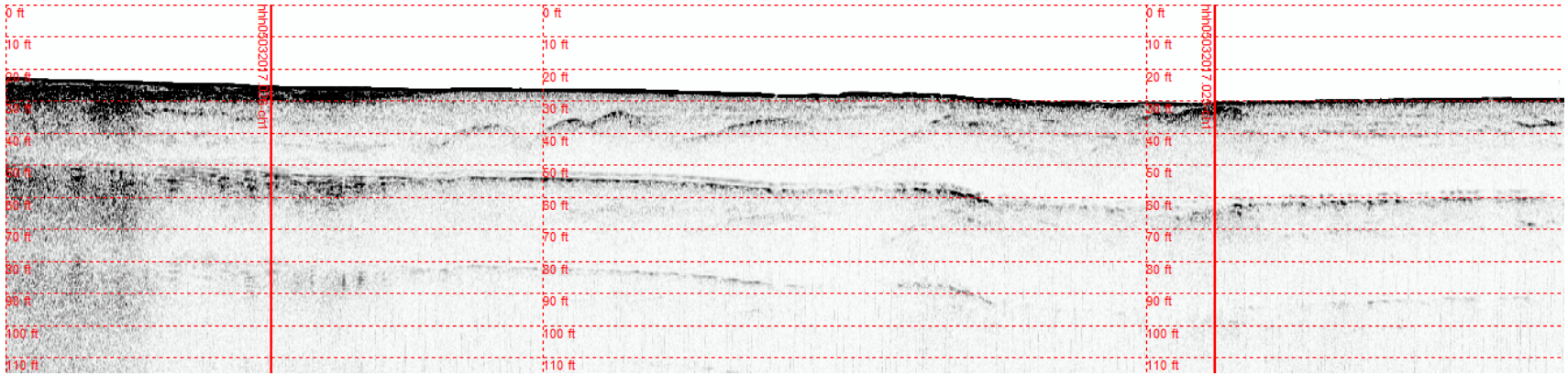


APPENDIX C

VIDEO SURVEY TARGET DATABASE

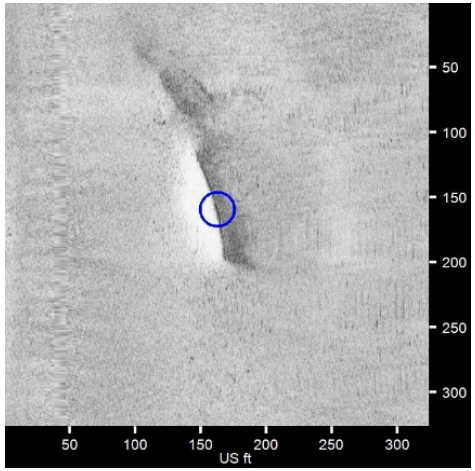
SONAR TARGET: NHH-019				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.225366	-72.913218	642883.41	955100.08

Source File: 008_1415.HSX	Target Length: 85 feet	Target Width: 12 feet	Classification: Shell Reef

Survey Notes:

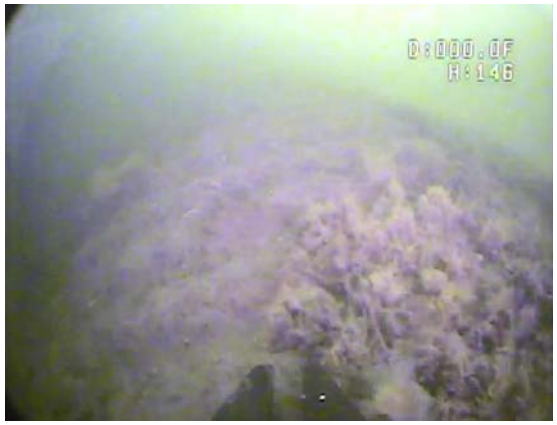
Vessel anchored directly over sonar target. ROV footage documented an elongated Crepidula sp. reef with a linear furrow running along the edge furthest from the channel. The shell area created a high intensity return in the side scan sonar imagery followed by a data gap in the area corresponding to the narrow depression. This was initially interpreted as a linear structure that was proud of the seafloor. Based on the ROV footage the target classification survey footage the classification for this target was changed to from ‘debris – possible shipwreck’ to ‘isolated sediment feature – shell reef’.

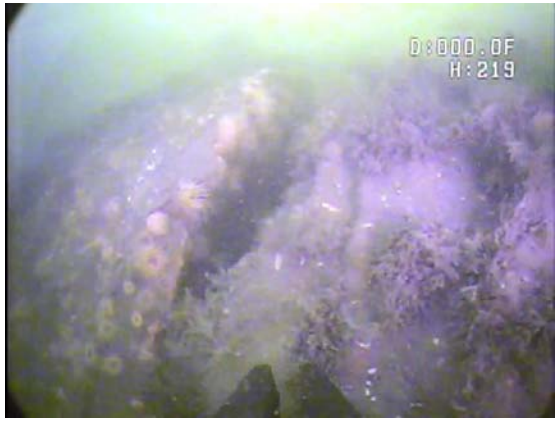
Side Scan Sonar Image:



SONAR TARGET: NHH-0153				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.269442	-72.913172	658942.99	955143.17

Source File: 007_1642.HSX	Target Length: 31 feet	Target Width: 5 feet	Classification: Pipeline

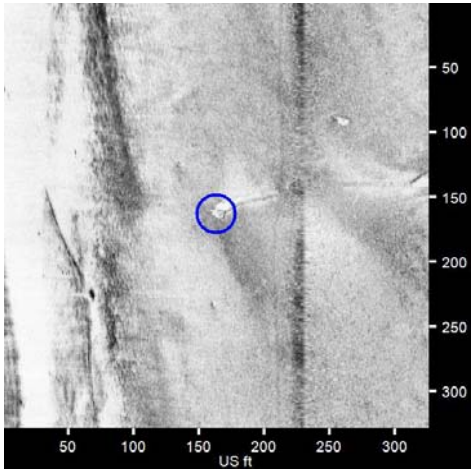




Survey Notes:

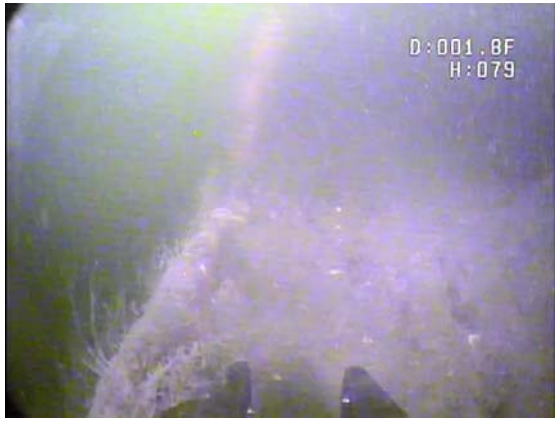
Vessel anchored directly over sonar target. Primary target is the open mouth of an exposed corrugated steel/ concrete pipeline extending west of channel. No flow was apparent at the time of inspection. ROV footage documented mouth and approximately 20 feet of pipeline. Areas of heavy marine growth and several fractures were noted. Anchor points and scattered debris were present on the adjacent seafloor.

Side Scan Sonar Image:



SONAR TARGET: NHH-0176				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.277411	-72.913807	661847.27	954974.21

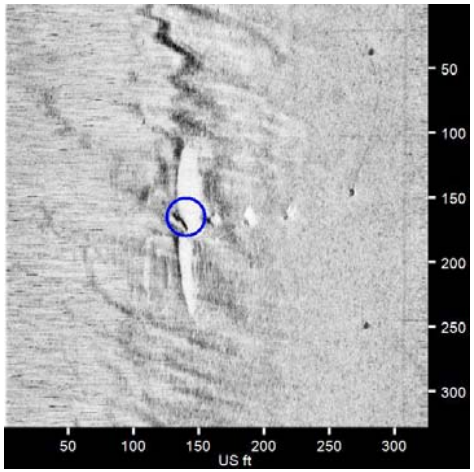
Source File: 008_1747.HSX	Target Length: 129 feet	Target Width: 20 feet	Classification: Debris - Possible Wreck



Survey Notes:

Vessel anchored 20 feet from sonar target on channel side. ROV inspection documented a large and irregularly shaped metallic object with heavy marine growth. The target was partially buried in the sediment and had no distinguishing markings. Due to limited visibility it was not possible to obtain a wide angle view of the entire target but close up video footage documented a hollow structure with an elongated and rounded form. Video footage suggests the presence of rolled metal edges but the amount of marine growth present makes this observation uncertain. Based on the information available, a classification of 'debris – possible wreckage' was assigned to the target.

Side Scan Sonar Image:



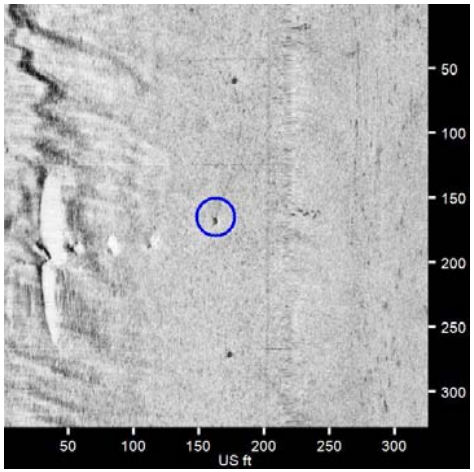
SONAR TARGET: NHH-0178				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.277485	-72.913345	661873.91	955101.06

Source File: 008_1747.HSX	Target Length: 3.5 feet	Target Width: 3 feet	Classification: Fishing Gear

Survey Notes:

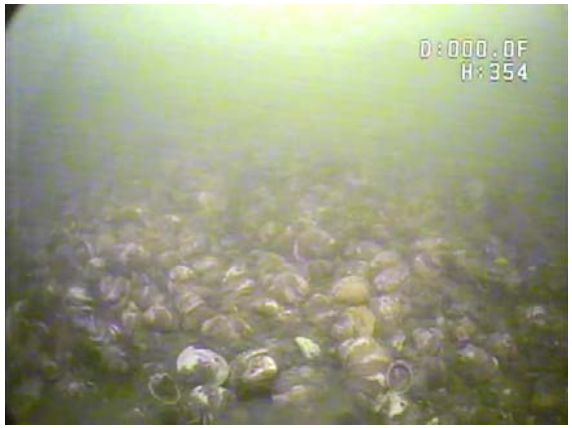
Vessel anchored 30 feet west of target. Sunken line was located with ROV and followed to location of derelict lobster pot with heavy marine growth. Target was proud of the seafloor. Mesh size was estimated to be 1 inch. Target was classified as derelict fishing gear.

Side Scan Sonar Image:



SONAR TARGET: NHH-0203				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.281970	-72.910550	663506.74	955872.45

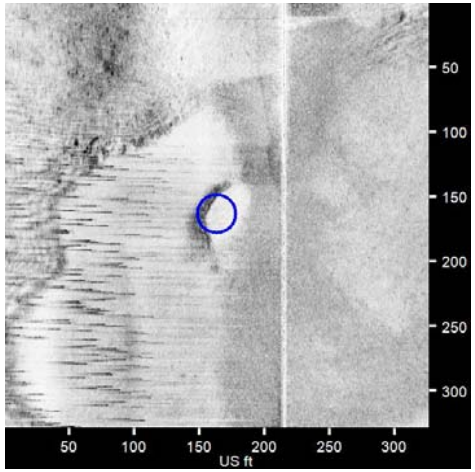
Source File: 015_1503.HSX	Target Length: 53 feet	Target Width: 15 feet	Classification: Shell Reef



Survey Notes:

Vessel anchored directly over target. ROV footage documented a large gravel and shell reef along the eastern edge of the existing federal channel. Shell noted to be mostly *Crepidula* sp. Small dip in elevation was observed along western edge of reef. Ambient seafloor sediment was fine sand and silt. Target was classified as a shell reef.

Side Scan Sonar Image:



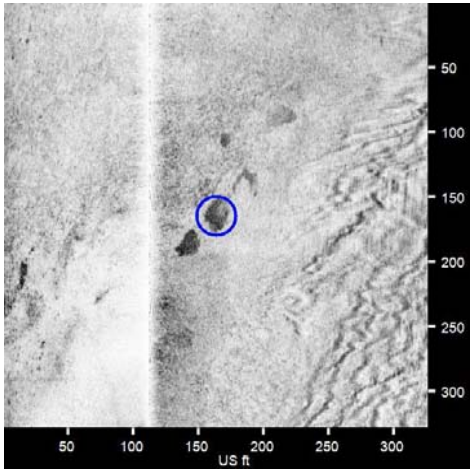
SONAR TARGET: NHH-0205				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.282889	-72.910015	663841.24	956020.07

Source File: 015_1503.HSX	Target Length: 63 feet	Target Width: 21 feet	Classification: Disturbed Sediment

Survey Notes:

Vessel anchored approximately 25 feet east of target along edge of channel. Target was an area of partially buried *laminaria* sp. and mixed macroalgae along the toe of the existing channel side slope. Adjacent seafloor noted to be featureless fine grained sediment. Amount of deposition observed suggested slumping of adjacent slope material. Target was classified as an area of disturbed sediment.

Side Scan Sonar Image:



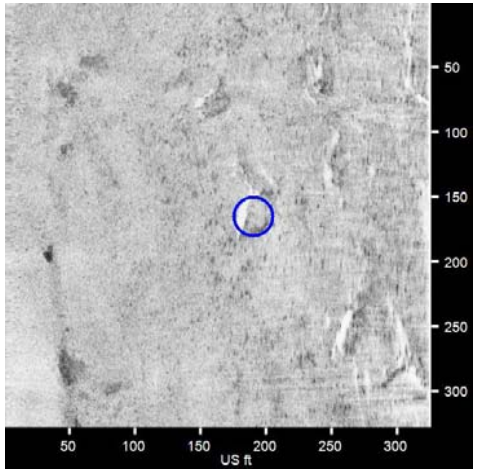
SONAR TARGET: NHH-0215				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.288226	-72.911063	665786.35	955735.65

Source File: 008_1747.HSX	Target Length: 21 feet	Target Width: 13 feet	Classification: Coarse Substrate

Survey Notes:

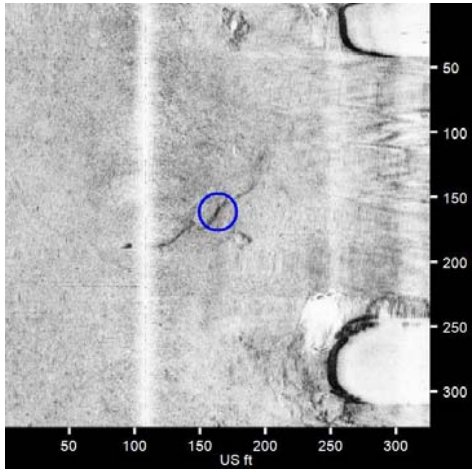
Vessel anchored approximately 30 feet north of target. ROV footage documented multiple isolated areas of macroalgae and dense *Crepidula* sp. on an otherwise featureless seafloor. Ambient sediments were predominantly fine grained material. Target was classified as isolated areas of coarse substrate.

Side Scan Sonar Image:



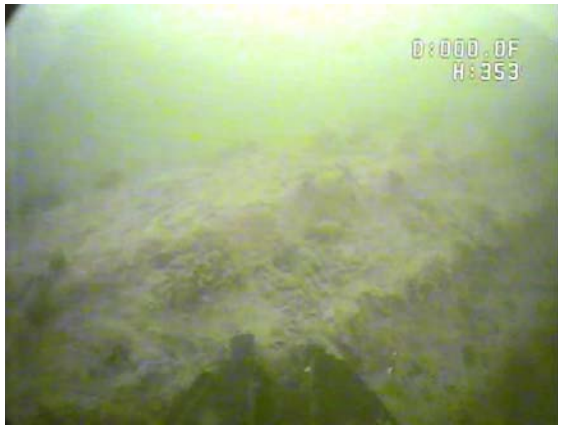
SONAR TARGET: NHH-0217				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.289873	-72.908348	666385.06	956482.99

Source File: 008_1747.HSX	Target Length: 95 feet	Target Width: < 1 foot	Classification: Debris - Cable

Survey Notes:	Side Scan Sonar Image:
Vessel anchored directly over target. Poor visibility due to high turbidity in water column. After multiple sweeps the ROV picked up a section of discarded cable adjacent to the terminal facility on the eastern shore. Ambient seafloor was featureless fine grained sediment. Target was classified as 'debris – cable'.	

SONAR TARGET: NHH-0221				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.292702	-72.912517	667417.86	955339.24

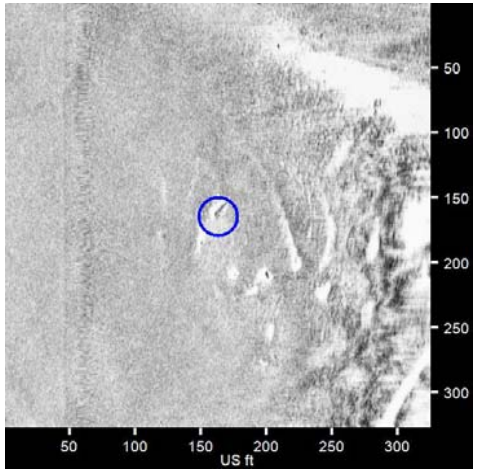
Source File: 005_1455.HSX	Target Length: 11 feet	Target Width: 2.5 feet	Classification: Debris - Unidentified



Survey Notes:

Vessel anchored approximately 10 feet north of target. ROV footage documented an unidentifiable target with heavy marine growth in existing anchorage area. Partially buried with attached line. Ribbing or multiple lines running along the length of object. Target was classified as ‘debris – unidentified’.

Side Scan Sonar Image:



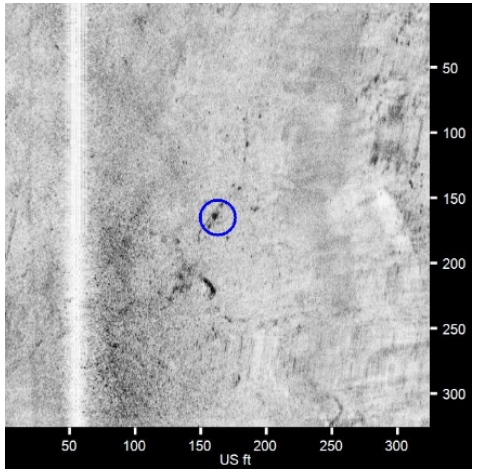
SONAR TARGET: NHH-0228				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.295380	-72.907333	668391.22	956765.57

Source File: 015_0905.HSX	Target Length: - feet	Target Width: - feet	Classification: Debris - Unidentified

Survey Notes:

Vessel anchored approximately 30 feet south of target. Multiple sonar contacts identified from side scan sonar data with a possible line visible. No target found with the ROV after multiple passes. Fish caucus noted in survey area. Ambient seafloor was featureless fine grained sediment. High turbidity and location in harbor suggests reworking of sediment. Target was classified as 'debris – unidentified'.

Side Scan Sonar Image:



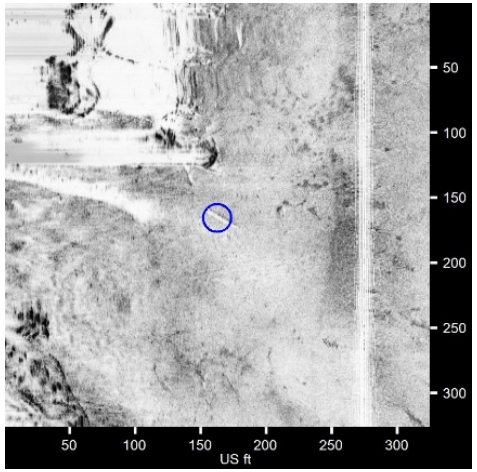
SONAR TARGET: NHH-0242				
Target Location:	Latitude: (NAD83):	Longitude (NAD83):	Northing (CTSP83FT):	Easting (CTSP83FT):
	41.297225	-72.908892	669063.93	956338.38

Source File: 015_0905.HSX	Target Length: 27 feet	Target Width: 1.5 feet	Classification: Debris - Piling

Survey Notes:

Vessel anchored 10 feet south of target. ROV footage documented a fallen timber piling in vicinity of pier along western side of channel. Fine layer of marine growth and damage to the piling were noted. Ambient seafloor is predominantly fine grained sediment. Target was classified as ‘debris – piling’.

Side Scan Sonar Image:



NEW HAVEN HARBOR
CONNECTICUT
NAVIGATION IMPROVEMENT PROJECT

INTEGRATED FEASIBILITY REPORT
AND ENVIRONMENTAL IMPACT STATEMENT

SUPPORTING TECHNICAL DOCUMENT #3
AECOM SUPPLEMENTAL SEDIMENT EVALUATION

USACE CONTRACT NO. W912WJ-17-D-0003
Delivery Order No. W912WJ18F0109

Final Report: Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project:

New Haven Harbor Navigation Improvement Project New Haven, Connecticut

Prepared for

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

Prepared by
AECOM
250 Apollo Drive
Chelmsford, MA 01824

Final Report: Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project:

New Haven Harbor Navigation Improvement Project New Haven, Connecticut

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12 April, 2019
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Acronyms

ARO	Aquatic Resource Organisms, Inc.
AWQC	Ambient Water Quality Criteria
CLDS	Central Long Island Sound Disposal Site
COC	Chain of Custody
CR	CR Environmental
CWA	Clean Water Act
DGPS	Differential Global Positioning System
DM	Dredged Material
EC50	Median Effective Concentration
EPA	U.S. Environmental Protection Agency
ERL	Effects Range Low
ERM	Effects Range Median
ESI	EnviroSystems, Inc.
FNP	Federal Navigation Project
FSP	Field Sampling Plan
HMW	High Molecular Weight
ICP/MS	Inductively Coupled Plasma Mass Spectrometry
LC50	Median Lethal Concentration
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LMW	Low Molecular Weight
MDL	Method Detection Limit
MLLW	Mean Lower Low Water
MPRSA	Marine Protection, Research, and Sanctuaries Act
NAE	U.S. Army Corps of Engineers, New England District
NOAA	National Oceanic and Atmospheric Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PHB	Phil Harrington Bait
PWS	Performance Work Statement
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RIM	Regional Implementation Manual
RL	Reporting Limit
RPD	Relative Percent Difference
SPP	Suspended Particulate Phase
SRM	Standard Reference Material
TOC	Total Organic Carbon
USACE	US Army Corps of Engineers

1. Introduction

The New England District (NAE) of the US Army Corps of Engineers (USACE) is currently preparing a suitability determination to assess disposal options for materials which may be generated during improvement dredging activities proposed at the New Haven Harbor Federal Navigation Project (FNP) located in New Haven, Connecticut. This report summarizes efforts performed by the AECOM Team (comprised of AECOM Technical Services, Inc., Ocean Surveys Inc. [OSI], EnviroSystems, Inc. [ESI], and Alpha Analytical, Inc. [Alpha]) under Delivery Order # W912WJ-18-F-0109 of USACE Contract W912WJ-17-D-0003.

The AECOM Team work scope included provision of logistical support to NAE and laboratory analysis for the generation of pertinent environmental data. Data generated under this task order will be used by NAE to assess the suitability of materials to be dredged from the New Haven Harbor FNP (depicted in Figure 1) for potential beneficial reuse, for unconfined open water disposal at the Central Long Island Sound Disposal Site (CLDS) and/or for disposal in proposed Confined Aqueous Disposal Cells (CAD Cells) located within the harbor. The CLDS and the corresponding reference locations are depicted in Figure 2.

This report summarizes the methodology used for field sampling and laboratory analysis, the results of the testing and the quality assurance/quality control (QA/QC) details regarding the analyses.

1.1 Project Background

USACE NAE is currently preparing a feasibility study for improvements to the New Haven Harbor FNP. Anticipated project components include: deepening and widening the main ship channel, widening the channel bend at Southwest Ledge, straightening the channel bend downstream of the existing turning basin; and relocating and deepening the turning basin. These combined actions would require the mechanical removal of up to 4,500,000 cubic yards of sediment and up to 32,000 cubic yards of rock depending on the selected channel alignment and dimensions. Dredged sediments are expected to be a mix of poorly graded sand and fine grained material within the existing channel profile and adjacent harbor seafloor with glaciofluvial deposits at depth. To the extent practical, suitable dredged material will be beneficially reused for marsh creation, habitat restoration, and/or as cover of historic dredged material disposal mounds at the CLDS. Unsuitable material will be placed in a CAD cell to be located in the inner harbor.

NAE completed a sampling and testing effort during the summer of 2017 in order to characterize the materials to be dredged. NAE later revised the alignment of the proposed channel and turning basin based on the results of ship simulation modeling. In addition, a portion of the material from the inner harbor was determined to be unsuitable for unconfined open water placement, based on the results of suspended particulate phase and whole sediment bioassays. In July 2018, NAE coordinated a supplemental sampling and analysis plan (SAP) to characterize sediment from reaches of the redesigned project that were not previously sampled, to characterize the material that would be dredged during CAD cell construction, and to further define the extent of unsuitable material in the inner harbor.

The supplemental work described in this report was performed in late 2018/early 2019, and included field sampling efforts, evaluation of sediment chemistry, preparation and chemical evaluation of representative elutriates, suspended particulate phase (SPP) toxicity testing, 10-day whole sediment toxicity testing and 28-day bioaccumulation testing with associated tissue analysis on applicable harbor material (i.e. sediments and water) from thirteen FNP locations identified in NAE's Performance Work Statement (PWS) entitled "*Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project New Haven, Connecticut*" dated 25 July 2018. The PWS scope was subsequently issued to AECOM on 21 August 2018 and was further revised by NAE on 11 October, 2018.

In order to further characterize materials to be generated under the proposed FNP improvement dredging project, sediments from thirteen core locations within the New Haven Harbor were collected by NAE in October 2018 to undergo sediment, water and elutriate chemical analysis, and biological testing in accordance with the evaluation requirements set forth in the EPA/ NAE regional protocol "*Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters*" (RIM: U.S. Environmental Protection Agency [EPA]/USACE, 2004). To support these evaluations, NAE collected related site waters in October 2018 and supplemental site waters in November 2018 (to support ammonia-reduced SPP toxicity testing). CLDS Reference Site sediment and waters were collected by AECOM in October 2018.

Sediment, water, elutriate and tissue samples were analysed for individual metals, Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and pesticides in accordance with reporting limits set forth in the RIM in order to determine the suitability of this material for unconfined open water disposal.

A Work Plan (AECOM, 2018a; included as Appendix A) was prepared by AECOM to guide the field sampling and sample handling efforts, as well as the laboratory analyses for samples collected by both NAE and AECOM (NAE's field sampling efforts were completed under the NAE-generated SAP). Field sampling efforts and laboratory analyses described herein were generally completed in accordance with this project Work Plan. Deviations from the Work Plan are described herein. The Work Plan was prepared in accordance with relevant regulations and standards, as described in Section 1.2, below, and in accordance with project-specific requirements identified by NAE in its "*Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project New Haven, Connecticut*" PWS.

1.2 Relevant Regulations/Standards

Data for the dredged material suitability evaluations under the Marine Protection, Research, and Sanctuaries Act (MPRSA) and the Clean Water Act (CWA) have been collected based on quality standards outlined in *QA/QC Guidance for Sampling and Analysis of Sediments, Water and Tissues for Dredged Material Evaluations* (EPA, 1995). The evaluations have followed guidance provided in the Green Book (EPA/USACE, 1991), the *Inland Testing Manual* (EPA/USACE, 1998), and the RIM (EPA/USACE, 2004).

2. Methods

Field and laboratory methods are detailed in the project Work Plan (AECOM, 2018a; included as Appendix A), which is comprised of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP). Brief summaries of the field and laboratory methods used are included in the following subsections.

The Supplemental New Haven Harbor field work described herein was completed by both USACE NAE personnel and individuals on the AECOM and OSI Field Team (collectively the AECOM Field Team). NAE personnel performed sediment and water sampling efforts within the New Haven Harbor FNP. Field activities undertaken by the AECOM Field Team included collection and transport of sediment and water samples from the CLDS Reference Site, as well as receipt and delivery of NAE-collected sediment and water samples obtained from the New Haven Harbor FNP.

Tasks described in Section 2.1, below, as well as in the accompanying Field Report (AECOM, 2018b; included as Appendix B) focus primarily on activities undertaken by the AECOM Field Team. Sampling techniques employed by NAE personnel, relative to sediment and water collection activities on New Haven Harbor, are addressed under separate cover.

2.1 Field Sampling

Sample locations were established by NAE and are distributed throughout the proposed New Haven Harbor FNP project area, as depicted in Figure. The 2018 sampling locations were chosen to augment data collected in the harbor in 2017 and to reflect the revised, anticipated FNP alignment and CAD cell layout. In addition, the CLDS Reference Site sampling location was selected by NAE. The bulk of the project field sampling efforts occurred in October 2018; specifically, sampling commenced on October 22 and was completed on October 26, 2018. To ensure that the waters used in the program's Optional Task 7.1 ammonia-reduced SPP assays remained within hold times, a discrete sampling event was completed by NAE on November, 14, 2018 for the collection of additional dredge site waters from the New Haven Harbor FNP.

The AECOM Field Team program was divided into five subtasks:

- The AECOM Field Team's collection of sediment and water samples at the CLDS Reference Site on October 23, 2018;
- AECOM's receipt of New Haven Harbor sediment and water samples which were collected by NAE (samples collected by NAE on October 22 through 25, 2018) and received by AECOM on October 23 through 25, 2018;
- AECOM's delivery of samples to the project toxicology laboratory (ESI) on October 24, 2018 and two additional deliveries to ESI on October 25, 2018; and,

- AECOM's delivery of samples directly to the project chemistry laboratory (Alpha) or to the Alpha courier on October 24 and 25, 2018.
- AECOM arranged for ESI to provide courier service directly to NAE on November 14, 2018 for receipt of the additional New Haven Harbor dredge site waters.

Appropriate volumes of dredge area sediment and water were collected by NAE at each of the thirteen harbor stations for the elutriate and biological testing activities described in the sections below. These samples were subsequently composited by the laboratory into the six project composite samples, as described in the project PWS Table 1.

The AECOM Field Team collected sediment and water samples from the CLDS Reference Site (Figure 2), located at latitude 41.134850 and longitude -72.834690 to further facilitate the evaluation of the dredge area material for potential unconfined open water placement.

CLDS Reference Site samples (sediment/water) were collected by the AECOM Field Team from OSI's sampling platform, the survey vessel *R/V Willing II*. Vessel positioning and the determination of actual sample locations were accomplished utilizing a Differential Global Positioning System (DGPS). The sampling vessel was held on station at the CLDS Reference Site by the vessel captain utilizing real-time navigation software (i.e. Hypack). Attachment 4 of the Field Report (AECOM, 2018b; Appendix B) lists the grab sample positions for each attempt.

The Field Report (AECOM, 2018b) provided in Appendix B provides additional detail regarding field activities, including CLDS Reference Site field observations such as penetration depth, material recovery, visual descriptions and other pertinent observations.

2.1.1 Sediment Collection

Sediments from the New Haven Harbor FNP were collected by NAE using vibracore methodology. These sediment samples were containerized by NAE and transferred to AECOM under chain of custody (COC) at the conclusion of NAE sampling efforts.

CLDS Reference Site sediments were collected by the AECOM Field Team using a modified Van Veen grab sampler as outlined in the project Work Plan. Prior to use, the sediment sample field collection equipment was decontaminated in accordance with the project Work Plan. In addition, equipment blanks were collected on the sediment sampling field collection equipment, in accordance with the project Work Plan.

The New Haven Harbor FNP sediment samples and the CLDS Reference Site sediment samples were transferred to a temperature-controlled refrigerated van unit immediately upon return to the dock and were held at temperature and in accordance with the project Work Plan until delivery to ESI.

2.1.2 Water Collection

Water from the vicinity of the six New Haven Harbor sediment composite locations (dredge site water) was collected by NAE personnel on October 24, 2018 using a pump and tubing system. NAE collected additional New Haven Harbor FNP dredge site waters on November, 14, 2018 in support of the Optional Task 7.1 (ammonia-reduced SPP assays).

Waters from the CLDS Reference Site were collected by the AECOM Field Team on October 23, 2018 using a large volume Niskin bottle as outlined in the Work Plan. Prior to use, the water collection equipment was decontaminated in accordance with the project Work Plan. In addition, Equipment blanks were collected on the water collection equipment, in accordance with the project Work Plan.

Water samples were transferred to the refrigerated van immediately after returning to the dock and held at temperature in accordance with the project Work Plan until delivery to ESI.

2.1.3 Sampling Deviations/Difficulties Encountered

There are two notes of interest relative to the New Haven Harbor / CLDS field sample collection effort:

- During the CLDS Reference Site field sampling operations, sea conditions picked up with larger wave action than was forecast for the day (i.e. approximately 4 foot seas, intermittently). During the water sample collection efforts, the captain and AECOM Field Team determined that it was unsafe and unadvisable to attempt to fill the laboratory glassware with CLDS waters while offshore, due to the wave action. All of the equipment blanks and large volume cube containers had been filled with reference site waters when this decision was made. The CLDS Reference Site laboratory waters, which were collected while at sea, were temporarily containerized in spare large volume cube containers and subsequently transported back to the dock for final containerization into the laboratory-provided glassware. No project work plan deviations were incurred as a result of this change, which was made for Health and Safety reasons. No associated project implications are anticipated.
- The Project Work Plan indicates that *"Samples will be chilled on wet ice while on board the vessel and subsequently transferred to a refrigerated box truck/van daily during field operations. The temperature in the refrigerated vehicle will be regularly monitored to ensure that the storage temperature is maintained at 4° Celsius (C) ±2° C ".* During sample transport, AECOM continuously monitored the conditions aboard the vessel and within the refrigerated van unit as prescribed. In addition, and as a precaution against the potential of malfunctioning refrigeration equipment, AECOM packed the samples with wet-ice during the sample transport to the project toxicology laboratory. During two discrete periods (approximately 20 minutes prior to sample delivery at the project toxicology laboratory on October 25, 2018; and again later that same day), the AECOM transport driver noticed an intermittent malfunction of the refrigerated van's compressor unit. Upon investigation, the driver determined that the refrigeration compressor was displaying an error code and subsequently notified the AECOM Project Manager, the refrigerated van provider and the NAE Task Manager. Throughout the sample transport operations, and upon sample check-ins at the project toxicology laboratory, AECOM confirmed that cargo area holding temperatures were within or below the Work Plan-prescribed temperature range. Accordingly, and as the samples were also transported on ice, no Project Work Plan "deviation" is noted. Additional details regarding temperatures within the refrigerated van are presented in Appendix B.

Neither of the above items represented a deviation from the approved work plan. As such, no corrective action forms have been prepared. No associated project implications are anticipated as a result of either of the above items.

2.2 Sample Processing and Analysis

The project QAPP provides detailed descriptions of the aqueous and sediment sample handling requirements and the methods used for water column and biological testing. Section B.6 of the QAPP (AECOM, 2018a) summarizes the chemical testing methods used and Section B.7 summarizes the bioassay test methods. Only minor deviations from the QAPP were noted. These minor deviations are discussed in Sections 3 for the biological testing (specifically, in Sections 3.1.2.3, 3.2.2.3, and 3.2.3.4) and in Section 4 for the analytical chemistry. These deviations are not expected to have an impact on the usability of the data for decision making.

The biological and analytical project team included two laboratories:

- EnviroSystems, Inc.. (ESI; Hampton, NH) provided processing facilities and performed SPP analysis, 10-day whole sediment toxicity testing, and 28-day bioaccumulation bioassays; and,
- Alpha Analytical Laboratories (Mansfield, MA) provided sediment, elutriate, and tissue chemistry testing services.

Sediment and water samples were transferred directly from the field to ESI for further processing before subsequent testing commenced. Tissue samples were shipped from ESI to Alpha Analytical Laboratories on December 26, 2018 following the completion of the 28-day bioaccumulation assay. All field to lab transfers (and subsequent lab to lab transfers) were conducted under COC procedures, as specified in the project work plan. COC records are included in the laboratory backup appendices (Appendices C and D), as well as in the Field Report (Appendix B).

2.2.1 Sample Handling

Sample handling and delivery was performed as outlined in the project Work Plan. CLDS Reference Site samples collected by the AECOM Team were stored in labeled, 5-gallon food grade collapsible carboys (water samples) or 3.5-gallon food grade high

density polyethylene pails with locking lids (sediment samples), and kept on wet ice until returning to the dock. All sediment and water samples were securely stored in a locked, refrigerated van (set to 4±2° C) for the field sample transport effort.

2.2.2 Test Sample Preparation and Compositing

Following the sample compositing scheme outlined in the Work Plan / PWS, sediment composites were prepared by combining equal volumes of the material from the various stations for subsequent testing. The sample compositing scheme is depicted in Table 1. These composite samples were used in the sediment bioassays and to develop elutriate/SPP samples for chemical and toxicological testing. As described in the project PWS, Composite 1 sediment was used in the bulk chemistry, elutriate and SPP analyses; however, as per Table 1 of the PWS, these materials were not subject to the 10-day whole sediment toxicity test or the 28-day bioaccumulation bioassay.

2.2.3 Chemical Sample Analysis

Chemical analysis methods are fully detailed in the project work plan (Appendix A). In some cases, specialized or modified methods were specified to accommodate unique project objectives. A description of the specialized or modified methods is also provided in this section. All laboratory reports for chemical analyses are provided in Appendix C.

Bulk sediment samples were analyzed for total organic carbon (TOC), metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyl (PCB) congeners in October and November 2018, accordance with Table 5 of the PWS and in accordance with the protocols recommended in Tables 1, 2, and 3 of the New England District RIM document, with appropriate updates to current analytical methods. As discussed in Section 3.2.3, below, the bulk sediment samples were re-analyzed for PCBs in March 2019 (within specified hold times), due to elevated reporting limits encountered during the initial PCB analysis (which were attributable to the sample dilution methodology employed). The project team used EPA SW-846 8270D-SIM /680M for the analysis of PCB congeners. The selected gas chromatography/mass spectrometry (GC/MS) method is generally preferred because it provides more definitive quantitation and identification of the target PCB congeners and is less prone to interferences or mis-identification than the earlier 8082 (gas chromatography/electron capture detector [GC/ECD]) method. Table 2 summarizes the analytes, analytical methods and method detection limits achieved for the bulk sediment chemistry analyses.

2.2.4 Elutriate/Suspended Particulate Phase Sample Preparation and Analysis

New Haven Harbor dredge site water was used in the preparation of all chemical elutriates and formed the basis of all elutriate/SPP sample preparations. Overlying water from the CLDS Reference Site was used for all SPP dilutions in the toxicity tests.

Each elutriate/SPP batch was prepared by adding the homogenized sediment to the site water in a 1:4 volumetric ratio, stirring the mixture for 30 minutes, and then allowing the mixture to settle for an hour. The supernatant was siphoned off prior to chemical and biological evaluations. Chemical samples were also centrifuged as required by the protocol. All samples were stored at or below 4°C when not in use. Elutriate samples were containerized for chemistry analysis (i.e., filtration of metals samples, analysis of metals and (total) organic compounds). Table 3 provides a summary of the elutriate/SPP preparation.

Elutriate samples were analyzed for metals, pesticides, pentachlorophenol, and PCB congeners in accordance with Table 6 of the PWS and in accordance with the protocol recommended in Table 5 of the New England District RIM document, with appropriate updates to current analytical methods. Chelation extraction and acid digestion followed by analysis using an inductively coupled plasma mass spectrometer (ICP/MS) was used for the analysis of the extracted metals except arsenic, selenium, mercury, and hexavalent chromium. Arsenic and selenium were determined using Hydride Generation Quartz Furnace Atomic Absorption Spectrometry; mercury was determined using Cold Vapor Atomic Fluorescence Spectrometry, and the diphenylcarbazide colorimetric procedure described in Standard Methods 3500-Cr D was used to measure chromium 6 (Cr6+). Table 4 summarizes the analytes, analytical methods and method detection limits achieved for the elutriate chemistry analyses.

Water column bioassays were conducted in accordance with the RIM (EPA/USACE, 2004), the Inland Testing Manual (EPA/USACE, 1998) and the project Work Plan (AECOM, 2018a). Test organisms for the water column bioassays included

Americamysis bahia, *Menidia beryllina*, and *Arbacia punctulata*. Table 6 summarizes the test conditions for these bioassays and Table 7 identifies the dates of the SPP testing. The toxicity tests were completed on the six harbor dredge site elutriate samples, as well as on the CLDS Reference Site water sample. SPP testing was started before the 24-hour holding time for SPP solutions. Results and protocol deviations are described in Section 3.1.2.

2.2.4.1 Ammonia-Mitigated SPP Assays

Because the organisms used in suspended phase toxicity testing are sensitive to ammonia, excessive ammonia concentrations may cause a toxic response not of interest to the evaluation, which focuses on persistent contaminants. To account for this potential false positive, the EPA and NAE devised a protocol to determine if ammonia is the driver of toxicity in situations where unionized ammonia is present at concentrations that may cause toxicity. After the SPP assays were initiated, ammonia levels were measured and elevated levels were noted. In accordance with the PWS requirements, NAE was notified of the elevated ammonia within 24 hours. NAE issued an authorization for AECOM to proceed with running the optional ammonia-mitigated SPP assays, in addition to the “standard” SPP assays that were included under the initial scope of work.

Following receipt of authorization from NAE, a second set of “mitigated” assays were established wherein each test sediment composite was purged to reduce the ammonia concentration in the sediment prior to preparing the elutriate samples for a second round of ammonia-reduced SPP biological testing. Sediment purges were set up in accordance with the Work Plan and followed the Ferretti method (Ferretti et al, 2000), which involved loading a portion of each composite sediment sample into clean HDPE vessels to a depth of 7-11 mm and adding clean overlying water (Hampton-Seabrook Estuary water used by the laboratory as control water) in a 1:3 ratio of sediment to water. A thin piece of plastic was placed over the sediment prior to adding the overlying water in an effort to keep the sediment from becoming suspended during the addition. The thin piece of plastic was slowly removed after the overlying water was added. Each mitigation vessel was aerated and the temperature, pH, specific conductivity, salinity and dissolved oxygen were recorded daily prior to siphoning off the overlying water.

A small sub-sample was removed daily from each sediment composite and centrifuged to extract pore water. Temperature, pH and salinity of the extract were recorded and the pore water was subsequently analyzed for total ammonia. These data were used to calculate the pore water unionized ammonia levels daily. When the daily value of any composite was below the target threshold of 0.1 mg/L unionized ammonia (AECOM, 2018a), composites were removed from their mitigation vessels, placed in clean HDPE 1-gallon buckets and refrigerated prior to preparing elutriate solutions for use in “mitigated” assays. Table 5 summarizes the results of the ammonia purging process.

2.2.4.2 Test Species

A. bahia were ≤5 days old and were obtained from Aquatic Resource Organisms (ARO) of Hampton, New Hampshire. *M. beryllina* were 9-14 days old at the start of the assay and were also obtained from ARO. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. Organisms were transferred to test vessels using a large bore pipet to minimize the amount of water added to test solutions.

Adult *A. punctulata* were obtained from ESI, and the original stock was obtained from ARO of Hampton, New Hampshire. Adult sea urchins are maintained in the laboratory for as long as they are viable. Male and female urchins are maintained in separate chambers at a temperature of approximately 12±3°C after spawning.

2.2.4.3 Reference Toxicant Assays

ESI completed acute ammonium chloride reference toxicant assays for *A. bahia*, *M. beryllina, and A. punctulata.* The LC50s for all three species fell within the 95% confidence limits of their respective control charts, indicating that the test organisms were healthy. Table 8 summarizes the results of the reference toxicant assays conducted in support of the SPP assays.

2.2.5 10-Day Whole Sediment Toxicity Testing

Bulk sediment bioassays are an important part of the overall suitability testing framework for open water disposal consideration and agency guidance specifies that a filter feeder, a deposit feeder, and a burrowing organism be represented in the assay. Ten-day whole sediment bioassays were performed using the crustacean *A. bahia* (mysid shrimp) and the crustacean *Leptocheirus*

plumulosus (amphipod) to represent these feeding strategies in accordance with the RIM (EPA/USACE, 2004), the Inland Testing Manual (EPA/USACE, 1998), and the project Work Plan (AECOM, 2018a). *A. bahia* is a filter and deposit feeder that spends much of its time in the water above the sediment-water interface. The amphipod *L. plumulosus* builds burrows in the sediment and feeds on particles that are in suspension and on the sediment surface.

Table 9 summarizes the test conditions for the 10-day whole sediment toxicity tests. Assays with both species began on November 9, 2018 and were terminated on November 19, 2018. The *A. bahia* and *L. plumulosus* assays were successful and met test acceptability criterion for survival. The control sediment used in the *A. bahia* assay was natural sediment collected from the Hampton Estuary, Hampton, New Hampshire. The area is not known to receive any direct industrial inputs and has been used as laboratory reference sediment in the testing of marine sediments for over 30 years. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. The Hampton Estuary laboratory control was included to verify the health of the test organisms, and as a relative benchmark for reference site toxicity.

Results and protocol deviations are described in Section 3.2.2.

2.2.5.1 Test Species

A. bahia were obtained from Aquatic Research Organisms, Hampton, NH. Prior to use, test organisms were held for 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *A. bahia* used in the assay were $\leq$5 days old at the start of the test.

L. plumulosus were obtained from cultures maintained by Aquatic Research Organisms, Hampton, NH. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *L. plumulosus* were non-reproductive adults.

2.2.5.2 Reference Toxicants

ESI completed acute 96-hour ammonium chloride reference toxicant assays for *A. bahia* and *L. plumulosus.* Results were within two standard deviations of the historic mean of ESI's control charts, indicating that the test organisms were healthy. Table 10 summarizes the results of the reference toxicant assays conducted in support of the 10-day tests. The LC50 for the two species fell within the 95% confidence limits of their respective control charts.

2.2.6 28-Day Bioaccumulation Bioassay and Tissue Analysis

The 28-day solid phase/bioaccumulation evaluation was conducted in accordance with the RIM (EPA/USACE, 2004), the Inland Testing Manual (EPA/USACE, 1998) and the project Work Plan (AECOM, 2018a) using the bivalve *Macoma nasuta* and the burrowing polychaete *Nereis virens*. Table 11 summarizes the test conditions for the 28-day bioaccumulation bioassay.

The *M. nasuta* assays were initiated November 21, 2018 and were completed on December 19, 2018. The *N. virens* assays were initiated on November 20, 2018 and terminated on December 18, 2018. Results and protocol deviations are described in Section 3.2.3.

At the end of the 28-day bioaccumulation assay exposure period and the 24 hour depuration period, the test organisms were recovered, rinsed/depurated with clean seawater, homogenized, frozen and transferred to the chemistry laboratory for preparation and analysis. Tissue samples were analyzed for total lipids, percent moisture, metals, pesticides, PAHs, and PCB congeners. Table 12 summarizes the analytes, analytical methods and method detection limits achieved for the tissue chemistry analyses.

2.2.6.1 Test Species

M. nasuta, approximately 28-45 mm in total length, were obtained from ARO. Organisms were field collected along the Washington coast and shipped to ARO via overnight delivery. At ESI, the clams were placed in clean holding sediment with flowing seawater and monitored for at least 24 hours prior to use. Damaged bivalves and those that would not close when

prodded were discarded. The *Macoma* test commenced on November 21, 2018. A total of 20 organisms were added to each replicate in order to obtain sufficient tissue at test termination.

Adult *N. virens* were also obtained from ARO. Consistent with historic 28-day bioassays, worms were collected in the field (by Phil Harrington Bait [PHB] of Woolwich, ME) primarily from the Damariscotta River watershed, with (with some organism lots potentially sourced by PHB between Portland, ME and Jonesport, ME). Organisms were delivered directly to ARO. If not used the same day, worms were refrigerated overnight in seaweed. Damaged and inactive worms were not used in the assay. The *Nereis* test assay commenced on November 20, 2018 with a total of 20 organisms added to each replicate in order to obtain sufficient tissue at test termination.

2.2.6.2 Reference Toxicant Assays

ESI completed acute 96-hour copper reference toxicant assays for *M. nasuta* and *N. virens* concurrent with the 28-day bioassays. Results were within two standard deviations of the historic mean of ESI's control charts, indicating that the test organisms were healthy. Table 13 summarizes the results of the reference toxicant assays conducted in support of the 28-day bioassays.

2.3 Data Analysis

The array of water column and biological testing that was performed on the New Haven Harbor sediments provides a comprehensive data set from which a suitability assessment for the anticipated unconfined placement of this material at the CLDS may be determined. These data sets were generally evaluated in the following ways:

- Biological testing data were compared to reference or control values;
- Tissue chemistry results for site sediments were compared to the CLDS Reference Site tissue chemistry using non-parametric and t-tests. Additionally, tissue chemistry results for PCB body-burdens from site sediments and CLDS reference sediments were compared to native "pre-test" (i.e., unexposed) tissue chemistry results.

A description of these evaluation methods is provided below.

2.3.1 Toxicity Bioassay Statistics

Survival and effects data were analyzed using statistical software to determine significant differences between the project sediments and the laboratory control, and between project sediments or suspended phase solutions and the agency-selected reference site sediments or solutions. Survival data were evaluated to determine homogeneity of sample variances and normality of distribution. Data sets were subsequently evaluated using the appropriate parametric or non-parametric analysis. Pair-wise comparisons were based on the appropriate statistical analysis presented in the EPA decision tree guidelines specified in individual test methods. Statistical difference was evaluated at $\alpha=0.05$. For the SPP testing, acute exposure endpoints, the median lethal concentration (LC50) and the median effective concentration (EC50; in the *Arbacia* testing), were calculated and responses in the undiluted SPP solutions were evaluated against the responses in the CLDS Reference Site diluent.

2.3.2 Bioaccumulative Tissue Statistics

The statistical analyses of body burden data were completed to determine significant differences between the CLDS reference sediment and each site composite sample. The statistical analyses were completed for all compounds of concern identified in the Work Plan; however, the findings of significance discussed in Section 3.2.3.3 focus only on those compounds detected in the reference sample.

As noted in Section 3.2.3, elevated levels of select PCBs were detected in replicates of the *N. virens* native pre-test tissue. As such, additional comparisons were completed to evaluate the statistical significance of the PCB body-burden observed in the dredge-site composite samples and the CLDS reference site samples versus corresponding levels observed in native pre-test tissue samples.

Per RIM guidelines and direction provided by the NAE (R.B. Loyd, personal communication, March 26, 2018), one-half the MDL is used in instances when a compound of concern is not detected for purposes of calculating a mean tissue concentration and total concentrations for PAHs, PCBs, and pesticides. MDLs used in statistical computations may be adjusted for differences in tissue mass and final extract volumes used in the analysis for each sample.

Data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistics. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Statistical difference was evaluated at $\alpha = 0.05$.

Table 1 Biological Testing and Elutriate Preparation - Sample Collection Dates and Compositing Information

Station ID	Date	Core Length (ft.) / Water Sample Collection Depth (ft.)	Water Depth (MLLW [ft.])	Latitude[c]	Longitude[c]	Composite ID	SPP/Elutriate testing	10-day toxicity bioassay	28-day bioassay/tissue
Sediment (Composite ID No.)									
Comp V',W' Station V' (1)	10/23/18	6.5	-35.3	41.294036	-72.909534	1	X		
Comp V',W' Station W'(1)	10/23/18	6.7	-33.8	41.293886	-72.907800				
Comp R',S' Station R' (2)	10/23/18	6.0	-36.1	41.291922	-72.908113	2	X	X	X
Comp R',S' Station S' (2)	10/23/18	5.5	-36.5	41.291986	-72.909875				
Comp US-1-2, Station US-1 (3)	10/25/18	6.0	-34.5	41.295935	-72.908823	3	X	X	X
Comp US-1-2, Station US-2 (3)	10/25/18	6.0	-36.2	41.295338	-72.907488				
Comp DS-1-2, Station DS-1 (4)	10/24/18	7.0	-34.9	41.289980	-72.910244				
Comp DS-1-2, Station DS-2 (4)	10/25/18	7.0	-35.3	41.289660	-72.908568	4	X	X	X
Comp TB-1-2, Station TB-1 (5)	10/24/18	7.0	-34.9	41.290108	-72.912034				
Comp TB-1-2, Station TB-2 (5)	10/24/18	7.0	-35.5	41.291559	-72.911608	5	X	X	X
Comp CAD 1-3 Station CAD 1 (6)	10/23/18	5.5	-8.6	41.267155	-72.915131				
Comp CAD 1-3 Station CAD 2 (6)	10/23/18	5.5	-7.3	41.266472	-72.916295	6	X	X	X
Comp CAD 1-3 Station CAD 3 (6)	10/23/18	5.5	-8.3	41.265511	-72.915443				
NHH-CLDS[a]	10/23/18	1	-78.7	41.134850	-72.834690	CLDS	X	X	X
Seawater									
Comp V',W'	10/24/18	Mid Depth	-25.1	41.278348	-72.913132	1	X		
Comp R',S'	10/24/18	Mid Depth	-25.1	41.278348	-72.913132	2	X		
Comp US 1-2	10/24/18	Mid Depth	-25.1	41.278348	-72.913132	3	X		
Comp DS 1-2	10/24/18	Mid Depth	-25.1	41.278348	-72.913132	4	X		
Comp TB 1-2	10/24/18	Mid Depth	-25.1	41.278348	-72.913132	5	X		
Comp CAD 1,2,3	10/24/18	Mid Depth	-25.1	41.278348	-72.913132	6	X		
New Haven [b]	11/14/18	Mid Depth	-1.0	41.269492	-72.931430	All SPP Urchin (Ap.) re-tests			
NHH-CLDS	10/23/18	Mid Depth	-78.7	41.134850	-72.834690	CLDS-Ref	X		
Sediment									

[a] Sample collected using grab sampler. Other sediment samples collected using vibracoring device.
[b] This water was used only for the repeated *A. punctulata* SPP assay.
[c] As-built coordinates are presented herein.

Table 2 Bulk Sediment - Parameters, Analytical Methods, and Method Detection Limits

Parameter	Method Reference	Method Number	MDL	MDL Units
Physical Tests				
Total Solids/Water Content	SM	2540G	0.1	%
Percent Moisture	SM	2540G	0.1	%
TOC	SW-846	9060A	0.01	%
Metals				
Arsenic	SW 846	6020B	0.198	mg/kg
Cadmium	SW 846	6020B	0.079	mg/kg
Chromium	SW 846	6020B	1.41	mg/kg
Copper	SW 846	6020B	0.583	mg/kg
Lead	SW 846	6020B	0.439	mg/kg
Mercury	SW 846	7474	0.004	mg/kg
Nickel	SW 846	6020B	0.803	mg/kg
Zinc	SW 846	6020B	7.82	mg/kg
PAHs				
Acenaphthene	SW-846	8270DSIM	37.4	ug/kg
Acenaphthylene	SW-846	8270DSIM	37.4	ug/kg
Anthracene	SW-846	8270D-SIM	37.4	ug/kg
Benzo(a)anthracene	SW-846	8270DSIM	37.4	ug/kg
Benzo(a)pyrene	SW-846	8270DSIM	37.4	ug/kg
Benzo(b)fluoranthene	SW-846	8270D-SIM	37.4	ug/kg
Benzo(k)fluoranthene	SW-846	8270D-SIM	37.4	ug/kg
Benzo(g,h,i)perylene	SW-846	8270D-SIM	37.4	ug/kg
Chrysene	SW-846	8270D-SIM	37.4	ug/kg
Dibenz(a,h)anthracene	SW-846	8270DSIM	37.4	ug/kg
Fluoranthene	SW-846	8270D-SIM	37.4	ug/kg
Fluorene	SW-846	8270D-SIM	37.4	ug/kg
Indeno(1,2,3-cd)pyrene	SW-846	8270D-SIM	37.4	ug/kg
Naphthalene	SW-846	8270D-SIM	37.4	ug/kg
Phenanthrene	SW-846	8270D-SIM	37.4	ug/kg
Pyrene	SW-846	8270D-SIM	37.4	ug/kg
Pesticides				
Aldrin	SW-846	8081B	0.747	ug/kg
Chlordane – Alpha	SW-846	8081B	0.747	ug/kg
Chlordane – gamma	SW-846	8081B	0.747	ug/kg
Chlordane – oxy	SW-846	8081B	1.49	ug/kg
4,4' – DDT	SW-846	8081B	0.747	ug/kg
4,4' – DDD	SW-846	8081B	0.747	ug/kg
4,4' – DDE	SW-846	8081B	0.747	ug/kg
Dieldrin	SW-846	8081B	0.747	ug/kg
Endosulfan alpha and beta	SW-846	8081B	0.747	ug/kg
Endrin	SW-846	8081B	0.747	ug/kg
Heptachlor and derivative (epoxide)	SW-846	8081B	1.49	ug/kg
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.747	ug/kg
Methoxychlor	SW-846	8081B	2.99	ug/kg
Toxaphene	SW-846	8081B	37.5	ug/kg
trans and cis Nonachlor	SW-846	8081B	0.747	ug/kg
Hexachlorobenzene	SW-846	8081B	1.49	ug/kg
PCBs				
PCB 8	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 18	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 28	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 44	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 49	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 52	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 66	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 87	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 101	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 105	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 118	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 128	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 138	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 153	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 170	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 180	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 183	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg

Table 2 Bulk Sediment - Parameters, Analytical Methods, and Method Detection Limits (Continued)

Parameter	Method Reference	Method Number	MDL	MDL Units
PCB 195	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 206	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg
PCB 209	SW-846/EPA	8270D-SIM/680(M)	0.77	ug/kg

Maximum MDL listed per parameter. MDLs are adjusted to reflect differences in dilutions used in the analysis for each sample.

Table 3 Elutriate Solution Preparation Summary

Water		Sediment		Elutriate Preparation			
Station ID	ESI Code	Composite ID	ESI Code	Elutriate ID	ESI Code	Date	Time
Unmitigated Assays							
Comp V',W'	31242-018	1	31243-100	Composite 1 Elutriate	31246-101	10/25/18	1310
Comp R',S'	31242-022	2	31243-101	Composite 2 Elutriate	31246-103	10/25/18	1405
Comp R',S'	31242-022	2	31243-101	Composite 2 Elutriate	31246-103	10/25/18	1700
Comp US 1-2	31242-014	3	31243-102	Composite 3 Elutriate	31246-105	10/26/18	1615
Comp US 1-2	31242-014	3	31243-102	Composite 3 Elutriate	31246-105	10/26/18	1810
Comp DS 1-2	31242-015	4	31243-103	Composite 4 Elutriate	31246-107	10/26/18	1310
Comp TB 1-2	31242-016	5	31243-104	Composite 5 Elutriate	31246-109	10/26/18	1525
Comp CAD 1,2,3	31242-017	6	31243-105	Composite 6 Elutriate	31246-111	10/25/18	1520
Mitigated Assays							
Comp V',W'	31242-018	1	31243-100	Composite 1 Elutriate	31246-112	10/31/18	1040
Comp R',S'	31242-022	2	31243-101	Composite 2 Elutriate	31246-113	10/31/18	1040
Comp US 1-2	31242-014	3	31243-102	Composite 3 Elutriate	31246-114	10/31/18	1250
Comp DS 1-2	31242-015	4	31243-103	Composite 4 Elutriate	31246-115	10/31/18	1250
Comp TB 1-2	31242-016	5	31243-104	Composite 5 Elutriate	31246-116	10/31/18	1125
Comp CAD 1,2,3	31242-017	6	31243-105	Composite 6 Elutriate	31246-117	10/31/18	1125
Mitigated – A. punctulata repeated assay							
New Haven	31242-021	1	31243-100	Composite 1 Elutriate	31246-118	11/21/18	0900
New Haven	31242-021	2	31243-101	Composite 2 Elutriate	31246-119	11/21/18	0900
New Haven	31242-021	3	31243-102	Composite 3 Elutriate	31246-120	11/21/18	0939
New Haven	31242-021	4	31243-103	Composite 4 Elutriate	31246-121	11/21/18	0939
New Haven	31242-021	5	31243-104	Composite 5 Elutriate	31246-122	11/21/18	1030
New Haven	31242-021	6	31243-105	Composite 6 Elutriate	31246-123	11/21/18	1030

Table 4 Elutriates and Equipment Blank - Parameters, Analytical Methods, and Method Detection Limits

Parameter	Method Reference	Method Number	MDL	MDL Units
Metals				
Arsenic	SW-846	1632A	0.0009	mg/L
Cadmium	SW-846	6020B	0.00001	mg/L
Chromium	SW-846	6020B	0.00003	mg/L
Hexavalent chromium	SW-846	3500-Cr-B	0.003	mg/L
Copper	SW-846	6020B	0.00007	mg/L
Lead	SW-846	6020B	0.00006	mg/L
Mercury	SW-846	7474	0.00001	mg/L
Nickel	SW-846	6020B	0.00011	mg/L
Selenium	SW-846	1632A	0.0009	mg/L
Silver	SW-846	6020B	0.00003	mg/L
Zinc	SW-846	6020B	0.00068	mg/L
Semi-volatile compounds				
Pentachlorophenol	SW-846	8270D	0.464	ug/L
Pesticides				
Aldrin	SW-846	8081B	0.0022	ug/L
Chlordane (alpha/gamma)	SW-846	8081B	0.0005	ug/L
Chloropyrifos	SW-846	8081B	0.0022	ug/L
4,4'-DDT	SW-846	8081B	0.0011	ug/L
Dieldrin	SW-846	8081B	0.0011	ug/L
Endosulfan and derivatives (I, II)	SW-846	8081B	0.0011	ug/L
Endrin	SW-846	8081B	0.0011	ug/L
Heptachlor & derivative (epoxide)	SW-846	8081B	0.0022	ug/L
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.0011	ug/L
Toxaphene	SW-846	8081B	0.0284	ug/L
PCBs				
PCB 8	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 18	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 28	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 44	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 49	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 52	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 66	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 87	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 101	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 105	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 118	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 128	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 138	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 153	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 170	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 180	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 183	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 184	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 187	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 195	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 206	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L
PCB 209	SW-846/EPA	8270D/ 680(M)	0.00114	ug/L

Maximum MDL listed per parameter. MDLs are adjusted to reflect differences in dilutions used in the analysis for each sample.

Table 5 Summary of Ammonia Mitigation Data

Composite ID	Hour	Date & Time Sampled	Temperature (°C)	pH (SU)	Salinity (‰)	Pore Water Ammonia (mg/L) Total	Pore Water Ammonia (mg/L) Unionized
Comp 001 (V', W')	24	10/25/18 1000	18.9	7.46	30	38	0.3361
Comp 001 (V', W')	48	10/26/18 1000	20.0	7.71	30	14	0.2371
Comp 001 (V', W')	72	10/27/18 1350	20.3	7.44	30	15	0.1406
Comp 001 (V', W')	96	10/28/18 1145	17.0	7.43	30	7.8	0.0560
Comp 001 (V', W')	120	10/29/18 1130	19.5	7.37	32	5.2	0.0387
Comp 002 (R', S')	24	10/25/18 1000	18.4	7.59	30	27	0.3095
Comp 002 (R', S')	48	10/26/18 1000	20.0	7.64	30	15	0.2168
Comp 002 (R', S')	72	10/27/18 1350	19.8	7.43	30	16	0.1413
Comp 002 (R', S')	96	10/28/18 1145	17.0	7.37	32	8.4	0.0520
Comp 002 (R', S')	120	10/29/18 1130	19.7	7.39	32	7.3	0.0577
Comp 003 (US-1, US-2)	24	10/27/18 1350	21.0	7.48	30	38	0.4108
Comp 003 (US-1, US-2)	48	10/28/18 1145	18.0	7.38	32	22	0.1499
Comp 003 (US-1, US-2)	72	10/29/18 1130	19.8	7.44	32	14	0.1250
Comp 003 (US-1, US-2)	96	10/30/18 0915	13.8	7.39	32	8	0.0409
Comp 004 (DS-1, DS-2)	24	10/27/18 1350	20.0	7.61	30	31.8	0.4293
Comp 004 (DS-1, DS-2)	48	10/28/18 1145	18.0	7.56	32	15	0.1542
Comp 004 (DS-1, DS-2)	72	10/29/18 1130	19.9	7.51	32	13	0.1372
Comp 004 (DS-1, DS-2)	96	10/30/18 0915	13.5	7.54	32	6.6	0.0465
Comp 005 (TB-1, TB-2)	24	10/25/18 1000	20.0	7.70	30	31	0.5132
Comp 005 (TB-1, TB-2)	48	10/27/18 1350	20.0	7.38	30	18	0.1439
Comp 005 (TB-1, TB-2)	72	10/28/18 1145	18.0	7.39	30	13	0.0917
Comp 005 (TB-1, TB-2)	96	10/29/18 1130	20.0	7.35	32	13	0.0959
Comp 006 (CAD-1, 2 & 3)	24	10/26/18 1000	18.9	7.92	30	12	0.3011
Comp 006 (CAD-1, 2 & 3)	48	10/26/18 1000	20.0	7.62	30	5.5	0.0760
Comp 006 (CAD-1, 2 & 3)	72	10/27/18 1350	20.0	7.63	31	4.2	0.0590
Comp 006 (CAD-1, 2 & 3)	96	10/28/18 1145	19.0	7.55	32	3	0.0325
Comp 006 (CAD-1, 2 & 3)	120	10/29/18 1130	20.0	7.58	32	3	0.0374

Table 6 Suspended Particulate Phase Testing - Testing Conditions

Parameter	*A. bahia*	*M. beryllina*	*A. punctulata*
Treatments (SPP prepared from sediment composites and harbor water)	6 Sample Composites and 1 CLDS Reference Site water	6 Sample Composites and 1 CLDS Reference Site water	6 Sample Composites and 1 CLDS Reference Site water
Replicates	5	5	5
Test population	1-5 days old	7-10 days	2 hours after fertilization
Temperature	Mean of 20 ± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation	NA
Salinity	25-30 ‰ ±10%	25-30 ‰ ±10%	30 ‰ ±2‰
Feeding	Daily, <24 hour old *Artemia nauplii*	Daily, <24 hour old *Artemia nauplii*	None
Reference Toxicant	NH4Cl	NH4Cl	NH4Cl

Table 7 Suspended Particulate Phase Testing – Period of Assay Conduct

Elutriate			Assay Start [a]		Assay End [a]	
Comp/Elutriate ID	ESI Code	Test Species	Date	Time	Date	Time
Unmitigated Assays						
Composite 1 Elutriate	31246-101	*A. bahia*	10/25/18	1645	10/29/18	1600
Composite 2 Elutriate	31246-103	*M. beryllina*	10/25/18	1720	Failed [b]	
			10/26/18	1430	10/30/18	1253
Composite 6 Elutriate	31246-111	*A. punctulata*	10/25/18	1735	10/29/18	1140
Composite 3 Elutriate	31246-105	*A. bahia*	10/26/18	1815	10/30/18	1615
Composite 4 Elutriate	31246-107	*M. beryllina*	10/26/18	1710	10/30/18	1311
Composite 5 Elutriate	31246-109	*A. punctulata*	10/27/18	1330	10/30/18	1600
Mitigated Assays						
	31246-112	*A. bahia*	10/25/18	1645	11/04/18	1250
	31246-113	*M. beryllina*	10/31/18	1605	11/04/18	1325
Composite 1 Elutriate Composite 2 Elutriate Composite 3 Elutriate	31246-114 31246-115 31246-116 31246-117	*A. punctulata*	10/31/18	1820	Failed [c]	
Composite 4 Elutriate Composite 5 Elutriate Composite 6 Elutriate	31246-118 31246-119 31246-120 31246-121 31246-122 31246-123		11/21/18	1310	11/24/18	0935

[a] Start and end times are based on when the controls were started and ended.
[b] The failed *M. beryllina* assay was repeated starting on 10/26/18 using the same elutriate samples (within the hold time) and lot of test organisms.
[c] The failed *A. punctulata* assay was repeated starting on 11/21/18 using newly prepared elutriate solutions and a new lot of test organisms

Table 8 Suspended Particulate Phase Testing – Reference Toxicant Results

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency [a]	Acceptable Range [a]	Reference Toxicant
A. bahia						
10/25/18	03AbARO102418	96Hr LC-50	65.6	59.2	35.3 - 84.1	NH4Cl (mg/L)
10/31/18	02AbARO102918	96Hr LC-50	75.5	60.2	35.8 - 84.6	NH4Cl (mg/L)
M. beryllina						
10/25/18	08MbARO102418	96Hr LC-50	46.7	48.8 [a]	16.5 - 81.0 [a]	NH4Cl (mg/L)
10/31/18	08MbARO102918	96Hr LC-50	40.0	46.9	18.4 - 75.5	NH4Cl (mg/L)
A. punctulata						
10/25/18	99ApARO080118	96Hr EC-50	5.9	4.1 [b]	0.0-8.4 [b]	NH4Cl (mg/L)
11/21/18	No data [c]					

[a] Values based on the results of 19 assays.
[b] Values based on the results of 7 assays
[c] Reference toxicant data are not available.

Table 9 10-Day Whole Sediment Testing – Test Conditions

Parameter	*L. plumulosus*	*A. bahia*
Treatments	5 Sample Composites and CLDS Reference Site	5 Sample Composites and CLDS Reference Site
Replicates	5	5
Test population	Juvenile -non reproductive adult (3-5 mm)	1-5 days old
Temperature	Mean of 20± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation
Salinity	20-30‰ ±10%	20-30‰ ±10%
Ammonia	Pore water unionized ammonia <0.8 mg/L	Overlying water unionized ammonia <0.6 mg/L
Feeding	None	Daily, <24 hour old *Artemia nauplii*
Reference Toxicant	NH4Cl	NH4Cl

Table 10 10-Day Whole Sediment Testing – Reference Toxicant Results

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency [a]	Acceptable Range [a]	Reference Toxicant
A. bahia						
11/09/18	03AbARO110818	96Hr LC-50	90.8 [a]	62.2	34.6 - 89.8	NH4Cl (mg/L)
L. plumulosus						
11/09/18	19LpARO110818	96Hr LC-50	225.0	183.1 [b]	84.6 - 281.6 [b]	Ammonia (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays unless otherwise noted.

[a] Normal Acceptance Limits set at ±2 Std Dev of historic mean; maximum limits are ±3 Std of historic mean. The ±3 limit is acceptable, but considered high.

[b] Means and acceptable ranges are based on the results of 9 assays.

Table 11 28-Day Bioaccumulation Bioassay – Test Conditions

Parameter	*M. nasuta*	*N. virens*
Treatments	5 Sample Composites and CLDS Reference Site	5 Sample Composites and CLDS Reference Site
Replicates	5	5
Test population	Adult clam	Adult Polychaete; 3-15 grams
Temperature	Mean of 12 ±2°C Maximum Deviation of 3°C	Mean of 12 ± 2°C Maximum Deviation of 3°C
Dissolved Oxygen	>40% Saturation	>40% Saturation
Salinity	25-30‰ ±10%	25-30‰ ±10%
Ammonia	NA (flow through)	NA (flow through)
Feeding	None	None
Reference Toxicant	Copper	Copper

Table 12 Tissue Analysis - Parameters, Analytical Methods, and Method Detection Limits

Parameter	Method Reference	Method Number	MDL	MDL Units
Physical tests				
Percent Moisture	SM	2540G	0.1	%
Total lipids	NOAA 130, 1998	NOAA TM NOS ORCA 130, 1998	0.1	%
Metals (wet wt.)				
Arsenic	SW-846	6020B	0.0328	mg/kg
Cadmium	SW-846	6020B	0.01	mg/kg
Chromium	SW-846	6020B	0.0343	mg/kg
Copper	SW-846	6020B	0.0318	mg/kg
Lead	SW-846	6020B	0.00554	mg/kg
Mercury	SW-846	7474	0.00344	mg/kg
Nickel	SW-846	6020B	0.0354	mg/kg
Zinc	SW-846	6020B	0.142	mg/kg
PAHs (wet wt.)				
Acenaphthene	SW-846	8270D-SIM	4.95	ug/kg
Acenaphthylene	SW-846	8270D-SIM	4.95	ug/kg
Anthracene	SW-846	8270D-SIM	4.95	ug/kg
Benzo(a)anthracene	SW-846	8270D-SIM	4.95	ug/kg
Benzo(a)pyrene	SW-846	8270D-SIM	4.95	ug/kg
Benzo(b)fluoranthene	SW-846	8270D-SIM	4.95	ug/kg
Benzo(k)fluoranthene	SW-846	8270D-SIM	4.95	ug/kg
Benzo(g,h,I)perylene	SW-846	8270D-SIM)	4.95	ug/kg
Dibenz(a,h)anthracene	SW-846	8270D-SIM)	4.95	ug/kg
Chrysene	SW-846	8270D-SIM	4.95	ug/kg
Fluoranthene	SW-846	8270D-SIM	4.95	ug/kg
Fluorene	SW-846	8270D-SIM	4.95	ug/kg
Indeno(1,2,3-cd)pyrene	SW-846	8270D-SIM	4.95	ug/kg
Naphthalene	SW-846	8270D-SIM	4.95	ug/kg
Phenanthrene	SW-846	8270D-SIM	4.95	ug/kg
Pyrene	SW-846	8270D-SIM	4.95	ug/kg
Pesticides (wet wt)				
Aldrin	SW-846	8081B	0.495	ug/kg
cis-Chlordane	SW-846	8081B	0.495	ug/kg
trans-Chlordane	SW-846	8081B	0.495	ug/kg
cis-Nonachlor	SW-846	8081B	0.495	ug/kg
trans-Nonachlor	SW846	8081B	0.495	ug/kg
Oxychlordane	SW-846	8081B	0.99	ug/kg
Total Chlordanes	SW-846	8081B	0.495	ug/kg
4,4'-DDT	SW-846	8081B	0.495	ug/kg
4,4'-DDD	SW-846	8081B	0.495	ug/kg
4,4'-DDE	SW-846	8081B	0.495	ug/kg
Dieldrin	SW-846	8081B	0.495	ug/kg
alpha-Endosulfan	SW-846	8081B	0.495	ug/kg
Endrin	SW-846	8081B	0.495	ug/kg
Heptachlor	SW-846	8081B	0.495	ug/kg
Heptachlor epoxide	SW-846	8081B	0.99	ug/kg
Hexachlorobenzene	SW-846	8081B	0.99	ug/kg
Lindane	SW-846	8081B	0.495	ug/kg
Methoxychlor	SW-846	8081B	1.98	ug/kg
Toxaphene	SW-846	8081B	24.8	ug/kg

Table 12 Tissue Analysis - Parameters, Analytical Methods, and Method Detection Limits (continued)

Parameter	Method Reference	Method Number	MDL	MDL Units
PCBs (wet wt.)				
PCB 8	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 18	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 28	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 44	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 52	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 66	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 101	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 105	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 118	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 128	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 138	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 153	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 170	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 180	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 187	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 195	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 206	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg
PCB 209	SW-846/EPA	8270D-SIM/680(M)	0.495	ug/kg

Maximum MDL listed per parameter. MDLs are adjusted for differences in tissue mass and final extract volumes used in the analysis for each sample

Table 13 28-Day Bioaccumulation Bioassay – Reference Toxicant Results

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
M. nasuta						
11/21/18	99MnARO111318	96Hr LC-50	4.1	8.9	0.5 – 17.4	Copper (mg/L)
N. virens						
11/20/18	99NvARA112018	96Hr LC-50	1.3	3.1	0.5 – 5.7	Copper (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays.

Figure 1 New Haven Harbor Sediment and Water Sampling Locations [Figure from PWS, NAE 2018]

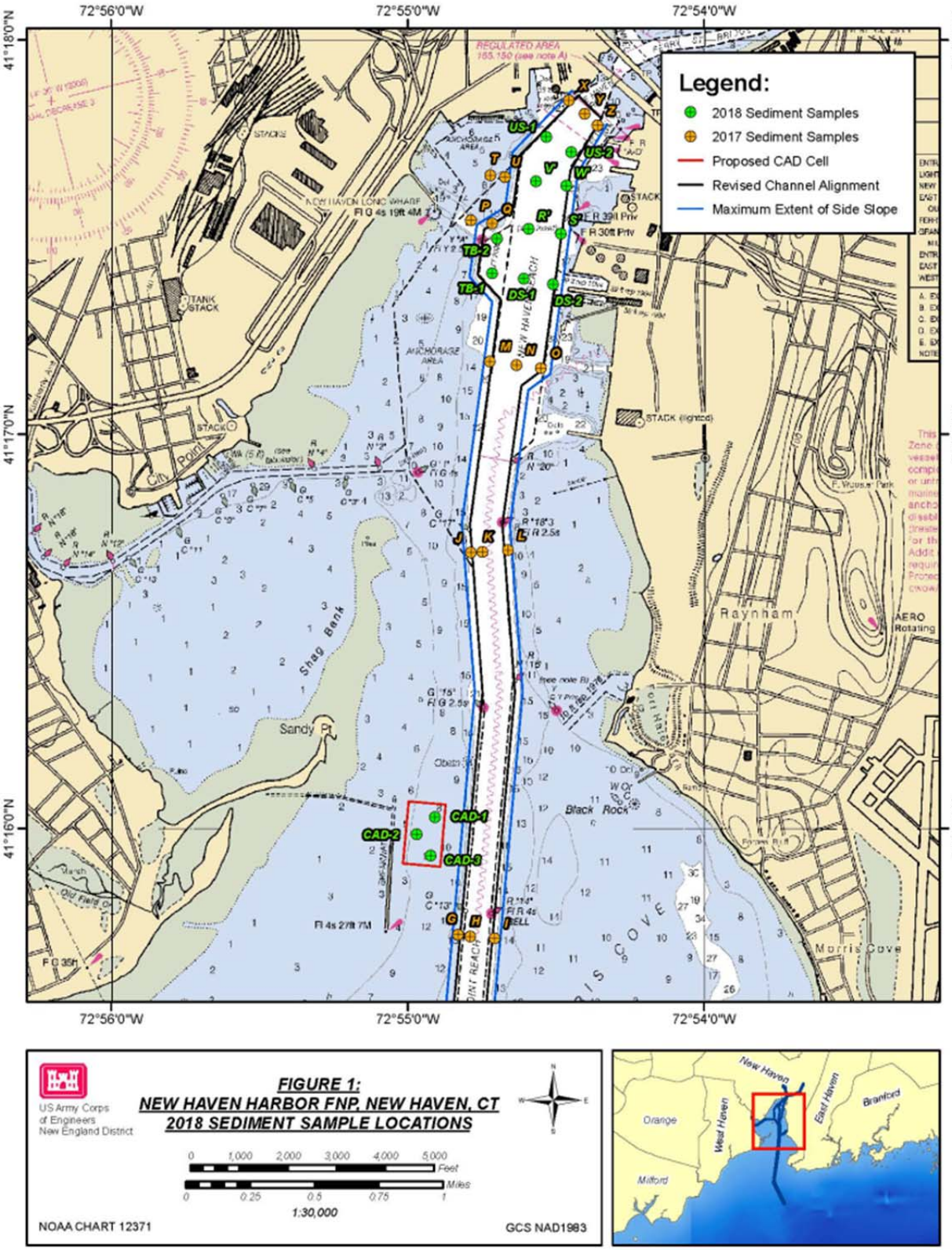
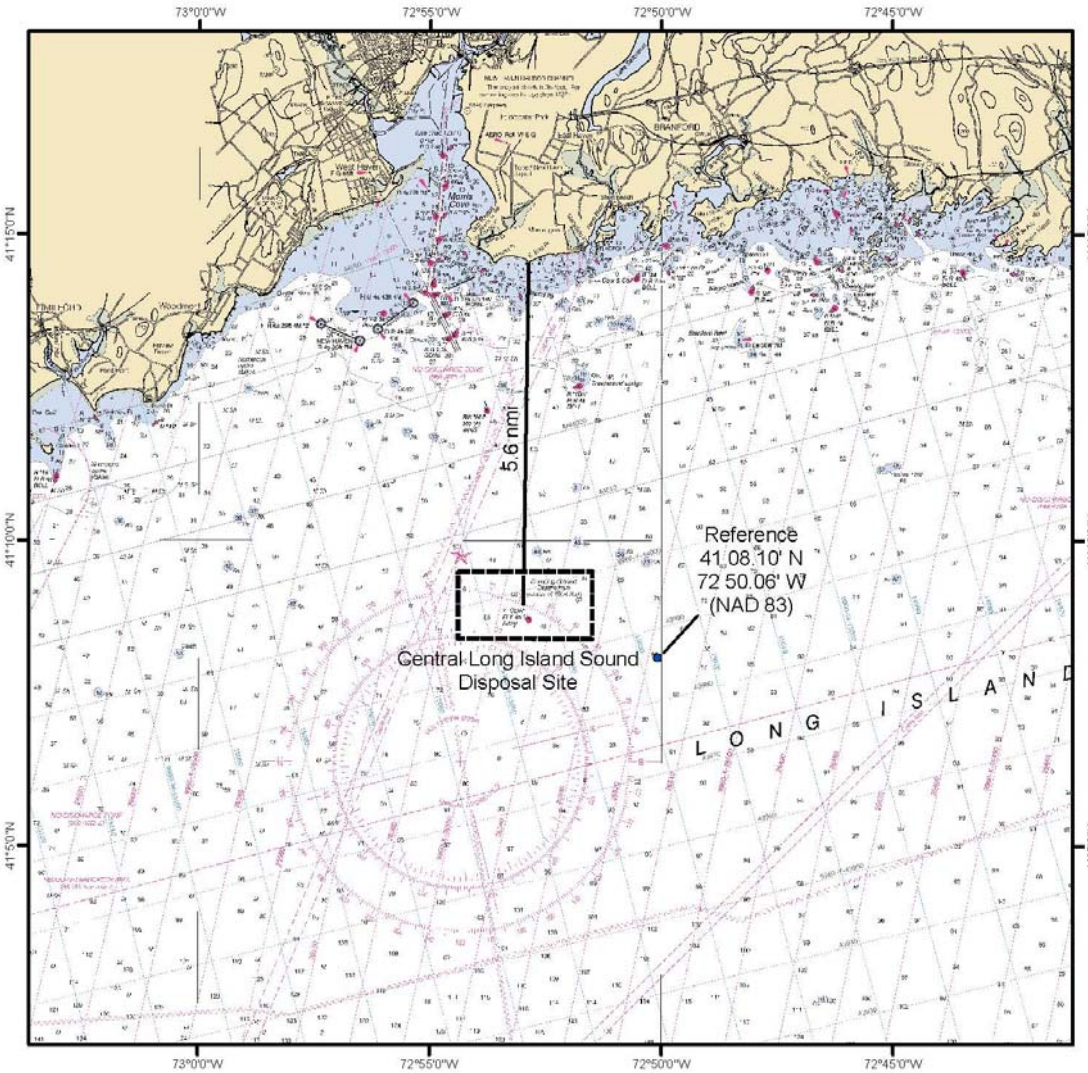
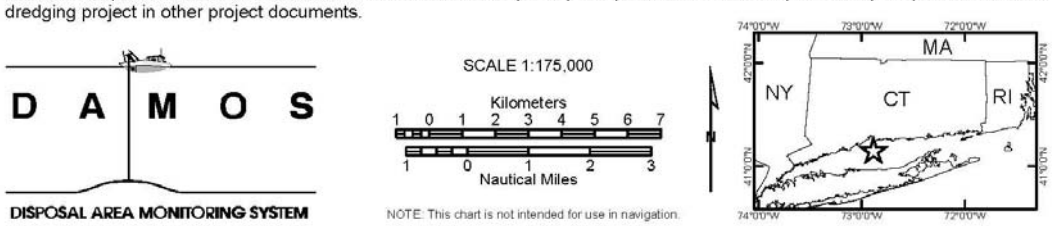


Figure 2 CLDS Reference Site Sediment and Water Sampling Location (Figure from PWS, NAE 2018)



CENTRAL LONG ISLAND SOUND DISPOSAL SITE

Description: The Central Long Island Sound Disposal Site (CLDS) is one of four regional dredged material disposal sites located in the waters of Long Island Sound. CLDS covers a 11.04 km² (3.2 nmi²) area and is centered at 41° 08.950' N, 72° 52.950' W (NAD 83). It is located approximately 10.89 km (5.6 nmi) south of South End Point, East Haven, Connecticut. Since 1977, the management strategy at CLDS has entailed the controlled placement of small to moderate volumes of sediment to form individual disposal mounds on the seafloor. The authorized disposal point (within the overall disposal area) is specified for each dredging project in other project documents.



3. Results and Discussion

The Section 3 subsections present results evaluating the following potential exposure pathways associated with the anticipated unconfined open water material placement at the CLDS:

- Direct exposure to the water column during/after mixing (elutriate and particulate phase analysis);
- Direct exposure to the dredged material (DM) following placement (bulk sediment; chemistry previously analyzed); and,
- Bioaccumulation potential resulting from DM exposure over a period of time (bioaccumulation bioassays followed by tissue analysis).

As described in Section 1, NAE completed a sampling and testing effort during the summer of 2017 in order to characterize the materials to be dredged. NAE later revised the alignment of the proposed channel and turning basin based on the results of ship simulation modeling. In addition, a portion of the material from the inner harbor was determined to be unsuitable for unconfined open water placement, based on the results of suspended particulate phase and whole sediment bioassays. In July 2018, NAE coordinated a supplemental SAP to characterize sediment from reaches of the redesigned project that were not previously sampled, to characterize the material that would be dredged during CAD cell construction, and to further define the extent of unsuitable material in the inner harbor.

The October and November 2018 sampling and analysis efforts described herein include the evaluation of sediment chemistry, elutriate chemistry, SPP toxicity testing, 10-day whole sediment toxicity testing and 28-day bioaccumulation bioassay data with accompanying tissue analysis at sampled stations. This data will be used to form the basis of a suitability determination for unconfined open water disposal at the CLDS, as well as the potential for beneficial reuse (i.e. marsh creation, habitat restoration, cover of historic CLDS disposal mounds).

3.1 Water Column Evaluations

Water column evaluations performed in this study incorporated the analysis of chemical elutriate samples and SPP bioassay tests. The full suite of chemicals were measured in the elutriate mixtures to evaluate possible DM effects on water quality in an open water disposal setting. SPP toxicity bioassays included three test organisms: crustacean, fish, and sea urchin larvae. Acute toxicity as well as sensitive (larvae) developmental effects were evaluated.

3.1.1 Elutriate Chemistry

Table 14 summarizes the elutriate chemistry results obtained after mixing the site materials with reference site seawater to simulate DM mixing at an open water disposal site. Analytical results for the CLDS Reference water are also included in Table 14. Laboratory elutriate chemistry data are included in Appendix C.1.

Pentachlorophenol was below the project reporting limit for all elutriate samples analyzed. In general, metals results were also below project reporting limits in most samples, with the exception of As, Cu, and Zn. There were detects above the project reporting limits for As, Zn, and Cu in six, five, and four elutriate samples, respectively. All detects for pesticides and individual PCB congeners in all elutriate samples were below project reporting limits.

3.1.2 SPP Bioassay Results

Two sets of SPP assays were completed using the unmitigated and mitigated sediment (prepared as described in Section 2.2.4), each with their own paired laboratory control and CLDS reference. Other than the different sediment preparations, assay conduct for both the unmitigated and mitigated sediment was the same. The unmitigated assays were completed in two batches, each with their own paired laboratory control and CLDS reference with elutriate solutions 1, 2 and 6 included in the first batch and elutriate solutions 3, 4 and 5 included in the second batch. The mitigated assays were completed using all six elutriate solutions, one shared laboratory control and one shared CLDS reference for each species.

The SPP endpoints and adverse effects are presented in Table 15. Associated SPP water quality data is presented in Table 16 for the unmitigated assays and Table 17 for the ammonia mitigated assays. Laboratory summary reports, including laboratory bench data, are presented in Appendix D.1.

All SPP laboratory control samples in completed assays met minimum survival criteria. *A. bahia* survival was 100% in the laboratory control and 100% in the CLDS reference water treatment for both batches of unmitigated assays and the single batch of mitigated assays. These *A. bahia* results meet the minimum test acceptability criteria of ≥90% survival in the laboratory control and are an indication that the test organisms were healthy and not stressed by handling.

The first batch of *M. beryllina* assays conducted using unmitigated sediment for elutriate solutions 1, 2 and 6 demonstrated poor performance in the laboratory control within 24 hours and that test was terminated and re-started. At the end of the 96 hour exposure period for the unmitigated assays, *M. beryllina* survival was 96% in the laboratory control and 98% in the CLDS reference water treatment for the assays completed on elutriate solutions 1, 2 and 6. *M. beryllina* survival was 90% in the laboratory control and 98% in the CLDS reference water treatment for the unmitigated assays completed on elutriate solutions 3, 4 and 5. For the mitigated assays, *M. beryllina* survival was 90% in the laboratory control and 92% in the CLDS reference water treatment at the end of the 96 hour exposure period. These *M. beryllina* results meet the minimum test acceptability criteria of ≥90% survival in the laboratory control and are an indication that the test organisms were healthy and not stressed by handling.

In the *A. punctulata* assays, embryo counts in the laboratory control treatment for the first batch of unmitigated assays showed 78% of the embryos survived at the end of the assay and, of the original embryos, 77% were normally developed pluteus larvae. In the second batch of unmitigated assays, embryo counts in the laboratory control treatment showed 86% of the embryos survived at the end of the assay and, of the original embryos, 85% were normally developed pluteus larvae. In the ammonia reduced assays, embryo counts in the laboratory control treatment showed 76% of the embryos survived at the end of the assay and, of the original embryos, 74% were normally developed pluteus larvae. These results meet the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control sample.

At the start of the unmitigated assays, total ammonia was observed in the elutriates generated from all six composites (ranging from 12 to 37 mg/L) at the start of the assays for all three test species. Total ammonia levels decreased slightly throughout the life of the unmitigated assays for all three species. Calculated unionized ammonia values from the start of the unmitigated assays for all composites ranged between 0.35 to 0.65 mg/L for all three species. In the ammonia reduced composites, total ammonia ranged from 1.1 to 3.4 mg/L and unionized ammonia ranged from 0.042 to 0.090 mg/L at the start of the assays for all three test species. At the end of the assays, total ammonia in the ammonia reduced composites ranged from 1.2 to 3.7 mg/L.

EPA guidance suggests that ammonia, generally in the unionized form, can be a source of toxicity when total ammonia values are >5 mg/L (EPA 2002). EPA Ambient Water Quality Criteria (AWQC) for unionized ammonia in saltwater references LC50 values for two of the species tested: *A. bahia* (1.04 mg/L) and *M. beryllina* (0.88 mg/L) (EPA, 1989). AWQC for unionized ammonia in saltwater are not available for *A. punctulata*, however, effects levels are available in the literature for urchin species ranging from 0.06 mg/L for an EC50 for development (Maguire Group Inc., 2003) to approximately 0.336 mg/L for a 96-hour LC50 (Chang-Hoon Lee et al., 2013).

Total ammonia concentrations were well above 5 mg/L in all of the unmitigated SPP composites. The calculated unionized ammonia levels for the initial urchin assay were above the literature-based effect levels (0.06 to 0.336 mg/L). The calculated unionized ammonia levels for the unmitigated *A. bahia* and *M. beryllina* SPP assays were below the AWQC LC50s (1.04 mg/L and 0.88 mg/L respectively) in all of the composites.

As described below, survival and development results, particularly for the sea urchin, were improved in the ammonia reduced SPP assays. These results indicate that elevated ammonia levels in the initial SPP assays may have contributed to the observed survival and development impacts.

3.1.2.1 *A. bahia* and *M. beryllina* Acute SPP Evaluations

In the unmitigated assays, mysid shrimp were not adversely affected by exposure to SPP prepared from elutriate solutions 1, 2, 4, and 6 with LC50 values of >100% for these samples. In SPP solutions prepared from Composite 3 and 5, the LC50 values

were 74% and 73% respectively. For the ammonia mitigated assays (conducted with elutriate prepared from sediment that was reduced in ammonia), LC50 values were >100% for all six composites.

The first batch of unmitigated *M. beryllina* assays prepared from elutriate solutions 1, 2 and 6 demonstrated poor performance in the laboratory control within 24 hours, therefore that assay was terminated and re-started using the same elutriate sample and lot of test organisms. At the end of the 96 hour exposure period, data generated from the unmitigated assays documented significant negative effects on minnow survival from elutriate solutions 1, 2, 3, 4 and 5. The LC50 values for these elutriate solutions ranged from 56% to 69%. The minnow LC50 was >100% for elutriate solution 6 in the unmitigated assay. For the ammonia mitigated assays, LC50 values were >100% for all six composites.

3.1.2.2 *A. punctulata* Acute SPP Evaluations

Arbacia punctulata is the most sensitive of the project SPP exposed species. Survival and normal development were quantified when it was determined that the majority of the larvae (>90%) in the laboratory controls had reached the pluteus larval stage.

Review of the data collected at the end of the unmitigated assays indicated that SPP assays prepared from all elutriate solutions had negative impacts on embryonic survival and/or development. LC50s and EC50s from SPP solutions prepared from the six composites ranged from 3 to 22% for both survival and development.

For the ammonia mitigated assays, LC50 and EC50 values were >100% for all six composites.

3.1.2.3 SPP Protocol Deviations

Review of the data collected for these assays documented minor deviations from the method protocol and/or ESI's standard procedures, as described below. These lab issues are considered to have had no impact on the outcome of the assays.

Protocol requires, and it is common laboratory procedure, that a reference toxicant assay be completed concurrently with any project assay (at a minimum frequency of once per month). However, the *A. punctulata* assay completed using mitigated sediment does not have an associated reference toxicant assay, and there are no reference toxicant data available for that lot of organisms due in part to the time of year and organism viability. This deviation had no adverse impact on the outcome of the assay as the project assay met all acceptability criteria and there were no impacts on embryonic survival or development in the elutriates.

Protocol requires that the *A. bahia* and *M. beryllina* assays be conducted at 20±2°C and the *A. punctulata* assay be conducted at 20±1°C. Although the assays were maintained in incubators set at their target temperature, the minimum temperatures recorded during the unmitigated assays for elutriate solutions 3, 4 and 5 fell below the protocol range to a low of 17°C on day 2 of the mysid assay, a low of 14°C on day 2 of the minnow assay and a low of 18°C at the start of the urchin assay. There were no notations on the bench sheets indicating a reason for the low temperatures, therefore the drop below the threshold is likely due to the ambient laboratory temperature at the time that water quality measurements were taken. There was also an isolated exceedance of the upper threshold in the laboratory control of the unmitigated minnow assay for elutriate solutions 1, 2 and 6, which reached a maximum of 23°C on day 0. These species can tolerate temperatures within the ranges measured and this deviation did not adversely affect the outcome of the assay.

In addition, the protocol requires that the assays be conducted at a salinity of 30±2 ‰. It is not uncommon for the salinity to drift upwards during assay conduct due to evaporation and exceed the protocol requirement, but the salinities are adjusted daily as needed to account for this occurrence, except at assay termination. These occurrences at test termination are not considered deviations. In one instance, the salinity in the mysid laboratory control for the mitigated assay for elutriate solutions 3, 4 and 5 was inadvertently overlooked and not adjusted down from 33 ‰ at 72 hours. This was an isolated incident and all other in-life assay measurements >32 ‰ were adjusted accordingly. This deviation did not adversely affect the outcome of the assay.

These lab issues are considered to have had no impact on the outcome of the assays.

3.2 Sediment Chemical and Toxicity Characteristics

Under the current program, bulk sediment chemistry analyses, 10-day whole sediment toxicity testing and 28-day bioaccumulation bioassays with associated tissue analyses were conducted at the proposed FNP stations. These investigations are described in further detail below.

3.2.1 Sediment Chemistry

Table 18 summarizes the results of the bulk sediment chemistry analyses conducted on the 18 samples submitted for analysis. Backup laboratory sediment chemistry data are included in Appendix C.2. In cases where values were below the laboratory reporting limit (RL), the result is considered undetected and qualified with a “U” in the data table.

An overview of findings per parameter is presented below.

3.1.2.1 Metals

Five of the metals analyzed (As, Cr, Cu, Pb, Ni) were present in all sediment samples at levels greater than the project reporting limits. Cadmium was reported as non-detect in 1 of the samples and as estimated values in 5 of the 18 samples; all at concentrations above the project reporting limit. Zinc was reported in one sample as an estimated value above the project reporting limit. Mercury was reported as non-detect in 2 of the 18 samples and was reported as an estimated value between the method detection limit (MDL) and RL in 2 samples.

3.1.2.2 Polycyclic Aromatic Hydrocarbons (PAHs)

PAH compounds were detected in all 18 samples (Table 18). In all samples, concentrations of high molecular weight (HMW) PAHs were greater than the concentrations of the low molecular weight (LMW) PAHs. The highest concentration of HMW PAHs (6,494 µg/kg) was measured at location W’ and the highest concentration of LMW PAHs (1,662 µg/kg) was measured at location DS-2.

3.1.2.3 Pesticides

Pesticides were undetected in 4 of the 18 samples. 4,4’ DDE, 4,4’ DDD, 4,4’ DDT, Endosulfan II, Oxychlordane and trans-Chlordane were the most frequently detected pesticides. Cis-Chlordane, cis-Nonachlor, gamma-BHC, Methoxychlor, and trans-Nonachlor were also detected in several of the samples. Toxaphene was not detected in any of the samples; several samples were reported as non-detects at levels above the project reporting limit.

3.1.2.4 Polychlorinated Biphenyls (PCBs)

Measurable concentrations of PCB congeners were reported in 13 of the 18 samples (Table 18). The highest concentration of Total PCBs (222 µg/kg) was measured at location DS-2 0-7.0. Several samples had non-detected PCB congeners at levels above the project reporting limits.

3.2.2 10-Day Whole Sediment Toxicity Testing

A summary of survival data from the 10-day *A. bahia* and *L. plumulosus* assays is included in Table 19. Supporting data, including copies of bench sheets, are included in Appendix D.2. Table 20 summarizes the laboratory control results and other assay acceptability criteria for the 10-day assays. Tables 21 and 22 present the water quality data for *A. bahia* and *L. plumulosus*, respectively, as measured during the 10-day bioassays. Overlying water quality data is presented for *A. bahia* and overlying and pore water quality data is presented for the *L. plumulosus* assays.

Tests were initiated with sediments that were submitted to the ammonia mitigation process (described in Section 2.2.4). This mitigation process ensured that the unionized ammonia levels in the sediment pore waters were less than 0.8 mg/L prior to test initiation. Once the pore waters were below the unionized ammonia threshold for a 24-hour period, composites were removed from their mitigation vessels and placed in clean HDPE 1-gallon buckets until all samples were ready to be loaded into test

chambers for assay initiation. Test chambers were loaded 24-hours prior to assay initiation to allow sediments and overlying water time to settle.

For the *A. bahia* assay, test organisms were added to the test vessels on November 9, 2018. On November 9, 2018, unionized ammonia samples were collected from the overlying water and concentrations ranged from <0.0022 to 0.0684 mg/L. These levels are below the 0.6 mg/L unionized ammonia overlying water threshold for *A.bahia* test initiation.

For the *L. plumulosus* assay, unionized pore water ammonia levels in the composites were measured one day prior to the addition of tests organisms and ranged from 0.1974 to 0.5615 mg/L. These levels were below the 0.8 mg/L unionized ammonia pore water threshold for *L. plumulosus* test initiation so organisms were added the following day (November 9, 2018). On November 9, 2018, unionized ammonia concentrations in the pore water ranged from <0.0104 to 0.2467 mg/L.

3.2.2.1 *A. bahia* 10-Day Solid Phase Assay

Mean mysid survival in the laboratory control sediment was 98%, and met acceptance criteria (e.g. mean survival ≥90%; ≥70% in any replicate). Mean survival in the CLDS reference sediment was 63%. Mean survival of mysid shrimp exposed to the six New Haven Harbor sediment composites ranged from 91% (Composites 3 and 4) to 96% (Composite 6). The statistical analyses show that there were no negative effects on survival for mysids exposed to site composite samples as compared to mysids exposed to the CLDS reference sediment.

3.2.2.2 *L. plumulosus* 10-day solid phase assay

Mean amphipod survival in the laboratory control was 98% and met acceptance criteria. Mean amphipod survival among organisms exposed to CLDS reference sediment was 79%. Mean amphipod exposed to the six New Haven Harbor sediment composites ranged from 92% (Composite 4) to 99% (Composite 5), and the statistical analyses show that there were no negative effects on survival for amphipods exposed to site composite samples as compared to amphipods exposed to the CLDS reference sediments.

3.2.2.3 Whole Sediment Protocol Deviations

Review of the data collected for these assays documented a few minor deviations from the method protocol and/or ESI's standard procedures.

The CLDS reference sediment performed poorly in both the mysid and amphipod assays, achieving only 63% and 79% survival, respectively. The laboratory control and site composites achieved ≥90% survival for both species, indicating that organisms were healthy. None of the site composites were determined to be significantly impacted as compared with the reference sediment, given this performance. Test parameters were largely within their targeted ranges, except as noted, and there were no indications that there were any issues with assay conduct. The calculated unionized ammonia levels for the CLDS reference were well below the threshold of 0.8 mg/L in both the pre-assay pore water sample and during assay conduct. There were some juvenile polychaetes found in replicates D and E of the CLDS reference sediment upon recovery of the amphipod assay. It cannot be determined if their presence adversely impacted amphipod survival in those replicates; however, it is plausible that they were a stressor. All test sediments are sieved prior to use and any native organisms present in the reference sediment would have been small enough to pass through this process. Predation within these replicates is possible, but the size of the polychaetes makes it unlikely. Furthermore, none of these polychaetes were recovered from the mysid reference sediment. Although there are no related criteria that the reference sediment must meet, this is considered an out of control event and remains an uncertainty.

Protocol requires that the *A. bahia* and *L. plumulosus* assays be conducted at 30±2‰ and 20±2‰, respectively. Salinity values recorded on day 9 of the *A. bahia* assay and day 10 of both assays fell below their acceptable ranges: to as low as 24.6‰ (*A. bahia*) and 17.2‰ (*L. plumulosus*). The analyst indicated that low readings were experienced with one of the salinity probes and it was subsequently recalibrated. Following recalibration, salinity measurements were generally within range; however, the out of range salinity readings for this project were not able to be recaptured and, as such, may be considered suspect readings. Salinity readings were also encountered on days 3 (*L. plumulosus*) and 7 (both species) that sporadically exceeded the target range; however, these are isolated instances of exceedance and not believed to be related to systemic causes. Mean salinity for

the assays (28.3‰ for *A. bahia* and 19.3‰ for *L. plumulosus*) were within their target ranges and the control survival met acceptance criteria demonstrating that the test organisms are tolerant of salinities within the ranges measured.

The dissolved oxygen in the *L. plumulosus* assay temporarily dropped to a low of 4.9 mg/L, which is below the threshold outlined in ESI's standard operating procedures, however the minimum percent dissolved oxygen (62%) remained above the RIM's threshold of ≥40%. This was an isolated excursion that occurred in the surrogate vessel of the laboratory control on Day 1, which may have been caused if an airline fell out of the test vessel and was subsequently replaced upon discovery.

These lab issues are considered to have had no impact on the outcome of the assays.

3.2.3 28-Day Bioaccumulation Bioassay and Tissue Analysis

To evaluate the bioaccumulation potential of dredged sediments, the clam *Macoma nasuta* and the worm *Nereis virens* were exposed to material from five of the sediment composites. Table 23 provides a summary of the *M. nasuta* and *N. virens* survival data. Table 24 summarizes the laboratory control results and other assay acceptability criteria. Tissue chemistry data and statistical results (relative to reference) are summarized in Table 25 and Table 26. As described in Section 3.2.3.3, additional statistical comparisons were conducted to evaluate PCB body-burdens in the five sediment composites and the CLDS reference site relative to the native pre-test tissue samples for *N. virens*. These results are also summarized in Table 26. Laboratory bench sheets and statistical support are included in Appendix D.3.

3.2.3.1 Survival Analysis

Mean *M. nasuta* survival was 99% for clams maintained the laboratory control and for clams exposed to the CLDS reference sediment. Mean percent survival of the bivalves exposed to harbor sediment composites ranged from 94% to 100%. The statistical evaluation of the survival data showed no significant reduction in survival for bivalves maintained in the site composites when compared to the CLDS reference sediment.

Mean *N. virens* survival was 99% in the laboratory control and 98% in the CLDS reference sediment. Mean percent survival among polychaetes exposed to harbor sediment composites ranged from 93% to 97%. The statistical evaluation of the data showed a significant reduction in survival for polychaetes maintained in Composite 5 sediment when compared to the CLDS reference sediment, however the difference in survival was <10%.

Survival of clams and worms met the established guideline criteria. Surviving organisms for both species tested provided sufficient tissue for preparation and analysis of body burdens.

3.2.3.2 Tissue Chemistry

Test organism tissues were analyzed for the full set of chemical parameters established for the program (AECOM, 2018a) to evaluate the bioaccumulative aspect of the project material. The chemical results provided in Table 25 (*M. nasuta*) and Table 26 (*N. virens*) are presented on a wet weight basis. Backup laboratory tissue chemistry data are included in Appendix C.3. Statistical comparisons of tissue body burdens are discussed in Section 2.3.2.

Review of *M. nasuta* tissue data documented that arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc were detected in *M. nasuta* tissues from all five composites and reference samples. PAHs were also detected above the MDL throughout the five composite samples and in the reference samples. Eleven of the PCB congeners were detected above the MDL at least once among the five composites. Composites 5 and 6 had fewer detections of PCB congeners and lower concentrations of the detected congeners than Composites 2, 3, and 4. PCB congeners were not detected in the CLDS Reference samples. Chlordanes (cis, trans, and oxy) and 4,4'-DDE were each detected above the MDL at least once among the five composites. 4,4'-DDE was the only pesticide detected in the CLDS Reference samples.

Review of *N. virens* tissue data documented that arsenic, cadmium, chromium, copper, lead, nickel, and zinc were detected in *N. virens* tissues from all five composites and reference samples. Mercury was detected above the MDL in Composites 3, 4, 5, and 6 but not in Composite 1 or the CLDS Reference samples. Fluoranthene and pyrene were the only PAHs detect in *N. virens* tissues. Fluoranthene and pyrene were detected in samples from Composites 2, 3, 4, and 6. PAHs were not detected in samples

from Composite 5 or the CLDS Reference. Eight of the PCB congeners were detected above the MDL at least once among the five composites. Four PCB congeners were also detected in the CLDS Reference samples. Twelve pesticides were detected in Composite 4, particularly in the replicate 2 sample. In the remaining composites, 4,4'-DDT was detected in one replicate from Composite 2 and 4,4'-DDE was detected in one replicate from Composite 3.

3.2.3.3 Tissue Body Burden Analysis

Review of *M. nasuta* tissue data document statistically significant increases in body burdens for clams maintained in the project composite sediments for two metals (cadmium in Composite 2 and lead in Composite 6), six PAHs (in multiple composites) and 4,4'-DDE (in Composites 2, 3, and 4) as compared to CLDS Reference tissue. Most notably, the PAHs primarily in Composites 2, 3, 4 and 6 tissues were detected at concentrations 5 to 16 times higher than in CLDS Reference tissue, especially fluoranthene in Composites 3, 4 and 6, and chrysene and pyrene in Composite 6 tissue, which were also detected at concentrations an order of magnitude or more greater than in reference tissue.

Review of the native pre-test clam tissue data indicates that the site composite concentration of cadmium, lead and 4,4'-DDE were only slightly higher than in native tissue, suggesting that the findings of significance may be attributable to background levels of these compounds in the native clam tissue. The same is true for five of the six PAHs detected in Composite 5 tissue. Concentrations of chemicals in native pre-test *Macoma* tissue were generally similar to or below the CLDS Reference tissues.

Review of body burden data also showed that the following chemicals of concern were detected in *M. nasuta* tissue following exposure to site composite sediment but were not detected in CLDS Reference tissue, therefore these COCs were eliminated from further evaluation: six PAHs (acenaphthene, anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene), ten PCB congeners (8, 18, 28, 44, 52, 66, 101, 118, 138 and 153), and six pesticides (4,4'-DDD, 4,4'-DDT, alpha-chlordane, gamma-chlordane, dieldrin and oxychlordane).

The review of *N. virens* tissue data found that there were significant increases in body burdens for worms maintained in the project composite sediments for one metal (copper in Composite 6) and five PCB congeners (138, 153, 170, 180 and 187 in multiple composites), compared to CLDS Reference tissue.

Review of the native pre-test worm tissue data indicates that the site composite tissue concentrations of PCB congeners 138 and 170 were approximately equal to or less than concentrations found in native tissue, and site composite tissue concentrations of copper and PCB congeners 153, 180 and 187 were only slightly higher than in native tissue, indicating that the findings of significance may be attributable to levels occurring in worm tissue prior to testing. The concentrations of several PCB congeners in the native tissues were higher than in the CLDS Reference or composite tissue samples and these levels triggered a review of the native tissue PCB data and performance of additional statistical evaluations. This supplemental review is discussed in Section 3.2.3.3.1.

Review of body burden data also showed that the following chemicals of concern were detected in worm tissue following exposure to site composite sediment but were not detected in CLDS reference tissue, therefore these COCs were eliminated from further evaluation: mercury, two PAHs (fluoranthene and pyrene), seven PCB congeners (8, 18, 52, 101, 105, 128 and 195), and 14 pesticides (4,4'-DDE, 4,4'-DDT, aldrin, cis-nonachlor, alpha-chlordane, gamma-chlordane, dieldrin endosulfan I, endosulfan II, gamma-BHC, heptachlor, heptachlor epoxide, hexachlorobenzene and oxychlordane).

3.2.3.3.1 *N. virens* Supplemental PCB Data Review

As discussed above, PCB congeners were detected in native pre-test *N. virens* samples. As indicated in Table 26, mean concentrations of some congeners in the native tissues were higher than those detected in the CLDS Reference or composite tissue samples. In some cases, congeners in Composites 2, 4, and 5 were statistically higher than the CLDS Reference sample results, but concentrations were lower than the native tissue result.

Therefore, additional statistics were conducted to assess whether CLDS Reference and site composite concentrations were statistically significantly higher than the native pre-test concentrations. PCB congener 52 in Composites 2 and 4 were the only congeners in the exposed treatments (CLDS Reference or site composites) that were statistically higher than in the native tissues. None of the congeners in Composites 2, 4, or 5 that were statistically greater than the CLDS reference site tissue were

statistically above the native tissue concentrations. These results show that there are generally similar concentrations of these congeners (i.e., 138, 153, 170, 180 and 187) among Composites 2, 4, and 5 native tissues.

An additional set of statistics presented in Table 26 also shows that for several congeners, concentrations in the native tissues are statistically greater than in the exposed site sediments or the CLDS Reference sediments. These supplemental statistical comparisons support the observation that the original findings of significance relative to the CLDS Reference results, may be attributable to PCB levels occurring in worm tissue prior to testing.

A review of the sediment PCB data presented in Table 18 was also conducted. In accordance with the Work Plan, sediments (representing multiple individual samples depicted on Table 18) were combined in equal parts to generate the tested composites. As such, the averages of these samples approximate the PCB concentrations for the tested sediment in the *N. virens* assays. The estimated Total PCB concentrations for the tested composites are listed below:

- Composite 2 - 82 ug/kg
- Composite 3 - 50 ug/kg
- Composite 4 - 166 ug/kg
- Composite 5 - 32 ug/kg
- Composite 6 - 18 ug/kg

Concentrations of Total PCBs in Composites 2, 3, 4, and 5 are all between the Effects Range Low (ERL) and Effects Range Median (ERM) sediment benchmarks of 23 and 180 ug/kg, respectively (Buchman, 2008) and concentrations in Composite 6 are below the ERL. None of the concentrations were above the ERM at a level where adverse effects on the benthic community would be likely.

This supplemental review of PCB data indicates that the native pre-test *N virens* tissues contained elevated levels of some PCB congeners. The statistical finding of significance, relative to the CLDS Reference, for PCB 138, 153, 170, 180 and 187 in some tested Composites appears to be influenced by the concentrations in the native tissues. None of the congeners were statistically higher than both the CLDS Reference and the native tissues.

3.2.3.4 28-Day Bioaccumulation Bioassay and Tissue Protocol Deviations

Review of the data collected for these assays documented minor deviations from the method protocol and/or ESI's standard procedures.

Data from daily temperature readings suggests that temperatures were generally on the low end of the acceptable range as the mean temperature of 11.4°C for the *N. virens* assay falls below the targeted limit of 14±2°C and the mean temperature of 11.6°C for the *M. nasuta* assay only meets the criterion by rounding to the precision reflected in the protocol. The mean temperature of 12.0°C calculated from the hourly data logger readings is within the acceptable range. Although slightly low, the daily temperature values are still within the normal temperature range tolerated by these species. It is the opinion of ESI's technical manager that this deviation had no adverse impact on the results of the assays.

Data from the daily salinity readings indicates that the minimum measurements fell outside of the acceptable range for both species. The excursions all occurred on November 28, 2018 (day 7 of the *M. nasuta* assay and day 8 of the *N. virens* assay) and were all within the 25-27‰ range, except for one measurement of 13.3‰ in replicate E of composite 5 for *N. virens* that is likely an erroneous reading resulting from technician error. While the exact reason for the excursions is unclear, this deviation did not adversely affect the outcome of the assay.

The temperature logger for collecting hourly data was not activated at the start of the assays, but instead was activated on November 30, 2018 (day 9 of the *M. nasuta* assay and day 10 of the *N. virens* assay). As a result, approximately one-quarter of the hourly temperature readings were not recorded. In addition, daily water quality readings are missing for replicate A of composite 6 on day 0 of the *N. virens* assay due to a multi-probe malfunction; however, water quality readings were obtained from replicates B, C, D and E for that same composite, and all measurements appear to be within reasonable proximity to each other and to the measurements collected for the other composites that day. While these deviations represent a data gap, this deviation did not adversely affect the outcome of the assay.

As described in Section 3.2.3.2, native pre-test PCB concentrations in *N. virens* were elevated and greater than historic concentrations of PCBs noted in source organisms. The *Inland Testing Manual* (EPA/USACE, 1998) specifies that the background levels of contaminants in time-zero tissues should not be “inordinate”. In order to address the potential influence of the background PCB levels noted in exposed test organisms, additional statistical comparisons were performed as described in Section 3.2.3.3.1.

Table 14 Elutriate Chemistry Results

Analyte		NHH-CLDS		Composite 1		Composite 2		Composite 3		Composite 4		Composite 5		Composite 6	
Total Metals (mg/L)															
Arsenic, Total		0.00066		0.0394		0.038677		0.02935		0.03803		0.03354		0.02174	
Selenium, Total		0.00056	U	0.00029		0.00031		0.00018		0.00023		0.00020		0.00014	
Chromium, Hexavalent		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Cadmium, Total		0.00008		0.00003		0.00003		0.00002		0.00003		0.00004	U	0.00004	U
Chromium, Total		0.00019		0.00039		0.00092		0.00109		0.00069		0.00035		0.00031	
Copper, Total		0.00085		0.00077		0.00131		0.00053		0.00124		0.00027		0.00099	
Lead, Total		0.00073		0.00052		0.00107		0.00041		0.00100		0.00020		0.00044	
Nickel, Total		0.0007		0.00056		0.00061		0.00039		0.00044		0.00025		0.00035	
Silver, Total		0.00011		0.00008	U	0.00007		0.00008	U	0.00006		0.00006		0.00008	U
Zinc, Total		0.0014	J	0.00157		0.00219		0.00129		0.00225		0.002	U	0.00126	
Mercury, Total		0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U	0.00005	U
Organochlorine Pesticides (ug/L)															
4,4-DDT		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0011		0.0004	U	0.0005	U
Aldrin		0.001	U	0.001	U	0.001	U	0.0010	U	0.0014	U	0.0009	U	0.001	U
Chloropyrifos		0.001	U	0.001	U	0.001	U	0.0010	U	0.0014	U	0.0009	U	0.001	U
cis-Chlordane		0.0005	U	0.0007		0.0007		0.0041		0.0041		0.0011		0.0005	U
Dieldrin		0.0005	U	0.0011		0.0011		0.0007		0.0012		0.0004	U	0.0014	
Endosulfan I		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0009		0.0004	U	0.0005	U
Endosulfan II		0.0005	U	0.0009		0.0015		0.0025		0.0030		0.0011		0.0005	U
Endrin		0.0005	U	0.0005	U	0.0020		0.0005	U	0.0007	U	0.0004	U	0.0005	
gamma-BHC		0.0005	U	0.0028		0.0023		0.0005	U	0.0007	U	0.0004	U	0.0025	
Heptachlor		0.0005	U	0.0005	U	0.0005	U	0.0005	U	0.0007	U	0.0004	U	0.0005	U
Heptachlor epoxide		0.001	U	0.001	U	0.001	U	0.001	U	0.0014	U	0.0009	U	0.001	U
Toxaphene		0.0263	U	0.025	U	0.0257	U	0.0251	U	0.0359	U	0.0247	U	0.0256	U
trans-Chlordane		0.0005	U	0.0010		0.0019		0.0005	U	0.0024		0.0008		0.0010	
Pentachlorophenol (ug/L)															
Pentachlorophenol		2.1	U	2.06	U	2.09	U	1.97	U	1.99	U	1.99	U	2.05	U
Polychlorinated Biphenyl Congeners (ug/L)															
PCB 8		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00144	U	0.00099	U	0.001	U
PCB 18		0.0011	U	0.001	U	0.001		0.00111		0.00165		0.00099	U	0.001	U
PCB 28		0.0011	U	0.002		0.001		0.00097		0.00225		0.00099	U	0.001	U
PCB 44		0.0011	U	0.001		0.001		0.00100	U	0.00260		0.00099	U	0.001	U
PCB 49	x	0.0011	U	0.001		0.001	U	0.00142		0.00287		0.00099	U	0.001	U
PCB 52		0.0011	U	0.001		0.001		0.00239		0.00527		0.00079		0.001	U
PCB 66		0.0011	U	0.001		0.001	U	0.00124		0.00266		0.00099	U	0.001	U
PCB 87	x	0.0011	U	0.001	U	0.001	U	0.00100		0.00198		0.00099	U	0.001	U
PCB 101		0.0011	U	0.001		0.001	U	0.00178		0.00440		0.00056		0.001	U
PCB 105		0.0011	U	0.001		0.001		0.00100	U	0.00140		0.00099	U	0.001	U
PCB 118		0.0011	U	0.001		0.001	U	0.00157		0.00433		0.00080		0.001	U
PCB 128		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00144	U	0.00099	U	0.001	U
PCB 138		0.0011	U	0.001		0.001		0.00185		0.00510		0.00066		0.001	U
PCB 153		0.0011	U	0.001		0.001	U	0.00159		0.00514		0.00066		0.001	U
PCB 170		0.0011	U	0.001	U	0.001	U	0.00090		0.00227		0.00099	U	0.001	U
PCB 180		0.0011	U	0.001		0.001	U	0.00138		0.00355		0.00087		0.001	U
PCB 183	x	0.0011	U	0.001	U	0.001	U	0.00085		0.00175		0.00099	U	0.001	U
PCB 184	x	0.0011	U	0.001	U	0.001	U	0.00100	U	0.00144	U	0.00099	U	0.001	U
PCB 187		0.0011	U	0.001	U	0.001	U	0.00115		0.00245		0.00099	U	0.001	U
PCB 195		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00143		0.00099	U	0.001	U
PCB 206		0.0011	U	0.001	U	0.001	U	0.00088		0.00163		0.00099	U	0.001	U
PCB 209		0.0011	U	0.001	U	0.001	U	0.00100	U	0.00128		0.00099	U	0.001	U
Total PCBs		*0.009*	*U*	*0.025*		*0.022*		*0.026*		*0.078*		*0.013*		*0.018*	*U*

Results presented for composite samples are the mean of three replicate samples.
One-half of the sample-specific method detection limit (MDL) is used to represent non-detects in calculation of Total PCBs.
Total Polychlorinated Biphenyls (PCBs) calculated as the sum of the 18 NOAA congeners multiplied by 2.
B – Analyte found in laboratory blank.
J – Estimated value.
mg/L - Milligram per liter.
U – Not detected above the laboratory reporting limit (RL).
ug/L - Microgram per liter.
x – Congener is not one of the 18 NOAA congeners included in Total PCBs.
Due to a laboratory spiking error, all non-detected pesticide results for elutriate composite 3, 4, and 5 samples are considered unusable and the pesticide detects, PCB detects and PCB non-detects for these composites are considered as estimated with a low bias.

Table 15 Suspended Particulate Phase Testing – Bioassay Findings

Sample ID	*A. bahia*	*M. beryllina*	*A. punctulata*	
	LC50 (%)	LC50 (%)	LC50 (%)	EC50 (%)
Unmitigated Assays				
Composite 1 Elutriate	>100%	65%	7%	4%
Composite 2 Elutriate	>100%	57%	13%	4%
Composite 3 Elutriate	74%	58%	3%	3%
Composite 4 Elutriate	>100%	69%	10%	7%
Composite 5 Elutriate	73%	56%	5%	4%
Composite 6 Elutriate	>100%	>100%	22%	22%
Mitigated Assays				
Composite 1 Elutriate	>100%	>100%	>100%	>100%
Composite 2 Elutriate	>100%	>100%	>100%	>100%
Composite 3 Elutriate	>100%	>100%	>100%	>100%
Composite 4 Elutriate	>100%	>100%	>100%	>100%
Composite 5 Elutriate	>100%	>100%	>100%	>100%
Composite 6 Elutriate	>100%	>100%	>100%	>100%

Americamysis bahia – survival endpoint
Menidia beryllina – survival endpoint
Arbacia punctulata – survival and development endpoints

Table 16 Suspended Particulate Phase Testing – Water Quality Data Summary - Unmitigated

	Temperature (°C)		pH (SU)		Salinity (‰)		Ammonia (mg/L) Start		Ammonia (mg/L) End	
Sample ID	Start	End	Start	End	Start	End	Total	Unionized	Total	Unionized
A. bahia										
Lab Control	20	19	7.96	7.76	31	31	<0.1	<0.0030	1.6	0.0280
CLDS Reference	20	19	7.91	7.74	29	32	<0.1	<0.0027	1.6	0.0267
Composite 1	20	19	7.68	8.30	29	32	33	0.5251	17	0.9850
Composite 2	19	19	7.78	8.34	29	31	35	0.6489	19	1.2067
Composite 6	20	19	7.97	8.25	31	31	12	0.3627	6	0.3135
Lab Control	21.0	19	7.95	7.73	30.4	33	<0.1	<0.0034	1.6	0.0276
CLDS Reference	20.0	19	7.87	7.69	27.6	30	<0.1	<0.0024	1.7	0.0326
Composite 3	19.8	19	7.70	8.32	28.0	32	35	0.5381	25	1.5126
Composite 4	19.9	19	7.77	8.34	28.2	31	33	0.6048	25	1.3973
Composite 5	19.3	19	7.62	8.33	28.7	32	12	0.3508	9.3	1.7311
M. beryllina										
Lab Control	23	19	7.92	7.75	30	30	<0.1	<0.0034	1.6	0.0276
CLDS Reference Water	19	19	7.89	7.80	28	31	<0.1	<0.0024	1.7	0.0326
Composite 1	21	19	7.63	8.31	28	31	35	0.5381	25	1.4881
Composite 2	20	19	7.74	7.26	28	30	33	0.6048	25	1.3421
Composite 6	19	19	7.98	8.20	28	32	12	0.3508	9.3	0.4332
Lab Control	22.0	18	7.97	7.86	30.3	33	<0.1	<0.0035	1.4	0.0283
CLDS Reference Water	20.0	18	7.88	7.82	27.5	31	<0.1	<0.0025	1.3	0.0243
Composite 3	19.8	17	7.69	8.27	29.0	32	33	0.5453	24	1.1307
Composite 4	20.0	18	7.76	8.30	28.1	32	35	0.5174	20	1.0800
Composite 5	19.2	15	7.66	8.25	28.7	31	12	0.5314	29	1.1396
A. punctulata										
Lab Control	20	21	7.98	8.02	31	32	<0.1	<0.0031	0.36	0.0130
CLDS Reference Water	19	21	7.91	8.06	29	31	<0.1	<0.0025	0.3	0.0119
Composite 1	21	21	7.68	8.43	29	29	33	0.5650	31	2.7659
Composite 2	20	21	7.73	8.42	29	29	35	0.6236	29	2.5337
Composite 6	20	21	7.97	8.35	31	31	12	0.3627	11	0.8202
Lab Control	19	20.4	7.92	8.04	31	30.3	<0.1	<0.0025	0.9	0.0328
CLDS Reference Water	18.5	20.5	7.95	8.08	30	28.1	<0.1	<0.0026	0.14	0.0057
Composite 3	19.9	19.9	7.76	8.32	30	30.9	34	0.6400	20	1.2963

Table 16 Suspended Particulate Phase Testing – Water Quality Data Summary – Unmitigated (Continued)

	Temperature (°C)		pH (SU)		Salinity (‰)		Ammonia (mg/L) Start		Ammonia (mg/L) End	
Sample ID	Start	End	Start	End	Start	End	Total	Unionized	Total	Unionized
Composite 4	20.1	20.0	7.87	8.36	30	30.0	30	0.7342	23	1.6434
Composite 5	20.1	19.9	7.70	8.35	30	29.8	36	0.6004	22	1.5296

Table 17 Suspended Particulate Phase Testing –Water Quality Data Summary - Mitigated

	Temperature (°C)		pH (SU)		Salinity (‰)		Ammonia (mg/L) Start		Ammonia (mg/L) End	
Sample ID	Start	End	Start	End	Start	End	Total	Unionized	Total	Unionized
A. bahia										
Lab Control	19	20	8.0	7.84	31	34	<0.1	<0.0030	1.4	0.0311
CLDS Reference Water	19	20	7.97	7.73	29	33	<0.1	<0.0028	1.7	0.0296
Composite 1	21	20	7.83	7.82	28	30	2	0.0483	2.9	0.0630
Composite 2	19	20	7.85	7.80	28	30	3.1	0.0677	3.7	0.0768
Composite 3	21	20	7.79	7.83	28	30	3.4	0.0750	3.5	0.0777
Composite 4	19	20	7.95	7.89	28	30	3.3	0.0902	3.5	0.0889
Composite 5	19	20	7.86	7.91	28	30	2.9	0.0648	3	0.0797
Composite 6	22	20	7.97	7.86	28	29	1.2	0.0426	2.6	0.0621
M. beryllina										
Lab Control	19	20	8.00	7.73	31	32	<0.1	<0.0030	2	0.0350
CLDS Reference Water	19	20	7.97	7.82	29	32	<0.1	<0.0028	2.2	0.0472
Composite 1	21	20	7.83	8.86	28	30	2	0.0483	2.9	0.0689
Composite 2	19	20	7.85	7.92	28	32	3.1	0.0677	3.3	0.0887
Composite 3	21	20	7.79	7.84	28	30	3.4	0.0750	3.7	0.0840
Composite 4	19	20	7.95	7.89	28	30	3.3	0.0902	3.5	0.0889
Composite 5	19	20	7.80	7.88	28	30	2.9	0.0566	3.2	0.0795
Composite 6	22	20	7.97	7.81	28	29	1.2	0.0426	2.6	0.0555
A. punctulata										
Lab Control	19	20	7.91	8.00	31	33	<0.1	<0.0025	0.15	0.0048
Composite 1	20	21	7.79	8.04	30	31	1.1	0.0223	1.2	0.0456
Composite 2	19	21	7.72	8.13	30	32	2.4	0.0386	2.4	0.1105
Composite 3	20	20	8.01	8.11	30	31	1.4	0.0465	1.4	0.0578
Composite 4	20	20	8.01	8.15	30	32	2.3	0.0764	2.2	0.0986
Composite 5	20	20	7.74	8.14	32	32	2.6	0.0466	2.7	0.1184
Composite 6	20	21	7.88	8.12	30	30	1.7	0.0422	1.8	0.0820

Table 18 Sediment Chemistry Results

Analyte	CAD-1 0-4.0	CAD-1 4.4-9.0	CAD-2 0.5.3	CAD-2 5.3-10.8	CAD-3 0-5.5	CAD-3 6.1-9.9	DS-1 0-7.3	DS-2 0-7.0	R1	S1	TB-1 0-5.2	TB-1 5.2-6.0	TB-2	US-1 0-5.5	US-2 0.0-5.0	US-2 5.0-6.0	V1	W1
Total Solids (%)	42.7	50.7	43.6	50.4	45.8	55.4	37.4	37.5	40.8	41.2	37.5	73.4	36.6	36.3	42	74.9	32.1	38.9
Moisture (%)	57.3	49.3	56.4	49.6	54.2	44.6	62.6	62.5	59.2	58.8	62.5	26.6	63.4	63.7	58	25.1	67.9	61.1
Total Organic Carbon (%)	2.2	1.27	2.085	1.33	2.03	1.6	2.525	3.02	2.875	2.49	2.505	0.071	2.705	3.37	2.905	0.0165	2.92	3.065
Total Metals (mg/kg)																		
Arsenic, Total	9.64	7.2	10.3	7.38	9.33	7.29	9.97	9	9.5	7.85	8.12	1.64	9.42	10.3	9.43	1.31	10.4	8.24
Cadmium, Total	1.01	0.163 J	0.574	0.133 J	0.568	0.141 J	1.53	1.77	1.42	1.46	0.618	0.068 J	0.597	1	2.48	0.267 U	0.545 J	2.74
Chromium, Total	74.2	27.4	45.5	26.6	51.2	25.5	102	105	97.9	94.4	64.9	9.69	67.8	85.2	117	6.16	67.8	110
Copper, Total	139	10.5	75.6	8.63	103	10.5	135	134	144	132	86.7	11.9	89.7	129	178	5.2	86.2	189
Lead, Total	70.6	8.92	48.8	7.78	56.4	9.49	75.7	69.5	85	79.5	49.8	8.4	53.8	77.9	100	5.3	55.4	109
Nickel, Total	23.3	16.5	19.8	16.4	20	16.4	28.8	28	31.7	28.8	23.6	5.58	25	30.2	31.7	4.16	27.1	31.4
Zinc, Total	210	48.9	142	48.4	159	44.3	224	235	226	214	165	21.4	173	216	263	11.5 J	173	256
Mercury, Total	0.699	0.007 J	0.667	0.021 U	0.784	0.015 J	0.382	0.433	0.367	0.383	0.219	0.016	0.21	0.299	0.418	0.014 U	0.191	0.49
Organochlorine Pesticides (ug/kg)																		
4,4-DDD	0.541 U	0.463 U	0.54 U	0.456 U	2.05	0.421 U	0.909	1.5	1.21	1.3	0.704	0.654 U	0.932	1.56	1.84	0.599 U	0.77	1.83
4,4-DDE	1.52	0.463 U	0.942	0.456 U	0.926	0.421 U	3.6	4.93	4.66	4.2	2.03	0.654 U	1.93	3.77	6.16	0.599 U	1.62	5.72
4,4-DDT	0.541 U	0.463 U	0.54 U	0.456 U	0.541	0.421 U	1.36	1.73	3.4	3.44	0.691	0.654 U	2.14	3.42	4.7	0.599 U	0.768	6.96
Total DDT	*2.061*	*0.6945 U*	*1.482*	*0.684 U*	*3.517*	*0.6315 U*	*5.869*	*8.16*	*9.27*	*8.94*	*3.425*	*0.981 U*	*5.002*	*8.75*	*12.7*	*0.8985 U*	*3.158*	*14.51*
Aldrin	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
cis-Chlordane	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	1.04	0.754	0.662 U	0.654 U	0.656 U	1.38	1.49	0.599 U	0.825	2.16
cis-Nonachlor	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	1.52	0.934	0.662 U	0.654 U	0.656 U	0.687	1.85	0.599 U	0.747 U	1.89
Dieldrin	0.541 U	0.463 U	0.54 U	0.456 U	0.533	0.421 U	0.799	1.81	0.953	1.2	0.662 U	0.654 U	1.79	1.25	1.12	0.599 U	0.954	1.12
Endosulfan I	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
Endosulfan II	1.38	0.463 U	0.887	0.456 U	0.989	0.421 U	2.92	0.652 U	5.46	6.3	1.46	0.654 U	0.656 U	3.97	10.2	0.599 U	1.29	12.4
Endrin	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
gamma-BHC	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.688	0.883	0.662 U	0.654 U	0.656 U	0.998	1.23	0.599 U	0.747 U	1.54
Heptachlor	0.541 U	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.662 U	0.652 U	0.585 U	0.597 U	0.662 U	0.654 U	0.656 U	0.631 U	0.571 U	0.599 U	0.747 U	0.595 U
Heptachlor epoxide	1.08 U	0.927 U	1.08 U	0.913 U	1.05 U	0.843 U	1.32 U	1.3 U	1.17 U	1.19 U	1.32 U	1.31 U	1.31 U	1.26 U	1.14 U	1.2 U	1.49 U	1.19 U
Hexachlorobenzene	1.08 U	0.927 U	1.08 U	0.913 U	1.05 U	0.843 U	1.32 U	1.3 U	1.17 U	1.19 U	1.32 U	1.31 U	1.31 U	1.26 U	1.14 U	1.2 U	1.49 U	1.19 U
Methoxychlor	3.6	1.85 U	2.16 U	1.82 U	3.71	1.68 U	2.65 U	3.66	6.14	3.44	2.65 U	2.61 U	2.62 U	3.89	7.97	2.4 U	2.99 U	7.88
Oxychlordane	4.2	0.927 U	1.08 U	16.4	1.05 U	0.843 U	3.81	4.82	7.92	6.41	3.24	1.31 U	3.73	5.85	10.6	1.2 U	3.66	12.3
Toxaphene	27.2 U	23.3 U	27.1 U	22.9 U	26.3 U	21.2 U	33.2 U	32.7 U	29.4 U	30 U	33.2 U	32.8 U	32.9 U	31.7 U	28.6 U	30.1 U	37.5 U	29.9 U
trans-Chlordane	3.25	0.463 U	1.42	0.456 U	1.36	0.421 U	7.57	8.37	28.1	27	5.12	0.654 U	5.78	17.6	36	0.599 U	4.62	56.3
trans-Nonachlor	0.666	0.463 U	0.54 U	0.456 U	0.524 U	0.421 U	0.721	0.852	2.99	1.97	0.662 U	0.654 U	0.656 U	1.86	3.65	0.599 U	0.747 U	0.595 U

Table 18 Sediment Chemistry Results

Analyte		CAD-1 0-4.0	CAD-1 4.4-9.0	CAD-2 0.5.3	CAD-2 5.3-10.8	CAD-3 0-5.5	CAD-3 6.1-9.9	DS-1 0-7.3	DS-2 0-7.0	R1	S1	TB-1 0-5.2	TB-1 5.2-6.0	TB-2	US-1 0-5.5	US-2 0.0-5.0	US-2 5.0-6.0	V1	W1
Polycyclic Aromatic Hydrocarbons (ug/kg)																			
Acenaphthene		54.1 U	9.27 U	54 U	9.13 U	52.4 U	8.43 U	66.2 U	82.3	40 J	46.2 J	66.2 U	13.1 U	65.6 U	51.4 J	51.2 J	12 U	74.7 U	67
Acenaphthylene		47.8 J	9.27 U	54 U	9.13 U	39.7 J	8.43 U	38.1 J	42.5 J	51.4 J	35.4 J	66.2 U	13.1 U	34 J	52.7 J	62.4	12 U	74.7 U	68.2
Anthracene		91	9.27 U	49.3 J	9.13 U	113	8.43 U	58.1 J	128	95.4	105	45.5 J	13.1 U	51.5 J	104	119	12 U	46.5 J	146
Benz(a)anthracene		423	8.61 J	196	9.13 U	449	5.46 J	230	377	358	327	250	9.75 J	264	511	475	12 U	229	530
Benzo(a)pyrene		522	8.76 J	228	9.13 U	557	4.33 J	273	337	420	356	303	12.1 J	323	522	521	12 U	282	583
Benzo(b)fluoranthene		461	8.37 J	200	9.13 U	484	5.25 J	292	421	448	370	362	14.5	403	595	613	12 U	329	640
Benzo(ghi)perylene		435	7.01 J	179	9.13 U	445	8.43 U	251	286	369	306	271	10.7 J	294	439	445	12 U	258	515
Benzo(k)fluoranthene		455	5.78 J	180	9.13 U	380	8.43 U	307	293	425	368	276	11.1 J	287	488	479	12 U	292	570
Chrysene		462	7.87 J	209	9.13 U	476	4.38 J	291	446	435	382	324	11.1 J	327	624	590	12 U	338	673
Dibenz(a,h)anthracene		89.2	9.27 U	40.8 J	9.13 U	91.8	8.43 U	58.3 J	62.6 J	75.4	62.6	62.1 J	13.1 U	65.6	89.4	100	12 U	51.5 J	116
Fluoranthene		769	16.2	348	9.13 U	848	11.5	499	818	811	762	493	17.2	564	1110	1060	12 U	505	1250
Fluorene		37.2 J	9.27 U	54 U	9.13 U	42.7 J	8.43 U	34.2 J	97.1	53.8 J	42.3 J	66.2 U	13.1 U	65.6 U	55.9 J	83.4	12 U	74.7 U	92.6
Indeno(1,2,3-cd)Pyrene		488	10.6	235	4.56 J	461	7.57 J	302	317	421	360	331	16.7	352	520	498	6.13 J	309	547
Naphthalene		92.9	9.27 U	41.2 J	9.13 U	97	8.43 U	121	947	90	122	62.4 J	13.7	76.2	75.2	190	12 U	37.5 J	152
Phenanthrene		250	8.47 J	134	9.13 U	326	4.62 J	183	365	290	176	159	8.6 J	188	323	321	12 U	161	417
Pyrene		893	16.2	431	9.13 U	1050	9.62	469	705	710	678	448	24.5	516	954	914	12 U	466	1070
Total LMW PAHs		*532*	*20*	*265*	*14 U*	*632*	*15*	*451*	*1662*	*621*	*527*	*317*	*35*	*383*	*662*	*827*	*18 U*	*301*	*943*
Total HMW PAHs		*4997*	*92*	*2247*	*25*	*5242*	*54*	*2972*	*4063*	*4472*	*3972*	*3120*	*131*	*3396*	*5852*	*5695*	*33*	*3060*	*6494*
Total PAHs		*5530*	*112*	*2512*	*39*	*5873*	*70*	*3423*	*5725*	*5093*	*4499*	*3437*	*166*	*3778*	*6515*	*6522*	*51*	*3361*	*7437*
Polychlorinated Biphenyl Congeners (ug/kg)																			
PCB 8		1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.31 U	1.25 J	0.635 J	0.689 J	1.33 U	0.677 U	1.26 U	1.36 U	0.669 J	0.665 U	1.54 U	1.59
PCB 18		1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.68	2.98	1.25	2.38	1.33 U	0.677 U	1.26 U	1.44	1.55	0.665 U	0.797 J	3.16
PCB 28		1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	2	3.96	1.03 J	1.49	0.776 J	0.677 U	1.01 J	1.36 U	2.42	0.665 U	0.937 J	2.64
PCB 44		0.803 J	0.985 U	0.594 J	0.966 U	0.636 J	0.883 U	3.75	9.98	2.75	4.83	1 J	0.677 U	1.24 J	0.779 J	3.83	0.665 U	0.899 J	6.54
PCB 49	x	0.731 J	0.985 U	0.595 J	0.966 U	0.63 J	0.883 U	3.33	6.28	2.27	4.43	1.08 J	0.677 U	1.59	0.802 J	3.6	0.665 U	1.18 J	7.42
PCB 52		0.739 J	0.985 U	1.22	0.966 U	0.632 J	0.883 U	3.85	8.39	2.77	7	1.04 J	0.677 U	1.38	1.25 J	6.72	0.665 U	1.37 J	9.76
PCB 66		0.671 J	0.985 U	0.639 J	0.966 U	0.533 J	0.883 U	3.71	6.84	1.87	2.96	1.34	0.677 U	1.83	0.801 J	3.77	0.665 U	1.8	5.7
PCB 87	x	1.14 U	0.985 U	1.06 J	0.966 U	0.538 J	0.883 U	1.7	4.3	0.976 J	1.56	1.33 U	0.677 U	0.872 J	1.43	1.98	0.665 U	0.996 J	3.14
PCB 101		1.27	0.985 U	2.26	0.966 U	1.09	0.883 U	5.91	13.7	3.3	6.01	2.4	0.37 J	3.08	2.66	5.58	0.665 U	2.51	10.6
PCB 105		1.14 U	0.985 U	0.882 J	0.966 U	1.05 U	0.883 U	1.15 J	3.07	1.2 U	1.16 U	1.33 U	0.677 U	0.752 J	0.918 J	1.18	0.665 U	1.54 U	3.14
PCB 118		1.01 J	0.985 U	1.81	0.966 U	1.06	0.883 U	4.89	9.47	2.11	3.82	1.6	0.677 U	2.59	2.37	3.78	0.665 U	2.18	9.02
PCB 128		1.14 U	0.985 U	0.567 J	0.966 U	0.577 J	0.883 U	2.02	3.32	0.984 J	1.66	0.986 J	0.677 U	1.06 J	0.963 J	0.737 J	0.665 U	0.913 J	2.01
PCB 138		1.53	0.985 U	3.15	0.966 U	1.43	0.883 U	6.5	14.1	3.53	6.11	2.48	0.435 J	3.51	3.38	5.31	0.665 U	3.37	12.8
PCB 153		1.37	0.985 U	2.24	0.966 U	1.16	0.883 U	6.01	11.5	3.39	5.26	2.24	0.354 J	2.82	2.48	4.88	0.665 U	2.84	10.4
PCB 170		1.14 U	0.985 U	0.584 J	0.966 U	1.05 U	0.883 U	2.6	4.38	1.42	1.89	0.912 J	0.677 U	0.711 J	1.36 U	2.67	0.665 U	1.02 J	2.84
PCB 180		0.883 J	0.985 U	1.32	0.966 U	0.793 J	0.883 U	3.52	7.12	2.12	2.52	1.28 J	0.677 U	1.62	1.54	3.03	0.665 U	1.66	5.24
PCB 183	x	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.07 J	2.04	0.683 J	0.766 J	1.33 U	0.677 U	1.26 U	1.36 U	0.941 J	0.665 U	1.54 U	1.66
PCB 184	x	1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.31 U	1.32 U	1.2 U	1.16 U	1.33 U	0.677 U	1.26 U	1.36 U	1.13 U	0.665 U	1.54 U	1.26
PCB 187		0.757 J	0.985 U	0.89 J	0.966 U	0.752 J	0.883 U	3.2	6.78	1.76	2.43	1.07 J	0.677 U	1.4	0.922 J	2.17	0.665 U	1.52 J	5.56
PCB 195		1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	1.03 J	0.812 J	1.2 U	1.16 U	1.33 U	0.677 U	1.26 U	1.36 U	1.13 U	0.665 U	1.54 U	0.692 J
PCB 206		0.638 J	0.985 U	1.12 U	0.966 U	0.602 J	0.883 U	1.44	2.46	0.995 J	0.922 J	1.33 U	0.677 U	0.847 J	1.36 U	1.02 J	0.665 U	1.15 J	1.66
PCB 209		1.14 U	0.985 U	1.12 U	0.966 U	1.05 U	0.883 U	0.884 J	1.01 J	0.62 J	1.16 U	1.33 U	0.677 U	1.26 U	1.36 U	1.13 U	0.665 U	1.54 U	0.848 J
Total PCBs		*23.918*	*8.874 U*	*35.69*	*8.694 U*	*22.212*	*7.956 U*	*108.95*	*222.24*	*62.264*	*101.69*	*38.238*	*7.388 U*	*50.228*	*43.092*	*99.764*	*5.976 U*	*49.012*	*188.4*

One-half of the sample-specific method detection limit (MDL) is used to represent non-detects in calculation of totals.
Total Polychlorinated Biphenyls (PCBs) calculated as the sum of the 18 NOAA congeners multiplied by 2.
mg/kg - Milligram per kilogram.
J - Estimated value.
U - Not detected at the laboratory reporting limit (RL).
ug/kg - Microgram per kilogram.
x – Congener is not one of the 18 NOAA congeners included in Total PCBs.

Table 19 10-Day Whole Sediment Bioassay - Findings

A. bahia percent survival results

	Replicate Survival at the End of 10-Day Exposure (%)					Mean Survival (%)	Statistically Different from CLDS Reference [a]?	Difference in Survival >20% Compared to CLDS Reference?
	A	B	C	D	E			
Lab Control	100%	100%	100%	90%	100%	98%	--	--
CLDS Reference	10%	30%	75%	100%	100%	63%	--	--
Composite 2	95%	95%	95%	90%	85%	92%	No	No [a]
Composite 3	85%	95%	90%	100%	85%	91%	No	No [a]
Composite 4	95%	90%	90%	85%	95%	91%	No	No [a]
Composite 5	90%	95%	100%	90%	100%	95%	No	No [a]
Composite 6	90%	100%	100%	100%	90%	96%	No	No [a]

[a] The difference in survival is >20%, however survival is improved in the site composite samples as compared with the CLDS reference sediment.

L. plumulosus percent survival results

	Replicate Survival at the End of 10-Day Exposure (%)					Mean Survival (%)	Statistically Different from CLDS Reference [a]?	Difference in Survival >20% Compared to CLDS Reference?
	A	B	C	D	E			
Lab Control	95%	100%	100%	95%	100%	98%	--	--
CLDS Reference	95%	100%	100%	15%	85%	79%	--	--
Composite 2	100%	90%	90%	90%	100%	94%	No	No
Composite 3	95%	100%	90%	95%	100%	96%	No	No
Composite 4	90%	95%	85%	95%	95%	92%	No	No
Composite 5	100%	100%	95%	100%	100%	99%	No	No [a]
Composite 6	90%	95%	100%	90%	95%	90%	No	No

[a] The difference in survival is equal to 20% in Composite 5, however survival is improved in all the site composite samples as compared with the CLDS reference sediment.

Table 20 10-Day Whole Sediment Bioassay - Lab Control Performance and Assay Acceptability Criteria Summary

Endpoint / Measurement		Protocol Criteria	Unit	*A. bahia*	*L. plumulosus*
Mean Survival		Laboratory Control ≥ 90%	%	98%	98%
			Protocol Met	Yes	Yes
Salinity	Minimum:	*A. bahia* - 28‰	‰	24.6	17.2
		L. plumulosus - 18‰	Protocol Met	No [a]	No [a]
	Maximum:	*A. bahia* - 32‰	‰	32.9	23.6
		L. plumulosus - 22‰	Protocol Met	No [a]	No [a]
Temperature		Mean: 20±1°C	Daily / Hourly °C	20.9 / 21.0	20.9 / 21.0
		Minimum: 17°C	Daily / Hourly °C	19.7 / 19.8	20.0 / 19.8
		Maximum: 23°C	Daily / Hourly °C	21.7 / 21.8	21.7 / 21.8
			Protocol Met	Yes / Yes	Yes/ Yes

[a] Salinity values recorded on day 9 of the *A. bahia* assay and day 10 of both assays fell below their acceptable ranges; however, these results appear to have been related to an issue with a salinity probe. Mean salinity for the assays were within their target ranges and the control survival met acceptance criteria demonstrating that the test organisms are tolerant of salinities within the ranges measured.

Table 21 10-Day Whole Sediment Bioassay Water Quality Data Summary: *A. bahia*

Sample ID	Day	Temperature (° C)	pH (SU)	Salinity (‰)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
A. bahia – Overlying Water Quality Data						
Lab Control	00	20.3	7.71	28.02	0.15	0.0026
CLDS Reference	00	20.0	7.82	28.42	<0.1	<0.0022
Composite 2	00	20.1	7.89	28.39	1.6	0.0413
Composite 3	00	20.0	7.92	28.72	1.8	0.0493
Composite 4	00	20.3	7.91	28.66	2.2	0.0602
Composite 5	00	20.6	7.90	28.57	2.5	0.0684
Composite 6	00	20.7	7.89	28.64	0.61	0.0164
Lab Control	03	21.2	7.54	28.88	0.63	0.0080
CLDS Reference	03	21.0	7.67	29.19	0.13	0.0022
Composite 2	03	21.1	7.74	29.75	3	0.0590
Composite 3	03	21.1	7.77	29.20	1.6	0.0338
Composite 4	03	21.2	7.79	29.09	1.8	0.0401
Composite 5	03	21.2	7.81	29.45	3.4	0.0790
Composite 6	03	21.3	7.82	30.09	<0.1	<0.0024
Lab Control	10	21.2	7.57	24.75	0.56	0.0078
CLDS Reference	10	20.9	7.73	25.44	0.15	0.0029
Composite 2	10	21.2	7.90	25.41	0.21	0.0061
Composite 3	10	21.2	7.99	25.31	0.16	0.0057
Composite 4	10	21.2	8.03	25.67	0.31	0.0120
Composite 5	10	21.3	8.12	24.60	0.21	0.0101
Composite 6	10	21.3	7.97	25.87	<0.1	<0.0034

Data in overlying water summary were obtained from the "A" replicate of each *A. bahia* treatment.
Ammonia levels in the sediment were mitigated prior to the addition of sediments to the test vessels. See Table 5 for the ammonia mitigation measurements.

Table 22 10-Day Whole Sediment Bioassay Water Quality Data Summary: *L. plumulosus*

Sample ID	Day	Temperature (° C)	pH (SU)	Salinity (‰)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
L. plumulosus – Overlying Water Quality Data [a]						
Lab Control	00	20.2	7.78	18.5	<0.1	<0.0021
CLDS Reference	00	20.0	7.78	19.01	<0.1	<0.0021
Composite 2	00	20.3	7.93	18.78	4.3	0.1298
Composite 3	00	20.3	7.89	18.59	2.1	0.0580
Composite 4	00	20.3	8.91	18.62	2.2	0.0636
Composite 5	00	20.3	7.90	19.12	2	0.0564
Composite 6	00	20.4	7.89	19.35	0.68	0.0189
Lab Control	03	21.1	6.30	18.63	0.47	0.0004
CLDS Reference	03	20.8	6.52	19.67	<0.1	<0.0001
Composite 2	03	21.0	7.26	21.06	5.7	0.0392
Composite 3	03	21.1	7.48	18.94	1.6	0.0185
Composite 4	03	21.1	7.54	18.93	1.7	0.0226
Composite 5	03	21.1	7.59	18.74	2.6	0.0387
Composite 6	03	21.2	7.62	19.89	0.61	0.0097
Lab Control	10	20.8	7.00	18.26	0.27	0.0010
CLDS Reference	10	20.8	7.17	18.75	<0.1	<0.0006
Composite 2	10	20.8	7.46	20.68	0.18	<0.0019
Composite 3	10	21.0	7.59	18.21	<0.1	<0.0015
Composite 4	10	21.0	7.66	18.24	<0.1	<0.0017
Composite 5	10	21.1	7.75	17.36	<0.1	<0.0022
Composite 6	10	21.1	7.72	17.18	<0.1	<0.0020
L. plumulosus – Pore Water Quality Data [b]						
Lab Control	-02	21.0	4.19	30	1.3	0.0000073
CLDS Reference	-02	20.1	7.68	30	2.3	0.0367
Composite 2	-01	21.0	7.60	30	25	0.3551
Composite 3	-01	21.1	7.59	30	32	0.4476
Composite 4	-01	21.1	7.69	30	32	0.5615
Composite 5	-01	21.0	7.56	30	23	0.2983
Composite 6	-01	21.1	7.70	30	11	0.1974

Table 22 10-Day Whole Sediment Bioassay Water Quality Data Summary: *L. plumulosus* (Continued)

Sample ID	Day	Temperature (° C)	pH (SU)	Salinity (‰)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
L. plumulosus – Pore Water Quality Data [a]						
Lab Control	00	20.9	5.82	20	0.69	0.0002
CLDS Reference	00	21.0	7.75	22	<0.5	<0.0104
Composite 2	00	21.0	7.65	24	15	0.2467
Composite 3	00	21.2	7.73	20	6.5	0.1329
Composite 4	00	21.2	7.79	20	6.9	0.1614
Composite 5	00	21.2	7.60	21	16	0.2424
Composite 6	00	21.1	7.84	20	3.8	0.0987
Lab Control	03	21.2	6.10	19	1.8	0.0009
CLDS Reference	03	21.1	7.63	21	0.28	0.0045
Composite 2	03	21.0	7.57	22	7.2	0.0999
Composite 3	03	20.9	7.44	20	2	0.0207
Composite 4	03	21.0	7.58	20	3.2	0.0459
Composite 5	03	21.1	7.39	20	6.7	0.0628
Composite 6	03	21.1	7.74	21	0.91	0.0188
Lab Control	10	21.2	6.60	20	1.2	0.019
CLDS Reference	10	21.0	7.41	21	0.26	0.0025
Composite 2	10	21.2	7.24	21	0.8	0.0053
Composite 3	10	21.3	7.26	21	0.1	0.0007
Composite 4	10	21.1	7.31	21	0.36	0.0208
Composite 5	10	21.1	6.93	20	0.5	0.0016
Composite 6	10	20.9	7.51	20	0.2	0.0024

Data in water quality summary are obtained from the “Surrogate” replicate of each treatment.
Ammonia levels in the sediment were mitigated prior to the addition of sediments to the test vessels. See Table 5 for the ammonia mitigation measurements.
[a] In-life assay pore water monitoring.
[b] Pre-assay pore water monitoring to confirm unionized ammonia levels were below 0.8 mg/L threshold for assay initiation.

Table 23 28-Day Bioaccumulation Bioassay - Findings

M. nasuta Survival

	Replicate Survival at the End of 28-Day Exposure (%)						
	A	B	C	D	E	Mean Survival (%)	Statistically Different from CLDS Reference [a]?
Lab Control	100%	95%	100%	100%	100	99%	--
CLDS Reference	100%	100%	100%	100%	95%	99%	--
Composite 2	100%	100%	100%	100%	100%	100%	No
Composite 3	100%	100%	90%	100%	100%	98%	No
Composite 4	95%	90%	95%	100%	100%	96%	No
Composite 5	90%	90%	90%	100%	100%	94%	No
Composite 6	100%	100%	90%	100%	100%	98%	No

N. virens Survival

	Replicate Survival at the End of 28-Day Exposure (%)						
	A	B	C	D	E	Mean Survival (%)	Statistically Different from CLDS Reference [a]?
Lab Control	95%	100%	100%	95%	90%	96%	--
CLDS Reference	100%	100%	95%	100%	95%	98%	--
Composite 2	100%	100%	95%	100%	85%	96%	No
Composite 3	100%	95%	100%	95%	95%	97%	No
Composite 4	100%	100%	95%	95%	95%	97%	No
Composite 5	95%	95%	95%	90%	90%	93%	Yes
Composite 6	100%	95%	85%	100%	90%	94%	No

[a] Statistically significant difference (α=0.05) from Reference.

Table 24 28-Day Bioaccumulation Bioassay – Lab Control Performance and Assay Acceptability Criteria Summary

Endpoint/Measurement	Protocol Criteria	Unit	*M. nasuta*	*N. virens*
Mean Survival	Laboratory control ≥90%	%	99%	96%
		Protocol Met	Yes	Yes
Tissue Mass	Sufficient for analysis	Protocol Met	Yes	Yes
Salinity	Minimum: 28‰	‰	25.7	13.3
		Protocol Met	No [a]	No [a]
	Maximum: 32‰	‰	32.0	31.1 [c]
		Protocol Met	Yes	Yes
Temperature	Mean: 12-16°C	Daily/Hourly	11.6 [c] / 12.0	11.4 [b] / 12.0
	Minimum: 11°C	Daily/Hourly	11.0 / 11.8	10.8 [c] / 11.8
	Maximum: 17°C	Daily/Hourly	12.4 / 12.5	12.2 / 12.5
		Protocol Met	Yes / Yes	No [b] / Yes

[a] The salinity of the incoming water for the assay was below the target range on one day. The lowest recorded value of 13.3 ‰ in one replicate is likely an erroneous reading. Control survival in both assays met acceptance criteria demonstrating that the test organisms are tolerant of salinities within the ranges measured.
[b] Although slightly low, the daily temperature values are still within the normal temperature range tolerated by these species.
[c] This value meets the criterion when rounded to the whole number precision reflected in the protocol.

Table 25 Tissue Analysis – Mean Chemical Concentrations and Statistical Findings for *M. nasuta* Tissue

Analyte	Native Tissue	CLDS Reference	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
Total Metals (mg/kg)							
Arsenic	1.8	2.3	1.9 NS	2.3 NS	1.8 NS	1.8 NS	1.7 NS
Cadmium	0.029 b	0.024 b	0.030 bS	0.027 bNS	0.025 bNS	0.026 bNS	0.028 bNS
Chromium	0.46	0.49 b	0.47 NS	0.38 bNS	0.46 NS	0.32 bNS	0.49 NS
Copper	1.6	1.9	2.1 NS	2.1 NS	2.2 NS	1.5 NS	2.2 NS
Lead	0.28	0.46	0.45 NS	0.40 NS	0.40 NS	0.31 NS	0.61 S
Mercury	0.0037 b	0.0064 b	0.0031 abNS	0.0018 abNS	0.0023 abNS	0.0020 abNS	0.0074 bNS
Nickel	0.38	0.42	0.34 NS	0.36 NS	0.33 NS	0.32 NS	0.35 NS
Zinc	9.7	9.4	9.8 NS	10.7 NS	9.1 NS	8.8 NS	9.6 NS
Polycyclic Aromatic Hydrocarbons (ug/kg)							
Acenaphthene	2.4 a	2.3 a	2.3 ac	2.7 abc	2.3 ac	2.3 ac	2.4 ac
Acenaphthylene	2.4 a	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Anthracene	2.4 a	2.3 a	3.7 abc	7.4 bc	6.6 bc	2.3 ac	4.4 abc
Benzo(a)anthracene	2.4 a	3.6 ab	18 S	24 S	23 S	7.5 bS	28 S
Benzo(a)pyrene	2.4 a	2.3 a	7.7 bc	8.9 bc	9.6 bc	2.7 abc	17 c
Benzo(b)fluoranthene	2.4 a	2.8 ab	16 S	17 S	17 S	7.8 bS	23 S
Benzo(k)fluoranthene	2.4 a	2.3 a	8.2 bc	11 bc	11 bc	4.4 abc	17 c
Benzo(g,h,i)perylene	2.4 a	2.3 a	2.3 ac	3.8 abc	4.2 abc	2.3 ac	7.6 bc
Chrysene	2.4 a	2.8 ab	17 S	23 S	24 S	7.6 bS	30 S
Dibenzo(a,h)anthracene	2.4 a	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Fluoranthene	3.5 ab	6.3 ab	55 S	98 S	83 S	29 S	78 S
Fluorene	2.4 a	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Indeno(1,2,3-c,d)pyrene	2.4 a	2.3 a	2.3 ac	2.7 abc	2.8 abc	2.3 ac	5.0 abc
Naphthalene	2.4 a	2.3 a	2.3 ac	2.2 ac	2.3 ac	2.3 ac	2.4 ac
Phenanthrene	2.4 a	4.2 ab	12.0 S	16 S	22 S	6.9 bS	11 bS
Pyrene	3.3 ab	9.1 b	45 S	72 S	64 S	23 S	113 S
Total LMW PAHs [1]	14	16	25	33	38	18	25
Total HMW PAHs [1]	26	36	174	263	241	89	321
Total PAHs [1]	40	52	199	295	279	107	346
Polychlorinated Biphenyl Congeners (ug/kg)							
PCB 8	0.24 a	0.23 a	0.40 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 18	0.47 ab	0.23 a	0.90 ac	1.8 c	1.5 c	0.62 ac	0.52 ac
PCB 28	0.24 a	0.23 a	2.2 abc	0.61 abc	0.80 bc	0.23 ac	0.24 ac
PCB 44	0.24 a	0.23 a	0.40 abc	0.35 abc	0.60 abc	0.23 ac	0.24 ac
PCB 52	0.24 a	0.23 a	1.2 c	1.4 c	1.8 c	0.23 ac	0.24 ac
PCB 66	0.24 a	0.23 a	0.63 bc	0.56 bc	0.90 bc	0.23 ac	0.24 ac
PCB 101	0.24 a	0.23 a	1.2 c	0.83 bc	1.4 c	0.38 abc	0.30 abc
PCB 105	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 118	0.24 a	0.23 a	0.61 bc	0.42 abc	0.90 bc	0.28 abc	0.29 abc
PCB 128	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 138	0.24 a	0.23 a	0.82 bc	0.72 bc	1.2 bc	0.33 abc	0.31 abc
PCB 153	0.24 a	0.23 a	0.79 bc	0.69 bc	1.0 bc	0.32 abc	0.28 abc
PCB 170	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 180	0.24 a	0.23 a	0.23 ac	0.22 ac	0.30 abc	0.23 ac	0.24 ac
PCB 187	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 195	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 206	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
PCB 209	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Total PCBs [1]	9.0	8.3	22	19	24	10	10
Pesticides (ug/kg)							
Aldrin	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
cis-Chlordane	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.30 ac	0.24 ac
trans-Chlordane	0.24 a	0.23 a	0.23 ac	2.1 c	1.5 c	1.0 ac	0.24 ac
cis-Nonachlor	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
trans-Nonachlor	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Oxychlordane	0.47 a	0.46 a	0.62 ac	0.56 ac	0.45 ac	0.46 ac	0.47 ac
Total Chlordanes	1.4	1.4	1.5	3.3	2.6	2.2	1.4
4,4'-DDT	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.29 ac	0.24 ac
4,4'-DDD	0.24 a	0.23 a	0.23 ac	0.22 ac	0.28 ac	0.23 ac	0.24 ac
4,4'-DDE	0.24 a	0.33 a	0.73 S	0.70 S	0.91 S	0.35 aNS	0.24 aNS
Total DDT [1]	0.71	0.79	1.2	1.1	1.4	0.87	0.71
Dieldrin	0.24 a	0.23 a	0.23 ac	0.22 ac	0.28 ac	0.23 ac	0.24 ac
alpha-Endosulfan	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
beta-Endosulfan	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Endosulfans [1]	0.47	0.46	0.46	0.44	0.45	0.46	0.47
Endrin	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Heptachlor	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Heptachlor epoxide	0.47 a	0.46 a	0.46 ac	0.44 ac	0.45 ac	0.46 ac	0.47 ac
Hexachlorobenzene	0.47 a	0.46 a	0.46 ac	0.44 ac	0.45 ac	0.46 ac	0.47 ac
Lindane	0.24 a	0.23 a	0.23 ac	0.22 ac	0.23 ac	0.23 ac	0.24 ac
Methoxychlor	0.95 a	0.93 a	0.92 ac	0.89 ac	0.91 ac	0.91 ac	0.94 ac
Toxaphene	12 a	12 a	12 ac	11 ac	11 ac	11 ac	12 ac

Results for CLDS Reference and Composites are presented are the mean of five replicate samples. Native tissue results are presented as the mean of three replicates.

1 - Totals calculated for informational purposes only using 1/2 MDL for non-detected values. Statistical analysis not conducted on total values and qualifiers not applied.

Statistical qualifiers -

a - Analyte not detected (below MDL) in at least one replicate; mean value was calculated using one-half the MDL for the non-detect.

b - Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.

c - Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS - Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.

S - Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05

Table 26 Tissue Analysis – Mean Chemical Concentrations and Statistical Findings for *N. virens* Tissue

Analyte	Native Tissue	CLDS Reference	Composite 2	Composite 3	Composite 4	Composite 5	Composite 6
Total Metals (mg/kg)							
Arsenic	2.1	1.5	1.3 NS	1.5 NS	1.4 NS	1.4 NS	1.5 NS
Cadmium	0.030 b	0.029 b	0.028 bNS	0.029 bNS	0.028 bNS	0.022 bNS	0.024 bNS
Chromium	0.29 b	0.073 b	0.061 bNS	0.071 bNS	0.063 bNS	0.077 bNS	0.079 bNS
Copper	1.1	1.2	0.92 NS	1.1 NS	1.1 NS	1.1 NS	1.4 S
Lead	0.26	0.17	0.17 NS	0.19 NS	0.17 NS	0.13 NS	0.15 NS
Mercury	0.0021 ab	0.0016 a	0.0016 ac	0.0048 abc	0.0047 abc	0.0072 bc	0.0090 bc
Nickel	0.30	0.12	0.10 bNS	0.11 NS	0.13 NS	0.12 bNS	0.15 NS
Zinc	7.7	10.4	10.1 NS	6.7 NS	10.7 NS	13.6 NS	14.1 NS
Polycyclic Aromatic Hydrocarbons (ug/kg)							
Acenaphthene	4.9 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Acenaphthylene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Anthracene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(a)anthracene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(a)pyrene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(b)fluoranthene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(k)fluoranthene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Benzo(g,h,i)perylene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Chrysene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Dibenzo(a,h)anthracene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Fluoranthene	3.4 ab	2.3 a	4.4 abc	6.9 abc	6.9 abc	2.4 ac	6.0 bc
Fluorene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Indeno(1,2,3-c,d)pyrene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Naphthalene	2.3 a	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Phenanthrene	3.4 ab	2.3 a	2.3 ac	2.3 ac	2.2 ac	2.4 ac	2.3 ac
Pyrene	3.2 ab	2.3 a	2.9 abc	4.7 abc	5.1 abc	2.4 ac	8.3 bc
Total LMW PAHs [1]	18	14	14	14	13	14	14
Total HMW PAHs [1]	25	23	26	30	30	24	33
Total PAHs [1]	43	37	40	44	43	38	47
Polychlorinated Biphenyl Congeners (ug/kg)							
PCB 8	0.72 a	0.23 a	0.23 ac	0.23 ac	0.52 ac	0.24 ac	0.23 ac
PCB 18	1.9 a	0.23 a	0.39 ac	0.23 ac	1.1 ac	0.24 ac	0.88 ac
PCB 28	0.23 a [4]	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 44	0.23 a [4]	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 52	0.35 ab	0.23 a	0.63 bc	0.31 abc	0.98 bc	0.24 ac	0.23 ac
PCB 66	0.23 a [4]	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 101	0.42 ab [CLDS,6]	0.23 a	0.36 abc	0.46 abc	0.78 abc	0.32 abc	0.23 ac
PCB 105	0.23 a [4]	0.23 a	0.28 abc	0.31 abc	0.22 ac	0.24 ac	0.23 ac
PCB 118	0.23 a [4]	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 128	0.23 a [4]	0.23 a	0.28 abc	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 138	2.3 [CLDS,6]	1.1 b	1.9 S	1.8 NS	2.6 S	1.5 bNS	1.1 bNS
PCB 153	3.1 [CLDS,6]	1.7	3.1 NS	3.0 NS	3.8 S	2.5 NS	1.9 NS
PCB 170	1.2 b [CLDS,6]	0.40 ab	1.1 abNS	0.94 abNS	1.1 aNS	0.91 abS	0.23 aNS
PCB 180	3.0 [CLDS,6]	1.4 b	3.1 S	2.8 NS	3.3 NS	2.2 bNS	1.2 bNS
PCB 187	2.3 [CLDS,6]	1.0 b	1.9 bNS	1.9 NS	2.4 S	1.4 abNS	0.85 abNS
PCB 195	0.23 a [4]	0.23 a	0.23 ac	0.33 abc	0.22 ac	0.24 ac	0.23 ac
PCB 206	0.23 a [4]	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
PCB 209	0.23 a [4]	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
Total PCBs [1]	35	17	30	28	37	23	18
Pesticides (ug/kg)							
Aldrin	0.23 a	0.23 a	0.23 ac	0.23 ac	0.28 ac	0.24 ac	0.23 ac
cis-Chlordane	0.23 a	0.23 a	0.23 ac	0.23 ac	0.49 ac	0.24 ac	0.23 ac
trans-Chlordane	0.23 a	0.23 a	0.23 ac	0.29 ac	0.40 ac	0.24 ac	0.23 ac
cis-Nonachlor	0.23 a	0.23 a	0.23 ac	0.23 ac	0.48 ac	0.24 ac	0.23 ac
trans-Nonachlor	0.23 a	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
Oxychlordane	0.47 a	0.46 a	0.46 ac	0.47 ac	0.45 ac	0.48 ac	0.47 ac
Total Chlordanes	1.4	1.4	1.4	1.5	2.0	1.4	1.4
4,4'-DDT	0.23 a	0.23 a	0.43 ac	0.23 ac	0.63 ac	0.24 ac	0.23 ac
4,4'-DDD	0.23 a	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
4,4'-DDE	0.23 a	0.23 a	0.23 ac	0.28 ac	0.22 ac	0.24 ac	0.23 ac
Total DDT [1]	0.70	0.69	0.89	0.75	1.1	0.71	0.70
Dieldrin	0.23 a	0.23 a	0.23 ac	0.23 ac	0.66 ac	0.24 ac	0.23 ac
alpha-Endosulfan	0.23 a	0.23 a	0.23 ac	0.23 ac	0.50 ac	0.24 ac	0.23 ac
beta-Endosulfan	0.23 a	0.23 a	0.23 ac	0.23 ac	0.45 ac	0.24 ac	0.23 ac
Endosulfans [1]	0.47	0.46	0.46	0.47	0.94	0.48	0.47
Endrin	0.23 a	0.23 a	0.23 ac	0.23 ac	0.22 ac	0.24 ac	0.23 ac
Heptachlor	0.23 a	0.23 a	0.23 ac	0.23 ac	0.31 ac	0.24 ac	0.23 ac
Heptachlor epoxide	0.47 a	0.46 a	0.46 ac	0.47 ac	0.45 ac	0.48 ac	0.47 ac
Hexachlorobenzene	0.47 a	0.46 a	0.46 ac	0.47 ac	1.30 ac	0.48 ac	0.47 ac
Lindane	0.23 a	0.23 a	0.23 ac	0.23 ac	0.67 ac	0.24 ac	0.23 ac
Methoxychlor	0.94 a	0.92 a	0.91 ac	0.94 ac	0.90 ac	0.95 ac	0.93 ac
Toxaphene	12 a	12 a	11 ac	12 ac	11 ac	12 ac	12 ac

Results for CLDS Reference and Composites are presented are the mean of five replicate samples. Native tissue results are presented as the mean of three replicates.

1 - Totals calculated for informational purposes only using 1/2 MDL for non-detected values. Statistical analysis not conducted on total values and qualifiers not applied.

Statistical qualifiers -

a - Analyte not detected (below MDL) in at least one replicate; mean value was calculated using one-half the MDL for the non-detect.

b - Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.

c - Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS - Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.

S - Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05

Supplemental statistics for PCBs -

Red text - Mean tissue body burden was statistically different, greater than the mean native tissue body burden. Statistical significance accepted at α=0.05.

Purple text - Mean native tissue body burden was significantly different, greater than the mean reference or composite tissue body burden [information in brackets identifies the associated tissue that the native tissue is statistically greater than]. Statistical significance accepted at α=0.05.

4. Chemical Analyses QA/QC

This section provides quality control information and documents the overall quality of the analytical data upon which the project conclusions are drawn. Project QA/QC information (e.g., laboratory control survival, reference toxicant results) for the biological testing program is discussed in Sections 2 and 3.

The chemical data collected during the investigation were of sufficient quality and sensitivity to meet the project objectives. The majority of the QC results associated with the analytical parameters met the measurement objectives presented in the Work Plan (AECOM, 2018a). Specific nonconformances with those measurement objectives are presented in the laboratory report narrative, RIM Checklist and AECOM-internal validation memorandum associated with each laboratory report. A full set of QC sample findings (method blanks, duplicate precision results, laboratory control sample results, and matrix spike results) is provided in Appendix C.1, Appendix C.2, and Appendix C.3.

4.1 Deviations

Due to an initial laboratory spiking error, 18 elutriate samples required re-extraction for pesticides and PCBs for elutriate composite and blank samples 3, 4, and 5. The re-extraction was performed three weeks beyond the technical hold-time of seven days. For samples with detectable pesticide hits, there was poor reproducibility between sample replicates. The non-detected pesticide results for these 18 samples are considered unusable for project objectives. The detected results should be considered estimated with a low bias.

As noted above, the PCB congeners reported for all elutriate composite samples 3, 4, and 5 were extracted beyond the project-specific work plan hold-time; however, the current EPA guidance, Table 4-1, EPA SW846 Ch. 4 Rev 5 2012, states “None” as the hold-time for PCBs. Both detects and non-detects should be considered usable as estimated with a low bias.

Elutriate and ambient seawater samples were analyzed for arsenic and selenium by method 1632A, not method 6020B as stated in the project-specific work plan.

No other deviations relative to chemical analysis were noted. These deviations are not expected to have an impact on the usability of the data for decision making.

4.2 Analytical Sensitivity

The sensitivity of program chemical measurements can sometimes dictate the ultimate usefulness of the final data. Results that are insufficiently sensitive to detect changes can limit the final project conclusions. The New Haven Harbor project required RLs were specified in the approved Work Plan (AECOM, 2018a) to detect sedimentary contaminant considerations, ambient seawater and elutriate concentrations, and bioaccumulative tissue concerns.

The Work Plan (AECOM, 2018a) summarized the laboratory RLs and project required RLs. Nondetect chemistry results were reported at laboratory RLs since they provide greater confidence. The majority of the RLs met the QAPP specifications. Laboratory reporting limits for copper, nickel, silver, zinc, and hexavalent chromium in the elutriate samples were higher than the project required limits shown in the QAPP.

Several sediment samples had elevated RLs for PAHs due to dilutions that were required by the sample matrix. The PAH RLs for two sediment samples, TB-1 5.2-6.0 and US-2 5.0-6.0, were slightly higher than the project RLs; however, the MDLs met the project RLs. Analytes detected between the RL and the MDL were reported as estimated and qualified with a J qualifier. Several sediment samples had laboratory RLs for PCB congeners slightly higher than the project RLs due to low percent solids. In all instances there were measurable concentrations of total PCBs. Laboratory RLs for the following pesticides in several sediment samples were slightly higher than the project RLs; Heptachlor epoxide, Hexachlorobenzene, Methoxychlor, Oxychlordane, and Toxaphene.

Laboratory RLs for all PCB congeners for all tissue samples exceeded the RIM required RL (0.5 ppb); however, the MDLs met the RIM RLs, which assure the sensitivity of detected results. Analyte concentrations that were detected

between the MDL and the RL were qualified as estimated and J qualified. The laboratory RL for the pesticide Methoxychlor was slightly higher than the project RL in all tissue samples.

Sample contamination can sometimes affect sample results, particularly when measuring chemical parameters at very low concentrations. In this study, potential contamination has been monitored using equipment blank QC samples. Silver and cis-Chlordane were detected in the equipment blank associated with the water pump; trans-Chlordane, cis-Chlordane, Dieldrin, and 4,4'-DDT were detected in CLDS water equipment blank, and trans-Chlordane, chromium, copper, nickel, and selenium were detected in CLDS grab equipment blank. All were at very low levels and are not considered to have an impact on sample results. Equipment blank performance data is presented in Appendix C.1.

4.3 Data Precision

Analytical precision was measured at the laboratory level using laboratory control sample (LCS) duplicates or matrix spike duplicates.

4.3.1 Elutriate and Ambient Seawater Measurement Precision

Elutriate analysis precision was evaluated using matrix duplicates, matrix spike duplicates, and Laboratory Control Sample (LCS) duplicates. Relative Percent Difference (RPD) objectives for this project were equivalent to the sediment objectives (20 percent for metals, 30 percent for trace organic compounds). The RPD criteria were met for all elutriate/seawater parameters, with the following exceptions: the RPD criteria were not met for the LCS/LCSD for Pentachlorophenol, where the reported RPD value was 40%; the sample duplicate (NHH-CLDS) for nickel where the reported RPD value was 49%; and the sample duplicate (Composite 2 -Rep1) for chromium, lead, and zinc where the reported RPD values were 62%, 26%, and 26%, respectively. These variances are not considered to adversely affect the elutriate dataset.

4.3.2 Sediment Measurement Precision

Sediment analysis precision was evaluated using matrix duplicates, matrix spike duplicates, and Laboratory Control Sample (LCS) duplicates. Relative Percent Difference (RPD) objectives for this project were 20 percent for metals and 30 percent for trace organic compounds. The RPD criteria were not met for select congeners in the laboratory duplicates; reported RPDs range from 42-51%. These may be the result of sample non-homogeneity. These variances are not considered to adversely affect the sediment dataset.

4.3.3 Tissue Measurement Precision

Tissue analysis precision was evaluated using matrix duplicates, MSDs, and LCS duplicates. The tissue RPD objectives for this project component were also 20 percent for metals and 30 percent for trace organic compounds. The RPD criteria were not met for select congeners and Zinc in the laboratory duplicates; reported RPDs range from 26-107%. These may be the result of sample non-homogeneity. The RPD criterion was not met in the MS/MSD for PCB congener C13-BZ#18; reported RPD value 55%. The RPD criteria were not met for select pesticides in the LCS/LCSD; reported RPDs range from 31-122%. These variances are not considered to adversely affect the tissue dataset.

4.4 Data Accuracy

Accuracy was evaluated using several QC sample types by calculating the percent recovered for each parameter of interest. A recovery value of 100% corresponds to 100% accuracy in this analysis. LCS and matrix spiked samples were incorporated as accuracy QC samples. Additionally, surrogate spikes were used to evaluate the accuracy of organic measurements and standard reference materials (SRMs) were included where available.

4.4.1 Elutriate and Ambient Seawater Analysis Accuracy

The chromium and silver results in the LCSs associated with NHH-CLDS and all elutriate composite samples were reported between 0% and 6%, this would represent a low bias for detected results in the associated samples; the non-detect results would be unusable. The cadmium, copper, lead, nickel, and zinc results in the LCSs associated with NHH-CLDS and all of the elutriate composite samples 1, 2, and 6 and the copper result in the LCS associated with all of the elutriate composite samples 3, 4, and 5, were below the lower control limit of 80%. This would represent a low bias in the associated samples for these analytes. Heptachlor was reported at 39% and 37% and Aldrin was reported at 37% and 34% in the LCS/LCSD associated with all of the elutriate composite samples 3, 4, and 5. This would represent a low bias in the associated samples for these analytes.

Matrix spike results for cadmium, chromium, copper, lead, nickel, silver, and zinc and the MS/MSD results for Heptachlor and Aldrin associated with NHH-CLDS were below the low control limits. This would represent a low bias for the results in the associated sample. Matrix spike results for cadmium, chromium, copper, lead, nickel, silver, and zinc associated Composite 3-Rep 1 were below 30%. This would represent a low bias for the detected cadmium, chromium, and zinc results in the associated sample; the non-detected copper, lead, nickel, and silver results would be unusable The MS/MSD results for mercury associated Composite 3-Rep 1 were 78% and 78%. This would represent a low bias for the results in the associated sample.

The recoveries for PCB congener surrogate, BZ-198, and pesticides surrogates DBOB and BZ-198 for Pump Blank and Core Blank were below the low control limits; results for these samples would be considered bias low. The recoveries for the pesticide surrogates, BZ-198, for CLDS-Water-EB and CLDS-Grab-EB and DBOB for CLDS-Grab-EB were below the low control limits; results for these samples would be considered bias low. The recovery of pesticide surrogate, BZ-198 for Composite 5-Rep 2 was above the upper control limit at 184%. All results were non-detected; no impact to the data. The recoveries of the pesticide surrogate BZ-198 on column B were above the upper control limit for Composite 4-Rep1 (291%), Composite 4-Rep 2 (360%), Composite 3-Rep 1 (271%), and Composite 3-Rep 2 (303%). Detected results on column B in these samples would be considered bias high.

4.4.2 Sediment analysis accuracy

Percent recovery objectives for sediment measurements were met with few exceptions. Results for individual target analytes exceeded control limits in some matrix spikes; this is generally indicative of a sample specific matrix interference. Also, Trans Nonachlor measured in the sediment SRM was outside of the certified range. None of the exceedances are considered to negatively impact data usability.

4.4.3 Tissue Analysis Accuracy

The SRMs represent an excellent measure of overall analytical accuracy. Results below criteria were reported for As, Cd, Zn, and PCB congener C13-BZ#28 in the SRMs; associated sample results for these analytes would be considered biased low.

An elevated recovery (122%) was reported for Hg in a metals LCS. Mercury was not detected in any of the associated samples. LCS recoveries were below criteria for pesticides Methoxychlor (17%) and Endosulfan II (45%); however, the LCSD recoveries for these analytes were within criteria.

Matrix spike recovery measurements were largely within work plan specified limits. An elevated recovery (193%) was reported for C13-BZ#18 in PCB congener MSD associated with sample B567PRENVA and a low recovery (49%) for C14-BZ#49 in PCB congener MS associated with sample B567PRENVA. More information can be found in the individual laboratory reports. None of the variances are considered to negatively impact data usability.

4.5 Chemical QA/QC Summary

All non-detected pesticide results for all elutriate composite 3, 4, and 5 samples are considered unusable and the pesticide detects, PCB detects and PCB non-detects for these composites are considered as estimated with a low

bias. As noted in Section 3.1.2.1 and Table 15, the LC50 performance of the ammonia-mitigated SPP assays was >100% for all assays.

The hexavalent chromium data for NHH-CLDS, CLDS-Water-EB, and CLDS-Grab-EB Water may be used for information purposes but are considered rejected due to the holding time exceedance documented by the laboratory. Several non-detected elutriate metals are considered unusable due to LCS and MS non-conformances.

Remaining analytical results are considered usable as reported.

5. References

AECOM, 2018a. Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Project Work Plan. New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. October 2018.

AECOM. 2018b. Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Field Report. New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. November 2018.

Buchman, M.F. 2008. NOAA Screening Quick Reference Tables, NOAA CR&R Report 08-1, Seattle WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration. 34 pages.

Chang-Hoon Lee, Chan-Gyoung Sung, Seong-Dae Moon and Jong-Hyeon Lee. 2013. Effects of Ammonia on Fertilization, Development, and Larval Survival in the Northern Pacific Asteroid, *Asterias amurensis* (Sea urchin). Bulletin of Environmental Contamination and Toxicology. 91:102-106.

EPA. 1989. Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989. EPA 440/5-88-004. April 1989.

EPA 2002. Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012.

EPA/USACE. 1991. Evaluation of Dredged Material Proposed for Ocean Disposal: Testing Manual (Green Book). EPA 503/8-91/001. February 1991.

EPA/USACE. 1998. Evaluation of Dredged Material Proposed For Discharge in Waters of the U.S. – Testing Manual. Inland Testing Manual. EPA-823-B-98-004. February 2004.

EPA/USACE, 2004. Regional Implementation Manual for the Evaluation Of Dredged Material Proposed For Disposal In New England Waters. April, 2004.

Ferretti, J.A. D.F. Calesso, and T.R. Hermon. 2000. Evaluation of Methods to Remove Ammonia Interference in Marine Sediment Toxicity Tests. Environmental Toxicology and Chemistry 19(8): 1935-1941.

Maguire Group, Inc. 2003. Laboratory Testing in Support of Site Specific Water Quality Criteria Assessment and Hydrographic Data Collection for New Bedford Harbor. Toxicity Identification Evaluation Testing with Mysids and Sea Urchins.

Appendix A: Work Plan

USACE CONTRACT NO. W912WJ-17-D-0003
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Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Project Work Plan

New Haven Harbor Navigation Improvement Project New Haven, Connecticut

Prepared for

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Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project:

Project Work Plan

New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

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Appendix B RIM QC Summary Tables

Acronyms

%R	Percent recovery
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
AWQC	Ambient Water Quality Criteria
BrCl	Bromium Monochloride
C	Celsius
CFR	Code of Federal Regulations
CLDS	Central Long Island Sound Disposal Site
COC	Chain of Custody
CR	CR Environmental
d	day
DGPS	Differential Global Positioning System
DIW	Deionized Water
DM	Dredged Material
DPM	Deputy Program Manager
DQI	Data quality indicator
DQO	Data quality objective
EDD	Electronic Data Deliverable
EM	Engineer Manual
EPA	Environmental Protection Agency
ERS	Environmental Resources Section
ESI	EnviroSystems, Inc.
FNP	Federal Navigation Project
FSP	Field Sampling Plan
GC/MS	Gas chromatography/mass spectrometry
HDPE	High density polyethylene
ICP/MS	Inductively Coupled Plasma Mass Spectrometry
ID	Identification
L	Liter
LCS	Laboratory control sample
LPC	Limited Permissible Concentration
MDL	Method detection limit
mg/L	milligrams per liter
MLLW	Mean Lower Low Water

MPRSA	Marine Protection, Research, and Sanctuaries Act
MQO	Measurement quality objectives
MS/MSD	Matrix spike/Matrix spike duplicate
NAE	New England District
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PM	Program Manager
PDS	Portland Disposal Site
PPE	Personal Protective Equipment
PWS	Performance Work Statement
QAPP	Quality Assurance Project Plan
QA	Quality Assurance
QC	Quality Control
pdf	Printed document format
RIM	Regional Implementation Manual
RL	Reporting Limit
RPD	Relative percent difference
SOP	Standard Operating Procedure
SPP	Suspended Particulate Phase
SRM	Standard Reference Material
SSHO	Site Safety and Health Officer
TM	Technical Manager
USACE	U.S. Army Corps of Engineers
µg/L	micrograms per liter

This Project Work Plan has been prepared by AECOM for the United States Army Corps of Engineers (USACE), New England District (NAE) in support of NAE's New Haven Harbor proposed navigation improvement project (proposed project) located in New Haven, Connecticut. USACE's (2001) Engineer Manual (EM) 200-1-3 *Requirements for the Preparation of Sampling and Analysis Plans* was referenced during the preparation of this Work Plan. The Work Plan has been prepared in accordance with the program design provided in the Performance Work Statement (PWS) entitled "*Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project New Haven, Connecticut*" dated 25 July 2018. The PWS scope was subsequently issued to AECOM on 21 August 2018 and was further revised by NAE on 11 October, 2018. The enclosed Work Plan is comprised of a Field Sampling Plan (FSP; Work Plan Section A) and a Quality Assurance Project Plan (QAPP: Work Plan Section B).

The New Haven Harbor dredged material suitability determination field program will be completed by both NAE personnel (harbor site sampling) and individuals on the AECOM/Ocean Surveys, Inc. (OSI) Team (collectively the AECOM Field Team). Field activities to be undertaken by the AECOM Field Team include: collection and transport of sediment and water samples from the Central Long Island Sound Disposal Site (CLDS) Reference Site; as well as receipt and delivery of NAE-collected representative sediment and water samples from the proposed navigation improvement project.

Field tasks described within this Work Plan focus primarily on activities that will be undertaken by the AECOM Field Team. Sampling techniques and Standard Operating Procedures (SOPs) to be employed by NAE personnel, relative to sediment and water collection activities within the proposed New Haven Harbor navigation project are addressed in detail under separate cover.

Field Sampling Plan

Supplemental Sampling and Testing – New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

A.0 Field Sampling Plan (FSP)

A.1 Project Background

The New England District (NAE) of the US Army Corps of Engineers (USACE) is currently preparing a feasibility study for improvements to the New Haven Harbor Federal navigation project (FNP). Anticipated project components include: deepening and widening the main ship channel, widening the channel bend at Southwest Ledge, straightening the channel bend downstream of the existing turning basin; and relocating and deepening the turning basin. These combined actions would require the mechanical removal of up to 4,500,000 cubic yards of sediment and up to 32,000 cubic yards of rock depending on the selected channel alignment and dimensions. Dredged sediments are expected to be a mix of poorly graded sand and fine grained material within the existing channel profile and adjacent harbor seafloor with glaciofluvial deposits at depth. To the extent practical, suitable dredged material will be beneficially reused for marsh creation, habitat restoration, and/or as cover of historic dredged material disposal mounds at the Central Long Island Sound Disposal Site (CLDS). Unsuitable material will be placed in a confined aquatic disposal (CAD) cell to be located in the inner harbor.

NAE completed a sampling and testing effort during the summer of 2017 in order to characterize the materials to be dredged. NAE later revised the alignment of the proposed channel and turning basin based on the results of ship simulation modeling. In addition, a portion of the material from the inner harbor was determined to be unsuitable for unconfined open water placement, based on the results of suspended particulate phase and whole sediment bioassays. In July 2018, NAE coordinated a supplemental sampling and analysis plan (SAP) to characterize sediment from reaches of the redesigned project that were not previously sampled, to characterize the material that would be dredged during CAD cell construction, and to further define the extent of unsuitable material in the inner harbor. The enclosed FSP was prepared in support of this New Haven Harbor SAP.

A.2 Project Organization and Responsibilities

Highly qualified individuals have been selected for each of the tasks to ensure that the project objectives are accomplished accurately and efficiently. The project organization and work breakdown is depicted in **Figure A-1**. Individual responsibilities are detailed below.

Figure A-1 Task Order Organization and Project Contact Information

Contact	Phone	Responsibility
R. Ben Loyd	978-318-8048	NAE Technical Manager
Don Dwight	978-905-2970	AECOM Program Manager
Maura Surprenant	508-833-6960	AECOM Deputy Program Manager
Kris van Naerssen	484-678-1876	AECOM Task Order Manager
Paula Winchell	774-454-7653	AECOM Field Services Task Leader/SSHO/Chief Scientist
C.J. Nixon	203-654-1174	AECOM Transport Driver
Rich Renzi	978-905-3137	AECOM Health & Safety Officer
Debra Simmons	978-905-2399	AECOM QA Officer
Edith Hutchinson	508-524-5442	AECOM Chemistry Coordinator
Christine Archer	603-622-1556	AECOM Biology/Bioassay Laboratory Coordinator

Contact	Phone	Responsibility
Kenneth Cadmus	860-395-8112	OSI Project Manager & Vessel Captain
Morgan Barrett	860-227-1355	OSI Vessel Captain / Mate (Alternate)
Kyle Toothaker	860-227-7995	OSI Mate
Ken Simon	603-475-7654	ESI Technical Advisor
Kirk Cram	603-926-3345	ESI Laboratory Director
Liz Porta	508-822-9300	Alpha Laboratory Project Manager

NAE Technical Manager (TM)
The NAE Technical Manager, Mr. R. Ben Loyd, will be consulted during the project planning and performance phases. As the primary point of contact for NAE and this scope of work, Mr. Loyd will be in daily contact with the AECOM project team during field sampling activities and weekly contact with the AECOM team during sample preparation, chemical and biological analysis, and in regular contact, in the event that any problems are encountered.

AECOM Program Manager (PM)
Mr. Don Dwight, serving as AECOM's Program Manager (PM), will provide overall leadership in the performance of this task order with regular NAE and AECOM team communications. Mr. Dwight will verify that the right people are committed to contract tasks, that safety and quality systems are in place, regular reviews are undertaken, issues resolved without delay and contractual specifications met or exceeded.

AECOM Deputy Program Manager (DPM)
Ms. Maura Surprenant, serving as AECOM's Deputy Program Manager (DPM), will provide daily leadership in the performance of this task order with regular NAE and AECOM team communications. Ms. Surprenant will assist Mr. Dwight with daily duties including ensuring that the right people are committed to contract tasks, that safety and quality systems are in place, regular reviews are undertaken, issues resolved without delay and contractual specifications met or exceeded.

AECOM Task Order Manager
Mr. Kris van Naerssen will serve as the AECOM Task Order Manager, with the responsibility for technical, financial, and scheduling matters related to this task. Mr. van Naerssen, as the point of contact between task leads, safety and quality managers, and program management, will communicate regularly with the project team to discuss action items, schedule, financial, and technical considerations on a regular basis during the implementation of this Work Plan and will procure the subcontractor team.

Mr. van Naerssen will also oversee the preparation of the task reports to ensure they meet or exceed NAE specifications, particularly as required by NAE's Regional Implementation Manual (RIM; Environmental Protection Agency [EPA]/USACE, 2004). Raw and statistical data will be provided to fully support agency dredged material (DM) suitability decision-making. All reports will be available electronically and the water chemistry and toxicity data will be provided in electronic data deliverable (EDD) format meeting RIM requirements. Quality control (QC) summary tables will be included with each data submission.

AECOM Safety and Health Manager (SHM)
Mr. Richard Renzi, CIH is AECOM's SHM dedicated to this investigation with direct communication to the AECOM Task Order Manager and Site Safety and Health Officer (SSHO). He will prepare/ review all modifications to the project Accident Prevention Plan (APP), and any applicable Activity Hazard Analyses (AHA). Specific duties include:

- On behalf of AECOM, reviewing and approving the APP and amendments and ensuring that Engineer Manual EM 385-1-1 requirements are fully met before delivery of the APP to the NAE TM and NAE SHE Manager for approval;
- Advising the AECOM Task Order Manager on matters relating to health and safety at the site;
- Conducting accident investigations;
- Maintaining regular contact with the project team to evaluate site conditions and new information that might require modifications to the APP; and
- Overseeing the SSHO.

Project Quality Assurance (QA) Officer
Ms. Debra Simmons will serve as the Project Quality Assurance (QA) Officer and has overall responsibility for quality assurance oversight. Ms. Simmons has led quality assurance programs for more than 30 years and in this role will communicate directly to the AECOM Task Order Manager. Specific responsibilities include:

- Implementation of this Work Plan upon approval;
- Reviewing and approving QA procedures on behalf of AECOM, including any modifications to existing approved procedures;
- Ensuring that QA audits of the various phases of the project are conducted as required; and
- Providing QA technical assistance to project staff.

Field Services Task Leader, Chief Scientist & SSHO
Ms. Paula Winchell, serving as the Field Services Task Leader will provide leadership in every aspect of the field program, and implement the sediment and water collection program. Ms. Winchell will oversee the field services subcontractor (OSI) and all AECOM Field Team sample collection activities.

The Field Services Task Leader has overall responsibility for completion of all field activities in accordance with the Work Plan and is the communication link between the Program Manager and the field team. This individual also acts as the SSHO and will engage the field personnel in daily safety discussions, field safety related documentation (float plans, etc.) and will be the primary point of contact for all field related safety communications. Specific responsibilities of the Field Services Task Leader include:

- Coordinating activities in the field, and assigning specific duties to field team members;
- Collecting samples, conducting field measurements, and decontaminating equipment according to documented procedures stated in the FSP and QAPP;
- Mobilizing and demobilizing of the field team and subcontractors;
- Directing the activities of subcontractors in the field;
- Resolving any logistical problems that could potentially hinder field activities, such as equipment malfunctions or availability, personnel conflicts, or weather dependent working conditions;
- Implementing field QC including issuance and tracking of measurement and test equipment; the proper labeling, handling, storage, shipping, and chain of custody (COC) procedures used at the time of sampling; and control and collection of all field documentation;
- Ensuring that field documentation and data are complete and accurate
- Communicating any nonconformance or potential data quality issues to the DPM.
- Serving as SSHO (see Section A.3.2); and
- Preparing the Field Report.

Chemistry Coordinator
Ms. Edith Hutchinson, as the Chemistry Coordinator, will oversee the subcontractor chemical testing. Ms. Hutchinson, a Senior Chemist, will serve as the liaison between field and laboratory personnel; supervise data review activities, and author related progress reports.

Biology/Bioassay Laboratory Coordinator
Ms. Christine Archer, an Ecotoxicologist and former bioassay laboratory biologist, will serve as the Biology/Bioassay Laboratory Coordinator. Ms. Archer will coordinate with the laboratory to implement sample composite formation, preparation of elutriate samples, and performance and reporting of the SPP, 10-day bioassay results, 28-day bioaccumulation results, and all relevant statistics.

OSI Project Manager
Ocean Surveys, Inc. (OSI) of Old Saybrook, CT will provide field services and equipment for the project. OSI will be responsible for providing and maintaining the sampling vessel for the reference site sampling, vessel and equipment handling staff, appropriate field equipment for positioning the vessel and obtaining sediment and water samples at the specified sample depths provided in the PWS. Mr. Kenneth Cadmus will serve as the OSI Project Manager and will be responsible for ensuring the Work Plan boat based field sampling and program safety requirements for OSI personnel are appropriately implemented.

Mr. Ken Cadmus, or the designated alternate, will captain the sampling vessel and oversee navigational and shipboard operations. Mr. Cadmus will implement the field survey requirements specified in this Work Plan when approved.

ESI Technical Advisor
Mr. Ken Simon, EnviroSystems Inc.'s (ESI) Technical Advisor will provide overall leadership on toxicity testing aspects of this Work Plan.

ESI Laboratory Director

Mr. Kirk Cram, ESI's Laboratory Director, will oversee ESI's implementation of this Work Plan and the specifications detailed in Section B (QAPP). ESI's responsibilities include elutriate/ SPP sample preparation, toxicological testing (both 10-day testing and the 28-day bioaccumulation testing) and associated reporting. Mr. Cram will communicate with the AECOM Biological and Chemistry Laboratory Coordinators to confirm the condition of samples arriving at the laboratory, verify the COC specified sample list and testing requirements, oversee the preparation of sample composites, standard chemical elutriate and SPP preparations, and all project bioassays. He will bring any project concerns to the AECOM Biological Laboratory Coordinator without delay, and transmit EDDs and related laboratory reports, and bioassay results with corresponding statistics and reports to the AECOM Biological Laboratory and Chemistry Coordinators according to the established project schedule.

Alpha Laboratory Manager
Ms. Liz Porta, Alpha Analytical Laboratory Project Manager will oversee the implementation of the bulk sediment chemistry, elutriate chemistry and tissue analytical portions of this Work Plan, including the specifications detailed in Section B (QAPP). Alpha will be responsible for chemical laboratory activities involving the above analyses, including data analysis and reporting. She will communicate with the AECOM Laboratory and Chemistry Coordinators to confirm the condition of samples arriving at the laboratory, verify the COC specified sample list and testing requirements, oversee the preparation of sample composites, and all project analyses. Ms. Porta will bring any project concerns to the AECOM Laboratory Coordinator without delay, and transmit the chemistry EDDs and related laboratory reports to the AECOM Laboratory and Chemistry Coordinators according to the established project schedule.

A.3 Project Scope and Objectives

The objective of this work is to acquire data for the characterization of sediments proposed for navigation improvement dredging from New Haven Harbor.

A.3.1 Task Description

This New Haven Harbor dredged material suitability determination project will require the collection of discrete sediment samples from thirteen stations throughout the FNP which are representative of the material to be dredged. Samples (cores) collected by NAE from discrete locations within the proposed project footprint will be combined into six composite samples. Seawater will also be needed to evaluate potential water column impacts (i.e., the formation of chemical elutriate and suspended particulate phase (SPP) samples). In accordance with Table A-1, materials from Composite Sample 1 will be excluded from the 10-Day and 28-Day bioassays.

The proposed work involves NAE collecting sediment cores to the project design depths, plus aproriate overdepths (see **Table A-1**) from thirteen locations along a stretch within the FNP to be analyzed for parameters as defined in Tasks 5 through 10. It is anticipated that the New Haven Harbor sediment cores will be combined into six composites for analysis. The AECOM Team will collect reference site sediments from the CLDS reference site, located at latitude 41.134850 N and longitude 72.834690 W (NAD83).

New Haven Harbor water samples will be collected by NAE from a central area to each sediment core composite location. This water will be used in the preparation of dredge site elutriate samples. The AECOM Field Team will collect water samples from the CLDS reference site location, for use in preparation of SPP samples for biological analyses and for associated water chemistry analyses.

Testing results will be used to characterize the sediment in order to determine the suitable alternatives available for disposal.

General guidance for this work is found in the EPA/USACE regional protocol “Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters” (RIM, EPA/ USACE, 2004). Sampling, testing, and QA/QC procedures as required and detailed in the RIM are referenced in each task of the PWS (NAE, 2018).

To accomplish the full range of project requirements, NAE has established the following tasks:

Task	Description
1	Work Plan
2	Accident Prevention Plan
3	Field Support for Dredge Site Sediment and Water Collection
4	Reference Site Sampling
5	Sediment Chemistry
6	Standard Elutriate Testing
7	Suspended Phase Acute Toxicity Testing
7.1	Suspended Phase Acute Toxicity Testing With Ammonia Reduction (Optional)
8	10-day Whole Sediment Acute Toxicity Testing
9	28-day Bioaccumulation Testing
10	Tissue Analysis
11	Reporting

A.3.2 Health and Safety

A program specific APP has been developed and was submitted to NAE, in draft form on October 12, 2018. The APP was prepared in accordance with EM-385-1-1. The APP addresses unusual or unique aspects of the proposed scope of work to be executed (e.g., working on water, etc.). A draft version of the APP was submitted electronically to the Safety and Occupational Health Office and to the NAE Technical Manager along with a draft version of this Work Plan. The final version of the APP will incoprate any pending NAE comments and will be submitted electronically prior to the commencement of field efforts.

The APP addresses AECOM-specific policies and procedures that must be followed over the course of the field program, and should be considered a "living document" that can be updated based on changing site conditions. Task-specific AHA documents have been prepared, for use in the field for each major phase of work to be completed. A major phase of work is defined as an operation involving a type of work presenting hazards not experienced in previous operations or where a new subcontractor or work crew is to perform the work. The analysis defines all activities to be performed, identifies the sequence of work, the specific hazards anticipated, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level. Prior to the commencement of any field work, the training records for all staff (AECOM and subcontractors) proposed to be utilized on this program will be reviewed to ensure that they are current.

The SSHO for this project is Ms. Paula Winchell. Ms. Winchell will be responsible for general day-to-day health and safety of AECOM field personnel and subcontractors, ensuring that all AECOM Field Team staff participate in daily tailgate/ dockside safety meetings, ensuring correct usage of personal protective equipment (PPE) by field staff, and monitoring of field activities for adherence to the APP (and Work Plan). Ms. Winchell will also be responsible for hosting a project Healthy and Safety kickoff meeting for all staff prior to mobilization.

In the event of an incident, Ms. Winchell is responsible for initial response protocols, incident management, and proper reporting. Ms. Winchell and all field staff have "Stop Work Authority" in the event an employee identifies a condition or act that is likely to cause an Imminent Danger situation.

All safety meetings/ briefings will be documented and submitted to the NAE as part of standard reporting procedures. AECOM will complete the "*USACE Contractor Monthly Summary Record of Injuries/ Illness and Work Hour Exposure*" log (for prime and its subcontractors) and electronically submit the completed form to the Environmental Resources Section (ERS) project manager (R. Ben Loyd) and the NAE Safety and Occupational Health Office (Sheila Harvey) no later than the 5th calendar day of the following month. This form shall be submitted during months with active field efforts.

A.3.3 Project Mobilization

Upon NAE's approval of this Work Plan and project APP, the project team will mobilize to the field in order to:

- receive NAE-collected sediments and water samples from the New Haven Harbor dredge site; and,
- to collect surface sediment and seawater samples at the CLDS Reference Site; and,
- to deliver the harbor and reference site samples to the analytical laboratories.

Following the collection of sediment and water samples, sample compositing, sample preparation and sample analyses will commence at the selected project laboratories (i.e. at ESI [sample compositing, elutriate preparation, SPP Assays, 10-Day Toxicity Testing and 28-Day Bioaccumulation Testing] and at Alpha [bulk sediment chemistry, elutriate chemistry and tissue chemistry]).

Table A-1 New Haven Harbor (NAE Sampling Locations) – Coordinates / Estimated Penetration / Sample Quantities

TABLE A-1:
SAMPLING LOCATIONS - COORDINATES / ESTIMATED PENETRATION/ SAMPLE QUANTITIES (Adapted from USACE NHH PWS)

Sample ID	Composite ID	Latitude	Longitude	Survey Depth (FT MLLW	Project Depth + Overdepth (FT MLLW)	Estimated Core Length (FT)	Estimated Volume Per Core (Gallons) *	Minimum Sample Volume per Location (Gallons) **	Estimated Minimum Number of Buckets / Carboys ***	Required Analyses				
										Bulk Chemistry	Elutriate Testing	Suspended Phase Toxicity	10-Day Whole Sediment Tox.	28-Day Bioaccum. Test
V’	1	41.294024	-72.909459	-36.0	-42.0	6.0	2.2	3.0	1/3	X	X	X		
W’	1	41.293841	-72.907753	-36.8	-42.0	5.2	1.9	3.0	1/3	X				
R’	2	41.292011	-72.909869	-37.6	-42.0	4.4	1.6	13.0	4/4	X	X	X	X	X
S’	2	41.291829	-72.908069	-38.7	-42.0	3.3	1.2	13.0	4/4	X				
US-1	3	41.295908	-72.908872	-38.3	-42.0	3.7	1.4	13.0	4/4	X	X	X	X	X
US-2	3	41.295277	-72.907473	-37.9	-42.0	4.1	1.5	13.0	4/4	X				
DS-1	4	41.289914	-72.910146	-37.3	-42.0	4.7	1.7	12.0	4/3	X	X	X	X	X
DS-2	4	41.289682	-72.908491	-35.8	-42.0	6.2	2.3	12.0	4/3	X				
TB-1	5	41.290146	-72.911912	-36.1	-42.0	5.9	2.2	12.0	4/3	X	X	X	X	X
TB-2	5	41.291600	-72.911632	-35.5	-42.0	6.5	2.4	12.0	4/3	X				
CAD-1	6	41.267153	-72.915138	-8.0	TBD	10.0+	3.7	8.0	3/2	X	X	X	X	X
CAD-2	6	41.266433	-72.916180	-6.0	TBD	10.0+	3.7	8.0	3/2	X				
CAD-3	6	41.265541	-72.915376	-9.0	TBD	10.0+	3.7	8.0	3/2	X				

* Volume estimated assuming 3” inner diameter core liners for dredge area sediment samples

** Assumes 23 gallons of sediment per composite (25 gallons at QC stations) for testing and archiving unless otherwise specified. QC stations may change; however, QC samples are depicted at Stations 2 and 3 in this example. Sediment cores for bulk chemistry are not included in volume calculations.

*** 28 gallons of dredge site water will be collected from a central location in the vicinity of each composite group (37 gallons to be collected at QC stations). QC stations may change; however, QC samples are depicted at Stations 2 and 3 in this example.

Sample containers for dredge area sediments shall be 3.5 gallon food grade high density polyethylene pails with locking lids (Grainger® item numbers 49EN25 and 49EN23 or equivalent). Sample containers for dredge area water shall be 5 gallon food grade collapsible carboys (Grainger® item number 9LA45 or equivalent).

Table A-2 Example Composite IDs and Water Sample IDs/ Volumes Used to Prepare the Elutriate and SPP Mixtures

Sample ID~	Water Sample ID Used for Elutriate/SPP Mixture~	Expected Composite ID~	Minimum Water Sample Volume Required (gal)+	Anticipated Sediment Sample Volume+ (gal)
V;	NHHSW-1	1**	28	6***
W'				
R'	NHHSW-2	2**	37	25
S'				
US-1	NHHSW-3	3**	37	25
US-2				
DS-1	NHHSW-4	4**	28	23
DS-2				
TB-1	NHHSW-5	5**	28	23
TB-2				
CAD-1	NHHSW-6	6**	28	23
CAD-2				
CAD-3				
NHHS-CLDS*	NHHSW-CLDS	NHHSW-CLDS	45 (plus 7 gallons collected in laboratory glassware)	18

~ Sample IDs to be assigned by NAE.

* CLDS Reference Site locations.

+ Sediment composite and water sample volumes reflected in the PWS (NAE, 2018) have been amended to account for material volume details provided by the ESI and Alpha Project Managers on 8/30/18 and 10/15/18.
** Based on field conditions, QC samples may be obtained from alternate composites. Sufficient volumes for project QC obtained from Composite 2 and 3 in the above example.
*** No 10-Day or 28-Day Sediment Toxicity to be performed on Composite 1 materials

Data gathered in the tasks described herein will be evaluated to assess the suitability of the material for unconfined open water disposal and potential risks to marine life posed by the material to be dredged:

- **Aquatic life exposures** may be assessed with a chemistry screening approach, but are generally modeled using a mixture of seawater and the material to be dredged corresponding to standard chemical elutriates and SPP samples (Tasks 6, 7 and 7.1). Chemical elutriate results are used to ensure that Ambient Water Quality Criteria (AWQC) will not be exceeded at the dredged material placement site (CLDS) four hours after discharge, or outside of the site boundary at any time. SPP toxicity testing results are used to develop a Limiting Permissible Concentration (LPC), and, based on regulatory modelling by ADDAMS/ STFATE, are also used to determine Marine Protection, Research, and Sanctuaries Act (MPRSA) §103 water column compliance. SPP toxicity tests include three species: a fish, a mysid shrimp, and a sea urchin (Task 7). These species are sensitive to multiple parameters, including ammonia levels which may be elevated in the elutriates. If elevated ammonia levels are measured in the SPP tests, then these tests will be repeated with new elutriates prepared after an ammonia reduction procedure is implemented (see Section B.7.2).
- **Whole sediment exposure** will be assessed with whole-sediment bioassay data (Task 8) and bioaccumulation data (Tasks 9 and 10). The RIM (EPA/ USACE, 2004) summarizes the wide range of parameters included in the assessment. The biological testing incorporates aquatic

organisms (i.e. amphipod and shrimp; clam and worm) to identify the potential impacts to sediment-associated organisms.

A.3.4 Applicable Regulations/ Standards

This project has been designed to collect environmental data needed to characterize the sediment to be dredged, and determine suitability for placement unconfined in the marine environment under MPRSA §103, detailed in the Ocean Dumping Regulations (Title 40, Code of Federal Regulations, [CFR] 220-229). As such, the work will be guided by NAE's *Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters* (RIM, EPA/ USACE, 2004), the *Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual* (Green Book, EPA/ USACE, 1991), and the *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S.* (Inland Testing Manual, EPA/ USACE, 1998). These regulations are adhered to within the jurisdictional area of the NAE by the RIM and the laws and regulations of Connecticut (where this proposed project is located).

A.3.5 Project Schedule

The sampling schedule is provided in **Table A-3** along with project milestones and deliverables.

A.4 Non-measurement Data Acquisition

AECOM anticipates that relevant grain size or other site information reviewed by NAE for planning purposes would be available if needed.

A.5 Field Activities

The New Haven Harbor dredged material suitability determination field program will be completed by NAE personnel and by the AECOM Field Team (AECOM and OSI personnel). AECOM Field Team activities include: collection of sediment and water samples from the CLDS Reference Site; as well as receipt and delivery of NAE-collected representative sediment and water samples from New Haven Harbor.

Field activities described herein focus primarily on AECOM Field Team activities. Sampling techniques and SOPs to be employed by NAE personnel, relative to sediment and water collection activities within the New Haven Harbor proposed navigation improvement project, are addressed in detail under separate cover (NAE Sampling and Analysis Plan).

The sampling approach selected by NAE to meet the project objectives requires the collection of the following sample types:

- New Haven Harbor sediment cores to be collected and composited by NAE (13 stations / 6 composites)
- New Haven Harbor water samples to be collected by NAE (Central location to each composite). Single- to multiple-depth seawater collection at the New Haven Harbor sampling stations (by NAE) [composite of surface, mid-depth, and bottom water (3-feet above) when overlying water depth > 30 ft. MLLW, and collection at mid-depth only for overlying water depths < 30 ft. MLLW].
- CLDS Reference Site sediment grab sampling by the AECOM Field Team
- CLDS Reference Site water sampling by the AECOM Team at near surface (3-feet below) or mid-depth prior to the collection of the sediment samples[1].

[1] In contrast to the PWS language regarding sampling depths; but, in accordance with RIM guidance and NAE Technical Manager guidance (15 October 2018). RIM Section 4.5 states "*Dilution water is used in water column toxicity tests to make up the required dilutions. It must be clean seawater, appropriately aged*

A.5.1 New Haven Harbor Proposed FNP and CLDS Reference Site Sediment

Sediment within the proposed FNP will be cored by NAE to the authorized depth (plus allowable over dredge) to fully characterize the sediment prism that requires removal/dredging. The dredge site sediments will be used in the bulk sediment chemistry, toxicity testing, bioaccumulation testing and associated analyses.

At the reference site, only the surface sediment character is relevant for comparison purposes. As such, a grab sampler is the sampling equipment of choice. The CLDS Reference Site sediments will be used in the toxicity testing, bioaccumulation testing and associated analyses.

This section details the locations, composite preparation, field and laboratory measurements, and QC sampling requirements.

A.5.1.1 Coring Collection Locations

NAE has determined that 13 sampling stations are sufficient to further characterize the proposed navigation project to be dredged. New Haven Harbor sediment core samples will be collected by NAE sampling personnel. Station positions are detailed on **Table A-1** and depicted on **Figure A-2**.

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artificial seawater, or seawater collected from the disposal site reference location at near surface or mid-depth prior to collection of the sediment samples."

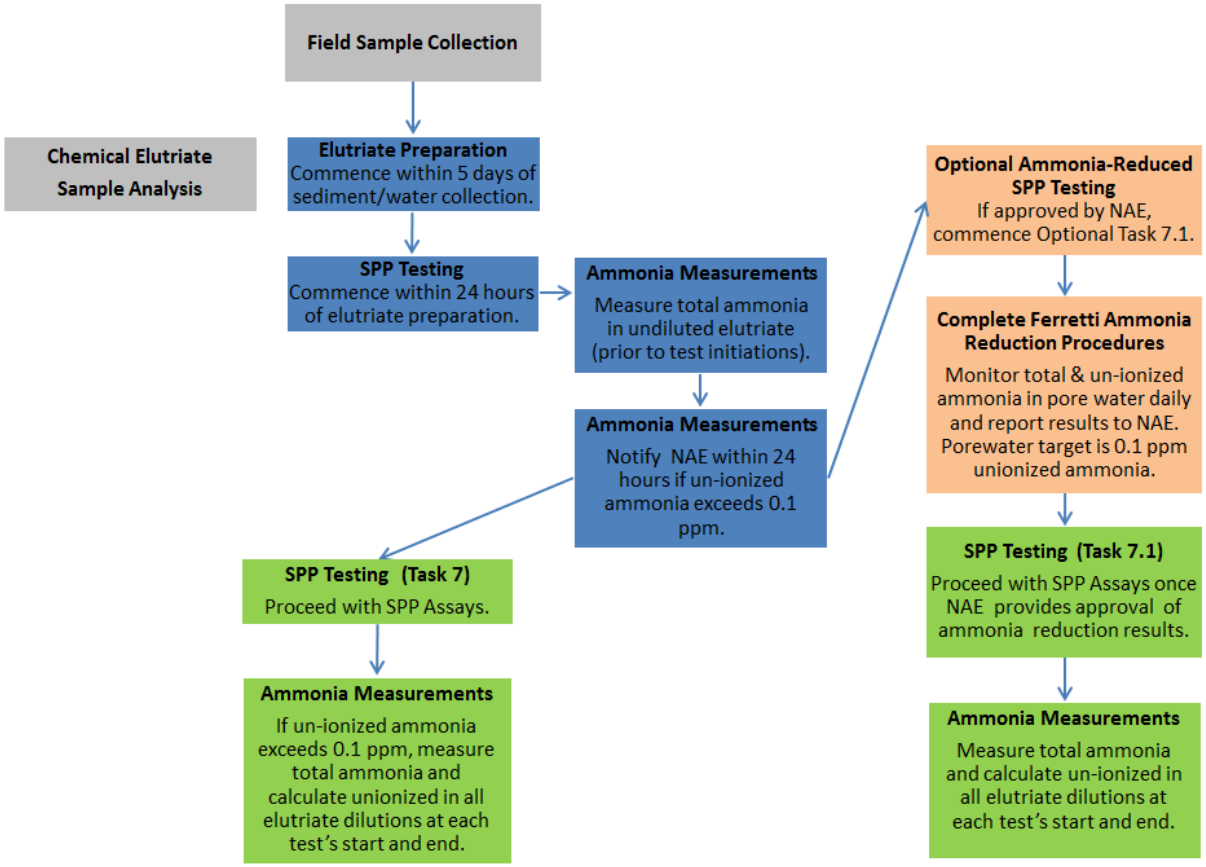
Table A-3 Milestones & Deliverables Schedule (With Anticipated SPP Optional Task Flow & Timing Details)

Task		Milestone[1]	Schedule*
	TASK NOTICE TO PROCEED		21 September 18
	PLANNING		
1, 2		SAP & APP preparation	24 September 18 - 15 October 18
		DRAFT SAP delivered to NAE	**15 October 18**
		DRAFT APP delivered to NAE	**12 October 18**
		NAE SAP & APP review, AECOM finalizes, NAE approves SAP & APP	19 October 18
	SAMPLE COLLECTION		
3		Field Effort: 3 day effort - NAE New Haven Harbor FNP sampling surveys	22-24 October 18
		Field Effort: 3 day effort - AECOM receives NAE-collected sediment and water samples	22-24 October 18
		Field Effort: 1-day CLDS Ref sediment and water sample collection	23 October 18
4		AECOM transport and deliver samples to ESI / ESI Initiate sample processing	23 - 25 October 18
		Submit Field Report (Incl. Sample Logs and COCs) to NAE	01 November 18
5	BULK SEDIMENT CHEMISTRY		
		Bulk Sediment Chemistry – samples by courier to Alpha	24 October 18
		Bulk Sediment Chemistry Progress Report and EDD delivered to NAE	**21 November 18**
6	ELUTRIATE CHEMISTRY & SUSPENDED PARTICULATE PHASE TESTING		
		Elutriate Preparation	24 & 25 October 18
		Start Elutriate Chemistry (plus ambient water) – Samples by courier to Alpha	25 & 26 October 18
		Elutriate/Site Water Progress Report and EDD delivered to NAE	**27 November 18**
7	SPP BIOASSAY (Prepare Elutriates)		24 & 25 October 18
		Ammonia readings / Ammonia reduction Discussions	25 & 26 October 18
		Introduce Organisms (Once Approved / Acceptable conditions met)	25 & 26 October 18
		SPP bioassay – ammonia reduction OPTION	Notify NAE within 24 hours of ammonia threshold exceedance / need for option
		Initiate Ferretti Method	26 & 27/29 October 18
		SPP progress report delivered to NAE (without statistical analysis)	**Within 1 week of test completion**
8	10-DAY WHOLE SEDIMENT ACUTE TOXICITY BIOASSAY		
		Samples loaded, ammonia equilibration	28 November 18
		10-day bioassay testing	05 December 18
		10-day whole sediment bioassay written progress report delivered to NAE	**04 January 19**
9	28-DAY BIOACCUMULATION		
		28-day Bioaccumulation testing initiation	05 December 18**
		28-day Bioaccumulation testing conclusion	02 January 19**
		28-day Bioaccumulation Progress Report delivered to NAE	**30 January 19**
10	TISSUE ANALYSIS		
		Tissue Analysis	04 January 19**
		Tissue Analysis Progress Report and EDD delivered to NAE	**15 February 19****
		Tissue Analysis statistics complete	01 March 19
11	FINAL REPORT		
		Draft Final Report delivered to NAE	**14 March 19**
		Final Report delivered to NAE	**Within 7 days of receipt of NAE comments**

[1]NAE Deliverables are bolded
* Anticipated on or before.
**Schedule as per PWS delivery schedule constraints and anticipated field sampling dates. 28-Day Assay & Tissue Analysis may need to start earlier than dates shown, in order to meet the required interim tissue report delivery date, as

Task		Milestone[1]	Schedule*
shown (assuming a 3-week standard tissue analysis TAT).			

Optional Task 7.1: Anticipated Flow and Timing Detail



Task Reporting– See Accompanying Delivery Schedule Table

Action	Sample Delivery Batch 1	Sample Delivery Batch 2
NAE Sediment Collection	Monday & Tuesday (10/22 & 10/23)	Wednesday (10/24)
NAE Dredge Site Water Collection (14 day hold)	Monday (10/22)	Monday (10/22)
CLDS Water Collection (14 day hold)	Tuesday (10/23)	Tuesday (10/23)
Sample Delivery to ESI	Wednesday Morning (Sediment & Waters: 10/24)	Thursday Morning (Sediment Only: 10/25)
Prepare Elutriates	Wednesday (10/24)	Thursday (10/25)
Alpha Chemical Elutriate Courier (Hex Cr – 24 Hr.)	Thursday (10/25)	Friday (10/26)
Ammonia Elutriate Readings	Thursday (10/25)	Friday (10/26)
Introduce SPP Organisms	Thursday (10/25)	Friday (10/26)
Ferretti Contracting Discussions/Decision	Thursday (10/25)	Friday (10/26)
Initiate Ferretti Method	Friday (10/26)	Saturday (10/27)/ Monday (10/29)

To expedite the biological assay processing and to meet the project schedule constraints outlined herein, the AECOM team anticipates completing two sample deliveries to the toxicology laboratory, as outlined above.

Receipt of the CLDS and Dredge Site waters in the first delivery will be required by the laboratory. Further, provision of waters collected on the program's sampling "Day 2" (i.e. as listed as Tuesday 10/23/18, above) will allow the greatest balance between test initiation constraints (5 days) and water hold time constraints (14 days).

Figure A-2 New Haven Harbor Proposed Navigation Project [Figure from PWS, NAE, 2018]

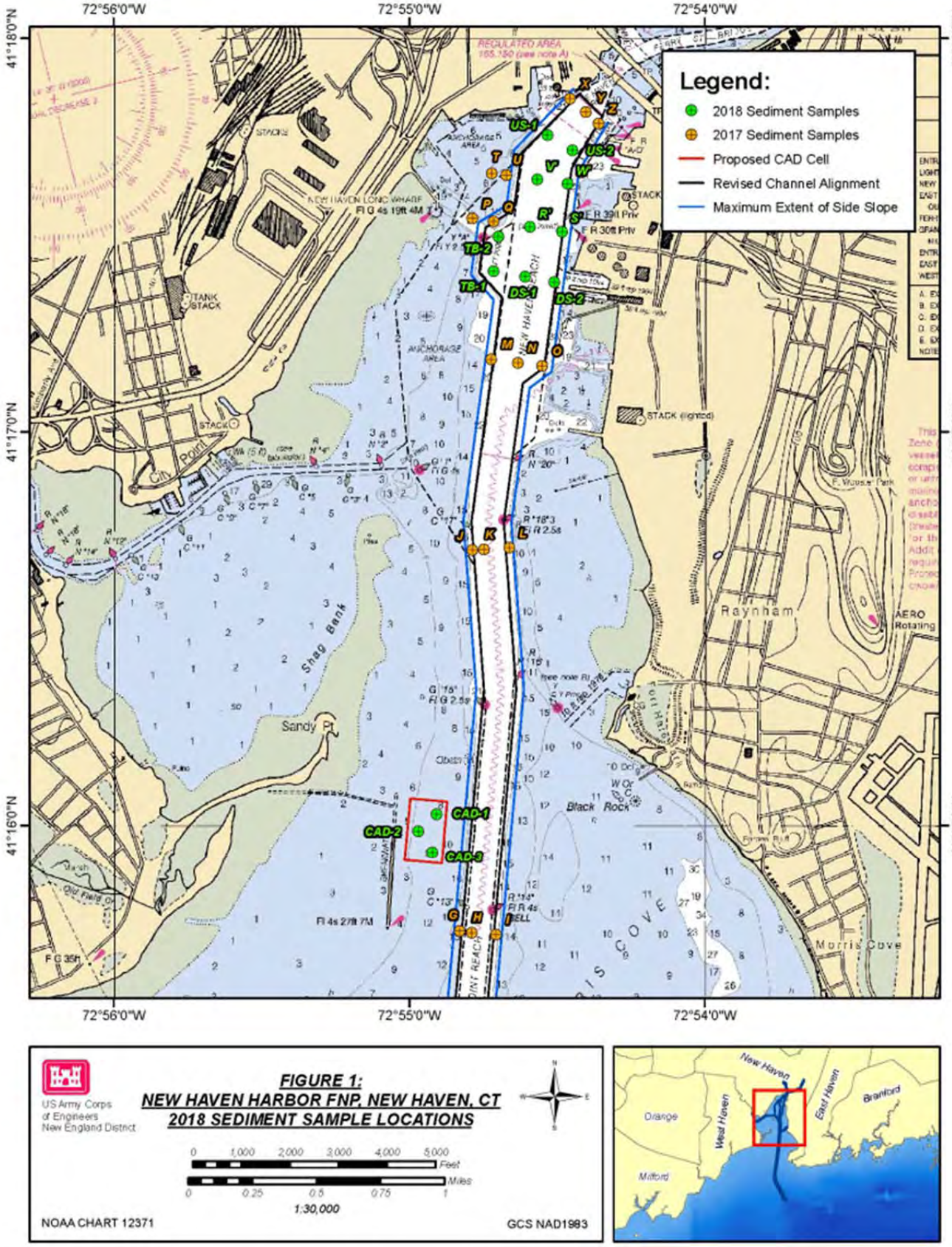
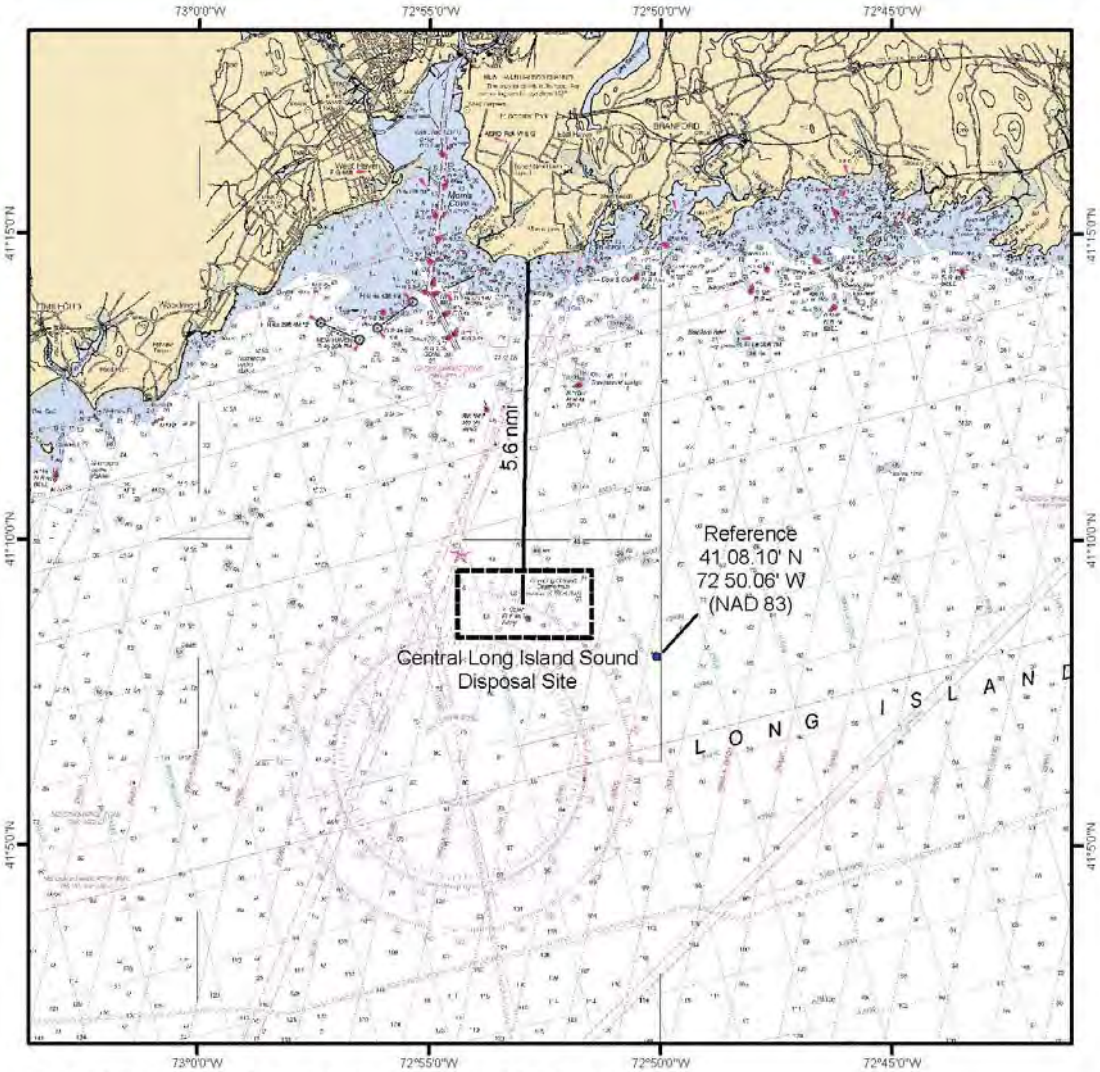


Figure A-3 CLDS Reference Site (Figure from PWS, NAE 2018)



CENTRAL LONG ISLAND SOUND DISPOSAL SITE

Description: The Central Long Island Sound Disposal Site (CLDS) is one of four regional dredged material disposal sites located in the waters of Long Island Sound. CLDS covers a 11.04 km² (3.2 nmi²) area and is centered at 41° 08.950' N, 72° 52.950' W (NAD 83). It is located approximately 10.89 km (5.6 nmi) south of South End Point, East Haven, Connecticut. Since 1977, the management strategy at CLDS has entailed the controlled placement of small to moderate volumes of sediment to form individual disposal mounds on the seafloor. The authorized disposal point (within the overall disposal area) is specified for each dredging project in other project documents.

D A M O S

DISPOSAL AREA MONITORING SYSTEM

SCALE 1:175,000

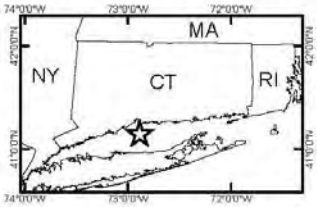
Kilometers

1 0 1 2 3 4 5 6 7

1 0 1 2 3

Nautical Miles

NOTE: This chart is not intended for use in navigation



A.5.1.2 Discrete/Composite Sediment Sampling Requirements

Initially, the NAE-collected cores will be processed aboard the NAE sampling vessel (or on shore by NAE) and will be transferred to appropriate sample containers (provided by the AECOM Field Team). Sediments will be transferred from NAE to AECOM in the provided containers under chain of custody (see SOP ES-G-04). The sediment volume needed from each station and stations that will be pooled together by NAE to form composites, as detailed on **Table A-1**. Additionally, the sample volumes needed for the array of testing parameters are detailed on **Table A-4** *Sample Mass/ Volume Requirements.*

Biological laboratory composite preparation procedures are detailed in Section B of this Work Plan (QAPP).

Table A-4 Sample Mass/ Volume Requirements (minimum)

Parameter	Units	Sediment Volume		Water Volume		Prepared Elutriate Volume	
		New Haven Harbor (Per Tested Sample or Composite)	CLDS Reference Site	New Haven Harbor Dredge Site (Per Composite)	CLDS Reference Site (Total)	New Haven Harbor Dredge Site (Per Composite)	New Haven Harbor Dredge Site QC (two sets)
Chemistry Testing Parameters – Bulk Sediment							
Bulk Sediment Chemistry***	L	**0.25 (8 Oz Jars provided to NAE)**	-	**-**	-	**-**	-
Chemistry Testing Parameters - Elutriate*							
Elutriate Chemistry - Prepared Elutriate**	L	**12**	-	**48**	-	**21**	-
Elutriate Chemistry - Prepared Elutriate for QC samples***	L	**9 (18 for project)*****	-	**32 (64 for project)*****	-	-	**18 (36 for project)*****
Chemistry Testing Parameters – Surface Waters							
Elutriate Blank Chemistry (Centrifuged Dredge Site Water)**	L	-	-	**25**	-	-	-
Reference Site Chemistry (Surface water or Mid-Depth Water)**	L	-	-	-	**25 Collected in laboratory glassware**	-	-
Toxicity Testing Parameters*							
SPP Toxicity Bioassay	L	**4**	-	**16**	**72**	**8**	-
SPP Toxicity Bioassay – Ammonia Reduced	L	**4**	-	**16**	**72**	**8**	-
10-Day Whole Sediment Toxicity Bioassay	L	**6**	**6**	-	-	-	-
Bioaccumulation Testing Parameters							
Nereis 28-Day Study	L	**30**	**30**	-	-	-	-
Macoma 28-Day Study	L	**30**	**30**	-	-	-	-
Total Volumes Required							
Bulk Sample Volume (L)	L	**86 Per Sample [95 per QC sample]********	**66 Total**	**106 Per Sample [137 per QC sample]********	**170 Total (including above glassware)**	**37 Per Sample**	**18 Per Sample (2 for QC)**
Bulk Sample Volume (Gal)	Gal	**23 Per Sample [25 per QC sample]********	**18 Total**	**28 [37 per QC sample]********	**45 Total (including above glassware)**	**10 Per Sample**	**5 Per Sample (2 for QC)**

Footnotes:
* In order to achieve the volumes of elutriate required for chemistry and biological (SPP) testing, the elutriate preparation methods assumes an ~50% yield of final elutriate volume.
**Elutriates, elutriate blanks and reference site waters are analyzed in triplicate. A final volume of 7-L of elutriate is required per replicate for analysis. Volume presented represents 7 L or elutriate per replicate x 3 replicates for each

composite.
***Two sets of QC samples are required for the project; each set requires one MS/Dup (all parameters: 14-L) and one MSD (Organics only: 4-L) sample. Additional volume should be prepared from two separate composites to prepare sufficient volume for QC (i.e. prepare an additional 18-L from Comp 2 and an additional 18- L from Comp 3 in this example).
****Volume in parentheses includes material required at composites with associated QC samples (two/project).
*****AECOM anticipates that NAE will collect 22 sets of bulk sediment chemistry for project analysis.

A.5.1.3 Sample Collection and Field & Laboratory Analysis

Navigation. Vessel positioning for all sediment collections will be accomplished utilizing a Differential Global Positioning System (DGPS) Integrated with HYPACK software with an accuracy of 3 meters or less according to AECOM SOP ES-G-02 (Appendix A). Local tide data will be obtained to calculate tidal height in feet above MLLW. The reference site target distance is defined as up to 250 feet from the sampling coordinate. Consultation with the Task Order Manager will be attempted prior to collection of materials from beyond this distance (if further relocation is required, based on benthic conditions). All coordinate data shall be reported in geographic NAD 83 decimal degrees. All depth data shall be reported in tenths of feet.

Care will be taken to avoid sample contamination from sampling gear, airborne dust, vessel engine exhaust, cross contamination, etc. If wind/current/ traffic conditions allow, engines will be shut off during sampling; otherwise, sampling will be performed upwind of exhaust and contamination sources. Final sample mixing will be performed in the laboratory for greater contamination control.

Collection & Analysis. The harbor locations will be cored by NAE using vibracoring equipment according to the NAE SAP/SOPs. Grab samples of the surface sediment from the CLDS Reference Site and will be collected using a Ponar, Ted Young modified Van Veen grab sampler, or equivalent, in accordance with AECOM SOP ES-S-01 (Appendix A). **Table A-5** lists the equipment intended for use during project performance and equipment calibration /checking requirements are detailed in **Table A-6**.

Table A-5 Proposed Sampling Gear for the CLDS Sampling Task

Equipment	Description	Objective
Sampling Vessel	27-foot Forward Cabin Power Boat	Reference station sampling
Refrigerated Storage Vehicle	16 foot Refrigerated Box Truck, Refrigerated Van, or equivalent	Chilled sample storage during the field program
DGPS	Sub-meter GPS with Hypack Survey Software or equivalent	Vessel positioning and data collection
Grab Sampler	Ted Young modified Van Veen (0.1 meter squared) Grab Sampler or Equivalent	Reference sediment collection
30L Niskin Bottle	Messenger activated sampling bottle for specified depths	CLDS reference site water collections

Table A-6 Field Instrument Calibration, Checking, and Corrective Action

Parameter/ Instrument	Calibration Frequency	Calibration Standards	Acceptance Criteria/ Corrective Action
Water Depths Non-contaminating weighted line. and, Lowrance X50DS Sounder (or equivalent)	Initial: Each time instrument is turned on.	Deployable metal plate and metering line	Within 10% of metering line instrument will be replaced.
Station Locations Trimble DGPS System w/ Hypack	Initial: Start of field program	Survey of benchmark	3 meter accuracy minimum or GPs to be replaced
	Check: Daily	Survey of benchmark	
Sample Temperature Refrigerated Truck Storage	Check twice daily	Alternate thermometer	Vehicle gauge within 0.5°C of the hand-held monitoring thermometer. Re-calibrate stationary thermometer as needed.

Samples will be chilled on wet ice while on board the vessel and subsequently transferred to a refrigerated box truck/van daily during field operations. The temperature in the refrigerated vehicle will be regularly monitored to ensure that the storage temperature is maintained at 4° Celsius (C) ±2° C. Upon completion of the NAE New Haven Harbor sediment coring activities, NAE will place core contents into pre-provided containers. AECOM personnel will accept custody of the harbor sediment and water from NAE at the end of each sampling day (SOP ES-G-04) and place into the refrigerated vehicle.

In addition, the AECOM driver will accept custody of the reference site sediment and water samples from the AECOM Field Team (SOP ES-G-04) and place into the refrigerated vehicle. Samples will be delivered to the toxicology laboratory at the end of two field sampling days, as specified in Table A-3. AECOM anticipates one sample deliver to occur mid-way through the program, and one sample delivery at the end of the sampling program. Chemical laboratory courier service will also be coordinated by AECOM and te project labratories.

Sample collections will be recorded on the Daily Activity Log (Attachment 3). Project documentation requirements are provided in Section A.6.

Bulk sediment chemistry samples will be collected by NAE in the field.

Composite samples for project toxicology and elutriate analysis will be prepared at the laboratory. After the sample composites are prepared, the elutriate chemistry (metals, polychlorinated biphenyls [PCBs], pesticides, and pentachlorophenol), biological tests (SPP, 10-day whole sediment acute toxicity) and 28-Day bioaccumulation testing associated tissue chemistry will proceed. Refer to the task order QAPP (Section B) for a listing of the detailed parameters and species to be tested. The project will follow the schedule presented in **Table A-3**.

Table A-7 Sample Container, Preservations, and Holding Time Requirements

Sediment Parameters	Volume/Mass	Container	Preservation	Storage	Holding Time
Bulk Chemical/ Biological Testing Material	3.5-Gal Buckets (see Tables A-2 and A-4 for volume)	Plastic	Fill Completely	4°C dark/airtight	14 days (d) recommended, no longer than 56 days (d)

Aqueous Parameters	Volume/Mass	Container	Preservation	Storage	Holding Time
Metals	2-liter (L)	Plastic	HNO_3 to pH<2	4±2 °C	28 d (Hg) 180 d (other metals)
Hexavalent Chromium	1-L	Plastic	Chill	4±2 °C	24 hours
Pentachlorophenol	2-L	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
Pesticides	2-L	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
PCBs	2-L	Amber Glass	Chill	4±2 °C	7 d (extract)/ 40 d (analyze)
Bulk Chemical/ Biological Testing Material	5-Gal Cubitainers (see Tables A-2 and A-4 for volume)	Plastic	Fill Completely	4°C dark/airtight	14 d

A.5.1.4 QC Samples & Frequency

Contamination control is one of the important aspects of environmental sample collection efforts. For this reason, equipment blank QC samples will be collected from all equipment that comes in contact with the sediment and surface water samples.

A total of two sediment and two water equipment blanks will be collected during the program:

- One equipment rinse blank will be collected by NAE from the New Haven Harbor site coring equipment;
- One equipment rinse blank will be collected by NAE from the New Haven Harbor site water sampling equipment;
- One equipment rinse blank will be collected by the AECOM Team from the CLDS grab sampling equipment; and
- One equipment rinse blank will be collected by the AECOM Team from the CLDS water sampling equipment.

In each case, high purity deionized water (DIW) will be poured over clean (i.e., decontaminated per SOP ES-G-03) collection equipment (e.g., surface water sampling bottle, core liners, cutters, catchers, and processing utensils or grab sampler) or run through the pump/Niskin bottle, and collected in a chemistry container set.

A standard set of laboratory QC will be included in the analytical program as defined in the QAPP, but will not require any additional volume collected during field operations beyond those mass/volumes already specified (**Table A-2** and **Table A-4**).

A.5.1.5 Sample Containers and Preservation Techniques

The sediment storage containers specified for the project are provided on **Table A-7**. Large/ bulk sediment samples will be transferred to food-grade plastic (high density polyethylene) 3.5 gallon buckets. Seawater samples will be stored in 5-gallon collapsible carboys (food-grade cubitainers). All samples will be transferred to a refrigerated storage truck / van on shore.

A.5.1.6 Decontamination Procedures

The sediment coring equipment will be decontaminated as appropriate by NAE. The grab sampler utilized by the AECOM Team will be cleaned thoroughly to remove any dust/ film before the reference sediment is collected. Level 1 decontamination procedures (SOP ES-G-03) applied to sediment collection equipment (grab sampler) corresponds to the following procedure:

- Non-phosphate soap solution wash/ brush-down;
- Thorough rinse with site water

Re-cleaning between discrete grab samples at the CLDS Reference Site will not be necessary unless the grab sampler is compromised in some way as determined by the field scientist (e.g., rinsing residual sediment from the grab using the deck-hose with reference site water). Stainless steel spoons used to homogenize the sediment will be cleaned in the same manner.

A.5.2 New Haven Harbor Proposed FNP Site and CLDS Reference Sites Water

As required by the PWS (NAE, 2018), seawater from the harbor will be used in the preparation of chemical elutriates. Water samples will be collected using either a non-contaminating pump with program dedicated tubing, or a decontaminated discrete grab water sampler per the applicable SOPs. Given the inherent purity of seawater, collection and handling procedures must follow strict contamination control procedures as discussed in this section.

Seawater from the CLDS Reference Site will be collected using a large-volume (30L) Niskin bottle and used for preparing the SPP toxicity testing dilution series (dilutions of elutriate samples with CLDS water).

A.5.2.1 Water Collection Locations

Dredge site water will be collected by NAE from a point centrally located in each composite sample area, as noted in Tables A-1 and A-2.

If possible, dredge site water collection should be completed by NAE on an incoming tide, in order to ensure appropriate salinity (25 to 30 ‰) is achieved. In the event that field testing confirms that the New Haven Harbor dredge site waters are too fresh, NAE should subsequently collect the above-noted volumes from an appropriate source of clean (salty) seawater.

CLDS Reference Site seawater will be collected by the AECOM Team for SPP dilution series preparations and for chemical analysis. CLDS Reference site water will be collected from near-surface or at mid-depth, in accordance with the RIM.

A.5.2.2 Water Sampling Requirements

As indicated above, water samples will be collected to support the required laboratory testing. To meet the range of testing requirements, an appropriate volume of seawater will be collected from the harbor and from the CLDS Reference Site, as depicted in **Table A-2** and **Table A-4**.

A.5.2.3 Sample Collection and Field & Laboratory Analysis

Navigation. The same navigation equipment and protocol used for the sediment collection effort (i.e. as outlined in Section A.5.1.3) will be used for the water collection effort (AECOM SOP ES-G-02; Appendix A).

Seawater Collection. Seawater from the harbor area (site water collected by NAE) and the reference area (water collected by the AECOM Team for SPP dilutions and chemical analysis) will be collected using a pre-cleaned large-volume Niskin bottle, at the sampling depths outlined in Section 5.1, above.

CLDS Reference Site water collections will be performed according to SOP ES-W-01 (Appendix A). The volume to be collected at each proposed location is detailed in **Table A-2** and **Table A-4**. AECOM will record reference area water collections in the field log book and on daily activity logs (Attachment 3). Pertinent field observations (turbidity, sheen, blooms, etc.) will also be recorded on the field collection log. Project documentation requirements are provided in Section A.6.

In the evening of the final water collection field day (or first thing the following day, depending upon sampling timing), all samples will be transferred to the biological laboratory (ESI) using the refrigerated storage vehicle. The off-water timing (i.e. AECOM's return to the dock) and laboratory hours of operation may require that the samples be delivered to ESI the first thing the following morning. Sample preparations may then begin, to ensure adherence to the PWS schedule constraints and the 14-day hold time for all surface water to be used in the elutriate preparation and the SPP bioassays.

A.5.2.4 QC Samples and Frequency

QC sampling of the water collection program will include collection of equipment blanks during the field effort to verify operation cleanliness. Additional information pertaining to the anticipated QC sampling is presented In Section A.5.1.4

A standard set of analytical QC samples will be included in the laboratory analysis program, but additional volume beyond that already specified (**Table A-4**) is not anticipated.

A.5.2.5 Sample Containers and Preservation Techniques

Water samples collected in the field will be contained in clean, new five gallon plastic cubitainers and placed on ice for preservation. Discrete seawater samples for rinsate blanks will be contained in smaller plastic (metals) and glass (trace organics) bottles. Water sample containerization and preservation requirements are detailed on **Table A-7**. In addition to icing immediately following collection, the water samples will be transferred to the refrigerated box truck /van upon returning to the dock.

A.5.2.6 Decontamination Procedures

The water sampler used to collect the CLDS waters will be cleaned prior to use in the following manner:

- Deionized water (DIW) rinse
- Dilute Liquinox™ rinse
- DIW rinse

A.6 Field Operations Documentation

AECOM's field documentation will include grab sampling logs, with narratives describing relative grain sizes, color, odor, and depth of penetration along with other pertinent sediment sampling observations. Seawater collection data (profile information, unique observations) will be recorded in the field logbook. Project field records will be documented and maintained in accordance with AECOM SOP ES-G-01 (Appendix A).

The full range of information to be included in field records is provided in AECOM SOP ES-G-01 (Appendix A). Field documents developed for this task are provided as Attachments.

A.6.1 Field Logbook and Field Sheets

Field logbooks will provide the means of recording the data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that persons reviewing site data can reconstruct a particular situation without reliance on memory.

Field logbooks will be bound field survey books or notebooks, and assigned to the field personnel, but will be stored in the project files when not in use. Each logbook will be identified by the project-specific document number.

The title page of each logbook will contain the following:

- Person to whom the logbook is assigned;
- The logbook number;
- Project name and number;
- Project start date; and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, and the signature of the person making the entry will be entered. The names of any visitors and the purpose of their visit will also be recorded in the field logbook.

Field logbooks will be supplemented by standardized forms, such as daily activity logs (Attachment 3). All measurements made and samples collected will be promptly recorded. All entries will be made in permanent ink, signed, and dated, and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark that is initialed and dated by the sampler. Whenever a sample is collected, or a measurement is made, latitude and longitude information will be recorded. All equipment used to make measurements will be identified, along with time and date of calibration and checking.

A.6.2 Sample Documentation

The data management strategy for this task comprises the following elements:

- Assignment of unique sample codes. This code is used to track the sample from collection, through the analysis, to reporting.
- Data retention. Data will be retained in accordance with the requirements stated in Section A.6.2.4 of this Work Plan.

A.6.2.1 Sample Identification/Numbering

For each set of samples collected, the sample containers will be labeled with the following information:

- Project Name (New Haven Harbor Navigation Improvement Dredging Project Suitability Study 2018);
- Unique sample identification number
- Date and time of sample collection;
- Name or initials of collector;
- Sample preservation/storage condition; and
- Type of analysis (grain size, etc.).

QC samples will be labeled in the following manner:

- Equipment blanks: NH-EB-XXXX-mm/dd/yy where XXXX corresponds to the equipment type (either pump or grab) and mm/dd/yy corresponds to the collection date.
- Replicates: The sample identification (ID) is to be appended with “-Rep”

Water samples collected (by NAE) for preparation of elutriates will be labeled by NAE and water samples collected for chemical testing and the preparation of SPP/Elutriate dilution series mixtures (by AECOM Field Team) will be labeled MW-CLDS, as outlined in **Table A-2**.

A.6.2.2 Chain-of Custody Records

Custody is one of several factors necessary to satisfy the two major requirements for data admissibility: relevance and authenticity. Sample custody is addressed in two parts: field sample collection and laboratory analysis. Refer to AECOM SOP ES-G-04 (Appendix A) for further details.

The field team is personally responsible for the care and custody of the samples until they are transferred or dispatched properly to the laboratories. Field procedures have been designed such that as few people as possible will handle the samples.

All sample containers will be identified by the use of adhesive sample labels. Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

Samples will be accompanied by properly completed COC forms. The sample codes will be listed on the COC form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location. An example COC form is attached (Attachment 4).

A.6.2.3 Field Instrument Calibration & Documentation

As discussed in Section A.5, navigational positioning will be acquired using DGPS instrumentation. Field measurements will include station position information.

Navigation instrumentation will be checked prior to the daily each day that CLDS reference site waters and sediments are sampled, and checked at the end of each sampling day, as specified on **Table A-6.** Calibration will follow the procedures detailed in SOP ES-G-02 (Appendix A).

Records of navigational accuracy and checking results will be recorded at the time of calibration or checking in the bound field logbook.

A.6.2.4 Documentation Procedures/ Data Management and Retention

Entries in field logbooks and on standardized forms will be reviewed for outliers and omissions prior to leaving the sampling site. Navigational data will be collected using DGPS integrated with computer-based navigational software. Actual survey positions will be documented at the time of sample collection on the electronic navigation charts and downloaded as survey records.

Any potential deviation from the work plan must be discussed with the Task Order Manager and NAE TM and corrective actions documented as discussed in Section A.9 and in ES-G-01 (Appendix A). If uncertainties arise, then the Field Services Task Leader may suspend activities until clarification is obtained from the task leadership (AECOM DPM, NAE TM).

Field station positions, collection dates/times, field analytical data and field observations will be included in field sampling documentation and will be appended to laboratory-submitted EDDs. Sample collection times will begin the COC record, based on unique sample IDs for discrete and composite samples, and all laboratory data will be maintained. Field and laboratory documentation will provide the source data for project progress, draft and final reports. Water chemistry and toxicity data will be provided in EDD format matching NAE's preferred format among the RIM specified formats. EDDs will be checked using the most current EDD Checker available on the RIM website. EDDs that pass the Checker without error will be submitted, along with the Checker report.

All field/ project records will be maintained in the electronic project files for a minimum of 5 years. Archived project files will include all field records as specialized log forms and measurement data, station positions, logbook photocopies, calibration records, EDDs, corrective action reports, and audit reports. The field report, final maps, progress reports, laboratory reports, and the draft and final Task Order reports will also be placed on the project website, as discussed in the QAPP Section of this Work Plan (Section B.13 *Reports*).

A.7 Sample Packaging and Shipping

All sample shipments will be accompanied by the COC record identifying the contents. The original record and one copy will accompany the shipment, and one copy will be retained by the sampler and placed in the project files.

Bulk samples will be transported via refrigerated truck/van; discrete samples may be properly packaged on ice at 4°C for shipment and dispatched to the laboratory for analysis according to AECOM SOP ES-G-05 (Appendix A). A separate signed COC will be enclosed in and secured to the inside top of each sample box or cooler.

All project samples will be transferred by project couriers; common carriers are not anticipated. If common carriers become necessary for discrete sample shipments, then samples will be placed in plastic coolers for storage and transfer according to procedures detailed in AECOM SOP ES-G-05. In these cases, custody seals will be attached to the front and back opposite corners of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations and the waybill will be retained in the project file.

A.8 Field Assessment/ Inspection

Sampling and subcontractor equipment will be checked by the Field Services Task Leader or designee during mobilization, initially before use, and at the end of each day. Furthermore, a field audit may be scheduled at the discretion of the Task Order Manager to verify the inspection process and to review methods and documentation from collection through final packaging and shipment.

Preliminary results of the audit will be reviewed with the Task Order Manager to ensure that deficiencies adversely affecting data quality are immediately corrected.

For this task, critical supplies for field activities will be tracked by the Field Services Task Leader as outlined in Table A-8.

Table A-8 Field Supplies, Equipment and Inspection Requirements

Critical Supplies and Consumables	Inspection Requirements and Acceptance Criteria
Sample Containers	Visually inspected upon receipt for cracks/ breakage/ cleanliness. Must be accompanied by certificate of analysis.
Field Equipment & Instrumentation	Functional checks to ensure proper operation and testing (echo sounder, DGPS)
Sampling Equipment	Visually inspected for obvious defects, damage, and contamination

Supplies and consumables not meeting acceptance criteria will initiate the appropriate corrective action as detailed in ES-G-01 (Appendix A). Corrective measures may include repair or replacement of measurement equipment, and/or notification of vendor and subsequent replacement of defective or inappropriate materials. All actions will be documented in the project files.

Field equipment testing activities are listed in **Table A-6** along with non-conformance corrective actions. The laboratory system of inspection and acceptance of supplies and consumable is documented in each project laboratory QA manual.

Field data will be reviewed daily by the Field Services Task Leader to ensure that the records are complete, accurate, and legible and to verify that the sampling procedures are in accordance with the protocols specified in the FSP and QAPP.

A.9 Nonconformance/Corrective Actions

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or poor performance that can affect data quality. Corrective action proposed and implemented should be documented in QA reports to management. Corrective action should only be implemented after approval by the Task Order Manager or designee.

Field Corrective Action
Corrective action in the field may be needed when the sample network is changed (i.e., more/ less samples, sampling locations other than those specified in the work plan, etc.), or when sampling procedures and/ or field analytical procedures require modification, etc., due to unexpected conditions. The field team may identify the need for corrective action. The DPM will notify the NAE Technical Manager who will approve the corrective measure. The Field Services Task Leader will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field records (SOP ES-G-01 in Appendix A). Documentation will include:

- A description of the circumstances that initiated the corrective action;
- The action taken in response;
- The final resolution; and
- Any necessary approvals.

No staff member will initiate corrective action without prior communication of findings through the proper channels. If uncertainties arise in the field, the Chief Scientist may suspend field activities until clarification is obtained from the NAE TM.

Quality Assurance Project Plan

Sampling and Testing – New Haven Harbor Navigation Improvement Dredging Project, New Haven, Connecticut

B.0 Quality Assurance Project Plan (QAPP)

B.1 Project Laboratory Organization and Responsibilities

Two laboratories will support the environmental testing task: Alpha Analytical and ESI. The laboratory organization and work breakdown is depicted in **Figure A-1** and **Table B-1**.

Table B-1 Laboratory Roles and Responsibilities

Task	Responsibility	Management	Contact
Sample processing/composite formation, elutriate and SPP preparation, elutriate chemistry, and bioassays			
Task 6 • Elutriate Preparation	Kirk Cram, ESI Laboratory Director	Technical Advisor: Ken Simon Laboratory Director: Kirk Cram QA Officer: Catie Sasso Sample Custodian: James Provencher	EnviroSystems Inc., 1 Lafayette Rd, Hampton, NH 03842 (603) 926-3345
Task 7 • SPP Preparation and Bioassays	Kirk Cram, ESI Laboratory Director		
Task 7.1 • SPP with Ammonia Reduction (Optional)	Kirk Cram, ESI Laboratory Director		
Task 8 • 10-Day Whole Sediment Acute Toxicity Bioassays	Kirk Cram, ESI Laboratory Director		
Task 9 • 28-Day Bioaccumulation Bioassay	Kirk Cram, ESI Laboratory Director		
Task 10 • Tissue Statistical Analysis	Kirk Cram, ESI Laboratory Director		
Task 5 • Sediment Chemistry	Liz Porta, Alpha Laboratory Project Manager	Laboratory Manager: Christopher Ouellette QA Officer: James Todaro Sample Custodian: Kim Bailey	Alpha Analytical 320 Forbes Boulevard Mansfield, MA 02048 508 822-9300
Task 6 • Elutriate Chemistry	Liz Porta, Alpha Laboratory Project Manager		
Task 10 • Tissue Chemistry	Liz Porta, Alpha Laboratory Project Manager		

The ESI Technical Advisor is Mr. Ken Simon and the ESI Laboratory Director will be Mr. Kirk Cram. Mr. Cram will serve as the point of contact at ESI and will be responsible for technical, financial, and scheduling matters related to sample processing, chemical elutriate preparation, and bioassay testing tasks. Ms. Christine Archer, AECOM's Biology/Bioassay Laboratory Coordinator, will be the point of contact for the biology laboratory task leads and safety and quality managers.

Liz Porta will serve as the point of contact at Alpha for sediment and elutriate chemistry analysis and the tissue chemistry task. Ms. Edith Hutchinson, AECOM's Chemistry Coordinator, will also interface with the analytical laboratory task leads and safety and quality managers.

The **Laboratory Manager** is ultimately responsible for the data produced by the laboratory. Specific responsibilities include:

- Implementing and adhering to the laboratory QA manual and all corporate policies and procedures within the laboratory,
- Approving the SOPs,
- Maintaining adequate staffing documented on organization charts, and
- Implementing internal/external audit findings corrective actions.

Laboratory QA Coordinator

The Laboratory QA Coordinator reports to the Laboratory Manager. Specific responsibilities include:

- Approving SOPs;
- Assessing and maintaining the laboratory QA manual implementation within the facility operations;
- Recommending resolutions for ongoing or recurrent non-conformances within the laboratory;
- Performing QA assessments; and
- Reviewing and approving corrective action plans for non-conformances, tracking trends of non-conformances to detect systematic problems, and initiating additional corrective actions as needed.

The Laboratory Project Manager is the primary point of contact between the laboratory and the appropriate AECOM Laboratory and Chemistry Coordinator. Specific responsibilities of the Laboratory Project Manager include:

- Monitoring analytical and QA project requirements for a specified project,
- Acting as a liaison between the client and the laboratory staff,
- Reviewing project data packages for completeness and compliance to client needs, and
- Monitoring, reviewing, and evaluating the progress and performance of projects.

B.2 Data Assessment and Responsibilities

Organization of the data assessment tasks are detailed in **Table B-2**. Chemical data will be verified by the Alpha Analytical QA department to check that the laboratory tasks followed the specified methods and conform to the QAPP including measurement quality objectives (MQOs) and reporting specifications. Laboratory reports and data/EDD submittals will also be validated to check for completeness, evaluate quality control sample results and apply validation qualifiers as needed based on MQO non-compliance (e.g., blank contamination, etc.).

Similarly, the biological data will be verified by the ESI QA department to check that the laboratory tasks followed the specified methods, and conform to the QAPP specifications, including ancillary bioassay test water quality data collection.

B.3 Data Quality Objectives

The data quality objectives (DQOs) for this task have been established by EPA and USACE as documented in the RIM document (EPA/USACE, 2004). The DQO process, that is –problem statement, goal

identification and study questions, new data/analysis requirements, study boundaries, analytical approach with corresponding performance/acceptance criteria - have been incorporated into this Work Plan.

Table B-2 Data Assessments Organization and Responsibilities

Task	Data Verification Responsibility	Data Validation Responsibility
Task 5 • Sediment Chemistry	James Todaro, Alpha QA Officer 320 Forbes Boulevard Mansfield, MA 02048 508-822-9300	Sharon McKechnie, AECOM 250 Apollo Drive Chelmsford, MA 01824 978-905-2317
Task 6 • Elutriate Chemistry Testing		
Task 7 • Standard SPP sample preparation • SPP acute toxicity bioassays	Catie Sasso, EnviroSystems Inc., 1 Lafayette Rd, Hampton, NH 03842 603-926-3345	Christine Archer, AECOM 1155 Elm Street Suite 401 Manchester, NH 03101 603-622-1556
Task 7.1 • Suspended Phase Acute Toxicity Testing With Ammonia Reduction		
Task 8 • 10-day whole sediment acute toxicity bioassays		
Task 9 • 28-day bioaccumulation bioassay		
Task 10 • Tissue analysis	James Todaro, Alpha QA Officer 320 Forbes Boulevard Mansfield, MA 02048 508-822-9300	Sharon McKechnie, AECOM 250 Apollo Drive Chelmsford, MA 01824 978-905-2317

B.3.1 Data Use Background

The assessment of dredged material typically follows a tiered testing approach. If data collected in earlier tests are insufficient to provide a basis for an environmental conclusion, then additional testing (higher level tiers) is undertaken to collect additional data. For example, if grain size data identified that the accumulated sediment to be dredged was only coarse-grained (i.e. sandy) material, then the exclusionary criteria admitting placement in the marine environment unconfined without further testing may be met. Conversely, fine-grained sediments require added testing before an impact assessment can be completed and a decision made with respect to the final dredged material placement.

Based on NAE decision-making, including prior analytical results, chemical and biological (bioassay) data will be generated concurrently during the performance of this Task Order to evaluate potential AWQC and LPC exceedances (Elutriate & SPP bioassays) and potential toxicity to sediment-associated organisms (10-day whole sediment acute toxicity bioassay with an amphipod and shrimp).

Overall, the data will be used to evaluate potential environmental impacts associated with the proposed dredging project in the New Haven Harbor proposed navigation site, but each data type will be addressed separately in the following sections.

B.3.2 Measurement Quality Objectives

MQOs for sensitivity are well established and published in the RIM document for this task. Required methods and corresponding target reporting limits are provided in the RIM document, summarized in this section, and detailed on **Table B-3** (sediment chemistry), **Table B-4** (aqueous chemistry) and **Table B-5** (tissue chemistry).

Table B-3 Sediment Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Metals					
Arsenic	SW-846	6020B	0.05	0.4	ppm
Cadmium	SW-846	6020B	0.02	0.07	ppm
Chromium	SW-846	6020B	0.2	0.5	ppm
Copper	SW-846	6020B	0.2	0.5	ppm
Lead	SW-846	6020B	0.06	0.5	ppm
Mercury	SW-846	7474	0.0125	0.02	ppm
Nickel	SW-846	6020B	0.1	0.5	ppm
Zinc	SW-846	6020B	1	1	ppm
PCBs					
Selected Congener analysis	SW-846	8270D-SIM(m)/NOAA)	0.0008	0.001	ppm
Pesticides					
Aldrin	SW-846	8081B	0.0005	0.001	ppm
Chlordane (cis- and trans-)	SW-846	8081B	0.0005	0.001	ppm
4,4' – DDT	SW-846	8081B	0.0005	0.001	ppm
4,4' – DDD	SW-846	8081B	0.0005	0.001	ppm
4,4' – DDE	SW-846	8081B	0.0005	0.001	ppm
Dieldrin	SW-846	8081B	0.0005	0.001	ppm
Endosulfan & derivatives (I, II)	SW-846	8081B	0.0005	0.001	ppm
Endrin	SW-846	8081B	0.0005	0.001	ppm
Heptachlor & derivative (epoxide)	SW-846	8081B	0.001	0.001	ppm
Hexachlorobenzene	SW-846	8081B	0.001	0.001	ppm
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.0005	0.001	ppm
Methoxychlor	SW-846	8081B	0.002	0.001	ppm
Nonachlor (cis- and trans-)	SW-846	8081B	0.0005	0.001	ppm
Oxychlordane	SW-846	8081B	0.001	0.001	ppm
Toxaphene	SW-846	8081B	0.025	0.025	ppm
PAHs					
Acenaphthene	SW-846	8270D-SIM	0.008	0.01	ppm
Acenaphthylene	SW-846	8270D-SIM	0.008	0.01	ppm
Anthracene	SW-846	8270D-SIM	0.008	0.01	ppm
Benzo(a)anthracene	SW-846	8270D-SIM	0.008	0.01	ppm

Table B-3 Sediment Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Benzo(a)pyrene	SW-846	8270D-SIM	0.008	0.01	ppm
Benzo(b)fluoranthene	SW-846	8270D-SIM	0.008	0.01	ppm
Benzo(k)fluoranthene	SW-846	8270D-SIM	0.008	0.01	ppm
Benzo(g,h,I)perylene	SW-846	8270D-SIM	0.008	0.01	ppm
Dibenz(a,h)anthracene	SW-846	8270D-SIM	0.008	0.01	ppm
Chrysene	SW-846	8270D-SIM	0.008	0.01	ppm
Fluoranthene	SW-846	8270D-SIM	0.008	0.01	ppm
Fluorene	SW-846	8270D-SIM	0.008	0.01	ppm
Indeno(1,2,3-cd)pyrene	SW-846	8270D-SIM	0.008	0.01	ppm
Naphthalene	SW-846	8270D-SIM	0.008	0.01	ppm
Phenanthrene	SW-846	8270D-SIM	0.008	0.01	ppm
Pyrene	SW-846	8270D-SIM	0.008	0.01	ppm
Total Organic Carbon					
TOC	SW-846	9060A	0.01	0.1	%

Table B-4 Aqueous Methods, Reporting Limits, and Project-Required Detection Limits (Surface Water, Elutriates, and Blank Samples)

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Metals[1]					
Arsenic	SW-846	6020B	1	1	ppb
Cadmium	SW-846	6020B	0.1	1	ppb
Chromium	SW-846	6020B	0.5	1	ppb
Hexavalent chromium	SW-846	3500Cr-B	3	1	ppb
Copper	SW-846	6020B	0.5	0.6	ppb
Lead	SW-846	6020B	0.5	1	ppb
Mercury	SW-846	7474	0.05	0.4	ppb
Nickel	SW-846	6020B	1	1	ppb
Selenium	SW-846	6020B	0.56	1	ppb
Silver	SW-846	6020B	0.125	0.5	ppb
Zinc	SW-846	6020B	5	1	ppb
Semi-volatile compounds					
Pentachlorophenol[2]	SW-846	8270D	2	2.60	ppb
Pesticides					
Aldrin	SW-846	8081B	0.001	0.26	ppb
Chlordane (alpha/gamma/oxy)	SW-846	8081B	0.0005	0.02	ppb
Chloropyrifos	SW-846	8081B	0.001	0.002	ppb
4,4'-DDT	SW-846	8081B	0.0005	0.03	ppb

Table B-4 Aqueous Methods, Reporting Limits, and Project-Required Detection Limits (Surface Water, Elutriates, and Blank Samples)

Parameter	Method Reference	Method Number	Lab MRL	Project Required RL	RL Units
Dieldrin	SW-846	8081B	0.0005	0.14	ppb
Endosulfan and derivatives (I, II)	SW-846	8081B	0.0005	0.007	ppb
Endrin	SW-846	8081B	0.0005	0.007	ppb
Heptachlor & derivative (epoxide)	SW-846	8081B	0.001	0.01	ppb
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.0005	0.26	ppb
Toxaphene	SW-846	8081B	0.025	0.04	ppb
PCBs					
Selected Congener analysis	SW-846	8270D-SIM(m)/NOAA	0.001	0.006	ppb

[1] Metals samples will be extracted from seawater matrix and preconcentrated before analysis.
[2] Pentachlorophenol will not be analyzed in the grab sampler equipment blank.

Table B-5 Tissue Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Laboratory RL	Project Required RL	RL Units
Percent Moisture	SM 2540	SM 2540	0.1	0.1	%
Total lipids	NOAA 130, 1998	NOAA Tech Memo NOS ORCA 130, 1998	0.1	0.1	%
PCBs (wet wt.)					
PCB Congeners	SW-846	8270D-SIM(m)/NOAA)	0.8	0.5	ppb
Metals (wet wt.)					
Arsenic	SW-846	6020B	0.1	0.5	ppm
Cadmium	SW-846	6020B	0.04	0.1	ppm
Chromium	SW-846	6020B	0.4	1.0	ppm
Copper	SW-846	6020B	0.1	1.0	ppm
Lead	SW-846	6020B	0.04	1.0	ppm
Mercury	SW-846	7474	0.0125	0.02	ppm
Nickel	SW-846	6020B	0.1	1.0	ppm
Zinc	SW-846	6020B	1.0	1.0	ppm
PAHs (wet wt.)					
Acenaphthene	SW-846	8270D-SIM	0.008	0.02	ppm
Acenaphthylene	SW-846	8270D-SIM	0.008	0.02	ppm
Anthracene	SW-846	8270D-SIM	0.008	0.02	ppm
Benzo(a)anthracene	SW-846	8270D-SIM	0.008	0.02	ppm
Benzo(a)pyrene	SW-846	8270D-SIM	0.008	0.02	ppm

Table B-5 Tissue Methods, Reporting Limits, and Project-Required Detection Limits

Parameter	Method Reference	Method Number	Laboratory RL	Project Required RL	RL Units
Benzo(b)fluoranthene	SW-846	8270D-SIM	0.008	0.02	ppm
Benzo(k)fluoranthene	SW-846	8270D-SIM	0.008	0.02	ppm
Benzo(g,h,I)perylene	SW-846	8270D-SIM	0.008	0.02	ppm
Dibenz(a,h)anthracene	SW-846	8270D-SIM	0.008	0.02	ppm
Chrysene	SW-846	8270D-SIM	0.008	0.02	ppm
Fluoranthene	SW-846	8270D-SIM	0.008	0.02	ppm
Fluorene	SW-846	8270D-SIM	0.008	0.02	ppm
Indeno(1,2,3-cd)pyrene	SW-846	8270D-SIM	0.008	0.02	ppm
Naphthalene	SW-846	8270D-SIM	0.008	0.02	ppm
Phenanthrene	SW-846	8270D-SIM	0.008	0.02	ppm
Pyrene	SW-846	8270D-SIM	0.008	0.02	ppm
Pesticides (wet wt.)					
Aldrin	SW-846	8081B	0.0004	0.001	ppm
Chlordane – Alpha	SW-846	8081B	0.0004	0.001	ppm
Chlordane – gamma	SW-846	8081B	0.0004	0.001	ppm
Chlordane – oxy	SW-846	8081B	0.0008	0.001	ppm
4,4' – DDT	SW-846	8081B	0.0004	0.001	ppm
4,4' – DDD	SW-846	8081B	0.0004	0.001	ppm
4,4' – DDE	SW-846	8081B	0.0004	0.001	ppm
Dieldrin	SW-846	8081B	0.0004	0.001	ppm
Endosulfan & derivatives (I, II)	SW-846	8081B	0.0004	0.001	ppm
Endrin	SW-846	8081B	0.0004	0.001	ppm
Cis-Nonachlor	SW-846	8081B	0.0004	0.001	ppm
Heptachlor & derivative (epoxide)	SW-846	8081B	0.0008	0.001	ppm
Trans-Nonachlor	SW-846	8081B	0.0004	0.001	ppm
Hexachlorocyclohexane (lindane)	SW-846	8081B	0.0004	0.001	ppm
Methoxychlor	SW-846	8081B	0.004	0.001	ppm
Toxaphene	SW-846	8081B	0.020	0.05	ppm
Hexachlorobenzene	SW-846	8081B	0.0008	0.001	ppm

[1]RL – Reporting limit. Listed laboratory RLs correspond to clam and worm species.

For this task, systematic checks have been included to ensure data quality. MQOs corresponding to the QC samples are detailed in **Table B-6** (Chemistry) and **Table B-7** (Bioassays) to ensure that the Data Quality Indicators (DQIs) support the task data usability quality requirements. Quantitative laboratory DQIs for accuracy are supported through the analysis of QC samples as method blanks, matrix spikes, standard reference materials, and in the case of bioassays, through the use of reference toxicants and the monitoring of controls (control survival).

DQIs for precision are supported with the analysis of QC sample spike and/or laboratory duplicates. Field blanks and in some cases field duplicates can also provide important indications of data quality and field blanks have been included in this task (refer to FSP). Completeness of targeted field and laboratory scopes is another important indicator of overall usability/quality.

Qualitative DQIs addressing representativeness and comparability will be assured to some degree through the high number of stations to be sampled, and the subsequent formation of composite samples. The use of RIM specified methods will also assure comparability of the dataset to historical data sets generated for similar purposes.

The MQOs established for the quantitative DQIs have been defined below for this task.

Precision

Precision is a measure of the degree to which two or more measurements are in agreement. Laboratory precision will be assessed through the calculation of Relative Percent Difference (RPD) for laboratory duplicate samples, either as matrix spike/ matrix spike duplicates (MS/MSDs) or as laboratory duplicates. Laboratory precision control limits are provided in **Table B-6**. Specific formulas/equations supporting these and other DQIs are provided in Section B.8 *Data Reduction/ Calculation of Data Quality Indicators*.

Accuracy

Accuracy is the degree of agreement between the observed value and an accepted reference or true value. Field accuracy will be assessed through the use of equipment rinsate blanks and through the adherence to all sample handling, preservation, and holding time requirements. Laboratory accuracy will be assessed through the analysis of MS/MSDs, standard reference materials (SRMs), laboratory control samples (LCSs), and surrogate compounds, and the subsequent determination of percent recoveries (%Rs). Accuracy control limits are provided in **Table B-6**.

Table B-6 Measurement Quality Objectives for Chemical Analytical Measurements

QC Sample	Units	GS	TOC	Pentachlorophenol	Metals	PCBs	Pest	PAHs	Corrective Action
Method Blank	Conc	-	-	<RL	<RL	<RL	<RL	<RL	*1*
Surrogate Spikes	% Rec	-	-	30-150	-	30-150	30-150	30-150	*2*
Matrix Duplicate	% RPD	-	<30	-<30	-<30	<30	<30	-<30	*3*
Matrix Spike	% Rec	-	-	50-120	75-125	50-120	50-120	50-120	*4*
MSD	% RPD	-	-	30	-	30	30	30	*5*
LCS	% Rec	-	-	50-120	80-120	50-120	50-120	50-120	*6*
SRM	% Rec		w/i limits	-	w/i limits	w/i limits	w/i limits	w/i limits	*7*

[a]QC samples analyzed at a frequency of one per batch of 20 or fewer samples, except surrogates are added to each sample.

Corrective Action Codes:

1 Flag results if <5x blank concentration, re-extract or reanalyze the entire batch.

2 Re-extract sample, re-analyze sample or document and narrate

3 Flag results

4 Flag results

5 Investigate, re-analyze or flag results

6 Re-extract/reanalyze entire batch if all analytes are outside limits; if selected analytes affected, investigate and provide narrative.

7. Flag results

Data Qualifiers:

J: Analyte detected < laboratory achieved detection limit (i.e., ssRL for organics and RL for metals) but above MDL.

E: Estimate, result > highest concentration level in the calibration.

B: Analyte concentration is <5x the level found in the procedural blank (the qualifier is only applied to the affected field samples).

U: Not detected above laboratory achieved reporting detection limit

Q: QC value outside the accuracy or precision criteria goal.

Table B-7 Bioassay Measurement Quality Objectives

QC Parameter	Measure or Acceptance Criteria	Corrective Action
SPP Toxicity Testing	*Menidia beryllina:* ≥90% control survival *Americamysis bahia*: ≥90% control survival *Arbacia punctulata*: ≥70% control survival	Re-run Test
10-Day Whole Sediment Acute Testing	*Leptocheirus plumulosus*[2]: control ≥90%mean survival in control *Americamysis bahia*: ≥90%mean survival in control	Re-run Test
Reference Toxicity Tests (10-day and SPP)	≥90% mean survival in control (and within control chart limits)	Repeat entire test series
Suspended Phase Acute Toxicity Testing With Ammonia Reduction	*Menidia beryllina:* ≥90% control survival *Americamysis bahia*: ≥90% control survival *Arbacia punctulata*: ≥70% control survival	Re-run Test
28-day Bioaccumulation Assay	Sufficient *Macoma nasuta* and *Nereis virens* tissue for detection of target analytes	Re-run Test

Completeness
Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

- Field completeness is a measure of the amount of valid samples obtained during all sampling for the project. The field completeness objective is greater than 95%.
- Laboratory completeness is a measure of the amount of valid measurements obtained from all the measurements taken in the project. The laboratory completeness objective is greater than 95%.

All analytical data that do not meet the listed MQOs will be submitted to the AECOM Laboratory and Chemistry Coordinators for review and assessment of the potential impact of the results. Affected samples may be reanalyzed at the discretion of the AECOM Task Order Manager. Data accepted outside these criteria (**Table B-5** and **Table B-6**) will be flagged with the appropriate data qualifier, and the rationale for accepting results will be thoroughly documented.

B.4 Sample Receipt, Handling, Custody, and Holding Time Requirements

B.4.1 Sample Receipt Condition Verification/Documentation

Upon sample receipt at the laboratories, the condition of samples and associated packaging will be evaluated and documented on a sample receipt form (Attachments 6 and 7). As noted on the form, temperature, container condition, unique or unusual sample observations, labeling discrepancies, preservation status, COC completeness, etc. will be documented and a copy sent to the AECOM Laboratory Coordinator without delay.

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[2] The PWS lists *Ampelisca abdita* as the test species for this test. However, due to availability, *Leptocheirus plumulosus* may be substituted. This potential change was documented in the proposal assumptions.

When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the COC form (Attachment 4). This record documents the transfer of custody of samples from the sampler to another person, to the permanent laboratory, or to/from a secure storage location.

B.4.2 Corrective Action for Incoming Samples

Corrective actions may in some cases be taken on incoming samples that do not meet storage requirements. All actions are to be discussed with the Task Order Manager, and may include re-containerizing samples when containers are cracked, etc.

Corrective actions will be documented in the project file. Documentation will include:

- A description of the circumstances that initiated the corrective action;
- The action taken in response;
- The final resolution; and
- Any necessary approvals.

No person will initiate corrective action without prior communication of findings through the proper channels.

B.5 Sample Preparation for Chemical & Biological Tests

Station homogenates will be prepared initially in the field by mixing the sediment within each bucket with large pre-cleaned stainless steel spoons as additional sediment is added.

Stations will be re-homogenized at the bioassay laboratory (ESI) before sample pooling commences by mixing the full volume collected from each station in a large 40-L high density polyethylene (HDPE) plastic bin. These same bins will be used to mix the station composites, one bin per composite for storage between subsampling for the Elutriate/SPP samples and the 10-day bioassay.

Composites will be prepared by mixing **equal volumes** from each station to form the final composite sample (see **Table A-1** for compositing scheme). Field sample container and storage requirements are detailed on **Table A-7**.

Tools used in sample transfer and mixing will be either stainless steel or Teflon pre-cleaned using the Level III decontamination procedure detailed in SOP ES-G-03 (Appendix A). Composite labeling will be as specified in **Table A-1** and **Table A-2**. Materials will be retained (refrigerated) until NAE accepts/approves the final project report.

B.6 Analytical Procedures– Chemical Parameters (Task 5)

B.6.1 Bulk Sediment Chemistry

Bulk sediment samples will be analyzed by sediment chemical methods (Task 5, Alpha). **Table B-3** details the methods and Reporting Limits (RLs) established as DQOs (equivalent to RIM requirements) to meet project objectives.

Total Organic Carbon (TOC) will be analyzed as detailed in Alpha SOP 17452 Total Organic Carbon and Soot in Soil, Sediment (Revision 1, July 2015). All samples will be analyzed in duplicate. Results will be reported on a dry-weight basis.

Trace Organic Parameters as PAHs, PCB Congeners and pesticides will be analyzed following Alpha SOPs 2157, Analysis of Polynuclear Aromatic Hydrocarbons and PCB Congeners by Gas Chromatography/Mass Spectrometry with Selected Ion Monitoring (Revision 14, September 2017) and 2158, Determination of Organochlorine Pesticides By Gas Chromatography/Electron Capture Detection (GC/ECD) (Revision 14, May 2018). Samples are extracted three times using appropriate solvent. Extracts

are combined, dried over sodium sulfate, and evaporatively concentrated. Concentrated extracts may require cleanup before analysis. Cleanup procedures may include copper, silica gel, florisil, sulfuric acid or other appropriate cleanup techniques.

Target compound identification will be based on dual- column analysis for GC analyses or reference mass spectral identification for GC-MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using internal standards for both GC and GC-MS analyses.

All results will be reported in microgram per kilogram (µg/kg) dry weight.

Metals (arsenic, cadmium, chromium, copper, lead, nickel, and zinc) will be analyzed following procedures in Alpha SOP 2137, Inductively Coupled Plasma-Mass Spectrometry (Revision 15, January 2018). Sample preparation will be conducted according to the SOP An aliquot of digestate will be nebulized into a spray chamber where a stream of argon carries the sample aerosol through a quartz torch and injects it into the radio frequency inductively coupled plasma. The ions produced in the plasma are introduced to the mass spectrometer for quantification against a single point initial calibration. All results are reported in milligrams per kilogram (mg/kg) dry weight.

Mercury will be analyzed following procedures in Alpha SOP2143, Mercury Determination in Tissue and Soil/Sediment Samples by Cold Vapor Atomic Fluorescence Technique (CVAF) (Revision 8, July 2015) Sediment samples (approximately 1 g) will be digested by hot plate in an aqua regia acid solution. An aliquot of the digest will then be prepared with HCL/BrCl and hydroxylamine hydrochloride solution. Mercury in the digested sample is reduced to elemental mercury, aerated from solution and introduced into the spectrophotometer. The emission is measured and compared to a multi-level initial calibration for quantification. All results will be reported in mg/kg dry weight.

B.6.2 Elutriate/ SPP Preparation & Aqueous Analytical Procedures (Tasks 6 and 7)

The preparation of elutriate and SPP samples will utilize the sediment composites prepared as detailed above. Elutriate and other (i.e., equipment blanks and CLDS Reference Site water) aqueous samples will be analyzed for trace metals, PAHs (equipment blank only), PCBs/pesticides and pentachlorophenol (not in CLDS water equipment blanks). The samples will be prepared in glass containers. The elutriate/SPP preparation must commence no later than 14 days after seawater collection. Elutriate and SPP samples will be prepared concurrently and used within 24 hours of preparation.

The elutriate samples are prepared by placing one volume of test sediment and four volumes of dredging site water (i.e. harbor water) from the appropriate site in an eight-gallon glass container and mixing vigorously with a magnetic stir bar. Additionally, the sediment/water mixture will be hand stirred at approximately 10 minute intervals during the mixing period. At the end of the 30-minute period, the sediment/water mixture will be allowed to settle for one hour and the supernatant (elutriate) siphoned off for testing. Sufficient sediment and seawater volumes are used to prepare samples for chemical analysis of the elutriate and creation of SPP bioassay sample dilutions. If required, the SPP portion may be centrifuged (only enough to clear the water so organisms can be seen) to facilitate biological observations.

The elutriate samples will be prepared in **triplicate** for the analyses of PCBs/pesticides, pentachlorophenol, and trace metals. Elutriate samples will be centrifuged at ESI, split for metals and organic analysis, and then containerized. Elutriate blanks are defined for this project as the site water (used to prepare elutriates) that are run through the entire elutriate preparation process for background correction purposes.

Table B-4 details the list of target elutriate analytes, corresponding analytical method references, and target detection limits for the aqueous project samples.

Trace Organic Parameter elutriate and elutriate blank samples will be centrifuged at Alpha and analyzed at Alpha. Rinsate blank samples will be transferred to Alpha directly from the field. PAH (sediment equipment

blank), pentachlorophenol, PCB Congeners and pesticides will be analyzed following the Alpha SOPs 2155 (Revision 20, 11/29/17) Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), 2157 (Revision 14, 9/28/17) Analysis of Polynuclear Aromatic Hydrocarbons and PCB Congeners by Gas Chromatography/Mass Spectrometry with Selected Ion Monitoring and 2158 (Revision 14, 5/23/18) Determination of Organochlorine Pesticides by Gas Chromatography/Electron Capture Detection (GC/ECD). Water samples will be extracted according to Alpha SOP (Revision 14, 1/15/16) Extraction of Water Samples by Separatoty Funnel.

Samples are extracted three times using appropriate solvent. Extracts are combined, dried over sodium sulfate, and evaporatively concentrated. Concentrated extracts may require cleanup before analysis. Cleanup procedures may include copper, silica gel, florisil, sulfuric acid or other appropriate cleanup techniques.

Target compound identification will be based on dual- column analysis for GC analyses or reference mass spectral identification for GC/MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using external standards for GC analyses and internal standards for GC/MS analyses.

All results will be reported in microgram per liter (µg/L) units.

Metals elutriate and elutriate blank samples will be prepared by ESI and analyzed at Alpha Analytical. The reference site water samples will be transferred to ESI directly from the field. Elutriate and elutriate blank samples will be analyzed for ten metals: arsenic, cadmium, hexavalent chromium, copper, nickel, lead, silver, selenium, zinc, and mercury.

Mercury will be analyzed following procedures in Alpha SOP 2142 (Revision 8, 1/21/16), Mercury Determination in Aqueous Samples by Cold Vapor Atomic Fluorescence Technique (CVAF). Water samples will be digested in an acidic, oxidizing solution consisting of sulfuric acid, nitric acid, potassium permanganate and potassium persulfate and heated in a block digester at 90-95C for two hours to convert all forms of mercury to inorganic mercury. The CVAA technique is based on the absorption of radiation at 253.7-nm by mercury vapor. Mercury is reduced with stannous chloride to elemental mercury. The elemental mercury is aerated as mercury vapor from the digestate in a closed system where the vapor passes through a cell positioned in the light path of an atomic absorption spectrometer. The absorbance is measured as a function of mercury concentration bases on the peak height measured.
Arsenic, cadmium, copper, nickel, lead, selenium, silver, and zinc will be extracted from seawater according to Alpha SOP 2152 (Revision 3, 7/22/15) Seawater Extraction Procedure for Trace Metals and/or simply digested according to SOP 18716 (Revision 2, 7/27/16) Hot Block Digestion For Aqueous Samples; and analyzed according to Alpha SOP 2137 (Revision 15, 1/24/18) Inductively Couples Plasma-Mass Spectrometry 6020.

Hexavalent chromium will be analyzed according to Alpha SOP 2204 (Revision 7, 3/28/16) Hexavalent Chromium.

All metals results will be reported in mg/L units.

B.6.3 Tissue Analytical Procedures (Task 10)

Although the 28-day bioaccumulation testing will be performed on all composite group sediment samples, chemical analyses will only be performed on tissue samples for those sediments that pass the 10-day whole sediment acute toxicity test. **Table B-5** lists the potential parameters that may be analyzed in the bioaccumulative tissue samples. If selected parameters are not detected in selected sediment composites, then those parameters may be omitted from tissue testing with NAE approval.

Trace organic tissue parameters as PAHs, PCB Congeners and Pesticides will be analyzed after preparation following Alpha SOPs 2157 (Revision 14, September 2017) Analysis of Polynuclear Aromatic

Hydrocarbons and PCB Congeners by Gas Chromatography/Mass Spectrometry with Selected Ion Monitoring and 2158, Determination of Organochlorine Pesticides By Gas Chromatography/Electron Capture Detection (GC/ECD) (Revision 14, May 2018). Samples are extracted three times using appropriate solvent. Extracts are combined, dried over sodium sulfate, and evaporatively concentrated. Concentrated extracts may require cleanup before analysis. Cleanup procedures may include copper, silica gel, florisil, sulfuric acid or other appropriate cleanup techniques.

Target compound identification will be based on dual- column analysis for GC analyses or reference mass spectral identification for GC-MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using internal standards for both GC and GC-MS analyses.

Quantitation will be based on response factors determined from an initial 5 point calibration using external standards for GC analyses and internal standards for GC-MS analyses.

All tissue results will be reported in nanograms per gram (ng/g) on a wet weight basis.

Lipid Content in tissue samples will be determined according to NOAA Tech Memo 130, 1998. An aliquot of tissue is weighed in a tared glass vial and the lipid content of the sample is extracted using a specific ratio of solvent to water. The sample is serially extracted three times. The organic layer is removed and dried over sodium sulfate. The extract is evaporated to dryness, leaving the lipid content. Amount of residue is determined gravimetrically.

The results will be reported in % wet tissue.

Metals tissue samples will be processed according to Alpha SOP 2137 (Revision 15,January 2018) Inductively Coupled Plasma-Mass Spectrometry.

For metals other than mercury, an aliquot of the digestate will be analyzed following procedures in Alpha SOP 2137. By this procedure, the digestion solution is nebulized into a spray chamber where a stream of argon carries the sample aerosol through a quartz torch and injects it into the radio frequency inductively coupled plasma. The ions produced in the plasma will be introduced to the mass spectrometer for quantification against a single point initial calibration.

Mercury will be analyzed following procedures in Alpha SOP 2143 (Revision 8, July 2015) Mercury Determination in Tissue and Soil/Sediment Samples by Cold Vapor Atomic Fluorescence Technique. An aliquot of the digest is prepared with HCL/BrCl and hydroxylamine hydrochloride solution. Mercury in the digested sample will be reduced to elemental mercury, aerated from solution and introduced into the fluorescence detector. The fluorescence will be measured and compared to a multi-level initial calibration for quantification.

All metals results will be reported in micrograms per gram (µg/g) on a wet weight basis.

B.6.4 Preventive Maintenance

Routine testing and preventive maintenance is performed by the laboratory as part of their QA program. Details on the type of checks, frequencies, and corrective actions associated with the project measurements are included in the accompanying laboratory QA manuals.

B.6.5 Calibration Procedures & Frequency

Specific laboratory method calibration procedures and frequency requirements are detailed in NAE QC summary tables, referenced in the RIM (EPA/ USACE, 2004) and included in Appendix B.

Calibration procedures for laboratory instruments will consist of initial calibrations, initial calibration verifications, and continuing calibration verification. The SOP for each analysis performed in the laboratory describes the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. This information is summarized in the laboratory QA Manuals.

The laboratory maintains documentation for each instrument which includes the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions, and the samples associated with these calibrations.

Inspection/ Acceptance of Supplies and Consumables
The laboratory system of inspection and acceptance of supplies and consumable is documented in the laboratory QA Manuals.

Supplies and consumables not meeting acceptance criteria will initiate the appropriate corrective action. Corrective measures may include repair or replacement of measurement equipment, and/or notification of vendor and subsequent replacement of defective or inappropriate materials. All actions will be documented in the project files.

B.6.6 Laboratory QC Procedures

Each batch of twenty or fewer sediment samples analyzed for organic contaminants (PCB/ pesticides and PAHs) and metals will be prepared with a routine set of QC samples, including one method blank, one laboratory control sample, one matrix spike, one matrix spike duplicate, one sample duplicate, and one sediment standard reference material sample. For total organic carbon analysis, one sediment standard reference material sample will be prepared with each batch of sediment samples.

Each batch of twenty aqueous samples analyzed for organic contaminants and metals will be prepared with a set of QC samples as specified in the RIM. For organic contaminant analysis, QC samples will include one method blank, one laboratory control sample, one matrix spike, and one matrix spike duplicate. For metals analyses, QC samples will include one method blank, one laboratory control sample, one matrix spike and one matrix spike duplicate.

Each batch of twenty or fewer tissue samples analyzed for organic contaminants (PCB/ pesticides and PAHs) and metals will be prepared with a routine set of QC samples, including one method blank, one laboratory control sample, one matrix spike, one matrix spike duplicate, one sample duplicate, and one tissue standard reference material sample. For lipid content analysis, one sample duplicate will be prepared with each batch of tissue samples.

B.6.7 Performance and System Audits

The sediment analytical program includes analysis of Standard Reference Materials (SRMs), which provide an excellent way to audit the performance of laboratory procedures for sample preparation and analysis. Field and/or laboratory system audits may be performed at the discretion of the NAE TM to ensure project personnel are performing project related tasks according to the project specific Work Plan and associated field and laboratory SOPs.

Field Audit
As detailed in Section A.9 of the FSP, the AECOM Field Services Task Leader will be responsible for ensuring that the approved procedures documented in the Work Plan (FSP and QAPP) are being followed. The Task Leader will review field sampling records, field measurement results, and field instrument operating and calibration records. The Field Services Task Leader will also be responsible for monitoring procedures for sample collection, handling, and packaging procedures, QA procedures, chain-of-custody, and sample documentation, etc.

If significant deficiencies are noted in procedures outlined in the QAPP, corrective action will be implemented as discussed in Section B.6.6.

Laboratory Audit
Laboratory audits are conducted periodically by AECOM as part of their analytical subcontractor monitoring program. A typical systems audit includes review of the following areas:

- QA organization and procedures,
- Personnel training and qualifications,
- Sample log-in procedures,
- Sample storage facilities,
- Analyst technique
- Adherence to laboratory SOPs and project Work Plan,
- Compliance with QA/QC objectives,
- Instrument calibration and maintenance,
- Data recording, reduction, review, and reporting, and
- Cleanliness and housekeeping.

Preliminary results of the audit are discussed with the Laboratory Manager, Laboratory Project Manager, and Laboratory QA Coordinator. A written report that summarizes audit findings and recommends corrective actions is prepared and submitted to the Laboratory Manager for response, and to the AECOM Project Manager.

Data Package Audits
Audits of analytical data packages will be conducted for 100% of the packages received as part of the data validation process (Section B.11). The review will include an evaluation of the package to ensure that (1) all required deliverables are provided, (2) the package contains the information necessary to reproduce the reported results, and (3) the QC acceptance criteria specified in the Work Plan were met. Any deficiencies will be communicated to the laboratory and documented in the project files.

Audit Samples
Audit samples will be incorporated into the program as discussed in the Laboratory QC Procedures section above. Results for the audit/SRM samples will be reviewed by the Chemistry / Laboratory Coordinator and compared to the acceptable limits provided by the vendor. Failure to meet the acceptance criteria will result in the review of the results and supporting data by the laboratory to identify the cause of the failure. Depending on the outcome of this review, subsequent corrective actions may include the following:

- Qualification/flagging of affected data,
- Discarding affected data and re-analysis, or
- Discarding affected data, re-sampling, and re-analysis.

B.6.8 Nonconformance & Corrective Actions

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter Work Plan specification nonconformance, unacceptable procedures, or out-of-limit QC performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. All corrective action proposed and implemented will be documented as detailed in Section B.13 - Reports.

Corrective action should only be implemented after approval by the AECOM Task Order Manager, or his designee. Field related corrective action is discussed in Section A.10 of the FSP.

Laboratory Corrective Action
Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, multiple phases, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or analysis. Following consultation with laboratory analysts and supervisory personnel, it may be necessary for the Laboratory QA Coordinator to approve the implementation of corrective action. If the nonconformance causes project objectives not to be achieved, the AECOM Task Order Manager will be notified.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and in the narrative data report sent from the laboratory to the AECOM Laboratory Coordinator and the AECOM Task Order Manager. If the corrective action does not rectify the situation, the laboratory will contact the AECOM Task Order Manager who, in concert with the AECOM Laboratory Coordinator and NAE's TM, will determine the action to be taken and inform the appropriate personnel.

Chemical Measurements
The need for corrective action may be identified during either data validation or data assessment. Potential types of corrective action may include resampling by the field team or reinjection/reanalysis of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team and whether the data to be collected is necessary to meet the required QA objectives. If the AECOM Laboratory identifies a corrective action situation, the AECOM Task Order Manager will be responsible for informing the appropriate personnel.

B.6.9 Corrective Action Reports to Management

QA reports will be submitted to the AECOM Task Order Manager to ensure that any problems identified during the sampling and analysis programs are investigated and the proper corrective measures taken in response. The QA reports will include:

- All results of field and laboratory audits,
- Problems noted during data validation and assessment, and
- Significant QA/QC problems, recommended corrective actions, and the outcome of corrective actions.

QA reports will be prepared by the AECOM Project QA Officer and submitted on an as-needed basis.

B.7 Analytical Procedures – Bioassays (Tasks 7, 7.1 & 8)

All toxicity testing will be conducted following protocol guidance presented in NAE's RIM (EPA/USACE, 2004) and in the Inland Testing Manual (EPA/USACE, 1998).

B.7.1 SPP Bioassays (Task 7)

SPP toxicity tests will commence no later than 24 hours after the SPP is prepared. SPP from all six of the composites will be tested at 100%, 50%, 10%, and 0% concentrations, using the CLDS Reference Site water as the dilution water. In addition, a 1% concentration may be run. Three species, *M. beryllina*, *A. bahia*, and *A. punctulata*, will be exposed to the SPP dilution series, reference site water, as well as a clean seawater control (i.e., laboratory control). All SPP tests will be conducted static, with aeration provided if dissolved oxygen falls below 40% saturation (~4 milligrams per liter [mg/L] at 20ºC and 30 parts-per-thousand salinity). The *M. beryllina* and *A. bahia* tests are 96-hour duration; the *A. punctulata* larval development test is 48-72-hour duration. A reference toxicant test of the same duration, using ammonia in clean seawater, will be performed with each SPP test species on a regular basis by the laboratory. Specific test conditions for the SPP tests are provided in **Table B-7**.

To account for the potential for ammonia toxicity to adversely impact the SPP results, total ammonia in the undiluted elutriate samples will be measured prior to test initiation and the un-ionized ammonia concentration will be calculated based on additional measurements of pH, temperature, and salinity. If the calculated un-ionized ammonia concentrations are greater than the applicable WQC (or approximately 0.23 mg/L un-ionized ammonia[3]), the NAE will be notified within 24 hours. NAE will then provide guidance on whether to implement project-specific procedures for the preparation of additional elutriate samples treated to reduce ammonia levels and conduct additional SPP toxicity testing (see optional Task 6.1 described in Section B.7.2).

If un-ionized ammonia concentrations in the undiluted elutriate samples exceed 0.1 mg/L, then total ammonia concentrations (and calculated un-ionized ammonia concentrations) will be measured in all elutriate dilutions at the start and end of each test. If complete mortality is observed prior to the full test duration, then total ammonia (and calculated un-ionized ammonia) will be measured when the test is ended.

B.7.2 SPP Bioassays with Ammonia Reduction (Task 7.1, Optional)

The test organisms used in SPP toxicity testing are sensitive to ammonia, and excessive ammonia concentrations may cause a toxic response in the toxicity tests that is not related to other chemical contaminants present in the elutriate. Therefore, if elevated ammonia levels are identified in the undiluted elutriate samples (as described in Section B.7.1), then an ammonia reduction protocol may be implemented (at the discretion of NAE) to generate a second elutriate and to repeat SPP testing (elutriate chemistry sampling will not be repeated) for one or more composites.

When ammonia concentrations are determined to be at potentially toxic levels (as described in Section B.7.1) and NAE has provided approval, an ammonia reduction procedure (referred to as the Ferretti Ammonia Reduction Procedure; Ferretti et al., 2001) will be run to reduce the levels of ammonia in test sediments to nontoxic levels before the sediments are used to prepare the elutriate samples for the SPP tests. A thin layer of the test sediment is placed in a plastic tray and clean seawater (4 times the sediment volume) is slowly added over the top of the sediment. The tray is aerated and renewed with clean seawater once daily, being careful not to disturb the sediment. Sediment porewater shall be monitored daily for ammonia and ESI will communicate daily with AECOM regarding the ammonia reduction progress. When the un-ionized ammonia in the porewater is less than 0.1 mg/L, aeration is stopped and the sediment is used to prepare the elutriate samples with site water to use in the SPP tests.

Total and un-ionized ammonia levels will be measured in all elutriate dilutions at the start and end of each test for the ammonia reduced elutriates. If complete mortality is observed prior to the full test duration, then total ammonia (and calculated un-ionized ammonia) will be measured when the test is ended. The ammonia monitoring records and all measurement made during the assays will be included in the SPP report.

The SPP tests conducted with elutriates prepared after the ammonia reduction procedure are conducted as described in Section B.7.1. Specific test conditions for the SPP tests are provided in **Table B-7**.

[3] In accordance with 10/15/18 discussion between NAE (R. Loyd) and AECOM (K. van Naerssen).

Table B-8 Suspended Particulate Phase Testing Conditions

Parameter	*Americamysis bahia*	*Menidia beryllina*	*Arbacia punctulata*
Treatments (SPP prepared from sediment composites and harbor water)*	6 Sample Composites and 1 CLDS Reference Site water	6 Sample Composites and 1 CLDS Reference Site water	6 Sample Composites and 1 CLDS Reference Site water
Replicates	5	5	5
Test population	1-5 days old	7-10 day with 24 hours variation	2 hours after fertilization
Temperature	Mean of 20 ± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	40% Saturation	40% Saturation	NA
pH	NA	NA	NA
Salinity	25 – 30 ‰ ±10%	25 – 30 ‰ ±10%	30-32‰
Ammonia	NA	NA	NA
Feeding	Daily, <24 hour old *Artemia nauplii*	Daily, <24 hour old *Artemia nauplii*	None
Reference Toxicant	Ammonia	Ammonia	Ammonia

*Study design also includes laboratory control.

B.7.3 10-day Whole Sediment Bioassay (Task 8)

The 10-day whole sediment toxicity testing will commence no later than six weeks after the sample collection date.

Whole sediment acute toxicity testing will be performed using the marine invertebrates *Leptocheirus plumulosus* and *A. bahia*. *L. plumulosus* and *A. bahia* will be exposed to all six sample composites plus the CLDS Reference Site sediment. A laboratory control will also be run with each test. Tests with each species will be 10-day static renewal exposures with mortality as the endpoint. Depending on the concentrations of ammonia in bulk sediment and/or overlying water, the test chambers may require purging to reduce ammonia below toxic levels prior to the addition of test organisms.

The acceptable porewater ammonia concentrations for *L. plumulosus* at test initiation is 60 mg/L total ammonia and 0.8 mg/L for un-ionized ammonia (EPA, 1994, 2001). These levels are higher than the levels recommended for amphipods in the RIM (20 mg/L total and 0.4 mg/L un-ionized) but are acceptable levels for *L. plumulosus*. The acceptable overlying water ammonia concentration for *A. bahia* is 0.6 mg/L as un-ionized ammonia. The Ferretti Ammonia Reduction Procedure (Ferretti et al., 2001) described in Section B.7.2 will be used to purge ammonia from the sediments, if needed. Overlying and porewater ammonia will be monitored each day during the purging period. Once acceptable porewater ammonia concentrations are reached, the 10-day whole sediment bioassay can begin. I t is anticipated that the ammonia purging procedures for the 10-day test whole sediment bioassay will be conducted concurrent with the Task 7.1 SPP assays, if the Task 7.1 option is executed. Sediments for the 10-day test whole sediment bioassay will be containerized and refrigerated at 4°C after they meet the acceptable porewater ammonia concentration for *L. plumulosus*. The ammonia reduced sediments will be added to test vessels and allowed to equilibrate with overlying water under test conditions for at least 24 hours prior to the addition of test organisms. Porewater and overlying ammonia will be measured at least 24 hours prior to the addition of test organisms to confirm that ammonia levels are at acceptable levels.

For both test species, organisms (20 per chamber) will be introduced to the test chambers once ammonia levels are within acceptable levels. Overlying water will be monitored on Days 0, 3, and 10 of the test, per the guidance in Appendix F of the Inland Testing Manual (Day 0, 10 monitoring) and NAE (intermediate Day 3 monitoring). Porewater ammonia will be monitored in the amphipod test on Day 0, 3 and 10 as well.

The static-renewal test conditions of one exchange per day should ensure that ammonia remains within acceptable range. However, if the Day 3 monitoring results show that ammonia was above the acceptable range, the static-renewal frequency will be increased to up to two exchanges per day. Other water quality parameters (temperature, pH, dissolved oxygen, and salinity) will be measured in all replicates at test initiation, in one replicate per day during the test, and again in all replicates at test termination.

Reference toxicant assays will be conducted by the laboratory on a regular basis for each test species. The bioassay tests will also include a 96-h, water-only, reference toxicant test using ammonia to assess the sensitivity of *L. plumulosus* and *A. bahia*. Specific test conditions for the whole sediment toxicity tests are provided in **Table B-8**.

Table B-9 10-day Whole Sediment Test Conditions

Parameter	*Leptocheirus plumulosus*	*Americamysis bahia*
Treatments*	6 Sample Composites and 1 CLDS Reference Site Control	6 Sample Composites and 1 CLDS Reference Site Control
Replicates	5	5
Test population	Sub-adult (3-5 mm)	1-5 days old
Temperature	Mean of 20± 1°C Maximum Deviation of 3°C	Mean of 20 ± 1°C Maximum Deviation of 3°C
Dissolved Oxygen	>40%Saturation	40% Saturation
pH	NA	NA
Salinity	20 – 30‰ ±10%	25 – 30‰ ±10%
Ammonia	Porewater un-ionized ammonia <0.8 mg/L	Overlying water un-ionized ammonia <0.6 mg/L
Feeding	None	Daily, <24 hour old *Artemia nauplii*
Reference Toxicant	Ammonia	Ammonia

*Study design also includes laboratory control.

B.7.4 28-day Bioaccumulation Bioassay (Task 8)

Project bioaccumulation tests will commence within six weeks of sample collection. Chemical analyses will only be performed on tissue samples for sediments that pass the 10-day whole sediment acute toxicity test. Bioaccumulation tests will be performed by ESI according to the NAE Regional Guidance (EPA/USACE 1998, 2004).

Macoma nasuta and *Nereis virens* will be exposed to the six sample composites, plus the CLDS Reference Site sediment, and native control sediments (i.e., negative laboratory control), for 28 days under flow-through conditions. *M. nasuta* and *N. virens* will be tested in separate 10-gallon aquaria, with five replicate aquaria per treatment. Twenty organisms will be introduced into each replicate aquaria[4].

Water quality parameters (temperature, dissolved oxygen, pH, and salinity) will be measured in all replicates at test initiation, in at least one replicate per treatment daily, and in all replicates at test termination. Flow rates into individual aquaria are measured daily and adjusted as necessary from Days 0 through 27 of the bioaccumulation test. If necessary, aeration will be provided to all test chambers to maintain dissolved oxygen >40% saturation.

[4] The PWS identified a minimum of 30 *M. nasuta* per replicate; however, the toxicity testing laboratory has indicated that sufficient test mass will be achieved with 20 organisms per replicate.

At the end of the 28-day testing period, *M. nasuta* and *N. virens* will depurate in clean seawater for 24 hours. Specific test conditions for the 28-day bioaccumulation test are provided in **Table B-9.**

Table B-10 28-Day Bioaccumulation Bioassay Test Conditions

Parameter	Macoma nasuta	Nereis virens
Treatments*	6 Sample Composites and 1 CLDS Reference Site Control	6 Sample Composites and 1 CLDS Reference Site Control
Replicates	5	5
Test population	Adult clam	Adult Polychaete; 3-15 grams
Temperature	Mean of 12 ±2°C Maximum Deviation of 3°C	Mean of 12 ± 2°C Maximum Deviation of 3°C
Dissolved Oxygen	>40% Saturation	>40% Saturation
pH	NA	NA
Salinity	25 – 30‰ ±10%	25 – 30‰ ±10%
Ammonia	NA	NA
Feeding	None	None
Reference Toxicant	NA	NA

*Study design also includes laboratory control.

B.7.5 Tissue Analysis (Task 10)

Following depuration, organism tissues will be homogenized, transferred into the appropriate chemistry jars for tissue chemistry analyses and stored frozen (<20°C) until analysis. Tissue sample container and storage requirements are detailed in **Table B-11** and Attachment 5.

Table B-4 Sample Container, Preservation, and Holding Time Requirements for Tissue Samples

Tissue Parameters	Mass (g)	Container	Preservation	Storage	Holding Time
Lipids	0	N/A – lipid content obtained from organic analysis			
Moisture	2-10	Glass	Freeze	-20°C	14 d (1yr if frozen)
Organic Chemistry (PAHs/PCBs/ Pesticides)	40	Glass	Freeze	-20°C	14 d or 1yr if frozen (extract)/ 40 d (analyze) when thawed
Metals Chemistry	10	Glass	Freeze	-20°C	28 d (Hg), 180 d or 1yr if frozen (other metals) when thawed

B.7.6 Preventive Maintenance

Routine testing and preventive maintenance of instrumentation needed to carry out bioassay test chamber monitoring is performed by the laboratory as part of their QA program. Details on the type of checks, frequencies, and corrective actions associated with the project measurements are included in the accompanying laboratory QA manuals.

B.7.7 Calibration Procedures & Frequency

Calibration of bioassay monitoring instrumentation will be guided by the procedures detailed in the laboratory QA manual.

Ammonia and pH measurement probes will be calibrated immediately before (daily) use and at the finish of (daily) monitoring activities. Thermometers and temperature recording devices will be checked daily and are calibrated annually against a calibrated NIST standard thermometer. Dissolved oxygen probes will also be checked before (daily) use.

B.7.8 Laboratory QC Procedures

All bioassays will include a negative control, and a water-only, reference toxicant test to assess the sensitivity of each test population. The reference toxicant assays will be conducted by the laboratory on a regular basis for each test species.

Additionally, the biological QC elements detailed in the NAE QC summary tables, referenced in the RIM (EPA/USACE, 2004) and included in Appendix B will be adhered to, including test species age/health, control abnormality and mortality acceptance criteria and test-specific acceptability requirements.

B.7.9 Performance and System Audits

Bioassay programs include the use of reference toxicants to audit the performance of bioassay laboratory procedures. Laboratory system audits may be performed at the discretion of the NAE TM to ensure project personnel are performing project related tasks according to the project specific Work Plan and associated field and laboratory SOPs.

Laboratory Audit
ESI laboratory audits are conducted periodically by AECOM as part of their analytical subcontractor monitoring program. A typical systems audit includes review of the following areas:

- QA organization and procedures,
- Personnel training and qualifications,
- Sample log-in procedures,
- Sample storage facilities,
- Analyst technique
- Adherence to laboratory SOPs and project Work Plan,
- Compliance with QA/QC objectives,
- Equipment calibration and maintenance,
- Data recording, reduction, review, and reporting, and
- Cleanliness and housekeeping.

Preliminary results of the audit are discussed with the Laboratory Manager, Laboratory Project Manager, and Laboratory QA Coordinator. A written report that summarizes audit findings and recommends corrective actions is prepared and submitted to the Laboratory Manager for response, and to the AECOM Project Manager.

Data Package Audits
Audits of bioassay reports will be conducted for 100% of the packages received as part of the data review process. The review will include an evaluation of the package to ensure that (1) all required deliverables are provided, (2) the package contains the information necessary to reproduce the reported results, and (3) the

QC acceptance criteria specified in the Work Plan were met. Any deficiencies will be communicated to the laboratory and documented in the project files.

Audit Samples
Audit samples will be incorporated into the program as discussed in the Laboratory QC Procedures section above. Reference toxicant results will be reviewed by the Biology/Bioassay Laboratory Coordinator and compared to the acceptable limits provided by the vendor. Failure to meet the acceptance criteria will result in the review of the results and supporting data by the laboratory to identify the cause of the failure. Depending on the outcome of this review, subsequent corrective actions may include the following:

- Qualification/flagging of affected data,
- Discarding affected data and re-analysis, or
- Discarding affected data, re-sampling, and re-analysis.

B.7.10 Nonconformance & Corrective Actions

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter Work Plan specification nonconformance, unacceptable procedures, or out-of-limit QC performance that can affect data quality. All corrective action proposed and implemented will be documented as detailed in Section B.13 Reports.

Corrective action should only be implemented after approval by the AECOM Task Order Manager, or her designee.

Biological Laboratory Corrective Action
Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as low/high water quality readings may be identified. Following consultation with laboratory personnel, it may be necessary for the Laboratory QA Coordinator to approve the implementation of corrective action. If the nonconformance causes project objectives not to be achieved, the AECOM Task Order Manager will be notified.

These corrective actions are performed prior to release of the reports from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and in the narrative report sent from the laboratory to the AECOM Biology/Bioassay Laboratory Coordinator and the AECOM Task Order Manager. If the corrective action does not rectify the situation, the laboratory will contact the AECOM Task Order manager who, in concert with the AECOM Biology/Bioassay Laboratory Coordinator and NAE's TM, will determine the action to be taken and inform the appropriate personnel.

B.8 Data Reduction/ Calculation of Data Quality Indicators

In addition to measurement sensitivity discussed previously, data usability will depend on the measurement accuracy and precision, as indicated by the corresponding accuracy and precision QC samples (i.e., method & equipment blanks, matrix spike samples, laboratory control samples (LCSs), standard reference materials (SRMs), and replicates). The field and laboratory data collected during this investigation will be used to achieve the objectives identified in this QAPP. The QC results associated with each analytical parameter for each matrix will be compared to the measurement objectives presented herein.

This section details the calculation of these DQIs.

B.8.1 Accuracy Assessment

One measure of accuracy will be R, which is calculated for matrix spikes, surrogates, LCSs, and SRMs. Percent recoveries for matrix spike results will be determined according to the following equation:

$$\%R = \frac{(Amount\ in\ Spiked\ Sample - Amount\ in\ Sample)}{Known\ Amount\ Added} x\,100$$

Percent recoveries for LCS, SRM, and surrogate compound results will be determined according to the following equation:

$$\%R = \frac{Experimental\ Concentration}{Known\ Amount\ Added} x\,100$$

An additional measure of accuracy is blank contamination. The blanks associated with this project include laboratory method blanks and equipment rinsate blanks. The results of the laboratory and field blanks will be compared to the objectives in stated Section B.3.2 of the QAPP. Failure to meet these objectives may indicate a systematic laboratory or field problem that should be investigated and resolved immediately. Associated data may have limitations placed on its use, depending on the magnitude of the problem.

B.8.2 Precision Assessment

The RPD between sample replicates is calculated to compare to precision objectives. The RPD will be calculated according to the following formula.

$$RPD = \frac{(Amount\ in\ Sample\ 1 - Amount\ in\ Sample\ 2)}{0.5\,(Amount\ in\ Sample\ 1 + Amount\ in\ Sample\ 2)} x\,100$$

Failure to achieve precision objectives may result in the associated data having limitations placed upon its use.

Completeness Assessment
Completeness is the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$Completeness = \frac{(number\ of\ valid\ measurements)}{(number\ of\ measurements\ planned)} x\,100$$

Failure to meet the completeness objective will require an assessment to determine if the missing or invalid data are critical to achieving the project objectives. Corrective actions may include re-sampling or re-analysis, depending on the type of problem, logistical constraints, etc.

B.8.3 Comparison to Project Objectives

In addition, the data obtained will be both qualitatively and quantitatively assessed on a project-wide, matrix-specific, and parameter-specific basis. Factors to be considered in this assessment of field and laboratory data will include, but not necessarily be limited to, the following:

- Conformance to the field methodologies proposed in the FSP and QAPP,
- Conformance to the analytical methodologies provided in the QAPP,
- Adherence to proposed sampling strategy,

- Presence of elevated detection limits due to matrix interferences or contaminants present at high concentrations,
- Unusable data sets based on the data review results,
- Data sets identified as usable for limited purposes based on the data review results,
- Status of all issues requiring corrective action, as presented in the QA reports to management,
- Effect of nonconformance (procedures or requirements) on project objectives,
- Adequacy of the data as a whole in meeting the project objectives, and
- Identification of any remaining data gaps and need to reevaluate project decision rules.

This assessment will be performed by the technical team, in conjunction with the Project QA Officer, and the results presented in the final report.

B.9 Laboratory Operations Documentation

Laboratory data reduction procedures will be performed according to the following protocol. All information related to analysis will be documented in controlled laboratory logbooks, instrument printouts, or other approved forms. All entries that are not generated by an automated data system will be made neatly and legibly in permanent, waterproof ink.

Information will not be erased or obliterated. Corrections will be made by drawing a single line through the error and entering the correct information adjacent to the cross-out. All changes will be initialed, dated, and, if appropriate, accompanied by a brief explanation. Unused pages or portions of pages will be crossed out to prevent future data entry. Analytical laboratory records will be reviewed by the supervisory personnel on a regular basis, and by the Laboratory QA Coordinator periodically, to verify adherence to documentation requirements.

Data and report deliverables will be provided within the turnaround time specified in **Table A-3** of the FSP. The laboratory will provide at least one report in a printed document format (PDF) and one EDD to the Chemistry Coordinator. Upon approval of this Work Plan, the required format of the EDD will be provided (per the RIM). The hard copy data package will include the information summarized below:

- Case narrative (see description below);
- Cross reference of field sample IDs and laboratory IDs;
- Method summary;
- COC documentation;
- Dates of sample extraction and analysis;
- Description of any data qualifiers used;
- Sample results, including units;
- Sample preparation information;
- Results for MS/MSDs, method or preparation/calibration blanks, LCSs, surrogate spikes, and laboratory duplicates; and
- Matrix-specific method detection limits (MDLs) and reporting limits (RLs).

The case narrative will include the client name, project name and number, date of issuance, and a discussion of any deviations from analytical strategy, technical problems, and QC failures or non-conformances. The report will be signed by the Laboratory Project Manager.

All laboratory reports will be maintained on the project website (along with all project related/generated information) with access only to designated AECOM and NAE personnel for a minimum period of five years.

B.10 Data Assessment Procedures

All data generated through field activities or through the analytical program will be reviewed prior to reporting. No data will be disseminated by AECOM until it has been subjected to the procedures summarized below.

B.10.1 Internal Laboratory Review

Prior to the release of any data from the laboratories, the data will be reviewed and approved by laboratory personnel. The review will consist of a tiered approach that will include reviews by the person performing the work, by a qualified peer, and by supervisory and/or QA personnel.

B.10.2 Validation of Analytical Data

Validation of the laboratory deliverables will be performed by AECOM. The laboratory data will be reviewed for the following, as appropriate to the method:

- Completeness of deliverable;
- Technical holding times;
- Laboratory and field blank contamination;
- Surrogate spike recoveries;
- MS/MSD recoveries and RPDs;
- Laboratory duplicate RPDs;
- LCS recoveries; and
- Field duplicate.

The evaluation will consist of a review of the data package narrative and QC result. If data are considered usable, no data qualification will occur. In the event that serious deficiencies in data quality are noted, the data may be rejected and considered unusable.

B.11 Verification and Validation Methods

B.11.1 Field Data Verification

Field records will be reviewed by the Field Services Task Leader to ensure that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good recordkeeping practices, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the FSP and QAPP, and that any deviations were documented and approved by the appropriate personnel.

B.11.2 Laboratory Data Verification

Prior to being released as final, laboratory data will proceed through a tiered review process. Data verification starts with the analyst who performs a 100% review of the data to ensure the work was done correctly the first time. The data reduction and initial verification process must ensure that:

- Sample preparation and analysis information is correct and complete,
- Analytical results are correct and complete,
- The appropriate SOPs have been followed and are identified in the project records,
- Proper documentation procedures have been followed, and
- All non-conformances have been documented.

Following the completion of the initial verification by the analyst performing the data reduction, a systematic check of the data will be performed by an experienced peer or supervisor. This check will be performed to ensure that initial review has been completed correctly and thoroughly and will include a review of

- Adherence to the requested analytical method SOP;
- Correct interpretation of chromatograms, mass spectra, etc.;
- Correctness of numerical input when computer programs are used (checked randomly);
- Correct identification and quantitation of constituents with appropriate qualifiers;
- Numerical correctness of calculations and formulas (checked randomly);
- Acceptability of QC data;
- Documentation that instruments were operating according to method specifications (calibrations, performance checks, etc.);
- Documentation of dilution factors, standard concentrations, etc.; and
- Sample holding time assessment.

A third-level review will be performed by the Laboratory Project Manager before results are submitted to clients. This review serves to verify the completeness of the data report and to ensure that project requirements are met for the analyses performed. A narrative to accompany the final report will be prepared by the Laboratory Project Manager.

B.11.3 Validation of Laboratory Deliverables

Data will be reviewed as described in Sections B.11 of the QAPP. Upon completion of the validation, a brief report will be prepared discussing the acceptability of the data.

B.11.4 Verification during Data Management

All manually entered data (e.g., field data) will be proofed 100% against the original. Electronic data will be checked 100% after loading against laboratory data sheets for completeness and spot checked for accuracy.

B.12 Reconciliation with User Requirements

The field and laboratory data collected during this investigation will be used to achieve the objectives identified in this QAPP. The QC results associated with each analytical parameter for each matrix will be compared to the measurement objectives presented in this QAPP.

B.13 Reports

In addition to any potential audit and/or corrective action reports, several progress reports are scheduled to be delivered prior to submission of the project draft and final reports. The scheduled reports are as follows:

Bulk Sediment Chemistry Progress Report
A written progress report will be provided immediately upon the receipt of laboratory results (anticipated within four weeks of the start analyses) to properly inform the decision-making process. Chemistry data will be provided in the NAE EDD spreadsheet format. A completeness checklist and Quality Control Summary sheets as prescribed in the RIM will be filled out and submitted with the progress report for all data reported.

Elutriate Chemistry Progress Report
A written progress report will be provided within five weeks of the start of elutriate preparation to properly inform the decision-making process. Chemistry data will be provided in the NAE EDD spreadsheet format. A completeness checklist and Quality Control Summary sheets as prescribed in the RIM will be filled out and submitted with the progress report for all data reported.

SPP Toxicity Test Progress Report
A written progress report, without statistical analysis, will be provided within one week from the SPP test completion. If the ammonia reduction SPP test option is implemented (Task 6.1), then those results will be included in the progress report, which will be provided within one week of Task 6.1 test completion. The report will include summaries of all procedures and present tabulated data for each test series and organism analyzed.

Statistical analysis will be performed upon approval from NAE of the written progress report. Statistical analyses will be performed following Appendix D2 of the Inland Testing Manual (EPA/USACE, 1998). In addition to the written report all data will be submitted in electronic transmittable spreadsheets.

Whole Sediment Acute Toxicity Test Progress Report
A written progress report for toxicity and bioassay testing, without statistical analysis, will be provided within two weeks from test initiation. The report will include summaries of all procedures and present tabulated data for each test series and organism analyzed.

Statistical analysis will be performed upon approval from NAE of the written progress report. Statistical analyses will be performed following Appendix D2 of the Inland Testing Manual. In addition to the written report all data will be submitted in electronic transmittable spreadsheets.

28-day Bioaccumulation Bioassay Progress Report
A written progress report for toxicity and bioassay testing, without statistical analysis, will be provided within eight weeks from test initiation. The report will include summaries of all procedures and present tabulated data for each test series and organism analyzed. In addition to the written report all data will be submitted in electronic transmittable spreadsheets.

Tissue Analysis Progress Report
A written progress report, without statistical analysis, will be provided within six weeks from the start of the task. Chemistry data will be reported in approved EDD spreadsheet formats (once the Work Plan is approved). A completeness checklist and Quality Control Summary sheets as prescribed in the RIM will be filled out and submitted with the progress report for all data reported.

Draft and Final Reports
A draft report will be prepared to allow NAE an opportunity to review and comment on the document before finalizing. In each case, the draft and final reports will be transmitted to NAE within the established schedule (FSP **Table A-3**) containing the following elements:

- Cover sheet, which includes contract number, statement of data authenticity, and official signature of release.
- Table of contents.

- Case narrative which shall include analytical methods used, field sample and laboratory number correlations, data qualifier definitions, and deviations from established QA/QC procedures with associated corrective action.
- Summary tables of chemical analyses and biological tests.
- Complete field report, which includes sampling procedures and any problems or deviations from the Work Plan encountered.
- Biological testing results (toxicity).
- Sample documentation which includes original Chain of Custody record, shipping documents, and cooler receipt forms.
- QA/QC information which shall include method detection limits for each analyte, spike recoveries including surrogate recoveries, measures of precision, and all control limits for accuracy and precision. The QA/QC samples analyzed for each batch of samples (maximum of 20 samples to a batch) consist of:
  - Method blank.
  - Laboratory Control Sample (LCS).
  - Matrix Duplicate (using sample from project).
  - Matrix Spike/Matrix Spike Duplicate (using sample from project).
  - SRM (if available with analyte concentrations comparable to the project).
- The water chemistry and toxicity data will also be presented in an EDD according to http://www.nae.usace.army.mil/reg/rim.htm under Data Reporting Requirements/Sediment Evaluation/EDD.
- Completion of the Completeness Checklist Table II-1 located under Appendix II of the RIM (Appendix B).

Delivery dates for all reports are provided on **Table A-3**. Project reports, along with all relevant project records will also be maintained on AECOMs project files with for a minimum period of five years.

B.14 References

Ferretti, J.A. D.F. Calesso, and T.R. Hermon. 2000. Evaluation of Methods to Remove Ammonia Interference in Marine Sediment Toxicity Tests. Environmental Toxicology and Chemistry 19(8): 1935-1941.

United States Army Corps of Engineer New England District (NAE), 2018. Performance Work Statement. Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut. 25 July 2018 (Updated 11 October 2018).

United States Army Corps of Engineers. 2001. Requirements for the Preparation of sampling and Analysis Plans. Department of the Army Engineering and Design, Engineer Manual EM 200-1-3. February, 2001.

United States Army Corps of Engineers. 2014. Safety and health Requirements. Department of the Army, U.S. Army Corps of Engineers Washington, D.C. 20314-1000. Engineer Manual (EM) 385-1-1. November 2014.

United States Environmental Protection Agency/ United States Army Corps of Engineers. 1991. Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual. EPA-503/8-91/001.

United States Environmental Protection Agency/ United States Army Corps of Engineers. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual. Inland Testing Manual. EPA-823-B-98-004. February 1998.

United States Environmental Protection Agency/ United States Army Corps of Engineers. 2004. Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters. April, 2004.

United States Environmental Protection Agency. 1989. Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989. EPA 440/5-88-004. April 1989.

United States Environmental Protection Agency. 1994. Methods for Assessing the Toxicity of Sediment-associated Contaminants with Estuarine and Marine Amphipods. EPA 600/R-94/025. June 1994.

United States Environmental Protection Agency. 1995. QC/QC Guidance for Sampling and Analysis of Sediments, Water, and Tissues for Dredged Material Evaluations – Chemical Evaluations. EPA 823-B-95-001. Office of Water, Office of Science and Technology, Standards and Applied Science Division, Washington, DC.

United States Environmental Protection Agency. 1997. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846. Third Edition. May 1986, revised June 1997.

United States Environmental Protection Agency. 2001. Methods for Assessing the Chronic Toxicity of Marine and Estuarine Sediment-associated Contaminants with the Amphipod *Leptocheirus plumulosus*. EPA 600/R-01/020. March 2001.

United States Environmental Protection Agency. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. October 2002.

Attachment 1

Accident Prevention Plan

Provided under separate cover

Attachment 2

Grab Sampling Log

Sediment Grab Collection Record

AECOM

Location ID _____ **Date** _____ **Project #** _____

Sampler _____ **Contractor** _____ **Vessel** _____

Weather _____

Sampling Equipment _____ **Diameter** *in* _____

Target **Northing** _____ **Easting** _____ *NAD83 Stateplane Feet*

Grab Number _____ **Time** *24hr* _____ **Water Depth** *ft* _____ **# Attempts** _____

Actual **Northing** _____ **Easting** _____ **Distance from target** *ft* _____

Target **Penetration Depth** *ft* _____

Actual **Penetration Depth** *ft* _____

Recovered Length *ft* _____

Recovery % _____

Remarks _____

RPD *cm* _____ **Texture** *all* Clay Clay+Silt Silt Silt+Sand Sand Sand +Gravel Gravel

PID *ppm* _____ **H2S** *ppm* _____ **Color** Black Dark Gray Light Gray Brown Tan Green

Debris Yes No **Oil sheen** Yes No **Visible biology** Yes No

---

Grab Number _____ **Time** *24hr* _____ **Water Depth** *ft* _____ **# Attempts** _____

Actual **Northing** _____ **Easting** _____ **Distance from target** *ft* _____

Target **Penetration Depth** *ft* _____

Actual **Penetration Depth** *ft* _____

Recovered Length *ft* _____

Recovery % _____

Remarks _____

RPD *cm* _____ **Texture** *all* Clay Clay+Silt Silt Silt+Sand Sand Sand +Gravel Gravel

PID *ppm* _____ **H2S** *ppm* _____ **Color** Black Dark Gray Light Gray Brown Tan Green

Debris Yes No **Oil sheen** Yes No **Visible biology** Yes No

---

Grab Number _____ **Time** *24hr* _____ **Water Depth** *ft* _____ **# Attempts** _____

Actual **Northing** _____ **Easting** _____ **Distance from target** *ft* _____

Target **Penetration Depth** *ft* _____

Actual **Penetration Depth** *ft* _____

Recovered Length *ft* _____

Recovery % _____

Remarks _____

RPD *cm* _____ **Texture** *all* Clay Clay+Silt Silt Silt+Sand Sand Sand +Gravel Gravel

PID *ppm* _____ **H2S** *ppm* _____ **Color** Black Dark Gray Light Gray Brown Tan Green

Debris Yes No **Oil sheen** Yes No **Visible biology** Yes No

Attachment 3

Daily Activity Logs

AECOM

Daily Activity Log New Haven Harbor Supplemental Evaluations Reference Site Sampling and Sample Transport	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. W912WJ-18-F-0109
Date: _____	
Vessel/Sampling Platform:	
Personnel (Name/Affiliation/Role):	
Sampling Performed/Equipment Used:	
Stations Sampled:	
Health and Safety Issues:	
Deviations from Approved Plan:	
Dock Departure Time:	
Dock Return Time:	
Recorded by:	

Attachment 4

COC Form

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name:	Project Location:	
Project Number:	Field Logbook No.:	
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape Nos.:	
Signature:	Send Results/Report to:	TAT:

Analysis Requested

Container Type
P – Plastic
A – Amber Glass
G – Clear Glass
V – VOA Vial
O – Other
E – Encore

Preservation
1 – HCl, 4°
2 – H2SO4, 4°
3 – HNO3, 4°
4 – NaOH, 4°
5 – NaOH/ZnAc, 4°
6 – Na2S2O3, 4°
7 – 4°

Matrix Codes:
DW – Drinking Water
WW – Wastewater
GW – Groundwater
SW – Surface Water
ST – Storm Water
W – Water
S – Soil
SL – Sludge
SD – Sediment
SO – Solid
A – Air
L – Liquid
P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered											Lab I.D.	Remarks

Relinquished by: (Print Name)/(Affiliation)	Date:	Received by: (Print Name)/(Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Relinquished by: (Print Name)/(Affiliation)	Date:	Received by: (Print Name)/(Affiliation)	Date:
Signature:	Time:	Signature:	Time:
Relinquished by: (Print Name)/(Affiliation)	Date:	Received by: (Print Name)/(Affiliation)	Date:
Signature:	Time:	Signature:	Time:

Analytical Laboratory (Destination):

Sample Shipped Via:
UPS FedEx Courier Other

Temp blank
Yes No

Serial No._____

Attachment 5

Corrective Action Form

AECOM

Field Corrective Action Form New Haven Harbor Supplemental Sediment Evaluations	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. W912WJ-18-F-0109
Date: _____	
Document (plan or SOP title):	
Activity:	
Proposed Modification:	
Effective Date:	
Rationale:	
Submitted by:	Date:
Chief Scientist Approval:	Date:
Task Order Manager Approval:	Date:
NAE Technical Manager Approval:	Date:

Attachment 6

EnviroSystems, Inc. Sample Receipt Condition Verification Form

ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:
SDG No:
Project:

Delivered via:
Date and Time Received: Date and TIme Logged into Lab:
Received By: Logged into Lab by:

Air bill / Way bill: Air bill included in folder if received?
Cooler on ice/packs: Custody Seals present?
Cooler Blank Temp (C) at arrival: Custody Seals intact?
Number of COC Pages:
COC Serial Number(s):
COC Complete: Does the info on the COC match the samples?
Sampled Date: Were samples received within holding time?
Field ID complete: Were all samples properly labeled?
Sampled Time: Were proper sample containers used?
Analysis request: Were samples received intact? (none broken or leaking)
COC Signed and dated: Were sample volumes sufficient for requested analysis?
Were all samples received? Were VOC vials free of headspace?
Client notification/authorization: pH Test strip ID number:

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Field ID	LabID	M	Analyses Requested	CTR	PRES	

Notes and qualifications:

Attachment 7

Alpha Analytical Sample Receipt Condition Verification Form

Sample Delivery Group Summary

Alpha Job Number : L17XXXX

Received :Month,Day, 2017
Reviewer :Sample Custodian

Account Name : AECOM
Project Number :
Project Name :

Delivery Information

Samples Delivered By : Alpha Courier

Chain of Custody : Present

Cooler Information

Cooler	Seal/Seal#	Preservation	Temperature(°C)	Additional Information
A	Absent/	Ice	2.0	
B	Absent/	Ice	2.0	

Condition Information

All samples on COC received?	**YES**
Extra samples received?	**NO**
Are there any sample container discrepancies?	**NO**
Are there any discrepancies between sample labels & COC?	**NO**
Are samples in appropriate containers for requested analysis?	**YES**
Are samples properly preserved for requested analysis?	**YES**
Are samples within holding time for requested analysis?	**YES**
All sampling equipment returned?	**NA**

Volatile Organics/VPH

Reagent Water Vials Frozen by Client?	**NA**

Appendix A

Field Standard Operating Procedures

- ES-G-01 Field Records
- ES-G-02 Navigation
- ES-G-03 Equipment Decontamination
- ES-G-04 Custody
- ES-G-05 Packaging/ Shipping
- ES-S-01 Grab Sampling
- ES-W-01 Water Quality Data and Water Collection

AECOM

Standard Operating Procedure

Field Records

Procedure Number: ES-G-01

Revision No.: 0

Revision Date: September 2017

Prepared by

Kristen Durocher

_____ Date: _____

Maura Surprenant
AECOM Deputy Program Manager

_____ Date: _____

Debra L. Simmons
AECOM Project Quality Assurance Officer

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

Contents

1.0 SCOPE AND APPLICABILITY 1

2.0 HEALTH AND SAFETY CONSIDERATIONS 1

3.0 INTERFERENCES 1

4.0 EQUIPMENT AND MATERIALS 2

5.0 PROCEDURES 2

6.0 QUALITY ASSURANCE/QUALITY CONTROL 6

7.0 DATA AND RECORDS MANAGEMENT 6

8.0 PERSONNEL QUALIFICATIONS AND TRAINING 6

9.0 REVISION HISTORY 7

Attachment 1 Example of Daily Activity Log

Attachment 2 Field Corrective Action Form

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for documentation of field activities conducted under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program including sample collection events, field measurements, and site visits. Appropriate documentation of field activities provides an accurate and comprehensive record of the work performed, sufficient for a technical peer to reconstruct the day's activities and determine that necessary requirements were met. Field records also provide evidence and support technical interpretations and judgments. The procedures and systems defined in this SOP help ensure that the records are identifiable (reference the project task/activity), legible, retrievable, and protected from loss or damage. Specific information regarding field records to be kept can be found in the associated task order-specific Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP).

1.2 Field data may be recorded electronically or in field logbooks, standardized forms, annotated maps, or photos. This SOP provides general guidance on field recordkeeping; additional details for specific procedures (for example, chain of custody, sample collection) are provided in the SOPs for the individual task.

1.3 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Deviations from this SOP will be documented in the field records. Substantive modification to this SOP will be approved in advance by the AECOM Project Quality Assurance (QA) Officer and AECOM Task Order Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 Although record keeping itself does not generally pose significant health and safety risks, the tasks being implemented in the vicinity of individuals keeping records may require attention to safety practices. Project-related physical, chemical and biological hazards are addressed in the Accident Prevention Plan (APP).

2.2 Daily safety briefings will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day’s events and any potential health risks of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are remedied to the satisfaction of the SSO.

3.0 Interferences

Not Applicable

4.0 Equipment and Materials

The following equipment list contains materials that may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Bound field logbook
- Standardized field data sheets (refer to Section 5.3)
- Black ballpoint pen, Rite-in-Rain® pen, or black Sharpie® (or equivalent)
- Site maps
- Clipboard
- Three-ring binder or equivalent
- Camera (optional)
- Time piece
- Hand-held electronic recording device (optional) with EQuIS Data Gathering Engine (EDGE)™ software from Earthsoft, Intelligent Data Entry Form® (IDEF) software or equivalent
- Laptop, tablet or other portable electronic recording device (optional)

5.0 Procedures

5.1 General requirements

5.1.1 The field records will contain sufficient detail so that the collection effort can be reconstructed without reliance on the collector's memory.

5.1.2 Pertinent field information will be recorded legibly in a logbook and/or an appropriate standardized form (as described herein), or directly onto a portable electronic device, as described in Section 5.6. It is recommended that entries made by hand be made in black ballpoint pen.

5.1.3 Entries will be signed and dated. No erasures or obliterations will be made. A single line will be drawn through incorrect entries and the corrected entry written next to the original strikeout. Strikeouts are to be initialed and dated by the originator.

5.1.4 If a ballpoint pen cannot be used because of adverse weather conditions (rain or freezing temperatures), fine-point Sharpie® or Rite-in-Rain® pens are acceptable substitutes. If conditions are such that only pencil can be used, an explanation will be included in the logbook and the affected data will be photocopied, signed as verified copy, and maintained in the project files as documentation that the information has not been changed.

5.1.5 Entries will be factual and observational (i.e., no speculation or opinion), and will not contain any personal information or non-project-related entries. Abbreviations and acronyms will be defined.

5.1.6 Field information will be recorded without delay – information recorded significantly after the fact will be dated as such.

5.1.7 Field activities and other events pertinent to the field activities will be documented in chronological order. Times will be recorded using Eastern Standard Time (EST) or Eastern Daylight Savings Time (EDT) notation for each entry.

5.2 Field logbooks

5.2.1 Field logbooks will be bound waterproof field books. Logbooks will be dedicated to the project and will not be used for any other project or purpose. Separate and dedicated logbooks will be kept for different operations running concurrently (e.g., sample collection on board the vessel, core processing, surface water collection on-board a vessel, surface water collection from the shore); individual tasks making up each operation will be maintained in the same logbook, if possible.

5.2.2 The cover and binding of each logbook will be labeled to identify the operation and dates included with the logbook; each page in the logbook will be consecutively numbered. Pages will not be removed or torn out of the logbook.

5.2.3 The title page of each logbook will contain the following:

- AECOM contact, AECOM office location, and phone number;
- A unique logbook number (assigned at the time the logbook is signed out)
- Project name and AECOM project number; and
- Start and end dates of work covered by the logbook.

5.2.4 To assist in the return of a field logbook in the event it is lost, the following will also be included on the title page: “$25 Reward if found and returned to AECOM, 250 Apollo Drive, Chelmsford, Massachusetts 01824”.

5.2.5 At the front of each logbook will be a page cross-referencing each author’s printed name, signature, and initials.

5.2.6 A page header will appear on the first page of each day’s notes in the logbook, and activities for each day will be recorded on a new page. The page header will include:

- Name of author and other personnel on site (and affiliated organization if applicable);
- Date;
- Time of arrival (military time);

- Proposed activity (task); and
- Current weather and tidal conditions, and weather forecast for the day.

5.2.7 An abbreviated header, containing at least the date, will appear at the top of each additional page for the active date.

5.2.8 The field logbook will provide a chronology of events. At a minimum, documentation in a logbook will include the following (unless documented on a standard form):

- Names of visitor(s), including time of arrival and departure, the visitor's affiliation, and reason for visit;
- Summary of project-related communications, including names of people involved and time;
- Time daily work commences and ceases;
- Start and stop times of new tasks;
- Start and stop times of significant stand-by time (work interruptions);
- Safety or other monitoring data, including units with each measurement;
- Deviations from approved scope of work, including the necessary approvals;
- Progress updates;
- Problems/delays encountered;
- Unusual events; and
- Signature or initials of author on every page.

Additional detail on the contents of the field logbook is provided in Table 1.

5.2.9 The logbook will cross-reference the field forms if necessary; however, whenever possible, details recorded on the standardized forms will not be replicated in the logbook.

5.2.10 If there are additional lines on the page at the end of the day's activities, a line will be drawn through the empty space, and initialed and dated, leaving no room for additional entries.

5.3 Standardized forms

5.3.1 Standard forms for field data are provided with each SOP. The Daily Activity Log is attached to this SOP (Attachment 1). This form will be completed each day of active work and transmitted to the Task Order Manager or his/her designee. Refer to the appropriate SOP (e.g., core processing) for the forms specific to that task.

5.3.2 The information collected on any field form may alternately be collected electronically by laptop/handheld as appropriate.

5.3.3 The following rules apply to the standardized forms:

- Each form will be signed and dated by the person completing the form.
- There will be no blank spaces on the form – unused spaces will have “not applicable” or “not available” explanations.

5.4 Maps and drawings

5.4.1 Pre-existing maps and drawings that include notations made in the field (for example, relocating of sample locations) will be referenced in the logbook and, like all field records, include the project/task name and number, site identification, and be signed/dated by the person that prepared them.

5.4.2 Maps and drawings will include compass orientation and scale. Sketches will include points of reference and distances to the reference points.

5.5 Photographs and other photo documentation

Photographs or videos may be taken by the field team to help document site conditions, sample locations, or sample characteristics. Photographs and videos will be identified in the logbook or on the standard form by a unique numbering system. If photographs are collected by a digital camera, the file number as well as the photograph number will accompany the description of the photograph in the logbook. At a minimum, the date/time the photograph was taken, the general location, a brief description, and the photographer’s name will be recorded. For photographs taken with a cellular phone, the photo should be documented either by including an additional photo of information identifying the photograph, or by sending via text or email to another phone with appropriate information included. Additional information may include Differential Global Positioning System (DGPS) coordinates, direction the photographer was facing, and/or weather conditions. If necessary, an object will be included to indicate the scale of the object in the photograph.

5.6 Electronic files

5.6.1 Electronic recording devices may include data logging systems, laptops, or tablet computers.

5.6.2 Sufficient backup systems will be in place to protect against electronic data loss. Information will be saved to a disk or backed up immediately upon completion. The backup disk or other media (CD, flash drive) will then be stored in a secure location separate from the laptop or tablet.

5.6.3 Files will be uniquely identified and will be stored in the project files on the network in accordance with the FSPs . An unedited version of the file will be maintained and all subsequent manipulations tracked.

6.0 Quality Assurance/Quality Control

6.1 Entries in the field forms will be double-checked by the field team members to verify the information is correct.

6.2 Completed field forms will be reviewed by the Field Services Task Leader and/or his/her designee to verify that the requirements are being met. At a minimum, this should occur at the end of each day. When the review is complete, the reviewer will append his/her initials and date to the pages reviewed for documentation purposes.

6.3 If information recorded in the field is transcribed to another format, the original record will be retained for comparison purposes.

7.0 Data and Records Management

7.1 Deviations to the procedures detailed in the SOP or approved plans will be noted in the field logbook or other appropriate field form at the time of occurrence and summarized on the Daily Activity Log (Attachment 1).

7.2 Proposed modifications to the SOPs or approved plans will be documented on a Field Corrective Action Form. An example Field Corrective Action Form is presented as Attachment 2.

7.3 Logbooks that are taken offsite from the field will be photocopied or scanned and filed at the end of each day to mitigate against the loss of historical entries should the logbook be lost in the field.

7.4 Field data forms and chain of custody will be filed in the office facility once they have been completed and distributed (if necessary), or at the end of each field day. These documents will be maintained in labeled three-ring binders or contained in some other organized manner that prevents loss.

7.5 Distribution of daily forms will be performed according to the needs of the project team and at the direction of the Field Services Task Leader or designee.

8.0 Personnel Qualifications and Training

8.1 Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP, FSPs, and QAPP). No specialized training is required. Nonetheless, these activities should be reviewed by the Field Services Task Leader, as described below.

8.2 The Field Services Task Leader is responsible for reviewing and approving the field records for accuracy, completeness, and conformance to the procedures in this SOP. The Field Services Task Leader is also responsible for ensuring that the field records are distributed to the appropriate personnel during field activities, ensuring that records are maintained properly on site, and for archiving the records upon completion of field activities.

9.0 Revision History

Revision	Date	Changes
0	September 2017	NA

Table 1 Summary of Typical Field Information

General Information	Applicable Record[1]
Project/task name/general location	All
Personnel on site (AECOM, clients, site contacts, regulators, oversight personnel, subcontractors, general public)	A, B
Results of phone calls, conversations (See FSPs) for project contact information)	B
Chronology of activities, including mobilization, investigatory activities, and demobilization	B
Weather conditions (initial and any changes; temperature, barometric pressure, wind conditions, precipitation)	B
Tidal and atmospheric information (if applicable)	B
Subcontractors, description of services to be provided, and any issues (equipment problems, corrective action, stand by time)	A, B
Health and safety (H&S) tailgate meetings, H&S monitoring	Refer to APP
Description of major equipment (survey vessels, sampling platforms, sampling devices) and any problems or conditions that might impact performance or data quality	A, B, F
Equipment decontamination	B
Any pertinent field observations such as difficulties in sampling or conducting measurements or unusual circumstances that could affect data quality (instrument problems, contamination sources)	B, D, F
Deviations from approved plan (schedule, relocation/elimination of locations, change orders), including rationale and approval	A, B, F
Sample collection and transfer summary, custody information from collection through analysis	C
Field measurements	
Description of Instruments (make, model, serial number) and inspection	B
Measurement date, time, location/station, results (units, any correction factors applied, calculations (if applicable)	D, E
Identity of person performing the measurements	D, E
Sampling information	
Equipment description and inspection	B, D, E
Sample selection criteria/rationale (if different from plan)	A, B, D, E
Sample location (GPS coordinates, depth, compass/distance from fixed points)	D, E
Sample description (recovery, moisture, color, odor, texture, general sediment profile/stratigraphy, artifacts)	D, E
Sample manipulations (homogenization, compositing, filtering, preservation)	D, E
Sample ID, segment/interval, date, time, and sampler identity	B, D, E
Sample parameters, containers (size/type), preservation	
Field and QC sample ID, storage container and conditions for each (sub)sample/parameter set	B, C, D, E

[1] Locations for this information may include but are not limited to: A: Daily Activity Log; B: Field Notebook; C: COC Form; D: Field Coring Log; E: Grab Collection Form; F: Field Corrective Action Form

Attachment 1 Example of Daily Activity Log

Daily Activity Log USACE NAE ES	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. _____
Date: _____	
Vessel/Sampling Platform:	
Personnel (Name/Affiliation/Role):	
Sampling Performed/Equipment Used:	
Stations Sampled:	
Health and Safety Issues:	
Deviations from Approved Plan:	
Dock Departure Time:	
Dock Return Time:	
Recorded by:	

Attachment 2 Example of Field Corrective Action Form

Field Corrective Action Form USACE NAE ES	USACE Contract No. W912WJ-17-D-0003 Delivery Order No. _____
Date: _____	
Document (plan or SOP title):	
Activity:	
Proposed Modification:	
Effective Date:	
Rationale:	
Submitted by:	Date:
Field Task Manager Approval:	Date:
Task Order Manager Approval:	Date:

AECOM

Standard Operating Procedure

Navigation/Positioning

Procedure Number: ES-G-02

Revision No.: 0

Revision Date: September 2017

Prepared by

Kristen Durocher

Date: _____

Maura Surprenant
AECOM Deputy Program Manager

Date: _____

Debra L. Simmons
AECOM Project Quality Assurance Officer

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

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1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for positioning vessels under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program. Positioning will be conducted to locate the vessel(s) with sufficient accuracy and precision to meet project objectives during sampling or measurement activities. Specific information regarding proposed sampling and/or measurement locations is provided in the task order-specific Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP).

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the AECOM Project Quality Assurance (QA) Officer and the AECOM Task Order Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 The health and safety (H&S) considerations for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the task order-specific Accident Prevention Plan (APP). The major H&S considerations for the work associated with navigating/positioning are the marine/on-water safety aspects of the program.

2.2 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risks of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are remedied to the satisfaction of the SSO.

3.0 Interferences

Differential global positioning system (DGPS) signal interferences/blockage can occur from time to time by bridges or other structures. These interferences can prevent system function until satellite signals are re-established. If insufficient satellite coverage occurs for proper function, the user will be alerted by the HYPACK system. In these cases the vessel will be repositioned to obtain better satellite coverage.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP;
- Sampling vessel(s) adequately sized and equipped for the task and expected conditions, including high frequency (VHF) radio, ground tackle, and required U.S. Coast Guard safety gear;
- Navigation charts and sampling/measurement locations figure;
- Electronic navigation charts with pre-loaded waypoints for all sampling and measurement locations - refer to the FSP;
- DGPS Receiver with an accuracy of ± one foot;
- DGPS External Antennas;
- Field laptop computer with HYPACK survey software;
- Equipment user manuals;
- Table of target sampling/measurement location coordinates;
- Assorted nautical equipment (e.g., anchors, lines, personal flotation devices);
- Logbook and ballpoint pen;
- Sample collection forms; and
- RTK DGPS positioning system with an accuracy of ± 2 centimeters horizontal and 3 centimeters (optional).

5.0 Procedures

Sampling and measurement activities will be conducted from a vessel. In accordance with procedures outlined below, these vessels must be properly positioned and their position recorded before each activity can begin. The following describes the procedures that will be performed to accurately position sampling vessels at a designated sampling location, and the pertinent observations that will be recorded in the appropriate field notebook and/or data sheet.

Positioning will be achieved by using a DGPS integrated with HYPACK survey software in order to obtain the real time position of the vessel, in relation to planned sampling stations, displayed on an electronic nautical chart. Survey personnel will follow the appropriate sections of equipment user's manuals to ensure proper equipment operation and system performance..

5.1 Positioning the Vessel

This section gives the step-by-step procedures for vessel positioning. Observations made during vessel positioning will be recorded on the sample collection forms, other standardized forms, and/or logbook, as appropriate.

A DGPS will be used to establish locations during implementation of activities specified in the FSP. While this SOP provides general guidance and procedural steps, personnel performing positioning activities also will follow the appropriate sections of equipment user's manuals and have the manuals available for reference while operating the equipment.

The following procedures describe the steps to establish position at a location, as well as the steps to adjust the positioning if necessary to collect additional samples.

5.1.1 Obtain the appropriate form(s). Initiate the Daily Activity Log provided in SOP ES-G-01 (Field Records).

5.1.2 Obtain the target sampling/measurement locations. These locations will have been selected prior to commencement of field activities, as described in the FSP. The location of each target sampling location will be established in the local State Plane Coordinate System with respect to the North American Datum of 1983 (NAD83).

5.1.3 Enter the coordinates for each sampling location as a waypoint into the HYPACK software package. Confirm accuracy of each entry against the coordinates established in the corresponding FSP.

5.1.4 Configure the HYPACK system for the survey, including setting the survey grid to the local State Plane Coordinate System with respect to the North American Datum of 1983 (NAD83 - feet), and setting the "target ring" or maximum allowable offset based on task specific requirements listed in the FSP.

5.1.5 If less than sub-meter accuracy is required, a DGPS base station will be established over a shore-based marker prior to sampling or measurement operations. The operation and horizontal/vertical accuracy of the vessel mounted DGPS will be verified at another shore-based marker by recording observed horizontal and vertical (XYZ) data and comparing these data to the published XYZ data for a given point. After initial DGPS system verification, a temporary benchmark may be established at a location convenient to the vessel to facilitate daily DGPS system performance verification. DGPS system performance verification will be conducted twice per day and documented in the logbook and vessel data logger. The horizontal and vertical accuracy will be compared to shore-based markers to verify performance. Elevations will be recorded in North American Vertical Datum of 1988 (NAVD88) with an accuracy of +/- one foot.

5.1.6 Install the DGPS antennae in a safe location which accurately represents the actual sample or measurement collection point; (e.g., immediately adjacent to a coring well, or mounted to the A-frame).

5.1.7 Identify and approach actual sampling/measurement locations by using data from the DGPS/HYPACK system in the navigation mode (while observing other navigational "Rules of the Road"). The navigation mode provides information on heading, distance remaining,

and time remaining. This information is based on the selected waypoint location and the present location of the vessel.

5.1.8 For sediment sampling, the vessel will be secured by lowering spud poles once in position within the station "target radius". In water depths that preclude the use of spud poles, maneuver the vessel approximately 60 feet up-current (or up-wind in slack conditions) of the target, drop the anchor, and pay out anchor line until the vessel drifts within the "target radius". A second anchor set may be required to increase lateral stability under certain conditions.

5.1.9 For water column sampling, the vessel will be positioned over each sampling/measurement location with no contact with the bottom. The operator will utilize the onboard navigation system to attempt to maintain positioning of the vessel within 10 feet of the sampling/measurement location.

5.1.10 Once the vessel is on location (and secured as appropriate, for sediment sampling), note the coordinates from the DGPS unit and check the coordinates to verify that the vessel is within the pre-determined range of the target location as defined in the FSP. If not acceptable, adjust the vessel's location, and recheck the position. Repeat this process until the vessel's position is within acceptable range of the target. Record the actual sampling coordinates electronically (using HYPACK).

5.1.11 Once the coordinates are acceptable, perform the sampling or measurement activity at the location. Record final location coordinates on the appropriate form. For sediment sampling, final location coordinates will be recorded once the sampling device has penetrated the sediment to the target depth or refusal and prior to retrieval. For surface water sampling, final location coordinate will be recorded once the sample is being collected. Plot locations onto a master chart or use computer-based, real-time software to verify location.

5.1.12 To adjust the vessel's position to repeat an attempt at sediment sampling, the vessel will be moved by allowing it to rotate around the spud pole or by adjusting an anchor line until the new position for the sampling device has been established. Record the new position.

5.1.13 At the end of the sampling day, check the data loaded onto the DGPS units to verify the existence of locations where data were collected. Spot check the location data for accuracy. Download HYPACK navigation files to a portable data storage device and transfer data to an applicable secure project directory.

5.2 Elevation Measurements

5.2.1 In order to establish the elevation of the sediment surface at locations within a body of water, a system will be established whereby the water level of that water body is continuously monitored and recorded for use as a local reference (e.g., local NOAA station).

5.3 Calibration, Maintenance, and Use of Field Instruments

5.3.1 Poor DGPS Reception or System Failure

If insufficient satellite coverage occurs for proper function, the user will be alerted by the HYPACK® system or the DGPS unit. In these cases, the Field Services Task Leader will

be notified that verification of the field position of the vessel or sampler on foot at the target location cannot be performed. The Field Task Manager will review the situation with respect to available reference resources and may provide the field team with alternate locations, as required by the FSP. The selection of alternate sampling locations will be made jointly through discussions with the Field Services Task Leader, sampling personnel and/or the Task Order Manager.

When satellite reception is insufficient to meet system accuracy requirements, system error codes will appear on the output screen. Nonetheless, proper operation of the DGPS / HYPACK navigation system can be verified by checking the displayed position on the electronic base map against surrounding geographic features. This activity will be undertaken at the start of each day after start-up as a quick check to verify proper system function. Note: system function errors will be obvious and rigorous checking of the system is not necessary.

5.3.2 Maintenance

Prior to use, the DGPS units will be inspected for functionality. Maintenance and use of DGPS units will follow the appropriate sections of the equipment user's manual. Field personnel will have the manual available for reference. Equipment maintenance will be recorded in the field logbook, including the reason for the maintenance (routine or because of a problem), actions taken, and final resolution (e.g., correction of the problem, replacement of the instrument).

6.0 Quality Assurance/Quality Control

6.1 Actual sampling/measurement locations will be verified as being within the FSP-specified radius/tolerance surrounding the target coordinates specified in the FSP. Using a navigational software system allows the user to see the real time position of the sampling vessel in relation to the designated position of the sampling/measurement station and the user defined “target radius” surrounding each station. This visual confirmation on the electronic chart is also complemented by a data display that indicates the actual distance to target. Using these two features ensures proper vessel positioning.

6.2 DGPS system performance will be verified by confirming the accuracy of the initial navigational software configuration (i.e., geographic reference) and by regular system checks during the course of the day.

6.3 The quality of the data provided by the DGPS unit is monitored by the navigational software as another control feature built into the system. In the event there is degradation in DGPS signal quality, either by a reduced number of available satellites or satellite geometry, the navigational software system will alert the operator of the reduced quality of horizontal and vertical precision levels.

6.4 Data recorded manually and electronically (see Section 7.2) will be cross-checked for accuracy

7.0 Data and Records Management

7.1 Field records will be generated as outlined in SOP ES-G-01 (Field Records). This document provides specifics on recording data for field activities. At a minimum, sample position information (x, y, and z), verification of DGPS system performance, and any positioning-related problems encountered will be recorded. Additional information may be required for sample collection or measurement activities and are outlined in the relevant SOPs.

7.2 Position data will be saved electronically at the time of sampling within HYPACK and recorded manually on the sample collection/measurement forms. The electronic record represents the primary record and the sample collection/measurement form information will serve as a backup to the electronic file.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP ES-G-01 – Field Records). Proposed modifications to this SOP will be recorded on a Field Corrective Action Form (refer to SOP ES-G-01 – Field Records), including reason and impact on the program, and will be submitted to the AECOM Task Order Manager for approval.

7.4 All records (electronic and hard copy) associated with the activities described in this SOP will be maintained in accordance with the FSP.

8.0 Personnel Qualifications and Training

The individuals executing these procedures must have read, and be familiar with, the requirements of this SOP and the corresponding project plans (e.g., APP, FSP, and QAPP. Vessel navigation and positioning by vessel will only be performed by experienced RTK DGPS / HYPACK operators from the vessel subcontractors

9.0 Revision History

Revision	Date	Changes
0	September 2017	NA

AECOM

Standard Operating Procedure

Equipment Decontamination

Procedure Number: ES-G-03

Revision No.: 0

Revision Date: September 2017

Prepared by

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_____ Date: _____

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_____ Date: _____

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Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
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1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for decontamination of equipment, instruments, and other materials used during implementation of field tasks under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program. Decontamination is the process of neutralizing, washing, and rinsing exposed surfaces of equipment to minimize the potential for contaminant migration and/or cross-contamination. Specific information regarding equipment that will be used and necessary decontamination can be found in the associated task order-specific Quality Assurance Project Plan (QAPP) and, Field Sampling Plan (FSP). This procedure does not apply to personnel decontamination which is described in the task order-specific Accident Prevention Plan (APP).

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications to this SOP may be warranted depending upon field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the AECOM Project Quality Assurance (QA) Officer and AECOM Task Order Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical and biological hazards, are addressed in the APP.

2.2 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risks of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are remedied to the satisfaction of the SSO.

3.0 Interferences

3.1 Equipment decontamination should be performed in an area that does not interfere with sampling activities, but sufficiently close to maintain an efficient working environment. Whenever possible, decontamination activities will be performed in a location that is not subject to potential sources of contamination (for example, generators and other combustion engines). Where decontamination is required on a boat, the vessel's engines must be turned off during decontamination. Ideally, boat engines and/or generators should be shut off during collection of equipment blanks, consistent with collection of surface water samples. If this is not possible, then the sampling platform should be positioned upwind from any running combustion engines.

3.2 Equipment that is improperly or inadequately decontaminated may result in biased sample results. To avoid sample contamination, the procedures and equipment specified in this SOP are to be followed. Specifically:

- The decontamination materials, including detergent, water, and solvents will meet the specifications of the SOP;
- Buckets and other containers holding decontamination solutions will be labeled to segregate containers holding “dirty” from “clean” solutions, and brushes will be dedicated to a particular step in the decontamination process; and,
- Decontaminated equipment that is not immediately reused will be covered/wrapped in plastic or aluminum foil and marked to indicate it is clean.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- personal protective equipment (PPE) and other safety equipment, as required by the APP;
- bristle brushes;
- plastic wash/rinse buckets or tubs;
- phosphate-free biodegradable detergent (e.g. Liquinox®);
- acetone wipes or similar (for oily residues);
- deionized "analyte-free" water (DIW);
- stainless steel bowls or pans (labeled as needed);
- squeeze or spray bottles (Teflon® for solvent);
- aluminum foil;
- plastic sheeting;
- zipper-lock bags;
- tap water (from any treated municipal water supply);
- sample container(s) for equipment rinsate blank, if collected;
- temporary storage containers for investigation-derived waste (IDW) storage containers (if needed); and
- field logbook and standardized forms as needed.

5.0 Procedures

Non-dedicated sampling equipment that comes into contact with the media to be sampled will be decontaminated prior to use in the field to eliminate or minimize cross-contamination. The frequency of decontamination is provided in the task-specific SOPs (for example, surface water sampling, grab sampling, sediment core collection, core processing). Sufficient decontaminated equipment will be available to be dedicated to the sampling locations planned for each day, where feasible. Equipment will be decontaminated in the area designated for decontamination.

Sampling equipment will be decontaminated as described in Section 5.0 below. Decontamination of the sampling equipment will be commensurate with the analyses to be performed.

Not all sampling equipment will require full decontamination procedures. Three levels of decontamination (i.e., solvent, soap and water, or ambient water decontamination) will be performed based on the usage of the sampling equipment as defined below.

5.1 General preparation

Inspect equipment needed for sample collection to ensure that it is in good working order and establish an equipment decontamination area that includes a collection basin that can be placed beneath the equipment to collect decontamination fluids, brushes, and a series of wash bottles for each of the solutions specified in the following sections.

5.2 Level I (Decontamination with Ambient Water): The following steps will be used to decontaminate sampling and support vessels, vessel anchors, lines, ropes, and buoy marker weights associated with sediment sampling:

5.2.1 Personnel will dress in suitable PPE to reduce exposure to contaminants (refer to the APP).

5.2.2 Equipment will be rinsed with site surface water onboard the sampling vessel.

5.2.3 Rinse water will not be contained.

5.2.4 Daily decontamination of the decks of the vessels will consist of a surface water washing as soon as possible after concluding work. Further wash-down with tap water at the marina is at the discretion of the boat's captain.

5.3 Level II (Decontamination with Soap and Water): The following steps will be used to decontaminate non-dedicated sampling equipment that is used to collect samples for chemical analysis:

5.3.1 Personnel will dress in suitable PPE to reduce exposure to contaminants (refer to the APP).

5.3.2 Residual sediment, as appropriate, will be scraped off and the equipment rinsed with site surface water (on the sampling vessel while on site).

5.3.3 Residual sediment on equipment will be discharged overboard upon completion of sampling at a location.

5.3.4 Equipment may be rinsed with tap water if needed to further remove gross contamination.

5.3.5 Equipment will be placed in a wash tub or bucket (if size allows) containing Liquinox® (or other phosphate-free detergent) along with tap water, and scrubbed with a bristle brush or similar utensil.

5.3.6 Equipment will be rinsed twice with tap water over a bucket using a squeeze bottle or pressure washer.

5.3.7 Following decontamination, equipment will be placed in a dedicated clean area or will be protected from re-contamination by covering with plastic or wrapping in foil.

5.3.8 Rinse water and detergent water will be replaced frequently. Residual decontamination water used on the boat will be held in 5-gallon buckets and discharged overboard upon completion at a station.

5.4 Level III (Decontamination with Solvents): The following steps will be used to decontaminate small sampling equipment that comes into contact with sediment or surface water with oily residues designated for chemical analysis. This sampling equipment may include such items as stainless steel trowels, spoons and bowls, stainless steel core cutters and catchers, plastic caps for the core tubes, and trigger-activated bottle samples. Sampling devices will be decontaminated between collection of samples at different depths and different times at the same sampling location. Details of when equipment is decontaminated is provided in the activity-specific SOPs.

5.4.1 Personnel will dress in suitable PPE to reduce exposure to chemicals and contaminants (refer to the APP).

5.4.2 Any residual sediment will be scraped off and the equipment rinsed with site surface water (on the vessel while on site).

5.4.3 Equipment may be brushed and rinsed with tap water if needed to further remove gross contamination.

5.4.4 Equipment will be placed in a wash tub or bucket containing Liquinox (or other phosphate-free detergent) along with tap water, and scrubbed with a bristle brush or similar utensil. Equipment will be rinsed with tap water over a second wash tub or bucket, using a squeeze bottle or pressure sprayer, followed by cleaning with an acetone wipe.

5.4.5 Following decontamination, equipment will be placed in a clean area on clean aluminum foil or plastic sheeting and allowed to air dry. Following air drying, the equipment will be wrapped in aluminum foil or placed in a zipper-lock bag, if not immediately re-used for sample collection. Larger equipment may be wrapped in clean plastic sheeting. Equipment that may be used immediately (i.e., before fully air dried) may be reused providing obvious water has been shaken off. Clean equipment should be marked in some way to indicate that it is clean.

5.4.6 Used decontamination non-solvent solutions and associated materials will be collected in 5-gallon buckets and discharged overboard upon completion at a station.

5.4.7 Acetone wipes will be placed in an open container and allowed to air-day as practical. Dried acetone wipes will be disposed of with PPE.

5.5 Field instrumentation should be cleaned according to the manufacturer's instructions. Care will be taken to prevent damage to equipment. Field instruments such as water quality meters will be rinsed daily during field operations at the end of each workday with tap or Site water at a minimum, or more rigorously according to the manufacturer’s instructions. When possible, instruments which are difficult to decontaminate, such as cameras and data logging instruments, may be protectively wrapped to reduce or eliminate the need for decontamination.

5.6 Peristaltic pumps used for surface water sampling will be rinsed with tap water prior to and following each day of use. Decontamination of the pump between wells, stations or between depths is not

required. Decontamination of other pumps (e.g., bladder pumps, diaphragm pumps) between stations and depths is required.

5.7 Submersible pumps, if needed, will be decontaminated using Level II procedures.

5.8 Tubing, bladder pump bladders, and bailers will be dedicated to sample locations and will not require decontamination in the field.

5.9 Other sampling equipment that might be used and that has had direct contact with sediments or wastes will initially be decontaminated at a designated area prior to leaving the Site. If the above decontamination procedures are not applicable or feasible, the decontamination procedure will be as follows:

5.9.1 Equipment will be wrapped or draped in plastic or placed in the plastic-lined cargo area of a truck for transport to the area designated for decontamination.

5.9.2 Equipment will first be washed with a hot water, high-pressure spray or steam-cleaned.

5.9.3 Equipment will then be rinsed, by hose or high pressure spray, with tap water.

5.9.4 Decontamination rinse and wash water generated between surface water or sediment sample locations will be discharged overboard upon completion at a station.

5.10 Equipment leaving the Site upon the completion of on-site investigation activities will be decontaminated according to Sections 5.2, 5.3, 5.4, 5.5, or 5.6, above.

5.11 Equipment rinsate blanks will be collected to assess the adequacy of equipment decontamination procedures. Equipment rinsate blanks will be submitted for testing at the frequency specified in the QAPP. The equipment rinsate blank collection procedures are included in the SOPs for the individual tasks (e.g., surface water sampling, sediment sampling, core processing, groundwater sampling, etc.).

6.0 Quality Assurance/Quality Control

6.1 Decontamination quality assurance/quality control (QA/QC) procedures described in Section 5.0 will be performed to assess the adequacy of equipment decontamination procedures. Equipment rinsate blanks will be collected at the frequency specified in the QAPP.

6.2 It is the responsibility of the Field Services Task Leader to periodically check/ensure that the equipment decontamination procedures are in conformance with those stated in this SOP.

7.0 Data and Records Management

7.1 Documentation of decontamination procedures will be contained in the field logbook or recorded on the appropriate task-specific standardized form and should include:

- a list of equipment being decontaminated along with the date and time;
- a brief description of the procedure and materials used during the process (e.g., Level I/ambient water rinse; Level II/soap and water rinse; Level III/solvent rinse);
- the names of the project staff performing the decontamination; and,

- documentation of equipment rinsate blanks including sample ID, date and time, the equipment rinsed, collector, and parameters.

7.2 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP ES-G-01 – Field Records). Proposed modifications to this SOP will be recorded on a Field Corrective Action Form (refer to SOP ES-G-01 – Field Records), including reason and impact on the program, and will be submitted to the AECOM Task Order Manager for approval.

7.3 All records associated with the activities described in this SOP will be ultimately maintained in accordance with the QAPP.

8.0 Personnel Qualifications and Training

8.1 Individuals executing these procedures will have read, and be familiar with, the requirements of this SOP and the corresponding plans (e.g., APP, FSPs and QAPP). Decontamination of field equipment is a relatively simple procedure; no specialized training is needed. However, execution of these activities will initially be supervised by more experienced personnel.

8.2 The Field Services Task Leader is responsible for ensuring the procedures for decontamination in this SOP are followed.

9.0 Revision History

Revision	Date	Changes
0	September 2017	NA

AECOM

Standard Operating Procedure

Sample Custody

Procedure Number: ES-G-04

Revision No.: 0

Revision Date: September 2017

Prepared by

Kristen Durocher

Date: _____

Maura Surprenant
AECOM Deputy Program Manager

Date: _____

Debra L. Simmons
AECOM Project Quality Assurance Officer

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
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Attachment 1 Example Chain-of-Custody Form

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for the chain-of-custody (COC) procedures associated with samples collected under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program. The objective of COC procedures is to provide sufficient evidence of sample integrity to satisfy data defensibility requirements. Samples may include sediment or water collected or generated for chemical, biological, and/or physical analyses, and associated quality control (QC) analysis. Specific information regarding samples collected can be found in the associated task order-specific Quality Assurance Project Plan (QAPP), and Field Sampling Plan (FSP). This SOP is intended to be complete enough that: 1) the steps which could affect tracking, documentation, or integrity of samples are explained in sufficient detail and 2) different sampling personnel following these procedures will deliver samples to the laboratory which are equally reliable and consistent.

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the AECOM Project Quality Assurance (QA) Officer and the AECOM Task Order Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 Although COC activities do not generally pose significant health and safety risks, sample exposure via external container residues may occur and much of the work going on in the vicinity of sample custodians requires attention to safety practices. Project-related physical, chemical and biological hazards are addressed in the Accident Prevention Plan (APP).

2.2 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risks of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are remedied to the satisfaction of the SSO.

3.0 Interferences

Not applicable.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP;
- Sample containers as specified in the Quality Assurance Project Plan (QAPP) Addendum;
- Sample labels;
- COC forms;
- Custody tape or seals;
- Field logbook;
- Ballpoint pen or fine-tipped marked (e.g., Sharpie®); and
- Clear plastic sealing tape.

5.0 Procedures

5.1 General requirements

5.1.1 As few people as possible should handle the samples.

5.1.2 Sampling personnel should be able to testify that tampering of the samples could not occur without their knowledge.

5.2 Sample identification

Each sample, including field samples and QC samples (e.g., equipment rinsate blanks, field duplicates) will be assigned a unique identification. Refer to the QAPP and FSP for the sample identification protocol.

5.3 Sample labeling

5.3.1 A label will be attached to each bottle used for sampling. Waterproof, adhesive labels are preferred. Labels will be applied to the container, not the lid, whenever possible.

5.3.2 The project identification, sample matrix, laboratory designation/analyses requested, field sample identification code, and preservation will be typed or printed onto the label before sampling. The label will be protected from water and solvents with clear packing tape, except in cases where not appropriate.

5.3.3 Completion of the sample labels (including the sampler's initials and the date and time of sample collection) will occur at the time of sample collection. Labels will be completed in waterproof, indelible ink.

5.4 Sample tracking

5.4.1 From the time of collection through transportation, the handling of samples will follow COC procedures. A representative from each sampling team will be assigned as the field sample custodian. This individual will be responsible for the custody of the samples from collection until release for processing or shipment to the laboratories. The field sample custodian will provide a sample transfer/custody form and the completed and electronic versions of the sample collection forms (refer to task-specific SOPs) when relinquishing the collected samples for sample processing or shipment. The samples will be verified against the sample transfer/custody form. An example standard COC form is provided in Attachment 1.

5.4.2 A sample is considered under a person's custody if one or more of the criteria are met:

- Sample is in the person's possession;
- Sample is in the person's view after being in person's possession;
- Sample was in the person's possession and then was locked up to prevent tampering; or
- Sample is in a designated secure area.

5.4.3 Samples collected for analysis will be continuously tracked and while in transit to the laboratory by use of the following procedures below.

5.4.4 Individual sample bottles will be properly labeled and securely sealed before being placed in the container for shipment to the laboratory.

5.4.5 Pertinent information will be entered on the COC form (Attachment 1) and will include:

- Project identification
- Signatures of samplers;
- Sample identification code. This code should be unique to the sampling event and to the program and must agree exactly with the field sample identification code recorded on the bottle label;
- Date and time of sample collection,
- Sample matrix (sediment, water, etc.);
- Analyses requested;
- Number of sample containers;
- Preservative;
- Grab or composite sample designation (if applicable);
- Sampler's remarks (optional). These comments may serve to alert the laboratory to highly contaminated samples or identify QC sample requirements.
- Signatures of individuals involved in sample transfer;
- Destination (e.g., laboratory name and location);

- Page number (for example: 1 of 2, 2 of 2);
- If applicable, COC tape numbers (example provided in Attachment 2); and
- If applicable, the air bill or other shipping number.

This information is consistent with guidance in SW 846, Test Methods for Evaluating Solid Waste (USEPA, 2017).

5.4.6 The COC will be manually filled out completely and legibly in indelible ink. COCs may be pre-printed with known information (project identification, parameters to be analyzed, etc.) or may be hand-written on pre-printed forms. Corrections will be made, if necessary, by drawing a single line through and initialing and dating the error. The correct information will then be recorded with indelible ink. There should be no unexplained blank spaces. Blank lines will be lined out and initialed and dated.

5.4.7 Each COC will be cooler-specific (i.e., list only the samples packed in the cooler). Information on the COC must agree exactly with that recorded on the sample containers. Discrepancies may result in the samples being incorrectly logged into the laboratory or delays in initiating sample analysis.

5.4.8 The completed COC form will be signed, dated, enclosed in a sealable plastic bag, and placed in the container prior to shipment/ transfer to a courier. A copy of the COC will be retained by field personnel and stored in a dedicated binder or file. Additional copies will be distributed via email or fax as follows:

- Project Chemist/Laboratory Coordinator or his/her designee;
- Data Manager or his/her designee; and
- Laboratory project manager at each laboratory being used.

5.4.9 If samples are to be shipped by commercial overnight carrier, COC seals must be used and the COC seal numbers recorded on the COC form. Refer to SOP ES-G-05 – Sample Packaging and Shipping for specific packaging procedures. Representatives of commercial carriers are not required to sign the COC form.

5.4.10 If samples are hand carried to a laboratory, custody will be maintained and documented on the COC form through the process (e.g., from the person packing the cooler to the person transporting the samples to the laboratory).

5.4.11 If samples are transmitted to the laboratory by courier, the procedures described in either Section 5.4.9 or 5.4.10 will be followed, depending on whether the courier is a commercial courier or laboratory representative, and whether the cooler has been secured by COC seals prior to pick up by a laboratory courier.

5.4.12 Upon receipt at the laboratory, the designated laboratory sample custodian will sign the COC form indicating receipt of the incoming field samples. The samples will be checked against the COC form upon arrival at the laboratory. The receiving personnel will enter all arriving samples into the laboratory system. Any discrepancies between the samples and the COC form(s), or any evidence of tampering with the shipping container or the custody seal will be immediately reported to the Project Chemist. The laboratory sample custodian will check the

temperature of the cooler upon arrival at the laboratory and record the measured temperature on the COC and/or appropriate sample/cooler receipt forms. The Project Chemist will be immediately notified of any sample preservation issues, including temperature exceedances.

5.4.13 A completed copy of the COC form will be distributed via email or fax to the Project Chemist within 24 hours of sample receipt at the laboratory. The original will be retained by the laboratory.

6.0 Quality Assurance/Quality Control

6.1 Completed COCs will be reviewed by the individuals preparing the samples for shipment for completeness, accuracy, and legibility. Specifically, the samples and COC record will be compared to ensure agreement between the sample labels and the COC, and to verify the number of sample containers.

6.2 These records are subjected to periodic review by the Field Services Task Leader to verify adherence to the procedures outlined in this SOP.

7.0 Data and Records Management

7.1 The records associated with the custody process (transfer forms, COC records, air bills, etc.) will be maintained in an organized and contained manner.

7.2 COC records will be distributed to the appropriate personnel as described in the FSP and QAPP.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP ES-G-01 – Field Records). Proposed modifications to this SOP will be recorded on a Field Corrective Action Form (refer to SOP ES-G-01 – Field Records), including reason and impact on the program, and will be submitted to the AECOM Project Manager for approval.

8.0 Personnel Qualifications and Training

8.1 Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP, FSP and QAPP. No specialized training is required; however, execution of these activities will initially be supervised by more experienced personnel.

9.0 References

United States Environmental Protection Agency. 2017. SW 846, Test Methods for Evaluating Solid Waste. Available online: https://www.epa.gov/hw-sw846/sw-846-compendium.

10.0 Revision History

Revision	Date	Changes
0	September 2017	NA

Attachment 1 Example Chain-of-Custody Form

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name:	Project Location:	Analysis Requested
Project Number:	Field Logbook No.:	
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape Nos.:	
Signature:	Send Results/Report to:	TAT:

Container Type
P – Plastic
A – Amber Glass
G – Clear Glass
V – VOA Vial
O – Other
E – Encore

Preservation
1 – HCl, 4°
2 – H2SO4, 4°
3 – HNO3, 4°
4 – NaOH, 4°
5 – NaOH/ZnAc, 4°
6 – Na2S2O3, 4°
7 – 4°

Matrix Codes:
DW – Drinking Water
WW – Wastewater
GW – Groundwater
SW – Surface Water
ST – Storm Water
W – Water
S – Soil
SL – Sludge
SD – Sediment
SO – Solid
A – Air
L – Liquid
P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered											Lab I.D.	Remarks

Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Analytical Laboratory (Destination):
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other Temp blank Yes No

Attachment 2 Example Chain-of-Custody Seal

№

Signature _____

Date _____

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Standard Operating Procedure

Sample Packaging and Shipping

Procedure Number: ES-G-05

Revision No.: 0

Revision Date: September 2017

Prepared by

Kristen Durocher

Date: _____

Maura Surprenant
AECOM Deputy Program Manager

Date: _____

Debra L. Simmons
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Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
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1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for packaging and shipping samples collected under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program. Sample packaging and shipment generally involves the placement of individual sample containers into a cooler or other similar shipping container and placement of packing materials and coolant in such a manner as to isolate the samples, maintain the required temperature, and to limit the potential for damage to sample containers when the cooler is transported. Specific information regarding samples to be collected sampling can be found in the associated task order-specific Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP).

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the AECOM Project Quality Assurance (QA) Officer and the AECOM Task Order Manager and communicated to the client. Deviations from this SOP will be documented in the field records. The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 Although packaging activities do not generally pose significant health and safety risks, sample exposure via external container residues may occur and much of the work going on in the vicinity of sample custodians requires attention to safety practices. Project-related physical, chemical and biological hazards are addressed in the task order Accident Prevention Plan (APP).

2.2 Sample packaging and shipping involves potential physical hazards primarily associated with handling of occasional broken sample containers and lifting of heavy objects. Adequate precautions will be taken, including minimizing the weight of individual coolers, using hand carts to transport coolers, and using the buddy system to lift coolers into and out of vehicles.

2.3 Daily safety briefs will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risks of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are remedied to the satisfaction of the SSO.

3.0 Interferences

Improper sample storage or inadequate protection against breakage and cross-contamination could potentially affect sample results. The field team will follow this SOP to minimize these effects.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Personal protective equipment (PPE) and other safety equipment, as required by the APP;
- Inert packing material (e.g., foam peanuts, vermiculite, cardboard, bubble wrap, etc.);
- Sample containers as specified in the FSP and QAPP;
- Sample labels;
- Chain of custody (COC) forms;
- Insulated coolers;
- Custody tape or seals;
- Indelible marking pens;
- Shipping tape;
- Sealable plastic bags;
- Temperature blanks (provided by the laboratory);
- Field logbook;
- Ice or similar chilling source;
- Ballpoint pen or fine-tipped marked (e.g., Sharpie®); and
- Clear plastic sealing tape.

5.0 Procedures

5.1 General requirements

5.1.1 Vehicular sample transport will adhere to normal/applicable Department of Transportation (DOT) regulations. DOT regulations/guidelines related to sample shipments can be viewed on AECOM's Safety, Health & Environment (SH&E) intranet web page.

5.1.2 An area for storing unused sample containers/coolers and a clean area for sample handling, packaging, and shipment will be identified.

5.1.3 Laboratories will often re-use coolers. The interior and exterior of each cooler received at a project location should be inspected for cleanliness before using it. Any coolers that have cracked interior or exterior linings/panels or hinges should be discarded. Any coolers missing one or both handles should also be discarded if replacement handles (i.e., knotted rope handles) cannot be fashioned in the field.

5.1.4 Excess strapping tape and old shipping labels should be removed. If the cooler interior exhibits visible contamination or odors it should be decontaminated in accordance with ES-G-03 – Equipment Decontamination prior to use.

5.1.5 The Field Services Task Leader or designee will notify the laboratory(ies) of the number, type and approximate collection and shipment dates for the samples in advance of any sample transfers and communicate any delays. The laboratory(ies) will provide courier service for all sample shipments.

5.2 Sample packaging and shipping will be done in accordance with applicable regulations, as described below:

5.2.1 After filling a sample container, affix cap. For sediment/solids containers, secure the cap with clear tape; the use of plastic tape to secure the cap is not required for aqueous containers. Complete the sample label. Apply the label to the sample container and cover with clear tape.

5.2.2 Clean the outside of each sample container by wiping it off with a clean paper towel. Verify that residual sediment has been removed from the outside of the container, and from the area under and around the cap.

5.2.3 Place each glass sample bottle into an individual bubble bag sleeve provided by the lab or wrap each glass bottle/jar individually using bubble wrap secured with tape or rubber bands

5.2.4 Seal each sample container inside a sealable plastic bag.

5.2.5 For those samples that require thermal preservation, place on ice or similar chilling source immediately after collection.

5.2.6 Place plastic bubble wrap matting in the bottom of each cooler or shipping container as needed.

5.2.7 Transfer the samples to the plastic-lined cooler. Place bottles upright into the cooler. If a combination of plastic and glass sample containers are to be packed, alternate them within the cooler to further protect the glass. Use inert packaging material (e.g., cardboard, etc.) to cushion the samples and minimize the potential for breakage by placing additional packing material throughout the voids between sample containers and between any layers within each cooler to a level which meets the approximate top of the sample containers. Packing material may require tamping by hand to reduce the potential for settling. Seal the drains on the ice chest (if present) with shipping tape or plug the drains with silicone sealant or a similar inert substance.

5.2.8 Conduct an inventory of sample numbers, fractions and containers when placing samples into the coolers, and check the inventory against the corresponding COC form before sealing the cooler (SOP ES-G-04 – Sample Custody).

5.2.9 For those samples requiring thermal preservation, ice or similar chilling sources sufficient to maintain a temperature of 4° ± 2° Celsius (°C) will be placed inside the cooler during transport. Double bag cubed ice in heavy duty Ziploc type plastic bags to prevent leakage, close the bags, and distribute the packages in a layer over the top of the samples. If sample bottles are bubble wrapped, it is also permissible to insert double bagged ice packages between the sample bottles. Never place un-bagged loose ice directly into a cooler. Use

sufficient ice to accommodate reasonable delays in shipment. A temperature blank provided by the analytical laboratory with each cooler will be included in the shipment.

5.2.10 If required, obtain two custody seals and enter the seal numbers on the COC form. Complete sample tracking documentation as described in SOP ES-G-04 (Sample Custody), and place the documents in a sealable plastic bag inside the ice chest, taped to the inside of the lid.

5.2.11 Secure chest lid with shipping tape by covering the entire seal with tape. Sign and date the two custody seals, affix the custody seals on opposing corners of the cooler lid and cover the seals with clear plastic tape.

5.2.12 Repeat the above steps for each cooler or shipping container. If more than one cooler is being delivered to a laboratory, mark each cooler as “1 of 2”, “2 of 2”, etc.

5.2.13 Transport the shipping container directly to the laboratory or the laboratory courier. Samples will be shipped by close of the same day, whenever possible.

6.0 Quality Assurance/Quality Control

6.1 Completed COCs will be reviewed by the individuals preparing the samples for shipment for completeness, accuracy, and legibility. Specifically, the samples and COC record will be compared to ensure agreement between the sample labels and the COC, and to verify the number of sample containers.

6.2 The laboratory will notify the Project Chemist within 24 hours of receipt in the event that samples are received broken, that there are sample preservation concerns or holding time exceedances, or there are discrepancies between the custody paperwork and the sample containers.

6.3 The procedures and records associated with sample packaging and shipping are subjected to periodic inspection and review by the Field Services Task Leader to verify adherence to the procedures outlined in this SOP.

7.0 Data and Records Management

7.1 The records associated with the shipment process (COC records, etc.) will be maintained in an organized and contained manner. Field notes will be kept during sampling activities in accordance with SOP ES-G-01 - Field Records.

7.2 COC records will be distributed to the appropriate personnel as described in SOP the QAPP and FSP.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP ES-G-01 – Field Records). Proposed modifications to this SOP will be recorded on a Field Corrective Action Form (refer to SOP ES-G-01 – Field Records), including reason and impact on the program, and will be submitted to the AECOM Task Order Manager for approval.

8.0 Personnel Qualifications and Training

Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP, FSP and QAPP. No specialized training is required; however, execution of these activities will initially be supervised by more experienced personnel.

9.0 Revision History

Revision	Date	Changes
0	September 2017	NA

AECOM

Standard Operating Procedure

Sediment Grab Sampling

Procedure Number: ES-S-01

Revision No.: 0

Revision Date: September 2017

Originally Prepared by

Rachel MacPhee

_____ Date: _____

Maura Surprenant
AECOM Deputy Program Manager

_____ Date: _____

Debra L. Simmons
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Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

Standard Operating Procedure
Sediment Grab Sampling

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Attachment 1 Example Of Grab Collection Form

Attachment 2 Equipment Rinsate Blank Collection Procedure

Standard Operating Procedure
Sediment Grab Sampling

1.0 Scope and Applicability

1.1 The purpose of this document is to define the standard operating procedure (SOP) for collecting sediment grab samples using a grab sampler deployed from a boat or other sampling platform under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program. Surface sediment samples will be collected for a variety of chemical, physical, and biological parameters. Grab samplers can include Van Veen grab samplers (including Ted Young modified), ponar grab samplers, power grab samplers, and box corers. This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to collect grab samples. Specific information regarding grab sampling can be found in the associated task order specific Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP). This SOP is based on United States Environmental Protection Agency (USEPA) guidance document Methods for Collection, Storage, and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual (USEPA, 2001).

1.2 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted based on field conditions, equipment limitations, or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the AECOM Project Quality Assurance (QA) Officer and the AECOM Task Order Manager. Deviations from this SOP will be documented in the field records and on a field corrective action form (SOP ES-G-01 – Field Records) including the reason for the deviation(s). The ultimate procedure employed will be documented in the report summarizing the results of the sampling event or field activity.

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the task order specific Accident Prevention Plan (APP).

2.2 The health and safety considerations for the work associated with grab sampling include:

- The physical hazards of handling heavy equipment,
- Pinch hazards associated with the grab or box core sampler,
- Overhead lifting hazards using boat based winches and A-frames,
- Marine safety aspects of the program, and
- The specific chemical hazards related to the sediments.

2.3 Daily safety briefings will be conducted at the start of each working day before any work commences. These daily briefs will be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

Grab sampler collection issues generally include mechanical failures, over penetration, or surface sediment loss. Each of these will affect the quality/representativeness of the resulting data. Any sampler that did not trigger properly, or did not completely close will be rejected. Samplers that are either over-filled or appear to have lost surface fines will also be rejected. These details are further discussed in Section 5 (Procedures).

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, pending field conditions.

- Coring/sampling vessel, including the necessary navigational, communication, and grab deployment equipment;
- Marine VHF radio;
- Van Veen (or Ted Young modified Van Veen) grab sampler;
- Ponar grab sampler;
- Stainless-steel power grab sampler with pneumatic ram and stainless steel guide;
- Box corer;
- Stand (cradle) on which to place the grab or box core while not in deployment;
- Siphon tubing and bucket or pipette;
- Source of running water (optional);
- Water pump and hoses (optional);
- First aid kit and personal protective equipment (PPE) (refer to APP);
- Approved plans, including target sampling locations;
- Sample containers (refer to the task order specific QAPP);
- Stainless steel bowls/trays and spoons/spatulas (or equivalent);
- Insulated coolers with wet ice;
- Sample labels;
- Waterproof paper and pen;
- Field notebook, Grab Collection Form, and other standardized forms (as needed);
- Ruler and tape measure;
- Digital camera (optional);

- Chain-of-custody forms and seals;
- Decontamination supplies (refer to SOP ES-G-03 – Equipment Decontamination).

5.0 Procedures

This section gives the step-by-step procedures for collecting grab samples using a grab sampler (Van Veen, Ted Young modified Van Veen, or power grab) or box corer. Observations made during sediment grab sample collection will be recorded on the Grab Collection Form (Attachment 1), and/or a logbook (SOP ES-G-01 - Field Records).

5.1 Equipment decontamination

The grab sampler or box corer, stainless steel bowls/containers, and stainless steel spoons/spatulas will be cleaned prior to initial use and between each station following the procedures in SOP ES-G-03 and documented in the field notebook. A sufficient supply of pre-decontaminated small equipment will be mobilized to the sampling locations to minimize the need for performing field decontamination. Larger equipment, such as a grab or box core, will, however, require field decontamination on the vessel between sampling stations. Note: grabs or box corers will not require decontamination between deployments at the same station; only between sampling stations, unless sticky or tar-like materials are encountered.

5.2 Equipment rinsate blanks

Equipment rinsate blanks will be collected at the frequency specified in the task order specific QAPP after the sampling gear is decontaminated. The procedure for collecting equipment rinsate blanks and related sample containerization requirements are detailed in Attachment 2.

5.3 Positioning

5.3.1 The sediment sampling schedule for the day will be established prior to vessel departure, and sufficient equipment to complete the work will be on-board the sampling/coring vessel. Grab samples are anticipated to be collected adjacent to core collection locations.

5.3.2 The sampling/coring vessel will move to a grab/coring location in accordance with SOP ES-G-02 (Navigation Positioning).

5.4 Sampling preparation

The associated QAPP summarizes the parameters that require collection at each station, and list the sample mass, container type, preservatives, and storage conditions required for each sample.

5.5 Sampler Deployment and Retrieval

5.5.1 Don PPE as required by the APP.

5.5.2 Attach the sampler (grab sampler or box corer) to the end of the winch cable with a shackle and tighten the pin.

5.5.3 Attach any needed weights to achieve the needed penetration or pads (boards) for stabilization. Arm the grab/box corer.

5.5.4 Lower the sampler through the water column until the cable slackens. Nearing the bottom travel time will not exceed 1 m/sec to minimize bow wave disturbance. Record the station location (HYPACK system) and water depth (echo sounder or weighted line) on the Grab Collection Form (Attachment 1).

5.5.5 Retrieve the sampler and place it on the stand.

5.5.6 Open the sampler and examine it for acceptability:

- The sediment surface should be basically level and intact over the surface area of the grab, with no sign of channeling or sample washout
- Penetration depth should be sufficient (as measured from the center of the grab) to meet the project requirements
- The jaws of the sampler should be tightly closed and water should not be substantially leaking from the sampler
- The surface appears intact (shell hash or coarse material visible on the surface is acceptable as long as the first two criteria are met and the jaws of the grab are tightly closed and not leaking).
- Grabs that are only partially filled, or obviously slumped or pitched due to the sampler hitting at an angle are not considered acceptable. In addition, sediments should not be in contact with the underside of the sampler access doors. Drain overlying water from the sampler (by siphoning, not decanting) until only a thin film remains.

5.5.7 Describe the sample surface (color, texture, odor, etc.) on the Grab Collection Form (Attachment 1); continue to describe the sample during sample processing.

5.5.8 Collect the sample as described below. Future deployments will be adjusted for local sediment conditions by either adding/removing weight or pads to the grab frame to control the penetration depth.

5.5.9 Repeat steps 5.5.4 through 5.5.9 until sufficient grab samples are collected to meet the sample volume requirements for the full set of parameters as specified in the FSP and QAPP. Care will be taken to ensure that the precise collection interval/horizon specified in the corresponding FSP is collected. Slight adjustments/relocation of the vessel on-station between sampler deployments will be performed according to SOP ES-G-02.

5.6 Shipboard sample collection

5.6.1 Siphon off the overlying water (or remove via pipette) to the sediment/water interface without substantially disturbing the soft surface sediment. This will be performed by gently allowing the water to drain to one corner of the sampler for siphoning-off.

5.6.2 Sediment to be homogenized (for non-discrete sample parameters) will be placed in a covered plastic bucket (e.g., 3 ½ gallon bucket) provided by the laboratory.

5.6.3 Store the sample containers in an insulated cooler containing wet ice to keep samples cold while on the vessel until they can be transported to shore for further processing or shipment to the corresponding analytical laboratory as described in SOP ES-G-05 (Sample Packaging and Shipping).

5.6.4 Clean the grab sampler or box corer in accordance with the procedures in SOP ES-G-03 between stations.

6.0 Quality Assurance/Quality Control

6.1 Completing the Grab Collection Form (Attachment 1) will document that the process is being followed and that pertinent information is being collected and recorded in accordance with the procedures outlined in this SOP.

6.2 Entries on the forms and in the field logbook will be double-checked by the samplers to verify the information is correct. Completed forms and field logbook will be reviewed periodically by the Field Services Task Leader to verify that the requirements are being met.

6.3 High sediment moisture content, which can impact the achievable reporting/detection limits and sample representativeness, will be evaluated. Samples collected with a high water content will be discussed with the Field Services Task Leader to evaluate the need to collect additional sample or to take additional action that would reduce the water content (e.g., allowing the sediment slurry to settle in a bucket followed by siphoning the overlying water).

6.4 Data quality evaluations will be based on quality control (QC) sample results. QC samples may include field duplicates and equipment rinsate blanks; collection requirements are tabulated in the associated task order specific QAPP.

6.5 The task order specific QAPP lists the proper sediment sample containerization, preservation, and storage conditions required to maintain sample integrity.

7.0 Data and Records Management

7.1 Field notes will be kept during sampling activities in accordance with SOP ES-G-01 - Field Records.

7.2 Field data will be distributed to the appropriate personnel as described in the task order specific FSP.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP ES-G-01 – Field Records). A field corrective action form, including reason and impact on the program, will be submitted to the Task Order Manager and Project QA Officer for approval.

8.0 Personnel Qualifications and Training

8.1 Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding plans (e.g., APP, FSP, QAPP). Inexperienced personnel performing these activities will be initially supervised by the Field Services Task Leader or his/her designee.

9.0 References

USEPA 2001. Methods for Collection, Storage and Chemical Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual. United States Environmental Protection Agency, Office of Water. EPA-823-B-01-002. October 2001.

10.0 Revision History

Revision	Date	Changes
0	September 2017	NA

Standard Operating Procedure
Sediment Grab Sampling

Attachment 1 Example of Grab Collection Form

Sediment Grab Collection Record AECOM

Location ID **Date** **Proje**

Sampler **Contractor** **Vessel**

Weather

Sampling Equipment Ted Young Box Core **Diameter** *in*

Target **Northing** **Easting** *NJ NAD83 Stateplane Feet*

Grab Number **Time** *24hr* **Water Depth** *ft* **# Attempts**

Actual **Northing** **Easting** **Distance from target** *ft*

Target **Penetration Depth** *ft*
Actual **Penetration Depth** *ft*
Recovered Length *ft*
Recovery %

Remarks

RPD *cm* **Texture** *all* Clay Clay+Silt Silt Silt+Sand Sand Sand +Gravel Gravel

PID *ppm* **H2S** *ppm* **Color** Black Dark Gray Light Gray Brown Tan Green

Debris Yes No **Oil sheen** Yes No **Visible biology** Yes No

---

Grab Number **Time** *24hr* **Water Depth** *ft* **# Attempts**

Actual **Northing** **Easting** **Distance from target** *ft*

Target **Penetration Depth** *ft*
Actual **Penetration Depth** *ft*
Recovered Length *ft*
Recovery %

Remarks

RPD *cm* **Texture** *all* Clay Clay+Silt Silt Silt+Sand Sand Sand +Gravel Gravel

PID *ppm* **H2S** *ppm* **Color** Black Dark Gray Light Gray Brown Tan Green

Debris Yes No **Oil sheen** Yes No **Visible biology** Yes No

---

Grab Number **Time** *24hr* **Water Depth** *ft* **# Attempts**

Actual **Northing** **Easting** **Distance from target** *ft*

Target **Penetration Depth** *ft*
Actual **Penetration Depth** *ft*
Recovered Length *ft*
Recovery %

Remarks

RPD *cm* **Texture** *all* Clay Clay+Silt Silt Silt+Sand Sand Sand +Gravel Gravel

PID *ppm* **H2S** *ppm* **Color** Black Dark Gray Light Gray Brown Tan Green

Debris Yes No **Oil sheen** Yes No **Visible biology** Yes No

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Attachment 2 Equipment Rinsate Blank Collection Procedure

1. Decontaminate the sample handling equipment (e.g., grab, box corer, utensils and basins/bowls) according to the procedures detailed in SOP ES-G-03 – Equipment Decontamination.

2. Rinse the utensils with de-ionized water (DIW), collect the rinse water in the decontaminated basin/bowl, and pour it into laboratory-provided containers. Note that equipment rinsate blanks for dioxins/furans will substitute hexane for the DIW. Sample volume, container type, preservatives, and storage details are provided in the task order specific QAPP. QC sample blank containers will be pre-preserved by the laboratory that provides them. Note: equipment blanks may not be appropriate for each parameter

3. Label each container with the sample ID, date and time of collection, and the analytical parameters, cover the label with clear packing tape and fill out the custody form (refer to SOP ES-G-04 – Sample Custody).

4. Store the samples in a cooler on ice until they are transported to the field facility, under the Field Custody and Transfer Form (refer to SOP ES-G-04 – Sample Custody), for shipment to the corresponding analytical laboratory following SOP ES-G-05 – Sample Packaging and Shipping.

AECOM

Standard Operating Procedure

Surface Water Sampling

Procedure Number: ES-W-01

Revision No.: 0

Revision Date: September 2017

Prepared by

Rachel MacPhee

Reviewed by:

_____ Date: _____

Maura Surprenant
AECOM Deputy Program Manager

_____ Date: _____

Debra L. Simmons
AECOM Project Quality Assurance Officer

Annual review of this SOP has been performed
and the SOP still reflects current practice.

Initials: _____ Date: _____
Initials: _____ Date: _____

Contents

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1.0 Scope and Applicability

1.1 This project Standard Operating Procedure (SOP) defines the operating procedures for the collection of bulk and discrete water samples under the United States Army Corps of Engineers New England District (NAE) Environmental Services (ES) Program. Water samples are collected either using a bottle-type sampler, or with the aid of a peristaltic (or other equivalent) water pump.

1.2 Samples will be collected using a pre-cleaned peristaltic pump and CFLEX™ (or equivalent) tubing system. If needed, a Niskin bottle may be utilized. Samples may be analyzed for chemical, biological and physical analyses. Analytes and water depths for samples for a particular program are specified in the task order specific Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP).

1.3 It is fully expected that the procedures outlined in this SOP will be followed. Procedural modifications may be warranted depending upon field conditions or limitations imposed by the procedure. Substantive modification to this SOP will be approved in advance by the AECOM Project QA Officer and the AECOM Task Order Manager and communicated to the client. Deviations from this SOP will be documented in the field records.

2.0 Health and Safety Considerations

2.1 The health and safety considerations for the work associated with this SOP, including physical, chemical, and biological hazards are addressed in the task order specific Accident Prevention Plan. The major health and safety considerations for the work are the near and on-water safety aspects of the sample collection.

2.2 Daily safety briefings are to be conducted at the start of each working day before any work commences. These daily briefs are to be facilitated by the Site Safety Officer (SSO) or his/her designee to discuss the day's events and any potential health risk areas covering every aspect of the work to be completed. Weather conditions are often part of these discussions. As detailed in the APP, everyone on the field team has the authority to stop work if an unsafe condition is perceived until the conditions are fully remedied to the satisfaction of the SSO.

3.0 Interferences

3.1 Cross-contaminations of samples may result if sample handling equipment is inadequately or improperly decontaminated.

3.2 Contamination of samples may result if samples are exposed to certain environmental conditions. Exposure to potential sources of contamination (e.g., exhaust fumes) will be minimized.

3.3 Care must be taken to avoid disturbing the bed sediment during sampling. Re-suspended bed sediments may contaminate/ artificially bias the surface water samples.

3.4 Inappropriate sampling equipment, such as that manufactured from non-inert plastics, may contaminate samples. Using Teflon, polymer, or stainless steel sampling equipment will minimize contamination during sample collection activities.

3.5 Purging of the pump system with a minimum of three volumes of site water prior to sample collection will ensure a representative sample.

4.0 Equipment and Materials

The following equipment list contains materials which may be needed in carrying out the procedures contained in this SOP. Not all equipment listed below may be necessary for a specific activity. Additional equipment may be required, depending on the field conditions encountered:

- Peristaltic or equivalent water pump, variable speed
- 12-volt battery (as needed)
- CFLEX or equivalent polymer tubing (typical configuration requires 3/8 in. Inner Diameter [ID])
- Silicone tubing (typical configuration requires ¼ in. ID) for peristaltic pump head
- Niskin or equivalent sampling bottle
- Sample containers as specified in the QAPP
- Connective (serial) cabling
- Zip ties
- Weight bearing line/cable
- Field computer (if applicable)
- Project specific field log book
- Chemical-free wipes
- Disinfectant wipes
- Approved plans, including target sampling locations
- Insulated coolers with wet ice
- Field notebook, pen, standardized forms (as needed)
- Chain-of-custody forms and seals
- Replacement batteries
- GPS
- Safety gear (APP specified PPE)
- Nitrile gloves
- Gauntlet gloves
- Storage bags
- Survey vessel fitted with differential global positioning system (DGPS) navigational equipment (SOP ES-G-02) and fathometer

- Multi-parameter datasonde, calibrated daily according to manufacturer's instructions
- Dry storage cooler

5.0 Procedures

5.1 Water Pump/Tubing Set-up

5.1.1 Fasten the CFLEX™ tubing to the datasonde (YSI or equivalent) that will be used to conduct water column profiling with plastic tape if water quality parameters are needed. Avoid causing any obstruction to the turbidity sensor. Attach the datasonde and the tubing inlet to the weighted deployment line at approximately 3 feet above the anchor weight. The tubing and the sensor cable should then be fastened (with plastic tape or similar) to the weighted deployment line at regular intervals over the entire length.

5.1.2 Connect the pump to a 12-volt battery or directly to the vessel's 12-volt electrical system using appropriate electrical connections. The water pumps and associated tubing should be new and dedicated to the project. Water pumps should be rinsed with tap water before and after each sampling day but between-station (or between sampling depth) rinsing is not generally required for major component sampling/analysis. However, the internal volume of water carried in the system (pump inlet to pump outlet) should be purged with a least three volumes of river water prior to sample collection to ensure that a representative sample is collected. The tubing should be sealed in a bag when not in use; open tube ends should also be covered and protected when not in use, including between stations. The number of minutes required to purge the pump and tubing will be calculated as follows:

$(((\pi r^2 \times l)/10)/f) \times 3$ = minutes to purge the pump

Where:

π = pi

r = half the inner diameter of the tubing (centimeters)

l = length of tubing used on station (meters)

f = flow rate of the pump (liters/minute)

5.2 Field Data and Sample Collections

5.2.1 Navigate to sampling stations per SOP ES-G-02, Navigation/Positioning; sample locations are described in the task order specific FSP.Estimate and record the depth of the water. Water depth may be recorded using a weighted line with 0.1 ft increments marked.

5.2.2 Deploy the datasonde and attached sampling tube and begin water column profiling as outlined in the FSP.

At the station of interest, the datasonde (and sampling tubing) should be lowered through the water column until it is at the correct depth according to the FSP. Turbidity will be monitored real time during the descent and caution taken to avoid contact with the bottom. In the event of bottom contact during sampling, as determined by operator "feel" or sporadically high real-time turbidity readings, sampling should be delayed until the turbidity plume has dissipated.

Water quality measurements will be recorded as required by the task order specific FSP. After completion of an initial water column profile by instrument retrieval, water collections will then made by returning the instrument package to the desired depth.

Following the purging procedure, water sampled from the pump outlet will be collected directly into the appropriate sample containers for laboratory analysis per the task order specific FSP and QAPP. Fill each sample container while avoiding contact between the sampling tube and the bottle.

5.2.3 In areas and for parameters that allow grab sampling, the Niskin or equivalent sampler is lowered to the desired depth. The trigger mechanism is activated to close the sampler and the sampler is retrieved to the boat. Water from the sampler may be poured directly in the sample containers. Place the capped container on ice in a cooler.

5.2.4 The samples will be numbered and labeled as described in the FSP. Samples will be placed in coolers and stored on ice until shipment or transfer to the laboratory.

5.2.5 All discrete water samples should be collected and stored/transferred to laboratories according to the procedures described in SOP ES-G-05 - Packaging and Shipping.

6.0 Quality Assurance / Quality Control

6.1 It is the responsibility of the Field Services Team Leader to check the calibration information, to spot check instrument operations, and to check the documentation accuracy of all field staff.

6.2 Quality control (QC) samples may include equipment blanks, field and laboratory duplicates as specified in the task order specific QAPP.

6.2.1 Equipment blanks

Equipment blanks will be collected at the frequency specified in the QAPP, and from each set of sampling gear (e.g., tubing, tubing outfitted with a filter, and bottle sampler with tubing, etc.), after the sampling gear is decontaminated per SOP ES-G-03 – Equipment Decontamination.

Equipment blanks may be collected if required by the task order specific QAPP for pumped samples by flushing the collection tube with deionized water and filling a set of containers with deionized water that has been pumped through the system.

If required, bottle blanks may be used to evaluate potential contamination associated with the direct grab sampling technique. In this case, bottles may be filled directly with deionized, capped, bagged, and stored on ice for transfer to the laboratory.

7.0 Data and Records Management

7.1 Field notes will be kept during coring activities in accordance with SOP ES-G-01 – Field Records. The information pertinent to coring activities includes chronology of events, sample locations (x,y,z), time/date, sampler name, methods, sampler penetration and acceptability, sample observations, and the times and type of equipment decontamination. This information will be recorded in the field logbook.

7.2 Field data will be distributed to the appropriate personnel as described in the task order specific QAPP and FSP.

7.3 Deviations to the procedures detailed in the SOP will be recorded in the field logbook at the time of occurrence and reported on the Daily Activity Log (refer to SOP ES-G-01 – Field Records). Proposed modifications to this SOP will be recorded on a Field Corrective Action Form (refer to SOP ES-G-01 – Field Records), including reason and impact on the program, and will be submitted to the AECOM Task Order Manager for approval.

All records associated with the activities described in this SOP will be ultimately maintained in accordance with the task order specific QAPP.

8.0 Personnel Qualifications and Training

Individuals executing these procedures will have read and be familiar with the requirements of this SOP and the corresponding project plans (e.g., APP, FSP, and QAPP). Inexperienced personnel performing these activities will be initially supervised by the Field Services Task Leader or his/her designee. Surface water sampling procedures are relatively simple and can be implemented by personnel without specialized training. However, it is recommended that initial sampling activities be supervised by more experienced personnel.

9.0 Revision History

Revision	Date	Changes
0	September 2017	NA

Appendix B

RIM QC Summary Tables

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	
3. If not, were deviations documented?	
4. Was the SAP approved by the New England District?	
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	
7. Were the correct stations sampled (include the precision of the navigation method used)?	
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	
9. Were the samples properly labeled?	
10. Were all the requested data included?	
11. Were the reporting limits met?	
12. Were the chain-of-custody forms properly processed?	
13. Were the method blanks run and were the concentration below the acceptance criteria?	
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	
15. Were the SRM/CRM analyses within acceptance criteria?	

Table II-1 (continued): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	
19. Were surrogate recoveries within the required acceptance criteria?	
20. Were corrective action forms provided for all non-conforming data?	
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-2 (continued): Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270C

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for Analyses of Pesticides in Sediment, Tissue and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (< 20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-3 (continued): Quality Control Summary for Analyses of Pesticides in Sediment, Tissue and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychorinated Biphenyls (PCB congeners) in Sediment, Tissue and Water Matrices

Method Reference Number: 8082A

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration. (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-4 (continued): Quality Control Summary for Analyses of Polychorinated Biphenyls (PCB congeners) in Sediment, Tissue and Water Matrices

Method Reference Number: 8082A

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly			Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery			Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package

Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)			In Data Package

Table II-5 (continued): Quality Control Summary for Analyses of Metals in Sediments, Tissue and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample.(<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package

Table II-6 (continued): Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; ≤ 40% clam larvae, ≤ 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Appendix B: Field Report

USACE CONTRACT NO. W912WJ-17-D-0003
Delivery Order No. W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Field Report

New Haven Harbor Navigation Improvement Project, New Haven Connecticut

Prepared for

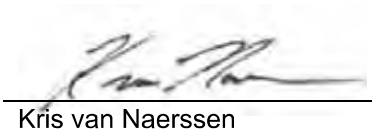
U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

Prepared by
AECOM
250 Apollo Drive
Chelmsford, MA 01824

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Field Report

New Haven Harbor Navigation Improvement Project, New Haven Connecticut

Prepared By:



11/02/2018

Kris van Naerssen
AECOM Task Order Manager / Chief Scientist / Site Safety Officer

Date

Reviewed By:

11/02/2018

Maura Surprenant
AECOM Deputy Program Manager

Date

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Attachment 1 New Haven Harbor / CLDS Sampling Daily Activity Logs
Attachment 2 New Haven Harbor / CLDS SH&E Documentation
Attachment 3 New Haven Harbor / CLDS Chain of Custody Forms
Attachment 4 New Haven Harbor / CLDS Field Logs

Acronyms

Alpha	Alpha Analytical Labratories
˚C	degrees Celsius
CLDS	Central Long Island Sound Disposal Site
COC	Chain of Custody
DGPS	Differential Global Positioning System
ESI	EnviroSystems, Inc.
FSP	Field Sampling Plan
FNP	Federal Navigation Project
L	liter
NAE	New England District
NOAA	National Oceanographic and Atmospheric Administration
OSI	Ocean Surveys, Inc.
R/V	Research Vessel
QAPP	Quality Assurance Project Plan
SPP	Suspended Particulate Phase
USACE	United States Army Corps of Engineers

1. Introduction

The New Haven Harbor dredged material suitability determination field program was completed by both U.S. Army Corps of Engineers (USACE), New England District (NAE) personnel (harbor site sampling) and individuals on the AECOM and Ocean Surveys Inc. (OSI) Field Team (collectively the AECOM Field Team). Field activities undertaken by the AECOM Field Team included collection and transport of sediment and water samples from the Central Long Island Sound Disposal Site (CLDS) Reference Site, as well as receipt and delivery of NAE-collected representative sediment and water samples from proposed maintenance and improvement dredging areas within the New Haven Harbor Federal Navigation Project (FNP).

Tasks described within this Field Report focus primarily on activities undertaken by the AECOM Field Team. Sampling techniques employed by NAE personnel, relative to sediment and water collection activities within New Haven Harbor, are addressed under separate cover.

2. New Haven Harbor / CLDS Reference Site Sampling Field Summary

The project field effort commenced on October 22, 2018 and was completed on October 26, 2018. The AECOM Field Team program was divided into four subtasks:

- The AECOM Field Team's collection of sediment and water samples at the CLDS Reference Site on October 23, 2018;
- AECOM's receipt of New Haven Harbor sediment and water samples which were collected by NAE (samples collected by NAE on October 22 through 25, 2018) and received by AECOM on October 23 through 25, 2018;
- AECOM's delivery of samples to the project toxicology laboratory, EnviroSystems, Inc. (ESI) on October 24, 2018 and two deliveries to ESI on October 25, 2018; and,
- AECOM's delivery of samples directly to the project chemistry laboratory, Alpha Analytical, Inc. (Alpha) or to the Alpha courier on October 24 and 25, 2018.

CLDS Reference Site samples (sediment/water) were collected by the AECOM Field Team from OSI's sampling platform, the survey vessel R/V Willing II. Table 1 summarizes the activities accomplished during the field effort. Daily Activity Logs are provided in Attachment 1.

3. Health and Safety

The New Haven Harbor dredged material suitability determination efforts and the associated CLDS sampling activities were completed safely and without incident. AECOM Team participants took an active part during the daily project safety briefings. The AECOM Deputy Program Manager and the USACE Task Order Manger were notified at the completion of the on-water field activities. Documentation of the daily safety briefings is included in Attachment 2. The Float Plan and Tailgate meeting forms covering boating activities and task order safety protocols are included in Attachment 2.

4. Sediment Collection

New Haven Harbor sediments were collected by NAE using vibracore methodology. NAE collected vibrocore samples from thirteen representative harbor locations to be composited into six composites, as detailed in Table A-1 of the Project Work Plan[1]. These NAE-collected sediment samples were containerized by NAE and transferred to AECOM under chain of custody (COC) during, and at the conclusion of, the USACE sampling efforts.

CLDS Reference Site sediments were collected by the AECOM Field Team using a modified Van Veen grab sampler as outlined in, and in accordance with, the Project Work Plan.

[1] AECOM, 2018. *Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Project Work Plan - New Haven Harbor Navigation Improvement Project New Haven, Connecticut" USACE Contract No. W912WJ-17-D-003. Delivery Order No. W912WJ18F0109.* October, 2018. The Project Work Plan is comprised of the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP).

New Haven Harbor samples and the CLDS Reference Site samples were held in a temperature-controlled refrigerated truck unit in accordance with the project Work Plan until delivery to ESI and/or Alpha.

4.1 Vessel Positioning

Vessel positioning was accomplished utilizing a Differential Global Positioning System (DGPS) unit and associated Hypack vessel positioning software. The local National Oceanic and Atmospheric Administration (NOAA) tide data were obtained from the appropriate local stations.

4.2 Grab Sample Handling

Grab sampling at the CLDS Reference Site was accomplished as outlined in the Work Plan, using a modified Van Veen grab sampler. Multiple deployments of the grab sampler were required to obtain the minimum volume of reference site sediments required for testing (18-gallons). For each grab, the sample was examined, key features were recorded and the sample was transferred with stainless steel spoons into food-grade polyethylene buckets. These samples were placed on ice for preservation until return to the dock.

The buckets of sediment collected at the reference site were transferred from the vessel and placed into a locked refrigerated truck set to 2.2 degrees Celsius (°C) upon return to the dock. These sediment samples were transported under COC and signed over to the biological laboratory, as detailed in Table 1.

Before and after sediment collection, the sampling gear was decontaminated as outlined in the Project Work Plan.

5. Water Collection

Water samples from the harbor area (site water) were collected by NAE from representative harbor locations on October 24, 2018, and composited into six samples as detailed in Table A-1 of the Work Plan. These water samples were transferred to AECOM under COC during the NAE field sampling efforts.

Water from the CLDS reference site was collected by the AECOM Team on 23 October, 2018 for chemical analysis and for use as SPP dilution water.

The CLDS reference site water samples were collected using a large volume Niskin bottle system as described in the Work Plan. The reference site water samples were collected from mid-depth in the water column. The seawater was transferred directly into new 5-gallon plastic cubitainers and into Alpha-supplied sample bottles. These samples were placed on ice for preservation until return to the dock.

Water samples collected by the AECOM Field Team were transferred to the refrigerated truck upon return to the dock.

Before and after water collection, the sampling gear was decontaminated as outlined in the Work Plan.

6. Field QA/QC Procedures

Equipment blanks were collected (by USACE personnel) on October 24, 2018 from the field sampling equipment used by NAE in New Haven Harbor (i.e. the core sampler and pump and tubing system). Equipment blanks were collected (by the AECOM Field Team) on October 23, 2018 from the field sampling equipment used by the AECOM Field Team (sediment and water grab samplers) for the CLDS Reference Site sampling.

Equipment blanks were iced for transport to the dock, and transferred to the locked refrigerated truck upon return to the dock. All samples were held under COC, and signed for during ownership transfer (Attachment 3).

7. Difficulties Encountered

There are two notes of interest relative to the New Haven Harbor / CLDS field sample collection effort:

- During the CLDS Reference Site field sampling operations, sea conditions picked up with larger wave action than was forecast for the day (i.e. approx.. 4' seas intermittently). During the water sample collection efforts,

the captain and AECOM Field Team determined that it was unsafe and unadvisable to attempt to fill the laboratory glassware with CLDS waters while offshore, due to the wave action. All of the equipment blanks and large volume cube containers had been filled with reference site waters when this decision was made. The CLDS Reference Site laboratory waters which were collected while at sea, were temporarily containerized in spare large volume cube containers and subsequently transported back to the dock for final containerization into the laboratory-provided glassware. No project work plan deviations were incurred as a result of this change, which was made for Health and Safety reasons. No associated project implications are anticipated.

- The Project Work Plan indicates that *"Samples will be chilled on wet ice while on board the vessel and subsequently transferred to a refrigerated box truck/van daily during field operations. The temperature in the refrigerated vehicle will be regularly monitored to ensure that the storage temperature is maintained at 4° Celsius (C) ±2° C ".* During sample transport, AECOM continuously monitored the conditions within the refrigerated van unit as prescribed. In addition, and as a precaution against the potential of malfunctioning refrigeration equipment, AECOM packed the samples with wet-ice during the sample transport to the project toxicology laboratory. During two discrete periods (approximately 20 minutes prior to simple delivery at the project toxicology laboratory on 25-October-18; and again later that same day), the AECOM transport driver noticed an intermittent malfunction of the refrigerated van's compressor unit. Upon investigation, the driver determined that the refrigeration compressor was displaying an error code and subsequently notified the AECOM Project Manager, the refrigerated van provider and the NAE Task Manager. Throughout the sample transport operations, and upon sample check-ins at the project toxicology laboratory, AECOM confirmed that cargo area holding temperatures were within or below the work plan prescribed temperature range. Accordingly, and as the samples were also transported on ice, no Project Work Plan "deviation" is noted here. Additional details regarding temperatures within the refrigerated van are presented in Attachment 4.

Project logbook entries and grab sample logs are included in Attachment 4. Neither of the above items represented a deviation from the approved work plan. As such no corrective action forms have been prepared.

Table 1 New Haven Harbor / CLDS Field Survey Activity Summary

Date	AECOM Field Activities	Equipment	Platform
October 22, 2018	Project Mobilization. NAE Field Sampling coordination, AECOM on stand-bye.	Refrigerated Truck	Refrigerated Truck
October 23, 2018	CLDS Reference Site water and sediment grab sampling. Equipment blank collection (for CLDS sampling equipment).	Van Veen Grab Sampler, Niskin Bottle, Refrigerated Truck	R/V Willing II Refrigerated Truck
	New Haven Harbor sediment receipt from NAE and subsequent storage/transport to ESI and Alpha Analytical	Refrigerated Truck	Refrigerated Truck
October 24, 2018	CLDS and New Haven Harbor sample transport to ESI	Refrigerated Truck	Refrigerated Truck
	Analytical sample transfer to Alpha Analytical	Lab supplied cooler	Lab courier
	New Haven Harbor sediment and water sample receipt from NAE. Subsequent storage/transport to ESI and Alpha Analytical	Refrigerated Truck	Refrigerated Truck
October 25, 2018	New Haven Harbor sediment water sample receipt from NAE and subsequent storage/transport to ESI and Alpha Analytical	Refrigerated Truck	Refrigerated Truck
	Analytical sample transfer to Alpha Analytical	Lab supplied cooler	Lab courier
October 26, 2018	Project Demobilization	Refrigerated Truck	Refrigerated Truck

Figure 1 CLDS Reference Site Sediment and Water Sampling Location – New Haven Harbor Sediment Characterization Study (Figure from PWS, NAE 2018)

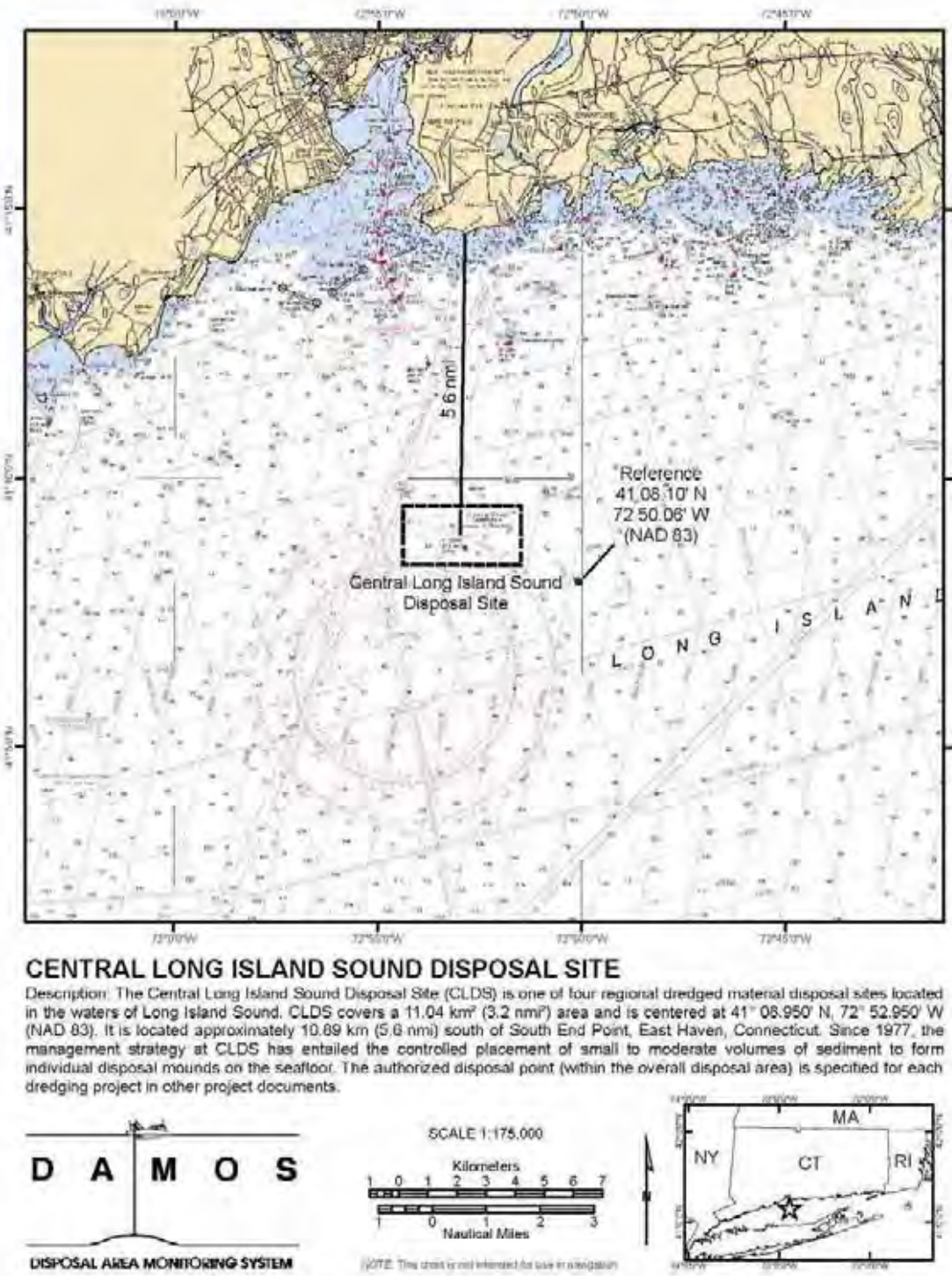

Figure 2 New Haven Harbor FNP – NAE Sediment and Water Sampling Location (Figure from PWS, NAE 2018)

Attachment 1 New Haven Harbor / CLDS Sampling Daily Activity Logs

AECOM

Daily Activity Log
New Haven Harbor Supplemental Evaluations
Reference Site Sampling and Sample Transport

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ-18-F-0109

Date: 10/23/18

Vessel/Sampling Platform:

R/V Willing II, Refrigerated Truck

Personnel (Name/Affiliation/Role):

K. van Naersen / AECOM / Field Scientist/SSO/TOM
K. Cadmus / OSI / Captain
M. Barrett / OSI / Mate
C. Nixon / AECOM / Transport Driver

Sampling Performed/Equipment Used:

CLDS Sampling by AECOM TOAM (modified van Veen sampler + Niskin bottle)
NHH sediment + water sampling by NAE (see COCs for sample IDs), vibrocore sampling

Stations Sampled:

CLDS Reference site sampled by AECOM

New Haven Harbor stations - see accompanying COCs

Health and Safety Issues:

None noted (larger waves/winds than predicted)

Deviations from Approved Plan:

None noted. Two items of note:
- CLDS ~~Equipment Reference site wrong Below~~ samples collected at ref. site, but containerized in cab glassware at dock due to high seas/SHO concerns. No project implications anticipated.
- Reefer truck exchanged by rental company prior to sample storage, to correct a compressor issue - no project implications anticipated.

Dock Departure Time: 09:00

Dock Return Time: 16:05

Recorded by: K. van Naersen, AECOM

AECOM

Daily Activity Log
New Haven Harbor Supplemental Evaluations
Reference Site Sampling and Sample Transport

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ-18-F-0109

Date: 10/24/18

Vessel/Sampling Platform: REFRIGERATED TRUCK

Personnel (Name/Affiliation/Role):
C. NIXON / AECOM / TRANSPORT DRIVER

Sampling Performed/Equipment Used:
NEW HAVEN HARBOR SEDIMENT + WATER SAMPLING BY NAE (VIBRO CORE + PUMP & TUBING SAMPLING)

Stations Sampled:
NEW HAVEN HARBOR STATIONS - SEE ACCOMPANYING COCs

Health and Safety Issues:
NONE NOTED

Deviations from Approved Plan:
NONE NOTED

Dock Departure Time: N/A
Dock Return Time: N/A
Recorded by: K. VAN NAGRSSON, AECOM

AECOM

Daily Activity Log
New Haven Harbor Supplemental Evaluations
Reference Site Sampling and Sample Transport

USACE Contract No. W912WJ-17-D-0003
Delivery Order No. W912WJ-18-F-0109

Date: 10/25/18

Vessel/Sampling Platform:

REFRIGERATED TRUCK

Personnel (Name/Affiliation/Role):

C. NIXON / AECOM / TRANSPORT DRIVER

Sampling Performed/Equipment Used:

NEW HAVEN HARBOR SEDIMENT SAMPLING
BY NAE (VIBRACORE SAMPLING)

Stations Sampled:

NEW HAVEN HARBOR STATIONS –
SEE ACCOMPANYING COCs

Health and Safety Issues:

NONE NOTED

Deviations from Approved Plan:

NO NOT NOTED – REFRIGERATED TRUCK / COMPRESSOR
ISSUES NOTED. SEE ACCOMPANYING LOG-BOOK +
FIELD REPORT. TEMPS MAINTAINED AT OR BELOW
WORK PLAN SPECIFIED RANGE – NO
PROJECT IMPLICATIONS ANTICIPATED

Dock Departure Time: N/A

Dock Return Time: N/A

Recorded by: K. VAN NAPPERSON, AECOM

Attachment 2 New Haven Harbor / CLDS SH&E Documentation

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Supplimental Harbor Suitability Studies
Sediment/ Water Sampling

Conducted by:	K. VAN NORDSTRAND	**Date Performed:**	10/23/18
Topics Discussed:	1. JSA		
	2. WEATHER		
	3. PINCH POINTS		
	4.		

Printed Name	Signature	Representing
K. VAN NORDSTRAND		AECOM
Ken Cadwus		OSI
MORGAN BARRETT		OSI

AECOM

Daily Float Plan

Name of vessel's operator:	KEN CADMUS
Telephone Number:	860-395-8112
Name of Vessel:	~~EPR~~ Willy II
Registration No.:	CT 2716 AM
Description of Vessel: Type: Make: Color of Hull/Trim	CUSTOM SURVEY (SEE APP FOR SPECS) 27' WHITE
Most distinguishing identifiable feature:	PORT SIDE DAVIT

Rafts/Dinghies: Number: 0 Size: — Color: N/A

Radio: Type: UHF Frequencies Monitored: 16, 13

Number of persons onboard: 3

Name:	Age:	Address & Telephone:
KRIS VAN NORDSEN	39	NORTHAMPTON, MA 484-678-1876
Ken Cadmus	46	PANCATUCK, CT 860 395-8112
MORGAN BARRETT	49	WESTBROOK, CT 860-277-1355

Engine Type: YAMAHA OUTBOARD H.P.: 2X 150 HP Normal Fuel Supply (days): 1+

Survival equipment on board: (check as appropriate)

- [x] Life Jackets
- [x] Flares
- [x] Smoke Signals
- [x] Medical Kit
- [ ] EPIRB
- [ ] Paddles
- [x] Anchor
- [x] Loran/GPS
- [x] Life Ring

Trip: CLDS SAMPLING

Date & Time of Departure: 10/23/18 09:00

Departure From: BRANFORD R. BOAT LAUNCH Departure To: SAME

Expected to arrive by: 14:00 In no case later than: 17:00

Date & Time of Arrival: 10/23/18 16:05 Boat Lead Signature at Arrival: [signature]

AECOM

Boat Safety Checklist

Date: 10/23/18

Keep this page with your boat, ready for inspection. By using this checklist, or one fine-tuned by yourself, you'll be sure that everything is on board and in good working order. Your passengers will appreciate knowing you're concerned about boating safety.

- [x] Float plan: let someone landside know when you're leaving, where you're going, when you expect to return, what to do if you don't, and a description of your boat
- [x] Registration certificate or documentation
- [x] Personal Flotation Devices (wearable and throwable): USCG approved, good condition, readily accessible, assigned and fitted
- [x] Fire Extinguishers: right number, size, and class for boat; charged, not corroded, nozzle clear, bracketed, readily accessible
- [x] Visual Distress Signals: current dates on flares, proper number, batteries good if lights or EF
- [x] Anchors and Line: adequate anchor for bottom, adequate line for water depth
- [x] Bilge device: bilge pump operable, alternative bailing device available
- [x] Watch or clock: operable
- [x] Bright flashlight or searchlight
- [x] Navigation lights: tested and operable, spare bulbs
- [x] Batteries: fully charged, encased in plastic boxes or terminals covered, securely fastened do
- [x] Sound-producing device: horn, whistle appropriate for boat
- [x] Alternate propulsion: paddle or oar
- [x] First Aid Kit
- [ ] Tools, spare outboard prop and lock nut
- [ ] Compass
- [x] Sunscreen
- [ ] Weather Radio

Vessel: Willy II

Captain: KEN CADMUS

Captain's Signature: Ken Cadmus

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Supplimental Harbor Suitability Studies
Sediment/ Water Sampling

Conducted by:	Charles Nixon	**Date Performed:**	10/23/18
Topics Discussed:	1. Water Safety		
	2. Lifting		
	3. Driving safety		
	4.		

Printed Name	Signature	Representing
Charles Nixon	[illegible]	AECOM

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Supplimental Harbor Suitability Studies
Sediment/ Water Sampling

Conducted by:	Charles Nixon	Date Performed:	10/24
Topics Discussed:	1. Driving safety		
	2. Fatigue - watch out for signs while driving		
	3. Lifting - buckets and cube containers		
	4.		

Printed Name	Signature	Representing
Charles Nixon	[illegible]	AECOM

AECOM

Pre-Entry Briefing/Daily Safety Meeting Attendance Form
New Haven Supplimental Harbor Suitability Studies
Sediment/ Water Sampling

Conducted by:	Charles Nixon	**Date Performed:**	10/25
Topics Discussed:	1. Diving Safety		
	2. Fatigue -- 8+ hrs of driving today!!		
	3. Lifting + moving samples (buckets + cubes)		
	4.		

Printed Name	Signature	Representing
Charles Nixon	Charles Nixon	AECOM

AECOM

Americas

Behavior Based Safety Checklist

S3AM-007-FM1

Use comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

Job Location: New Haven Harbor Date: 10/23/18

Task/Work Observed: Loading samples into van Observer: CJ Nixon

	Safe	Unsafe	Comments
Personal Protective Equipment			
Head	☐	☐	
Hand	☐	☐	
Feet	☐	☐	
Eyes/Face	☐	☐	
Skin	☑	☐	
Hearing	☐	☐	
Fall Protection	☐	☐	
Equipment / Tools			
Proper tool for the job	☐	☐	
Condition	☐	☐	
Proper Use	☐	☐	
Body Use / Position			
Lifting	☑	☐	Safe lifting of buckets/cubitainers
Pinch Point	☑	☐	
Ladder / stairs	☐	☐	
Hand placement	☑	☐	
Travel path / speed	☑	☐	
Body position	☑	☐	
Work Practices			
Follow Safety Plan / Procedures	☑	☐	
Housekeeping	☑	☐	
Other			
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	

AECOM

Americas

Behavior Based Safety Checklist

S3AM-007-FM1

Use comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

Job Location: New Haven Harbor

Date: 10/24/18

Task/Work Observed: Loading samples

Observer: CJ Nixon

	Safe	Unsafe	Comments
Personal Protective Equipment			
Head	☐	☐	
Hand	☐	☐	
Feet	☐	☐	
Eyes/Face	☐	☐	
Skin	☐	☐	
Hearing	☐	☐	
Fall Protection	☐	☐	
Equipment / Tools			
Proper tool for the job	☐	☐	
Condition	☐	☐	
Proper Use	☐	☐	
Body Use / Position			
Lifting	☑	☐	Safe lifting
Pinch Point	☑	☐	Doors of van secured open
Ladder / stairs	☐	☐	
Hand placement	☑	☐	Hands on handles
Travel path / speed	☑	☐	Travel path kept clear
Body position	☑	☐	Safe lifting movements
Work Practices			
Follow Safety Plan / Procedures	☑	☐	
Housekeeping	☑	☐	
Other			
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	

AECOM

Americas

Behavior Based Safety Checklist

S3AM-007-FM1

Use comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

Job Location: Hampton, NH

Date: 10/25/18

Task/Work Observed: Unloading Samples

Observer: CJ Nixon

	Safe	Unsafe	Comments
Personal Protective Equipment			
Head	☐	☐	
Hand	☐	☐	
Feet	☐	☐	
Eyes/Face	☐	☐	
Skin	☐	☐	
Hearing	☐	☐	
Fall Protection	☐	☐	
Equipment / Tools			
Proper tool for the job	☐	☐	
Condition	☐	☐	
Proper Use	☐	☐	
Body Use / Position			
Lifting	☑	☐	Safe lifting
Pinch Point	☑	☐	Doors at van / building secured open
Ladder / stairs	☑	☐	Stairs in lab marked
Hand placement	☑	☐	hands on handles
Travel path / speed	☑	☐	travel path clear
Body position	☑	☐	Safe lifting positions
Work Practices			
Follow Safety Plan / Procedures	☑	☐	
Housekeeping	☑	☐	
Other			
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	
	☐	☐	

AECOM

Americas

(US – CAN) Pre- OR Post-Trip Inspection

S3AM-320-FM2

Commercial Motor Vehicle (CMV) Inspection

Pre-Trip Safety Inspection ☒ **Post-Trip Safety Inspection** ☐

(Checklist to be completed by driver prior to operation of CMV and at the end of each shift and/or change in drivers.)

Office / Project Name	New Haven Harbor Sampling	Project / Location #	

Driver's Full Name (printed)	License #	State / Prov.	Date: Time of Inspection dd/mm/yyyy	xx:xx am/pm
Charles I Nixon, Jr	240392905	CT	10/23/18	1230

Power Unit/CMV	License #	State / Prov.	Exp. Date	Registration/Inspection	Expiration
Mercedes Sprinter	34173ML	NY	4/30/20		

Type of Trailer	License #	State / Prov.	Exp. Date	Registration/Inspection	Expiration

Insurance Provider	Policy #	State / Prov.	Exp. Date	Provider Contact Information

INSPECTION ITEMS	N/A	YES	NO	DATE CORRECTED
Has this equipment been properly inspected by a CMV competent person and ensured to be in a safe operating condition?		✓		
Are seat belts readily available and operational? Is the horn in working condition?		✓		
Is the overall body condition of the vehicle satisfactory? Properly placarded?		✓		
Is the steering mechanism operational? Are instrument lights fully functional?		✓		
Are all required mirrors present, clean, and adjusted for the CMV operator?		✓		
Do tires meet manufacturer's operational criteria (pressure, tread, spare, etc.)?		✓		
Are back-up alarms installed as required and operational?		✓		
Are service brakes, including trailer brake connections, and parking (hand) brake functional?		✓		
Are turn signals visible and operational?		✓		
Are headlights (low/high beam) operational?		✓		
Are brake lights, tail lights and back-up lights visible and operable?		✓		
Is all cab glass intact and free of distortion? Are wipers, including wiper fluid, operational? As applicable, is an ice scraper available?		✓		
Have all fluids been checked and comply with operations manual criteria?		✓		
Is there a functional fire extinguisher and stocked first aid kit accessible?	✓			
Are there at least three stopped vehicle reflective triangles and a reflective vest?	✓			
If load lines/straps are in use have they been inspected? a. Used in accordance with manufacturer's operational guidelines and with regulatory cargo securement requirements? b. Rated and approved for this type of load?		✓		
Have all coupling devices been inspected and secured?	✓	✓		
Is the vehicle equipped with the appropriate equipment (e.g. wheel wrench, jack, tire chains)?		✓		
Does the engine and exhaust system appear to be functioning properly?		✓		
Is applicable documentation valid, current and immediately accessible (e.g. insurance, registration, driver medical certificate, CDL, shipping documents, etc.)?		✓		

Driver's Signature/ Inspection Date: [signature] 10/23/18

AECOM

Americas

(US – CAN) Cargo Inspection

S3AM-320-FM3

Commercial Motor Vehicle (CMV) Cargo Inspection Checklist

(The cargo inspection checklist items 1-4 are to be completed by the CMV employee prior to CMV operation.)

Office/ Project Name	New Haven Harbor	Project/ Location Number	60588790

Driver's Full Name (Printed)	License Number	State / Prov	dd/mm/yyyy	xx:xx am/pm
Charles Nixon	248392985	CT	10/23/18	1815

Power Unit/CMV	License Number	State / Prov	Expiration	Registration/Certification	Expiration
Mercedes	34169 ML	NY	4/30/20		

Type of Trailer	License Number	State / Prov	Expiration	Registration/Certification	Expiration

INSPECTION ITEMS	N/A	YES	NO
1. Cargo is loaded and secured to prevent: a. Loss of load b. Leaking c. Spilling d. Blowing off e. Falling		✓	
2. Cargo is immobilized or secured to prevent shifting upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is not adversely affected.		✓	
3. The following are secure: a. Tailgate b. Tailboard c. Doors d. Tarpaulins e. Spare tire f. Any other devices used to secure the cargo/load		✓	
4. The cargo or any other object does not: a. Obscure the driver's view ahead or to the right or left b. Interfere with the free movement of the driver's arms or legs c. Prevent ready access to accessories required for emergencies d. Prevent the free and ready exit of any person from the CMV	✓		
5. Inspect and resecure as necessary the cargo and the devices used to secure the cargo within the first 50 miles (80km) after beginning a trip.	✓		
6. Re-examine and resecure the cargo: a. When the driver makes a change of duty status b. The CMV has been driven for 3 hours or 150 miles (240km) (whichever comes first) c. These inspection requirements do not apply: i. If the container/trailer is sealed and the driver has been provided written direction not to open it to inspect the cargo ii. The cargo has been loaded in a manner that makes inspection of its cargo impracticable		✓	

Americas

(US – CAN) Pre- OR Post-Trip Inspection

S3AM-320-FM2

Commercial Motor Vehicle (CMV) Inspection

Pre-Trip Safety Inspection ☐ **Post-Trip Safety Inspection** ☐

(Checklist to be completed by driver prior to operation of CMV and at the end of each shift and/or change in drivers.)

Office / Project Name	New Haven Harbor sampling	Project / Location #	60588790

Driver's Full Name (printed)	License #	State / Prov.	Date: Time of Inspection dd/mm/yyyy	xx:xx am/pm
Charles Nixon	240342985	CT	10/24/18	0530

Power Unit/CMV	License #	State / Prov.	Exp. Date	Registration/Inspection	Expiration
Mercedes Sprinter	34169 ML	NY	4/30/20		4/30/20

Type of Trailer	License #	State / Prov.	Exp. Date	Registration/Inspection	Expiration

Insurance Provider	Policy #	State / Prov.	Exp. Date	Provider Contact Information
Republic-Franklin	5067126	NY		

INSPECTION ITEMS	N/A	YES	NO	DATE CORRECTED
Has this equipment been properly inspected by a CMV competent person and ensured to be in a safe operating condition?		✓		
Are seat belts readily available and operational? Is the horn in working condition?		✓		
Is the overall body condition of the vehicle satisfactory? Properly placarded?		✓		
Is the steering mechanism operational? Are instrument lights fully functional?		✓		
Are all required mirrors present, clean, and adjusted for the CMV operator?		✓		
Do tires meet manufacturer's operational criteria (pressure, tread, spare, etc.)?		✓		
Are back-up alarms installed as required and operational?	✓			
Are service brakes, including trailer brake connections, and parking (hand) brake functional?		✓		
Are turn signals visible and operational?		✓		
Are headlights (low/high beam) operational?		✓		
Are brake lights, tail lights and back-up lights visible and operable?		✓		
Is all cab glass intact and free of distortion? Are wipers, including wiper fluid, operational? As applicable, is an ice scraper available?		✓		
Have all fluids been checked and comply with operations manual criteria?		✓		
Is there a functional fire extinguisher and stocked first aid kit accessible?	✓	✓		
Are there at least three stopped vehicle reflective triangles and a reflective vest?	✓	✓		
If load lines/straps are in use have they been inspected? a. Used in accordance with manufacturer's operational guidelines and with regulatory cargo securement requirements? b. Rated and approved for this type of load?	✓			
Have all coupling devices been inspected and secured?	✓			
Is the vehicle equipped with the appropriate equipment (e.g. wheel wrench, jack, tire chains)?		✓		
Does the engine and exhaust system appear to be functioning properly?	✓			
Is applicable documentation valid, current and immediately accessible (e.g. insurance, registration, driver medical certificate, CDL, shipping documents, etc.)?	✓			

Driver's Signature/ Inspection Date:	[signature] 10/24/18

Americas

(US – CAN) Cargo Inspection

S3AM-320-FM3

Commercial Motor Vehicle (CMV) Cargo Inspection Checklist

(The cargo inspection checklist items 1-4 are to be completed by the CMV employee prior to CMV operation.)

Office/ Project Name	New Haven Harbor Sampling	Project/ Location Number	60588790

Driver's Full Name (Printed)	License Number	State / Prov	dd/mm/yyyy	xx:xx am/pm
Charles N. Xom	Z48392985	CT	10/24/18	0630

Power Unit/CMV	License Number	State / Prov	Expiration	Registration/Certification	Expiration
Mercedes Sprinter	34169 ML	NY	4/30/20		

Type of Trailer	License Number	State / Prov	Expiration	Registration/Certification	Expiration

INSPECTION ITEMS	N/A	YES	NO
1. Cargo is loaded and secured to prevent: a. Loss of load b. Leaking c. Spilling d. Blowing off e. Falling		✓	
2. Cargo is immobilized or secured to prevent shifting upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is not adversely affected.		✓	
3. The following are secure: a. Tailgate b. Tailboard c. Doors d. Tarpaulins e. Spare tire f. Any other devices used to secure the cargo/load		✓	
4. The cargo or any other object does not: a. Obscure the driver's view ahead or to the right or left b. Interfere with the free movement of the driver's arms or legs c. Prevent ready access to accessories required for emergencies d. Prevent the free and ready exit of any person from the CMV	✓		
5. Inspect and resecure as necessary the cargo and the devices used to secure the cargo within the first 50 miles (80km) after beginning a trip.		✓	
6. Re-examine and resecure the cargo: a. When the driver makes a change of duty status b. The CMV has been driven for 3 hours or 150 miles (240km) (whichever comes first) c. These inspection requirements do not apply: i. If the container/trailer is sealed and the driver has been provided written direction not to open it to inspect the cargo ii. The cargo has been loaded in a manner that makes inspection of its cargo impracticable		✓	

AECOM

Americas

(US – CAN) Pre- OR Post-Trip Inspection

S3AM-320-FM2

Commercial Motor Vehicle (CMV) Inspection

Pre-Trip Safety Inspection ☑ **Post-Trip Safety Inspection** ☐

(Checklist to be completed by driver prior to operation of CMV and at the end of each shift and/or change in drivers.)

Office / Project Name	Northwest Harbor Sampling	Project / Location #	60588790

Driver's Full Name (printed)	License #	State / Prov.	Date: Time of Inspection dd/mm/yyyy	xx:xx am/pm
Charles Nixon	248392985	CT	10/25/18	0415/1345

Power Unit/CMV	License #	State / Prov.	Exp. Date	Registration/Inspection	Expiration
Mercedes Sprinter	34169 ML	NY	4/30/20		

Type of Trailer	License #	State / Prov.	Exp. Date	Registration/Inspection	Expiration

Insurance Provider	Policy #	State / Prov.	Exp. Date	Provider Contact Information
Republic-Franklin	5067176	NY		

INSPECTION ITEMS	N/A	YES	NO	DATE CORRECTED
Has this equipment been properly inspected by a CMV competent person and ensured to be in a safe operating condition?		✓		
Are seat belts readily available and operational? Is the horn in working condition?		✓		
Is the overall body condition of the vehicle satisfactory? Properly placarded?		✓		
Is the steering mechanism operational? Are instrument lights fully functional?		✓		
Are all required mirrors present, clean, and adjusted for the CMV operator?		✓		
Do tires meet manufacturer's operational criteria (pressure, tread, spare, etc.)?		✓		
Are back-up alarms installed as required and operational?	✓			
Are service brakes, including trailer brake connections, and parking (hand) brake functional?		✓		
Are turn signals visible and operational?		✓		
Are headlights (low/high beam) operational?		✓		
Are brake lights, tail lights and back-up lights visible and operable?		✓		
Is all cab glass intact and free of distortion? Are wipers, including wiper fluid, operational? As applicable, is an ice scraper available?		✓		
Have all fluids been checked and comply with operations manual criteria?		✓		
Is there a functional fire extinguisher and stocked first aid kit accessible?	✓			
Are there at least three stopped vehicle reflective triangles and a reflective vest?	✓	✓		
If load lines/straps are in use have they been inspected? a. Used in accordance with manufacturer's operational guidelines and with regulatory cargo securement requirements? b. Rated and approved for this type of load?	✓			
Have all coupling devices been inspected and secured?	✓			
Is the vehicle equipped with the appropriate equipment (e.g. wheel wrench, jack, tire chains)?		✓		
Does the engine and exhaust system appear to be functioning properly?	✓			
Is applicable documentation valid, current and immediately accessible (e.g. insurance, registration, driver medical certificate, CDL, shipping documents, etc.)?	✓			

Driver's Signature/ Inspection Date:	[signature] 10/25/18

AECOM

Americas

(US – CAN) Cargo Inspection

S3AM-320-FM3

Commercial Motor Vehicle (CMV) Cargo Inspection Checklist

(The cargo inspection checklist items 1-4 are to be completed by the CMV employee prior to CMV operation.)

Office/ Project Name	New Haven Harbor Sampling	Project/ Location Number	60588790

Driver's Full Name (Printed)	License Number	State / Prov	dd/mm/yyyy	xx:xx am/pm
Charley Nixon	248372985	CT	10/24/18	0415/1245

Power Unit/CMV	License Number	State / Prov	Expiration	Registration/Certification	Expiration
Mercedes	34169 ML	NY	4/30/20		

Type of Trailer	License Number	State / Prov	Expiration	Registration/Certification	Expiration

INSPECTION ITEMS	N/A	YES	NO
1. Cargo is loaded and secured to prevent: a. Loss of load b. Leaking c. Spilling d. Blowing off e. Falling		✓	
2. Cargo is immobilized or secured to prevent shifting upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is not adversely affected.		✓	
3. The following are secure: a. Tailgate b. Tailboard c. Doors d. Tarpaulins e. Spare tire f. Any other devices used to secure the cargo/load		✓	
4. The cargo or any other object does not: a. Obscure the driver's view ahead or to the right or left b. Interfere with the free movement of the driver's arms or legs c. Prevent ready access to accessories required for emergencies d. Prevent the free and ready exit of any person from the CMV	✓		
5. Inspect and resecure as necessary the cargo and the devices used to secure the cargo within the first 50 miles (80km) after beginning a trip.		✓	
6. Re-examine and resecure the cargo: a. When the driver makes a change of duty status b. The CMV has been driven for 3 hours or 150 miles (240km) (whichever comes first) c. These inspection requirements do not apply: i. If the container/trailer is sealed and the driver has been provided written direction not to open it to inspect the cargo ii. The cargo has been loaded in a manner that makes inspection of its cargo impracticable		✓	

Activity Hazard Analysis (AHA)

Activity/Work Task: Working On/ Near Water	Overall Risk Assessment Code (RAC) (Use highest code)					**M**
Project Location: New Haven Harbor, Connecticut	**Risk Assessment Code (RAC) Matrix**					
Contract Number: W912WJ-17-D-0003	**Severity**	**Probability**				
Date Prepared: 10/17/2018		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Angela Hinkle / Project Scientist	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title): Kris van Naerssen / Task Order Manager	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Job Steps	Hazards	Controls	RAC
Boat Travel – Travel to Sampling Locations on Water	Environment	• Establish safe work practices such as avoiding working on-deck while vessel is underway, avoid leaning over side rails, work in pairs, and avoid moving parts and lines/cables with tension. • Monitor weather conditions • Be aware of tidal levels and proximity to shallow water. • Be aware of underwater debris near site and shoreline. • Personal Flotation Devices, lifejackets, or Mustang Suits shall be worn by all workers who are exposed to the danger of drowning in water deep enough for the lifejacket to be effective. • Whenever there exists the possibility of falling into water, personnel must be attired in a USCG approved Type III or Type V work vest. The vest must be properly sized for the individual and must be secured at all times. • Waders shall never be worn aboard a watercraft of any kind.	**M**
	Slip/trip/fall (Rocking of boat, rough waters, unsteady surface while aboard vessel	• Use handrails, trekking poles or other aid to reduce stress on legs and prevent falls. Identify and avoid steep slopes, slippery areas, and wet conditions. • Evaluate work area and access routes for locations where fall prevention may be beneficial to field staff. Install low or zero-impact fall protection (e.g., stake-supported railings, cable, or ropes) as appropriate to provide handholds.	**M**
	Man overboard	• Cover in tailgate meeting each day procedures for man overboard scenario. • Proper PFDs always required on boat. • A throwable rescue device (Type IV flotation aid) along with whatever equipment (i.e., ladders, lifting gear, or rescue boat) necessary shall be immediately available to recover an individual from the water. • Wear USGS approved cold water immersion suit (a.k.a. Mustang suit) if water temperatures are less than 55°F	**M**
	General Boating	• Operate vessel in accordance with USCG and local, safe boating practice	**M**

Job Steps	Hazards	Controls	RAC
		• Only qualified personnel shall operate vessels • Be aware of the location of onboard fire extinguishers, VHF radio, throwable life ring, signaling devices, and first aid kit • Operate vessel only where safe navigation practice allows • Communicate written or verbal “Float Plan” to shore side entity, e.g. onsite project manager	
	Vessel Collisions / Other Vessel Hazards	• Operate vessel in accordance with USCG and local, safe boating practice • Only qualified personnel shall operate vessels • Be aware of the location of onboard fire extinguishers, VHF radio, throwable life ring, signaling devices, and first aid kit • Employ Man Overboard Controls (Above) • Wear USGS approved cold water immersion suit (a.k.a. Mustang suit) if water temperatures are less than 55°F • Wear Hearing protection as appropriate (i.e. if talking above normal levels is not possible) • Have First Aid and CPR trained individuals aboard and be familiar with contents of first aid kits	**M**
	Cold/Heat Stress	• Provide drinking water and first aid kit. • Wear appropriate clothing for weather conditions, dress in layers. • Buddy system; cold stress monitoring; cold stress control plan (including Mustang Suits, work rotation, methods of warming) as appropriate • Review prevention, symptoms and treatment guidance.	**L**

Job Steps	Hazards	Controls	RAC
Near-shore Activities	Slips, Trips, Falls	• Practice good housekeeping to keep the ground around the sampling location clear of obstructions, equipment and other tripping hazards. • Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. • If workers have the potential to get stuck in mud or fluidized sediment, air injection equipment designed to free workers feet/legs may need to be available onsite. At a minimum, a safety line should be available to be deployed from safe ground. If a worker does get stuck, they should not struggle as this causes further sinking. Use a pole to conduct sediment probing to assess water depths, the stability of shoreline terrain, and the bearing capacity of bottom sediments ahead of the chosen path. • Take special care on slippery rocks along shorelines, lakeshores, riverbanks, and creeks. Always look ahead at the ground when walking around the water's edge and avoid stepping on stones that have algal growth. • Waders may not be worn when working along, over, or in moving waters; or in waters influenced by tides or acted upon by waves when water depths exceed knee height unless specifically approved by the SH&E Manager. Waders may be worn in still waters in water depths up to the waist if bottom conditions are firm and well understood. • Waders shall never be worn aboard a watercraft of any kind.	**M**
	Biological Hazards	• Assess work area for poisonous plants and animals and communicate observations to avoid them. • If hazardous insects or plants such as ticks, poison oaks are identified or suspected in a work area, controls including the use of disposable (Tyvek) coveralls, insect repellent (23.8% DEET or similar), light colored clothing, barrier creams, frequent tick checks should be implemented. • Additionally, all field clothing and equipment should be thoroughly cleaned, removed and/or segregated from clean clothing, equipment and supplies to avoid transfer of hazardous plants/insects. • All employees should bath immediately following fieldwork and	**L**

Job Steps	Hazards	Controls	RAC
		use soaps/ cleansers designed to remove oils associated with poison oak, and conduct a full body tick check using a mirror.	
	Adverse Weather	• Be aware of changing weather condition and provide appropriate weather gear. • When work is halted due to inclement weather, personnel are to seek shelter in vehicles or building designated Shelter in Place (SIP)	**M**

Chemical Hazards and Monitoring Procedures	
Chemical Hazard(s) (list):	
Applicable HASP Section(s):	
Monitoring Instrument(s):	

Additional Safety Considerations

- Ensure all personnel have read the Accident Prevention Plan (APP)
- Ensure all equipment is equipped with necessary fire extinguishers (min 5 lbs BC).
- Follow safe driving procedures. Plan your travel path ahead of time. Use maps and known construction zones to make your selection. Consult with the other team members before making any changes to travel path.
- Use an equipment checklist to verify you have the appropriate equipment/tools for your tasks. Consult appropriate AHAs or SOPs.
- Stow all materials in vehicle properly, use appropriate cases and bags. Secure equipment in bed of truck with netting or straps. Do not leave any equipment loose in the cab or bed of the truck. It can cause property damage or serious injuries by falling from vehicle.
- When securing equipment, watch for pinch points. Straps and netting can get caught on objects and snap back as well as trap a finger if hand placement is not correct. Use a buddy to help secure equipment when possible.
- Maintain good housekeeping practices. When possible, use mechanical equipment to perform lifting of heavy objects. When lifting, follow safe lifting practices. Use the buddy system when lifting.
- Wear nitrile gloves to avoid dermal contact with potential contaminants. Be observant for tripping hazards, holes, stickups, vines, old fence wire, etc.

Additional Operational Safety Procedures		PPE
S3NA-002-PR1	Stop Work Authority	LEVEL D • ANSI approved hard hat • ANSI approved safety glasses • Shirts with sleeves and full-length pants • ANSI approved steel safety-toe boots or approved equivalent • High visibility reflective traffic vest if near moving vehicles • Nitrile Gloves • Leather work gloves • First aid kit (located on vessel) • Personal Floatation Device • Have a radio, cell phone or other communication device for emergency use • Fire extinguisher (located on vessel)
S3NA-001-PR1	Safe Work Standards and Rules	
S3NA-003-PR1	Safety Health & Environment Training	
S3NA-004-PR1	Incident Reporting, Notifications, and Investigation	
S3NA-011-PR1	Fire Protection	
S3NA-013-PR1	Housekeeping	
S3NA-113-PR1	Heat Stress	
S3NA-204-PR1	Environmental Compliance	
S3NA-208-PR1	Personal Protective Equipment	
S3NA-209-PR1	Risk Assessment and Management	
S3NA-209-FM5	Daily Tailgate Meeting Form	
S3NA-315-PR1	Working On and Near Water	
S3NA-315-ATT1	Personal Floatation Devices	
S3NA-333-ATT2	Boating Safe Work Practices	
S3NA-333-ATT4	Float Plan	
S3NA-333-ATT6	Emergency Response Procedures	
S3NA-333-ATT5	Marine Safety Equipment	
S3NA-333-ATT3	Small Boat Operation	
S3NA-333-ATT7	Hazardous Weather Operations	
S3NA-333-ATT8	Charters and Subcontractors	

S3NA-007-FM1 Inspection BBS Checklist	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Research vessel	Safe Boating certificate/ USCG Captain's license (where appropriate).	Equipment will be inspected prior to use. Any safety deficiencies detected will require cessation of activities until appropriate repairs have been made.

Acknowledgement

All employees, subcontractors, and visitors must sign the Acknowledgement form, in this section, before conducting field activities at this site.

By signing this form, AECOM employees agree that:

- I have read this Accident Hazard Analysis and I understand the requirements of the AHA.
- I will conduct work at this site in accordance with the requirements of the AHA.

By signing this form, subcontractors and visitors agree that:

- I have read and understood the potential hazards associated with the site.
- I will ensure compliance with my company's policies on health and safety.

Print Name & Company	Date	Signature
Charles I Nixon, Jr., AECOM	10/22/18	Charles I. Nixon, Jr.

Activity Hazard Analysis (AHA)

Activity/Work Task: Boat Based Sediment and Surface Water Sampling	Overall Risk Assessment Code (RAC) (Use highest code)					**M**
Project Location: New Haven Harbor, Connecticut	**Risk Assessment Code (RAC) Matrix**					
Contract Number: W912WJ-17-D-0003	**Severity**	**Probability**				
Date Prepared: 10/17/2018		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Angela Hinkle/ Project Scientist	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title): Kris van Naerssen/ Task Order Manager	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

Notes: (Field Notes, Review Comments, etc.)	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)	
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**RAC Chart**
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk**
		H = High Risk
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk**
		L = Low Risk

Job Steps	Hazards	Controls	RAC
Sediment or surface water sampling from vessel	Slips, trips, falls on boat or walking on pier around truck.	• Identify and discuss trip/slip hazards on boat pier during safety meetings and throughout the day communicating with all team members in work zone. • Keep work areas free of non-essential equipment, i.e. practice good housekeeping. • Maintain good balance. In rough vessel conditions practice "one hand for you one hand on the boat." • Wear appropriate footwear for the task. • Install handrail or handrail-chains around perimeter of boat deck as appropriate.	**M**
	Man overboard	• Cover in tailgate meeting each day procedures for man overboard scenario. • Wear appropriate USCG-approved personal flotation device (PFD). • A throwable rescue device (Type IV flotation aid) along with whatever equipment (i.e., ladders, lifting gear, or rescue boat) necessary shall be immediately available to recover an individual from the water. • Use buddy system when working near water's edge. • Install handrail or handrail-chains around perimeter of boat deck as appropriate. • Wear USGS approved cold water immersion suit (a.k.a. Mustang suit) if water temperatures are less than 55°F	**M**
	Underground Utilities	• Confirm utility clearance or presence before invasive work • Plan all vessel and vehicle movements • Observe surroundings prior to sampling	**L**
	Lifting and Ergonomic Hazards	• Practice correct lifting posture. • Two-person lifts should be used when appropriate, e.g. bulky object lifting. • Use mechanical assistance when appropriate.	**L**
	Hand Tools	• Use tool appropriate for the task	**L**

Job Steps	Hazards	Controls	RAC
		• Inspect tools for damage prior to use • Do not use tools with signs of fatigue or structural damage • Wear gloves to protect hands as appropriate for the task • Wear safety glasses as appropriate	
	Heavy Equipment Overhead	• Communicate with boom operator. Use hand signals if it is too loud to communicate over generator. • Hardhats will be worn on the deck at all times • Stop, look, and assess overhead lifts before attempting. • Confirm shackles, bolts, etc. associated with lifting activities are properly secured	**L**
	Inclement Weather	• Consult current marine forecast frequently during operations and plan vessel movements accordingly • Suspend or cancel daily vessel operations during high wind or during lightning events • Communicate written or verbal “Float Plan” to shore side entity, e.g. onsite project	**L**
	Grab Sampler (sediment or water)	• Inspect all elements of grab sampler and lifting apparatus prior to use • Beware of potential pinch hazards – specifically the snapping mechanism on the grab sampler. Ensure that all staff members are clear of the grab sampler while the dredge is open/engaged and ready to sample. • Keep non-essential personnel outside perimeter of work area • Establish routine for movement of sampling device and acquisition/ recovery of sample • Decide on team member responsibilities prior to sampling device deployment • Exercise caution handling and opening preserved glassware containers and use appropriate PPE (gloves and eyewear)	**M**
	General Boating	• Operate vessel in accordance with USCG and local, safe boating	**M**

Job Steps	Hazards	Controls	RAC
		practice • Only qualified personnel shall operate vessels • Be aware of the location of onboard fire extinguishers, VHF radio, throwable life ring, signaling devices, and first aid kit • Operate vessel only where safe navigation practice allows • Communicate written or verbal “Float Plan” to shore side entity, e.g. onsite project manager	
	Vessel Collisions / Other Vessel Hazards	• Operate vessel in accordance with USCG and local, safe boating practice • Only qualified personnel shall operate vessels • Be aware of the location of onboard fire extinguishers, VHF radio, throwable life ring, signaling devices, and first aid kit • Employ Man Overboard Controls (Above) • Wear USGS approved cold water immersion suit (a.k.a. Mustang suit) if water temperatures are less than 55°F • Wear Hearing protection as appropriate (i.e. if talking above normal levels is not possible) • Have First Aid and CPR trained individuals aboard and be familiar with contents of first aid kits	**M**
	Fire	• Practice safe fueling of generators and pumps • Maintain contact between fueling nozzle and fuel tank during fueling • Only fuel cool engines, do not fuel a running engine • Be aware of the location of onboard fire extinguisher(s)	**M**
	Cold Stress	• Provide drinking water and first aid kit. • Wear appropriate clothing for weather conditions, dress in layers. • Buddy system; cold stress monitoring; cold stress control plan (including Mustang Suits, work rotation, methods of warming) as appropriate • Review prevention, symptoms and treatment guidance.	**M**

Job Steps	Hazards	Controls	RAC
	Heat Stress	• A shaded or cooled shelter (or gathering point) shall be identified for rest periods when working in hot temperatures • Allow for work-rest cycles during periods of high heat • Wear clothing that allows for cooling • Drink liquids and take bathroom breaks to allow rehydration to occur • If necessary work shall be conducted during cooler times of the day, generally early mornings and late afternoon. No night work is permitted	**M**
	Sediment Contact	• Wear appropriate PPE (gloves, clothing, and eyewear) when working with sediment	**L**

Chemical Hazards and Monitoring Procedures	
Chemical Hazard(s) (list):	
Applicable HASP Section(s):	
Monitoring Instrument(s):	

Additional Safety Considerations

- Ensure all personnel have read the Accident Prevention Plan (APP)
- Ensure all equipment is equipped with necessary fire extinguishers (min 5 lbs BC).
- Follow safe driving procedures. Plan your travel path ahead of time. Use maps and known construction zones to make your selection. Consult with the other team members before making any changes to travel path.
- Use an equipment checklist to verify you have the appropriate equipment/tools for your tasks. Consult appropriate AHAs or SOPs.
- Stow all materials in vehicle properly, use appropriate cases and bags. Secure equipment in bed of truck with netting or straps. Do not leave any equipment loose in the cab or bed of the truck. It can cause property damage or serious injuries by falling from vehicle.
- When securing equipment, watch for pinch points. Straps and netting can get caught on objects and snap back as well as trap a finger if hand placement is not correct. Use a buddy to help secure equipment when possible.
- Maintain good housekeeping practices. When possible, use mechanical equipment to perform lifting of heavy objects. When lifting, follow safe lifting practices. Use the buddy system when lifting.
- Wear nitrile gloves to avoid dermal contact with potential contaminants. Be observant for tripping hazards, holes, stickups, vines, old fence wire, etc.

Additional Operational Safety Procedures		PPE
S3NA-002-PR1	Stop Work Authority	LEVEL D • ANSI approved hard hat • ANSI approved safety glasses • Shirts with sleeves and full-length pants • ANSI approved steel safety-toe boots or approved equivalent • High visibility reflective traffic vest if near moving vehicles • Nitrile Gloves • Hearing Protection • Leather work gloves • First aid kit (located on vessel) • Personal Floatation Device / Mustang Suit (For Water Temps <55° F) • Have a radio, cell phone or other communication device for emergency use • Fire extinguisher (located on vessel)
S3NA-001-PR1	Safe Work Standards and Rules	
S3NA-003-PR1	Safety Health & Environment Training	
S3NA-004-PR1	Incident Reporting, Notifications, and Investigation	
S3NA-011-PR1	Fire Protection	
S3NA-013-PR1	Housekeeping	
S3NA-113-PR1	Heat Stress	
S3NA-204-PR1	Environmental Compliance	
S3NA-208-PR1	Personal Protective Equipment	
S3NA-209-PR1	Risk Assessment and Management	

Additional Operational Safety Procedures		PPE
S3NA-209-FM5	Daily Tailgate Meeting Form	
S3NA-315-PR1	Working On and Near Water	
S3NA-315-ATT1	Personal Floatation Devices	
S3NA-333-ATT2	Boating Safe Work Practices	
S3NA-333-ATT4	Float Plan	
S3NA-333-ATT6	Emergency Response Procedures	
S3NA-333-ATT5	Marine Safety Equipment	
S3NA-333-ATT3	Small Boat Operation	
S3NA-333-ATT7	Hazardous Weather Operations	
S3NA-333-ATT8	Charters and Subcontractors	
S3NA-007-FM1	Inspection BBS Checklist	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Research vessel	Safe Boating certificate/ USCG Captain's license (where appropriate).	Equipment will be inspected prior to use. Any safety deficiencies detected will require cessation of activities until appropriate repairs have been made.
Grab & water sampling device – mounted on side davit, attached to the vessel	Boom will be operated by a competent person, familiar with the equipment. Daily safety briefings specific to the winch equipment will be conducted. Be aware of pinch points	Equipment will be inspected prior to use.

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Print Name & Company	Date	Signature
Charles I Nixon, Jr., AECOM	10/22/18	Charles I. Nixon, Jr.

Activity Hazard Analysis (AHA)

Activity/Work Task: Mobilization	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: New Haven Harbor, Connecticut	**Risk Assessment Code (RAC) Matrix**	
Contract Number: W912WJ-17-D-0003		
Date Prepared: 10/9/2018		
Prepared by (Name/Title): Angela Hinkle/ Project Scientist		
Reviewed by (Name/Title): Kris van Naerssen / Task Order Manager		

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended PPE:

_X_ Safety Glasses With Sideshields _X_ Steel-Toed Boots ___ Hard Hat _X_ Nitrile Gloves _X_ Leather Gloves ___ Hearing Protection ___ Flame Retardant Clothing

Job Steps	Hazards	Controls	RAC
Travel and Mobilization to Site	Driving	• All vehicle operators will be appropriately licensed • Complete a pre-use visual inspection. No electronic devices to be used while operating the vehicle. Be aware of road conditions and drive only to your comfort level • Drivers will obey all posted speed limits and traffic laws during travel to and from the site • Be aware of road conditions and drive only to your comfort level	**M**

Job Steps	Hazards	Controls	RAC
		• Slowly exit from parking spaces; Seek eye contact with other drivers or pedestrians • Before changing lanes, signal well in advance, check mirrors and over shoulder • Maintain safe distances behind vehicles and stay out of other vehicles' blind spots • DRIVE DEFENSIVELY. Move eyes and scan mirrors at least every 2 seconds • Back into parking spaces (or "pull through") when appropriate • Use a spotter when backing-up or maneuvering around objects or other vehicles • Be familiar with the handling and operation of company or rental vehicles • Assure tires are properly inflated and there is sufficient tread (including spare) • Be mindful of road fatigue. Park in a safe location and get out of the vehicle at regular intervals on long drives.	
	Hauling Equipment in Vehicles	• All equipment and tools will be properly tied down and inspected prior to travel to the site.	**L**
Travel and Mobilization to Site (Cont.)	Inclement Weather	• Evaluate weather conditions prior to beginning the travel to determine if travel should proceed. Verify your vehicle is equipped to travel in poor weather. Have supplies on hand in the event that you become stranded, including a communication device to call for help.	**L**
	Fatigue	• Buddy system. Rotation of shifts. Frequent breaks. • Limit work day to 12 hours, including driving time	**L**

Job Steps	Hazards	Controls	RAC
Loading / Offloading Equipment	Lifting Heavy Equipment	• Use proper lifting techniques by bending and lifting with legs and not back, and do not over extend or twist. Do not lift over 49 lbs. without assistance • Wear work gloves to aid in griping objects while moving • Use dollies, cart, come-alongs, or rollers whenever possible rather than unassisted lifting by employees	**M**
	Pinch Points	• Locate potential pinch points and guard as needed. • Warn others prior to closing doors and tailgates	
	Unstable Equipment	• Ensure equipment is being offloaded onto stable, even ground. • Move all offloaded equipment out of direct travel to avoid trips	**L**
	Slips/Trips/Falls	• Wear safety-toed boots with good tread • Keep walking paths and heavy use work areas clear of obstructions and trip hazards • Use caution if work areas are wet or slippery	**L**

Chemical Hazards and Monitoring Procedures	
Chemical Hazard(s) (list):	
Applicable HASP Section(s):	
Monitoring Instrument(s):	

Additional Safety Considerations

1. Ensure all personnel have read the Accident Prevention Plan (APP).
2. Ensure all equipment is equipped with necessary fire extinguishers (min 5 lbs BC).
3. Follow safe driving procedures. Always use the buddy system when moving vehicles. Plan your travel path ahead of time. Use maps and known construction zones to make your selection. Consult with the other team members before making any changes to travel path.
4. Use an equipment checklist to verify you have the appropriate equipment/tools for your tasks. Consult appropriate AHAs or SOPs.
5. Stow all materials in vehicle properly, use appropriate cases and bags. Secure equipment in bed of truck with netting or straps. Do not leave any equipment loose in the cab or bed of the truck. It can cause property damage or serious injuries by falling from vehicle.
6. When securing equipment, watch for pinch points. Straps and netting can get caught on objects and snap back as well as trap a finger if hand placement is not correct. Use a buddy to help secure equipment when possible.
7. Maintain good housekeeping practices. When possible, use mechanical equipment to perform lifting of heavy objects. When lifting, follow safe lifting practices. Use the buddy system when lifting.
8. Wear nitrile gloves when collecting samples in soil to avoid dermal contact with potential contaminants. Be observant for tripping hazards, holes, stickups, vines, old fence wire, etc.

Additional Operational Safety Procedures		PPE
S3NA-002-PR1	Stop Work Authority	• ANSI approved hard hat • ANSI approved safety glasses • Shirts with sleeves and full-length pants. • ANSI approved steel safety-toe boots or approved equivalent. • Nitrile Gloves • Leather work gloves • First aid kit
S3NA-001-PR1	Safe Work Standards and Rules	
S3NA-003-PR1	Safety Health & Environment Training	
S3NA-004-PR1	Incident Reporting, Notifications, and Investigation	
S3NA-005-PR1	Driving	
S3NA-013-PR1	Housekeeping	
S3NA-208-PR1	Personal Protective Equipment	
S3NA-209-PR1	Risk Assessment and Management	
S3NA-209-FM5	Daily Tailgate Meeting Form	
S3NA-317-PR1	Hand Safety	

S3NA-331-PR1	Underground Utilities	
S3NA-333-ATT6	Emergency Response Procedures	
S3NA-007-FM1	Inspection BBS Checklist	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Vehicles	Vehicle inspections will be completed prior to use All employees will carry appropriate licensure and trainings for use of motorized vehicles/CMVs.	Visual inspection of all vehicles prior to mobilization Tailgate safety meeting prior to offloading of all equipment at the Site

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Print Name & Company	Date	Signature
Charles I Nixon, Jr., AECOM	10/22/18	Charles I. Nixon, Jr.

Activity Hazard Analysis (AHA)

Activity/Work Task: Sample Storage/Shipping	Overall Risk Assessment Code (RAC) (Use highest code)					**M**
Project Location: New Haven Harbor, Connecticut	**Risk Assessment Code (RAC) Matrix**					
Contract Number: W912WJ-17-D-0003	**Severity**	**Probability**				
Date Prepared: 10/9/2018		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Angela Hinkle /Scientist	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title): Kris van Naerssen / Task Order Manager	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**

Notes: (Field Notes, Review Comments, etc.)

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

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Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Recommended PPE:

_X_ Safety Glasses With Sideshields _X_ Steel-Toed Boots _X_ Hard Hat _X_ Nitrile Gloves _X_ Leather Gloves _X_ Hearing Protection ___ Flame Retardant Clothing

Job Steps	Hazards	Controls	RAC
Sample Collection	Chemical hazards associated with sediment contact	• Chemical protective gloves shall be worn for handling sediments and equipment that has come in contact with impacted sediments and surface water. • Safety glasses, goggles, or a face shield shall be worn when handling sediments and surface water. • Personal hygiene facilities shall be maintained for crew members to wash face and hands before eating and before taking breaks. • Food shall be consumed in designated clean areas • Exercise caution handling and opening preserved glassware containers and use appropriate PPE (chemically resistant gloves and appropriate eyewear)	**M**
	Decontamination	• Wear appropriate PPE (Nitrile gloves, eye protection) • Have eyewash station accessible	**L**
Packing and Carrying Equipment	Lifting Heavy Equipment	• Use proper lifting techniques by bending and lifting with legs and not back, and do not over extend or twist. Do not lift over 49 lbs. without assistance • Wear work gloves to aid in griping objects while moving • Use dollies, cart, come-alongs, or rollers whenever possible rather than unassisted lifting by employees	**M**
	Unstable Equipment	• Ensure equipment is being packed and offloaded onto stable, even ground • Move all offloaded equipment out of direct travel to avoid trips	**L**
	Slips/Trips/Falls	• Wear safety-toed boots with good tread • Keep walking paths and heavy use work areas clear of obstructions and trip hazards • Use caution if work areas are wet or slippery	**L**

Chemical Hazards and Monitoring Procedures	
Chemical Hazard(s) (list):	
Applicable HASP Section(s):	
Monitoring Instrument(s):	

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6. Wear nitrile gloves when collecting samples in soil to avoid dermal contact with potential contaminants. Be observant for tripping hazards, holes, stickups, vines, old fence wire, etc.

Additional Operational Safety Procedures		PPE
S3NA-002-PR1	Stop Work Authority	• ANSI approved hard hat • ANSI approved safety glasses • Shirts with sleeves and full-length pants. • ANSI approved steel safety-toe boots or approved equivalent. • Nitrile Gloves • Leather work gloves • First aid kit
S3NA-001-PR1	Safe Work Standards and Rules	
S3NA-003-PR1	Safety Health & Environment Training	
S3NA-004-PR1	Incident Reporting, Notifications, and Investigation	
S3NA-013-PR1	Housekeeping	
S3NA-208-PR1	Personal Protective Equipment	
S3NA-209-PR1	Risk Assessment and Management	

S3NA-209-FM5	Daily Tailgate Meeting Form	
S3NA-317-PR1	Hand Safety	
S3NA-333-ATT6	Emergency Response Procedures	
S3NA-007-FM1	Inspection BBS Checklist	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Vehicles	Vehicle inspections will be completed prior to use All employees will carry appropriate licensure and training for use of motorized vehicles/CMVs.	Visual inspection of all vehicles prior to mobilization Tailgate safety meeting prior to offloading of all equipment at the Site

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Print Name & Company	Date	Signature
Ken Cadmus - OSI	10/23/18	Ken Cadmus
MORGAN BARRETT - OSI	10/23/18	
KLUS VAN NAOMSON AECOM	10/23/18	

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Print Name & Company	Date	Signature
Ken Cadmus - OSI	10/23/18	[illegible]
Morgan BARRETT - OSI	10/23/18	[illegible]
K. VAN NAMSSON - AECOM	10/23/18	[illegible]

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Ken Cadmus - OSI	10/23/18	
Morgan BARRETT - OSI	10/23/18	
KRISTAN NAUGSON - AECOM	10/23/18	

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Print Name & Company	Date	Signature
KRIS VAN ATOMOW AECOM	10/23/18	

Attachment 3 New Haven Harbor / CLDS Chain of Custody Forms

CHAIN OF CUSTODY

PAGE 1 OF 2

Date Rec'd in Lab: 10/24/18

ALPHA Job #: L1843305

ALPHA Analytical
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: NEW HAVEN HBR

Project Location: NEW HAVEN, CT

Project #:

Project Manager: RICHARD LOYD / KRIS VANNAERSEN

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: USACE / AECOM

Address: 696 VIRGINIA RD CONCORD, MA 01742

Phone: 978-318-8048

Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☑ Other State /Fed Program RIM Criteria RIM

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Additional Project Information:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ASN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	RIM METALS	PAHs	PCBs	PESTICIDES	TOC	%MOISTURE	Sample Comments	TOTAL # BOTTLES
43305-01	TB-2	10/22	10:50	SE	GJS	✓	✓	✓	✓	✓	✓		1
02	US-2 0.0-5.0	10/22	17:20	SE	GJS	✓	✓	✓	✓	✓	✓		1
03	US-2 5.0-6.0	10/22	17:20	SE	GJS	✓	✓	✓	✓	✓	✓		1
04	TB-1 0-5.2	10/23	10:25	SE	GJS	✓	✓	✓	✓	✓	✓		1
05	TB-1 5.2-6.0	10/23	10:25	SE	GJS	✓	✓	✓	✓	✓	✓		1
06	CAD-3 0-5.5	10/23	11:43	SE	GJS	✓	✓	✓	✓	✓	✓		1
07	US-1 0-5.5	10/23	12:37	SE	GJS	✓	✓	✓	✓	✓	✓		1
08	CAD-2 0.5.3	10/23	13:47	SE	GJS	✓	✓	✓	✓	✓	✓		1
09	CAD-2 5.3-10.8	10/23	14:15	SE	GJS	✓	✓	✓	✓	✓	✓		1
10	W11	10/25	13:10	SE	RBL	✓	✓	✓	✓	✓	✓		1
					Container Type	A	A	A	A	A	A		
					Preservative	A	A	A	A	A	A		

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H= $Na_2S_2O_3$, I= Ascorbic Acid, J= NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
Richard B. Loyd	10/23 18:00	[illegible]	10/23 1800
[illegible]	10/24 1325	[illegible]	10/24 1733
[illegible]	10/24/18 1859	[illegible]	10/24/18 18:59

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

CHAIN OF CUSTODY

PAGE 2 OF 2

Date Rec'd in Lab: 10/24/18

ALPHA Job #: L1843305

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: NEW HAVEN HBR

Project Location: NEW HAVEN, CT

Project #:

Project Manager: RICHARD LOYD, KRIS VAN NAARSSEN

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: USACE / AECOM

Address: 696 VIRGINIA RD, CONCORD, MA 01742

Phone: 978-318-8048

Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☑ Other State /Fed Program RCM Criteria RCM

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Additional Project Information:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; RCM METALS; PAHs; PCBs; PESTICIDES; TOC; % MOISTURE / TS

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Sample Comments	TOTAL # BOTTLES
	~~[illegible]~~ S1						
1843305-11	V1	10/23	11:31	SE	RBL		1
12	S1	10/23	12:25	SE	RBL		1
13	B1	10/23	12:31	SE	RBL		1
14	CAD-3 6.1-9.9	10/23	15:00	SE	GJS		1
15	CAD-1 0-4.0	10/23	15:58	SE	GJS		1
16	CAD-1 4.4-9.0	10/23	16:30	SE	GJS		1
17	DS-1 0-7.3	10/23	17:00	SE	GJS		1
18	DS-2 0-7.0	10/23	17:38	SE	GJS		1
07	DUP / MS/MSD	10/23	13:10	SE	GJS		2

Container Type	A	A	A	A	A	A
Preservative	A	A	A	A	A	A

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H= $Na_2S_2O_3$, I= Ascorbic Acid, J= NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/23 18:00	[signature]	10/23 18:00
[signature]	10/24 1325	[signature]	10/24/18 1325
[signature]	10/24/18 1500	[signature]	10/24/18 15:15

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

U.S. ARMY C[illegible] OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOYD [signature]

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE TESTING	SOS POLLUTED PHASE TOX.	10-DAY WHOLE SED TOX.	28-DAY BIOACCUM.			REMARKS
1	10/23	11:25	/		COMP U', W'	2	/	/					STATIONS U', W'
2	10/23	12:15	/		COMP R', S'	8	/	/	/	/			STATIONS R', S'
3	10/23	15:27	/		~~COMP~~ CAD 1-3	9	/	/	/	/			STATIONS CAD-1, CAD-2, CAD-3

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	10/23 1800	[signature]			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

ENSR | AECOM

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE / AECOM

Project Location: New Haven Harbor / CT Disposal Site

Project Number: 60588790

Field Logbook No.:

Sampler (Print Name)/(Affiliation): K. van Naoresson / AECOM

Chain of Custody Tape Nos.: N/A

Signature:

Send Results/Report to: K. van Naoresson

TAT: As per work plan

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Matl)	Matrix	Preserv.	Field Filtered	Glutaraldehyde Prop	SPP Assay	10-Day TOX	28-Day TOX/Tissue							Lab I.D.	Remarks
NHH-CLDS	10/23/18	10:28	X	X	3.5 G (6)	SD	7	No	X	X	X	X								For work
NHH-CLDS	10/23/18	13:12	X	X	5 G (10)	SW	7	No	X	X										Plan / Rem

Relinquished by: (Print Name)/(Affiliation)	Date / Time	Received by: (Print Name)/(Affiliation)	Date / Time
K. van Naoresson / AECOM Signature:	Date: 10/23/18 Time: 17:15	Charles Nixon Signature:	Date: 10/23 Time: 1715
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

C:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 02668

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 10/24/18

ALPHA Job #: L1843374

ALPHA Analytical
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: New Haven Harbor/CLDS

Project Location: Construct & Disposal Site

Project #: 60588790

Project Manager: K. Van Naarssen

ALPHA Quote #:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☒ Same as Client Info PO #:

Client Information

Client: USACE / AECOM

Address: 500 Enterprise Dr, Rocky Hill, CT

Phone: 484.678.1876

Email: Kris.VanNaarssen@AECOM.com

Additional Project Information:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☒ Other State /Fed Program ITM / RIM Criteria

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; SVOCs; RIM Pesticides; Hex Chrom; PCB congeners; RIM Total Metals; Total Hg (Total Metals)

PER Work Plan / RIM

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	EPH	VPH	PCB	TPH	SVOCs	RIM Pesticides	Hex Chrom	PCB congeners	RIM Total Metals	Total Hg (Total Metals)	Sample Comments	Total # Bottles
43374-01	NHH-CLDS	10/23/18	13:12	W	KVN								X	X	X	X	X	X	3 sets (MS/MSD)	18
02	CLDS-WATER-EB	10/23/18	1250	W	KVN								↓	↓	↓	↓	↓	↓		
03	CLDS-GRAB-SB	10/23/18	1220	W	KVN															

Container Type				A	A	P	A	A	P
Preservative				A	A	A	A	A	C

Container Type: P= Plastic; A= Amber glass; V= Vial; G= Glass; B= Bacteria cup; C= Cube; O= Other; E= Encore; D= BOD Bottle

Preservative: A= None; B= HCl; C= HNO_3; D= H_2SO_4; E= NaOH; F= MeOH; G= $NaHSO_4$; H= $Na_2S_2O_3$; I= Ascorbic Acid; J= NH_4Cl; K= Zn Acetate; O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
	10/23/18 17:15		10/23 17:15
	10/24 1324		10/24/18 1324
	10/24/18 1809		10/24/18 18:09

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOED [illegible] B. [illegible]

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE PREP	SUSPENDED PHASE TOX	10-DAY WHOLE SEDTOX	28-DAY BIOACCUM.			REMARKS
1	10/24		/		COMP TB1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
2	10/24		/		COMP DS1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
3					COMP US1-2	8	/	/					WATER FROM NEW HAVEN HBR
4					COMP DS1-2	8	/	/					
5					COMP TB1-2	6	/	/					
6					COMP CAD1,2,3	6	/	/					
7					COMP U'W'	6	/	/					
8					COMP R'S'	8	/	/					

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[illegible] B. [illegible]	10/24 1545	Charles N. [illegible] 10/24 1525			
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

CHAIN OF CUSTODY

PAGE ____ OF ____

Date Rec'd in Lab: 10/25/18

ALPHA Job #: L1843524

ALPHA Analytical Laboratories
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: NEW HAVEN HARBOR

Project Location: NEW HAVEN, CT

Project #:

Project Manager: RICHARD LOYD / KRIS VAN NIEUWSEN

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: USACE/AECOM

Address: 696 VIRGINIA RD CONCORD, MA 01742

Phone: 9783188048

Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☐ Other State /Fed Program RIDM Criteria RIDM

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Additional Project Information:

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC: ☐ 8260 ☐ 624 ☐ 524.2 / SVOC: ☐ ABN ☐ PAH / METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 / METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13 / EPH: ☐ Ranges & Targets ☐ Ranges Only / VPH: ☐ Ranges & Targets ☐ Ranges Only / ☐ PCB ☐ PEST / TPH: ☐ Quant Only ☐ Fingerprint	TOTAL METALS, HG	HEX CR	PCB CONGENERS	PESTICIDES	RIDM SVOCS	SAMPLE INFO (Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do)	Sample Comments	TOTAL # BOTTLES
43524-01	PUMP BLANK	10/24	1420	DI	GSS							/	/	/	/	/		6
02	CORE BLANK	10/24	1400	DI	GSS							/	/	/	/	/		6

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab:

~~ALPHA Job #:~~

Client Information

Client: US ARMY CORPS OF ENG.
Address: 696 VIRGINIA RD
CONCORD, MA 01742
Phone: 978-318-8048
Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Additional Project Information:

Project Information

Project Name: NEW HAVEN HARBOR
Project Location: NEW HAVEN, CT
Project #:
Project Manager: RICHARD LOYD
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info | PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ANALYSIS: ELUTRIATE PREP; SPP TOX.; 10-DAY WHOLE SED TOX; 28-DAY BIOACCUM

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ELUTRIATE PREP	SPP TOX.	10-DAY WHOLE SED TOX	28-DAY BIOACCUM	Sample Comments	Total # Bottles
	COMP DS 1-2	10/25	9:45	SE	RBL	/	/	/	/	STATION DS-2	3
	COMP US 1-2	10/25	10:23	SE	RBL	/	/	/	/	STATION US 1&2	8
Container Type						P	P	P	P		
Preservative						A	A	A	A		

SAMPLE INFO
Filtration
☐ Field
☐ Lab to do
Preservation
☐ Lab to do

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H= $Na_2S_2O_3$
I= Ascorbic Acid
J= NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/25 13:30	[signature]	10/25 1350

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

Attachment 4 New Haven Harbor / CLDS Field Logs

Attachment 4A New Haven Harbor / CLDS Logbook Entries

CONTENTS

PAGE	REFERENCE-USACE	DATE
1-8	WEST PORT HARBOR	10/11/17
9-15	CHEBOGUE I.S.	10/17/17
16-21	PLYMOUTH HARBOR	12/15/17
22-23	PROVIDENCE HARBOR	06/11/18
24-28	New Haven Harbor Supplemental	10/23/18

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

ALL-WEATHER
LEVEL BOOK

Name K. VAN NAERSSEN
AECOM

Address ~~500 ENTERPRISE DR.~~
500 ENTERPRISE DR. ROCKY HILL, CT

Phone 484 678-1876

Project ~~GEO (IP)~~ USACE SUITABILITY DETERM.
~~WESTPORT HARBOR / CORS SAMPLING~~

$25 REWARD IF FOUND & RETURNED TO 500 APOLLO DR. CHELMSFORD, MA

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Specifications for this book:

Page Pattern		Cover Options	
Left Page	Right Page	Polydura Cover	Fabrikoid Cover
Columnar	Columnar	Item No. 310	Item No. 310F

10/23/18 (24)

New Haven Harbor Supplemental
CLDS SAMPLING

0800 ONSITE - BRANFORD R.
START BOAT LAUNCH
ACOM - K. VAN NORDSTRAND
OSI - K. Cadmus - Captain
M. Barnett - Mate
42° CLOUDY, 60 FORCAST, CALM WINDS
PROP VESSEL - R/V Walling II
& SAMPLING GEAR

0845 SHE BRIEFING
JSA/TSA REVIEW
WEATHER (10:53 low tide / 1404 H. Tide)
ON WATER WORK
TARGET 18G SED + 45G H_2O + Supplies

0900 Depart for CLDS Ref site

0950 CLDS Ref Site Arrive

Lowered sampler / vessel
prep for grab sampling
18 Gallons Total - 200 Grams wet

10/23/18 CLDS Ref site Sample

G1 - 10:17 86.6' No Rec.
G2 10:23 85.8 No Rec
G3 10:28 86.2' ~~No Rec.~~ HW
See COC
G4 10:46 85.2' No Rec.
G5 10:54 84.8 See COC
G6 11:12 No Rec
G7 1115 No Rec
G8 1117 See COC
G9 11:40 85.8 " "
G10 11:57 " "

12:05 Prep for GRAB Sampler Equip. Blank

12:20 GRAB Sampler Equip Blank collection

1240 SWITCH over to Log Volume Niskin

1250 Water Sampler Equipment Blank

10/23/18 CLDS Ref Site/NHM
1300 Reposition on station for water Sampling

1310 on STATION for water Sampling

1314 HW GRAB Sample 1.
41.134880°N, -72.834673°E

1318 CS Nelson calls to inform K.N → Reefer Truck Reefer unit is inoperable. Joe Fouchs is Aware - Will Fix or send Replacement ASAP

Water Grab Sample #2

1334 Water GRAB Sample #3
41.134829°N, -72.834646°E

1358 " " " #4
41.134845°N, -72.834676°E

1424 " " " #5
41.134809°N, -72.834653°E

1442 1438 " " " #6
41.134866°N, -72.834757°E

1459 " " " #7
41.134859°N, -72.834736°E

Sent to Betty/Dave Tuesday

NHH / CLDS 10/23/18 (cont

1515 WATER GRAB SAMPLE #8
41.134884°N, -72.834707°E

1530 Return towards Branford
1550 Cool Fox Bringing Replacement van for CJ
1605 Return to Dock

Haul Boat / Demob

Complete Cleaning / Sample collection (Had to Bring CLDS H2O ashore in Cubitainers - 4x2' Seems [not predicted] at Ref Site this afternoon

6x3g NHH CLDS 50
10x 3g NHH CLDS H2O
Equip Blank CLDS H2O (blk)

1700 OSI office to
1715 Sign samples over to OSI
1725 CJ Nixon office to meet R. Loyd
1735 K. Van Nperesson office → West Haven
1800 At West Haven Boat Ramp
- Discuss project w/ USACE

NHH / CLDS 10/23/18

Personnel (R. Loyd, A. Hopkins, Inland)
- Per ACE - No Dredge Site H2O collected to DATE - Will inform ESI

1815 Depart W. Haven
Return Trailer
North via
Rocky Hill Office

2000 Return Home / EOD

10.23.18 New Haven Harbor Sed. Sampling
task: Pick up samples for delivery to New Hampshire
Driver: CJ Nixon (CJN)
Weather: Clear 60s

1245: CJN performs pre-trip safety check of van.

CJN arrives at Branford boat launch at 1315. Reefer unit not working. CJN calls Cool Fox, who will deliver identical replacement van to West Haven boat launch around 1700 10/23. CJN informs Kris Van Naerssen.

Cool Fox ~~sends~~ driver arrives at West Haven at 1545. Joe noted that driver would arrive at 1700, CJN has driver go to Branford River launch to drop off van.

Van is dropped at Branford launch and confirmed to be in operating condition

CJN ~~drop~~ loads samples and departs for West Haven at 1715, arrives at West Haven at 1735. Thermostat set to 30°F

Samples are loaded onto van, CJ sets thermostat to 30°F, confirms 30°F with second thermometer
CJN departs west haven at 1815, arrives home at 1845. Van plugged in and set to 30°F for the night. Temp confirmed at 32° on aux. thermometer. Ice purchased at grocery store to further cool samples (20 20-lb bags)

* all temp checks performed with auxiliary thermometer

10.24.18
Task - deliver samples to New Hampshire, return to West Haven for pickup
Weather: Clear, 40s
Driver: CJN

0530 CJN completes vehicle inspection, prepares Alpha samples for courier pickup

0680 CJN checks temp of cargo area (29°F)*, departs for New Hampshire

0730 Reefer unit starts displaying warning light and stops cooling. CJN stops, restarts reefer, re-checks temperature (30°F)*, continues on route

1000 CJN arrives at ESI in New Hampshire, confirms cargo box temp at 30°F*, unloads samples

1045 CJN departs New Hampshire for West Haven

1315 CJN forgot to relinquish Alpha chain, meets Alpha Courier at Rocky Hill to relinquish samples to courier

1345 CJN departs Rocky Hill for West Haven
1530 CJN arrives at West Haven boat ramp. Samples are loaded, covered in bagged ice, and thermostat is confirmed at 30°F. Temp is confirmed with aux. thermometer.
1600 CJN departs for home, arrives at 1630, van plugged in for overnight standby. 30°F confirmed in cargo box.

* All temp checks performed with auxilliary thermometer

10.25.18
Task: deliver samples to New Hampshire, pickup at West Haven, deliver to New Hampshire
Weather: clear, 30s
Driver: CJN

0415 CJN inspects vehicle, confirms cargo box at 29°F*, departs for New Hampshire at 0430
-- Per discussion with Alpha labs, CJN will stop at Alpha in Westborough, MA

0630 CJN arrives at Alpha Labs. Reefer unit malfunctioning. CJN attempts restart, unit turns back on, CJN completes sample drop off and departs for New Hampshire at 0645

0800 Reefer unit malfunctions again. CJN stops and attempts restart, but fails. Temp is confirmed at 30°F*. CJN continues to ESI.

0822 CJN arrives at ESI. Temp is checked and is at 35°F*. Samples unloaded, chain and recieved samples do not match. Ben Loyd notes he made a mistake on the COC, he will note changes to labs in e-mail

0900 CJN departs for West Haven

0945 after failure of reefer unit to turn on, CJN pulls over to call and inform Kris van Naerssen and Joe Fuchs (Cool Fox). CJN will continue on route and ice samples in lieu of running reefer unit.

1345 CJN arrives at West Haven. Reefer unit turned back on about 1315, CJN checked cargo box temp which is 34°F* upon arrival at West Haven. Samples are iced and thermostat set for 30°F.

1400 CJN departs for New Hampshire. Reefer unit working intermittently.

Temp checks: 1505 30°F (checked with aux
1642 34°F thermometer)
1712 35°F
1758 36°F

1800 CJN arrives at New Hampshire. Cargo box measured at 36°F.*
Samples unloaded, reefer unit turned off.

1830 CJN departs for home

1030 CJN arrives home

10/26
0900 CJN cleans van, hoses out cargo box, calls Cool Fox to take van off rent

10/24-10/25 reefer unit issues

On both 10/24 and 10/25, the reefer unit on the van malfunctioned. On 10/24, the unit was re-started once and continued running. The reefer unit also worked without fail when on electric standby. On 10/25, the reefer unit failed again about 0800. CJN attempted to restart the unit, but failed. Per discussion with Kris van Naersen, the samples were iced down and temperature was checked periodically. Temps in the cargo box climbed but did not exceed 40°F. The second trip on 10/25 would use ice in lieu of reefer unit per conversation with Kris van Naersen.
CJN did get the reefer unit to turn on about ½ hour from West Haven on 10/25. Reefer unit continued working for approx ½ hour, and failed. Temp was checked periodically, noted in daily logs. Ice was used to chill samples.

Attachment 4B CLDS Sediment Grab Collection Records

Sediment Grab Collection Record

AECOM

Location ID: CLDS Ref | Date: 10/23/16 | Project #: 60588796

Sampler: K. van Nimwegen | Contractor: AECOM / OSI | Vessel: Williams, II

Weather: Cloudy 50°

Sampling Equipment: Modified van Veen | Diameter in: 12

Target Northing: 41 08.10' N | Easting: 72 50.06' W | NAD83 Stateplane Feet

---

Grab Number: 1 | Time 24hr: 1015 | Water Depth ft: 86.6 | # Attempts: 1

Actual Northing: 41.13485 | Easting: -72.834650 | Distance from target ft: 0

Target Penetration Depth ft: 1 | Actual Penetration Depth ft: 0 | Recovered Length ft: 0 | Recovery %: 0

Remarks: - No Recovery. Down line triggered jaws per crew

RPD cm: — | Texture all: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm: N/A | H2S ppm: N/A | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: ~~Yes No~~ | Oil sheen: ~~Yes No~~ | Visible biology: ~~Yes No~~

Grab Number: 2 | Time 24hr: 1023 | Water Depth ft: 85.8 | # Attempts: 1

Actual Northing: 41.134832 | Easting: -72.834664 | Distance from target ft: 0

Target Penetration Depth ft: 1 | Actual Penetration Depth ft: | Recovered Length ft: | Recovery %:

Remarks: - NO Recovery

RPD cm: | Texture all: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm: | H2S ppm: | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No | Oil sheen: Yes No | Visible biology: Yes No

Grab Number: 3 | Time 24hr: 1028 | Water Depth ft: 86.2 | # Attempts: 1

Actual Northing: 41.134857 | Easting: -72.834649 | Distance from target ft: 0

Target Penetration Depth ft: 1 | Actual Penetration Depth ft: 1 | Recovered Length ft: 1 | Recovery %: 100

Remarks: One small twig + possible worm notch. 95% Dark Gray, slight band Black! 2 cm Brown at top

RPD cm: 2 | Texture all: Clay Clay+Silt (Silt) Silt+Sand Sand Sand+Gravel Gravel

PID ppm: — | H2S ppm: — | Color: Black (Dark Gray) Light Gray Brown Tan Green

Debris: (Yes) No | Oil sheen: Yes (No) | Visible biology: (Yes) No

Sediment Grab Collection Record

AECOM

Location ID: NHH-CLDS Date: 10/23/08 Project #: 60588750

Sampler: K. JAN NARKSON Contractor: AECOM/OSI Vessel: Willing II

Weather: Cloudy 50°

Sampling Equipment: MODIFIED VAN NEEN Diameter in: 12

Target Northing: 41 08.10N Easting: 72 50.06'W NAD83 Stateplane Feet

---

Grab Number: G4 Time 24hr: 10:46 Water Depth ft: 85.2 # Attempts: 1

Actual Northing: 41.134850 Easting: -72.834648 Distance from target ft: 0

Target Penetration Depth ft: 1
Actual Penetration Depth ft: 0
Recovered Length ft:
Recovery %:

Remarks: No Recovery

RPD cm: Texture all: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm: H2S ppm: Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No Oil sheen: Yes No Visible biology: Yes No

Grab Number: G5 Time 24hr: 10:54 Water Depth ft: 84.8 # Attempts: 1

Actual Northing: 41.134870 Easting: -72.834671 Distance from target ft: 0

Target Penetration Depth ft: 1
Actual Penetration Depth ft: 1
Recovered Length ft: 1
Recovery %: 100

Remarks: Few Small (1-2 cm) shells

RPD cm: 3 Texture all: Clay Clay+Silt (Silt) Silt+Sand Sand Sand+Gravel Gravel

PID ppm: — H2S ppm: — Color: Black (Dark Gray) Light Gray Brown Tan Green

Debris: (Yes) No Oil sheen: Yes (No) Visible biology: Yes (No)

Grab Number: G6 Time 24hr: 11:12 Water Depth ft: 85.0 # Attempts: 1

Actual Northing: 41.134852 Easting: -72.834705 Distance from target ft: 0

Target Penetration Depth ft: 1.0
Actual Penetration Depth ft: —
Recovered Length ft:
Recovery %:

Remarks: No Recovery

RPD cm: Texture all: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm: H2S ppm: Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No Oil sheen: Yes No Visible biology: Yes No

Sediment Grab Collection Record

AECOM

Location ID CLASS REF Date 10/23/18 Project # 60588798

Sampler K. VAN NAMEN Contractor AECOM/OSI Vessel WILLIAM H

Weather CLOUDY 50°

Sampling Equipment MANIFOLD VAN VEEN Diameter in 12

Target Northing 41° 08.10" N Easting 72 50.06" W ~~NAD83 Statplane Feet~~ LAT/LONG - ALSO RECORDED IT STAF PLAN

Grab Number G7 Time 24hr 11:15 Water Depth ft 86.7 # Attempts 1

Actual Northing 41.134880 Easting -72.834697 Distance from target ft 0

Target Penetration Depth ft 1 Remarks No Recovery

Actual Penetration Depth ft 0

Recovered Length ft 0

Recovery % 0

RPD cm — Texture all Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm — H2S ppm — Color Black Dark Gray Light Gray Brown Tan Green

Debris Yes No Oil sheen Yes No Visible biology Yes No

Grab Number G8 Time 24hr 11:19 Water Depth ft 86.0 # Attempts 1

Actual Northing 41.134880 Easting -72.834661 Distance from target ft 0

Target Penetration Depth ft 1 Remarks - Small worm/tube (2)

Actual Penetration Depth ft 1 - No odor/sheen, etc.

Recovered Length ft 1 sm. black streak noted

Recovery % 100

RPD cm 3 Texture all Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm — H2S ppm — Color Black Dark Gray Light Gray Brown Tan Green

Debris Yes No Oil sheen Yes No Visible biology Yes No

Grab Number G9 Time 24hr 11:48 Water Depth ft 85.0 # Attempts 1

Actual Northing 41.134848 Easting -72.834637 Distance from target ft 0

Target Penetration Depth ft 1 Remarks - small patch ~2"

Actual Penetration Depth ft 1 - No live organisms noted

Recovered Length ft 1 - slight sulfur odor noted

Recovery % 100

RPD cm 3 Texture all Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm — H2S ppm — Color Black Dark Gray Light Gray Brown Tan Green

Debris Yes No Oil sheen Yes No Visible biology Yes No

Sediment Grab Collection Record

AECOM

Location ID: CLDS RIF | Date: 10/23/18 | Project #: 60588790

Sampler: Kevin Nikkesson | Contractor: Aecom/USI | Vessel: Willing II

Weather: Cloudy, 50°

Sampling Equipment: Modified van Veen | Diameter in: 12

Target Northing: 41°08'10"N | Easting: 72°50.06'W | NAD83 Stateplane Feet LAT LONG (Also recorded in CT St. Plane)

Grab Number: G-10 | Time 24hr: 11:56 | Water Depth ft: 83.5 | # Attempts: 1

Actual Northing: 41,134 886 | Easting: 72 834 704 | Distance from target ft: 0

Target Penetration Depth ft: 1

Actual Penetration Depth ft: 1

Recovered Length ft: 1

Recovery %: 100

Remarks: - Similar to Curt

RPD cm: 2 | Texture all: Clay Clay+Silt (Silt) Silt+Sand Sand Sand+Gravel Gravel

PID ppm: — | H2S ppm: — | Color: Black (Dark Gray) Light Gray Brown Tan Green

Debris: (Yes) No | Oil sheen: Yes (No) | Visible biology: Yes (No)

Grab Number: | Time 24hr: | Water Depth ft: | # Attempts:

Actual Northing: | Easting: | Distance from target ft:

Target Penetration Depth ft:

Actual Penetration Depth ft:

Recovered Length ft:

Recovery %:

Remarks:

RPD cm: | Texture all: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm: | H2S ppm: | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No | Oil sheen: Yes No | Visible biology: Yes No

Grab Number: | Time 24hr: | Water Depth ft: | # Attempts:

Actual Northing: | Easting: | Distance from target ft:

Target Penetration Depth ft:

Actual Penetration Depth ft:

Recovered Length ft:

Recovery %:

Remarks:

RPD cm: | Texture all: Clay Clay+Silt Silt Silt+Sand Sand Sand+Gravel Gravel

PID ppm: | H2S ppm: | Color: Black Dark Gray Light Gray Brown Tan Green

Debris: Yes No | Oil sheen: Yes No | Visible biology: Yes No

Appendix C: Chemistry Data

Appendix C.1: Elutriate Chemistry Lab Report

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

21 December, 2018

Elutriate Chemistry Report (Final)

ANALYTICAL REPORT

Lab Number:	L1843374
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 6.0
Report Date:	11/15/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843374-01	NHH-CLDS	WATER	NEW HAVEN, CT	10/23/18 13:12	10/24/18
L1843374-02	CLDS-WATER-EB	WATER	NEW HAVEN, CT	10/23/18 12:50	10/24/18
L1843374-03	CLDS-GRAB-EB	WATER	NEW HAVEN, CT	10/23/18 12:20	10/24/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843374
Project Number:	60588790 TASK 6.0	**Report Date:**	11/15/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843374
Project Number:	60588790 TASK 6.0	**Report Date:**	11/15/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Pesticides

L1843374-02: The surrogate recoveries were outside the acceptance criteria for bz198 (29%/29%); however, the criteria were achieved upon re-extraction outside of holding time. The results of both extractions are reported; however, all associated compounds are considered to have a potential bias.

L1843374-03: The surrogate recoveries were outside the acceptance criteria for dbob (26%) and bz198 (24%/23%); however, the criteria were achieved upon re-extraction outside of holding time. The results of both extractions are reported; however, all associated compounds are considered to have a potential bias.

The WG1173904-5 MS recoveries, performed on L1843374-01, are outside the acceptance criteria for several compounds; however, the associated LCS/LCSD recoveries are within overall method allowances. The results of the native sample are considered to have a potentially low bias for heptachlor (37%), aldrin (33%) and toxaphene (0%).

The WG1173904-6 MSD recoveries, performed on L1843374-01, are outside the acceptance criteria for several compounds; however, the associated LCS/LCSD recoveries are within overall method allowances. The results of the native sample are considered to have a potentially high bias for heptachlor epoxide (142%) and a potentially low bias for heptachlor (49%), aldrin (44%) and toxaphene (0%).

Total Metals

The WG1176966-1 Method Blank, associated with L1843374-01, has a concentration above the reporting limit for zinc. Since the sample was non-detect to the RL for this target analyte, no further actions were taken. The results of the original analysis are reported.

The WG1176966-2 LCS recoveries, associated with L1843374-01, were below the acceptance criteria for cadmium (16%), chromium (5.6%), copper (13%), lead (17%), nickel (12%), silver (1.3%) and zinc (16%); the sample was rerun and gave similar results. The results of the original analyses are reported; however, all results are considered to have a potentially low bias for these analytes.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843374
Project Number:	60588790 TASK 6.0	**Report Date:**	11/15/18

Case Narrative (continued)

The WG1176966-3 MS recoveries, performed on L1843374-01, are below the acceptance criteria for cadmium (15%), chromium (1.3%), copper (13%), lead (17%), nickel (12%), silver (2%) and zinc (15%). The results of the native sample are considered to have a potentially low bias for these analytes.
The WG1176966-4 Laboratory Duplicate RPD for nickel (49%), performed on L1843374-01, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

Hexavalent Chromium
L1843374-01, -02, and -03 were analyzed with the method required holding time exceeded.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 11/15/18

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1843374
Project Number: 60588790 TASK 6.0
Report Date: 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-01
Client ID: NHH-CLDS
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:12
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 17:34
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.10	0.459	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-02
Client ID: CLDS-WATER-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 19:36
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	1.98	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-03
Client ID: CLDS-GRAB-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 20:07
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.22	0.484	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	74		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 11/09/18 11:57
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-03 Batch: WG1173998-1					
Pentachlorophenol	ND		ug/l	2.00	0.436

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	93		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-03 Batch: WG1173998-2 WG1173998-3								
Pentachlorophenol	77		78		50-120	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,6-Tribromophenol	95		93		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173998-5 WG1173998-6 QC Sample: L1843374-01 Client ID: NHH-CLDS												
Pentachlorophenol	ND	11.1	8.08	73		7.43	73		50-120	8		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	91		88		30-150

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173998-4 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Pentachlorophenol	ND	ND	ug/l	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	76		84		30-150

PCBS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-01
Client ID: NHH-CLDS
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:12
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 15:08
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.0011	0.0005	1
Cl3-BZ#18	ND		ug/l	0.0011	0.0005	1
Cl3-BZ#28	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#44	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#49	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#52	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#66	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#87	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#101	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#105	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#118	ND		ug/l	0.0011	0.0005	1
Cl6-BZ#128	ND		ug/l	0.0011	0.0005	1
Cl6-BZ#138	ND		ug/l	0.0011	0.0005	1
Cl6-BZ#153	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#170	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#180	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#183	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#184	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#187	ND		ug/l	0.0011	0.0005	1
Cl8-BZ#195	ND		ug/l	0.0011	0.0005	1
Cl9-BZ#206	ND		ug/l	0.0011	0.0005	1
Cl10-BZ#209	ND		ug/l	0.0011	0.0005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	76		30-150
BZ 198	65		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-02
Client ID: CLDS-WATER-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 17:23
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.0010	0.0005	1
Cl3-BZ#18	ND		ug/l	0.0010	0.0005	1
Cl3-BZ#28	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#44	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#49	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#52	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#66	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#87	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#101	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#105	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#118	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#128	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#138	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#153	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#170	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#180	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#183	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#184	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#187	ND		ug/l	0.0010	0.0005	1
Cl8-BZ#195	ND		ug/l	0.0010	0.0005	1
Cl9-BZ#206	ND		ug/l	0.0010	0.0005	1
Cl10-BZ#209	ND		ug/l	0.0010	0.0005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	66		30-150
BZ 198	42		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-03
Client ID: CLDS-GRAB-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 17:57
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.0011	0.0005	1
Cl3-BZ#18	ND		ug/l	0.0011	0.0005	1
Cl3-BZ#28	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#44	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#49	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#52	ND		ug/l	0.0011	0.0005	1
Cl4-BZ#66	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#87	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#101	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#105	ND		ug/l	0.0011	0.0005	1
Cl5-BZ#118	ND		ug/l	0.0011	0.0005	1
Cl6-BZ#128	ND		ug/l	0.0011	0.0005	1
Cl6-BZ#138	ND		ug/l	0.0011	0.0005	1
Cl6-BZ#153	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#170	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#180	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#183	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#184	ND		ug/l	0.0011	0.0005	1
Cl7-BZ#187	ND		ug/l	0.0011	0.0005	1
Cl8-BZ#195	ND		ug/l	0.0011	0.0005	1
Cl9-BZ#206	ND		ug/l	0.0011	0.0005	1
Cl10-BZ#209	ND		ug/l	0.0011	0.0005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	44		30-150
BZ 198	35		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 13:27
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners (RIM List) - Mansfield Lab for sample(s): 01-03 Batch: WG1173900-1					
Cl2-BZ#8	ND		ug/l	0.0010	0.0005
Cl3-BZ#18	ND		ug/l	0.0010	0.0005
Cl3-BZ#28	ND		ug/l	0.0010	0.0005
Cl4-BZ#44	ND		ug/l	0.0010	0.0005
Cl4-BZ#49	ND		ug/l	0.0010	0.0005
Cl4-BZ#52	ND		ug/l	0.0010	0.0005
Cl4-BZ#66	ND		ug/l	0.0010	0.0005
Cl5-BZ#87	ND		ug/l	0.0010	0.0005
Cl5-BZ#101	ND		ug/l	0.0010	0.0005
Cl5-BZ#105	ND		ug/l	0.0010	0.0005
Cl5-BZ#118	ND		ug/l	0.0010	0.0005
Cl6-BZ#128	ND		ug/l	0.0010	0.0005
Cl6-BZ#138	ND		ug/l	0.0010	0.0005
Cl6-BZ#153	ND		ug/l	0.0010	0.0005
Cl7-BZ#170	ND		ug/l	0.0010	0.0005
Cl7-BZ#180	ND		ug/l	0.0010	0.0005
Cl7-BZ#183	ND		ug/l	0.0010	0.0005
Cl7-BZ#184	ND		ug/l	0.0010	0.0005
Cl7-BZ#187	ND		ug/l	0.0010	0.0005
Cl8-BZ#195	ND		ug/l	0.0010	0.0005
Cl9-BZ#206	ND		ug/l	0.0010	0.0005
Cl10-BZ#209	ND		ug/l	0.0010	0.0005

Surrogate	%Recovery	Qualifier	Acceptance Criteria
DBOB	105		30-150
BZ 198	98		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-03 Batch: WG1173900-2 WG1173900-3								
Cl2-BZ#8	75		76		50-120	1		30
Cl3-BZ#18	77		77		50-120	0		30
Cl3-BZ#28	82		80		50-120	2		30
Cl4-BZ#44	88		88		50-120	0		30
Cl4-BZ#49	88		85		50-120	3		30
Cl4-BZ#52	84		83		50-120	1		30
Cl4-BZ#66	89		86		50-120	3		30
Cl5-BZ#87	92		89		50-120	3		30
Cl5-BZ#101	93		89		50-120	4		30
Cl5-BZ#105	94		92		50-120	2		30
Cl5-BZ#118	91		88		50-120	3		30
Cl6-BZ#128	90		87		50-120	3		30
Cl6-BZ#138	92		89		50-120	3		30
Cl6-BZ#153	91		87		50-120	4		30
Cl7-BZ#170	92		87		50-120	6		30
Cl7-BZ#180	88		85		50-120	3		30
Cl7-BZ#183	87		83		50-120	5		30
Cl7-BZ#184	92		87		50-120	6		30
Cl7-BZ#187	87		84		50-120	4		30
Cl8-BZ#195	97		92		50-120	5		30
Cl9-BZ#206	96		93		50-120	3		30
Cl10-BZ#209	93		90		50-120	3		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-03 Batch: WG1173900-2 WG1173900-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
DBOB	96		100		30-150
BZ 198	92		85		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173900-5 WG1173900-6 QC Sample: L1843374-01 Client ID: NHH-CLDS												
Cl2-BZ#8	ND	0.103	0.057	55		0.053	51		50-120	7		30
Cl3-BZ#18	ND	0.103	0.057	56		0.054	52		50-120	6		30
Cl3-BZ#28	ND	0.103	0.072	70		0.065	63		50-120	11		30
Cl4-BZ#44	ND	0.103	0.081	78		0.072	70		50-120	11		30
Cl4-BZ#49	ND	0.103	0.075	73		0.069	67		50-120	9		30
Cl4-BZ#52	ND	0.103	0.074	72		0.064	62		50-120	14		30
Cl4-BZ#66	ND	0.103	0.083	81		0.073	71		50-120	13		30
Cl5-BZ#87	ND	0.103	0.085	82		0.074	71		50-120	14		30
Cl5-BZ#101	ND	0.103	0.084	82		0.074	71		50-120	13		30
Cl5-BZ#105	ND	0.103	0.088	85		0.077	75		50-120	12		30
Cl5-BZ#118	ND	0.103	0.082	80		0.073	71		50-120	11		30
Cl6-BZ#128	ND	0.103	0.082	80		0.073	70		50-120	12		30
Cl6-BZ#138	ND	0.103	0.084	81		0.073	71		50-120	13		30
Cl6-BZ#153	ND	0.103	0.082	79		0.072	70		50-120	13		30
Cl7-BZ#170	ND	0.103	0.084	82		0.074	72		50-120	13		30
Cl7-BZ#180	ND	0.103	0.078	76		0.069	67		50-120	12		30
Cl7-BZ#183	ND	0.103	0.078	76		0.068	66		50-120	14		30
Cl7-BZ#184	ND	0.103	0.079	77		0.070	68		50-120	12		30
Cl7-BZ#187	ND	0.103	0.079	77		0.070	68		50-120	12		30
Cl8-BZ#195	ND	0.103	0.088	85		0.078	75		50-120	12		30
Cl9-BZ#206	ND	0.103	0.086	83		0.075	73		50-120	13		30
Cl10-BZ#209	ND	0.103	0.080	78		0.072	70		50-120	10		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173900-5 WG1173900-6 QC Sample: L1843374-01 Client ID: NHH-CLDS												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
BZ 198	69		57		30-150
DBOB	74		66		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173900-4 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Cl2-BZ#8	ND	ND	ug/l	NC		30
Cl3-BZ#18	ND	ND	ug/l	NC		30
Cl3-BZ#28	ND	ND	ug/l	NC		30
Cl4-BZ#44	ND	ND	ug/l	NC		30
Cl4-BZ#49	ND	ND	ug/l	NC		30
Cl4-BZ#52	ND	ND	ug/l	NC		30
Cl4-BZ#66	ND	ND	ug/l	NC		30
Cl5-BZ#87	ND	ND	ug/l	NC		30
Cl5-BZ#101	ND	ND	ug/l	NC		30
Cl5-BZ#105	ND	ND	ug/l	NC		30
Cl5-BZ#118	ND	ND	ug/l	NC		30
Cl6-BZ#128	ND	ND	ug/l	NC		30
Cl6-BZ#138	ND	ND	ug/l	NC		30
Cl6-BZ#153	ND	ND	ug/l	NC		30
Cl7-BZ#170	ND	ND	ug/l	NC		30
Cl7-BZ#180	ND	ND	ug/l	NC		30
Cl7-BZ#183	ND	ND	ug/l	NC		30
Cl7-BZ#184	ND	ND	ug/l	NC		30
Cl7-BZ#187	ND	ND	ug/l	NC		30
Cl8-BZ#195	ND	ND	ug/l	NC		30
Cl9-BZ#206	ND	ND	ug/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173900-4 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Cl10-BZ#209	ND	ND	ug/l	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
DBOB	76		81		30-150
BZ 198	65		75		30-150

PESTICIDES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-01
Client ID: NHH-CLDS
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:12
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 10/31/18 17:32
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	B
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0263	0.0131	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	44		30-150	A
BZ 198	45		30-150	A
DBOB	51		30-150	B
BZ 198	47		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-02
Client ID: CLDS-WATER-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 10/31/18 19:48
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	0.0007		ug/l	0.0004	0.0004	1	B
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Dieldrin	ND		ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	ND		ug/l	0.0004	0.0004	1	A
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0238	0.0119	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	44		30-150	A
BZ 198	**29**	Q	30-150	A
DBOB	37		30-150	B
BZ 198	**29**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-02 RE
Client ID: CLDS-WATER-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/12/18 15:16
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/08/18 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0015	P	ug/l	0.0005	0.0005	1	B
Dieldrin	0.0012		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	0.0016	P	ug/l	0.0005	0.0005	1	B
Toxaphene	ND		ug/l	0.0263	0.0131	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	105		30-150	A
BZ 198	78		30-150	A
DBOB	81		30-150	B
BZ 198	80		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-03
Client ID: CLDS-GRAB-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 10/31/18 20:22
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0005		ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0266	0.0133	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	30		30-150	A
BZ 198	**24**	Q	30-150	A
DBOB	**26**	Q	30-150	B
BZ 198	**23**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-03 RE
Client ID: CLDS-GRAB-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/12/18 15:50
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/08/18 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0263	0.0131	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	A
BZ 198	55		30-150	A
DBOB	68		30-150	B
BZ 198	57		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 10/31/18 15:50
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-03 Batch: WG1173904-1						
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Toxaphene	ND		ug/l	0.0250	0.0125	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	63		30-150	A
DBOB	64		30-150	B
BZ 198	65		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/12/18 12:26
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/08/18 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 02-03 Batch: WG1177505-1						
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Toxaphene	ND		ug/l	0.0250	0.0125	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	B
Endosulfan I	ND		ug/l	0.0005	0.0005	B
cis-Chlordane	ND		ug/l	0.0005	0.0005	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	93		30-150	A
BZ 198	82		30-150	A
DBOB	86		30-150	B
BZ 198	89		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03 Batch: WG1173904-2 WG1173904-3									
gamma-BHC	55		56		50-120	3		30	A
Heptachlor	61		63		50-120	3		30	A
Aldrin	63		65		50-120	2		30	A
Chloropyrifos	53		58		50-120	8		30	A
trans-Chlordane	73		75		50-120	2		30	A
Endosulfan I	70		71		50-120	3		30	A
cis-Chlordane	68		70		50-120	2		30	A
Dieldrin	77		79		50-120	3		30	A
Endrin	72		75		50-120	3		30	A
4,4'-DDT	76		79		50-120	4		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		56		30-150	A
BZ 198	63		63		30-150	A
DBOB	59		57		30-150	B
BZ 198	65		66		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03 Batch: WG1173904-2 WG1173904-3									
Heptachlor epoxide	76		73		50-120	4		30	B
Endosulfan II	81		84		50-120	3		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		56		30-150	A
BZ 198	63		63		30-150	A
DBOB	59		57		30-150	B
BZ 198	65		66		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 02-03 Batch: WG1177505-2 WG1177505-3									
gamma-BHC	91		88		50-120	3		30	A
Heptachlor	97		94		50-120	4		30	A
Aldrin	103		100		50-120	3		30	A
Chloropyrifos	96		88		50-120	9		30	A
trans-Chlordane	106		100		50-120	6		30	A
Endosulfan I	104		100		50-120	4		30	A
cis-Chlordane	99		96		50-120	3		30	A
Dieldrin	109		109		50-120	0		30	A
Endrin	102		99		50-120	3		30	A
4,4'-DDT	85		85		50-120	0		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	97		95		30-150	A
BZ 198	81		78		30-150	A
DBOB	90		88		30-150	B
BZ 198	88		85		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 02-03 Batch: WG1177505-2 WG1177505-3									
Heptachlor epoxide	95		95		50-120	0		30	B
Endosulfan II	87		85		50-120	2		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	97		95		30-150	A
BZ 198	81		78		30-150	A
DBOB	90		88		30-150	B
BZ 198	88		85		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173904-5 WG1173904-6 QC Sample: L1843374-01 Client ID: NHH-CLDS													
gamma-BHC	ND	0.103	0.0515	50		0.0629	61		50-120	20		30	A
Heptachlor	ND	0.103	0.0380	**37**	Q	0.0509	**49**	Q	50-120	29		30	A
Aldrin	ND	0.103	0.0337	**33**	Q	0.0451	**44**	Q	50-120	29		30	A
Chloropyrifos	ND	0.103	0.0573	56		0.0629	61		50-120	9		30	A
Heptachlor epoxide	ND	0.103	0.0723	70		0.0829	80		50-120	14		30	B
trans-Chlordane	ND	0.103	0.0640	62		0.0770	75		50-120	18		30	A
Endosulfan I	ND	0.103	0.0637	62		0.0761	74		50-120	18		30	A
cis-Chlordane	ND	0.103	0.0603	58		0.0726	70		50-120	19		30	A
Dieldrin	ND	0.103	0.0783	76		0.0941	91		50-120	18		30	B
Endrin	ND	0.103	0.0672	65		0.0794	77		50-120	17		30	A
Endosulfan II	ND	0.103	0.0744	72		0.0887	86		50-120	18		30	B
4,4'-DDT	ND	0.103	0.0663	64		0.0797	77		50-120	18		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	44		48		30-150	A
DBOB	42		51		30-150	A
BZ 198	47		51		30-150	B
DBOB	44		50		30-150	B

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1173904-4 QC Sample: L1843374-01 Client ID: NHH-CLDS							
gamma-BHC	ND	ND	ug/l	NC		30	A
Heptachlor	ND	ND	ug/l	NC		30	A
Aldrin	ND	ND	ug/l	NC		30	A
Chloropyrifos	ND	ND	ug/l	NC		30	A
Heptachlor epoxide	ND	ND	ug/l	NC		30	B
trans-Chlordane	ND	ND	ug/l	NC		30	A
Endosulfan I	ND	ND	ug/l	NC		30	A
cis-Chlordane	ND	ND	ug/l	NC		30	A
Dieldrin	ND	ND	ug/l	NC		30	B
Endrin	ND	ND	ug/l	NC		30	A
Endosulfan II	ND	ND	ug/l	NC		30	A
4,4'-DDT	ND	ND	ug/l	NC		30	A
Toxaphene	ND	ND	ug/l	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	44		49		30-150	A
BZ 198	45		54		30-150	A
DBOB	51		52		30-150	B
BZ 198	47		58		30-150	B

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-01 Date Collected: 10/23/18 13:12

Client ID: NHH-CLDS Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00066		mg/l	0.00050	0.00005	1	11/15/18 09:22	11/15/18 17:00	NA	86,1632A(M)	BV
Cadmium, Total	0.00008		mg/l	0.00004	0.00001	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM
Chromium, Total	0.00019		mg/l	0.00010	0.00003	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM
Copper, Total	0.00085		mg/l	0.00030	0.00007	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM
Lead, Total	0.00073		mg/l	0.00020	0.00006	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/15/18 10:25	11/15/18 13:17	EPA 7474	1,7474	BV
Nickel, Total	0.00070		mg/l	0.00040	0.00011	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/15/18 09:58	11/15/18 16:04	NA	86,1632A(M)	BV
Silver, Total	0.00011		mg/l	0.00008	0.00003	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM
Zinc, Total	0.00140	J	mg/l	0.00200	0.00068	10	11/07/18 08:30	11/14/18 16:55	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-02 Date Collected: 10/23/18 12:50

Client ID: CLDS-WATER-EB Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00050	0.00005	1	11/15/18 09:22	11/15/18 17:08	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM
Chromium, Total	ND		mg/l	0.00050	0.00017	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/15/18 10:25	11/15/18 13:27	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/15/18 09:58	11/15/18 16:12	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00040	0.00016	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	11/14/18 08:30	11/14/18 16:27	EPA 3005A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-03 Date Collected: 10/23/18 12:20

Client ID: CLDS-GRAB-EB Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00050	0.00005	1	11/15/18 09:22	11/15/18 17:10	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM
Chromium, Total	0.00064		mg/l	0.00050	0.00017	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM
Copper, Total	0.00048	J	mg/l	0.00100	0.00038	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/15/18 10:25	11/15/18 13:29	EPA 7474	1,7474	BV
Nickel, Total	0.00080	J	mg/l	0.00200	0.00055	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM
Selenium, Total	0.00024	J	mg/l	0.00056	0.00009	1	11/15/18 09:58	11/15/18 16:14	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00040	0.00016	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	11/14/18 08:30	11/14/18 16:32	EPA 3005A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01 Batch: WG1176966-1										
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM
Chromium, Total	0.00009	J	mg/l	0.00010	0.00003	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM
Copper, Total	0.00023	J	mg/l	0.00030	0.00007	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM
Lead, Total	0.00010	J	mg/l	0.00020	0.00006	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM
Nickel, Total	0.00016	J	mg/l	0.00040	0.00011	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM
Zinc, Total	0.00554		mg/l	0.00200	0.00068	10	11/07/18 08:30	11/14/18 15:55	1,6020B	AM

Prep Information

Digestion Method: CHELATION

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 02-03 Batch: WG1179256-1										
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM
Chromium, Total	ND		mg/l	0.00050	0.00017	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM
Nickel, Total	ND		mg/l	0.00200	0.00055	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM
Silver, Total	ND		mg/l	0.00040	0.00016	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	11/14/18 08:30	11/14/18 15:50	1,6020B	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1179725-1										
Arsenic, Total	ND		mg/l	0.00050	0.00005	1	11/15/18 09:22	11/15/18 16:56	86,1632A(M)	BV

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1179736-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/15/18 10:25	11/15/18 13:12	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03 Batch: WG1179754-1										
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/15/18 09:58	11/15/18 16:00	86,1632A(M)	BV

Prep Information

Digestion Method:

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 Batch: WG1176966-2								
Cadmium, Total	**16**	Q	-		80-120	-		20
Chromium, Total	**06**	Q	-		80-120	-		20
Copper, Total	**13**	Q	-		80-120	-		20
Lead, Total	**17**	Q	-		80-120	-		20
Nickel, Total	**12**	Q	-		80-120	-		20
Silver, Total	**01**	Q	-		80-120	-		20
Zinc, Total	**16**	Q	-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 02-03 Batch: WG1179256-2								
Cadmium, Total	108		-		80-120	-		20
Chromium, Total	98		-		80-120	-		20
Copper, Total	100		-		80-120	-		20
Lead, Total	109		-		80-120	-		20
Nickel, Total	100		-		80-120	-		20
Silver, Total	105		-		80-120	-		20
Zinc, Total	107		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1179725-2 SRM Lot Number: A2HGAF								
Arsenic, Total	96		-		80-120	-		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1179736-2 SRM Lot Number: HPHGAF					
Mercury, Total	103	-	80-120	-	20
Total Metals - Mansfield Lab Associated sample(s): 01-03 Batch: WG1179754-2 SRM Lot Number: A2HGAF					
Selenium, Total	103	-	80-120	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1176966-3 QC Sample: L1843374-01 Client ID: NHH-CLDS												
Cadmium, Total	0.00008	0.051	0.00773	**15**	Q	-	-		75-125	-		20
Chromium, Total	0.00019	0.2	0.00285	**1**	Q	-	-		75-125	-		20
Copper, Total	0.00085	0.25	0.0327	**13**	Q	-	-		75-125	-		20
Lead, Total	0.00073	0.51	0.0883	**17**	Q	-	-		75-125	-		20
Nickel, Total	0.00070	0.5	0.05866	**12**	Q	-	-		75-125	-		20
Silver, Total	0.00011	0.05	0.00109	**2**	Q	-	-		75-125	-		20
Zinc, Total	0.00140J	0.5	0.0732	**15**	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 02-03 QC Batch ID: WG1179256-3 QC Sample: L1843374-02 Client ID: CLDS-WATER-EB												
Cadmium, Total	ND	0.051	0.05641	111		-	-		75-125	-		20
Chromium, Total	ND	0.2	0.204	102		-	-		75-125	-		20
Copper, Total	ND	0.25	0.263	105		-	-		75-125	-		20
Lead, Total	ND	0.51	0.574	112		-	-		75-125	-		20
Nickel, Total	ND	0.5	0.5116	102		-	-		75-125	-		20
Silver, Total	ND	0.05	0.05400	108		-	-		75-125	-		20
Zinc, Total	ND	0.5	0.553	111		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1179725-3 WG1179725-4 QC Sample: L1843374-01 Client ID: NHH-CLDS												
Arsenic, Total	0.00066	0.005	0.00491	85		0.00572	101		75-125	15		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1179736-3 WG1179736-4 QC Sample: L1843374-01 Client ID: NHH-CLDS												
Mercury, Total	ND	0.0025	0.00238	95		0.00235	94		80-120	1		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1179754-3 WG1179754-4 QC Sample: L1843374-01 Client ID: NHH-CLDS									
Selenium, Total	ND	0.00556	0.00574	103	0.00566	102	75-125	1	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG1176966-4 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Cadmium, Total	0.00008	0.00002J	mg/l	NC		20
Chromium, Total	0.00019	0.00019	mg/l	1		20
Copper, Total	0.00085	0.00082	mg/l	3		20
Lead, Total	0.00073	0.00016J	mg/l	NC		20
Nickel, Total	0.00070	0.00042	mg/l	**49**	Q	20
Silver, Total	0.00011	ND	mg/l	NC		20
Zinc, Total	0.00140J	0.00124J	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 02-03 QC Batch ID: WG1179256-4 QC Sample: L1843374-02 Client ID: CLDS-WATER-EB						
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	0.00018J	mg/l	NC		20
Copper, Total	ND	ND	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1179725-5 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Arsenic, Total	0.00066	0.00073	mg/l	10		20
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1179736-5 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Mercury, Total	ND	ND	mg/l	NC		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03 QC Batch ID: WG1179754-5 QC Sample: L1843374-01 Client ID: NHH-CLDS					
Selenium, Total	ND	ND	mg/l	NC	20

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-01
Client ID: NHH-CLDS
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:12
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 03:00	10/25/18 03:40	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-02
Client ID: CLDS-WATER-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 03:00	10/25/18 03:42	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

SAMPLE RESULTS

Lab ID: L1843374-03
Client ID: CLDS-GRAB-EB
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 03:00	10/25/18 03:42	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1843374

Project Number: 60588790 TASK 6.0 **Report Date:** 11/15/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-03 Batch: WG1172040-1										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 03:00	10/25/18 03:39	121,3500CR-B	MA

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 Batch: WG1172040-2								
Chromium, Hexavalent	98		-		85-115	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1172040-4 WG1172040-5 QC Sample: L1843374-01 Client ID: NHH-CLDS												
Chromium, Hexavalent	ND	0.1	0.097	97		0.099	99		85-115	2		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843374

Report Date: 11/15/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-03 QC Batch ID: WG1172040-3 QC Sample: L1843374-01 Client ID: NHH-CLDS						
Chromium, Hexavalent	ND	ND	mg/l	NC		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent
C	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843374-01A	Plastic 250ml unpreserved	B	7	7	3.6	Y	Absent		HEXCR-3500(1)
L1843374-01B	Plastic 250ml unpreserved	B	7	7	3.6	Y	Absent		HEXCR-3500(1)
L1843374-01C	Plastic 250ml unpreserved	B	7	7	3.6	Y	Absent		HEXCR-3500(1)
L1843374-01D	Plastic 500ml HNO3 preserved	B	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843374-01E	Plastic 500ml HNO3 preserved	B	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843374-01F	Plastic 500ml HNO3 preserved	B	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843374-01G	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-01H	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-01I	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-01J	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-01K	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-01L	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-01M	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-01N	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-01O	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-PEST-ELUT(7)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843374
Report Date: 11/15/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843374-01P	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-01Q	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-01R	Amber 1000ml unpreserved	B	7	7	3.6	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-02A	Plastic 250ml unpreserved	C	7	7	2.0	Y	Absent		HEXCR-3500(1)
L1843374-02B	Plastic 500ml HNO3 preserved	C	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843374-02C	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-02D	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-02E	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-02F	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-03A	Plastic 250ml unpreserved	C	7	7	2.0	Y	Absent		HEXCR-3500(1)
L1843374-03B	Plastic 500ml HNO3 preserved	C	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843374-03C	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-03D	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-8270(7),A2-RIM-PCBCONG-8270(7)
L1843374-03E	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843374-03F	Amber 1000ml unpreserved	C	7	7	2.0	Y	Absent		A2-RIM-PEST-ELUT(7)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843374
Project Number:	60588790 TASK 6.0	**Report Date:**	11/15/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843374
Project Number:	60588790 TASK 6.0	**Report Date:**	11/15/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843374
Project Number:	60588790 TASK 6.0	**Report Date:**	11/15/18

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

86 Chemical Speciation of Arsenic in Water and Tissue by Hydride Generation Quartz Furnace Atomic Absorption Spectrometry. USEPA Office of Water, EPA Method 1632, Revision A, August 1998.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yed
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	No – see narrative
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	N/A
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – see narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	No	Pentachlorophenol 27.3%	Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	WG1174496-1: cis-nonachlor (18.1%D A channel), hexachlorobenzene (17.3%D B channel), heptachlor (16.1%D B channel), chloropyrifus (18.8%D B channel), 4,4'-DDT (18.8%D B channel), WG1174496-2: cis-nonachlor (19.7% B channel)	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1843374-02: BZ198 29%/29% L1843374-03: BZ198 24%/23%, DBOB 26% column B	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV associated with all samples: Cl2-BZ#8 @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	No	WG1176966-1 Zn	In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	WG1176966-3 MS Cd(15%), Cr(1%), Cu(13%), Pb(17%), Ni(12%), Ag(2%), Zn(15%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	WG1176966-4 Ni(49%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 10/24/18

ALPHA Job #: L1843374

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Client Information

Client: USACE / AECOM
Address: 500 Enterprise Dr, Rocky Hill, CT
Phone: 484.678.1876
Email: Kris.VanNaarssen@AECOM.com

Additional Project Information:

Project Information

Project Name: New Haven Harbor (CLDS)
Project Location: Central Disposal Site
Project #: 60588790
Project Manager: K. VAN NAARSSEN
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Report Information - Data Deliverables

☒ ADEx ☒ EMAIL

Billing Information

☒ Same as Client Info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☒ Other State /Fed Program ITM / RIM Criteria

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; SVOCs; RIM Restricted; Hex Chrom; PCB congeners; RIM Total Metals; Total Hg Total Metals

Per Work Plan RIM

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	SVOCs	RIM Restricted	Hex Chrom	PCB congeners	RIM Total Metals	Total Hg Total Metals	Sample Comments	Total # Bottles
43374-01	NHH-CLDS	10/23/18	1312	W	KVN	X	X	X	X	X	X	3 sets (MS/MSD)	18
02	CLDS-WATER-EB	10/23/18	1250	W	KVN	↓	↓	↓	↓	↓	↓		
03	CLDS-GRAB-SB	10/23/18	1220	W	KVN								

Container Type	P	A	A	P	A	A	P
Preservative	P	A	A	A	A	A	C

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H= $Na_2S_2O_3$, I= Ascorbic Acid, J= NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/23/18 17:15	[signature]	10/23 17:15
[signature]	10/24 1324	[signature]	10/24/18 1324
[signature]	10/24/18 1809	[signature]	10/24/18 19:09

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L1843524
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 6.0
Report Date:	11/12/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843524
Report Date: 11/12/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843524-01	PUMP BLANK	WATER	NEW HAVEN, CT	10/24/18 14:20	10/25/18
L1843524-02	CORE BLANK	WATER	NEW HAVEN, CT	10/24/18 14:00	10/25/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843524
Project Number:	60588790 TASK 6.0	**Report Date:**	11/12/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843524
Project Number:	60588790 TASK 6.0	**Report Date:**	11/12/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

PCBs

L1843524-01: The surrogate recovery is outside the individual acceptance criteria for bz 198 (22%), but within the overall method allowances. The results of the original analysis are reported; however, all associated compounds are considered to have a potential bias.

L1843524-02: The surrogate recovery is outside the individual acceptance criteria for bz 198 (26%), but within the overall method allowances. The results of the original analysis are reported; however, all associated compounds are considered to have a potential bias.

Pesticides

L1843524-01: The surrogate recoveries were outside the acceptance criteria for dbob (20%/17%) and bz 198 (19%/16%); however, the criteria were achieved upon re-extraction outside of holding time. The results of both extractions are reported; however, all associated compounds are considered to have a potential bias.

L1843524-02: The surrogate recoveries were outside the acceptance criteria for dbob (20%/20%) and bz 198 (21%/20%); however, the criteria were achieved upon re-extraction outside of holding time. The results of both extractions are reported; however, all associated compounds are considered to have a potential bias.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 11/12/18

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-01
Client ID: PUMP BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 13:29
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.22	0.484	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	72		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1843524
Project Number: 60588790 TASK 6.0
Report Date: 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-02
Client ID: CORE BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:00
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 14:00
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.02	0.440	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	65		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 11/09/18 11:57
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 19:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-02 Batch: WG1173998-1					
Pentachlorophenol	ND		ug/l	2.00	0.436

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	93		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-02 Batch: WG1173998-2 WG1173998-3								
Pentachlorophenol	77		78		50-120	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,6-Tribromophenol	95		93		30-150

PCBS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-01
Client ID: PUMP BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 18:31
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.0010	0.0005	1
Cl3-BZ#18	ND		ug/l	0.0010	0.0005	1
Cl3-BZ#28	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#44	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#49	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#52	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#66	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#87	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#101	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#105	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#118	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#128	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#138	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#153	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#170	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#180	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#183	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#184	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#187	ND		ug/l	0.0010	0.0005	1
Cl8-BZ#195	ND		ug/l	0.0010	0.0005	1
Cl9-BZ#206	ND		ug/l	0.0010	0.0005	1
Cl10-BZ#209	ND		ug/l	0.0010	0.0005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	31		30-150
BZ 198	**22**	Q	30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-02
Client ID: CORE BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:00
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 19:04
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.0010	0.0005	1
Cl3-BZ#18	ND		ug/l	0.0010	0.0005	1
Cl3-BZ#28	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#44	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#49	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#52	ND		ug/l	0.0010	0.0005	1
Cl4-BZ#66	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#87	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#101	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#105	ND		ug/l	0.0010	0.0005	1
Cl5-BZ#118	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#128	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#138	ND		ug/l	0.0010	0.0005	1
Cl6-BZ#153	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#170	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#180	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#183	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#184	ND		ug/l	0.0010	0.0005	1
Cl7-BZ#187	ND		ug/l	0.0010	0.0005	1
Cl8-BZ#195	ND		ug/l	0.0010	0.0005	1
Cl9-BZ#206	ND		ug/l	0.0010	0.0005	1
Cl10-BZ#209	ND		ug/l	0.0010	0.0005	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	32		30-150
BZ 198	**26**	Q	30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/10/18 13:27
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners (RIM List) - Mansfield Lab for sample(s): 01-02 Batch: WG1173900-1					
Cl2-BZ#8	ND		ug/l	0.0010	0.0005
Cl3-BZ#18	ND		ug/l	0.0010	0.0005
Cl3-BZ#28	ND		ug/l	0.0010	0.0005
Cl4-BZ#44	ND		ug/l	0.0010	0.0005
Cl4-BZ#49	ND		ug/l	0.0010	0.0005
Cl4-BZ#52	ND		ug/l	0.0010	0.0005
Cl4-BZ#66	ND		ug/l	0.0010	0.0005
Cl5-BZ#87	ND		ug/l	0.0010	0.0005
Cl5-BZ#101	ND		ug/l	0.0010	0.0005
Cl5-BZ#105	ND		ug/l	0.0010	0.0005
Cl5-BZ#118	ND		ug/l	0.0010	0.0005
Cl6-BZ#128	ND		ug/l	0.0010	0.0005
Cl6-BZ#138	ND		ug/l	0.0010	0.0005
Cl6-BZ#153	ND		ug/l	0.0010	0.0005
Cl7-BZ#170	ND		ug/l	0.0010	0.0005
Cl7-BZ#180	ND		ug/l	0.0010	0.0005
Cl7-BZ#183	ND		ug/l	0.0010	0.0005
Cl7-BZ#184	ND		ug/l	0.0010	0.0005
Cl7-BZ#187	ND		ug/l	0.0010	0.0005
Cl8-BZ#195	ND		ug/l	0.0010	0.0005
Cl9-BZ#206	ND		ug/l	0.0010	0.0005
Cl10-BZ#209	ND		ug/l	0.0010	0.0005

Surrogate	%Recovery	Qualifier	Acceptance Criteria
DBOB	105		30-150
BZ 198	98		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-02 Batch: WG1173900-2 WG1173900-3								
Cl2-BZ#8	75		76		50-120	1		30
Cl3-BZ#18	77		77		50-120	0		30
Cl3-BZ#28	82		80		50-120	2		30
Cl4-BZ#44	88		88		50-120	0		30
Cl4-BZ#49	88		85		50-120	3		30
Cl4-BZ#52	84		83		50-120	1		30
Cl4-BZ#66	89		86		50-120	3		30
Cl5-BZ#87	92		89		50-120	3		30
Cl5-BZ#101	93		89		50-120	4		30
Cl5-BZ#105	94		92		50-120	2		30
Cl5-BZ#118	91		88		50-120	3		30
Cl6-BZ#128	90		87		50-120	3		30
Cl6-BZ#138	92		89		50-120	3		30
Cl6-BZ#153	91		87		50-120	4		30
Cl7-BZ#170	92		87		50-120	6		30
Cl7-BZ#180	88		85		50-120	3		30
Cl7-BZ#183	87		83		50-120	5		30
Cl7-BZ#184	92		87		50-120	6		30
Cl7-BZ#187	87		84		50-120	4		30
Cl8-BZ#195	97		92		50-120	5		30
Cl9-BZ#206	96		93		50-120	3		30
Cl10-BZ#209	93		90		50-120	3		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-02 Batch: WG1173900-2 WG1173900-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
DBOB	96		100		30-150
BZ 198	92		85		30-150

PESTICIDES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-01
Client ID: PUMP BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 10/31/18 20:56
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0255	0.0127	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	**17**	Q	30-150	A
BZ 198	**18**	Q	30-150	A
DBOB	**20**	Q	30-150	B
BZ 198	**19**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-01 RE
Client ID: PUMP BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/12/18 14:08
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/08/18 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	0.0009	P	ug/l	0.0004	0.0004	1	B
Dieldrin	ND	I	ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	ND		ug/l	0.0004	0.0004	1	A
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0247	0.0123	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	87		30-150	A
BZ 198	53		30-150	A
DBOB	78		30-150	B
BZ 198	58		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-02
Client ID: CORE BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:00
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 10/31/18 21:30
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Dieldrin	ND		ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	ND		ug/l	0.0004	0.0004	1	A
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0238	0.0119	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	**20**	Q	30-150	A
BZ 198	**20**	Q	30-150	A
DBOB	**20**	Q	30-150	B
BZ 198	**21**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-02 RE
Client ID: CORE BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:00
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/12/18 14:42
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/08/18 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Dieldrin	ND	IP	ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	ND		ug/l	0.0004	0.0004	1	A
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0242	0.0121	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	93		30-150	A
BZ 198	67		30-150	A
DBOB	84		30-150	B
BZ 198	71		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 10/31/18 15:50
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 10/30/18 14:30

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-02 Batch: WG1173904-1						
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Toxaphene	ND		ug/l	0.0250	0.0125	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	63		30-150	A
DBOB	64		30-150	B
BZ 198	65		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/12/18 12:26
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/08/18 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-02 Batch: WG1177505-1						
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Toxaphene	ND		ug/l	0.0250	0.0125	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	B
Endosulfan I	ND		ug/l	0.0005	0.0005	B
cis-Chlordane	ND		ug/l	0.0005	0.0005	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	93		30-150	A
BZ 198	82		30-150	A
DBOB	86		30-150	B
BZ 198	89		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1173904-2 WG1173904-3									
gamma-BHC	55		56		50-120	3		30	A
Heptachlor	61		63		50-120	3		30	A
Aldrin	63		65		50-120	2		30	A
Chloropyrifos	53		58		50-120	8		30	A
trans-Chlordane	73		75		50-120	2		30	A
Endosulfan I	70		71		50-120	3		30	A
cis-Chlordane	68		70		50-120	2		30	A
Dieldrin	77		79		50-120	3		30	A
Endrin	72		75		50-120	3		30	A
4,4'-DDT	76		79		50-120	4		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		56		30-150	A
BZ 198	63		63		30-150	A
DBOB	59		57		30-150	B
BZ 198	65		66		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1173904-2 WG1173904-3									
Heptachlor epoxide	76		73		50-120	4		30	B
Endosulfan II	81		84		50-120	3		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	55		56		30-150	A
BZ 198	63		63		30-150	A
DBOB	59		57		30-150	B
BZ 198	65		66		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1177505-2 WG1177505-3									
gamma-BHC	91		88		50-120	3		30	A
Heptachlor	97		94		50-120	4		30	A
Aldrin	103		100		50-120	3		30	A
Chloropyrifos	96		88		50-120	9		30	A
trans-Chlordane	106		100		50-120	6		30	A
Endosulfan I	104		100		50-120	4		30	A
cis-Chlordane	99		96		50-120	3		30	A
Dieldrin	109		109		50-120	0		30	A
Endrin	102		99		50-120	3		30	A
4,4'-DDT	85		85		50-120	0		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	97		95		30-150	A
BZ 198	81		78		30-150	A
DBOB	90		88		30-150	B
BZ 198	88		85		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-02 Batch: WG1177505-2 WG1177505-3									
Heptachlor epoxide	95		95		50-120	0		30	B
Endosulfan II	87		85		50-120	2		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	97		95		30-150	A
BZ 198	81		78		30-150	A
DBOB	90		88		30-150	B
BZ 198	88		85		30-150	B

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-01 Date Collected: 10/24/18 14:20

Client ID: PUMP BLANK Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00100	0.00009	1	11/08/18 08:18	11/08/18 13:01	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM
Chromium, Total	ND		mg/l	0.00050	0.00017	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/07/18 17:52	11/08/18 10:10	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/08/18 08:38	11/08/18 14:05	NA	86,1632A(M)	BV
Silver, Total	0.00050	J	mg/l	0.00200	0.00016	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	11/06/18 10:22	11/06/18 17:03	EPA 3005A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-02 Date Collected: 10/24/18 14:00

Client ID: CORE BLANK Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.00100	0.00009	1	11/08/18 08:18	11/08/18 13:08	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM
Chromium, Total	ND		mg/l	0.00050	0.00017	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/07/18 17:52	11/08/18 10:17	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00200	0.00055	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/08/18 08:38	11/08/18 13:59	NA	86,1632A(M)	BV
Silver, Total	0.00016	J	mg/l	0.00200	0.00016	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	11/06/18 10:22	11/06/18 17:07	EPA 3005A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1176376-1										
Cadmium, Total	ND		mg/l	0.00020	0.00005	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM
Chromium, Total	ND		mg/l	0.00050	0.00017	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM
Copper, Total	ND		mg/l	0.00100	0.00038	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM
Lead, Total	ND		mg/l	0.00100	0.00034	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM
Nickel, Total	ND		mg/l	0.00200	0.00055	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM
Silver, Total	0.00036	J	mg/l	0.00200	0.00016	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM
Zinc, Total	ND		mg/l	0.0100	0.00341	1	11/06/18 10:22	11/06/18 16:59	1,6020B	AM

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1177111-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/07/18 17:52	11/08/18 10:05	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1177273-1										
Arsenic, Total	ND		mg/l	0.00100	0.00009	1	11/08/18 08:18	11/08/18 12:56	86,1632A(M)	BV

Prep Information

Digestion Method:

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1177277-1										
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/08/18 08:38	11/08/18 13:55	86,1632A(M)	BV

Prep Information

Digestion Method:

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1176376-2								
Cadmium, Total	114		-		80-120	-		20
Chromium, Total	96		-		80-120	-		20
Copper, Total	96		-		80-120	-		20
Lead, Total	110		-		80-120	-		20
Nickel, Total	98		-		80-120	-		20
Silver, Total	117		-		80-120	-		20
Zinc, Total	106		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1177111-2 SRM Lot Number: HPHGAF								
Mercury, Total	83		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1177273-2 SRM Lot Number: A2HGAF								
Arsenic, Total	89		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1177277-2 SRM Lot Number: A2HGAF								
Selenium, Total	105		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0
Lab Number: L1843524
Report Date: 11/12/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1176376-3 QC Sample: L1843046-01 Client ID: MS Sample												
Cadmium, Total	ND	0.051	0.05632	110		-	-		75-125	-		20
Chromium, Total	ND	0.2	0.198	99		-	-		75-125	-		20
Copper, Total	ND	0.25	0.253	101		-	-		75-125	-		20
Lead, Total	ND	0.51	0.564	110		-	-		75-125	-		20
Nickel, Total	ND	0.5	0.5071	101		-	-		75-125	-		20
Silver, Total	0.00017J	0.05	0.05795	116		-	-		75-125	-		20
Zinc, Total	ND	0.5	0.559	112		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1177111-3 QC Sample: L1843524-01 Client ID: PUMP BLANK												
Mercury, Total	ND	0.0025	0.00250	100		-	-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1177273-3 QC Sample: L1843524-01 Client ID: PUMP BLANK												
Arsenic, Total	ND	0.01	0.00970	97		-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1177277-3 QC Sample: L1843524-02 Client ID: CORE BLANK												
Selenium, Total	ND	0.00556	0.00552	99		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1176376-4 QC Sample: L1843046-01 Client ID: DUP Sample						
Cadmium, Total	ND	ND	mg/l	NC		20
Chromium, Total	ND	ND	mg/l	NC		20
Copper, Total	ND	0.00052J	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Silver, Total	0.00017J	0.00023J	mg/l	NC		20
Zinc, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1177111-4 QC Sample: L1843524-01 Client ID: PUMP BLANK						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1177273-4 QC Sample: L1843524-01 Client ID: PUMP BLANK						
Arsenic, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1177277-4 QC Sample: L1843524-02 Client ID: CORE BLANK						
Selenium, Total	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843524
Report Date: 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-01
Client ID: PUMP BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 11:45	10/25/18 12:02	121,3500CR-B	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843524
Report Date: 11/12/18

SAMPLE RESULTS

Lab ID: L1843524-02
Client ID: CORE BLANK
Sample Location: NEW HAVEN, CT

Date Collected: 10/24/18 14:00
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 11:45	10/25/18 12:02	121,3500CR-B	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1843524

Project Number: 60588790 TASK 6.0 **Report Date:** 11/12/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-02 Batch: WG1172223-1										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/25/18 11:45	10/25/18 12:00	121,3500CR-B	GD

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 Batch: WG1172223-2								
Chromium, Hexavalent	96		-		85-115	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843524
Report Date: 11/12/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1172223-4 QC Sample: L1843524-02 Client ID: CORE BLANK												
Chromium, Hexavalent	ND	0.1	0.094	94		-	-		85-115	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843524

Report Date: 11/12/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-02 QC Batch ID: WG1172223-3 QC Sample: L1843524-02 Client ID: CORE BLANK						
Chromium, Hexavalent	ND	ND	mg/l	NC		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843524
Report Date: 11/12/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843524-01A	Plastic 500ml unpreserved	A	7	7	3.2	Y	Absent		HEXCR-3500(1)
L1843524-01B	Plastic 500ml HNO3 preserved	A	<2	<2	3.2	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843524-01C	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843524-01D	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843524-01E	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843524-01F	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1843524-02A	Plastic 500ml unpreserved	A	7	7	3.2	Y	Absent		HEXCR-3500(1)
L1843524-02B	Plastic 500ml HNO3 preserved	A	<2	<2	3.2	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843524-02C	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843524-02D	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843524-02E	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843524-02F	Amber 1000ml unpreserved	A	7	7	3.2	Y	Absent		A2-RIM-8270(7)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843524
Project Number:	60588790 TASK 6.0	**Report Date:**	11/12/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843524
Project Number:	60588790 TASK 6.0	**Report Date:**	11/12/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843524
Project Number:	60588790 TASK 6.0	**Report Date:**	11/12/18

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

86 Chemical Speciation of Arsenic in Water and Tissue by Hydride Generation Quartz Furnace Atomic Absorption Spectrometry. USEPA Office of Water, EPA Method 1632, Revision A, August 1998.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	Yes
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	Yes
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	Yes
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	no	Pentachlorophenol 27.3%	Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	NA		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	WG1174496-1: cis-nonachlor (18.1%D A channel), hexachlorobenzene (17.3%D B channel), heptachlor (16.1%D B channel), chloropyrifus (18.8%D B channel), 4,4'-DDT (18.8%D B channel), WG1174496-2: cis-nonachlor (19.7% B channel)	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	NA		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1843524-01: DBOB (17% and 20%), BZ 198 (18% and 19%) L1843524-02: DBOB (20% and 20%), BZ 198 (20% and 21%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV associated with all samples: Cl2-BZ#8 @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	NA		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1843524-01: BZ198 @ 22% L1843524-02: BZ198 @ 26%	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	N/A		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

CHAIN OF CUSTODY

PAGE ____ OF ____

Date Rec'd in Lab: 10/25/18

ALPHA Job #: L1843524

ALPHA Analytical Laboratories
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: NEW HAVEN HARBOR
Project Location: NEW HAVEN, CT
Project #:
Project Manager: RICHARD LOYD / KRIS VAN NEERSSEN
ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: USACE/AECOM
Address: 696 VIRGINIA RD CONCORD, MA 01742
Phone: 9783188048
Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program RIM Criteria RIM

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Additional Project Information:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; TOTAL METALS, HG; HEX CR; PCB CONGENERS; PESTICIDES; RIM SVOCS

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	TOTAL METALS, HG	HEX CR	PCB CONGENERS	PESTICIDES	RIM SVOCS	Sample Comments	TOTAL # BOTTLES
43524-01	PUMP BLANK	10/24	1420	DI	GSS	/	/	/	/	/		6
02	CORE BLANK	10/24	1400	DI	GSS	/	/	/	/	/		6
Container Type						P	P	A	A	A		
Preservative						C	A	A	A	A		

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H= $Na_2S_2O_3$, I= Ascorbic Acid, J= NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/24 1545	[signature]	10/24 1545
[signature]	10/25 0645	[signature]	10/25/18 0645

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

ANALYTICAL REPORT

Lab Number:	L1843759
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 6.0
Report Date:	11/20/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843759-01	COMPOSITE 1 ELUTRIATE BLANK-REP1	WATER	NEW HAVEN, CT	10/25/18 10:55	10/25/18
L1843759-02	COMPOSITE 1 ELUTRIATE BLANK-REP2	WATER	NEW HAVEN, CT	10/25/18 10:55	10/25/18
L1843759-03	COMPOSITE 1 ELUTRIATE BLANK-REP3	WATER	NEW HAVEN, CT	10/25/18 10:55	10/25/18
L1843759-04	COMPOSITE 2 ELUTRIATE BLANK-REP1	WATER	NEW HAVEN, CT	10/25/18 10:55	10/25/18
L1843759-05	COMPOSITE 2 ELUTRIATE BLANK-REP2	WATER	NEW HAVEN, CT	10/25/18 10:55	10/25/18
L1843759-06	COMPOSITE 2 ELUTRIATE BLANK-REP3	WATER	NEW HAVEN, CT	10/25/18 10:55	10/25/18
L1843759-07	COMPOSITE 6 ELUTRIATE BLANK-REP1	WATER	NEW HAVEN, CT	10/25/18 11:30	10/25/18
L1843759-08	COMPOSITE 6 ELUTRIATE BLANK-REP2	WATER	NEW HAVEN, CT	10/25/18 11:30	10/25/18
L1843759-09	COMPOSITE 6 ELUTRIATE BLANK-REP3	WATER	NEW HAVEN, CT	10/25/18 11:30	10/25/18
L1843759-10	COMPOSITE 1 ELUTRIATE-REP1	WATER	NEW HAVEN, CT	10/25/18 13:10	10/25/18
L1843759-11	COMPOSITE 1 ELUTRIATE-REP2	WATER	NEW HAVEN, CT	10/25/18 13:10	10/25/18
L1843759-12	COMPOSITE 1 ELUTRIATE-REP3	WATER	NEW HAVEN, CT	10/25/18 13:10	10/25/18
L1843759-13	COMPOSITE 2 ELUTRIATE-REP1	WATER	NEW HAVEN, CT	10/25/18 14:05	10/25/18
L1843759-14	COMPOSITE 2 ELUTRIATE-REP2	WATER	NEW HAVEN, CT	10/25/18 14:05	10/25/18
L1843759-15	COMPOSITE 2 ELUTRIATE-REP3	WATER	NEW HAVEN, CT	10/25/18 14:05	10/25/18
L1843759-16	COMPOSITE 6 ELUTRIATE-REP1	WATER	NEW HAVEN, CT	10/25/18 15:20	10/25/18
L1843759-17	COMPOSITE 6 ELUTRIATE-REP2	WATER	NEW HAVEN, CT	10/25/18 15:20	10/25/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843759-18	COMPOSITE 6 ELUTRIATE-REP3	WATER	NEW HAVEN, CT	10/25/18 15:20	10/25/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843759
Project Number:	60588790 TASK 6.0	**Report Date:**	11/20/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843759
Project Number:	60588790 TASK 6.0	**Report Date:**	11/20/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L1843759-09 : A sample identified as "COMPOSITE 6 ELUTRIATE BLANK-REP3" was received but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

Total Metals

The WG1177004-2 LCS recoveries, associated with L1843759-01 through -18, were below the acceptance criteria for cadmium (75%), chromium (1.5%), copper (60%), lead (73%), nickel (53%), silver (5.4%) and zinc (69%); however, a rerun produced similar results. The results of the original analyses are reported; however, all results are considered to have a potentially low bias for these analytes.

The WG1177004-3 MS recoveries, performed on L1843759-13, are below the acceptance criteria for cadmium (50%), chromium (23%), copper (42%), lead (48%), nickel (27%), silver (22%) and zinc (41%). The results of the native sample are considered to have a potentially low bias for these analytes.

The WG1180829-3 MS recovery for arsenic (74%), performed on L1843759-13, does not apply because the sample concentration is greater than four times the spike amount added.

The WG1177004-5 Laboratory Duplicate RPDs for chromium (62%), lead (26%) and zinc (26%), performed on L1843759-13, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 11/20/18

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-01
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 20:37
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.02	0.440	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	73		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1843759
Project Number: 60588790 TASK 6.0
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-02
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 21:08
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.06	0.450	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-03
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 23:10
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.00	0.436	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	63		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1843759
Project Number: 60588790 TASK 6.0
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-04
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/09/18 23:40
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.00	0.436	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-05
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 00:11
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.02	0.440	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	71		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-06
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 00:42
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.10	0.459	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	59		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1843759
Project Number: 60588790 TASK 6.0
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-07
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 01:12
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.25	0.490	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	63		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-08
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 01:43
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.25	0.490	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	56		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-09
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 02:14
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.13	0.464	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	65		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-10
Client ID: COMPOSITE 1 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 02:45
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.02	0.440	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	39		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-11
Client ID: COMPOSITE 1 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 03:15
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.13	0.464	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	32		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-12
Client ID: COMPOSITE 1 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 03:46
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.02	0.440	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	53		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-13
Client ID: COMPOSITE 2 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 04:17
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.04	0.445	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	52		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-14
Client ID: COMPOSITE 2 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 06:19
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.10	0.459	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	63		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-15
Client ID: COMPOSITE 2 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 06:50
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.13	0.464	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	64		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1843759
Project Number: 60588790 TASK 6.0
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-16
Client ID: COMPOSITE 6 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 07:21
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.04	0.445	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	148		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-17
Client ID: COMPOSITE 6 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 07:51
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.08	0.454	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	65		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-18
Client ID: COMPOSITE 6 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 08:22
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.04	0.445	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	69		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 11/09/18 14:30
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 12:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-18 Batch: WG1174817-1					
Pentachlorophenol	ND		ug/l	2.00	0.436

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	87		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-18 Batch: WG1174817-2 WG1174817-3								
Pentachlorophenol	87		71		50-120	20		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,6-Tribromophenol	114		95		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1174817-4 WG1174817-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1												
Pentachlorophenol	ND	10.5	6.15	58		8.07	77		50-120	27		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	73		64		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1174817-6 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1						
Pentachlorophenol	ND	ND	ug/l	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	52		116		30-150

PCBS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-01
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 05:53
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	76		30-150
BZ 198	87		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-02
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 06:26
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	75		30-150
BZ 198	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-03
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 07:00
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	73		30-150
BZ 198	85		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-04
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 07:33
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	71		30-150
BZ 198	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-05
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 08:06
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	73		30-150
BZ 198	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-06
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 08:40
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	71		30-150
BZ 198	85		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-07
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 09:13
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	70		30-150
BZ 198	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-08
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 09:46
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	69		30-150
BZ 198	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-09
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 10:20
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	71		30-150
BZ 198	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-10
Client ID: COMPOSITE 1 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 10:53
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	0.001	J	ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	0.001	J	ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	66		30-150
BZ 198	62		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-11
Client ID: COMPOSITE 1 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 11:27
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	0.002		ug/l	0.001	0.001	1
Cl4-BZ#44	0.001	J	ug/l	0.001	0.001	1
Cl4-BZ#49	0.001		ug/l	0.001	0.001	1
Cl4-BZ#52	0.002		ug/l	0.001	0.001	1
Cl4-BZ#66	0.001	J	ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	0.001		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	0.001		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	0.001		ug/l	0.001	0.001	1
Cl6-BZ#153	0.001		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	0.001	J	ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	70		30-150
BZ 198	66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-12
Client ID: COMPOSITE 1 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 12:00
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	0.002		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	0.001	J	ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	0.001	J	ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	61		30-150
BZ 198	59		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-13
Client ID: COMPOSITE 2 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 12:34
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	0.001	J	ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	0.001	J	ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	67		30-150
BZ 198	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-14
Client ID: COMPOSITE 2 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 14:14
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	0.001	J	ug/l	0.001	0.001	1
Cl3-BZ#28	0.002		ug/l	0.001	0.001	1
Cl4-BZ#44	0.001	J	ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	0.001	J	ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	0.001	J	ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	0.001	J	ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	66		30-150
BZ 198	67		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-15
Client ID: COMPOSITE 2 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 14:48
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	0.001	J	ug/l	0.001	0.001	1
Cl3-BZ#28	0.001		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	0.001	J	ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	67		30-150
BZ 198	73		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-16
Client ID: COMPOSITE 6 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 15:21
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	63		30-150
BZ 198	67		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-17
Client ID: COMPOSITE 6 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 15:54
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	58		30-150
BZ 198	57		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-18
Client ID: COMPOSITE 6 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/17/18 16:27
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.001	0.001	1
Cl3-BZ#18	ND		ug/l	0.001	0.001	1
Cl3-BZ#28	ND		ug/l	0.001	0.001	1
Cl4-BZ#44	ND		ug/l	0.001	0.001	1
Cl4-BZ#49	ND		ug/l	0.001	0.001	1
Cl4-BZ#52	ND		ug/l	0.001	0.001	1
Cl4-BZ#66	ND		ug/l	0.001	0.001	1
Cl5-BZ#87	ND		ug/l	0.001	0.001	1
Cl5-BZ#101	ND		ug/l	0.001	0.001	1
Cl5-BZ#105	ND		ug/l	0.001	0.001	1
Cl5-BZ#118	ND		ug/l	0.001	0.001	1
Cl6-BZ#128	ND		ug/l	0.001	0.001	1
Cl6-BZ#138	ND		ug/l	0.001	0.001	1
Cl6-BZ#153	ND		ug/l	0.001	0.001	1
Cl7-BZ#170	ND		ug/l	0.001	0.001	1
Cl7-BZ#180	ND		ug/l	0.001	0.001	1
Cl7-BZ#183	ND		ug/l	0.001	0.001	1
Cl7-BZ#184	ND		ug/l	0.001	0.001	1
Cl7-BZ#187	ND		ug/l	0.001	0.001	1
Cl8-BZ#195	ND		ug/l	0.001	0.001	1
Cl9-BZ#206	ND		ug/l	0.001	0.001	1
Cl10-BZ#209	ND		ug/l	0.001	0.001	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	59		30-150
BZ 198	67		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 15:04
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:00

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners (RIM List) - Mansfield Lab for sample(s): 01-18 Batch: WG1174636-1					
Cl2-BZ#8	ND		ug/l	0.001	0.001
Cl3-BZ#18	ND		ug/l	0.001	0.001
Cl3-BZ#28	ND		ug/l	0.001	0.001
Cl4-BZ#44	ND		ug/l	0.001	0.001
Cl4-BZ#49	ND		ug/l	0.001	0.001
Cl4-BZ#52	ND		ug/l	0.001	0.001
Cl4-BZ#66	ND		ug/l	0.001	0.001
Cl5-BZ#87	ND		ug/l	0.001	0.001
Cl5-BZ#101	ND		ug/l	0.001	0.001
Cl5-BZ#105	ND		ug/l	0.001	0.001
Cl5-BZ#118	ND		ug/l	0.001	0.001
Cl6-BZ#128	ND		ug/l	0.001	0.001
Cl6-BZ#138	ND		ug/l	0.001	0.001
Cl6-BZ#153	ND		ug/l	0.001	0.001
Cl7-BZ#170	ND		ug/l	0.001	0.001
Cl7-BZ#180	ND		ug/l	0.001	0.001
Cl7-BZ#183	ND		ug/l	0.001	0.001
Cl7-BZ#184	ND		ug/l	0.001	0.001
Cl7-BZ#187	ND		ug/l	0.001	0.001
Cl8-BZ#195	ND		ug/l	0.001	0.001
Cl9-BZ#206	ND		ug/l	0.001	0.001
Cl10-BZ#209	ND		ug/l	0.001	0.001

Surrogate	%Recovery	Qualifier	Acceptance Criteria
DBOB	72		30-150
BZ 198	80		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 Batch: WG1174636-2 WG1174636-3								
Cl2-BZ#8	97		100		50-120	3		30
Cl3-BZ#18	94		95		50-120	1		30
Cl3-BZ#28	99		100		50-120	1		30
Cl4-BZ#44	106		109		50-120	3		30
Cl4-BZ#49	94		96		50-120	2		30
Cl4-BZ#52	102		107		50-120	5		30
Cl4-BZ#66	100		103		50-120	3		30
Cl5-BZ#87	99		103		50-120	4		30
Cl5-BZ#101	97		100		50-120	3		30
Cl5-BZ#105	99		102		50-120	3		30
Cl5-BZ#118	98		102		50-120	4		30
Cl6-BZ#128	93		94		50-120	1		30
Cl6-BZ#138	92		95		50-120	3		30
Cl6-BZ#153	94		98		50-120	4		30
Cl7-BZ#170	88		93		50-120	6		30
Cl7-BZ#180	84		86		50-120	2		30
Cl7-BZ#183	82		85		50-120	4		30
Cl7-BZ#184	88		92		50-120	4		30
Cl7-BZ#187	86		89		50-120	3		30
Cl8-BZ#195	91		94		50-120	3		30
Cl9-BZ#206	88		91		50-120	3		30
Cl10-BZ#209	85		89		50-120	5		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 Batch: WG1174636-2 WG1174636-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
DBOB	76		76		30-150
BZ 198	85		88		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1174636-4 WG1174636-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1												
Cl2-BZ#8	ND	0.102	0.088	86		0.093	93		50-120	5		30
Cl3-BZ#18	0.001J	0.102	0.087	85		0.091	91		50-120	5		30
Cl3-BZ#28	ND	0.102	0.095	93		0.100	100		50-120	5		30
Cl4-BZ#44	ND	0.102	0.099	97		0.105	105		50-120	6		30
Cl4-BZ#49	ND	0.102	0.089	87		0.097	97		50-120	9		30
Cl4-BZ#52	ND	0.102	0.095	93		0.096	96		50-120	1		30
Cl4-BZ#66	ND	0.102	0.092	91		0.097	97		50-120	5		30
Cl5-BZ#87	ND	0.102	0.086	85		0.093	93		50-120	8		30
Cl5-BZ#101	ND	0.102	0.085	83		0.091	91		50-120	7		30
Cl5-BZ#105	0.001J	0.102	0.088	86		0.094	94		50-120	7		30
Cl5-BZ#118	ND	0.102	0.083	82		0.089	89		50-120	7		30
Cl6-BZ#128	ND	0.102	0.076	74		0.081	81		50-120	7		30
Cl6-BZ#138	ND	0.102	0.077	75		0.083	83		50-120	8		30
Cl6-BZ#153	ND	0.102	0.077	75		0.083	83		50-120	8		30
Cl7-BZ#170	ND	0.102	0.075	73		0.082	82		50-120	9		30
Cl7-BZ#180	ND	0.102	0.067	66		0.072	72		50-120	7		30
Cl7-BZ#183	ND	0.102	0.068	66		0.074	74		50-120	9		30
Cl7-BZ#184	ND	0.102	0.070	69		0.076	76		50-120	8		30
Cl7-BZ#187	ND	0.102	0.070	69		0.076	76		50-120	8		30
Cl8-BZ#195	ND	0.102	0.077	76		0.084	84		50-120	8		30
Cl9-BZ#206	ND	0.102	0.070	68		0.077	77		50-120	9		30
Cl10-BZ#209	ND	0.102	0.067	65		0.073	73		50-120	9		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1174636-4 WG1174636-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
BZ 198	67		69		30-150
DBOB	68		67		30-150

PESTICIDES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-01
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 19:02
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0026	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	73		30-150	A
DBOB	57		30-150	B
BZ 198	81		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-02
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 19:35
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0025	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	B
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	A
BZ 198	71		30-150	A
DBOB	61		30-150	B
BZ 198	80		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-03
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 20:09
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0024	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	70		30-150	A
DBOB	59		30-150	B
BZ 198	78		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-04
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 20:43
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0030	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0260	0.0130	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	72		30-150	A
DBOB	59		30-150	B
BZ 198	80		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-05
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 21:17
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0023	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	67		30-150	A
DBOB	52		30-150	B
BZ 198	72		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-06
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 21:51
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0029	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	71		30-150	A
DBOB	57		30-150	B
BZ 198	80		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-07
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 22:25
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0026	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	70		30-150	A
DBOB	56		30-150	B
BZ 198	78		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-08
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 22:59
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0032	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	73		30-150	A
DBOB	58		30-150	B
BZ 198	82		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-09
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/14/18 23:33
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0029	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0274	0.0137	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	71		30-150	A
DBOB	53		30-150	B
BZ 198	79		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-10
Client ID: COMPOSITE 1 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 00:07
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0032	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0020	P	ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0005	P	ug/l	0.0005	0.0005	1	B
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0018	P	ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	57		30-150	A
DBOB	50		30-150	B
BZ 198	61		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-11
Client ID: COMPOSITE 1 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 00:41
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0026	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0009	P	ug/l	0.0005	0.0005	1	A
Dieldrin	0.0016		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0260	0.0130	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	59		30-150	A
DBOB	53		30-150	B
BZ 198	65		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-12
Client ID: COMPOSITE 1 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 01:15
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0026	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0008	P	ug/l	0.0005	0.0005	1	A
Dieldrin	0.0013	P	ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	58		30-150	A
BZ 198	54		30-150	A
DBOB	49		30-150	B
BZ 198	60		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-13
Client ID: COMPOSITE 2 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 01:49
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0023	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0020	P	ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0006	P	ug/l	0.0005	0.0005	1	A
Dieldrin	0.0009		ug/l	0.0005	0.0005	1	A
Endrin	0.0021	P	ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0016	P	ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	70		30-150	A
DBOB	48		30-150	B
BZ 198	76		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-14
Client ID: COMPOSITE 2 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 03:31
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0021	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0018	P	ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0006		ug/l	0.0005	0.0005	1	A
Dieldrin	0.0014	P	ug/l	0.0005	0.0005	1	A
Endrin	0.0019	P	ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0014	P	ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	A
BZ 198	57		30-150	A
DBOB	48		30-150	B
BZ 198	60		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-15
Client ID: COMPOSITE 2 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 04:05
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0024	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0019	P	ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0008	P	ug/l	0.0005	0.0005	1	A
Dieldrin	0.0010	P	ug/l	0.0005	0.0005	1	A
Endrin	0.0019	P	ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0015	P	ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0263	0.0131	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	57		30-150	A
BZ 198	65		30-150	A
DBOB	47		30-150	B
BZ 198	72		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-16
Client ID: COMPOSITE 6 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 04:39
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0022	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0010	P	ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	0.0016	P	ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0255	0.0127	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	60		30-150	A
DBOB	49		30-150	B
BZ 198	65		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-17
Client ID: COMPOSITE 6 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 05:13
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0029	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0010	P	ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	0.0014	P	ug/l	0.0005	0.0005	1	A
Endrin	0.0005		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	55		30-150	A
DBOB	48		30-150	B
BZ 198	59		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-18
Client ID: COMPOSITE 6 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/15/18 05:47
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	0.0024	P	ug/l	0.0005	0.0005	1	B
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0009	P	ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	0.0013	P	ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	59		30-150	A
DBOB	46		30-150	B
BZ 198	62		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/14/18 16:12
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/01/18 06:38

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-18 Batch: WG1174635-1						
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Toxaphene	ND		ug/l	0.0250	0.0125	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	74		30-150	A
BZ 198	78		30-150	A
DBOB	71		30-150	B
BZ 198	81		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 Batch: WG1174635-2 WG1174635-3									
gamma-BHC	68		73		50-120	6		30	A
Heptachlor	73		75		50-120	3		30	A
Aldrin	77		81		50-120	5		30	A
Chloropyrifos	69		58		50-120	17		30	A
trans-Chlordane	90		89		50-120	1		30	A
Endosulfan I	90		89		50-120	1		30	A
cis-Chlordane	86		87		50-120	1		30	A
Dieldrin	105		103		50-120	2		30	A
Endrin	99		93		50-120	6		30	A
4,4'-DDT	98		92		50-120	6		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	66		69		30-150	A
BZ 198	80		75		30-150	A
DBOB	65		67		30-150	B
BZ 198	88		82		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 Batch: WG1174635-2 WG1174635-3									
Heptachlor epoxide	81		81		50-120	1		30	B
Endosulfan II	95		85		50-120	12		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	66		69		30-150	A
BZ 198	80		75		30-150	A
DBOB	65		67		30-150	B
BZ 198	88		82		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1174635-4 WG1174635-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1													
gamma-BHC	ND	0.102	0.0804	78		0.0713	71		50-120	12		30	A
Heptachlor	ND	0.102	0.0775	76		0.0667	67		50-120	15		30	A
Aldrin	ND	0.102	0.0754	74		0.0706	71		50-120	7		30	A
Chloropyrifos	ND	0.102	0.0826	81		0.0739	74		50-120	11		30	A
Heptachlor epoxide	ND	0.102	0.0849	83		0.0787	79		50-120	8		30	B
trans-Chlordane	ND	0.102	0.0922	90		0.0848	84		50-120	8		30	A
Endosulfan I	ND	0.102	0.0946	93		0.0864	86		50-120	9		30	A
cis-Chlordane	0.0006	0.102	0.0857	83		0.0785	78		50-120	9		30	A
Dieldrin	0.0009	0.102	0.1104	107		0.1018	101		50-120	8		30	A
Endrin	0.0021	0.102	0.1041	100		0.0948	93		50-120	9		30	A
Endosulfan II	ND	0.102	0.0971	95		0.0878	88		50-120	10		30	B
4,4'-DDT	ND	0.102	0.0924	91		0.0866	87		50-120	6		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	68		61		30-150	A
DBOB	73		68		30-150	A
BZ 198	73		66		30-150	B
DBOB	57		48		30-150	B

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-01 Date Collected: 10/25/18 10:55

Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP1 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00130		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:14	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM
Chromium, Total	0.00015		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM
Copper, Total	0.00027		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM
Lead, Total	0.00026		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:19	EPA 7474	1,7474	BV
Nickel, Total	0.00024	J	mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM
Selenium, Total	0.0001	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:38	NA	86,1632A(M)	BV
Silver, Total	0.00006	J	mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM
Zinc, Total	0.00444		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:21	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-02 Date Collected: 10/25/18 10:55

Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP2 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00116		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:16	NA	86,1632A(M)	BV
Cadmium, Total	0.00002	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM
Chromium, Total	0.00022		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM
Copper, Total	0.00072		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM
Lead, Total	0.00046		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:22	EPA 7474	1,7474	BV
Nickel, Total	0.00067		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM
Selenium, Total	0.00018	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:40	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM
Zinc, Total	0.00321		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:25	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-03 Date Collected: 10/25/18 10:55

Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP3 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00110		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:18	NA	86,1632A(M)	BV
Cadmium, Total	0.00004		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM
Chromium, Total	0.00023		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM
Copper, Total	0.00081		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM
Lead, Total	0.00039		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:24	EPA 7474	1,7474	BV
Nickel, Total	0.00038	J	mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM
Selenium, Total	0.00020	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:42	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM
Zinc, Total	0.00327		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:30	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-04 Date Collected: 10/25/18 10:55

Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP1 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00098	J	mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:20	NA	86,1632A(M)	BV
Cadmium, Total	0.00005		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM
Chromium, Total	0.00013		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM
Copper, Total	0.00111		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM
Lead, Total	0.00038		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:27	EPA 7474	1,7474	BV
Nickel, Total	0.00058		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM
Selenium, Total	0.00016	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:44	NA	86,1632A(M)	BV
Silver, Total	0.00003	J	mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM
Zinc, Total	0.00379		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:34	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-05 Date Collected: 10/25/18 10:55

Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP2 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00146		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:26	NA	86,1632A(M)	BV
Cadmium, Total	0.00002	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM
Chromium, Total	0.00013		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM
Copper, Total	0.00115		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM
Lead, Total	0.00051		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:34	EPA 7474	1,7474	BV
Nickel, Total	0.00060		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM
Selenium, Total	0.00018	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:46	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM
Zinc, Total	0.00376		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:38	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-06 Date Collected: 10/25/18 10:55

Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP3 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00101		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:28	NA	86,1632A(M)	BV
Cadmium, Total	0.00002	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM
Chromium, Total	0.00012		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM
Copper, Total	0.00132		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM
Lead, Total	0.00069		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:37	EPA 7474	1,7474	BV
Nickel, Total	0.00069		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM
Selenium, Total	0.00015	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:52	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM
Zinc, Total	0.00336		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:42	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-07 Date Collected: 10/25/18 11:30

Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP1 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00107		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:30	NA	86,1632A(M)	BV
Cadmium, Total	0.00005		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM
Chromium, Total	0.00028		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM
Copper, Total	0.00320		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM
Lead, Total	0.00125		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:39	EPA 7474	1,7474	BV
Nickel, Total	0.00137		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM
Selenium, Total	0.00013	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:54	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM
Zinc, Total	0.00682		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:46	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-08 Date Collected: 10/25/18 11:30

Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP2 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00113		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:32	NA	86,1632A(M)	BV
Cadmium, Total	0.00003	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM
Chromium, Total	0.00016		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM
Copper, Total	0.00174		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM
Lead, Total	0.00050		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:42	EPA 7474	1,7474	BV
Nickel, Total	0.00075		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM
Selenium, Total	0.00013	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:56	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM
Zinc, Total	0.00349		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 19:50	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-09 Date Collected: 10/25/18 11:30

Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP3 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00105		mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:34	NA	86,1632A(M)	BV
Cadmium, Total	0.00003	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM
Chromium, Total	0.00023		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM
Copper, Total	0.00275		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM
Lead, Total	0.00062		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:44	EPA 7474	1,7474	BV
Nickel, Total	0.00139		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM
Selenium, Total	0.00015	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:58	NA	86,1632A(M)	BV
Silver, Total	0.00005	J	mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM
Zinc, Total	0.00476		mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:11	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-10 Date Collected: 10/25/18 13:10

Client ID: COMPOSITE 1 ELUTRIATE-REP1 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.04015		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:19	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM
Chromium, Total	0.00044		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM
Copper, Total	0.00079		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM
Lead, Total	0.00054		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:47	EPA 7474	1,7474	BV
Nickel, Total	0.00060		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM
Selenium, Total	0.00016	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 13:00	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM
Zinc, Total	0.00151	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:15	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-11 Date Collected: 10/25/18 13:10

Client ID: COMPOSITE 1 ELUTRIATE-REP2 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.04074		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:23	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM
Chromium, Total	0.00033		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM
Copper, Total	0.00076		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM
Lead, Total	0.00048		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:49	EPA 7474	1,7474	BV
Nickel, Total	0.00055		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM
Selenium, Total	0.00014	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:03	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM
Zinc, Total	0.00159	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:19	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-12 Date Collected: 10/25/18 13:10

Client ID: COMPOSITE 1 ELUTRIATE-REP3 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03731		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:25	NA	86,1632A(M)	BV
Cadmium, Total	0.00004		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM
Chromium, Total	0.00039		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM
Copper, Total	0.00076		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM
Lead, Total	0.00053		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:52	EPA 7474	1,7474	BV
Nickel, Total	0.00054		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:05	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM
Zinc, Total	0.00160	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:24	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-13 Date Collected: 10/25/18 14:05

Client ID: COMPOSITE 2 ELUTRIATE-REP1 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.04142		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:05	NA	86,1632A(M)	BV
Cadmium, Total	0.00008		mg/l	0.00004	0.00001	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM
Chromium, Total	0.00121		mg/l	0.00020	0.00003	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM
Copper, Total	0.00118		mg/l	0.00040	0.00007	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM
Lead, Total	0.00145		mg/l	0.00040	0.00006	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:09	EPA 7474	1,7474	BV
Nickel, Total	0.00074		mg/l	0.00040	0.00011	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM
Selenium, Total	0.00024	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:24	NA	86,1632A(M)	BV
Silver, Total	0.00006	J	mg/l	0.00008	0.00003	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM
Zinc, Total	0.00309		mg/l	0.00200	0.00068	10	11/16/18 09:00	11/16/18 14:33	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-14 Date Collected: 10/25/18 14:05

Client ID: COMPOSITE 2 ELUTRIATE-REP2 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03645		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:27	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM
Chromium, Total	0.00081		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM
Copper, Total	0.00145		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM
Lead, Total	0.00093		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:54	EPA 7474	1,7474	BV
Nickel, Total	0.00058		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:07	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM
Zinc, Total	0.00189	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:28	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-15 Date Collected: 10/25/18 14:05

Client ID: COMPOSITE 2 ELUTRIATE-REP3 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03816		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:29	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM
Chromium, Total	0.00073		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM
Copper, Total	0.00130		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM
Lead, Total	0.00084		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:57	EPA 7474	1,7474	BV
Nickel, Total	0.00050		mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM
Selenium, Total	0.00012	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:09	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM
Zinc, Total	0.00160	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:32	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-16 Date Collected: 10/25/18 15:20

Client ID: COMPOSITE 6 ELUTRIATE-REP1 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.01901		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:31	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM
Chromium, Total	0.00032		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM
Copper, Total	0.00077		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM
Lead, Total	0.00034		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:04	EPA 7474	1,7474	BV
Nickel, Total	0.00038	J	mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM
Selenium, Total	0.00014	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:11	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM
Zinc, Total	0.00118	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:36	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-17 Date Collected: 10/25/18 15:20

Client ID: COMPOSITE 6 ELUTRIATE-REP2 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.02087		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:33	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM
Chromium, Total	0.00029		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM
Copper, Total	0.00102		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM
Lead, Total	0.00047		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:07	EPA 7474	1,7474	BV
Nickel, Total	0.00035	J	mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM
Selenium, Total	0.00012	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:13	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM
Zinc, Total	0.00135	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:40	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-18 Date Collected: 10/25/18 15:20

Client ID: COMPOSITE 6 ELUTRIATE-REP3 Date Received: 10/25/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.02533		mg/l	0.00500	0.00047	5	11/19/18 09:15	11/19/18 16:35	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM
Chromium, Total	0.00031		mg/l	0.00010	0.00003	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM
Copper, Total	0.00119		mg/l	0.00020	0.00007	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM
Lead, Total	0.00052		mg/l	0.00020	0.00006	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:09	EPA 7474	1,7474	BV
Nickel, Total	0.00031	J	mg/l	0.00040	0.00011	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM
Selenium, Total	0.00017	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 14:15	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM
Zinc, Total	0.00126	J	mg/l	0.00200	0.00068	10	11/19/18 10:06	11/19/18 20:44	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1177004-1										
Cadmium, Total	0.00003	J	mg/l	0.00004	0.00001	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM
Chromium, Total	0.00011	J	mg/l	0.00020	0.00003	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM
Copper, Total	0.00039	J	mg/l	0.00040	0.00007	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM
Lead, Total	0.00031	J	mg/l	0.00040	0.00006	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM
Nickel, Total	0.00037	J	mg/l	0.00040	0.00011	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM
Zinc, Total	0.00140	J	mg/l	0.00200	0.00068	10	11/16/18 09:00	11/16/18 14:13	1,6020B	AM

Prep Information

Digestion Method: CHELATION

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1180587-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 08:04	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1180829-1										
Arsenic, Total	0.00011	J	mg/l	0.00100	0.00009	1	11/19/18 09:15	11/19/18 15:04	86,1632A(M)	BV

Prep Information

Digestion Method:

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1180891-1										
Selenium, Total	0.00015	J	mg/l	0.00056	0.00009	1	11/19/18 10:42	11/19/18 12:20	86,1632A(M)	BV

Prep Information

Digestion Method:

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1177004-2								
Cadmium, Total	**75**	Q	-		80-120	-		20
Chromium, Total	**02**	Q	-		80-120	-		20
Copper, Total	**60**	Q	-		80-120	-		20
Lead, Total	**73**	Q	-		80-120	-		20
Nickel, Total	**53**	Q	-		80-120	-		20
Silver, Total	**05**	Q	-		80-120	-		20
Zinc, Total	**69**	Q	-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1180587-2 SRM Lot Number: HPHGAF								
Mercury, Total	96		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1180829-2 SRM Lot Number: A2HGAF								
Arsenic, Total	95		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1180891-2 SRM Lot Number: A2HGAF								
Selenium, Total	100		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0
Lab Number: L1843759
Report Date: 11/20/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180587-3 WG1180587-4 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1												
Mercury, Total	ND	0.0025	0.00219	88		0.00213	85		80-120	3		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180829-3 WG1180829-4 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1												
Arsenic, Total	0.04142	0.01	0.04878	**74**	Q	0.05025	88		75-125	3		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180891-3 WG1180891-4 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1												
Selenium, Total	0.00024J	0.00556	0.00582	105		0.00571	103		75-125	2		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1177004-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1						
Cadmium, Total	0.00008	0.00002J	mg/l	NC		20
Chromium, Total	0.00121	0.00063	mg/l	**62**	Q	20
Copper, Total	0.00118	0.00101	mg/l	16		20
Lead, Total	0.00145	0.00112	mg/l	**26**	Q	20
Nickel, Total	0.00074	0.00032J	mg/l	NC		20
Silver, Total	0.00006J	ND	mg/l	NC		20
Zinc, Total	0.00309	0.00237	mg/l	**26**	Q	20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180587-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180829-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1						
Arsenic, Total	0.04142	0.04262	mg/l	3		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180891-5 QC Sample: L1843759-13 Client ID: COMPOSITE 2 ELUTRIATE-REP1						
Selenium, Total	0.00024J	0.00025J	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-01
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:15	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-02
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:15	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-03
Client ID: COMPOSITE 1 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:16	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-04
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:16	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-05
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:17	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-06
Client ID: COMPOSITE 2 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 10:55
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:17	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-07
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:17	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-08
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:18	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-09
Client ID: COMPOSITE 6 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 11:30
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:18	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-10
Client ID: COMPOSITE 1 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:19	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-11
Client ID: COMPOSITE 1 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:20	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-12
Client ID: COMPOSITE 1 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 13:10
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:21	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-13
Client ID: COMPOSITE 2 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:21	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-14
Client ID: COMPOSITE 2 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:22	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-15
Client ID: COMPOSITE 2 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 14:05
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:23	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-16
Client ID: COMPOSITE 6 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:23	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-17
Client ID: COMPOSITE 6 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:24	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

SAMPLE RESULTS

Lab ID: L1843759-18
Client ID: COMPOSITE 6 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/25/18 15:20
Date Received: 10/25/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:25	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1843759

Project Number: 60588790 TASK 6.0 **Report Date:** 11/20/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-18 Batch: WG1172489-1										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/26/18 01:30	10/26/18 03:14	121,3500CR-B	MA

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-18 Batch: WG1172489-2								
Chromium, Hexavalent	96		-		85-115	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0
Lab Number: L1843759
Report Date: 11/20/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-18 QC Batch ID: WG1172489-4 QC Sample: L1843759-18 Client ID: COMPOSITE 6 ELUTRIATE-REP3												
Chromium, Hexavalent	ND	0.1	0.099	99		-	-		85-115	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1843759

Report Date: 11/20/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-18 QC Batch ID: WG1172489-3 QC Sample: L1843759-17 Client ID: COMPOSITE 6 ELUTRIATE-REP2						
Chromium, Hexavalent	ND	ND	mg/l	NC		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
A1	Absent
B	Absent
B1	Absent
C	Absent
C1	Absent
D	Absent
D1	Absent
E	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-01A	Plastic 950ml HNO3 preserved	A	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-01B	Plastic 950ml HNO3 preserved	A	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-01C	Plastic 950ml unpreserved	A	7	7	2.3	Y	Absent		HEXCR-3500(1)
L1843759-01D	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1843759-01E	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1843759-01F	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-01G	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-PCBCONG-8270(7)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-02A	Plastic 950ml HNO3 preserved	D	<2	<2	3.2	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-02B	Plastic 950ml HNO3 preserved	D	<2	<2	3.2	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-02C	Plastic 950ml unpreserved	D	7	7	3.2	Y	Absent		HEXCR-3500(1)
L1843759-02D	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1843759-02E	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1843759-02F	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-02G	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-03A	Plastic 950ml HNO3 preserved	A	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-03B	Plastic 950ml HNO3 preserved	A	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-03C	Plastic 950ml unpreserved	A	7	7	2.3	Y	Absent		HEXCR-3500(1)
L1843759-03D	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1843759-03E	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1843759-03F	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-03G	Amber 1000ml unpreserved	A	7	7	2.3	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-04A	Plastic 950ml HNO3 preserved	B	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-04B	Plastic 950ml HNO3 preserved	B	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-04C	Plastic 950ml unpreserved	B	7	7	2.7	Y	Absent		HEXCR-3500(1)
L1843759-04D	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1843759-04E	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1843759-04F	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-04G	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-05A	Plastic 950ml HNO3 preserved	D	<2	<2	3.2	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-05B	Plastic 950ml HNO3 preserved	D	<2	<2	3.2	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-05C	Plastic 950ml unpreserved	D	7	7	3.2	Y	Absent		HEXCR-3500(1)
L1843759-05D	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1843759-05E	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1843759-05F	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-05G	Amber 1000ml unpreserved	D	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-06A	Plastic 950ml HNO3 preserved	B	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-06B	Plastic 950ml HNO3 preserved	B	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-06C	Plastic 950ml unpreserved	B	7	7	2.7	Y	Absent		HEXCR-3500(1)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-06D	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1843759-06E	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1843759-06F	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-06G	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-07A	Plastic 950ml HNO3 preserved	B	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-07B	Plastic 950ml HNO3 preserved	B	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-07C	Plastic 950ml unpreserved	B	7	7	2.7	Y	Absent		HEXCR-3500(1)
L1843759-07D	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1843759-07F	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-07G	Amber 1000ml unpreserved	B	7	7	2.7	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-08A	Plastic 950ml HNO3 preserved	C	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-08C	Plastic 950ml unpreserved	C	7	7	2.4	Y	Absent		HEXCR-3500(1)
L1843759-08D	Amber 1000ml unpreserved	C	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1843759-08F	Amber 1000ml unpreserved	C	7	7	2.4	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-08G	Amber 1000ml unpreserved	C	7	7	2.4	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-09A	Plastic 950ml HNO3 preserved	C	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-09B	Plastic 950ml HNO3 preserved	C	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-09C	Plastic 250ml unpreserved split	C	7	7	2.4	Y	Absent		HEXCR-3500(1)
L1843759-09D	Amber 1000ml unpreserved	C	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1843759-09E	Amber 1000ml unpreserved	C	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1843759-09F	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-09G	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-09H	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-09I	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-09L	Plastic 950ml unpreserved	A1	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1843759-09Y	Plastic 950ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-10A	Plastic 950ml unpreserved	C	7	7	2.4	Y	Absent		HEXCR-3500(1)
L1843759-10B	Plastic 950ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-10C	Plastic 950ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-10D	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-10E	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-10F	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-8270(7)
L1843759-10G	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-8270(7)
L1843759-11A	Plastic 950ml unpreserved	B1	7	7	3.1	Y	Absent		HEXCR-3500(1)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-11B	Plastic 950ml HNO3 preserved	B1	<2	<2	3.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-11C	Plastic 950ml HNO3 preserved	B1	<2	<2	3.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-11D	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-11E	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-11F	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-8270(7)
L1843759-11G	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-8270(7)
L1843759-12A	Plastic 950ml unpreserved	B1	7	7	3.1	Y	Absent		HEXCR-3500(1)
L1843759-12B	Plastic 950ml HNO3 preserved	B1	<2	<2	3.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-12C	Plastic 950ml HNO3 preserved	B1	<2	<2	3.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-12D	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-12E	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-12F	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-8270(7)
L1843759-12G	Amber 1000ml unpreserved	B1	7	7	3.1	Y	Absent		A2-RIM-8270(7)
L1843759-13A	Plastic 950ml unpreserved	C	7	7	2.4	Y	Absent		HEXCR-3500(1)
L1843759-13B	Plastic 950ml unpreserved	C1	7	7	3.6	Y	Absent		HEXCR-3500(1)
L1843759-13C	Plastic 950ml HNO3 preserved	C1	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-13D	Plastic 950ml HNO3 preserved	C1	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-13E	Plastic 950ml HNO3 preserved	C1	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-13F	Plastic 950ml HNO3 preserved	C1	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-13G	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13H	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13I	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13J	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13K	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13L	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13M	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13N	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13O	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13P	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13Q	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13R	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13S	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13T	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-8270(7)
L1843759-13U	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-13V	Amber 1000ml unpreserved	C1	7	7	3.6	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1843759-13X	Plastic 950ml HNO3 preserved	C1	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-13Y	Plastic 950ml HNO3 preserved	C1	<2	<2	3.6	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-14A	Plastic 950ml unpreserved	C1	7	7	3.6	Y	Absent		HEXCR-3500(1)
L1843759-14B	Plastic 950ml unpreserved	C1	7	7	3.6	Y	Absent		HEXCR-3500(1)
L1843759-14C	Plastic 950ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-14D	Plastic 950ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-14E	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-14F	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-14G	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-8270(7)
L1843759-14H	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-8270(7)
L1843759-15A	Plastic 950ml unpreserved	D1	7	7	2.9	Y	Absent		HEXCR-3500(1)
L1843759-15B	Plastic 250ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-15C	Plastic 250ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-15D	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-15E	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-15F	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-8270(7)
L1843759-15G	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-8270(7)
L1843759-16A	Plastic 950ml unpreserved	D1	7	7	2.9	Y	Absent		HEXCR-3500(1)
L1843759-16B	Plastic 250ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-16C	Plastic 250ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-16D	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-16E	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-16F	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-8270(7)
L1843759-16G	Amber 1000ml unpreserved	D1	7	7	2.9	Y	Absent		A2-RIM-8270(7)
L1843759-17A	Plastic 950ml unpreserved	D1	7	7	2.9	Y	Absent		HEXCR-3500(1)
L1843759-17B	Plastic 950ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-17C	Plastic 950ml HNO3 preserved	D1	<2	<2	2.9	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-17D	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PCBCONG-8270(7)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1843759
Report Date: 11/20/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843759-17E	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-17F	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-8270(7)
L1843759-17G	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-8270(7)
L1843759-18A	Plastic 950ml unpreserved	E	7	7	2.1	Y	Absent		HEXCR-3500(1)
L1843759-18B	Plastic 950ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-18C	Plastic 950ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1843759-18D	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1843759-18E	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-PEST-ELUT(7)
L1843759-18F	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-8270(7)
L1843759-18G	Amber 1000ml unpreserved	A1	7	7	2.8	Y	Absent		A2-RIM-8270(7)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843759
Project Number:	60588790 TASK 6.0	**Report Date:**	11/20/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843759
Project Number:	60588790 TASK 6.0	**Report Date:**	11/20/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843759
Project Number:	60588790 TASK 6.0	**Report Date:**	11/20/18

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

86 Chemical Speciation of Arsenic in Water and Tissue by Hydride Generation Quartz Furnace Atomic Absorption Spectrometry. USEPA Office of Water, EPA Method 1632, Revision A, August 1998.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	Yes
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – see narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	No	Pentachlorophenol 27.3%	Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV associated with all field samples: Cl4-BZ#77 @ 17%, Cl5-BZ#126 @ 16%,	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	WG1180829-3 MS As(74%) WG1144004-3 MS Cd(50%), Cr(23%), Cu(42%), Pb(48%), Ni(27%), Ag(22%) and Zn(41%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	WG1177004-5 RPD Cr(62%), Pb(26%), Zn(26%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

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ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 1 Elutriate Blank - Rep 1	10/25/18	1055	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 1 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
	Composite 1 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
	Composite 1 Elutriate Blank - Rep 1	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
	Composite 1 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
	Composite 1 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
	Composite 1 Elutriate Blank - Rep 1	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate Blank - Rep 1	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate Blank - Rep 2	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate Blank - Rep 3	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/25/18 Time: 1733	Received By: [signature] AAL	Date: 10/25 Time: 1733
Relinquished By: [signature] AAL	Date: 10/25 Time: 1910	Received at Lab By: [signature]	Date: 10/25/18 Time: 1910

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No: October 2018	Page of

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CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 2 Elutriate Blank - Rep 1	10/25/18	1055	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 2 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
	Composite 2 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
	Composite 2 Elutriate Blank - Rep 1	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
	Composite 2 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
	Composite 2 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
	Composite 2 Elutriate Blank - Rep 1	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 2 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 2 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 2 Elutriate Blank - Rep 1	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
	Composite 2 Elutriate Blank - Rep 2	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
	Composite 2 Elutriate Blank - Rep 3	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/25/18 Time: 1733	Received By: [signature] ANL	Date: 10/25 Time: 1733
Relinquished By: [signature] ANL	Date: 10/25 Time: 1910	Received at Lab By: [signature]	Date: 10/25/18 Time: 1910

Comments:

ERR

COC Number: A1016874

Sample Delivery Group No: Oct 2018

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ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions
	Composite 6 Elutriate Blank - Rep 1	10/25/18	1130	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 6 Elutriate Blank - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 6 Elutriate Blank - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 6 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 6 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 6 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 6 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate Blank - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 6 Elutriate Blank - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 6 Elutriate Blank - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/25/18 Time: 1733	Received By: [signature] AAL	Date: 10/25 Time: 1733
Relinquished By: [signature] AAL	Date: 10/25 Time: 1910	Received at Lab By: [signature]	Date: 10/25/18 Time: 1910

Comments:

ERR

COC Number: A1016666

Sample Delivery Group No: October 2018

Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 1 Elutriate - Rep 1	10/25/18	1235	ESI	C	6	1000	G	HNO3	Water	N	Total Metals
	Composite 1 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 1 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 1 Elutriate - Rep 1					6	1000	G	4 C	Water	N	PCP
	Composite 1 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 1 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 1 Elutriate - Rep 1					6	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate - Rep 1					3	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/25/18 Time: 1733	Received By: AAL	Date: 10/25 Time: 1733
Relinquished By: AAL	Date: 10/25 Time: 1910	Received at Lab By:	Date: 10/25/18 Time: 1910

Comments:

ERR

COC Number: A1016865

Sample Delivery Group No: October 2018 | Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	1 @ 24 10/25 Composite 2 Elutriate - Rep 1	10/25/18	1310	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 2 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 2 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 2 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 2 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 2 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 2 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 2 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 2 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 2 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 2 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 2 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/25/18	Time: 1733	Received By:	Date: 10/25	Time: 1732
Relinquished By: AAC	Date: 10/25	Time: 1910	Received at Lab By:	Date: 10/25/18	Time: 1910

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No:	October 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions.
	Composite 6 Elutriate - Rep 1	10/25/18	1520	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 6 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 6 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 6 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 6 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 6 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 6 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 6 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 6 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/25/18 Time: 1733	Received By:	Date: 10/25 Time: 1733
Relinquished By: AAC	Date: 10/25 Time: 1910	Received at Lab By:	Date: 10/25/18 Time: 1910

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No:	October 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
43759-13	Composite 1 Elutriate - Rep 1	10/25/18	1235	ESI	C	6	1000	G	HNO3	Water	N	Total Metals
-14	Composite 1 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
-15	Composite 1 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
-13	Composite 1 Elutriate - Rep 1					6	1000	G	4 C	Water	N	PCP
-14	Composite 1 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
-15	Composite 1 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
-13	Composite 1 Elutriate - Rep 1					6	1000	G	4 C	Water	N	PEST/CGR
-14	Composite 1 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
-15	Composite 1 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate - Rep 1					3	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/26/18 Time: 1725	Received By:	Date: 10/26/18 Time: 17:25
Relinquished By: RAL	Date: 10/26/18 Time: 19:50	Received at Lab By:	Date: 10/26/18 Time: 1950

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No: October 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
43759-16	Composite 6 Elutriate - Rep 1	10/25/18	1520	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
-17	Composite 6 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
-18	Composite 6 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
-16	Composite 6 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
-17	Composite 6 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
-18	Composite 6 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
-16	Composite 6 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
-17	Composite 6 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
-18	Composite 6 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 6 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 6 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 6 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] AAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] AAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 19:50

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No: October 2018

Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1843759

CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
43759-10	Composite 1 Elutriate - Rep 1	10/25/18	1310	ESI	C	~~6~~ 2	1000	G	HNO3	Water	N	Total Metals
-11	Composite 1 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
-12	Composite 1 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
-10	Composite 1 Elutriate - Rep 1					~~8~~ 2	1000	G	4 C	Water	N	PCP
-11	Composite 1 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
-12	Composite 1 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
-10	Composite 1 Elutriate - Rep 1					~~8~~ 2	1000	G	4 C	Water	N	PEST/CGR
-11	Composite 1 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
-12	Composite 1 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 1 Elutriate - Rep 1					~~3~~ 1	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 1 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] AAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] AAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:

ERR

COC Number: A1016885

Sample Delivery Group No:	Oct 2018	Page of

ANALYTICAL REPORT

Lab Number:	L1844003
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 6.0
Report Date:	11/28/18

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1844003-01	COMPOSITE 3 ELUTRIATE BLANK-REP1	WATER	NEW HAVEN, CT	10/26/18 09:20	10/26/18
L1844003-02	COMPOSITE 3 ELUTRIATE BLANK-REP2	WATER	NEW HAVEN, CT	10/26/18 09:20	10/26/18
L1844003-03	COMPOSITE 3 ELUTRIATE BLANK-REP3	WATER	NEW HAVEN, CT	10/26/18 09:20	10/26/18
L1844003-04	COMPOSITE 5 ELUTRIATE BLANK-REP1	WATER	NEW HAVEN, CT	10/26/18 11:40	10/26/18
L1844003-05	COMPOSITE 5 ELUTRIATE BLANK-REP2	WATER	NEW HAVEN, CT	10/26/18 11:40	10/26/18
L1844003-06	COMPOSITE 5 ELUTRIATE BLANK-REP3	WATER	NEW HAVEN, CT	10/26/18 11:40	10/26/18
L1844003-07	COMPOSITE 4 ELUTRIATE BLANK-REP1	WATER	NEW HAVEN, CT	10/26/18 09:20	10/26/18
L1844003-08	COMPOSITE 4 ELUTRIATE BLANK-REP2	WATER	NEW HAVEN, CT	10/26/18 09:20	10/26/18
L1844003-09	COMPOSITE 4 ELUTRIATE BLANK-REP3	WATER	NEW HAVEN, CT	10/26/18 09:20	10/26/18
L1844003-10	COMPOSITE 5 ELUTRIATE-REP1	WATER	NEW HAVEN, CT	10/26/18 15:25	10/26/18
L1844003-11	COMPOSITE 5 ELUTRIATE-REP2	WATER	NEW HAVEN, CT	10/26/18 15:25	10/26/18
L1844003-12	COMPOSITE 5 ELUTRIATE-REP3	WATER	NEW HAVEN, CT	10/26/18 15:25	10/26/18
L1844003-13	COMPOSITE 4 ELUTRIATE-REP1	WATER	NEW HAVEN, CT	10/26/18 13:10	10/26/18
L1844003-14	COMPOSITE 4 ELUTRIATE-REP2	WATER	NEW HAVEN, CT	10/26/18 13:10	10/26/18
L1844003-15	COMPOSITE 4 ELUTRIATE-REP3	WATER	NEW HAVEN, CT	10/26/18 13:10	10/26/18
L1844003-16	COMPOSITE 3 ELUTRIATE-REP1	WATER	NEW HAVEN, CT	10/26/18 16:15	10/26/18
L1844003-17	COMPOSITE 3 ELUTRIATE-REP2	WATER	NEW HAVEN, CT	10/26/18 16:15	10/26/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1844003-18	COMPOSITE 3 ELUTRIATE-REP3	WATER	NEW HAVEN, CT	10/26/18 16:15	10/26/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1844003
Project Number:	60588790 TASK 6.0	**Report Date:**	11/28/18

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1844003
Project Number:	60588790 TASK 6.0	**Report Date:**	11/28/18

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Semivolatile Organics

The WG1175119-2/-3 LCS/LCSD RPD, associated with L1844003-01 through -18, is above the acceptance criteria for pentachlorophenol (40%).

PCBs and Pesticides: L1844003 had the original extraction batch compromised in the laboratory and was re-extracted with the method required holding time exceeded. Only the re-extract could be reported.

Pesticides

L1844003-11: The surrogate recovery is outside the individual acceptance criteria for bz198 (184%), but within the overall method allowances.

L1844003-13: The surrogate recovery is outside the individual acceptance criteria for bz198 (291%), but within the overall method allowances.

L1844003-14: The surrogate recovery is outside the individual acceptance criteria for bz198 (360%), but within the overall method allowances.

L1844003-16: The surrogate recovery is outside the individual acceptance criteria for bz198 (271%), but within the overall method allowances.

L1844003-17: The surrogate recovery is outside the individual acceptance criteria for bz98 (303%), but within the overall method allowances.

The WG1182113-2/-3 recoveries for heptachlor (39%/37%) and aldrin (37%/34%) are below the acceptance criteria; however, the associated MS/MSD recoveries within overall method allowances. No further action was taken.

Total Metals

The WG1177006-2 LCS recoveries, associated with L1844003-01 through -18, were below the acceptance

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1844003
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Case Narrative (continued)

criteria for chromium (1%), copper (79%) and silver (0%); a second prep and run were also evaluated giving similar results; however, all results are considered to have a potentially low bias for these analytes.
The WG1177006-3 MS recoveries, performed on L1844003-16, are below the acceptance criteria for cadmium (24%), chromium (12%), copper (0%), lead (7%), nickel (0%), silver (0%) and zinc (22%). The results of the native sample are considered to have a potentially low bias for these analytes.

Total Mercury
The WG1180588-3/-4 MS/MSD recovery, performed on L1844003-16, is outside the acceptance criteria for mercury (78%/78%); however, the associated LCS recovery is within overall method allowances. No further action was required.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 11/28/18

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-01
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 10:23
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.04	0.445	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	61		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-02
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 10:54
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.25	0.490	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	62		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-03
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 11:24
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.22	0.484	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	60		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-04
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 11:55
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.00	0.436	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	62		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-05
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 12:25
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.08	0.454	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	58		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-06
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 12:56
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.17	0.474	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	42		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-07
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 13:26
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.06	0.450	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	37		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-08
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 13:57
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.25	0.490	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	54		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-09
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 14:27
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.13	0.464	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	52		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-10
Client ID: COMPOSITE 5 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 14:58
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	1.98	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	74		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-11
Client ID: COMPOSITE 5 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 15:28
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	1.96	0.428	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-12
Client ID: COMPOSITE 5 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 15:58
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.04	0.445	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	64		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-13
Client ID: COMPOSITE 4 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 16:29
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	1.98	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	64		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-14
Client ID: COMPOSITE 4 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 16:59
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.00	0.436	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-15
Client ID: COMPOSITE 4 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 17:29
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.00	0.436	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-16
Client ID: COMPOSITE 3 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 17:59
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	2.00	0.436	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-17
Client ID: COMPOSITE 3 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 19:30
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	1.94	0.423	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	73		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-18
Client ID: COMPOSITE 3 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270D
Analytical Date: 11/10/18 20:00
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM Semivolatile Organics by GC/MS - Mansfield Lab						
Pentachlorophenol	ND		ug/l	1.96	0.428	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	57		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270D
Analytical Date: 11/09/18 16:02
Analyst: PS

Extraction Method: EPA 3510C
Extraction Date: 11/02/18 05:00

Parameter	Result	Qualifier	Units	RL	MDL
RIM Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-18 Batch: WG1175119-1					
Pentachlorophenol	ND		ug/l	2.00	0.436

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	82		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-18 Batch: WG1175119-2 WG1175119-3								
Pentachlorophenol	75		50		50-120	**40**	Q	30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2,4,6-Tribromophenol	94		92		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1175119-4 WG1175119-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												
Pentachlorophenol	ND	10	8.30	83		9.05	90		50-120	9		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2,4,6-Tribromophenol	102		102		30-150

PCBS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-01
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 15:07
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00111	0.00056	1
Cl3-BZ#18	ND		ug/l	0.00111	0.00056	1
Cl3-BZ#28	ND		ug/l	0.00111	0.00056	1
Cl4-BZ#44	ND		ug/l	0.00111	0.00056	1
Cl4-BZ#49	ND		ug/l	0.00111	0.00056	1
Cl4-BZ#52	ND		ug/l	0.00111	0.00056	1
Cl4-BZ#66	ND		ug/l	0.00111	0.00056	1
Cl5-BZ#87	ND		ug/l	0.00111	0.00056	1
Cl5-BZ#101	ND		ug/l	0.00111	0.00056	1
Cl5-BZ#105	ND		ug/l	0.00111	0.00056	1
Cl5-BZ#118	ND		ug/l	0.00111	0.00056	1
Cl6-BZ#128	ND		ug/l	0.00111	0.00056	1
Cl6-BZ#138	ND		ug/l	0.00111	0.00056	1
Cl6-BZ#153	ND		ug/l	0.00111	0.00056	1
Cl7-BZ#170	ND		ug/l	0.00111	0.00056	1
Cl7-BZ#180	ND		ug/l	0.00111	0.00056	1
Cl7-BZ#183	ND		ug/l	0.00111	0.00056	1
Cl7-BZ#184	ND		ug/l	0.00111	0.00056	1
Cl7-BZ#187	ND		ug/l	0.00111	0.00056	1
Cl8-BZ#195	ND		ug/l	0.00111	0.00056	1
Cl9-BZ#206	ND		ug/l	0.00111	0.00056	1
Cl10-BZ#209	ND		ug/l	0.00111	0.00056	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	65		30-150
BZ 198	87		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-02
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 15:40
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00102	0.00051	1
Cl3-BZ#18	ND		ug/l	0.00102	0.00051	1
Cl3-BZ#28	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#44	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#49	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#52	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#66	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#87	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#101	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#105	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#118	ND		ug/l	0.00102	0.00051	1
Cl6-BZ#128	ND		ug/l	0.00102	0.00051	1
Cl6-BZ#138	ND		ug/l	0.00102	0.00051	1
Cl6-BZ#153	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#170	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#180	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#183	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#184	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#187	ND		ug/l	0.00102	0.00051	1
Cl8-BZ#195	ND		ug/l	0.00102	0.00051	1
Cl9-BZ#206	ND		ug/l	0.00102	0.00051	1
Cl10-BZ#209	ND		ug/l	0.00102	0.00051	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	70		30-150
BZ 198	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-03
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 16:14
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00110	0.00055	1
Cl3-BZ#18	ND		ug/l	0.00110	0.00055	1
Cl3-BZ#28	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#44	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#49	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#52	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#66	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#87	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#101	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#105	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#118	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#128	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#138	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#153	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#170	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#180	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#183	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#184	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#187	ND		ug/l	0.00110	0.00055	1
Cl8-BZ#195	ND		ug/l	0.00110	0.00055	1
Cl9-BZ#206	ND		ug/l	0.00110	0.00055	1
Cl10-BZ#209	ND		ug/l	0.00110	0.00055	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	46		30-150
BZ 198	59		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-04
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 16:48
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00105	0.00053	1
Cl3-BZ#18	ND		ug/l	0.00105	0.00053	1
Cl3-BZ#28	ND		ug/l	0.00105	0.00053	1
Cl4-BZ#44	ND		ug/l	0.00105	0.00053	1
Cl4-BZ#49	ND		ug/l	0.00105	0.00053	1
Cl4-BZ#52	ND		ug/l	0.00105	0.00053	1
Cl4-BZ#66	ND		ug/l	0.00105	0.00053	1
Cl5-BZ#87	ND		ug/l	0.00105	0.00053	1
Cl5-BZ#101	ND		ug/l	0.00105	0.00053	1
Cl5-BZ#105	ND		ug/l	0.00105	0.00053	1
Cl5-BZ#118	ND		ug/l	0.00105	0.00053	1
Cl6-BZ#128	ND		ug/l	0.00105	0.00053	1
Cl6-BZ#138	ND		ug/l	0.00105	0.00053	1
Cl6-BZ#153	ND		ug/l	0.00105	0.00053	1
Cl7-BZ#170	ND		ug/l	0.00105	0.00053	1
Cl7-BZ#180	ND		ug/l	0.00105	0.00053	1
Cl7-BZ#183	ND		ug/l	0.00105	0.00053	1
Cl7-BZ#184	ND		ug/l	0.00105	0.00053	1
Cl7-BZ#187	ND		ug/l	0.00105	0.00053	1
Cl8-BZ#195	ND		ug/l	0.00105	0.00053	1
Cl9-BZ#206	ND		ug/l	0.00105	0.00053	1
Cl10-BZ#209	ND		ug/l	0.00105	0.00053	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	65		30-150
BZ 198	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-05
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 17:21
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00110	0.00055	1
Cl3-BZ#18	ND		ug/l	0.00110	0.00055	1
Cl3-BZ#28	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#44	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#49	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#52	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#66	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#87	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#101	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#105	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#118	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#128	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#138	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#153	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#170	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#180	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#183	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#184	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#187	ND		ug/l	0.00110	0.00055	1
Cl8-BZ#195	ND		ug/l	0.00110	0.00055	1
Cl9-BZ#206	ND		ug/l	0.00110	0.00055	1
Cl10-BZ#209	ND		ug/l	0.00110	0.00055	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	70		30-150
BZ 198	89		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-06
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 17:55
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00108	0.00054	1
Cl3-BZ#18	ND		ug/l	0.00108	0.00054	1
Cl3-BZ#28	ND		ug/l	0.00108	0.00054	1
Cl4-BZ#44	ND		ug/l	0.00108	0.00054	1
Cl4-BZ#49	ND		ug/l	0.00108	0.00054	1
Cl4-BZ#52	ND		ug/l	0.00108	0.00054	1
Cl4-BZ#66	ND		ug/l	0.00108	0.00054	1
Cl5-BZ#87	ND		ug/l	0.00108	0.00054	1
Cl5-BZ#101	ND		ug/l	0.00108	0.00054	1
Cl5-BZ#105	ND		ug/l	0.00108	0.00054	1
Cl5-BZ#118	ND		ug/l	0.00108	0.00054	1
Cl6-BZ#128	ND		ug/l	0.00108	0.00054	1
Cl6-BZ#138	ND		ug/l	0.00108	0.00054	1
Cl6-BZ#153	ND		ug/l	0.00108	0.00054	1
Cl7-BZ#170	ND		ug/l	0.00108	0.00054	1
Cl7-BZ#180	ND		ug/l	0.00108	0.00054	1
Cl7-BZ#183	ND		ug/l	0.00108	0.00054	1
Cl7-BZ#184	ND		ug/l	0.00108	0.00054	1
Cl7-BZ#187	ND		ug/l	0.00108	0.00054	1
Cl8-BZ#195	ND		ug/l	0.00108	0.00054	1
Cl9-BZ#206	ND		ug/l	0.00108	0.00054	1
Cl10-BZ#209	ND		ug/l	0.00108	0.00054	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	67		30-150
BZ 198	87		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-07
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 18:29
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00102	0.00051	1
Cl3-BZ#18	ND		ug/l	0.00102	0.00051	1
Cl3-BZ#28	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#44	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#49	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#52	ND		ug/l	0.00102	0.00051	1
Cl4-BZ#66	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#87	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#101	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#105	ND		ug/l	0.00102	0.00051	1
Cl5-BZ#118	ND		ug/l	0.00102	0.00051	1
Cl6-BZ#128	ND		ug/l	0.00102	0.00051	1
Cl6-BZ#138	ND		ug/l	0.00102	0.00051	1
Cl6-BZ#153	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#170	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#180	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#183	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#184	ND		ug/l	0.00102	0.00051	1
Cl7-BZ#187	ND		ug/l	0.00102	0.00051	1
Cl8-BZ#195	ND		ug/l	0.00102	0.00051	1
Cl9-BZ#206	ND		ug/l	0.00102	0.00051	1
Cl10-BZ#209	ND		ug/l	0.00102	0.00051	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	64		30-150
BZ 198	87		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-08
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 19:03
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00110	0.00055	1
Cl3-BZ#18	ND		ug/l	0.00110	0.00055	1
Cl3-BZ#28	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#44	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#49	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#52	ND		ug/l	0.00110	0.00055	1
Cl4-BZ#66	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#87	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#101	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#105	ND		ug/l	0.00110	0.00055	1
Cl5-BZ#118	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#128	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#138	ND		ug/l	0.00110	0.00055	1
Cl6-BZ#153	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#170	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#180	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#183	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#184	ND		ug/l	0.00110	0.00055	1
Cl7-BZ#187	ND		ug/l	0.00110	0.00055	1
Cl8-BZ#195	ND		ug/l	0.00110	0.00055	1
Cl9-BZ#206	ND		ug/l	0.00110	0.00055	1
Cl10-BZ#209	ND		ug/l	0.00110	0.00055	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	63		30-150
BZ 198	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-09
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 19:37
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00103	0.00052	1
Cl3-BZ#18	ND		ug/l	0.00103	0.00052	1
Cl3-BZ#28	ND		ug/l	0.00103	0.00052	1
Cl4-BZ#44	ND		ug/l	0.00103	0.00052	1
Cl4-BZ#49	ND		ug/l	0.00103	0.00052	1
Cl4-BZ#52	ND		ug/l	0.00103	0.00052	1
Cl4-BZ#66	ND		ug/l	0.00103	0.00052	1
Cl5-BZ#87	ND		ug/l	0.00103	0.00052	1
Cl5-BZ#101	ND		ug/l	0.00103	0.00052	1
Cl5-BZ#105	ND		ug/l	0.00103	0.00052	1
Cl5-BZ#118	ND		ug/l	0.00103	0.00052	1
Cl6-BZ#128	ND		ug/l	0.00103	0.00052	1
Cl6-BZ#138	ND		ug/l	0.00103	0.00052	1
Cl6-BZ#153	ND		ug/l	0.00103	0.00052	1
Cl7-BZ#170	ND		ug/l	0.00103	0.00052	1
Cl7-BZ#180	ND		ug/l	0.00103	0.00052	1
Cl7-BZ#183	ND		ug/l	0.00103	0.00052	1
Cl7-BZ#184	ND		ug/l	0.00103	0.00052	1
Cl7-BZ#187	ND		ug/l	0.00103	0.00052	1
Cl8-BZ#195	ND		ug/l	0.00103	0.00052	1
Cl9-BZ#206	ND		ug/l	0.00103	0.00052	1
Cl10-BZ#209	ND		ug/l	0.00103	0.00052	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	69		30-150
BZ 198	90		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-10
Client ID: COMPOSITE 5 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 20:10
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00099	0.00050	1
Cl3-BZ#18	ND		ug/l	0.00099	0.00050	1
Cl3-BZ#28	ND		ug/l	0.00099	0.00050	1
Cl4-BZ#44	ND		ug/l	0.00099	0.00050	1
Cl4-BZ#49	ND		ug/l	0.00099	0.00050	1
Cl4-BZ#52	0.00088	J	ug/l	0.00099	0.00050	1
Cl4-BZ#66	ND		ug/l	0.00099	0.00050	1
Cl5-BZ#87	ND		ug/l	0.00099	0.00050	1
Cl5-BZ#101	0.00060	J	ug/l	0.00099	0.00050	1
Cl5-BZ#105	ND		ug/l	0.00099	0.00050	1
Cl5-BZ#118	0.00079	J	ug/l	0.00099	0.00050	1
Cl6-BZ#128	ND		ug/l	0.00099	0.00050	1
Cl6-BZ#138	0.00085	J	ug/l	0.00099	0.00050	1
Cl6-BZ#153	0.00087	J	ug/l	0.00099	0.00050	1
Cl7-BZ#170	ND		ug/l	0.00099	0.00050	1
Cl7-BZ#180	0.00063	J	ug/l	0.00099	0.00050	1
Cl7-BZ#183	ND		ug/l	0.00099	0.00050	1
Cl7-BZ#184	ND		ug/l	0.00099	0.00050	1
Cl7-BZ#187	ND		ug/l	0.00099	0.00050	1
Cl8-BZ#195	ND		ug/l	0.00099	0.00050	1
Cl9-BZ#206	ND		ug/l	0.00099	0.00050	1
Cl10-BZ#209	ND		ug/l	0.00099	0.00050	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	68		30-150
BZ 198	73		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-11
Client ID: COMPOSITE 5 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 20:44
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00098	0.00049	1
Cl3-BZ#18	ND		ug/l	0.00098	0.00049	1
Cl3-BZ#28	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#44	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#49	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#52	0.00063	J	ug/l	0.00098	0.00049	1
Cl4-BZ#66	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#87	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#101	0.00057	J	ug/l	0.00098	0.00049	1
Cl5-BZ#105	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#118	0.00060	J	ug/l	0.00098	0.00049	1
Cl6-BZ#128	ND		ug/l	0.00098	0.00049	1
Cl6-BZ#138	0.00062	J	ug/l	0.00098	0.00049	1
Cl6-BZ#153	0.00058	J	ug/l	0.00098	0.00049	1
Cl7-BZ#170	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#180	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#183	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#184	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#187	ND		ug/l	0.00098	0.00049	1
Cl8-BZ#195	ND		ug/l	0.00098	0.00049	1
Cl9-BZ#206	ND		ug/l	0.00098	0.00049	1
Cl10-BZ#209	ND		ug/l	0.00098	0.00049	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	75		30-150
BZ 198	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-12
Client ID: COMPOSITE 5 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 21:18
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00100	0.00050	1
Cl3-BZ#18	ND		ug/l	0.00100	0.00050	1
Cl3-BZ#28	ND		ug/l	0.00100	0.00050	1
Cl4-BZ#44	ND		ug/l	0.00100	0.00050	1
Cl4-BZ#49	ND		ug/l	0.00100	0.00050	1
Cl4-BZ#52	0.00087	J	ug/l	0.00100	0.00050	1
Cl4-BZ#66	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#87	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#101	0.00051	J	ug/l	0.00100	0.00050	1
Cl5-BZ#105	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#118	ND		ug/l	0.00100	0.00050	1
Cl6-BZ#128	ND		ug/l	0.00100	0.00050	1
Cl6-BZ#138	0.00051	J	ug/l	0.00100	0.00050	1
Cl6-BZ#153	0.00052	J	ug/l	0.00100	0.00050	1
Cl7-BZ#170	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#180	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#183	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#184	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#187	ND		ug/l	0.00100	0.00050	1
Cl8-BZ#195	ND		ug/l	0.00100	0.00050	1
Cl9-BZ#206	ND		ug/l	0.00100	0.00050	1
Cl10-BZ#209	ND		ug/l	0.00100	0.00050	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	71		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-13
Client ID: COMPOSITE 4 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 21:52
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00100	0.00050	1
Cl3-BZ#18	0.00092	J	ug/l	0.00100	0.00050	1
Cl3-BZ#28	0.00098	J	ug/l	0.00100	0.00050	1
Cl4-BZ#44	0.00061	J	ug/l	0.00100	0.00050	1
Cl4-BZ#49	0.00114		ug/l	0.00100	0.00050	1
Cl4-BZ#52	0.00152		ug/l	0.00100	0.00050	1
Cl4-BZ#66	0.00068	J	ug/l	0.00100	0.00050	1
Cl5-BZ#87	0.00065	J	ug/l	0.00100	0.00050	1
Cl5-BZ#101	0.00166		ug/l	0.00100	0.00050	1
Cl5-BZ#105	0.00089	J	ug/l	0.00100	0.00050	1
Cl5-BZ#118	0.00160		ug/l	0.00100	0.00050	1
Cl6-BZ#128	ND		ug/l	0.00100	0.00050	1
Cl6-BZ#138	0.00204		ug/l	0.00100	0.00050	1
Cl6-BZ#153	0.00184		ug/l	0.00100	0.00050	1
Cl7-BZ#170	0.00063	J	ug/l	0.00100	0.00050	1
Cl7-BZ#180	0.00100		ug/l	0.00100	0.00050	1
Cl7-BZ#183	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#184	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#187	0.00050	J	ug/l	0.00100	0.00050	1
Cl8-BZ#195	ND		ug/l	0.00100	0.00050	1
Cl9-BZ#206	ND		ug/l	0.00100	0.00050	1
Cl10-BZ#209	ND		ug/l	0.00100	0.00050	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	72		30-150
BZ 198	71		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-14
Client ID: COMPOSITE 4 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 22:25
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00104	0.00052	1
Cl3-BZ#18	0.00176		ug/l	0.00104	0.00052	1
Cl3-BZ#28	0.00349		ug/l	0.00104	0.00052	1
Cl4-BZ#44	0.00492		ug/l	0.00104	0.00052	1
Cl4-BZ#49	0.00521		ug/l	0.00104	0.00052	1
Cl4-BZ#52	0.01300		ug/l	0.00104	0.00052	1
Cl4-BZ#66	0.00502		ug/l	0.00104	0.00052	1
Cl5-BZ#87	0.00303		ug/l	0.00104	0.00052	1
Cl5-BZ#101	0.01010		ug/l	0.00104	0.00052	1
Cl5-BZ#105	ND		ug/l	0.00104	0.00052	1
Cl5-BZ#118	0.00913		ug/l	0.00104	0.00052	1
Cl6-BZ#128	ND		ug/l	0.00104	0.00052	1
Cl6-BZ#138	0.01100		ug/l	0.00104	0.00052	1
Cl6-BZ#153	0.01130		ug/l	0.00104	0.00052	1
Cl7-BZ#170	0.00391		ug/l	0.00104	0.00052	1
Cl7-BZ#180	0.00739		ug/l	0.00104	0.00052	1
Cl7-BZ#183	0.00199		ug/l	0.00104	0.00052	1
Cl7-BZ#184	ND		ug/l	0.00104	0.00052	1
Cl7-BZ#187	0.00458		ug/l	0.00104	0.00052	1
Cl8-BZ#195	0.00101	J	ug/l	0.00104	0.00052	1
Cl9-BZ#206	0.00163		ug/l	0.00104	0.00052	1
Cl10-BZ#209	0.00057	J	ug/l	0.00104	0.00052	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	87		30-150
BZ 198	88		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-15
Client ID: COMPOSITE 4 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 22:59
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00227	0.00114	1
Cl3-BZ#18	ND		ug/l	0.00227	0.00114	1
Cl3-BZ#28	ND		ug/l	0.00227	0.00114	1
Cl4-BZ#44	ND		ug/l	0.00227	0.00114	1
Cl4-BZ#49	ND		ug/l	0.00227	0.00114	1
Cl4-BZ#52	0.00129	J	ug/l	0.00227	0.00114	1
Cl4-BZ#66	ND		ug/l	0.00227	0.00114	1
Cl5-BZ#87	ND		ug/l	0.00227	0.00114	1
Cl5-BZ#101	0.00145	J	ug/l	0.00227	0.00114	1
Cl5-BZ#105	ND		ug/l	0.00227	0.00114	1
Cl5-BZ#118	ND		ug/l	0.00227	0.00114	1
Cl6-BZ#128	ND		ug/l	0.00227	0.00114	1
Cl6-BZ#138	ND		ug/l	0.00227	0.00114	1
Cl6-BZ#153	ND		ug/l	0.00227	0.00114	1
Cl7-BZ#170	ND		ug/l	0.00227	0.00114	1
Cl7-BZ#180	ND		ug/l	0.00227	0.00114	1
Cl7-BZ#183	ND		ug/l	0.00227	0.00114	1
Cl7-BZ#184	ND		ug/l	0.00227	0.00114	1
Cl7-BZ#187	ND		ug/l	0.00227	0.00114	1
Cl8-BZ#195	ND		ug/l	0.00227	0.00114	1
Cl9-BZ#206	ND		ug/l	0.00227	0.00114	1
Cl10-BZ#209	ND		ug/l	0.00227	0.00114	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	73		30-150
BZ 198	87		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-16
Client ID: COMPOSITE 3 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 23:33
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00100	0.00050	1
Cl3-BZ#18	ND		ug/l	0.00100	0.00050	1
Cl3-BZ#28	ND		ug/l	0.00100	0.00050	1
Cl4-BZ#44	ND		ug/l	0.00100	0.00050	1
Cl4-BZ#49	ND		ug/l	0.00100	0.00050	1
Cl4-BZ#52	0.00073	J	ug/l	0.00100	0.00050	1
Cl4-BZ#66	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#87	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#101	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#105	ND		ug/l	0.00100	0.00050	1
Cl5-BZ#118	ND		ug/l	0.00100	0.00050	1
Cl6-BZ#128	ND		ug/l	0.00100	0.00050	1
Cl6-BZ#138	ND		ug/l	0.00100	0.00050	1
Cl6-BZ#153	0.00050	J	ug/l	0.00100	0.00050	1
Cl7-BZ#170	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#180	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#183	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#184	ND		ug/l	0.00100	0.00050	1
Cl7-BZ#187	ND		ug/l	0.00100	0.00050	1
Cl8-BZ#195	ND		ug/l	0.00100	0.00050	1
Cl9-BZ#206	ND		ug/l	0.00100	0.00050	1
Cl10-BZ#209	ND		ug/l	0.00100	0.00050	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	73		30-150
BZ 198	69		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-17
Client ID: COMPOSITE 3 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/27/18 01:15
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00098	0.00049	1
Cl3-BZ#18	ND		ug/l	0.00098	0.00049	1
Cl3-BZ#28	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#44	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#49	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#52	ND		ug/l	0.00098	0.00049	1
Cl4-BZ#66	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#87	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#101	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#105	ND		ug/l	0.00098	0.00049	1
Cl5-BZ#118	ND		ug/l	0.00098	0.00049	1
Cl6-BZ#128	ND		ug/l	0.00098	0.00049	1
Cl6-BZ#138	ND		ug/l	0.00098	0.00049	1
Cl6-BZ#153	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#170	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#180	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#183	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#184	ND		ug/l	0.00098	0.00049	1
Cl7-BZ#187	ND		ug/l	0.00098	0.00049	1
Cl8-BZ#195	ND		ug/l	0.00098	0.00049	1
Cl9-BZ#206	ND		ug/l	0.00098	0.00049	1
Cl10-BZ#209	ND		ug/l	0.00098	0.00049	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	78		30-150
BZ 198	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-18
Client ID: COMPOSITE 3 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/27/18 01:49
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
PCB Congeners (RIM List) - Mansfield Lab						
Cl2-BZ#8	ND		ug/l	0.00103	0.00052	1
Cl3-BZ#18	0.00134		ug/l	0.00103	0.00052	1
Cl3-BZ#28	0.00092	J	ug/l	0.00103	0.00052	1
Cl4-BZ#44	ND		ug/l	0.00103	0.00052	1
Cl4-BZ#49	0.00227		ug/l	0.00103	0.00052	1
Cl4-BZ#52	0.00546		ug/l	0.00103	0.00052	1
Cl4-BZ#66	0.00175		ug/l	0.00103	0.00052	1
Cl5-BZ#87	0.00103		ug/l	0.00103	0.00052	1
Cl5-BZ#101	0.00335		ug/l	0.00103	0.00052	1
Cl5-BZ#105	ND		ug/l	0.00103	0.00052	1
Cl5-BZ#118	0.00272		ug/l	0.00103	0.00052	1
Cl6-BZ#128	ND		ug/l	0.00103	0.00052	1
Cl6-BZ#138	0.00357		ug/l	0.00103	0.00052	1
Cl6-BZ#153	0.00328		ug/l	0.00103	0.00052	1
Cl7-BZ#170	0.00072	J	ug/l	0.00103	0.00052	1
Cl7-BZ#180	0.00216		ug/l	0.00103	0.00052	1
Cl7-BZ#183	0.00056	J	ug/l	0.00103	0.00052	1
Cl7-BZ#184	ND		ug/l	0.00103	0.00052	1
Cl7-BZ#187	0.00148		ug/l	0.00103	0.00052	1
Cl8-BZ#195	ND		ug/l	0.00103	0.00052	1
Cl9-BZ#206	0.00065	J	ug/l	0.00103	0.00052	1
Cl10-BZ#209	ND		ug/l	0.00103	0.00052	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	75		30-150
BZ 198	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/26/18 12:29
Analyst: GP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:16

Parameter	Result	Qualifier	Units	RL	MDL
PCB Congeners (RIM List) - Mansfield Lab for sample(s): 01-18 Batch: WG1182112-1					
Cl2-BZ#8	ND		ug/l	0.00100	0.00050
Cl3-BZ#18	ND		ug/l	0.00100	0.00050
Cl3-BZ#28	ND		ug/l	0.00100	0.00050
Cl4-BZ#44	ND		ug/l	0.00100	0.00050
Cl4-BZ#49	ND		ug/l	0.00100	0.00050
Cl4-BZ#52	ND		ug/l	0.00100	0.00050
Cl4-BZ#66	ND		ug/l	0.00100	0.00050
Cl5-BZ#87	ND		ug/l	0.00100	0.00050
Cl5-BZ#101	ND		ug/l	0.00100	0.00050
Cl5-BZ#105	ND		ug/l	0.00100	0.00050
Cl5-BZ#118	ND		ug/l	0.00100	0.00050
Cl6-BZ#128	ND		ug/l	0.00100	0.00050
Cl6-BZ#138	ND		ug/l	0.00100	0.00050
Cl6-BZ#153	ND		ug/l	0.00100	0.00050
Cl7-BZ#170	ND		ug/l	0.00100	0.00050
Cl7-BZ#180	ND		ug/l	0.00100	0.00050
Cl7-BZ#183	ND		ug/l	0.00100	0.00050
Cl7-BZ#184	ND		ug/l	0.00100	0.00050
Cl7-BZ#187	ND		ug/l	0.00100	0.00050
Cl8-BZ#195	ND		ug/l	0.00100	0.00050
Cl9-BZ#206	ND		ug/l	0.00100	0.00050
Cl10-BZ#209	ND		ug/l	0.00100	0.00050

Surrogate	%Recovery	Qualifier	Acceptance Criteria
DBOB	65		30-150
BZ 198	78		30-150

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 Batch: WG1182112-2 WG1182112-3								
Cl2-BZ#8	55		57		50-120	4		30
Cl3-BZ#18	58		58		50-120	0		30
Cl3-BZ#28	69		71		50-120	3		30
Cl4-BZ#44	80		84		50-120	5		30
Cl4-BZ#49	67		72		50-120	7		30
Cl4-BZ#52	71		72		50-120	1		30
Cl4-BZ#66	83		86		50-120	4		30
Cl5-BZ#87	83		87		50-120	5		30
Cl5-BZ#101	80		82		50-120	2		30
Cl5-BZ#105	88		90		50-120	2		30
Cl5-BZ#118	88		88		50-120	0		30
Cl6-BZ#128	79		81		50-120	3		30
Cl6-BZ#138	80		82		50-120	2		30
Cl6-BZ#153	82		84		50-120	2		30
Cl7-BZ#170	76		78		50-120	3		30
Cl7-BZ#180	73		75		50-120	3		30
Cl7-BZ#183	72		74		50-120	3		30
Cl7-BZ#184	74		76		50-120	3		30
Cl7-BZ#187	74		76		50-120	3		30
Cl8-BZ#195	77		81		50-120	5		30
Cl9-BZ#206	74		74		50-120	0		30
Cl10-BZ#209	69		70		50-120	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 Batch: WG1182112-2 WG1182112-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
DBOB	63		66		30-150
BZ 198	81		80		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1182112-4 WG1182112-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												
Cl2-BZ#8	ND	0.102	0.067	66		0.063	65		50-120	6		30
Cl3-BZ#18	ND	0.102	0.059	58		0.066	67		50-120	11		30
Cl3-BZ#28	ND	0.102	0.070	69		0.077	79		50-120	10		30
Cl4-BZ#44	ND	0.102	0.078	76		0.084	86		50-120	8		30
Cl4-BZ#49	ND	0.102	0.067	66		0.077	78		50-120	13		30
Cl4-BZ#52	0.001J	0.102	0.071	69		0.085	86		50-120	18		30
Cl4-BZ#66	ND	0.102	0.077	75		0.078	79		50-120	1		30
Cl5-BZ#87	ND	0.102	0.076	75		0.081	82		50-120	6		30
Cl5-BZ#101	ND	0.102	0.074	72		0.079	80		50-120	7		30
Cl5-BZ#105	ND	0.102	0.078	77		0.081	82		50-120	3		30
Cl5-BZ#118	ND	0.102	0.076	74		0.077	79		50-120	2		30
Cl6-BZ#128	ND	0.102	0.074	73		0.073	75		50-120	2		30
Cl6-BZ#138	ND	0.102	0.073	71		0.076	78		50-120	5		30
Cl6-BZ#153	0.001J	0.102	0.073	72		0.075	77		50-120	2		30
Cl7-BZ#170	ND	0.102	0.075	73		0.077	78		50-120	2		30
Cl7-BZ#180	ND	0.102	0.065	64		0.065	67		50-120	0		30
Cl7-BZ#183	ND	0.102	0.067	66		0.068	69		50-120	0		30
Cl7-BZ#184	ND	0.102	0.068	67		0.068	70		50-120	0		30
Cl7-BZ#187	ND	0.102	0.069	67		0.070	71		50-120	1		30
Cl8-BZ#195	ND	0.102	0.078	77		0.077	79		50-120	1		30
Cl9-BZ#206	ND	0.102	0.071	69		0.070	72		50-120	0		30
Cl10-BZ#209	ND	0.102	0.066	65		0.064	65		50-120	4		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
PCB Congeners (RIM List) - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1182112-4 WG1182112-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
BZ 198	66		78		30-150
DBOB	64		75		30-150

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Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-01
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 18:51
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0011	0.0011	1	A
Chloropyrifos	ND		ug/l	0.0011	0.0011	1	A
Heptachlor epoxide	ND		ug/l	0.0011	0.0011	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0277	0.0138	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	60		30-150	A
BZ 198	71		30-150	A
DBOB	52		30-150	B
BZ 198	77		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-02
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 19:25
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0255	0.0127	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	78		30-150	A
DBOB	60		30-150	B
BZ 198	84		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-03
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 19:59
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0274	0.0137	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	51		30-150	A
BZ 198	51		30-150	A
DBOB	44		30-150	B
BZ 198	55		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-04
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 20:34
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0263	0.0131	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	83		30-150	A
DBOB	59		30-150	B
BZ 198	90		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-05
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 21:08
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0274	0.0137	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	A
BZ 198	78		30-150	A
DBOB	61		30-150	B
BZ 198	84		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-06
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 21:42
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0268	0.0134	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	A
BZ 198	75		30-150	A
DBOB	59		30-150	B
BZ 198	82		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-07
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 22:16
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0255	0.0127	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	78		30-150	A
DBOB	59		30-150	B
BZ 198	87		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-08
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 22:50
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0274	0.0137	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	A
BZ 198	73		30-150	A
DBOB	53		30-150	B
BZ 198	79		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-09
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 23:24
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	74		30-150	A
BZ 198	79		30-150	A
DBOB	65		30-150	B
BZ 198	87		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-10
Client ID: COMPOSITE 5 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/26/18 23:58
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Dieldrin	ND		ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	ND		ug/l	0.0004	0.0004	1	A
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0247	0.0123	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	69		30-150	A
BZ 198	63		30-150	A
DBOB	72		30-150	B
BZ 198	150		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-11
Client ID: COMPOSITE 5 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 00:32
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Dieldrin	ND		ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	ND		ug/l	0.0004	0.0004	1	A
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0245	0.0122	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	A
BZ 198	70		30-150	A
DBOB	87		30-150	B
BZ 198	**184**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-12
Client ID: COMPOSITE 5 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 01:06
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0016		ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0025		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0025		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	59		30-150	A
DBOB	93		30-150	B
BZ 198	148		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-13
Client ID: COMPOSITE 4 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 01:40
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0016		ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0045	P	ug/l	0.0005	0.0005	1	B
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0029		ug/l	0.0005	0.0005	1	B
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	A
BZ 198	62		30-150	A
DBOB	77		30-150	B
BZ 198	**291**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-14
Client ID: COMPOSITE 4 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 02:14
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	0.0046		ug/l	0.0005	0.0005	1	B
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0068	P	ug/l	0.0005	0.0005	1	B
Dieldrin	0.0020	IP	ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0049	P	ug/l	0.0005	0.0005	1	A
4,4'-DDT	0.0016	IP	ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0260	0.0130	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	78		30-150	A
BZ 198	64		30-150	A
DBOB	76		30-150	B
BZ 198	**360**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-15
Client ID: COMPOSITE 4 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 02:48
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0011	0.0011	1	A
Heptachlor	ND		ug/l	0.0011	0.0011	1	A
Aldrin	ND		ug/l	0.0022	0.0022	1	A
Chloropyrifos	ND		ug/l	0.0022	0.0022	1	A
Heptachlor epoxide	ND		ug/l	0.0022	0.0022	1	B
trans-Chlordane	ND		ug/l	0.0011	0.0011	1	A
Endosulfan I	0.0018	P	ug/l	0.0011	0.0011	1	A
cis-Chlordane	ND		ug/l	0.0011	0.0011	1	B
Dieldrin	ND		ug/l	0.0011	0.0011	1	A
Endrin	ND		ug/l	0.0011	0.0011	1	A
Endosulfan II	ND		ug/l	0.0011	0.0011	1	A
4,4'-DDT	ND		ug/l	0.0011	0.0011	1	A
Toxaphene	ND		ug/l	0.0568	0.0284	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	A
BZ 198	77		30-150	A
DBOB	62		30-150	B
BZ 198	82		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-16
Client ID: COMPOSITE 3 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 03:22
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Dieldrin	ND		ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	0.0028		ug/l	0.0005	0.0005	1	B
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0250	0.0125	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	A
BZ 198	51		30-150	A
DBOB	76		30-150	B
BZ 198	**271**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-17
Client ID: COMPOSITE 3 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 18:49
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0004	0.0004	1	A
Heptachlor	ND		ug/l	0.0004	0.0004	1	A
Aldrin	ND		ug/l	0.0009	0.0009	1	A
Chloropyrifos	ND		ug/l	0.0009	0.0009	1	A
Heptachlor epoxide	ND		ug/l	0.0009	0.0009	1	B
trans-Chlordane	ND		ug/l	0.0004	0.0004	1	A
Endosulfan I	ND		ug/l	0.0004	0.0004	1	A
cis-Chlordane	0.0059	P	ug/l	0.0004	0.0004	1	B
Dieldrin	ND		ug/l	0.0004	0.0004	1	A
Endrin	ND		ug/l	0.0004	0.0004	1	A
Endosulfan II	0.0041	P	ug/l	0.0004	0.0004	1	B
4,4'-DDT	ND		ug/l	0.0004	0.0004	1	A
Toxaphene	ND		ug/l	0.0245	0.0122	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	64		30-150	A
BZ 198	55		30-150	A
DBOB	73		30-150	B
BZ 198	**303**	Q	30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-18
Client ID: COMPOSITE 3 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8081B
Analytical Date: 11/27/18 19:23
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:21

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
gamma-BHC	ND		ug/l	0.0005	0.0005	1	A
Heptachlor	ND		ug/l	0.0005	0.0005	1	A
Aldrin	ND		ug/l	0.0010	0.0010	1	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	1	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	1	B
trans-Chlordane	ND		ug/l	0.0005	0.0005	1	A
Endosulfan I	ND		ug/l	0.0005	0.0005	1	A
cis-Chlordane	0.0060	P	ug/l	0.0005	0.0005	1	B
Dieldrin	0.0012	IP	ug/l	0.0005	0.0005	1	A
Endrin	ND		ug/l	0.0005	0.0005	1	A
Endosulfan II	ND		ug/l	0.0005	0.0005	1	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	1	A
Toxaphene	ND		ug/l	0.0257	0.0128	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	A
BZ 198	62		30-150	A
DBOB	65		30-150	B
BZ 198	116		30-150	B

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/26/18 17:09
Analyst: DP

Extraction Method: EPA 3510C
Extraction Date: 11/23/18 12:20

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-18 Batch: WG1182113-1						
gamma-BHC	ND		ug/l	0.0005	0.0005	A
Heptachlor	ND		ug/l	0.0005	0.0005	A
Aldrin	ND		ug/l	0.0010	0.0010	A
Chloropyrifos	ND		ug/l	0.0010	0.0010	A
trans-Chlordane	ND		ug/l	0.0005	0.0005	A
Endosulfan I	ND		ug/l	0.0005	0.0005	A
cis-Chlordane	ND		ug/l	0.0005	0.0005	A
Dieldrin	ND		ug/l	0.0005	0.0005	A
Endrin	ND		ug/l	0.0005	0.0005	A
Endosulfan II	ND		ug/l	0.0005	0.0005	A
4,4'-DDT	ND		ug/l	0.0005	0.0005	A
Toxaphene	ND		ug/l	0.0250	0.0125	A
Heptachlor epoxide	ND		ug/l	0.0010	0.0010	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	A
BZ 198	70		30-150	A
DBOB	60		30-150	B
BZ 198	74		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 Batch: WG1182113-2 WG1182113-3									
gamma-BHC	61		58		50-120	6		30	A
Heptachlor	**39**	Q	**37**	Q	50-120	3		30	A
Aldrin	**37**	Q	**34**	Q	50-120	9		30	A
Chloropyrifos	58		61		50-120	5		30	A
trans-Chlordane	80		75		50-120	6		30	A
Endosulfan I	85		78		50-120	9		30	A
cis-Chlordane	80		75		50-120	7		30	A
Dieldrin	99		90		50-120	9		30	A
Endrin	89		83		50-120	7		30	A
4,4'-DDT	88		82		50-120	8		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	65		63		30-150	A
BZ 198	83		72		30-150	A
DBOB	61		60		30-150	B
BZ 198	90		77		30-150	B

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 Batch: WG1182113-2 WG1182113-3									
Heptachlor epoxide	76		70		50-120	8		30	B
Endosulfan II	82		77		50-120	6		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	65		63		30-150	A
BZ 198	83		72		30-150	A
DBOB	61		60		30-150	B
BZ 198	90		77		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1182113-4 WG1182113-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1													
gamma-BHC	ND	0.102	0.0902	88		0.0835	85		50-120	8		30	A
Heptachlor	ND	0.102	0.0674	66		0.0643	66		50-120	5		30	A
Aldrin	ND	0.102	0.0575	56		0.0502	51		50-120	14		30	A
Chloropyrifos	ND	0.102	0.0986	97		0.0969	99		50-120	2		30	A
Heptachlor epoxide	ND	0.102	0.0826	81		0.0771	79		50-120	7		30	B
trans-Chlordane	ND	0.102	0.0861	84		0.0855	87		50-120	1		30	A
Endosulfan I	ND	0.102	0.0916	90		0.0863	88		50-120	6		30	A
cis-Chlordane	ND	0.102	0.0827	81		0.0767	78		50-120	8		30	A
Dieldrin	ND	0.102	0.1076	105		0.0976	100		50-120	10		30	A
Endrin	ND	0.102	0.0992	97		0.0915	93		50-120	8		30	A
Endosulfan II	0.0028	0.102	0.0923	88		0.0857	85		50-120	7		30	B
4,4'-DDT	ND	0.102	0.0856	84		0.0840	86		50-120	2		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	72		71		30-150	A
DBOB	77		82		30-150	A
BZ 198	**225**	Q	**231**	Q	30-150	B
DBOB	77		74		30-150	B

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-01 Date Collected: 10/26/18 09:20

Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP1 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00117		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:48	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM
Chromium, Total	0.00011	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM
Copper, Total	0.00060		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM
Lead, Total	0.00043		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:32	EPA 7474	1,7474	BV
Nickel, Total	0.00017	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:13	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM
Zinc, Total	0.00094	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 09:53	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-02 Date Collected: 10/26/18 09:20

Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP2 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00105		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:50	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM
Chromium, Total	0.00013	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM
Copper, Total	0.00035		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM
Lead, Total	0.00035		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:35	EPA 7474	1,7474	BV
Nickel, Total	0.00014	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM
Selenium, Total	0.00011	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:21	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM
Zinc, Total	0.00073	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 09:57	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-03 Date Collected: 10/26/18 09:20

Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP3 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00115		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:52	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM
Chromium, Total	0.00012	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM
Copper, Total	0.00075		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM
Lead, Total	0.00044		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:37	EPA 7474	1,7474	BV
Nickel, Total	0.00026	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:23	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM
Zinc, Total	0.00138	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 10:01	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-04 Date Collected: 10/26/18 11:40

Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP1 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00102		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:54	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM
Chromium, Total	0.00012	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM
Copper, Total	0.00093		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM
Lead, Total	0.00030		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:39	EPA 7474	1,7474	BV
Nickel, Total	0.00039	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:25	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM
Zinc, Total	0.00157	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 10:05	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-05 Date Collected: 10/26/18 11:40

Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP2 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00110		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:56	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM
Chromium, Total	0.00008	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM
Copper, Total	0.00102		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM
Lead, Total	0.00043		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:42	EPA 7474	1,7474	BV
Nickel, Total	0.00046		mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:27	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM
Zinc, Total	0.00227		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 10:09	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-06 Date Collected: 10/26/18 11:40

Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP3 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00115		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:58	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM
Chromium, Total	0.00009	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM
Copper, Total	0.00090		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM
Lead, Total	0.00028		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:50	EPA 7474	1,7474	BV
Nickel, Total	0.00026	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:29	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM
Zinc, Total	0.00135	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 10:14	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-07 Date Collected: 10/26/18 09:20

Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP1 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00112		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 09:00	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM
Chromium, Total	0.00011	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM
Copper, Total	0.00064		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM
Lead, Total	0.00030		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:53	EPA 7474	1,7474	BV
Nickel, Total	0.00019	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:31	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM
Zinc, Total	0.00140	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 10:18	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-08 Date Collected: 10/26/18 09:20

Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP2 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00108		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 09:02	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM
Chromium, Total	0.00010	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM
Copper, Total	0.00114		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM
Lead, Total	0.00064		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:55	EPA 7474	1,7474	BV
Nickel, Total	0.00026	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:33	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM
Zinc, Total	0.00300		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 10:55	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-09 Date Collected: 10/26/18 09:20

Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP3 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.00093	J	mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 09:24	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM
Chromium, Total	0.00008	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM
Copper, Total	0.00076		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM
Lead, Total	0.00011	J	mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:58	EPA 7474	1,7474	BV
Nickel, Total	0.00023	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM
Selenium, Total	0.00016	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:04	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM
Zinc, Total	0.00103	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 11:00	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-10 Date Collected: 10/26/18 15:25

Client ID: COMPOSITE 5 ELUTRIATE-REP1 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03230		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 09:26	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM
Chromium, Total	0.00020		mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM
Copper, Total	0.00024		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM
Lead, Total	0.00017	J	mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:00	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM
Selenium, Total	0.00020	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:06	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM
Zinc, Total	ND		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 11:04	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-11 Date Collected: 10/26/18 15:25

Client ID: COMPOSITE 5 ELUTRIATE-REP2 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03310		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 09:28	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM
Chromium, Total	0.00064		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM
Copper, Total	0.00030		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM
Lead, Total	0.00020		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:08	EPA 7474	1,7474	BV
Nickel, Total	0.00016	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM
Selenium, Total	0.00021	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:08	NA	86,1632A(M)	BV
Silver, Total	0.00003	J	mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM
Zinc, Total	ND		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:12	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-12 Date Collected: 10/26/18 15:25

Client ID: COMPOSITE 5 ELUTRIATE-REP3 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03523		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 09:30	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM
Chromium, Total	0.00022		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM
Copper, Total	0.00028		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM
Lead, Total	0.00022		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:10	EPA 7474	1,7474	BV
Nickel, Total	0.00018	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM
Selenium, Total	0.00019	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:10	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM
Zinc, Total	ND		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:16	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-13 Date Collected: 10/26/18 13:10

Client ID: COMPOSITE 4 ELUTRIATE-REP1 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.04418		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 09:32	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM
Chromium, Total	0.00065		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM
Copper, Total	0.00115		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM
Lead, Total	0.00097		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:13	EPA 7474	1,7474	BV
Nickel, Total	0.00025	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM
Selenium, Total	0.00021	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:12	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM
Zinc, Total	0.00184	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:20	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-14 Date Collected: 10/26/18 13:10

Client ID: COMPOSITE 4 ELUTRIATE-REP2 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.04159		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 11:06	NA	86,1632A(M)	BV
Cadmium, Total	0.00004		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM
Chromium, Total	0.00113		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM
Copper, Total	0.00195		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM
Lead, Total	0.00152		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:15	EPA 7474	1,7474	BV
Nickel, Total	0.00055		mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM
Selenium, Total	0.00022	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:19	NA	86,1632A(M)	BV
Silver, Total	0.00003	J	mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM
Zinc, Total	0.00380		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:24	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-15 Date Collected: 10/26/18 13:10

Client ID: COMPOSITE 4 ELUTRIATE-REP3 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.02832		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 11:08	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM
Chromium, Total	0.00030		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM
Copper, Total	0.00061		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM
Lead, Total	0.00050		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:18	EPA 7474	1,7474	BV
Nickel, Total	0.00051		mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM
Selenium, Total	0.00025	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:21	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM
Zinc, Total	0.00110	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:28	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-16 Date Collected: 10/26/18 16:15

Client ID: COMPOSITE 3 ELUTRIATE-REP1 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.03944		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 09:10	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM
Chromium, Total	0.00194		mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM
Copper, Total	ND		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM
Lead, Total	ND		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:17	EPA 7474	1,7474	BV
Nickel, Total	ND		mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM
Selenium, Total	0.00016	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:05	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM
Zinc, Total	0.00198	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 09:49	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-17 Date Collected: 10/26/18 16:15

Client ID: COMPOSITE 3 ELUTRIATE-REP2 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.02234		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 11:10	NA	86,1632A(M)	BV
Cadmium, Total	0.00001	J	mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM
Chromium, Total	0.00067		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM
Copper, Total	0.00079		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM
Lead, Total	0.00060		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:20	EPA 7474	1,7474	BV
Nickel, Total	0.00043		mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM
Selenium, Total	0.00019	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:23	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM
Zinc, Total	0.00113	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:32	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-18 Date Collected: 10/26/18 16:15

Client ID: COMPOSITE 3 ELUTRIATE-REP3 Date Received: 10/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	0.02627		mg/l	0.00500	0.00047	5	11/19/18 09:28	11/20/18 11:12	NA	86,1632A(M)	BV
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM
Chromium, Total	0.00067		mg/l	0.00010	0.00003	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM
Copper, Total	0.00060		mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM
Lead, Total	0.00042		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 10:23	EPA 7474	1,7474	BV
Nickel, Total	0.00035	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM
Selenium, Total	0.00018	J	mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 15:25	NA	86,1632A(M)	BV
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM
Zinc, Total	0.00076	J	mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 12:36	CHELATION	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1177006-1										
Cadmium, Total	ND		mg/l	0.00004	0.00001	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM
Chromium, Total	0.00017	J	mg/l	0.00020	0.00003	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM
Copper, Total	0.00017	J	mg/l	0.00020	0.00007	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM
Lead, Total	ND		mg/l	0.00020	0.00006	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM
Nickel, Total	0.00014	J	mg/l	0.00040	0.00011	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM
Silver, Total	ND		mg/l	0.00008	0.00003	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM
Zinc, Total	ND		mg/l	0.00200	0.00068	10	11/20/18 14:01	11/21/18 08:50	1,6020B	AM

Prep Information

Digestion Method: CHELATION

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1180588-1										
Mercury, Total	ND		mg/l	0.00005	0.00001	1	11/19/18 07:17	11/19/18 09:12	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1180838-1										
Selenium, Total	ND		mg/l	0.00056	0.00009	1	11/19/18 13:13	11/20/18 13:01	86,1632A(M)	BV

Prep Information

Digestion Method:

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1180844-1										
Arsenic, Total	ND		mg/l	0.00100	0.00009	1	11/19/18 09:28	11/20/18 08:44	86,1632A(M)	BV

Prep Information

Digestion Method:

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1177006-2								
Cadmium, Total	84		-		80-120	-		20
Chromium, Total	**1**	Q	-		80-120	-		20
Copper, Total	**79**	Q	-		80-120	-		20
Lead, Total	87		-		80-120	-		20
Nickel, Total	83		-		80-120	-		20
Silver, Total	**0**	Q	-		80-120	-		20
Zinc, Total	81		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1180588-2 SRM Lot Number: HPHGAF								
Mercury, Total	93		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1180838-2 SRM Lot Number: A2HGAF								
Selenium, Total	97		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1180844-2 SRM Lot Number: A2HGAF								
Arsenic, Total	99		-		80-120	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0
Lab Number: L1844003
Report Date: 11/28/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1177006-3 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												
Cadmium, Total	0.00001J	0.051	0.01246	**24**	Q	-	-		75-125	-		20
Chromium, Total	0.00194	0.2	0.0260	**12**	Q	-	-		75-125	-		20
Copper, Total	ND	0.25	ND	**0**	Q	-	-		75-125	-		20
Lead, Total	ND	0.51	0.0333	**7**	Q	-	-		75-125	-		20
Nickel, Total	ND	0.5	0.00014J	**0**	Q	-	-		75-125	-		20
Silver, Total	ND	0.05	0.00007J	**0**	Q	-	-		75-125	-		20
Zinc, Total	0.00198J	0.5	0.110	**22**	Q	-	-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180588-3 WG1180588-4 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												
Mercury, Total	ND	0.0025	0.00195	**78**	Q	0.00195	**78**	Q	80-120	0		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180838-3 WG1180838-4 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												
Selenium, Total	0.00016J	0.00556	0.00544	98		0.00575	104		75-125	6		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180844-3 WG1180844-4 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1												
Arsenic, Total	0.03944	0.01	0.04737	79		0.04843	90		75-125	2		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1177006-4 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1						
Cadmium, Total	0.00001J	ND	mg/l	NC		20
Chromium, Total	0.00194	0.00165	mg/l	16		20
Copper, Total	ND	ND	mg/l	NC		20
Lead, Total	ND	ND	mg/l	NC		20
Nickel, Total	ND	ND	mg/l	NC		20
Silver, Total	ND	ND	mg/l	NC		20
Zinc, Total	0.00198J	0.00161J	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180588-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1						
Mercury, Total	ND	ND	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180838-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1						
Selenium, Total	0.00016J	0.00013J	mg/l	NC		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1180844-5 QC Sample: L1844003-16 Client ID: COMPOSITE 3 ELUTRIATE-REP1						
Arsenic, Total	0.03944	0.04080	mg/l	3		20

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-01
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:26	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-02
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:26	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-03
Client ID: COMPOSITE 3 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:26	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-04
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:27	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-05
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:27	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-06
Client ID: COMPOSITE 5 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 11:40
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:27	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-07
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:28	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-08
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:29	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-09
Client ID: COMPOSITE 4 ELUTRIATE BLANK-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 09:20
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:29	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-10
Client ID: COMPOSITE 5 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:30	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-11
Client ID: COMPOSITE 5 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:33	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-12
Client ID: COMPOSITE 5 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 15:25
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:33	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-13
Client ID: COMPOSITE 4 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:33	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-14
Client ID: COMPOSITE 4 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:34	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-15
Client ID: COMPOSITE 4 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 13:10
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:34	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-16
Client ID: COMPOSITE 3 ELUTRIATE-REP1
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:34	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-17
Client ID: COMPOSITE 3 ELUTRIATE-REP2
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:35	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

SAMPLE RESULTS

Lab ID: L1844003-18
Client ID: COMPOSITE 3 ELUTRIATE-REP3
Sample Location: NEW HAVEN, CT

Date Collected: 10/26/18 16:15
Date Received: 10/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:35	121,3500CR-B	MA

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1844003

Project Number: 60588790 TASK 6.0 **Report Date:** 11/28/18

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01-18 Batch: WG1172938-1										
Chromium, Hexavalent	ND		mg/l	0.010	0.003	1	10/27/18 04:45	10/27/18 05:19	121,3500CR-B	MA

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-18 Batch: WG1172938-2								
Chromium, Hexavalent	100		-		85-115	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0
Lab Number: L1844003
Report Date: 11/28/18

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-18 QC Batch ID: WG1172938-4 QC Sample: L1844003-18 Client ID: COMPOSITE 3 ELUTRIATE-REP3												
Chromium, Hexavalent	ND	0.1	0.099	99		-	-		85-115	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 6.0

Lab Number: L1844003

Report Date: 11/28/18

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01-18 QC Batch ID: WG1172938-3 QC Sample: L1844003-18 Client ID: COMPOSITE 3 ELUTRIATE-REP3						
Chromium, Hexavalent	ND	ND	mg/l	NC		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A1	Absent
B1	Absent
C1	Absent
D1	Absent
E	Absent
E1	Absent
F	Absent
F1	Absent
G	Absent
G1	Absent
H1	Absent
I	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-01A	Plastic 950ml HNO3 preserved	E	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-01B	Plastic 950ml HNO3 preserved	E	<2	<2	2.7	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-01C	Plastic 950ml unpreserved	E	7	7	2.7	Y	Absent		HEXCR-3500(1)
L1844003-01D	Amber 1000ml unpreserved	E	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1844003-01E	Amber 1000ml unpreserved	E	7	7	2.7	Y	Absent		A2-RIM-8270(7)
L1844003-01F	Amber 1000ml unpreserved	E	7	7	2.7	Y	Absent		A2-RIM-PEST-ELUT(7)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-01G	Amber 1000ml unpreserved	E	7	7	2.7	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-02A	Plastic 950ml HNO3 preserved	F	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-02B	Plastic 950ml HNO3 preserved	F	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-02C	Plastic 950ml unpreserved	F	7	7	2.4	Y	Absent		HEXCR-3500(1)
L1844003-02D	Amber 1000ml unpreserved	F	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1844003-02E	Amber 1000ml unpreserved	F	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1844003-02F	Amber 1000ml unpreserved	F	7	7	2.4	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-02G	Amber 1000ml unpreserved	F	7	7	2.4	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-03A	Plastic 950ml HNO3 preserved	G	<2	<2	3.5	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-03B	Plastic 950ml HNO3 preserved	G	<2	<2	3.5	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-03C	Plastic 950ml unpreserved	G	7	7	3.5	Y	Absent		HEXCR-3500(1)
L1844003-03D	Amber 1000ml unpreserved	G	7	7	3.5	Y	Absent		A2-RIM-8270(7)
L1844003-03E	Amber 1000ml unpreserved	G	7	7	3.5	Y	Absent		A2-RIM-8270(7)
L1844003-03F	Amber 1000ml unpreserved	G	7	7	3.5	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-03G	Amber 1000ml unpreserved	I	7	7	2.8	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-04A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-04B	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-04C	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-04D	Amber 1000ml unpreserved	E1	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1844003-04E	Amber 1000ml unpreserved	E1	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1844003-04F	Amber 1000ml unpreserved	E1	7	7	2.3	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-04G	Amber 1000ml unpreserved	E1	7	7	2.3	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-05A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-05B	Plastic 950ml HNO3 preserved	C1	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-05C	Plastic 950ml HNO3 preserved	C1	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-05D	Amber 1000ml unpreserved	E1	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1844003-05E	Amber 1000ml unpreserved	E1	7	7	2.3	Y	Absent		A2-RIM-8270(7)
L1844003-05F	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-05G	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-06A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-06B	Plastic 950ml HNO3 preserved	C1	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-06C	Plastic 950ml HNO3 preserved	C1	<2	<2	2.4	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-06D	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1844003-06E	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-8270(7)
L1844003-06F	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-06G	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-07A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-07B	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-07C	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-07D	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-07E	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-07F	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-07G	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-08A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-08B	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-08C	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-08D	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-08E	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-08F	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-08G	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-09A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-09B	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-09C	Plastic 950ml HNO3 preserved	E1	<2	<2	2.3	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-09D	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-09E	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-09F	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-09G	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-10A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-10B	Plastic 950ml HNO3 preserved	A1	<2	<2	2.5	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-10C	Plastic 950ml HNO3 preserved	A1	<2	<2	2.5	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-10D	Amber 1000ml unpreserved	A1	7	7	2.5	Y	Absent		A2-RIM-8270(7)
L1844003-10E	Amber 1000ml unpreserved	A1	7	7	2.5	Y	Absent		A2-RIM-8270(7)
L1844003-10F	Amber 1000ml unpreserved	A1	7	7	2.5	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-10G	Amber 1000ml unpreserved	A1	7	7	2.5	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-11A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-11B	Plastic 950ml HNO3 preserved	H1	<2	<2	2.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-11C	Plastic 950ml HNO3 preserved	H1	<2	<2	2.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-11D	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-11E	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-11F	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-11G	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-12A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-12B	Plastic 950ml HNO3 preserved	H1	<2	<2	2.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-12C	Plastic 950ml HNO3 preserved	H1	<2	<2	2.1	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-12D	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-12E	Amber 1000ml unpreserved	H1	7	7	2.1	Y	Absent		A2-RIM-8270(7)
L1844003-12F	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-12G	Amber 1000ml unpreserved	C1	7	7	2.4	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-13A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-13B	Plastic 950ml HNO3 preserved	B1	<2	<2	3.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

Lab Number: L1844003
Report Date: 11/28/18

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-13C	Plastic 950ml HNO3 preserved	B1	<2	<2	3.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-13D	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-8270(7)
L1844003-13E	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-8270(7)
L1844003-13F	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-13G	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-14A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-14B	Plastic 950ml HNO3 preserved	B1	<2	<2	3.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-14C	Plastic 950ml HNO3 preserved	B1	<2	<2	3.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-14D	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-8270(7)
L1844003-14E	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-8270(7)
L1844003-14F	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-14G	Amber 1000ml unpreserved	B1	7	7	3.0	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-15A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-15B	Plastic 950ml HNO3 preserved	D1	<2	<2	4.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-15C	Plastic 950ml HNO3 preserved	D1	<2	<2	4.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-15D	Amber 1000ml unpreserved	F1	7	7	2.0	Y	Absent		A2-RIM-8270(7)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-15E	Amber 1000ml unpreserved	F1	7	7	2.0	Y	Absent		A2-RIM-8270(7)
L1844003-15F	Amber 1000ml unpreserved	F1	7	7	2.0	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-15G	Amber 1000ml unpreserved	F1	7	7	2.0	Y	Absent		A2-RIM-PCBCONG-8270(7)
L1844003-16A	Plastic 950ml unpreserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-16B	Plastic 950ml unpreserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-16C	Plastic 950ml unpreserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-16D	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-16E	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-16F	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-16G	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-16H	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-16I	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-16J	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)

*Values in parentheses indicate holding time in days

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-16K	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1844003-16L	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1844003-16M	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1844003-16N	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1844003-16O	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7),A2-RIM-PEST-ELUT(7)
L1844003-16P	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-16Q	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-16R	Amber 1000ml unpreserved	D1	7	7	4.0	Y	Absent		A2-RIM-8270(7)
L1844003-16R1	Amber 1000ml unpreserved	D1	7	7	4.0	Y	Absent		A2-RIM-8270(7)
L1844003-16S	Amber 1000ml unpreserved	D1	7	7	4.0	Y	Absent		A2-RIM-8270(7)
L1844003-16S1	Amber 1000ml unpreserved	D1	7	7	4.0	Y	Absent		A2-RIM-8270(7)
L1844003-16T	Amber 1000ml unpreserved	D1	7	7	4.0	Y	Absent		A2-RIM-8270(7)
L1844003-16T1	Amber 1000ml unpreserved	D1	7	7	4.0	Y	Absent		A2-RIM-8270(7)
L1844003-16U	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-16U1	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-17A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-17B	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-17C	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-17D	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-17E	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-17F	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-17G	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 6.0

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1844003-18A	Plastic 950ml HNO3 preserved	I	7	7	2.8	Y	Absent		HEXCR-3500(1)
L1844003-18B	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-18C	Plastic 950ml HNO3 preserved	F1	<2	<2	2.0	Y	Absent		A2-PB-6020T(180),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-SE-HGAF-T(180),A2-AS-HGAF-T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-AG-6020T(180),A2-CU-6020T(180)
L1844003-18D	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-18E	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-8270(7)
L1844003-18F	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PEST-ELUT(7)
L1844003-18G	Amber 1000ml unpreserved	G1	7	7	3.2	Y	Absent		A2-RIM-PCBCONG-8270(7)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1844003
Project Number:	60588790 TASK 6.0	**Report Date:**	11/28/18

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample¿s toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1844003
Project Number:	60588790 TASK 6.0	**Report Date:**	11/28/18

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1844003
Project Number:	60588790 TASK 6.0	**Report Date:**	11/28/18

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

86 Chemical Speciation of Arsenic in Water and Tissue by Hydride Generation Quartz Furnace Atomic Absorption Spectrometry. USEPA Office of Water, EPA Method 1632, Revision A, August 1998.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	Yes
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	Yes
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	No – see narrative

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	No	Pentachlorophenol 27.3%	Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	No	L1844003-11: BZ198 on column 2 @ 184% L1844003-13: BZ198 on column 2 @ 291% L1844003-14: BZ198 on column 2 @ 360% L1844003-16: BZ198 on column 2 @ 2711%	In Data Package

			L1844003-17: BZ198 on column 2 @ 303%	

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No	CCV associated with Blank, LCS, LCSD: Cl2-BZ#8 @ 18%, Cl3-BZ#18 @ 18%, Cl3-BZ#28 @ 18%, Cl4-BZ#44 @ 17%, Cl4-BZ#66 @ 18%, Cl4-BZ#77 @ 19% CCV associated with all field samples: Cl2-BZ#8 @ 18%, Cl3-BZ#18 @ 18%, Cl4-BZ#49 @ 20%, Cl4-BZ#77 @ 17%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	NA		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	NA		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	WG1177006-3 MS Cd(0%), Cr(12%), Cu(0%), Pb(7%), Ni(0%), Ag(0%), Zn(22%) WG1180588-3/4 MS/MSD Hg(78%/78%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or comp-osite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
44003-01	Composite 3 Elutriate Blank - Rep 1	10/26/18	9:20	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
-02	Composite 3 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
-03	Composite 3 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
-01	Composite 3 Elutriate Blank - Rep 1	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
-02	Composite 3 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
-03	Composite 3 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
-01	Composite 3 Elutriate Blank - Rep 1	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
-02	Composite 3 Elutriate Blank - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
-03	Composite 3 Elutriate Blank - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
-01	Composite 3 Elutriate Blank - Rep 1	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
-02	Composite 3 Elutriate Blank - Rep 2	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
-03	Composite 3 Elutriate Blank - Rep 3	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] AAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] AAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No:	October 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 5 Elutriate Blank - Rep 1	10/26/18	11:40	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 5 Elutriate Blank - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 5 Elutriate Blank - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 5 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 5 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 5 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 5 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 5 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 5 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
44003-04	Composite 5 Elutriate Blank - Rep 1					1	1000	P	4 C	Water	N	CR6
-05	Composite 5 Elutriate Blank - Rep 2					1	1000	P	4 C	Water	N	CR6
-06	Composite 5 Elutriate Blank - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] ATL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] ATL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:

ERR

COC Number: A1016886

Sample Delivery Group No: October 2018

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FAX: 603-926-3521

ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 4 Elutriate Blank - Rep 1	10/26/18	9:20	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 4 Elutriate Blank - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 4 Elutriate Blank - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 4 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 4 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 4 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 4 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 4 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 4 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
44003-07	Composite 4 Elutriate Blank - Rep 1					1	1000	P	4 C	Water	N	CR6
-08	Composite 4 Elutriate Blank - Rep 2					1	1000	P	4 C	Water	N	CR6
-09	Composite 4 Elutriate Blank - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] DAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] DAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No: October 2018

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ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 5 Elutriate - Rep 1	10/26/18	1525	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 5 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 5 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 5 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 5 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 5 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 5 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 5 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 5 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
44003-10	Composite 5 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
-11	Composite 5 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
-12	Composite 5 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] AAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] AAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:
ERR

COC Number: A1016866

Sample Delivery Group No: October 2018	Page of	

ESI EnviroSystems, Inc.
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ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 4 Elutriate - Rep 1	10/26/18	1310	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
	Composite 4 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 4 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 4 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
	Composite 4 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 4 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 4 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 4 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 4 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
44003-13	Composite 4 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
-14	Composite 4 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
-15	Composite 4 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] AAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] AAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:
ERR

COC Number: A1016866

Sample Delivery Group No: October 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
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ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
	Composite 3 Elutriate - Rep 1	10/26/18	1615 1510	ESI	C	6	1000	G	HNO3	Water	N	Total Metals
	Composite 3 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
	Composite 3 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
	Composite 3 Elutriate - Rep 1					6	1000	G	4 C	Water	N	PCP
	Composite 3 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
	Composite 3 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
	Composite 3 Elutriate - Rep 1					6	1000	G	4 C	Water	N	PEST/CGR
	Composite 3 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 3 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
44003-16	Composite 3 Elutriate - Rep 1					3	1000	P	4 C	Water	N	CR6
-17	Composite 3 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
-18	Composite 3 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By: [signature]	Date: 10/26/18 Time: 1725	Received By: [signature] AAL	Date: 10/26/18 Time: 17:25
Relinquished By: [signature] AAL	Date: 10/26/18 Time: 19:50	Received at Lab By: [signature]	Date: 10/26/18 Time: 1950

Comments:

ERR

COC Number: A1016866

Sample Delivery Group No: October 2018	Page of	

ESI EnviroSystems, Inc.
1 Lafayette Road
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ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
14003.04	Composite 5 Elutriate Blank - Rep 1	10/26/18	11:40	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
.05	Composite 5 Elutriate Blank - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
.06	Composite 5 Elutriate Blank - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
.04	Composite 5 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PCP
.05	Composite 5 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PCP
.06	Composite 5 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PCP
.04	Composite 5 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
.05	Composite 5 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
.06	Composite 5 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 5 Elutriate Blank - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 5 Elutriate Blank - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 5 Elutriate Blank - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/29/18 Time: 0930	Received By:	Date: 10/29/18 Time: 945
Relinquished By:	Date: 10/29/18 Time: 1145	Received at Lab By:	Date: 10/29/18 Time: 1143

Comments:

ERR

Rel 10/29/18 Rec 10/29/18
AEL 10/29/18 1145 Rec 10/29/18 1145

COC Number: A1016866

Sample Delivery Group No: October 2018

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ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client:	AECOM	Contact: Kris Van Naerssen	Project Name:	AECOM - New Haven Harbor	
Report to:	Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number:	P0803	Task: 0001
Invoice to:	Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager:	Kris Van Naerssen	
Voice:	0	Fax: 0	email:	kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
44/003.07	Composite 4 Elutriate Blank - Rep 1	10/26/18	9:20	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
.08	Composite 4 Elutriate Blank - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
.09	Composite 4 Elutriate Blank - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
.07	Composite 4 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PCP
.08	Composite 4 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PCP
.09	Composite 4 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PCP
.07	Composite 4 Elutriate Blank - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
.08	Composite 4 Elutriate Blank - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
.09	Composite 4 Elutriate Blank - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 4 Elutriate Blank - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 4 Elutriate Blank - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 4 Elutriate Blank - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/29/18 Time: 0930	Received By:	Date: 10/29/18 Time: 945
Relinquished By:	Date: 10/29/18 Time: 1143	Received at Lab By:	Date: 10/29/18 Time: 1143

Comments:

ERR

Rel [illegible] 10/29/18 REC [illegible] 10/29/18

REC [illegible] 10/29/18 1415 Rec: [illegible] 10/29/18 1415

COC Number: A1016866

Sample Delivery Group No: October 2018

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ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
44003.10	Composite 5 Elutriate - Rep 1	10/26/18	1525	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
.11	Composite 5 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
.12	Composite 5 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
.10	Composite 5 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
.11	Composite 5 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
.12	Composite 5 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
.10	Composite 5 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
.11	Composite 5 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
.12	Composite 5 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 5 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 5 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 5 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/29/18 Time: 0930	Received By:	Date: 10/29/18 Time: 910
Relinquished By:	Date: 10/29/18 Time: 1143	Received at Lab By:	Date: 10/29/18 Time: 1143

Comments:

ERR

Rel 10/29/18 MSM 10/29/18

COC Number: A1016866

REL MSM 10/29/18 1415 Rec: 10/29/18 1415

Sample Delivery Group No: October 2018	Page	of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
44003,13	Composite 4 Elutriate - Rep 1	10/26/18	1310	ESI	C	2	1000	G	HNO3	Water	N	Total Metals
.14	Composite 4 Elutriate - Rep 2					2	1000	G	HNO3	Water	N	Total Metals
.15	Composite 4 Elutriate - Rep 3					2	1000	G	HNO3	Water	N	Total Metals
.13	Composite 4 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PCP
.14	Composite 4 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PCP
.15	Composite 4 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PCP
.13	Composite 4 Elutriate - Rep 1					2	1000	G	4 C	Water	N	PEST/CGR
.14	Composite 4 Elutriate - Rep 2					2	1000	G	4 C	Water	N	PEST/CGR
.15	Composite 4 Elutriate - Rep 3					2	1000	G	4 C	Water	N	PEST/CGR
	Composite 4 Elutriate - Rep 1					1	1000	P	4 C	Water	N	CR6
	Composite 4 Elutriate - Rep 2					1	1000	P	4 C	Water	N	CR6
	Composite 4 Elutriate - Rep 3					1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/29/18 Time: 0930	Received By:	Date: 10/29/18 Time: 9:05
Relinquished By:	Date: 10/29/18 Time: 1143	Received at Lab By:	Date: 10/29/18 Time: 1143

Comments:

ERR

COC Number: A1016866

Rel 10/29/18 Rec 10/29/18
Rel 10/29/18 1415 Rec. 10/29/18 1415

Sample Delivery Group No: October 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1844003

CHAIN OF CUSTODY DOCUMENTATION

Client: AECOM	Contact: Kris Van Naerssen	Project Name: AECOM - New Haven Harbor	
Report to: Kris Van Naerssen	Address: 500 Enterprise Drive Suite 1A	Project Number: P0803	Task: 0001
Invoice to: Kris Van Naerssen	Address: Rocky Hill, CT 06067	Project Manager: Kris Van Naerssen	
Voice: 0	Fax: 0	email: kris.vannaerssen@aecom.com	ERR

Protocol: CENAE

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
44003.16	Composite 3 Elutriate - Rep 1	10/26/18	1615 ~~1510~~	ESI	C	6	1000	G	HNO3	Water	N	Total Metals
.17	Composite 3 Elutriate - Rep 2	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
.18	Composite 3 Elutriate - Rep 3	↓	↓	↓	↓	2	1000	G	HNO3	Water	N	Total Metals
.16	Composite 3 Elutriate - Rep 1	↓	↓	↓	↓	6	1000	G	4 C	Water	N	PCP
.17	Composite 3 Elutriate - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
.18	Composite 3 Elutriate - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PCP
.16	Composite 3 Elutriate - Rep 1	↓	↓	↓	↓	6	1000	G	4 C	Water	N	PEST/CGR
.17	Composite 3 Elutriate - Rep 2	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
.18	Composite 3 Elutriate - Rep 3	↓	↓	↓	↓	2	1000	G	4 C	Water	N	PEST/CGR
	Composite 3 Elutriate - Rep 1	↓	↓	↓	↓	3	1000	P	4 C	Water	N	CR6
	Composite 3 Elutriate - Rep 2	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6
	Composite 3 Elutriate - Rep 3	↓	↓	↓	↓	1	1000	P	4 C	Water	N	CR6

Relinquished By:	Date: 10/29/18 Time: 0930	Received By:	Date: 10/29/18 Time: 9:45
Relinquished By:	Date: 10/29/18 Time: 1143	Received at Lab By:	Date: 10/29/18 Time: 1143

Comments:

ERR

Rel 10/29/18 REL 10/29/18
COC Number: A1016866
REL 10/29/18 1415 Rec: 10/29/18 1415

Sample Delivery Group No:	October 2018	Page of

Appendix C.2: Sediment Chemistry Lab Report

AECOM Imagine it. Delivered.

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

April 11, 2019

Sediment Chemistry Report - Revised Submittal

ANALYTICAL REPORT

Lab Number:	L1843305
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 5.0
Report Date:	04/05/19

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1843305-01	TB-2	SEDIMENT	NEW HAVEN, CT	10/22/18 16:50	10/24/18
L1843305-02	US-2 0.0-5.0	SEDIMENT	NEW HAVEN, CT	10/22/18 17:15	10/24/18
L1843305-03	US-2 5.0-6.0	SEDIMENT	NEW HAVEN, CT	10/22/18 15:17	10/24/18
L1843305-04	TB-1 0-5.2	SEDIMENT	NEW HAVEN, CT	10/23/18 10:25	10/24/18
L1843305-05	TB-1 5.2-6.0	SEDIMENT	NEW HAVEN, CT	10/23/18 10:30	10/24/18
L1843305-06	CAD-3 0-5.5	SEDIMENT	NEW HAVEN, CT	10/23/18 11:10	10/24/18
L1843305-07	US-1 0-5.5	SEDIMENT	NEW HAVEN, CT	10/23/18 12:24	10/24/18
L1843305-08	CAD-2 0.5.3	SEDIMENT	NEW HAVEN, CT	10/23/18 13:10	10/24/18
L1843305-09	CAD-2 5.3-10.8	SEDIMENT	NEW HAVEN, CT	10/23/18 14:20	10/24/18
L1843305-10	W1	SEDIMENT	NEW HAVEN, CT	10/23/18 12:10	10/24/18
L1843305-11	V1	SEDIMENT	NEW HAVEN, CT	10/23/18 11:31	10/24/18
L1843305-12	S1	SEDIMENT	NEW HAVEN, CT	10/23/18 12:25	10/24/18
L1843305-13	R1	SEDIMENT	NEW HAVEN, CT	10/23/18 12:39	10/24/18
L1843305-14	CAD-3 6.1-9.9	SEDIMENT	NEW HAVEN, CT	10/23/18 15:00	10/24/18
L1843305-15	CAD-1 0-4.0	SEDIMENT	NEW HAVEN, CT	10/23/18 16:34	10/24/18
L1843305-16	CAD-1 4.4-9.0	SEDIMENT	NEW HAVEN, CT	10/23/18 16:30	10/24/18
L1843305-17	DS-1 0-7.3	SEDIMENT	NEW HAVEN, CT	10/23/18 16:15	10/24/18
L1843305-18	DS-2 0-7.0	SEDIMENT	NEW HAVEN, CT	10/23/18 17:35	10/24/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843305
Project Number:	60588790 TASK 5.0	**Report Date:**	04/05/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843305
Project Number:	60588790 TASK 5.0	**Report Date:**	04/05/19

Case Narrative (continued)

Report Reissue

This report replaces the report issued on November 19, 2018. The PCB data has been revised.

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L1843305: Samples were frozen upon receipt in order to arrest the holding time.

L1843305-02: The collection date and time on the chain of custody was 22-OCT-18 17:20; however, the collection date/time on the container label was 22-OCT-18 17:15. At the client's request, the collection date/time is reported as 22-OCT-18 17:15.

L1843305-03: The collection date and time on the chain of custody was 22-OCT-18 17:20; however, the collection date/time on the container label was 22-OCT-18 15:17. At the client's request, the collection date/time is reported as 22-OCT-18 15:17.

L1843305-05: The collection date and time on the chain of custody was 23-OCT-18 10:25; however, the collection date/time on the container label was 23-OCT-18 10:30. At the client's request, the collection date/time is reported as 23-OCT-18 10:30.

L1843305-06: The collection date and time on the chain of custody was 23-OCT-18 11:43; however, the collection date/time on the container label was 23-OCT-18 11:10. At the client's request, the collection date/time is reported as 23-OCT-18 11:10.

L1843305-07: The collection date and time on the chain of custody was 23-OCT-18 12:37; however, the collection date/time on the container label was 23-OCT-18 12:24. At the client's request, the collection date/time is reported as 23-OCT-18 12:24.

L1843305-08: The collection date and time on the chain of custody was 23-OCT-18 13:47; however, the collection date/time on the container label was 23-OCT-18 13:10. At the client's request, the collection date/time is reported as 23-OCT-18 13:10.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843305
Project Number:	60588790 TASK 5.0	**Report Date:**	04/05/19

Case Narrative (continued)

L1843305-09: The collection date and time on the chain of custody was 23-OCT-18 14:15; however, the collection date/time on the container label was 23-OCT-18 14:20. At the client's request, the collection date/time is reported as 23-OCT-18 14:20.
L1843305-15: The collection date and time on the chain of custody was 23-OCT-18 15:58; however, the collection date/time on the container label was 23-OCT-18 16:34. At the client's request, the collection date/time is reported as 23-OCT-18 16:34
L1843305-17: The collection date and time on the chain of custody was 23-OCT-18 17:00; however, the collection date/time on the container label was 23-OCT-18 16:45. At the client's request, the collection date/time is reported as 23-OCT-18 16:15.
L1843305-18: The collection date and time on the chain of custody was 23-OCT-18 17:38; however, the collection date/time on the container label was 23-OCT-18 17:35. At the client's request, the collection date/time is reported as 23-OCT-18 17:35.

Semivolatile Organics
PCB Congeners for samples L1843305-01, -02, -04, -06, -07, -08, -10, -11, -12, -13, -15, -17 and -18 do not meet required detection limits due to moisture content of the samples.
PAHs for samples L1843305-01, -02, -04, -06, -07, -08, -10, -11, -12, -13, -15, -17, and -18 have elevated detection limits due to the dilution required by the sample matrix.
The WG1218700-4 Laboratory Duplicate RPDs for Cl5-BZ#101 (42%), Cl5-BZ#118 (46%), Cl6-BZ#138 (51%) and Cl6-BZ#153 (45%), performed on L1843305-07, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

Pesticides
The WG1173137-7 MSD recoveries, performed on L1843305-07, are outside the acceptance criteria for endosulfan II (145%) and 4,4'-DDT (127%).
The SRM WG1173137-4 recovery for trans-Nonachlor (486%) is above the acceptance criteria.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843305
Project Number:	60588790 TASK 5.0	**Report Date:**	04/05/19

Case Narrative (continued)

Total Metals

The WG1178831-3/-4 MS/MSD recovery, performed on L1843305-07, is outside the acceptance criteria for copper (70%/65%) and zinc (72%/72%). A post digestion spike was performed and was within acceptance criteria.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Elizabeth Porta

Title: Technical Director/Representative Date: 04/05/19

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-01
Client ID: TB-2
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 16:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 17:38
Analyst: GP
Percent Solids: 37%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.26	0.632	1
Cl3-BZ#18	ND		ug/kg	1.26	0.632	1
Cl3-BZ#28	1.01	J	ug/kg	1.26	0.632	1
Cl4-BZ#44	1.24	J	ug/kg	1.26	0.632	1
Cl4-BZ#49	1.59		ug/kg	1.26	0.632	1
Cl4-BZ#52	1.38		ug/kg	1.26	0.632	1
Cl4-BZ#66	1.83		ug/kg	1.26	0.632	1
Cl5-BZ#87	0.872	J	ug/kg	1.26	0.632	1
Cl5-BZ#101	3.08		ug/kg	1.26	0.632	1
Cl5-BZ#105	0.752	J	ug/kg	1.26	0.632	1
Cl5-BZ#118	2.59		ug/kg	1.26	0.632	1
Cl6-BZ#128	1.06	J	ug/kg	1.26	0.632	1
Cl6-BZ#138	3.51		ug/kg	1.26	0.632	1
Cl6-BZ#153	2.82		ug/kg	1.26	0.632	1
Cl7-BZ#170	0.711	J	ug/kg	1.26	0.632	1
Cl7-BZ#180	1.62		ug/kg	1.26	0.632	1
Cl7-BZ#183	ND		ug/kg	1.26	0.632	1
Cl7-BZ#184	ND		ug/kg	1.26	0.632	1
Cl7-BZ#187	1.40		ug/kg	1.26	0.632	1
Cl8-BZ#195	ND		ug/kg	1.26	0.632	1
Cl9-BZ#206	0.847	J	ug/kg	1.26	0.632	1
Cl10-BZ#209	ND		ug/kg	1.26	0.632	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	101		30-150
BZ 198	88		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-01 D
Client ID: TB-2
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 16:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 21:23
Analyst: GP
Percent Solids: 37%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	76.2		ug/kg	65.6	32.8	5
Acenaphthylene	34.0	J	ug/kg	65.6	32.8	5
Acenaphthene	ND		ug/kg	65.6	32.8	5
Fluorene	ND		ug/kg	65.6	32.8	5
Phenanthrene	188		ug/kg	65.6	32.8	5
Anthracene	51.5	J	ug/kg	65.6	32.8	5
Fluoranthene	564		ug/kg	65.6	32.8	5
Pyrene	516		ug/kg	65.6	32.8	5
Benz(a)anthracene	264		ug/kg	65.6	32.8	5
Chrysene	327		ug/kg	65.6	32.8	5
Benzo(b)fluoranthene	403		ug/kg	65.6	32.8	5
Benzo(k)fluoranthene	287		ug/kg	65.6	32.8	5
Benzo(a)pyrene	323		ug/kg	65.6	32.8	5
Indeno(1,2,3-cd)Pyrene	352		ug/kg	65.6	32.8	5
Dibenz(a,h)anthracene	65.6		ug/kg	65.6	32.8	5
Benzo(ghi)perylene	294		ug/kg	65.6	32.8	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	93		30-150
Pyrene-d10	103		30-150
Benzo(b)fluoranthene-d12	98		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-02	Date Collected:	10/22/18 17:15
Client ID:	US-2 0.0-5.0	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/25/19 18:13	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	42%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	0.669	J	ug/kg	1.13	0.566	1
Cl3-BZ#18	1.55		ug/kg	1.13	0.566	1
Cl3-BZ#28	2.42		ug/kg	1.13	0.566	1
Cl4-BZ#44	3.83		ug/kg	1.13	0.566	1
Cl4-BZ#49	3.60		ug/kg	1.13	0.566	1
Cl4-BZ#52	6.72		ug/kg	1.13	0.566	1
Cl4-BZ#66	3.77		ug/kg	1.13	0.566	1
Cl5-BZ#87	1.98		ug/kg	1.13	0.566	1
Cl5-BZ#101	5.58		ug/kg	1.13	0.566	1
Cl5-BZ#105	1.18		ug/kg	1.13	0.566	1
Cl5-BZ#118	3.78		ug/kg	1.13	0.566	1
Cl6-BZ#128	0.737	J	ug/kg	1.13	0.566	1
Cl6-BZ#138	5.31		ug/kg	1.13	0.566	1
Cl6-BZ#153	4.88		ug/kg	1.13	0.566	1
Cl7-BZ#170	2.67		ug/kg	1.13	0.566	1
Cl7-BZ#180	3.03		ug/kg	1.13	0.566	1
Cl7-BZ#183	0.941	J	ug/kg	1.13	0.566	1
Cl7-BZ#184	ND		ug/kg	1.13	0.566	1
Cl7-BZ#187	2.17		ug/kg	1.13	0.566	1
Cl8-BZ#195	ND		ug/kg	1.13	0.566	1
Cl9-BZ#206	1.02	J	ug/kg	1.13	0.566	1
Cl10-BZ#209	ND		ug/kg	1.13	0.566	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	85		30-150
BZ 198	70		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-02 D
Client ID: US-2 0.0-5.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 17:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 21:56
Analyst: GP
Percent Solids: 42%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	190		ug/kg	57.1	28.5	5
Acenaphthylene	62.4		ug/kg	57.1	28.5	5
Acenaphthene	51.2	J	ug/kg	57.1	28.5	5
Fluorene	83.4		ug/kg	57.1	28.5	5
Phenanthrene	321		ug/kg	57.1	28.5	5
Anthracene	119		ug/kg	57.1	28.5	5
Fluoranthene	1060		ug/kg	57.1	28.5	5
Pyrene	914		ug/kg	57.1	28.5	5
Benz(a)anthracene	475		ug/kg	57.1	28.5	5
Chrysene	590		ug/kg	57.1	28.5	5
Benzo(b)fluoranthene	613		ug/kg	57.1	28.5	5
Benzo(k)fluoranthene	479		ug/kg	57.1	28.5	5
Benzo(a)pyrene	521		ug/kg	57.1	28.5	5
Indeno(1,2,3-cd)Pyrene	498		ug/kg	57.1	28.5	5
Dibenz(a,h)anthracene	100		ug/kg	57.1	28.5	5
Benzo(ghi)perylene	445		ug/kg	57.1	28.5	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	82		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-03
Client ID: US-2 5.0-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 15:17
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 14:19
Analyst: GP
Percent Solids: 75%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	0.665	0.332	1
Cl3-BZ#18	ND		ug/kg	0.665	0.332	1
Cl3-BZ#28	ND		ug/kg	0.665	0.332	1
Cl4-BZ#44	ND		ug/kg	0.665	0.332	1
Cl4-BZ#49	ND		ug/kg	0.665	0.332	1
Cl4-BZ#52	ND		ug/kg	0.665	0.332	1
Cl4-BZ#66	ND		ug/kg	0.665	0.332	1
Cl5-BZ#87	ND		ug/kg	0.665	0.332	1
Cl5-BZ#101	ND		ug/kg	0.665	0.332	1
Cl5-BZ#105	ND		ug/kg	0.665	0.332	1
Cl5-BZ#118	ND		ug/kg	0.665	0.332	1
Cl6-BZ#128	ND		ug/kg	0.665	0.332	1
Cl6-BZ#138	ND		ug/kg	0.665	0.332	1
Cl6-BZ#153	ND		ug/kg	0.665	0.332	1
Cl7-BZ#170	ND		ug/kg	0.665	0.332	1
Cl7-BZ#180	ND		ug/kg	0.665	0.332	1
Cl7-BZ#183	ND		ug/kg	0.665	0.332	1
Cl7-BZ#184	ND		ug/kg	0.665	0.332	1
Cl7-BZ#187	ND		ug/kg	0.665	0.332	1
Cl8-BZ#195	ND		ug/kg	0.665	0.332	1
Cl9-BZ#206	ND		ug/kg	0.665	0.332	1
Cl10-BZ#209	ND		ug/kg	0.665	0.332	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	87		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-03
Client ID: US-2 5.0-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 15:17
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 16:37
Analyst: GP
Percent Solids: 75%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	12.0	5.99	1
Acenaphthylene	ND		ug/kg	12.0	5.99	1
Acenaphthene	ND		ug/kg	12.0	5.99	1
Fluorene	ND		ug/kg	12.0	5.99	1
Phenanthrene	ND		ug/kg	12.0	5.99	1
Anthracene	ND		ug/kg	12.0	5.99	1
Fluoranthene	ND		ug/kg	12.0	5.99	1
Pyrene	ND		ug/kg	12.0	5.99	1
Benz(a)anthracene	ND		ug/kg	12.0	5.99	1
Chrysene	ND		ug/kg	12.0	5.99	1
Benzo(b)fluoranthene	ND		ug/kg	12.0	5.99	1
Benzo(k)fluoranthene	ND		ug/kg	12.0	5.99	1
Benzo(a)pyrene	ND		ug/kg	12.0	5.99	1
Indeno(1,2,3-cd)Pyrene	6.13	J	ug/kg	12.0	5.99	1
Dibenz(a,h)anthracene	ND		ug/kg	12.0	5.99	1
Benzo(ghi)perylene	ND		ug/kg	12.0	5.99	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-04
Client ID: TB-1 0-5.2
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 18:47
Analyst: GP
Percent Solids: 38%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.33	0.665	1
Cl3-BZ#18	ND		ug/kg	1.33	0.665	1
Cl3-BZ#28	0.776	J	ug/kg	1.33	0.665	1
Cl4-BZ#44	1.00	J	ug/kg	1.33	0.665	1
Cl4-BZ#49	1.08	J	ug/kg	1.33	0.665	1
Cl4-BZ#52	1.04	J	ug/kg	1.33	0.665	1
Cl4-BZ#66	1.34		ug/kg	1.33	0.665	1
Cl5-BZ#87	ND		ug/kg	1.33	0.665	1
Cl5-BZ#101	2.40		ug/kg	1.33	0.665	1
Cl5-BZ#105	ND		ug/kg	1.33	0.665	1
Cl5-BZ#118	1.60		ug/kg	1.33	0.665	1
Cl6-BZ#128	0.986	J	ug/kg	1.33	0.665	1
Cl6-BZ#138	2.48		ug/kg	1.33	0.665	1
Cl6-BZ#153	2.24		ug/kg	1.33	0.665	1
Cl7-BZ#170	0.912	J	ug/kg	1.33	0.665	1
Cl7-BZ#180	1.28	J	ug/kg	1.33	0.665	1
Cl7-BZ#183	ND		ug/kg	1.33	0.665	1
Cl7-BZ#184	ND		ug/kg	1.33	0.665	1
Cl7-BZ#187	1.07	J	ug/kg	1.33	0.665	1
Cl8-BZ#195	ND		ug/kg	1.33	0.665	1
Cl9-BZ#206	ND		ug/kg	1.33	0.665	1
Cl10-BZ#209	ND		ug/kg	1.33	0.665	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	86		30-150
BZ 198	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-04 D
Client ID: TB-1 0-5.2
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 22:30
Analyst: GP
Percent Solids: 38%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	62.4	J	ug/kg	66.2	33.1	5
Acenaphthylene	ND		ug/kg	66.2	33.1	5
Acenaphthene	ND		ug/kg	66.2	33.1	5
Fluorene	ND		ug/kg	66.2	33.1	5
Phenanthrene	159		ug/kg	66.2	33.1	5
Anthracene	45.5	J	ug/kg	66.2	33.1	5
Fluoranthene	493		ug/kg	66.2	33.1	5
Pyrene	448		ug/kg	66.2	33.1	5
Benz(a)anthracene	250		ug/kg	66.2	33.1	5
Chrysene	324		ug/kg	66.2	33.1	5
Benzo(b)fluoranthene	362		ug/kg	66.2	33.1	5
Benzo(k)fluoranthene	276		ug/kg	66.2	33.1	5
Benzo(a)pyrene	303		ug/kg	66.2	33.1	5
Indeno(1,2,3-cd)Pyrene	331		ug/kg	66.2	33.1	5
Dibenz(a,h)anthracene	62.1	J	ug/kg	66.2	33.1	5
Benzo(ghi)perylene	271		ug/kg	66.2	33.1	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	95		30-150
Benzo(b)fluoranthene-d12	91		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-05
Client ID: TB-1 5.2-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:30
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 14:54
Analyst: GP
Percent Solids: 73%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	0.677	0.338	1
Cl3-BZ#18	ND		ug/kg	0.677	0.338	1
Cl3-BZ#28	ND		ug/kg	0.677	0.338	1
Cl4-BZ#44	ND		ug/kg	0.677	0.338	1
Cl4-BZ#49	ND		ug/kg	0.677	0.338	1
Cl4-BZ#52	ND		ug/kg	0.677	0.338	1
Cl4-BZ#66	ND		ug/kg	0.677	0.338	1
Cl5-BZ#87	ND		ug/kg	0.677	0.338	1
Cl5-BZ#101	0.370	J	ug/kg	0.677	0.338	1
Cl5-BZ#105	ND		ug/kg	0.677	0.338	1
Cl5-BZ#118	ND		ug/kg	0.677	0.338	1
Cl6-BZ#128	ND		ug/kg	0.677	0.338	1
Cl6-BZ#138	0.435	J	ug/kg	0.677	0.338	1
Cl6-BZ#153	0.354	J	ug/kg	0.677	0.338	1
Cl7-BZ#170	ND		ug/kg	0.677	0.338	1
Cl7-BZ#180	ND		ug/kg	0.677	0.338	1
Cl7-BZ#183	ND		ug/kg	0.677	0.338	1
Cl7-BZ#184	ND		ug/kg	0.677	0.338	1
Cl7-BZ#187	ND		ug/kg	0.677	0.338	1
Cl8-BZ#195	ND		ug/kg	0.677	0.338	1
Cl9-BZ#206	ND		ug/kg	0.677	0.338	1
Cl10-BZ#209	ND		ug/kg	0.677	0.338	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	84		30-150
BZ 198	77		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-05
Client ID: TB-1 5.2-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:30
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 17:11
Analyst: GP
Percent Solids: 73%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	13.7		ug/kg	13.1	6.54	1
Acenaphthylene	ND		ug/kg	13.1	6.54	1
Acenaphthene	ND		ug/kg	13.1	6.54	1
Fluorene	ND		ug/kg	13.1	6.54	1
Phenanthrene	8.60	J	ug/kg	13.1	6.54	1
Anthracene	ND		ug/kg	13.1	6.54	1
Fluoranthene	17.2		ug/kg	13.1	6.54	1
Pyrene	24.5		ug/kg	13.1	6.54	1
Benz(a)anthracene	9.75	J	ug/kg	13.1	6.54	1
Chrysene	11.1	J	ug/kg	13.1	6.54	1
Benzo(b)fluoranthene	14.5		ug/kg	13.1	6.54	1
Benzo(k)fluoranthene	11.1	J	ug/kg	13.1	6.54	1
Benzo(a)pyrene	12.1	J	ug/kg	13.1	6.54	1
Indeno(1,2,3-cd)Pyrene	16.7		ug/kg	13.1	6.54	1
Dibenz(a,h)anthracene	ND		ug/kg	13.1	6.54	1
Benzo(ghi)perylene	10.7	J	ug/kg	13.1	6.54	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-06
Client ID: CAD-3 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 19:21
Analyst: GP
Percent Solids: 46%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.05	0.526	1
Cl3-BZ#18	ND		ug/kg	1.05	0.526	1
Cl3-BZ#28	ND		ug/kg	1.05	0.526	1
Cl4-BZ#44	0.636	J	ug/kg	1.05	0.526	1
Cl4-BZ#49	0.630	J	ug/kg	1.05	0.526	1
Cl4-BZ#52	0.632	J	ug/kg	1.05	0.526	1
Cl4-BZ#66	0.533	J	ug/kg	1.05	0.526	1
Cl5-BZ#87	0.538	J	ug/kg	1.05	0.526	1
Cl5-BZ#101	1.09		ug/kg	1.05	0.526	1
Cl5-BZ#105	ND		ug/kg	1.05	0.526	1
Cl5-BZ#118	1.06		ug/kg	1.05	0.526	1
Cl6-BZ#128	0.577	J	ug/kg	1.05	0.526	1
Cl6-BZ#138	1.43		ug/kg	1.05	0.526	1
Cl6-BZ#153	1.16		ug/kg	1.05	0.526	1
Cl7-BZ#170	ND		ug/kg	1.05	0.526	1
Cl7-BZ#180	0.793	J	ug/kg	1.05	0.526	1
Cl7-BZ#183	ND		ug/kg	1.05	0.526	1
Cl7-BZ#184	ND		ug/kg	1.05	0.526	1
Cl7-BZ#187	0.752	J	ug/kg	1.05	0.526	1
Cl8-BZ#195	ND		ug/kg	1.05	0.526	1
Cl9-BZ#206	0.602	J	ug/kg	1.05	0.526	1
Cl10-BZ#209	ND		ug/kg	1.05	0.526	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	113		30-150
BZ 198	97		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-06 D
Client ID: CAD-3 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 23:04
Analyst: GP
Percent Solids: 46%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	97.0		ug/kg	52.4	26.2	5
Acenaphthylene	39.7	J	ug/kg	52.4	26.2	5
Acenaphthene	ND		ug/kg	52.4	26.2	5
Fluorene	42.7	J	ug/kg	52.4	26.2	5
Phenanthrene	326		ug/kg	52.4	26.2	5
Anthracene	113		ug/kg	52.4	26.2	5
Fluoranthene	848		ug/kg	52.4	26.2	5
Pyrene	1050		ug/kg	52.4	26.2	5
Benz(a)anthracene	449		ug/kg	52.4	26.2	5
Chrysene	476		ug/kg	52.4	26.2	5
Benzo(b)fluoranthene	484		ug/kg	52.4	26.2	5
Benzo(k)fluoranthene	380		ug/kg	52.4	26.2	5
Benzo(a)pyrene	557		ug/kg	52.4	26.2	5
Indeno(1,2,3-cd)Pyrene	461		ug/kg	52.4	26.2	5
Dibenz(a,h)anthracene	91.8		ug/kg	52.4	26.2	5
Benzo(ghi)perylene	445		ug/kg	52.4	26.2	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	86		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-07
Client ID: US-1 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:24
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 19:55
Analyst: GP
Percent Solids: 36%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.36	0.681	1
Cl3-BZ#18	1.44		ug/kg	1.36	0.681	1
Cl3-BZ#28	ND		ug/kg	1.36	0.681	1
Cl4-BZ#44	0.779	J	ug/kg	1.36	0.681	1
Cl4-BZ#49	0.802	J	ug/kg	1.36	0.681	1
Cl4-BZ#52	1.25	J	ug/kg	1.36	0.681	1
Cl4-BZ#66	0.801	J	ug/kg	1.36	0.681	1
Cl5-BZ#87	1.43		ug/kg	1.36	0.681	1
Cl5-BZ#101	2.66		ug/kg	1.36	0.681	1
Cl5-BZ#105	0.918	J	ug/kg	1.36	0.681	1
Cl5-BZ#118	2.37		ug/kg	1.36	0.681	1
Cl6-BZ#128	0.963	J	ug/kg	1.36	0.681	1
Cl6-BZ#138	3.38		ug/kg	1.36	0.681	1
Cl6-BZ#153	2.48		ug/kg	1.36	0.681	1
Cl7-BZ#170	ND		ug/kg	1.36	0.681	1
Cl7-BZ#180	1.54		ug/kg	1.36	0.681	1
Cl7-BZ#183	ND		ug/kg	1.36	0.681	1
Cl7-BZ#184	ND		ug/kg	1.36	0.681	1
Cl7-BZ#187	0.922	J	ug/kg	1.36	0.681	1
Cl8-BZ#195	ND		ug/kg	1.36	0.681	1
Cl9-BZ#206	ND		ug/kg	1.36	0.681	1
Cl10-BZ#209	ND		ug/kg	1.36	0.681	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	105		30-150
BZ 198	86		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-07 D
Client ID: US-1 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:24
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 23:37
Analyst: GP
Percent Solids: 36%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	75.2		ug/kg	63.1	31.5	5
Acenaphthylene	52.7	J	ug/kg	63.1	31.5	5
Acenaphthene	51.4	J	ug/kg	63.1	31.5	5
Fluorene	55.9	J	ug/kg	63.1	31.5	5
Phenanthrene	323		ug/kg	63.1	31.5	5
Anthracene	104		ug/kg	63.1	31.5	5
Fluoranthene	1110		ug/kg	63.1	31.5	5
Pyrene	954		ug/kg	63.1	31.5	5
Benz(a)anthracene	511		ug/kg	63.1	31.5	5
Chrysene	624		ug/kg	63.1	31.5	5
Benzo(b)fluoranthene	595		ug/kg	63.1	31.5	5
Benzo(k)fluoranthene	488		ug/kg	63.1	31.5	5
Benzo(a)pyrene	522		ug/kg	63.1	31.5	5
Indeno(1,2,3-cd)Pyrene	520		ug/kg	63.1	31.5	5
Dibenz(a,h)anthracene	89.4		ug/kg	63.1	31.5	5
Benzo(ghi)perylene	439		ug/kg	63.1	31.5	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	97		30-150
Benzo(b)fluoranthene-d12	92		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-08
Client ID: CAD-2 0.5.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 22:09
Analyst: GP
Percent Solids: 44%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.12	0.563	1
Cl3-BZ#18	ND		ug/kg	1.12	0.563	1
Cl3-BZ#28	ND		ug/kg	1.12	0.563	1
Cl4-BZ#44	0.594	J	ug/kg	1.12	0.563	1
Cl4-BZ#49	0.595	J	ug/kg	1.12	0.563	1
Cl4-BZ#52	1.22		ug/kg	1.12	0.563	1
Cl4-BZ#66	0.639	J	ug/kg	1.12	0.563	1
Cl5-BZ#87	1.06	J	ug/kg	1.12	0.563	1
Cl5-BZ#101	2.26		ug/kg	1.12	0.563	1
Cl5-BZ#105	0.882	J	ug/kg	1.12	0.563	1
Cl5-BZ#118	1.81		ug/kg	1.12	0.563	1
Cl6-BZ#128	0.567	J	ug/kg	1.12	0.563	1
Cl6-BZ#138	3.15		ug/kg	1.12	0.563	1
Cl6-BZ#153	2.24		ug/kg	1.12	0.563	1
Cl7-BZ#170	0.584	J	ug/kg	1.12	0.563	1
Cl7-BZ#180	1.32		ug/kg	1.12	0.563	1
Cl7-BZ#183	ND		ug/kg	1.12	0.563	1
Cl7-BZ#184	ND		ug/kg	1.12	0.563	1
Cl7-BZ#187	0.890	J	ug/kg	1.12	0.563	1
Cl8-BZ#195	ND		ug/kg	1.12	0.563	1
Cl9-BZ#206	ND		ug/kg	1.12	0.563	1
Cl10-BZ#209	ND		ug/kg	1.12	0.563	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	120		30-150
BZ 198	96		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-08 D
Client ID: CAD-2 0.5.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 01:53
Analyst: GP
Percent Solids: 44%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	41.2	J	ug/kg	54.0	27.0	5
Acenaphthylene	ND		ug/kg	54.0	27.0	5
Acenaphthene	ND		ug/kg	54.0	27.0	5
Fluorene	ND		ug/kg	54.0	27.0	5
Phenanthrene	134		ug/kg	54.0	27.0	5
Anthracene	49.3	J	ug/kg	54.0	27.0	5
Fluoranthene	348		ug/kg	54.0	27.0	5
Pyrene	431		ug/kg	54.0	27.0	5
Benz(a)anthracene	196		ug/kg	54.0	27.0	5
Chrysene	209		ug/kg	54.0	27.0	5
Benzo(b)fluoranthene	200		ug/kg	54.0	27.0	5
Benzo(k)fluoranthene	180		ug/kg	54.0	27.0	5
Benzo(a)pyrene	228		ug/kg	54.0	27.0	5
Indeno(1,2,3-cd)Pyrene	235		ug/kg	54.0	27.0	5
Dibenz(a,h)anthracene	40.8	J	ug/kg	54.0	27.0	5
Benzo(ghi)perylene	179		ug/kg	54.0	27.0	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	70		30-150
Pyrene-d10	86		30-150
Benzo(b)fluoranthene-d12	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-09	Date Collected:	10/23/18 14:20
Client ID:	CAD-2 5.3-10.8	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/25/19 22:43	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	50%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	0.966	0.483	1
Cl3-BZ#18	ND		ug/kg	0.966	0.483	1
Cl3-BZ#28	ND		ug/kg	0.966	0.483	1
Cl4-BZ#44	ND		ug/kg	0.966	0.483	1
Cl4-BZ#49	ND		ug/kg	0.966	0.483	1
Cl4-BZ#52	ND		ug/kg	0.966	0.483	1
Cl4-BZ#66	ND		ug/kg	0.966	0.483	1
Cl5-BZ#87	ND		ug/kg	0.966	0.483	1
Cl5-BZ#101	ND		ug/kg	0.966	0.483	1
Cl5-BZ#105	ND		ug/kg	0.966	0.483	1
Cl5-BZ#118	ND		ug/kg	0.966	0.483	1
Cl6-BZ#128	ND		ug/kg	0.966	0.483	1
Cl6-BZ#138	ND		ug/kg	0.966	0.483	1
Cl6-BZ#153	ND		ug/kg	0.966	0.483	1
Cl7-BZ#170	ND		ug/kg	0.966	0.483	1
Cl7-BZ#180	ND		ug/kg	0.966	0.483	1
Cl7-BZ#183	ND		ug/kg	0.966	0.483	1
Cl7-BZ#184	ND		ug/kg	0.966	0.483	1
Cl7-BZ#187	ND		ug/kg	0.966	0.483	1
Cl8-BZ#195	ND		ug/kg	0.966	0.483	1
Cl9-BZ#206	ND		ug/kg	0.966	0.483	1
Cl10-BZ#209	ND		ug/kg	0.966	0.483	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	91		30-150
BZ 198	72		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-09
Client ID: CAD-2 5.3-10.8
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 14:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 19:08
Analyst: GP
Percent Solids: 50%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.13	4.56	1
Acenaphthylene	ND		ug/kg	9.13	4.56	1
Acenaphthene	ND		ug/kg	9.13	4.56	1
Fluorene	ND		ug/kg	9.13	4.56	1
Phenanthrene	ND		ug/kg	9.13	4.56	1
Anthracene	ND		ug/kg	9.13	4.56	1
Fluoranthene	ND		ug/kg	9.13	4.56	1
Pyrene	ND		ug/kg	9.13	4.56	1
Benz(a)anthracene	ND		ug/kg	9.13	4.56	1
Chrysene	ND		ug/kg	9.13	4.56	1
Benzo(b)fluoranthene	ND		ug/kg	9.13	4.56	1
Benzo(k)fluoranthene	ND		ug/kg	9.13	4.56	1
Benzo(a)pyrene	ND		ug/kg	9.13	4.56	1
Indeno(1,2,3-cd)Pyrene	4.56	J	ug/kg	9.13	4.56	1
Dibenz(a,h)anthracene	ND		ug/kg	9.13	4.56	1
Benzo(ghi)perylene	ND		ug/kg	9.13	4.56	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	77		30-150
Pyrene-d10	97		30-150
Benzo(b)fluoranthene-d12	95		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-10	Date Collected:	10/23/18 12:10
Client ID:	W1	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/25/19 23:17	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	39%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	1.59		ug/kg	1.26	0.631	1
Cl3-BZ#18	3.16		ug/kg	1.26	0.631	1
Cl3-BZ#28	2.64		ug/kg	1.26	0.631	1
Cl4-BZ#44	6.54		ug/kg	1.26	0.631	1
Cl4-BZ#49	7.42		ug/kg	1.26	0.631	1
Cl4-BZ#52	9.76		ug/kg	1.26	0.631	1
Cl4-BZ#66	5.70		ug/kg	1.26	0.631	1
Cl5-BZ#87	3.14		ug/kg	1.26	0.631	1
Cl5-BZ#101	10.6		ug/kg	1.26	0.631	1
Cl5-BZ#105	3.14		ug/kg	1.26	0.631	1
Cl5-BZ#118	9.02		ug/kg	1.26	0.631	1
Cl6-BZ#128	2.01		ug/kg	1.26	0.631	1
Cl6-BZ#138	12.8		ug/kg	1.26	0.631	1
Cl6-BZ#153	10.4		ug/kg	1.26	0.631	1
Cl7-BZ#170	2.84		ug/kg	1.26	0.631	1
Cl7-BZ#180	5.24		ug/kg	1.26	0.631	1
Cl7-BZ#183	1.66		ug/kg	1.26	0.631	1
Cl7-BZ#184	1.26		ug/kg	1.26	0.631	1
Cl7-BZ#187	5.56		ug/kg	1.26	0.631	1
Cl8-BZ#195	0.692	J	ug/kg	1.26	0.631	1
Cl9-BZ#206	1.66		ug/kg	1.26	0.631	1
Cl10-BZ#209	0.848	J	ug/kg	1.26	0.631	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	115		30-150
BZ 198	97		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-10 D
Client ID: W1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 02:26
Analyst: GP
Percent Solids: 39%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	152		ug/kg	59.5	29.8	5
Acenaphthylene	68.2		ug/kg	59.5	29.8	5
Acenaphthene	67.0		ug/kg	59.5	29.8	5
Fluorene	92.6		ug/kg	59.5	29.8	5
Phenanthrene	417		ug/kg	59.5	29.8	5
Anthracene	146		ug/kg	59.5	29.8	5
Fluoranthene	1250		ug/kg	59.5	29.8	5
Pyrene	1070		ug/kg	59.5	29.8	5
Benz(a)anthracene	530		ug/kg	59.5	29.8	5
Chrysene	673		ug/kg	59.5	29.8	5
Benzo(b)fluoranthene	640		ug/kg	59.5	29.8	5
Benzo(k)fluoranthene	570		ug/kg	59.5	29.8	5
Benzo(a)pyrene	583		ug/kg	59.5	29.8	5
Indeno(1,2,3-cd)Pyrene	547		ug/kg	59.5	29.8	5
Dibenz(a,h)anthracene	116		ug/kg	59.5	29.8	5
Benzo(ghi)perylene	515		ug/kg	59.5	29.8	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	94		30-150
Benzo(b)fluoranthene-d12	88		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-11
Client ID: V1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:31
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 23:50
Analyst: GP
Percent Solids: 32%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.54	0.770	1
Cl3-BZ#18	0.797	J	ug/kg	1.54	0.770	1
Cl3-BZ#28	0.937	J	ug/kg	1.54	0.770	1
Cl4-BZ#44	0.899	J	ug/kg	1.54	0.770	1
Cl4-BZ#49	1.18	J	ug/kg	1.54	0.770	1
Cl4-BZ#52	1.37	J	ug/kg	1.54	0.770	1
Cl4-BZ#66	1.80		ug/kg	1.54	0.770	1
Cl5-BZ#87	0.996	J	ug/kg	1.54	0.770	1
Cl5-BZ#101	2.51		ug/kg	1.54	0.770	1
Cl5-BZ#105	ND		ug/kg	1.54	0.770	1
Cl5-BZ#118	2.18		ug/kg	1.54	0.770	1
Cl6-BZ#128	0.913	J	ug/kg	1.54	0.770	1
Cl6-BZ#138	3.37		ug/kg	1.54	0.770	1
Cl6-BZ#153	2.84		ug/kg	1.54	0.770	1
Cl7-BZ#170	1.02	J	ug/kg	1.54	0.770	1
Cl7-BZ#180	1.66		ug/kg	1.54	0.770	1
Cl7-BZ#183	ND		ug/kg	1.54	0.770	1
Cl7-BZ#184	ND		ug/kg	1.54	0.770	1
Cl7-BZ#187	1.52	J	ug/kg	1.54	0.770	1
Cl8-BZ#195	ND		ug/kg	1.54	0.770	1
Cl9-BZ#206	1.15	J	ug/kg	1.54	0.770	1
Cl10-BZ#209	ND		ug/kg	1.54	0.770	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	121		30-150
BZ 198	96		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-11 D
Client ID: V1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:31
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 03:00
Analyst: GP
Percent Solids: 32%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	37.5	J	ug/kg	74.7	37.4	5
Acenaphthylene	ND		ug/kg	74.7	37.4	5
Acenaphthene	ND		ug/kg	74.7	37.4	5
Fluorene	ND		ug/kg	74.7	37.4	5
Phenanthrene	161		ug/kg	74.7	37.4	5
Anthracene	46.5	J	ug/kg	74.7	37.4	5
Fluoranthene	505		ug/kg	74.7	37.4	5
Pyrene	466		ug/kg	74.7	37.4	5
Benz(a)anthracene	229		ug/kg	74.7	37.4	5
Chrysene	338		ug/kg	74.7	37.4	5
Benzo(b)fluoranthene	329		ug/kg	74.7	37.4	5
Benzo(k)fluoranthene	292		ug/kg	74.7	37.4	5
Benzo(a)pyrene	282		ug/kg	74.7	37.4	5
Indeno(1,2,3-cd)Pyrene	309		ug/kg	74.7	37.4	5
Dibenz(a,h)anthracene	51.5	J	ug/kg	74.7	37.4	5
Benzo(ghi)perylene	258		ug/kg	74.7	37.4	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	85		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-12	Date Collected:	10/23/18 12:25
Client ID:	S1	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/26/19 00:24	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	41%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	0.689	J	ug/kg	1.16	0.583	1
Cl3-BZ#18	2.38		ug/kg	1.16	0.583	1
Cl3-BZ#28	1.49		ug/kg	1.16	0.583	1
Cl4-BZ#44	4.83		ug/kg	1.16	0.583	1
Cl4-BZ#49	4.43		ug/kg	1.16	0.583	1
Cl4-BZ#52	7.00		ug/kg	1.16	0.583	1
Cl4-BZ#66	2.96		ug/kg	1.16	0.583	1
Cl5-BZ#87	1.56		ug/kg	1.16	0.583	1
Cl5-BZ#101	6.01		ug/kg	1.16	0.583	1
Cl5-BZ#105	ND		ug/kg	1.16	0.583	1
Cl5-BZ#118	3.82		ug/kg	1.16	0.583	1
Cl6-BZ#128	1.66		ug/kg	1.16	0.583	1
Cl6-BZ#138	6.11		ug/kg	1.16	0.583	1
Cl6-BZ#153	5.26		ug/kg	1.16	0.583	1
Cl7-BZ#170	1.89		ug/kg	1.16	0.583	1
Cl7-BZ#180	2.52		ug/kg	1.16	0.583	1
Cl7-BZ#183	0.766	J	ug/kg	1.16	0.583	1
Cl7-BZ#184	ND		ug/kg	1.16	0.583	1
Cl7-BZ#187	2.43		ug/kg	1.16	0.583	1
Cl8-BZ#195	ND		ug/kg	1.16	0.583	1
Cl9-BZ#206	0.922	J	ug/kg	1.16	0.583	1
Cl10-BZ#209	ND		ug/kg	1.16	0.583	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	81		30-150
BZ 198	66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-12 D
Client ID: S1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 03:34
Analyst: GP
Percent Solids: 41%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	122		ug/kg	59.7	29.8	5
Acenaphthylene	35.4	J	ug/kg	59.7	29.8	5
Acenaphthene	46.2	J	ug/kg	59.7	29.8	5
Fluorene	42.3	J	ug/kg	59.7	29.8	5
Phenanthrene	176		ug/kg	59.7	29.8	5
Anthracene	105		ug/kg	59.7	29.8	5
Fluoranthene	762		ug/kg	59.7	29.8	5
Pyrene	678		ug/kg	59.7	29.8	5
Benz(a)anthracene	327		ug/kg	59.7	29.8	5
Chrysene	382		ug/kg	59.7	29.8	5
Benzo(b)fluoranthene	370		ug/kg	59.7	29.8	5
Benzo(k)fluoranthene	368		ug/kg	59.7	29.8	5
Benzo(a)pyrene	356		ug/kg	59.7	29.8	5
Indeno(1,2,3-cd)Pyrene	360		ug/kg	59.7	29.8	5
Dibenz(a,h)anthracene	62.6		ug/kg	59.7	29.8	5
Benzo(ghi)perylene	306		ug/kg	59.7	29.8	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	65		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	79		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-13	Date Collected:	10/23/18 12:39
Client ID:	R1	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/26/19 00:58	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	41%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	0.635	J	ug/kg	1.20	0.598	1
Cl3-BZ#18	1.25		ug/kg	1.20	0.598	1
Cl3-BZ#28	1.03	J	ug/kg	1.20	0.598	1
Cl4-BZ#44	2.75		ug/kg	1.20	0.598	1
Cl4-BZ#49	2.27		ug/kg	1.20	0.598	1
Cl4-BZ#52	2.77		ug/kg	1.20	0.598	1
Cl4-BZ#66	1.87		ug/kg	1.20	0.598	1
Cl5-BZ#87	0.976	J	ug/kg	1.20	0.598	1
Cl5-BZ#101	3.30		ug/kg	1.20	0.598	1
Cl5-BZ#105	ND		ug/kg	1.20	0.598	1
Cl5-BZ#118	2.11		ug/kg	1.20	0.598	1
Cl6-BZ#128	0.984	J	ug/kg	1.20	0.598	1
Cl6-BZ#138	3.53		ug/kg	1.20	0.598	1
Cl6-BZ#153	3.39		ug/kg	1.20	0.598	1
Cl7-BZ#170	1.42		ug/kg	1.20	0.598	1
Cl7-BZ#180	2.12		ug/kg	1.20	0.598	1
Cl7-BZ#183	0.683	J	ug/kg	1.20	0.598	1
Cl7-BZ#184	ND		ug/kg	1.20	0.598	1
Cl7-BZ#187	1.76		ug/kg	1.20	0.598	1
Cl8-BZ#195	ND		ug/kg	1.20	0.598	1
Cl9-BZ#206	0.995	J	ug/kg	1.20	0.598	1
Cl10-BZ#209	0.620	J	ug/kg	1.20	0.598	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	97		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-13 D
Client ID: R1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:39
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 04:08
Analyst: GP
Percent Solids: 41%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	90.0		ug/kg	58.5	29.2	5
Acenaphthylene	51.4	J	ug/kg	58.5	29.2	5
Acenaphthene	40.0	J	ug/kg	58.5	29.2	5
Fluorene	53.8	J	ug/kg	58.5	29.2	5
Phenanthrene	290		ug/kg	58.5	29.2	5
Anthracene	95.4		ug/kg	58.5	29.2	5
Fluoranthene	811		ug/kg	58.5	29.2	5
Pyrene	710		ug/kg	58.5	29.2	5
Benz(a)anthracene	358		ug/kg	58.5	29.2	5
Chrysene	435		ug/kg	58.5	29.2	5
Benzo(b)fluoranthene	448		ug/kg	58.5	29.2	5
Benzo(k)fluoranthene	425		ug/kg	58.5	29.2	5
Benzo(a)pyrene	420		ug/kg	58.5	29.2	5
Indeno(1,2,3-cd)Pyrene	421		ug/kg	58.5	29.2	5
Dibenz(a,h)anthracene	75.4		ug/kg	58.5	29.2	5
Benzo(ghi)perylene	369		ug/kg	58.5	29.2	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	84		30-150
Benzo(b)fluoranthene-d12	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-14	Date Collected:	10/23/18 15:00
Client ID:	CAD-3 6.1-9.9	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/25/19 15:28	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	55%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	0.883	0.442	1
Cl3-BZ#18	ND		ug/kg	0.883	0.442	1
Cl3-BZ#28	ND		ug/kg	0.883	0.442	1
Cl4-BZ#44	ND		ug/kg	0.883	0.442	1
Cl4-BZ#49	ND		ug/kg	0.883	0.442	1
Cl4-BZ#52	ND		ug/kg	0.883	0.442	1
Cl4-BZ#66	ND		ug/kg	0.883	0.442	1
Cl5-BZ#87	ND		ug/kg	0.883	0.442	1
Cl5-BZ#101	ND		ug/kg	0.883	0.442	1
Cl5-BZ#105	ND		ug/kg	0.883	0.442	1
Cl5-BZ#118	ND		ug/kg	0.883	0.442	1
Cl6-BZ#128	ND		ug/kg	0.883	0.442	1
Cl6-BZ#138	ND		ug/kg	0.883	0.442	1
Cl6-BZ#153	ND		ug/kg	0.883	0.442	1
Cl7-BZ#170	ND		ug/kg	0.883	0.442	1
Cl7-BZ#180	ND		ug/kg	0.883	0.442	1
Cl7-BZ#183	ND		ug/kg	0.883	0.442	1
Cl7-BZ#184	ND		ug/kg	0.883	0.442	1
Cl7-BZ#187	ND		ug/kg	0.883	0.442	1
Cl8-BZ#195	ND		ug/kg	0.883	0.442	1
Cl9-BZ#206	ND		ug/kg	0.883	0.442	1
Cl10-BZ#209	ND		ug/kg	0.883	0.442	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	59		30-150
BZ 198	54		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-14
Client ID: CAD-3 6.1-9.9
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 15:00
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 19:42
Analyst: GP
Percent Solids: 55%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.43	4.21	1
Acenaphthylene	ND		ug/kg	8.43	4.21	1
Acenaphthene	ND		ug/kg	8.43	4.21	1
Fluorene	ND		ug/kg	8.43	4.21	1
Phenanthrene	4.62	J	ug/kg	8.43	4.21	1
Anthracene	ND		ug/kg	8.43	4.21	1
Fluoranthene	11.5		ug/kg	8.43	4.21	1
Pyrene	9.62		ug/kg	8.43	4.21	1
Benz(a)anthracene	5.46	J	ug/kg	8.43	4.21	1
Chrysene	4.38	J	ug/kg	8.43	4.21	1
Benzo(b)fluoranthene	5.25	J	ug/kg	8.43	4.21	1
Benzo(k)fluoranthene	ND		ug/kg	8.43	4.21	1
Benzo(a)pyrene	4.33	J	ug/kg	8.43	4.21	1
Indeno(1,2,3-cd)Pyrene	7.57	J	ug/kg	8.43	4.21	1
Dibenz(a,h)anthracene	ND		ug/kg	8.43	4.21	1
Benzo(ghi)perylene	ND		ug/kg	8.43	4.21	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	87		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-15
Client ID: CAD-1 0-4.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:34
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/26/19 01:31
Analyst: GP
Percent Solids: 43%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.14	0.572	1
Cl3-BZ#18	ND		ug/kg	1.14	0.572	1
Cl3-BZ#28	ND		ug/kg	1.14	0.572	1
Cl4-BZ#44	0.803	J	ug/kg	1.14	0.572	1
Cl4-BZ#49	0.731	J	ug/kg	1.14	0.572	1
Cl4-BZ#52	0.739	J	ug/kg	1.14	0.572	1
Cl4-BZ#66	0.671	J	ug/kg	1.14	0.572	1
Cl5-BZ#87	ND		ug/kg	1.14	0.572	1
Cl5-BZ#101	1.27		ug/kg	1.14	0.572	1
Cl5-BZ#105	ND		ug/kg	1.14	0.572	1
Cl5-BZ#118	1.01	J	ug/kg	1.14	0.572	1
Cl6-BZ#128	ND		ug/kg	1.14	0.572	1
Cl6-BZ#138	1.53		ug/kg	1.14	0.572	1
Cl6-BZ#153	1.37		ug/kg	1.14	0.572	1
Cl7-BZ#170	ND		ug/kg	1.14	0.572	1
Cl7-BZ#180	0.883	J	ug/kg	1.14	0.572	1
Cl7-BZ#183	ND		ug/kg	1.14	0.572	1
Cl7-BZ#184	ND		ug/kg	1.14	0.572	1
Cl7-BZ#187	0.757	J	ug/kg	1.14	0.572	1
Cl8-BZ#195	ND		ug/kg	1.14	0.572	1
Cl9-BZ#206	0.638	J	ug/kg	1.14	0.572	1
Cl10-BZ#209	ND		ug/kg	1.14	0.572	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	89		30-150
BZ 198	68		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-15 D
Client ID: CAD-1 0-4.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:34
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 04:42
Analyst: GP
Percent Solids: 43%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	92.9		ug/kg	54.1	27.0	5
Acenaphthylene	47.8	J	ug/kg	54.1	27.0	5
Acenaphthene	ND		ug/kg	54.1	27.0	5
Fluorene	37.2	J	ug/kg	54.1	27.0	5
Phenanthrene	250		ug/kg	54.1	27.0	5
Anthracene	91.0		ug/kg	54.1	27.0	5
Fluoranthene	769		ug/kg	54.1	27.0	5
Pyrene	893		ug/kg	54.1	27.0	5
Benz(a)anthracene	423		ug/kg	54.1	27.0	5
Chrysene	462		ug/kg	54.1	27.0	5
Benzo(b)fluoranthene	461		ug/kg	54.1	27.0	5
Benzo(k)fluoranthene	455		ug/kg	54.1	27.0	5
Benzo(a)pyrene	522		ug/kg	54.1	27.0	5
Indeno(1,2,3-cd)Pyrene	488		ug/kg	54.1	27.0	5
Dibenz(a,h)anthracene	89.2		ug/kg	54.1	27.0	5
Benzo(ghi)perylene	435		ug/kg	54.1	27.0	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	69		30-150
Pyrene-d10	80		30-150
Benzo(b)fluoranthene-d12	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-16	Date Collected:	10/23/18 16:30
Client ID:	CAD-1 4.4-9.0	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	03/22/19 19:57
Analytical Date:	03/26/19 02:04	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	03/24/19
Percent Solids:	51%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	0.985	0.493	1
Cl3-BZ#18	ND		ug/kg	0.985	0.493	1
Cl3-BZ#28	ND		ug/kg	0.985	0.493	1
Cl4-BZ#44	ND		ug/kg	0.985	0.493	1
Cl4-BZ#49	ND		ug/kg	0.985	0.493	1
Cl4-BZ#52	ND		ug/kg	0.985	0.493	1
Cl4-BZ#66	ND		ug/kg	0.985	0.493	1
Cl5-BZ#87	ND		ug/kg	0.985	0.493	1
Cl5-BZ#101	ND		ug/kg	0.985	0.493	1
Cl5-BZ#105	ND		ug/kg	0.985	0.493	1
Cl5-BZ#118	ND		ug/kg	0.985	0.493	1
Cl6-BZ#128	ND		ug/kg	0.985	0.493	1
Cl6-BZ#138	ND		ug/kg	0.985	0.493	1
Cl6-BZ#153	ND		ug/kg	0.985	0.493	1
Cl7-BZ#170	ND		ug/kg	0.985	0.493	1
Cl7-BZ#180	ND		ug/kg	0.985	0.493	1
Cl7-BZ#183	ND		ug/kg	0.985	0.493	1
Cl7-BZ#184	ND		ug/kg	0.985	0.493	1
Cl7-BZ#187	ND		ug/kg	0.985	0.493	1
Cl8-BZ#195	ND		ug/kg	0.985	0.493	1
Cl9-BZ#206	ND		ug/kg	0.985	0.493	1
Cl10-BZ#209	ND		ug/kg	0.985	0.493	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	93		30-150
BZ 198	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID:	L1843305-16	Date Collected:	10/23/18 16:30
Client ID:	CAD-1 4.4-9.0	Date Received:	10/24/18
Sample Location:	NEW HAVEN, CT	Field Prep:	Not Specified
Sample Depth:			
Matrix:	Sediment	Extraction Method:	EPA 3570
Analytical Method:	105,8270D-SIM/680(M)	Extraction Date:	10/28/18 11:09
Analytical Date:	11/15/18 20:15	Cleanup Method:	EPA 3630
Analyst:	GP	Cleanup Date:	10/29/18
Percent Solids:	51%		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.27	4.63	1
Acenaphthylene	ND		ug/kg	9.27	4.63	1
Acenaphthene	ND		ug/kg	9.27	4.63	1
Fluorene	ND		ug/kg	9.27	4.63	1
Phenanthrene	8.47	J	ug/kg	9.27	4.63	1
Anthracene	ND		ug/kg	9.27	4.63	1
Fluoranthene	16.2		ug/kg	9.27	4.63	1
Pyrene	16.2		ug/kg	9.27	4.63	1
Benz(a)anthracene	8.61	J	ug/kg	9.27	4.63	1
Chrysene	7.87	J	ug/kg	9.27	4.63	1
Benzo(b)fluoranthene	8.37	J	ug/kg	9.27	4.63	1
Benzo(k)fluoranthene	5.78	J	ug/kg	9.27	4.63	1
Benzo(a)pyrene	8.76	J	ug/kg	9.27	4.63	1
Indeno(1,2,3-cd)Pyrene	10.6		ug/kg	9.27	4.63	1
Dibenz(a,h)anthracene	ND		ug/kg	9.27	4.63	1
Benzo(ghi)perylene	7.01	J	ug/kg	9.27	4.63	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	65		30-150
Pyrene-d10	88		30-150
Benzo(b)fluoranthene-d12	85		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-17
Client ID: DS-1 0-7.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/26/19 02:37
Analyst: GP
Percent Solids: 37%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	ND		ug/kg	1.31	0.657	1
Cl3-BZ#18	1.68		ug/kg	1.31	0.657	1
Cl3-BZ#28	2.00		ug/kg	1.31	0.657	1
Cl4-BZ#44	3.75		ug/kg	1.31	0.657	1
Cl4-BZ#49	3.33		ug/kg	1.31	0.657	1
Cl4-BZ#52	3.85		ug/kg	1.31	0.657	1
Cl4-BZ#66	3.71		ug/kg	1.31	0.657	1
Cl5-BZ#87	1.70		ug/kg	1.31	0.657	1
Cl5-BZ#101	5.91		ug/kg	1.31	0.657	1
Cl5-BZ#105	1.15	J	ug/kg	1.31	0.657	1
Cl5-BZ#118	4.89		ug/kg	1.31	0.657	1
Cl6-BZ#128	2.02		ug/kg	1.31	0.657	1
Cl6-BZ#138	6.50		ug/kg	1.31	0.657	1
Cl6-BZ#153	6.01		ug/kg	1.31	0.657	1
Cl7-BZ#170	2.60		ug/kg	1.31	0.657	1
Cl7-BZ#180	3.52		ug/kg	1.31	0.657	1
Cl7-BZ#183	1.07	J	ug/kg	1.31	0.657	1
Cl7-BZ#184	ND		ug/kg	1.31	0.657	1
Cl7-BZ#187	3.20		ug/kg	1.31	0.657	1
Cl8-BZ#195	1.03	J	ug/kg	1.31	0.657	1
Cl9-BZ#206	1.44		ug/kg	1.31	0.657	1
Cl10-BZ#209	0.884	J	ug/kg	1.31	0.657	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	118		30-150
BZ 198	96		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-17 D
Client ID: DS-1 0-7.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 05:16
Analyst: GP
Percent Solids: 37%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	121		ug/kg	66.2	33.1	5
Acenaphthylene	38.1	J	ug/kg	66.2	33.1	5
Acenaphthene	ND		ug/kg	66.2	33.1	5
Fluorene	34.2	J	ug/kg	66.2	33.1	5
Phenanthrene	183		ug/kg	66.2	33.1	5
Anthracene	58.1	J	ug/kg	66.2	33.1	5
Fluoranthene	499		ug/kg	66.2	33.1	5
Pyrene	469		ug/kg	66.2	33.1	5
Benz(a)anthracene	230		ug/kg	66.2	33.1	5
Chrysene	291		ug/kg	66.2	33.1	5
Benzo(b)fluoranthene	292		ug/kg	66.2	33.1	5
Benzo(k)fluoranthene	307		ug/kg	66.2	33.1	5
Benzo(a)pyrene	273		ug/kg	66.2	33.1	5
Indeno(1,2,3-cd)Pyrene	302		ug/kg	66.2	33.1	5
Dibenz(a,h)anthracene	58.3	J	ug/kg	66.2	33.1	5
Benzo(ghi)perylene	251		ug/kg	66.2	33.1	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	86		30-150
Benzo(b)fluoranthene-d12	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-18
Client ID: DS-2 0-7.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 17:35
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/26/19 03:11
Analyst: GP
Percent Solids: 38%

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl2-BZ#8	1.25	J	ug/kg	1.32	0.661	1
Cl3-BZ#18	2.98		ug/kg	1.32	0.661	1
Cl3-BZ#28	3.96		ug/kg	1.32	0.661	1
Cl4-BZ#44	9.98		ug/kg	1.32	0.661	1
Cl4-BZ#49	6.28		ug/kg	1.32	0.661	1
Cl4-BZ#52	8.39		ug/kg	1.32	0.661	1
Cl4-BZ#66	6.84		ug/kg	1.32	0.661	1
Cl5-BZ#87	4.30		ug/kg	1.32	0.661	1
Cl5-BZ#101	13.7		ug/kg	1.32	0.661	1
Cl5-BZ#105	3.07		ug/kg	1.32	0.661	1
Cl5-BZ#118	9.47		ug/kg	1.32	0.661	1
Cl6-BZ#128	3.32		ug/kg	1.32	0.661	1
Cl6-BZ#138	14.1		ug/kg	1.32	0.661	1
Cl6-BZ#153	11.5		ug/kg	1.32	0.661	1
Cl7-BZ#170	4.38		ug/kg	1.32	0.661	1
Cl7-BZ#180	7.12		ug/kg	1.32	0.661	1
Cl7-BZ#183	2.04		ug/kg	1.32	0.661	1
Cl7-BZ#184	ND		ug/kg	1.32	0.661	1
Cl7-BZ#187	6.78		ug/kg	1.32	0.661	1
Cl8-BZ#195	0.812	J	ug/kg	1.32	0.661	1
Cl9-BZ#206	2.46		ug/kg	1.32	0.661	1
Cl10-BZ#209	1.01	J	ug/kg	1.32	0.661	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
DBOB	116		30-150
BZ 198	97		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-18 D
Client ID: DS-2 0-7.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 17:35
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/16/18 05:50
Analyst: GP
Percent Solids: 38%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	947		ug/kg	65.2	32.6	5
Acenaphthylene	42.5	J	ug/kg	65.2	32.6	5
Acenaphthene	82.3		ug/kg	65.2	32.6	5
Fluorene	97.1		ug/kg	65.2	32.6	5
Phenanthrene	365		ug/kg	65.2	32.6	5
Anthracene	128		ug/kg	65.2	32.6	5
Fluoranthene	818		ug/kg	65.2	32.6	5
Pyrene	705		ug/kg	65.2	32.6	5
Benz(a)anthracene	377		ug/kg	65.2	32.6	5
Chrysene	446		ug/kg	65.2	32.6	5
Benzo(b)fluoranthene	421		ug/kg	65.2	32.6	5
Benzo(k)fluoranthene	293		ug/kg	65.2	32.6	5
Benzo(a)pyrene	337		ug/kg	65.2	32.6	5
Indeno(1,2,3-cd)Pyrene	317		ug/kg	65.2	32.6	5
Dibenz(a,h)anthracene	62.6	J	ug/kg	65.2	32.6	5
Benzo(ghi)perylene	286		ug/kg	65.2	32.6	5

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	81		30-150
Benzo(b)fluoranthene-d12	77		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 11/15/18 14:56
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-18 Batch: WG1173138-1					
Naphthalene	ND		ug/kg	5.00	2.50
Acenaphthylene	ND		ug/kg	5.00	2.50
Acenaphthene	ND		ug/kg	5.00	2.50
Fluorene	ND		ug/kg	5.00	2.50
Phenanthrene	ND		ug/kg	5.00	2.50
Anthracene	ND		ug/kg	5.00	2.50
Fluoranthene	ND		ug/kg	5.00	2.50
Pyrene	ND		ug/kg	5.00	2.50
Benz(a)anthracene	ND		ug/kg	5.00	2.50
Chrysene	ND		ug/kg	5.00	2.50
Benzo(b)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(k)fluoranthene	ND		ug/kg	5.00	2.50
Benzo(a)pyrene	ND		ug/kg	5.00	2.50
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	5.00	2.50
Dibenz(a,h)anthracene	ND		ug/kg	5.00	2.50
Benzo(ghi)perylene	ND		ug/kg	5.00	2.50

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	95		30-150
Benzo(b)fluoranthene-d12	97		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 03/25/19 12:35
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 03/22/19 19:57
Cleanup Method: EPA 3630
Cleanup Date: 03/24/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-18 Batch: WG1223124-1					
Cl2-BZ#8	ND		ug/kg	0.500	0.250
Cl3-BZ#18	ND		ug/kg	0.500	0.250
Cl3-BZ#28	ND		ug/kg	0.500	0.250
Cl4-BZ#44	ND		ug/kg	0.500	0.250
Cl4-BZ#49	ND		ug/kg	0.500	0.250
Cl4-BZ#52	ND		ug/kg	0.500	0.250
Cl4-BZ#66	ND		ug/kg	0.500	0.250
Cl5-BZ#87	ND		ug/kg	0.500	0.250
Cl5-BZ#101	ND		ug/kg	0.500	0.250
Cl5-BZ#105	ND		ug/kg	0.500	0.250
Cl5-BZ#118	ND		ug/kg	0.500	0.250
Cl6-BZ#128	ND		ug/kg	0.500	0.250
Cl6-BZ#138	ND		ug/kg	0.500	0.250
Cl6-BZ#153	ND		ug/kg	0.500	0.250
Cl7-BZ#170	ND		ug/kg	0.500	0.250
Cl7-BZ#180	ND		ug/kg	0.500	0.250
Cl7-BZ#183	ND		ug/kg	0.500	0.250
Cl7-BZ#184	ND		ug/kg	0.500	0.250
Cl7-BZ#187	ND		ug/kg	0.500	0.250
Cl8-BZ#195	ND		ug/kg	0.500	0.250
Cl9-BZ#206	ND		ug/kg	0.500	0.250
Cl10-BZ#209	ND		ug/kg	0.500	0.250

Surrogate	%Recovery	Qualifier	Acceptance Criteria
DBOB	95		30-150
BZ 198	79		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0
Lab Number: L1843305
Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 Batch: WG1173138-2 WG1173138-3								
Naphthalene	71		74		50-120	4		30
Acenaphthylene	67		70		50-120	4		30
Acenaphthene	70		72		50-120	3		30
Fluorene	72		72		50-120	0		30
Phenanthrene	75		73		50-120	3		30
Anthracene	77		76		50-120	1		30
Fluoranthene	79		75		50-120	5		30
Pyrene	74		72		50-120	3		30
Benz(a)anthracene	86		84		50-120	2		30
Chrysene	77		76		50-120	1		30
Benzo(b)fluoranthene	90		89		50-120	1		30
Benzo(k)fluoranthene	77		78		50-120	1		30
Benzo(a)pyrene	83		81		50-120	2		30
Indeno(1,2,3-cd)Pyrene	95		96		50-120	1		30
Dibenz(a,h)anthracene	90		88		50-120	2		30
Benzo(ghi)perylene	85		83		50-120	2		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	72		73		30-150
Pyrene-d10	85		82		30-150
Benzo(b)fluoranthene-d12	87		85		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0
Lab Number: L1843305
Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 Batch: WG1223124-2 WG1223124-3								
Cl2-BZ#8	70		68		50-120	3		30
Cl3-BZ#18	70		69		50-120	1		30
Cl3-BZ#28	72		71		50-120	1		30
Cl4-BZ#44	76		75		50-120	1		30
Cl4-BZ#49	74		73		50-120	1		30
Cl4-BZ#52	72		71		50-120	1		30
Cl4-BZ#66	76		75		50-120	1		30
Cl5-BZ#87	77		76		50-120	1		30
Cl5-BZ#101	77		76		50-120	1		30
Cl5-BZ#105	80		78		50-120	3		30
Cl5-BZ#118	75		74		50-120	1		30
Cl6-BZ#128	78		77		50-120	1		30
Cl6-BZ#138	82		81		50-120	1		30
Cl6-BZ#153	77		76		50-120	1		30
Cl7-BZ#170	80		79		50-120	1		30
Cl7-BZ#180	77		75		50-120	3		30
Cl7-BZ#183	74		74		50-120	0		30
Cl7-BZ#184	76		76		50-120	0		30
Cl7-BZ#187	75		76		50-120	1		30
Cl8-BZ#195	83		81		50-120	2		30
Cl9-BZ#206	84		82		50-120	2		30
Cl10-BZ#209	80		79		50-120	1		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 Batch: WG1223124-2 WG1223124-3								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
DBOB	89		88		30-150
BZ 198	78		78		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1173138-6 WG1173138-7 QC Sample: L1843305-07 Client ID: US-1 0-5.5												
Naphthalene	75.2	645	597	81		586	80		50-120	2		30
Acenaphthylene	52.7J	645	553	86		535	83		50-120	3		30
Acenaphthene	51.4J	645	570	88		537	84		50-120	6		30
Fluorene	55.9J	645	592	92		552	86		50-120	7		30
Phenanthrene	323	645	826	78		800	74		50-120	3		30
Anthracene	104	645	685	90		643	84		50-120	6		30
Fluoranthene	1110	645	1630	81		1580	73		50-120	3		30
Pyrene	954	645	1480	82		1460	79		50-120	1		30
Benz(a)anthracene	511	645	1070	87		1090	90		50-120	2		30
Chrysene	624	645	1130	78		1100	74		50-120	3		30
Benzo(b)fluoranthene	595	645	1150	86		1130	83		50-120	2		30
Benzo(k)fluoranthene	488	645	1070	90		1070	91		50-120	0		30
Benzo(a)pyrene	522	645	1100	90		1090	88		50-120	1		30
Indeno(1,2,3-cd)Pyrene	520	645	1160	99		1120	93		50-120	4		30
Dibenz(a,h)anthracene	89.4	645	782	107		746	102		50-120	5		30
Benzo(ghi)perylene	439	645	1040	93		989	86		50-120	5		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		79		30-150
Benzo(b)fluoranthene-d12	93		89		30-150
Pyrene-d10	98		94		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1223124-5 WG1223124-6 QC Sample: L1843305-07 Client ID: US-1 0-5.5												
Cl2-BZ#8	ND	137	89.5	65		89.8	67		50-120	0		30
Cl3-BZ#18	1.44	137	87.9	63		88.1	64		50-120	0		30
Cl3-BZ#28	ND	137	90.1	66		91.6	68		50-120	2		30
Cl4-BZ#44	0.779J	137	96.4	71		97.1	72		50-120	1		30
Cl4-BZ#49	0.802J	137	85.4	62		84.8	63		50-120	1		30
Cl4-BZ#52	1.25J	137	99.4	73		99.9	74		50-120	1		30
Cl4-BZ#66	0.801J	137	97.3	71		97.3	72		50-120	0		30
Cl5-BZ#87	1.43	137	99.3	72		99.0	72		50-120	0		30
Cl5-BZ#101	2.66	137	100	71		108	78		50-120	8		30
Cl5-BZ#105	0.918J	137	97.7	71		99.6	74		50-120	2		30
Cl5-BZ#118	2.37	137	94.5	67		94.6	68		50-120	0		30
Cl6-BZ#128	0.963J	137	107	78		107	79		50-120	0		30
Cl6-BZ#138	3.38	137	114	81		113	81		50-120	1		30
Cl6-BZ#153	2.48	137	104	74		104	75		50-120	0		30
Cl7-BZ#170	ND	137	117	86		118	88		50-120	1		30
Cl7-BZ#180	1.54	137	102	73		102	75		50-120	0		30
Cl7-BZ#183	ND	137	93.7	69		96.3	71		50-120	3		30
Cl7-BZ#184	ND	137	101	74		101	75		50-120	0		30
Cl7-BZ#187	0.922J	137	118	86		114	85		50-120	3		30
Cl8-BZ#195	ND	137	128	94		126	93		50-120	2		30
Cl9-BZ#206	ND	137	125	91		124	92		50-120	1		30
Cl10-BZ#209	ND	137	113	83		113	84		50-120	0		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1223124-5 WG1223124-6 QC Sample: L1843305-07 Client ID: US-1 0-5.5												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
BZ 198	90		92		30-150
DBOB	110		108		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1173138-5 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Naphthalene	75.2	74.1	ug/kg	1		30
Acenaphthylene	52.7J	44.5J	ug/kg	NC		30
Acenaphthene	51.4J	38.8J	ug/kg	NC		30
Fluorene	55.9J	52.3J	ug/kg	NC		30
Phenanthrene	323	298	ug/kg	8		30
Anthracene	104	128	ug/kg	21		30
Fluoranthene	1110	938	ug/kg	17		30
Pyrene	954	805	ug/kg	17		30
Benz(a)anthracene	511	428	ug/kg	18		30
Chrysene	624	595	ug/kg	5		30
Benzo(b)fluoranthene	595	531	ug/kg	11		30
Benzo(k)fluoranthene	488	430	ug/kg	13		30
Benzo(a)pyrene	522	458	ug/kg	13		30
Indeno(1,2,3-cd)Pyrene	520	458	ug/kg	13		30
Dibenz(a,h)anthracene	89.4	89.0	ug/kg	0		30
Benzo(ghi)perylene	439	390	ug/kg	12		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		74		30-150
Pyrene-d10	97		87		30-150
Benzo(b)fluoranthene-d12	92		81		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1223124-4 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	1.44	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	0.779J	0.806J	ug/kg	NC		30
Cl4-BZ#49	0.802J	ND	ug/kg	NC		30
Cl4-BZ#52	1.25J	1.02J	ug/kg	NC		30
Cl4-BZ#66	0.801J	ND	ug/kg	NC		30
Cl5-BZ#87	1.43	0.755J	ug/kg	NC		30
Cl5-BZ#101	2.66	1.74	ug/kg	**42**	Q	30
Cl5-BZ#105	0.918J	ND	ug/kg	NC		30
Cl5-BZ#118	2.37	1.48	ug/kg	**46**	Q	30
Cl6-BZ#128	0.963J	ND	ug/kg	NC		30
Cl6-BZ#138	3.38	2.00	ug/kg	**51**	Q	30
Cl6-BZ#153	2.48	1.57	ug/kg	**45**	Q	30
Cl7-BZ#170	ND	0.684J	ug/kg	NC		30
Cl7-BZ#180	1.54	0.960J	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	0.922J	0.689J	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1223124-4 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
DBOB	105		82		30-150
BZ 198	86		66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1173138-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	56		40-140
Fluoranthene	55		40-140
Pyrene	50		40-140
Benz(a)anthracene	55		40-140
Chrysene	68		40-140
Benzo(b)fluoranthene	57		40-140
Benzo(k)fluoranthene	97		40-140
Benzo(a)pyrene	49		40-140
Indeno(1,2,3-cd)Pyrene	70		40-140
Dibenz(a,h)anthracene	110		40-140
Benzo(ghi)perylene	61		40-140
2-Methylnaphthalene-d10 (Surrogate)	62		30-150
Pyrene-d10 (Surrogate)	73		30-150
Benzo(b)fluoranthene-d12 (Surrogate)	66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1223124-7

Parameter	% Recovery	Qual	QC Criteria
Cl2-BZ#8	53		40-140
Cl3-BZ#18	47		40-140
Cl3-BZ#28	42		40-140
Cl4-BZ#44	73		40-140
Cl4-BZ#49	50		40-140
Cl4-BZ#52	51		40-140
Cl4-BZ#66	42		40-140
Cl5-BZ#87	55		40-140
Cl5-BZ#101	56		40-140
Cl5-BZ#105	50		40-140
Cl5-BZ#118	50		40-140
Cl6-BZ#128	74		40-140
Cl6-BZ#138	62		40-140
Cl6-BZ#153	40		40-140
Cl7-BZ#170	62		40-140
Cl7-BZ#180	48		40-140
Cl7-BZ#183	46		40-140
Cl7-BZ#187	69		40-140
Cl9-BZ#206	63		40-140
Cl10-BZ#209	65		40-140
DBOB (Surrogate)	78		30-150
BZ 198 (Surrogate)	70		30-150

PESTICIDES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-01
Client ID: TB-2
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 16:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/13/18 22:44
Analyst: DP
Percent Solids: 37%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.31	1.31	1	A
gamma-BHC	ND		ug/kg	0.656	0.656	1	A
Heptachlor	ND		ug/kg	0.656	0.656	1	A
Aldrin	ND		ug/kg	0.656	0.656	1	A
Heptachlor epoxide	ND		ug/kg	1.31	1.31	1	B
Oxychlordane	3.73		ug/kg	1.31	1.31	1	B
trans-Chlordane	5.78	P	ug/kg	0.656	0.656	1	A
Endosulfan I	ND		ug/kg	0.656	0.656	1	A
cis-Chlordane	ND		ug/kg	0.656	0.656	1	A
trans-Nonachlor	ND		ug/kg	0.656	0.656	1	B
4,4'-DDE	1.93		ug/kg	0.656	0.656	1	A
Dieldrin	1.79	P	ug/kg	0.656	0.656	1	B
Endrin	ND		ug/kg	0.656	0.656	1	A
Endosulfan II	ND		ug/kg	0.656	0.656	1	B
4,4'-DDD	0.932		ug/kg	0.656	0.656	1	A
cis-Nonachlor	ND		ug/kg	0.656	0.656	1	B
4,4'-DDT	2.14	P	ug/kg	0.656	0.656	1	B
Methoxychlor	ND		ug/kg	2.62	2.62	1	B
Toxaphene	ND		ug/kg	32.9	32.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	B
BZ 198	74		30-150	B
DBOB	77		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-02
Client ID: US-2 0.0-5.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 17:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/13/18 23:18
Analyst: DP
Percent Solids: 42%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.14	1.14	1	A
gamma-BHC	1.23		ug/kg	0.571	0.571	1	B
Heptachlor	ND		ug/kg	0.571	0.571	1	A
Aldrin	ND		ug/kg	0.571	0.571	1	A
Heptachlor epoxide	ND		ug/kg	1.14	1.14	1	B
Oxychlordane	10.6		ug/kg	1.14	1.14	1	B
trans-Chlordane	36.0	P	ug/kg	0.571	0.571	1	A
Endosulfan I	ND		ug/kg	0.571	0.571	1	A
cis-Chlordane	1.49	P	ug/kg	0.571	0.571	1	A
trans-Nonachlor	3.65	P	ug/kg	0.571	0.571	1	A
4,4'-DDE	6.16		ug/kg	0.571	0.571	1	A
Dieldrin	1.12	IP	ug/kg	0.571	0.571	1	A
Endrin	ND		ug/kg	0.571	0.571	1	A
Endosulfan II	10.2	P	ug/kg	0.571	0.571	1	A
4,4'-DDD	1.84		ug/kg	0.571	0.571	1	A
cis-Nonachlor	1.85	P	ug/kg	0.571	0.571	1	B
4,4'-DDT	4.70	IP	ug/kg	0.571	0.571	1	A
Methoxychlor	7.97	P	ug/kg	2.28	2.28	1	B
Toxaphene	ND		ug/kg	28.6	28.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	B
BZ 198	78		30-150	B
DBOB	85		30-150	A
BZ 198	85		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-03
Client ID: US-2 5.0-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 15:17
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/13/18 23:52
Analyst: DP
Percent Solids: 75%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.20	1.20	1	A
gamma-BHC	ND		ug/kg	0.599	0.599	1	A
Heptachlor	ND		ug/kg	0.599	0.599	1	A
Aldrin	ND		ug/kg	0.599	0.599	1	A
Heptachlor epoxide	ND		ug/kg	1.20	1.20	1	B
Oxychlordane	ND		ug/kg	1.20	1.20	1	B
trans-Chlordane	ND		ug/kg	0.599	0.599	1	A
Endosulfan I	ND		ug/kg	0.599	0.599	1	A
cis-Chlordane	ND		ug/kg	0.599	0.599	1	A
trans-Nonachlor	ND		ug/kg	0.599	0.599	1	A
4,4'-DDE	ND		ug/kg	0.599	0.599	1	A
Dieldrin	ND		ug/kg	0.599	0.599	1	A
Endrin	ND		ug/kg	0.599	0.599	1	A
Endosulfan II	ND		ug/kg	0.599	0.599	1	A
4,4'-DDD	ND		ug/kg	0.599	0.599	1	A
cis-Nonachlor	ND		ug/kg	0.599	0.599	1	A
4,4'-DDT	ND		ug/kg	0.599	0.599	1	A
Methoxychlor	ND		ug/kg	2.40	2.40	1	A
Toxaphene	ND		ug/kg	30.1	30.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	56		30-150	B
BZ 198	65		30-150	B
DBOB	60		30-150	A
BZ 198	65		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-04
Client ID: TB-1 0-5.2
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 00:26
Analyst: DP
Percent Solids: 38%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.32	1.32	1	A
gamma-BHC	ND		ug/kg	0.662	0.662	1	A
Heptachlor	ND		ug/kg	0.662	0.662	1	A
Aldrin	ND		ug/kg	0.662	0.662	1	A
Heptachlor epoxide	ND		ug/kg	1.32	1.32	1	B
Oxychlordane	3.24		ug/kg	1.32	1.32	1	B
trans-Chlordane	5.12	P	ug/kg	0.662	0.662	1	A
Endosulfan I	ND		ug/kg	0.662	0.662	1	A
cis-Chlordane	ND		ug/kg	0.662	0.662	1	B
trans-Nonachlor	ND		ug/kg	0.662	0.662	1	B
4,4'-DDE	2.03		ug/kg	0.662	0.662	1	A
Dieldrin	ND	I	ug/kg	0.662	0.662	1	A
Endrin	ND		ug/kg	0.662	0.662	1	A
Endosulfan II	1.46	P	ug/kg	0.662	0.662	1	A
4,4'-DDD	0.704		ug/kg	0.662	0.662	1	A
cis-Nonachlor	ND		ug/kg	0.662	0.662	1	B
4,4'-DDT	0.691	IP	ug/kg	0.662	0.662	1	A
Methoxychlor	ND		ug/kg	2.65	2.65	1	A
Toxaphene	ND		ug/kg	33.2	33.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	B
BZ 198	69		30-150	B
DBOB	77		30-150	A
BZ 198	66		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-05
Client ID: TB-1 5.2-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:30
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 01:00
Analyst: DP
Percent Solids: 73%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.31	1.31	1	A
gamma-BHC	ND		ug/kg	0.654	0.654	1	A
Heptachlor	ND		ug/kg	0.654	0.654	1	A
Aldrin	ND		ug/kg	0.654	0.654	1	A
Heptachlor epoxide	ND		ug/kg	1.31	1.31	1	B
Oxychlordane	ND		ug/kg	1.31	1.31	1	B
trans-Chlordane	ND		ug/kg	0.654	0.654	1	B
Endosulfan I	ND		ug/kg	0.654	0.654	1	A
cis-Chlordane	ND		ug/kg	0.654	0.654	1	A
trans-Nonachlor	ND		ug/kg	0.654	0.654	1	A
4,4'-DDE	ND		ug/kg	0.654	0.654	1	A
Dieldrin	ND		ug/kg	0.654	0.654	1	B
Endrin	ND		ug/kg	0.654	0.654	1	A
Endosulfan II	ND		ug/kg	0.654	0.654	1	A
4,4'-DDD	ND		ug/kg	0.654	0.654	1	B
cis-Nonachlor	ND		ug/kg	0.654	0.654	1	A
4,4'-DDT	ND		ug/kg	0.654	0.654	1	A
Methoxychlor	ND		ug/kg	2.61	2.61	1	A
Toxaphene	ND		ug/kg	32.8	32.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	B
BZ 198	80		30-150	B
DBOB	74		30-150	A
BZ 198	76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-06
Client ID: CAD-3 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 01:34
Analyst: DP
Percent Solids: 46%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.05	1.05	1	A
gamma-BHC	ND		ug/kg	0.524	0.524	1	A
Heptachlor	ND		ug/kg	0.524	0.524	1	A
Aldrin	ND		ug/kg	0.524	0.524	1	A
Heptachlor epoxide	ND		ug/kg	1.05	1.05	1	B
Oxychlordane	ND		ug/kg	1.05	1.05	1	B
trans-Chlordane	1.36	P	ug/kg	0.524	0.524	1	A
Endosulfan I	ND		ug/kg	0.524	0.524	1	A
cis-Chlordane	ND		ug/kg	0.524	0.524	1	B
trans-Nonachlor	ND		ug/kg	0.524	0.524	1	A
4,4'-DDE	0.926		ug/kg	0.524	0.524	1	A
Dieldrin	0.533	IP	ug/kg	0.524	0.524	1	A
Endrin	ND		ug/kg	0.524	0.524	1	A
Endosulfan II	0.989	P	ug/kg	0.524	0.524	1	A
4,4'-DDD	2.05		ug/kg	0.524	0.524	1	A
cis-Nonachlor	ND		ug/kg	0.524	0.524	1	B
4,4'-DDT	0.541	IP	ug/kg	0.524	0.524	1	A
Methoxychlor	3.71		ug/kg	2.10	2.10	1	B
Toxaphene	ND		ug/kg	26.3	26.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	62		30-150	B
BZ 198	65		30-150	B
DBOB	73		30-150	A
BZ 198	66		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-07
Client ID: US-1 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:24
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 02:08
Analyst: DP
Percent Solids: 36%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.26	1.26	1	A
gamma-BHC	0.998	P	ug/kg	0.631	0.631	1	B
Heptachlor	ND		ug/kg	0.631	0.631	1	A
Aldrin	ND		ug/kg	0.631	0.631	1	A
Heptachlor epoxide	ND		ug/kg	1.26	1.26	1	B
Oxychlordane	5.85		ug/kg	1.26	1.26	1	B
trans-Chlordane	17.6	P	ug/kg	0.631	0.631	1	A
Endosulfan I	ND		ug/kg	0.631	0.631	1	A
cis-Chlordane	1.38		ug/kg	0.631	0.631	1	A
trans-Nonachlor	1.86	P	ug/kg	0.631	0.631	1	A
4,4'-DDE	3.77	P	ug/kg	0.631	0.631	1	A
Dieldrin	1.25	IP	ug/kg	0.631	0.631	1	A
Endrin	ND		ug/kg	0.631	0.631	1	A
Endosulfan II	3.97	P	ug/kg	0.631	0.631	1	A
4,4'-DDD	1.56		ug/kg	0.631	0.631	1	A
cis-Nonachlor	0.687		ug/kg	0.631	0.631	1	A
4,4'-DDT	3.42	P	ug/kg	0.631	0.631	1	B
Methoxychlor	3.89		ug/kg	2.52	2.52	1	B
Toxaphene	ND		ug/kg	31.7	31.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	B
BZ 198	76		30-150	B
DBOB	85		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-08
Client ID: CAD-2 0.5.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 04:24
Analyst: DP
Percent Solids: 44%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.08	1.08	1	A
gamma-BHC	ND		ug/kg	0.540	0.540	1	A
Heptachlor	ND		ug/kg	0.540	0.540	1	A
Aldrin	ND		ug/kg	0.540	0.540	1	A
Heptachlor epoxide	ND		ug/kg	1.08	1.08	1	B
Oxychlordane	ND		ug/kg	1.08	1.08	1	B
trans-Chlordane	1.42		ug/kg	0.540	0.540	1	A
Endosulfan I	ND		ug/kg	0.540	0.540	1	A
cis-Chlordane	ND		ug/kg	0.540	0.540	1	A
trans-Nonachlor	ND		ug/kg	0.540	0.540	1	A
4,4'-DDE	0.942		ug/kg	0.540	0.540	1	A
Dieldrin	ND		ug/kg	0.540	0.540	1	A
Endrin	ND		ug/kg	0.540	0.540	1	A
Endosulfan II	0.887	P	ug/kg	0.540	0.540	1	A
4,4'-DDD	ND		ug/kg	0.540	0.540	1	A
cis-Nonachlor	ND		ug/kg	0.540	0.540	1	A
4,4'-DDT	ND		ug/kg	0.540	0.540	1	A
Methoxychlor	ND		ug/kg	2.16	2.16	1	A
Toxaphene	ND		ug/kg	27.1	27.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	B
BZ 198	65		30-150	B
DBOB	80		30-150	A
BZ 198	62		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-09
Client ID: CAD-2 5.3-10.8
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 14:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 04:58
Analyst: DP
Percent Solids: 50%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.913	0.913	1	A
gamma-BHC	ND		ug/kg	0.456	0.456	1	A
Heptachlor	ND		ug/kg	0.456	0.456	1	A
Aldrin	ND		ug/kg	0.456	0.456	1	A
Heptachlor epoxide	ND		ug/kg	0.913	0.913	1	B
Oxychlordane	16.4		ug/kg	0.913	0.913	1	B
trans-Chlordane	ND		ug/kg	0.456	0.456	1	A
Endosulfan I	ND		ug/kg	0.456	0.456	1	A
cis-Chlordane	ND		ug/kg	0.456	0.456	1	A
trans-Nonachlor	ND		ug/kg	0.456	0.456	1	A
4,4'-DDE	ND		ug/kg	0.456	0.456	1	A
Dieldrin	ND		ug/kg	0.456	0.456	1	A
Endrin	ND		ug/kg	0.456	0.456	1	A
Endosulfan II	ND		ug/kg	0.456	0.456	1	A
4,4'-DDD	ND		ug/kg	0.456	0.456	1	A
cis-Nonachlor	ND		ug/kg	0.456	0.456	1	A
4,4'-DDT	ND		ug/kg	0.456	0.456	1	A
Methoxychlor	ND		ug/kg	1.82	1.82	1	A
Toxaphene	ND		ug/kg	22.9	22.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	B
BZ 198	77		30-150	B
DBOB	83		30-150	A
BZ 198	72		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-10
Client ID: W1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 05:32
Analyst: DP
Percent Solids: 39%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.19	1.19	1	A
gamma-BHC	1.54		ug/kg	0.595	0.595	1	B
Heptachlor	ND		ug/kg	0.595	0.595	1	A
Aldrin	ND		ug/kg	0.595	0.595	1	A
Heptachlor epoxide	ND		ug/kg	1.19	1.19	1	B
Oxychlordane	12.3		ug/kg	1.19	1.19	1	B
trans-Chlordane	56.3	P	ug/kg	0.595	0.595	1	A
Endosulfan I	ND		ug/kg	0.595	0.595	1	A
cis-Chlordane	2.16		ug/kg	0.595	0.595	1	A
trans-Nonachlor	ND		ug/kg	0.595	0.595	1	A
4,4'-DDE	5.72		ug/kg	0.595	0.595	1	A
Dieldrin	1.12	IP	ug/kg	0.595	0.595	1	A
Endrin	ND		ug/kg	0.595	0.595	1	A
Endosulfan II	12.4	P	ug/kg	0.595	0.595	1	A
4,4'-DDD	1.83		ug/kg	0.595	0.595	1	A
cis-Nonachlor	1.89	P	ug/kg	0.595	0.595	1	B
4,4'-DDT	6.96	I	ug/kg	0.595	0.595	1	A
Methoxychlor	7.88	P	ug/kg	2.38	2.38	1	B
Toxaphene	ND		ug/kg	29.9	29.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	B
BZ 198	84		30-150	B
DBOB	94		30-150	A
BZ 198	86		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-11
Client ID: V1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:31
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 06:06
Analyst: DP
Percent Solids: 32%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.49	1.49	1	A
gamma-BHC	ND		ug/kg	0.747	0.747	1	A
Heptachlor	ND		ug/kg	0.747	0.747	1	A
Aldrin	ND		ug/kg	0.747	0.747	1	A
Heptachlor epoxide	ND		ug/kg	1.49	1.49	1	B
Oxychlordane	3.66		ug/kg	1.49	1.49	1	B
trans-Chlordane	4.62	P	ug/kg	0.747	0.747	1	A
Endosulfan I	ND		ug/kg	0.747	0.747	1	A
cis-Chlordane	0.825		ug/kg	0.747	0.747	1	A
trans-Nonachlor	ND		ug/kg	0.747	0.747	1	B
4,4'-DDE	1.62		ug/kg	0.747	0.747	1	A
Dieldrin	0.954	IP	ug/kg	0.747	0.747	1	A
Endrin	ND		ug/kg	0.747	0.747	1	A
Endosulfan II	1.29	P	ug/kg	0.747	0.747	1	A
4,4'-DDD	0.770		ug/kg	0.747	0.747	1	A
cis-Nonachlor	ND		ug/kg	0.747	0.747	1	A
4,4'-DDT	0.768	IP	ug/kg	0.747	0.747	1	A
Methoxychlor	ND		ug/kg	2.99	2.99	1	B
Toxaphene	ND		ug/kg	37.5	37.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	B
BZ 198	66		30-150	B
DBOB	92		30-150	A
BZ 198	68		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-12
Client ID: S1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 06:40
Analyst: DP
Percent Solids: 41%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.19	1.19	1	A
gamma-BHC	0.883		ug/kg	0.597	0.597	1	B
Heptachlor	ND		ug/kg	0.597	0.597	1	A
Aldrin	ND		ug/kg	0.597	0.597	1	A
Heptachlor epoxide	ND		ug/kg	1.19	1.19	1	B
Oxychlordane	6.41		ug/kg	1.19	1.19	1	B
trans-Chlordane	27.0	P	ug/kg	0.597	0.597	1	A
Endosulfan I	ND		ug/kg	0.597	0.597	1	A
cis-Chlordane	0.754		ug/kg	0.597	0.597	1	A
trans-Nonachlor	1.97	P	ug/kg	0.597	0.597	1	A
4,4'-DDE	4.20		ug/kg	0.597	0.597	1	A
Dieldrin	1.20	IP	ug/kg	0.597	0.597	1	A
Endrin	ND		ug/kg	0.597	0.597	1	A
Endosulfan II	6.30	P	ug/kg	0.597	0.597	1	A
4,4'-DDD	1.30		ug/kg	0.597	0.597	1	A
cis-Nonachlor	0.934	P	ug/kg	0.597	0.597	1	B
4,4'-DDT	3.44	IP	ug/kg	0.597	0.597	1	A
Methoxychlor	3.44	P	ug/kg	2.39	2.39	1	B
Toxaphene	ND		ug/kg	30.0	30.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	76		30-150	B
BZ 198	72		30-150	B
DBOB	90		30-150	A
BZ 198	83		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-13
Client ID: R1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:39
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 07:14
Analyst: DP
Percent Solids: 41%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.17	1.17	1	A
gamma-BHC	0.688	P	ug/kg	0.585	0.585	1	A
Heptachlor	ND		ug/kg	0.585	0.585	1	A
Aldrin	ND		ug/kg	0.585	0.585	1	A
Heptachlor epoxide	ND		ug/kg	1.17	1.17	1	B
Oxychlordane	7.92		ug/kg	1.17	1.17	1	B
trans-Chlordane	28.1	P	ug/kg	0.585	0.585	1	A
Endosulfan I	ND		ug/kg	0.585	0.585	1	A
cis-Chlordane	1.04		ug/kg	0.585	0.585	1	A
trans-Nonachlor	2.99	P	ug/kg	0.585	0.585	1	A
4,4'-DDE	4.66	P	ug/kg	0.585	0.585	1	A
Dieldrin	0.953	IP	ug/kg	0.585	0.585	1	A
Endrin	ND		ug/kg	0.585	0.585	1	A
Endosulfan II	5.46	P	ug/kg	0.585	0.585	1	A
4,4'-DDD	1.21		ug/kg	0.585	0.585	1	A
cis-Nonachlor	1.52	P	ug/kg	0.585	0.585	1	B
4,4'-DDT	3.40	I	ug/kg	0.585	0.585	1	A
Methoxychlor	6.14	P	ug/kg	2.34	2.34	1	B
Toxaphene	ND		ug/kg	29.4	29.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	B
BZ 198	78		30-150	B
DBOB	110		30-150	A
BZ 198	89		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-14
Client ID: CAD-3 6.1-9.9
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 15:00
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 07:48
Analyst: DP
Percent Solids: 55%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.843	0.843	1	A
gamma-BHC	ND		ug/kg	0.421	0.421	1	A
Heptachlor	ND		ug/kg	0.421	0.421	1	A
Aldrin	ND		ug/kg	0.421	0.421	1	A
Heptachlor epoxide	ND		ug/kg	0.843	0.843	1	B
Oxychlordane	ND		ug/kg	0.843	0.843	1	B
trans-Chlordane	ND		ug/kg	0.421	0.421	1	A
Endosulfan I	ND		ug/kg	0.421	0.421	1	A
cis-Chlordane	ND		ug/kg	0.421	0.421	1	A
trans-Nonachlor	ND		ug/kg	0.421	0.421	1	A
4,4'-DDE	ND		ug/kg	0.421	0.421	1	A
Dieldrin	ND		ug/kg	0.421	0.421	1	A
Endrin	ND		ug/kg	0.421	0.421	1	A
Endosulfan II	ND		ug/kg	0.421	0.421	1	A
4,4'-DDD	ND		ug/kg	0.421	0.421	1	A
cis-Nonachlor	ND		ug/kg	0.421	0.421	1	A
4,4'-DDT	ND		ug/kg	0.421	0.421	1	A
Methoxychlor	ND		ug/kg	1.68	1.68	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	B
BZ 198	66		30-150	B
DBOB	72		30-150	A
BZ 198	64		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-15
Client ID: CAD-1 0-4.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:34
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/14/18 08:22
Analyst: DP
Percent Solids: 43%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.08	1.08	1	A
gamma-BHC	ND		ug/kg	0.541	0.541	1	A
Heptachlor	ND		ug/kg	0.541	0.541	1	A
Aldrin	ND		ug/kg	0.541	0.541	1	A
Heptachlor epoxide	ND		ug/kg	1.08	1.08	1	B
Oxychlordane	4.20		ug/kg	1.08	1.08	1	B
trans-Chlordane	3.25	P	ug/kg	0.541	0.541	1	A
Endosulfan I	ND		ug/kg	0.541	0.541	1	A
cis-Chlordane	ND		ug/kg	0.541	0.541	1	B
trans-Nonachlor	0.666		ug/kg	0.541	0.541	1	B
4,4'-DDE	1.52		ug/kg	0.541	0.541	1	A
Dieldrin	ND		ug/kg	0.541	0.541	1	A
Endrin	ND		ug/kg	0.541	0.541	1	A
Endosulfan II	1.38	P	ug/kg	0.541	0.541	1	A
4,4'-DDD	ND		ug/kg	0.541	0.541	1	A
cis-Nonachlor	ND		ug/kg	0.541	0.541	1	B
4,4'-DDT	ND		ug/kg	0.541	0.541	1	A
Methoxychlor	3.60		ug/kg	2.16	2.16	1	B
Toxaphene	ND		ug/kg	27.2	27.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	71		30-150	B
BZ 198	73		30-150	B
DBOB	86		30-150	A
BZ 198	78		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-16
Client ID: CAD-1 4.4-9.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:30
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/19/18 11:44
Analyst: DP
Percent Solids: 51%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.927	0.927	1	A
gamma-BHC	ND		ug/kg	0.463	0.463	1	A
Heptachlor	ND		ug/kg	0.463	0.463	1	A
Aldrin	ND		ug/kg	0.463	0.463	1	A
Heptachlor epoxide	ND		ug/kg	0.927	0.927	1	B
Oxychlordane	ND		ug/kg	0.927	0.927	1	B
trans-Chlordane	ND		ug/kg	0.463	0.463	1	B
Endosulfan I	ND		ug/kg	0.463	0.463	1	B
cis-Chlordane	ND		ug/kg	0.463	0.463	1	B
trans-Nonachlor	ND		ug/kg	0.463	0.463	1	B
4,4'-DDE	ND		ug/kg	0.463	0.463	1	A
Dieldrin	ND		ug/kg	0.463	0.463	1	B
Endrin	ND		ug/kg	0.463	0.463	1	A
Endosulfan II	ND		ug/kg	0.463	0.463	1	A
4,4'-DDD	ND		ug/kg	0.463	0.463	1	A
cis-Nonachlor	ND		ug/kg	0.463	0.463	1	B
4,4'-DDT	ND		ug/kg	0.463	0.463	1	B
Methoxychlor	ND		ug/kg	1.85	1.85	1	B
Toxaphene	ND		ug/kg	23.3	23.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	B
BZ 198	81		30-150	B
DBOB	72		30-150	A
BZ 198	78		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-17
Client ID: DS-1 0-7.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/19/18 12:18
Analyst: DP
Percent Solids: 37%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.32	1.32	1	A
gamma-BHC	ND		ug/kg	0.662	0.662	1	A
Heptachlor	ND		ug/kg	0.662	0.662	1	A
Aldrin	ND		ug/kg	0.662	0.662	1	A
Heptachlor epoxide	ND		ug/kg	1.32	1.32	1	B
Oxychlordane	3.81		ug/kg	1.32	1.32	1	B
trans-Chlordane	7.57	P	ug/kg	0.662	0.662	1	A
Endosulfan I	ND		ug/kg	0.662	0.662	1	A
cis-Chlordane	ND		ug/kg	0.662	0.662	1	B
trans-Nonachlor	0.721		ug/kg	0.662	0.662	1	A
4,4'-DDE	3.60		ug/kg	0.662	0.662	1	A
Dieldrin	0.799	IP	ug/kg	0.662	0.662	1	A
Endrin	ND		ug/kg	0.662	0.662	1	A
Endosulfan II	2.92	P	ug/kg	0.662	0.662	1	A
4,4'-DDD	0.909		ug/kg	0.662	0.662	1	A
cis-Nonachlor	ND		ug/kg	0.662	0.662	1	B
4,4'-DDT	1.36	IP	ug/kg	0.662	0.662	1	A
Methoxychlor	ND		ug/kg	2.65	2.65	1	B
Toxaphene	ND		ug/kg	33.2	33.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	63		30-150	B
BZ 198	75		30-150	B
DBOB	80		30-150	A
BZ 198	72		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-18
Client ID: DS-2 0-7.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 17:35
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment
Analytical Method: 1,8081B
Analytical Date: 11/19/18 12:52
Analyst: DP
Percent Solids: 38%

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	1.30	1.30	1	A
gamma-BHC	ND		ug/kg	0.652	0.652	1	A
Heptachlor	ND		ug/kg	0.652	0.652	1	A
Aldrin	ND		ug/kg	0.652	0.652	1	A
Heptachlor epoxide	ND		ug/kg	1.30	1.30	1	B
Oxychlordane	4.82		ug/kg	1.30	1.30	1	B
trans-Chlordane	8.37	P	ug/kg	0.652	0.652	1	A
Endosulfan I	ND		ug/kg	0.652	0.652	1	A
cis-Chlordane	ND		ug/kg	0.652	0.652	1	B
trans-Nonachlor	0.852	P	ug/kg	0.652	0.652	1	A
4,4'-DDE	4.93		ug/kg	0.652	0.652	1	A
Dieldrin	1.81	IP	ug/kg	0.652	0.652	1	A
Endrin	ND		ug/kg	0.652	0.652	1	A
Endosulfan II	ND		ug/kg	0.652	0.652	1	A
4,4'-DDD	1.50		ug/kg	0.652	0.652	1	A
cis-Nonachlor	ND		ug/kg	0.652	0.652	1	A
4,4'-DDT	1.73	IP	ug/kg	0.652	0.652	1	A
Methoxychlor	3.66	P	ug/kg	2.61	2.61	1	B
Toxaphene	ND		ug/kg	32.7	32.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	59		30-150	B
BZ 198	67		30-150	B
DBOB	72		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 11/13/18 19:20
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 10/28/18 11:09
Cleanup Method: EPA 3630
Cleanup Date: 10/29/18

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-18 Batch: WG1173137-1						
Hexachlorobenzene	ND		ug/kg	0.500	0.500	A
gamma-BHC	ND		ug/kg	0.250	0.250	A
Heptachlor	ND		ug/kg	0.250	0.250	A
Aldrin	ND		ug/kg	0.250	0.250	A
trans-Chlordane	ND		ug/kg	0.250	0.250	A
Endosulfan I	ND		ug/kg	0.250	0.250	A
cis-Chlordane	ND		ug/kg	0.250	0.250	A
trans-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDE	ND		ug/kg	0.250	0.250	A
Dieldrin	ND		ug/kg	0.250	0.250	A
Endrin	ND		ug/kg	0.250	0.250	A
Endosulfan II	ND		ug/kg	0.250	0.250	A
4,4'-DDD	ND		ug/kg	0.250	0.250	A
cis-Nonachlor	ND		ug/kg	0.250	0.250	A
4,4'-DDT	ND		ug/kg	0.250	0.250	A
Methoxychlor	ND		ug/kg	1.00	1.00	A
Toxaphene	ND		ug/kg	12.6	12.6	A
Heptachlor epoxide	ND		ug/kg	0.500	0.500	B
Oxychlordane	ND		ug/kg	0.500	0.500	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	44		30-150	B
BZ 198	42		30-150	B
DBOB	44		30-150	A
BZ 198	39		30-150	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0
Lab Number: L1843305
Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 Batch: WG1173137-2 WG1173137-3									
Hexachlorobenzene	69		73		50-120	6		30	A
gamma-BHC	66		69		50-120	4		30	A
Heptachlor	71		75		50-120	5		30	A
Aldrin	73		78		50-120	7		30	A
trans-Chlordane	82		87		50-120	6		30	A
Endosulfan I	80		85		50-120	6		30	A
cis-Chlordane	79		84		50-120	6		30	A
trans-Nonachlor	74		79		50-120	7		30	A
4,4'-DDE	92		98		50-120	6		30	A
Dieldrin	88		94		50-120	7		30	A
Endrin	81		85		50-120	5		30	A
4,4'-DDD	85		90		50-120	6		30	A
cis-Nonachlor	83		88		50-120	6		30	A
4,4'-DDT	81		86		50-120	6		30	A
Methoxychlor	75		78		50-120	4		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	69		71		30-150	B
BZ 198	74		75		30-150	B
DBOB	70		74		30-150	A
BZ 198	76		72		30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 Batch: WG1173137-2 WG1173137-3									
Heptachlor epoxide	74		74		50-120	0		30	B
Oxychlordane	75		75		50-120	0		30	B
Endosulfan II	75		78		50-120	4		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	69		71		30-150	B
BZ 198	74		75		30-150	B
DBOB	70		74		30-150	A
BZ 198	76		72		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1173137-6 WG1173137-7 QC Sample: L1843305-07 Client ID: US-1 0-5.5													
Hexachlorobenzene	ND	129	87.2	68		112	87		50-120	25		30	A
gamma-BHC	0.998	129	82.7	63		103	79		50-120	22		30	B
Heptachlor	ND	129	90.3	70		117	91		50-120	26		30	A
Aldrin	ND	129	99.7	77		130	101		50-120	26		30	A
Heptachlor epoxide	ND	129	84.2	65		104	81		50-120	21		30	B
Oxychlordane	5.85	129	90.0	65		112	83		50-120	22		30	B
trans-Chlordane	17.6	129	116	76		149	102		50-120	25		30	A
Endosulfan I	ND	129	101	78		130	101		50-120	25		30	A
cis-Chlordane	1.38	129	97.9	75		125	96		50-120	24		30	A
trans-Nonachlor	1.86	129	92.8	70		118	90		50-120	24		30	A
4,4'-DDE	3.77	129	116	87		148	112		50-120	24		30	A
Dieldrin	1.25	129	110	84		142	110		50-120	25		30	A
Endrin	ND	129	105	81		132	103		50-120	23		30	A
Endosulfan II	3.97	129	153	115		190	**145**	Q	50-120	22		30	A
4,4'-DDD	1.56	129	116	89		145	112		50-120	22		30	A
cis-Nonachlor	0.687	129	102	79		128	99		50-120	23		30	A
4,4'-DDT	3.42	129	142	107		166	**127**	Q	50-120	16		30	B
Methoxychlor	3.89	129	82.0	61		80.1	59		50-120	2		30	B

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	67		79		30-150	B
DBOB	60		74		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1173137-6 WG1173137-7 QC Sample: L1843305-07 Client ID: US-1 0-5.5												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	70		86		30-150	A
DBOB	72		89		30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1173137-5 QC Sample: L1843305-07 Client ID: US-1 0-5.5							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	0.998	1.01P	ug/kg	1		30	B
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	5.85	6.28	ug/kg	7		30	B
trans-Chlordane	17.6	15.7P	ug/kg	11		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	1.38	1.15P	ug/kg	18		30	A
trans-Nonachlor	1.86	1.79P	ug/kg	4		30	A
4,4'-DDE	3.77	3.60P	ug/kg	5		30	A
Dieldrin	1.25	1.18IP	ug/kg	6		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	3.97	3.47P	ug/kg	13		30	A
4,4'-DDD	1.56	1.38	ug/kg	12		30	A
cis-Nonachlor	0.687	ND	ug/kg	NC		30	A
4,4'-DDT	3.42	3.27	ug/kg	4		30	B
Methoxychlor	3.89	3.31	ug/kg	16		30	B
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1173137-5 QC Sample: L1843305-07 Client ID: US-1 0-5.5						

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		63		30-150	B
BZ 198	76		76		30-150	B
DBOB	85		87		30-150	A
BZ 198	79		74		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1173137-4

Parameter	% Recovery	Qual	QC Criteria
Hexachlorobenzene	56		40-140
cis-Chlordane	79		40-140
trans-Nonachlor	486	Q	40-140
DBOB (Surrogate)	50		30-150
DBOB (Surrogate)	57		30-150
BZ 198 (Surrogate)	46		30-150
BZ 198 (Surrogate)	58		30-150

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-01 Date Collected: 10/22/18 16:50

Client ID: TB-2 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 37%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.42		mg/kg	1.34	0.177	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM
Cadmium, Total	0.597		mg/kg	0.536	0.071	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM
Chromium, Total	67.8		mg/kg	5.36	1.25	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM
Copper, Total	89.7		mg/kg	5.36	0.520	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM
Lead, Total	53.8		mg/kg	1.61	0.391	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM
Mercury, Total	0.210		mg/kg	0.028	0.004	5	11/13/18 19:35	11/18/18 15:32	EPA 7474	1,7474	BV
Nickel, Total	25.0		mg/kg	2.68	0.716	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM
Zinc, Total	173		mg/kg	26.8	6.96	10	11/13/18 19:00	11/14/18 12:57	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-02 Date Collected: 10/22/18 17:15

Client ID: US-2 0.0-5.0 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 42%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.43		mg/kg	1.18	0.156	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM
Cadmium, Total	2.48		mg/kg	0.471	0.062	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM
Chromium, Total	117		mg/kg	4.71	1.10	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM
Copper, Total	178		mg/kg	4.71	0.457	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM
Lead, Total	100		mg/kg	1.41	0.344	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM
Mercury, Total	0.418		mg/kg	0.025	0.003	5	11/13/18 19:35	11/18/18 15:35	EPA 7474	1,7474	BV
Nickel, Total	31.7		mg/kg	2.36	0.630	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM
Zinc, Total	263		mg/kg	23.6	6.13	10	11/13/18 19:00	11/14/18 13:01	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-03 Date Collected: 10/22/18 15:17

Client ID: US-2 5.0-6.0 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 75%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.31		mg/kg	0.668	0.088	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM
Cadmium, Total	ND		mg/kg	0.267	0.035	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM
Chromium, Total	6.16		mg/kg	2.67	0.625	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM
Copper, Total	5.20		mg/kg	2.67	0.259	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM
Lead, Total	5.30		mg/kg	0.801	0.195	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM
Mercury, Total	ND		mg/kg	0.014	0.002	5	11/13/18 19:35	11/18/18 15:37	EPA 7474	1,7474	BV
Nickel, Total	4.16		mg/kg	1.34	0.357	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM
Zinc, Total	11.5	J	mg/kg	13.4	3.47	10	11/13/18 19:00	11/14/18 13:05	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-04 Date Collected: 10/23/18 10:25

Client ID: TB-1 0-5.2 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 38%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.12		mg/kg	1.30	0.171	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM
Cadmium, Total	0.618		mg/kg	0.518	0.068	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM
Chromium, Total	64.9		mg/kg	5.18	1.21	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM
Copper, Total	86.7		mg/kg	5.18	0.503	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM
Lead, Total	49.8		mg/kg	1.56	0.378	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM
Mercury, Total	0.219		mg/kg	0.028	0.004	5	11/13/18 19:35	11/18/18 15:45	EPA 7474	1,7474	BV
Nickel, Total	23.6		mg/kg	2.59	0.692	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM
Zinc, Total	165		mg/kg	25.9	6.74	10	11/13/18 19:00	11/14/18 13:09	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-05 Date Collected: 10/23/18 10:30

Client ID: TB-1 5.2-6.0 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 73%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.64		mg/kg	0.670	0.089	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM
Cadmium, Total	0.068	J	mg/kg	0.268	0.035	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM
Chromium, Total	9.69		mg/kg	2.68	0.628	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM
Copper, Total	11.9		mg/kg	2.68	0.260	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM
Lead, Total	8.40		mg/kg	0.804	0.196	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM
Mercury, Total	0.016		mg/kg	0.014	0.002	5	11/13/18 19:35	11/18/18 15:47	EPA 7474	1,7474	BV
Nickel, Total	5.58		mg/kg	1.34	0.358	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM
Zinc, Total	21.4		mg/kg	13.4	3.49	10	11/13/18 19:00	11/14/18 13:51	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-06 Date Collected: 10/23/18 11:10

Client ID: CAD-3 0-5.5 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 46%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.33		mg/kg	1.06	0.140	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM
Cadmium, Total	0.568		mg/kg	0.425	0.056	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM
Chromium, Total	51.2		mg/kg	4.25	0.996	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM
Copper, Total	103		mg/kg	4.25	0.413	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM
Lead, Total	56.4		mg/kg	1.28	0.310	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM
Mercury, Total	0.784		mg/kg	0.023	0.003	5	11/13/18 19:35	11/18/18 15:50	EPA 7474	1,7474	BV
Nickel, Total	20.0		mg/kg	2.13	0.568	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM
Zinc, Total	159		mg/kg	21.3	5.53	10	11/13/18 19:00	11/14/18 13:55	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-07 Date Collected: 10/23/18 12:24

Client ID: US-1 0-5.5 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 36%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.3		mg/kg	1.30	0.172	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM
Cadmium, Total	1.00		mg/kg	0.521	0.069	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM
Chromium, Total	85.2		mg/kg	5.21	1.22	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM
Copper, Total	129		mg/kg	5.21	0.505	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM
Lead, Total	77.9		mg/kg	1.56	0.380	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM
Mercury, Total	0.299		mg/kg	0.029	0.004	5	11/13/18 19:35	11/18/18 14:17	EPA 7474	1,7474	BV
Nickel, Total	30.2		mg/kg	2.60	0.696	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM
Zinc, Total	216		mg/kg	26.0	6.77	10	11/13/18 19:00	11/14/18 12:41	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-08 Date Collected: 10/23/18 13:10

Client ID: CAD-2 0.5.3 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 44%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.3		mg/kg	1.13	0.149	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM
Cadmium, Total	0.574		mg/kg	0.452	0.060	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM
Chromium, Total	45.5		mg/kg	4.52	1.06	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM
Copper, Total	75.6		mg/kg	4.52	0.439	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM
Lead, Total	48.8		mg/kg	1.36	0.330	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM
Mercury, Total	0.667		mg/kg	0.024	0.003	5	11/13/18 19:35	11/18/18 15:52	EPA 7474	1,7474	BV
Nickel, Total	19.8		mg/kg	2.26	0.605	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM
Zinc, Total	142		mg/kg	22.6	5.88	10	11/13/18 19:00	11/14/18 13:59	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-09 Date Collected: 10/23/18 14:20

Client ID: CAD-2 5.3-10.8 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 50%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.38		mg/kg	0.965	0.127	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM
Cadmium, Total	0.133	J	mg/kg	0.386	0.051	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM
Chromium, Total	26.6		mg/kg	3.86	0.903	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM
Copper, Total	8.63		mg/kg	3.86	0.374	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM
Lead, Total	7.78		mg/kg	1.16	0.282	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM
Mercury, Total	ND		mg/kg	0.021	0.003	5	11/13/18 19:35	11/18/18 15:55	EPA 7474	1,7474	BV
Nickel, Total	16.4		mg/kg	1.93	0.516	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM
Zinc, Total	48.4		mg/kg	19.3	5.02	10	11/13/18 19:00	11/14/18 14:17	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-10 Date Collected: 10/23/18 12:10

Client ID: W1 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 39%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	8.24		mg/kg	1.22	0.161	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM
Cadmium, Total	2.74		mg/kg	0.487	0.064	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM
Chromium, Total	110		mg/kg	4.87	1.14	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM
Copper, Total	189		mg/kg	4.87	0.472	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM
Lead, Total	109		mg/kg	1.46	0.355	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM
Mercury, Total	0.490		mg/kg	0.027	0.003	5	11/13/18 19:35	11/18/18 15:57	EPA 7474	1,7474	BV
Nickel, Total	31.4		mg/kg	2.43	0.650	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM
Zinc, Total	256		mg/kg	24.3	6.33	10	11/13/18 19:00	11/14/18 14:21	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-11 Date Collected: 10/23/18 11:31

Client ID: V1 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 32%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	10.4		mg/kg	1.50	0.198	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM
Cadmium, Total	0.545	J	mg/kg	0.601	0.079	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM
Chromium, Total	67.8		mg/kg	6.01	1.41	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM
Copper, Total	86.2		mg/kg	6.01	0.583	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM
Lead, Total	55.4		mg/kg	1.80	0.439	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM
Mercury, Total	0.191		mg/kg	0.032	0.004	5	11/13/18 19:35	11/18/18 16:00	EPA 7474	1,7474	BV
Nickel, Total	27.1		mg/kg	3.01	0.803	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM
Zinc, Total	173		mg/kg	30.1	7.82	10	11/13/18 19:00	11/14/18 14:25	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-12 Date Collected: 10/23/18 12:25

Client ID: S1 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 41%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.85		mg/kg	1.17	0.154	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM
Cadmium, Total	1.46		mg/kg	0.467	0.062	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM
Chromium, Total	94.4		mg/kg	4.67	1.09	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM
Copper, Total	132		mg/kg	4.67	0.453	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM
Lead, Total	79.5		mg/kg	1.40	0.341	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM
Mercury, Total	0.383		mg/kg	0.025	0.003	5	11/13/18 19:35	11/18/18 16:08	EPA 7474	1,7474	BV
Nickel, Total	28.8		mg/kg	2.33	0.624	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM
Zinc, Total	214		mg/kg	23.3	6.07	10	11/13/18 19:00	11/14/18 14:30	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-13 Date Collected: 10/23/18 12:39

Client ID: R1 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 41%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.50		mg/kg	1.17	0.154	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM
Cadmium, Total	1.42		mg/kg	0.467	0.062	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM
Chromium, Total	97.9		mg/kg	4.67	1.09	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM
Copper, Total	144		mg/kg	4.67	0.453	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM
Lead, Total	85.0		mg/kg	1.40	0.341	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM
Mercury, Total	0.367		mg/kg	0.026	0.003	5	11/13/18 19:35	11/18/18 16:10	EPA 7474	1,7474	BV
Nickel, Total	31.7		mg/kg	2.33	0.623	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM
Zinc, Total	226		mg/kg	23.3	6.07	10	11/13/18 19:00	11/14/18 14:34	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-14 Date Collected: 10/23/18 15:00

Client ID: CAD-3 6.1-9.9 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 55%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.29		mg/kg	0.884	0.117	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM
Cadmium, Total	0.141	J	mg/kg	0.354	0.047	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM
Chromium, Total	25.5		mg/kg	3.54	0.828	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM
Copper, Total	10.5		mg/kg	3.54	0.343	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM
Lead, Total	9.49		mg/kg	1.06	0.258	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM
Mercury, Total	0.015	J	mg/kg	0.019	0.002	5	11/13/18 19:35	11/18/18 16:13	EPA 7474	1,7474	BV
Nickel, Total	16.4		mg/kg	1.77	0.472	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM
Zinc, Total	44.3		mg/kg	17.7	4.60	10	11/13/18 19:00	11/14/18 14:38	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-15 Date Collected: 10/23/18 16:34

Client ID: CAD-1 0-4.0 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 43%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.64		mg/kg	1.14	0.151	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM
Cadmium, Total	1.01		mg/kg	0.457	0.060	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM
Chromium, Total	74.2		mg/kg	4.57	1.07	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM
Copper, Total	139		mg/kg	4.57	0.443	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM
Lead, Total	70.6		mg/kg	1.37	0.334	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM
Mercury, Total	0.699		mg/kg	0.025	0.003	5	11/13/18 19:35	11/18/18 16:15	EPA 7474	1,7474	BV
Nickel, Total	23.3		mg/kg	2.28	0.611	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM
Zinc, Total	210		mg/kg	22.8	5.94	10	11/13/18 19:00	11/14/18 14:42	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-16 Date Collected: 10/23/18 16:30

Client ID: CAD-1 4.4-9.0 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 51%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	7.20		mg/kg	0.948	0.125	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM
Cadmium, Total	0.163	J	mg/kg	0.379	0.050	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM
Chromium, Total	27.4		mg/kg	3.79	0.887	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM
Copper, Total	10.5		mg/kg	3.79	0.368	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM
Lead, Total	8.92		mg/kg	1.14	0.277	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM
Mercury, Total	0.007	J	mg/kg	0.021	0.003	5	11/13/18 19:35	11/18/18 16:18	EPA 7474	1,7474	BV
Nickel, Total	16.5		mg/kg	1.90	0.506	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM
Zinc, Total	48.9		mg/kg	19.0	4.93	10	11/13/18 19:00	11/14/18 14:46	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-17 Date Collected: 10/23/18 16:15

Client ID: DS-1 0-7.3 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 37%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.97		mg/kg	1.29	0.170	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM
Cadmium, Total	1.53		mg/kg	0.516	0.068	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM
Chromium, Total	102		mg/kg	5.16	1.21	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM
Copper, Total	135		mg/kg	5.16	0.501	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM
Lead, Total	75.7		mg/kg	1.55	0.377	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM
Mercury, Total	0.382		mg/kg	0.028	0.004	5	11/13/18 19:35	11/18/18 16:20	EPA 7474	1,7474	BV
Nickel, Total	28.8		mg/kg	2.58	0.690	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM
Zinc, Total	224		mg/kg	25.8	6.71	10	11/13/18 19:00	11/14/18 14:50	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-18 Date Collected: 10/23/18 17:35

Client ID: DS-2 0-7.0 Date Received: 10/24/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Sediment

Percent Solids: 38%

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	9.00		mg/kg	1.31	0.172	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM
Cadmium, Total	1.77		mg/kg	0.523	0.069	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM
Chromium, Total	105		mg/kg	5.23	1.22	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM
Copper, Total	134		mg/kg	5.23	0.507	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM
Lead, Total	69.5		mg/kg	1.57	0.382	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM
Mercury, Total	0.433		mg/kg	0.028	0.004	5	11/13/18 19:35	11/18/18 16:23	EPA 7474	1,7474	BV
Nickel, Total	28.0		mg/kg	2.61	0.698	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM
Zinc, Total	235		mg/kg	26.1	6.80	10	11/13/18 19:00	11/14/18 14:54	EPA 3050B	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1178831-1										
Arsenic, Total	ND		mg/kg	0.500	0.066	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM
Cadmium, Total	ND		mg/kg	0.200	0.026	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM
Chromium, Total	ND		mg/kg	2.00	0.468	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM
Copper, Total	ND		mg/kg	2.00	0.194	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM
Lead, Total	ND		mg/kg	0.600	0.146	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM
Nickel, Total	ND		mg/kg	1.00	0.267	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM
Zinc, Total	ND		mg/kg	10.0	2.60	10	11/13/18 19:00	11/14/18 11:46	1,6020B	AM

Prep Information

Digestion Method: EPA 3050B

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-18 Batch: WG1179091-1										
Mercury, Total	ND		mg/kg	0.013	0.002	5	11/13/18 19:35	11/18/18 14:12	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1178831-2 SRM Lot Number: D102-540								
Arsenic, Total	87		-		83-117	-		20
Cadmium, Total	99		-		83-118	-		20
Chromium, Total	85		-		83-117	-		20
Copper, Total	84		-		84-116	-		20
Lead, Total	85		-		82-118	-		20
Nickel, Total	88		-		83-117	-		20
Zinc, Total	83		-		81-118	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 Batch: WG1179091-2 SRM Lot Number: D102-540								
Mercury, Total	96		-		65-134	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1178831-3 WG1178831-4 QC Sample: L1843305-07 Client ID: US-1 0-5.5												
Arsenic, Total	10.3	25.4	33.9	93		34.4	93		75-125	1		20
Cadmium, Total	1.00	10.8	12.2	104		12.7	106		75-125	4		20
Chromium, Total	85.2	42.3	117	75		120	81		75-125	3		20
Copper, Total	129.	52.8	166	**70**	Q	164	**65**	Q	75-125	1		20
Lead, Total	77.9	108	178	93		192	104		75-125	8		20
Nickel, Total	30.2	106	123	88		130	93		75-125	6		20
Zinc, Total	216.	106	292	**72**	Q	293	**72**	Q	75-125	0		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1179091-3 WG1179091-4 QC Sample: L1843305-07 Client ID: US-1 0-5.5												
Mercury, Total	0.299	1.44	1.73	99		1.64	92		80-120	5		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1178831-5 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Arsenic, Total	10.3	9.61	mg/kg	7		20
Cadmium, Total	1.00	0.980	mg/kg	2		20
Chromium, Total	85.2	76.7	mg/kg	11		20
Copper, Total	129.	117	mg/kg	10		20
Lead, Total	77.9	65.4	mg/kg	17		20
Nickel, Total	30.2	27.3	mg/kg	10		20
Zinc, Total	216.	197	mg/kg	9		20
Total Metals - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1179091-5 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Mercury, Total	0.299	0.279	mg/kg	7		20

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-01
Client ID: TB-2
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 16:50
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.67		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.74		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	36.6		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	63.4		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-02
Client ID: US-2 0.0-5.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 17:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.88		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.93		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	42.0		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	58.0		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-03
Client ID: US-2 5.0-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/22/18 15:17
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.016		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.017		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	74.9		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	25.1		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-04
Client ID: TB-1 0-5.2
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.55		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.46		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	37.5		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	62.5		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-05
Client ID: TB-1 5.2-6.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 10:30
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	0.069		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	0.073		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	73.4		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	26.6		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-06
Client ID: CAD-3 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.15		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.91		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	45.8		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	54.2		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-07
Client ID: US-1 0-5.5
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:24
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	3.32		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.42		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	36.3		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	63.7		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-08
Client ID: CAD-2 0.5.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 13:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.14		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.03		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	43.6		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	56.4		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-09
Client ID: CAD-2 5.3-10.8
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 14:20
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.38		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.28		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	50.4		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	49.6		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-10
Client ID: W1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:10
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.99		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.14		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	38.9		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	61.1		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-11
Client ID: V1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 11:31
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.96		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.88		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	32.1		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	67.9		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-12
Client ID: S1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:25
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.52		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.46		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	41.2		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	58.8		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-13
Client ID: R1
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 12:39
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.88		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.87		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	40.8		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	59.2		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-14
Client ID: CAD-3 6.1-9.9
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 15:00
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.56		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.64		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	55.4		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	44.6		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-15
Client ID: CAD-1 0-4.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:34
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.26		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.14		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	42.7		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	57.3		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-16
Client ID: CAD-1 4.4-9.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:30
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	1.31		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	1.23		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	50.7		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	49.3		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-17
Client ID: DS-1 0-7.3
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 16:15
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.49		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	2.56		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	37.4		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	62.6		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

SAMPLE RESULTS

Lab ID: L1843305-18
Client ID: DS-2 0-7.0
Sample Location: NEW HAVEN, CT

Date Collected: 10/23/18 17:35
Date Received: 10/24/18
Field Prep: Not Specified

Sample Depth:
Matrix: Sediment

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab										
Total Organic Carbon (Rep1)	2.82		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	3.22		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
General Chemistry - Mansfield Lab										
Solids, Total	37.5		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD
Moisture	62.5		%	0.100	0.100	1	-	10/25/18 14:47	121,2540G	GD

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1843305

Project Number: 60588790 TASK 5.0 **Report Date:** 04/05/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Organic Carbon - Mansfield Lab for sample(s): 01-18 Batch: WG1178455-1										
Total Organic Carbon (Rep1)	ND		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP
Total Organic Carbon (Rep2)	ND		%	0.010	0.010	1	-	11/06/18 00:00	1,9060A	SP

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-18 Batch: WG1178455-2								
Total Organic Carbon (Rep1)	101		-		75-125	-		25
Total Organic Carbon (Rep2)	86		-		75-125	-		25

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1178455-4 WG1178455-5 QC Sample: L1843305-07 Client ID: US-1 0-5.5												
Total Organic Carbon (Rep1)	3.32	1.34	4.74	106		4.47	106		75-125	6		25
Total Organic Carbon (Rep2)	3.42	1.37	4.72	95		4.63	93		75-125	2		25

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 5.0

Lab Number: L1843305

Report Date: 04/05/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1172177-1 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Solids, Total	36.3	35.4	%	3		10
Moisture	63.7	64.6	%	1		10
Total Organic Carbon - Mansfield Lab Associated sample(s): 01-18 QC Batch ID: WG1178455-3 QC Sample: L1843305-07 Client ID: US-1 0-5.5						
Total Organic Carbon (Rep1)	3.32	3.40	%	2		25
Total Organic Carbon (Rep2)	3.42	3.39	%	1		25

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
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Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843305-01A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-02A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-03A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-04A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Lab Number: L1843305
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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843305-05A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-06A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-07A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-07B	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-07C	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

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Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843305-08A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-09A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-10A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-11A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-12A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843305-13A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-14A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-15A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-16A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1843305-17A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 5.0

Lab Number: L1843305
Report Date: 04/05/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1843305-18A	Glass 250ml/8oz unpreserved	A	NA		2.4	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-HG-7474T(28),A2-CR-6020T(180),A2-TS(7),A2-AS-6020T(180),A2-CD-6020T(180),A2-HGPREP-AF(28),A2-PREP-3050:2T(180),A2-TOC-9060-2REPS(28),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843305
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GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1843305
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1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No, see narrative
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No, see narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No, see narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No, see narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	Trans-Nonachlor @486%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1843305-07MSD: 4.4'-DDT @ 127%, endosulfan II @ 145%	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	Cl5-BZ#101 (42%), Cl5-BZ#118 (46%), Cl6-BZ#138 (51%) and Cl6-BZ#153 (45%)	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	N/A		Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	No	WG1178831-3 MS Cu (70%), Zn(72%); WG1178831-4 MSD Cu (65%), Zn(72%)	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

CHAIN OF CUSTODY

PAGE 1 OF 2

Date Rec'd in Lab: 10/24/18

ALPHA Job #: L1843305

ALPHA ANALYTICAL
8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Client Information

Client: USACE / AECOM
Address: 696 VIRGINIA RD
CONCORD, MA 01742
Phone: 978-318-8048
Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Project Information

Project Name: NEW HAVEN HBR
Project Location: NEW HAVEN, CT
Project #:
Project Manager: RICHARD LOYD / KRIS VANNAERSEN
ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☑ Other State /Fed Program RIM Criteria RIM

Additional Project Information:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	RIM METALS	PAHs	PCBs	PESTICIDES	TOC	%MOIST LIS	Sample Comments	TOTAL # BOTTLES
43305-01	TB-2	10/22	10:50	SE	GJS	✓	✓	✓	✓	✓	✓		1
02	US-2 0.0-5.0	10/22	17:20	SE	GJS	✓	✓	✓	✓	✓	✓		1
03	US-2 5.0-6.0	10/22	17:20	SE	GJS	✓	✓	✓	✓	✓	✓		1
04	TB-1 0-5.2	10/23	10:25	SE	GJS	✓	✓	✓	✓	✓	✓		1
05	TB-1 5.2-6.0	10/23	10:25	SE	GJS	✓	✓	✓	✓	✓	✓		1
06	CAD-3 0-5.5	10/23	11:43	SE	GJS	✓	✓	✓	✓	✓	✓		1
07	US-1 0-5.5	10/23	12:37	SE	GJS	✓	✓	✓	✓	✓	✓		1
08	CAD-2 0.5.3	10/23	13:47	SE	GJS	✓	✓	✓	✓	✓	✓		1
09	CAD-2 5.3-10.8	10/23	14:15	SE	GJS	✓	✓	✓	✓	✓	✓		1
10	W	10/23	13:10	SE	RBL	✓	✓	✓	✓	✓	✓		1
					Container Type	A	A	A	A	A	A		
					Preservative	A	A	A	A	A	A		

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
Richard B. Loyd	10/23 18:00	[illegible]	10/23 1800
[illegible]	10/24 12:25	[illegible]	10/24/18 1233
[illegible]	10/24/18 1509	[illegible]	10/24/18 15:09

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

CHAIN OF CUSTODY

PAGE 2 OF 2

Date Rec'd in Lab: 10/24/18

ALPHA Job #: L1843305

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Project Information

Project Name: NEW HAVEN HBR

Project Location: NEW HAVEN, CT

Project #:

Project Manager: RICHARD LOYD, KRIS VAN NAORSEN

ALPHA Quote #:

Report Information - Data Deliverables

☑ ADEx ☑ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: USACE / AECOM

Address: 696 VIRGINIA RD, CONCORD, MA 01742

Phone: 978-318-8048

Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods

☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☐ No NPDES RGP

☑ Other State /Fed Program RCM Criteria RCM

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Additional Project Information:

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint; RCM METALS; PAHS; PCBS; PESTICIDES; TOC; % MOISTURE/TS

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	Sample Comments	Total # Bottles
	~~[illegible]~~ S1						
L3305-11	V1	10/23	11:31	SE	RBL		1
12	S1	10/23	12:25	SE	RBL		1
13	B1	10/23	12:31	SE	RBL		1
14	CAD-3 6.1-9.9	10/23	15:00	SE	GJS		1
15	CAD-1 0-4.0	10/23	15:58	SE	GJS		1
16	CAD-1 4.4-9.0	10/23	16:30	SE	GJS		1
17	DS-1 0-7.3	10/23	17:00	SE	GJS		1
18	DS-2 0-7.0	10/23	17:38	SE	GJS		1
07	DUP / MS/MSD	10/23	13:10	SE	GJS		2

	RCM METALS	PAHS	PCBS	PESTICIDES	TOC	% MOISTURE/TS
Container Type	A	A	A	A	A	A
Preservative	A	A	A	A	A	A

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H= $Na_2S_2O_3$, I= Ascorbic Acid, J= NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/23 18:00	[signature]	10/23 18:00
[signature] Charles Nix	10/24 1325	[signature]	10/24/18 1325
[signature]	10/24/18 1559	[signature]	10/24/18 15:59

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

Appendix C.3: Tissue Chemistry Lab Report

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

February 5, 2019

28-Day Bioassay Preliminary Tissue Reports

AECOM Imagine it. Delivered.

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

28-Day Bioassay Preliminary Tissue Report

- ***Macoma nasuta* Data**

ANALYTICAL REPORT

Lab Number:	L1853052
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 10.0
Report Date:	01/24/19

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1853052-01	B567PREMNA	MACOMA	NEW HAVEN, CT	12/21/18 10:15	12/26/18
L1853052-02	B567PREMNB	MACOMA	NEW HAVEN, CT	12/21/18 10:15	12/26/18
L1853052-03	B567PREMNC	MACOMA	NEW HAVEN, CT	12/21/18 10:15	12/26/18
L1853052-04	B567PREMND	MACOMA	NEW HAVEN, CT	12/21/18 10:15	12/26/18
L1853052-05	B567PREMNE	MACOMA	NEW HAVEN, CT	12/21/18 10:15	12/26/18
L1853052-06	B567LABMNA	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-07	B567LABMNB	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-08	B567LABMNC	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-09	B567LABMND	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-10	B567LABMNE	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-11	B567R01MNA	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-12	B567R01MNB	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-13	B567R01MNC	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-14	B567R01MND	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-15	B567R01MNE	MACOMA	NEW HAVEN, CT	12/21/18 09:30	12/26/18
L1853052-16	B567S01MNA	MACOMA	NEW HAVEN, CT	12/21/18 10:30	12/26/18
L1853052-17	B567S01MNB	MACOMA	NEW HAVEN, CT	12/21/18 10:30	12/26/18
L1853052-18	B567S01MNC	MACOMA	NEW HAVEN, CT	12/21/18 10:30	12/26/18
L1853052-19	B567S01MND	MACOMA	NEW HAVEN, CT	12/21/18 10:30	12/26/18
L1853052-20	B567S01MNE	MACOMA	NEW HAVEN, CT	12/21/18 10:30	12/26/18
L1853052-21	B567S02MNA	MACOMA	NEW HAVEN, CT	12/21/18 10:45	12/26/18
L1853052-22	B567S02MNB	MACOMA	NEW HAVEN, CT	12/21/18 10:45	12/26/18
L1853052-23	B567S02MNC	MACOMA	NEW HAVEN, CT	12/21/18 10:45	12/26/18
L1853052-24	B567S02MND	MACOMA	NEW HAVEN, CT	12/21/18 10:45	12/26/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1853052-25	B567S02MNE	MACOMA	NEW HAVEN, CT	12/21/18 10:45	12/26/18
L1853052-26	B567S03MNA	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-27	B567S03MNB	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-28	B567S03MNC	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-29	B567S03MND	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-30	B567S03MNE	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-31	B567S04MNA	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-32	B567S04MNB	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-33	B567S04MNC	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-34	B567S04MND	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-35	B567S04MNE	MACOMA	NEW HAVEN, CT	12/21/18 11:15	12/26/18
L1853052-36	B567S05MNA	MACOMA	NEW HAVEN, CT	12/21/18 12:30	12/26/18
L1853052-37	B567S05MNB	MACOMA	NEW HAVEN, CT	12/21/18 12:30	12/26/18
L1853052-38	B567S05MNC	MACOMA	NEW HAVEN, CT	12/21/18 12:30	12/26/18
L1853052-39	B567S05MND	MACOMA	NEW HAVEN, CT	12/21/18 12:30	12/26/18
L1853052-40	B567S05MNE	MACOMA	NEW HAVEN, CT	12/21/18 12:30	12/26/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853052
Project Number:	60588790 TASK 10.0	**Report Date:**	01/24/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853052
Project Number:	60588790 TASK 10.0	**Report Date:**	01/24/19

Case Narrative (continued)

eportaReport Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

The samples were received at the laboratory below the required temperature range. The samples were transported to the laboratory in a cooler with ice and were noted to be frozen.

Semivolatile Organics

PCB Congeners did not achieve the requested regulatory limits due to the current lab RL, however results were reported to the MDL.

The WG1194647-5 Laboratory Duplicate RPD for Cl3-BZ#18 (43%), performed on L1853052-22, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

Pesticides

Methoxychlor did not achieve the requested regulatory limits due to the current lab RL, however results were reported to the MDL.

Total Metals

The WG1194805-8 SRM recoveries, associated with L1853052-01, -02, -03, -11, -12, -13, -14, -15, -16, -17, -18, -19, and -20, are above the acceptance criteria for arsenic (60%), cadmium (66%) and zinc (58%); however, the associated LCS recoveries are within criteria. No further action was taken.

The WG1194857-8 SRM recoveries, associated with L1853052-21-40, are outside the acceptance criteria for arsenic (60%), cadmium (66%) and zinc (60%); however, the associated LCS recoveries are within criteria. No further action was taken.

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853052
Project Number:	60588790 TASK 10.0	**Report Date:**	01/24/19

Case Narrative (continued)

Total Mercury

The WG1194808-2 LCS recovery, associated with L1853052-01, -02, -03, -11, -12, -13, -14, -15, -16, -17, -18, -19, and -20, is above the acceptance criteria for mercury (122%); however, the associated samples are non-detect to the RL for this target analyte. The results of the original analysis are reported.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 01/24/19

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-01
Client ID: B567PREMNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 15:50
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.90	4.95	1
Acenaphthylene	ND		ug/kg	9.90	4.95	1
Acenaphthene	ND		ug/kg	9.90	4.95	1
Fluorene	ND		ug/kg	9.90	4.95	1
Phenanthrene	ND		ug/kg	9.90	4.95	1
Anthracene	ND		ug/kg	9.90	4.95	1
Fluoranthene	ND		ug/kg	9.90	4.95	1
Pyrene	ND		ug/kg	9.90	4.95	1
Benz(a)anthracene	ND		ug/kg	9.90	4.95	1
Chrysene	ND		ug/kg	9.90	4.95	1
Benzo(b)fluoranthene	ND		ug/kg	9.90	4.95	1
Benzo(k)fluoranthene	ND		ug/kg	9.90	4.95	1
Benzo(a)pyrene	ND		ug/kg	9.90	4.95	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.90	4.95	1
Dibenz(a,h)anthracene	ND		ug/kg	9.90	4.95	1
Benzo(ghi)perylene	ND		ug/kg	9.90	4.95	1
Cl2-BZ#8	ND		ug/kg	0.990	0.495	1
Cl3-BZ#18	ND		ug/kg	0.990	0.495	1
Cl3-BZ#28	ND		ug/kg	0.990	0.495	1
Cl4-BZ#44	ND		ug/kg	0.990	0.495	1
Cl4-BZ#49	ND		ug/kg	0.990	0.495	1
Cl4-BZ#52	ND		ug/kg	0.990	0.495	1
Cl4-BZ#66	ND		ug/kg	0.990	0.495	1
Cl5-BZ#87	ND		ug/kg	0.990	0.495	1
Cl5-BZ#101	ND		ug/kg	0.990	0.495	1
Cl5-BZ#105	ND		ug/kg	0.990	0.495	1
Cl5-BZ#118	ND		ug/kg	0.990	0.495	1
Cl6-BZ#128	ND		ug/kg	0.990	0.495	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-01 Date Collected: 12/21/18 10:15

Client ID: B567PREMNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.990	0.495	1
Cl6-BZ#153	ND		ug/kg	0.990	0.495	1
Cl7-BZ#170	ND		ug/kg	0.990	0.495	1
Cl7-BZ#180	ND		ug/kg	0.990	0.495	1
Cl7-BZ#183	ND		ug/kg	0.990	0.495	1
Cl7-BZ#184	ND		ug/kg	0.990	0.495	1
Cl7-BZ#187	ND		ug/kg	0.990	0.495	1
Cl8-BZ#195	ND		ug/kg	0.990	0.495	1
Cl9-BZ#206	ND		ug/kg	0.990	0.495	1
Cl10-BZ#209	ND		ug/kg	0.990	0.495	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	79		30-150
Pyrene-d10	91		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	101		30-150
BZ 198	82		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-02
Client ID: B567PREMNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 17:29
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.38	4.69	1
Acenaphthylene	ND		ug/kg	9.38	4.69	1
Acenaphthene	ND		ug/kg	9.38	4.69	1
Fluorene	ND		ug/kg	9.38	4.69	1
Phenanthrene	ND		ug/kg	9.38	4.69	1
Anthracene	ND		ug/kg	9.38	4.69	1
Fluoranthene	5.70	J	ug/kg	9.38	4.69	1
Pyrene	5.02	J	ug/kg	9.38	4.69	1
Benz(a)anthracene	ND		ug/kg	9.38	4.69	1
Chrysene	ND		ug/kg	9.38	4.69	1
Benzo(b)fluoranthene	ND		ug/kg	9.38	4.69	1
Benzo(k)fluoranthene	ND		ug/kg	9.38	4.69	1
Benzo(a)pyrene	ND		ug/kg	9.38	4.69	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.38	4.69	1
Dibenz(a,h)anthracene	ND		ug/kg	9.38	4.69	1
Benzo(ghi)perylene	ND		ug/kg	9.38	4.69	1
Cl2-BZ#8	ND		ug/kg	0.938	0.469	1
Cl3-BZ#18	0.934	J	ug/kg	0.938	0.469	1
Cl3-BZ#28	ND		ug/kg	0.938	0.469	1
Cl4-BZ#44	ND		ug/kg	0.938	0.469	1
Cl4-BZ#49	ND		ug/kg	0.938	0.469	1
Cl4-BZ#52	ND		ug/kg	0.938	0.469	1
Cl4-BZ#66	ND		ug/kg	0.938	0.469	1
Cl5-BZ#87	ND		ug/kg	0.938	0.469	1
Cl5-BZ#101	ND		ug/kg	0.938	0.469	1
Cl5-BZ#105	ND		ug/kg	0.938	0.469	1
Cl5-BZ#118	ND		ug/kg	0.938	0.469	1
Cl6-BZ#128	ND		ug/kg	0.938	0.469	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-02 Date Collected: 12/21/18 10:15

Client ID: B567PREMNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.938	0.469	1
Cl6-BZ#153	ND		ug/kg	0.938	0.469	1
Cl7-BZ#170	ND		ug/kg	0.938	0.469	1
Cl7-BZ#180	ND		ug/kg	0.938	0.469	1
Cl7-BZ#183	ND		ug/kg	0.938	0.469	1
Cl7-BZ#184	0.489	J	ug/kg	0.938	0.469	1
Cl7-BZ#187	ND		ug/kg	0.938	0.469	1
Cl8-BZ#195	ND		ug/kg	0.938	0.469	1
Cl9-BZ#206	ND		ug/kg	0.938	0.469	1
Cl10-BZ#209	ND		ug/kg	0.938	0.469	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	87		30-150
Pyrene-d10	96		30-150
Benzo(b)fluoranthene-d12	90		30-150
DBOB	103		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-03
Client ID: B567PREMNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 18:36
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.06	4.53	1
Acenaphthylene	ND		ug/kg	9.06	4.53	1
Acenaphthene	ND		ug/kg	9.06	4.53	1
Fluorene	ND		ug/kg	9.06	4.53	1
Phenanthrene	ND		ug/kg	9.06	4.53	1
Anthracene	ND		ug/kg	9.06	4.53	1
Fluoranthene	ND		ug/kg	9.06	4.53	1
Pyrene	ND		ug/kg	9.06	4.53	1
Benz(a)anthracene	ND		ug/kg	9.06	4.53	1
Chrysene	ND		ug/kg	9.06	4.53	1
Benzo(b)fluoranthene	ND		ug/kg	9.06	4.53	1
Benzo(k)fluoranthene	ND		ug/kg	9.06	4.53	1
Benzo(a)pyrene	ND		ug/kg	9.06	4.53	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.06	4.53	1
Dibenz(a,h)anthracene	ND		ug/kg	9.06	4.53	1
Benzo(ghi)perylene	ND		ug/kg	9.06	4.53	1
Cl2-BZ#8	ND		ug/kg	0.906	0.453	1
Cl3-BZ#18	ND		ug/kg	0.906	0.453	1
Cl3-BZ#28	ND		ug/kg	0.906	0.453	1
Cl4-BZ#44	ND		ug/kg	0.906	0.453	1
Cl4-BZ#49	ND		ug/kg	0.906	0.453	1
Cl4-BZ#52	ND		ug/kg	0.906	0.453	1
Cl4-BZ#66	ND		ug/kg	0.906	0.453	1
Cl5-BZ#87	ND		ug/kg	0.906	0.453	1
Cl5-BZ#101	ND		ug/kg	0.906	0.453	1
Cl5-BZ#105	ND		ug/kg	0.906	0.453	1
Cl5-BZ#118	ND		ug/kg	0.906	0.453	1
Cl6-BZ#128	ND		ug/kg	0.906	0.453	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-03 Date Collected: 12/21/18 10:15

Client ID: B567PREMNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.906	0.453	1
Cl6-BZ#153	ND		ug/kg	0.906	0.453	1
Cl7-BZ#170	ND		ug/kg	0.906	0.453	1
Cl7-BZ#180	ND		ug/kg	0.906	0.453	1
Cl7-BZ#183	ND		ug/kg	0.906	0.453	1
Cl7-BZ#184	ND		ug/kg	0.906	0.453	1
Cl7-BZ#187	ND		ug/kg	0.906	0.453	1
Cl8-BZ#195	ND		ug/kg	0.906	0.453	1
Cl9-BZ#206	ND		ug/kg	0.906	0.453	1
Cl10-BZ#209	ND		ug/kg	0.906	0.453	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	94		30-150
Pyrene-d10	97		30-150
Benzo(b)fluoranthene-d12	90		30-150
DBOB	106		30-150
BZ 198	82		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-11
Client ID: B567R01MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 19:09
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.75	4.87	1
Acenaphthylene	ND		ug/kg	9.75	4.87	1
Acenaphthene	ND		ug/kg	9.75	4.87	1
Fluorene	ND		ug/kg	9.75	4.87	1
Phenanthrene	5.34	J	ug/kg	9.75	4.87	1
Anthracene	ND		ug/kg	9.75	4.87	1
Fluoranthene	8.38	J	ug/kg	9.75	4.87	1
Pyrene	10.5		ug/kg	9.75	4.87	1
Benz(a)anthracene	5.16	J	ug/kg	9.75	4.87	1
Chrysene	ND		ug/kg	9.75	4.87	1
Benzo(b)fluoranthene	5.04	J	ug/kg	9.75	4.87	1
Benzo(k)fluoranthene	ND		ug/kg	9.75	4.87	1
Benzo(a)pyrene	ND		ug/kg	9.75	4.87	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.75	4.87	1
Dibenz(a,h)anthracene	ND		ug/kg	9.75	4.87	1
Benzo(ghi)perylene	ND		ug/kg	9.75	4.87	1
Cl2-BZ#8	ND		ug/kg	0.975	0.487	1
Cl3-BZ#18	ND		ug/kg	0.975	0.487	1
Cl3-BZ#28	ND		ug/kg	0.975	0.487	1
Cl4-BZ#44	ND		ug/kg	0.975	0.487	1
Cl4-BZ#49	ND		ug/kg	0.975	0.487	1
Cl4-BZ#52	ND		ug/kg	0.975	0.487	1
Cl4-BZ#66	ND		ug/kg	0.975	0.487	1
Cl5-BZ#87	ND		ug/kg	0.975	0.487	1
Cl5-BZ#101	ND		ug/kg	0.975	0.487	1
Cl5-BZ#105	ND		ug/kg	0.975	0.487	1
Cl5-BZ#118	ND		ug/kg	0.975	0.487	1
Cl6-BZ#128	ND		ug/kg	0.975	0.487	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-11 Date Collected: 12/21/18 09:30

Client ID: B567R01MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.975	0.487	1
Cl6-BZ#153	ND		ug/kg	0.975	0.487	1
Cl7-BZ#170	ND		ug/kg	0.975	0.487	1
Cl7-BZ#180	ND		ug/kg	0.975	0.487	1
Cl7-BZ#183	ND		ug/kg	0.975	0.487	1
Cl7-BZ#184	ND		ug/kg	0.975	0.487	1
Cl7-BZ#187	ND		ug/kg	0.975	0.487	1
Cl8-BZ#195	ND		ug/kg	0.975	0.487	1
Cl9-BZ#206	ND		ug/kg	0.975	0.487	1
Cl10-BZ#209	ND		ug/kg	0.975	0.487	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	93		30-150
Benzo(b)fluoranthene-d12	87		30-150
DBOB	103		30-150
BZ 198	82		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-12
Client ID: B567R01MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 19:42
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.56	4.78	1
Acenaphthylene	ND		ug/kg	9.56	4.78	1
Acenaphthene	ND		ug/kg	9.56	4.78	1
Fluorene	ND		ug/kg	9.56	4.78	1
Phenanthrene	5.41	J	ug/kg	9.56	4.78	1
Anthracene	ND		ug/kg	9.56	4.78	1
Fluoranthene	7.27	J	ug/kg	9.56	4.78	1
Pyrene	9.52	J	ug/kg	9.56	4.78	1
Benz(a)anthracene	ND		ug/kg	9.56	4.78	1
Chrysene	ND		ug/kg	9.56	4.78	1
Benzo(b)fluoranthene	ND		ug/kg	9.56	4.78	1
Benzo(k)fluoranthene	ND		ug/kg	9.56	4.78	1
Benzo(a)pyrene	ND		ug/kg	9.56	4.78	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.56	4.78	1
Dibenz(a,h)anthracene	ND		ug/kg	9.56	4.78	1
Benzo(ghi)perylene	ND		ug/kg	9.56	4.78	1
Cl2-BZ#8	ND		ug/kg	0.956	0.478	1
Cl3-BZ#18	ND		ug/kg	0.956	0.478	1
Cl3-BZ#28	ND		ug/kg	0.956	0.478	1
Cl4-BZ#44	ND		ug/kg	0.956	0.478	1
Cl4-BZ#49	ND		ug/kg	0.956	0.478	1
Cl4-BZ#52	ND		ug/kg	0.956	0.478	1
Cl4-BZ#66	ND		ug/kg	0.956	0.478	1
Cl5-BZ#87	ND		ug/kg	0.956	0.478	1
Cl5-BZ#101	ND		ug/kg	0.956	0.478	1
Cl5-BZ#105	ND		ug/kg	0.956	0.478	1
Cl5-BZ#118	ND		ug/kg	0.956	0.478	1
Cl6-BZ#128	ND		ug/kg	0.956	0.478	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-12 Date Collected: 12/21/18 09:30

Client ID: B567R01MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.956	0.478	1
Cl6-BZ#153	ND		ug/kg	0.956	0.478	1
Cl7-BZ#170	ND		ug/kg	0.956	0.478	1
Cl7-BZ#180	ND		ug/kg	0.956	0.478	1
Cl7-BZ#183	ND		ug/kg	0.956	0.478	1
Cl7-BZ#184	0.479	J	ug/kg	0.956	0.478	1
Cl7-BZ#187	ND		ug/kg	0.956	0.478	1
Cl8-BZ#195	ND		ug/kg	0.956	0.478	1
Cl9-BZ#206	ND		ug/kg	0.956	0.478	1
Cl10-BZ#209	ND		ug/kg	0.956	0.478	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	87		30-150
Pyrene-d10	97		30-150
Benzo(b)fluoranthene-d12	91		30-150
DBOB	109		30-150
BZ 198	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-13
Client ID: B567R01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 20:15
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.53	4.27	1
Acenaphthylene	ND		ug/kg	8.53	4.27	1
Acenaphthene	ND		ug/kg	8.53	4.27	1
Fluorene	ND		ug/kg	8.53	4.27	1
Phenanthrene	ND		ug/kg	8.53	4.27	1
Anthracene	ND		ug/kg	8.53	4.27	1
Fluoranthene	ND		ug/kg	8.53	4.27	1
Pyrene	5.85	J	ug/kg	8.53	4.27	1
Benz(a)anthracene	ND		ug/kg	8.53	4.27	1
Chrysene	ND		ug/kg	8.53	4.27	1
Benzo(b)fluoranthene	ND		ug/kg	8.53	4.27	1
Benzo(k)fluoranthene	ND		ug/kg	8.53	4.27	1
Benzo(a)pyrene	ND		ug/kg	8.53	4.27	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.53	4.27	1
Dibenz(a,h)anthracene	ND		ug/kg	8.53	4.27	1
Benzo(ghi)perylene	ND		ug/kg	8.53	4.27	1
Cl2-BZ#8	ND		ug/kg	0.853	0.427	1
Cl3-BZ#18	ND		ug/kg	0.853	0.427	1
Cl3-BZ#28	ND		ug/kg	0.853	0.427	1
Cl4-BZ#44	ND		ug/kg	0.853	0.427	1
Cl4-BZ#49	ND		ug/kg	0.853	0.427	1
Cl4-BZ#52	ND		ug/kg	0.853	0.427	1
Cl4-BZ#66	ND		ug/kg	0.853	0.427	1
Cl5-BZ#87	ND		ug/kg	0.853	0.427	1
Cl5-BZ#101	ND		ug/kg	0.853	0.427	1
Cl5-BZ#105	ND		ug/kg	0.853	0.427	1
Cl5-BZ#118	ND		ug/kg	0.853	0.427	1
Cl6-BZ#128	ND		ug/kg	0.853	0.427	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-13 Date Collected: 12/21/18 09:30

Client ID: B567R01MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.853	0.427	1
Cl6-BZ#153	ND		ug/kg	0.853	0.427	1
Cl7-BZ#170	ND		ug/kg	0.853	0.427	1
Cl7-BZ#180	ND		ug/kg	0.853	0.427	1
Cl7-BZ#183	ND		ug/kg	0.853	0.427	1
Cl7-BZ#184	ND		ug/kg	0.853	0.427	1
Cl7-BZ#187	ND		ug/kg	0.853	0.427	1
Cl8-BZ#195	ND		ug/kg	0.853	0.427	1
Cl9-BZ#206	ND		ug/kg	0.853	0.427	1
Cl10-BZ#209	ND		ug/kg	0.853	0.427	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	86		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	88		30-150
DBOB	103		30-150
BZ 198	82		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-14
Client ID: B567R01MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 20:49
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.70	4.35	1
Acenaphthylene	ND		ug/kg	8.70	4.35	1
Acenaphthene	ND		ug/kg	8.70	4.35	1
Fluorene	ND		ug/kg	8.70	4.35	1
Phenanthrene	5.66	J	ug/kg	8.70	4.35	1
Anthracene	ND		ug/kg	8.70	4.35	1
Fluoranthene	8.26	J	ug/kg	8.70	4.35	1
Pyrene	11.7		ug/kg	8.70	4.35	1
Benz(a)anthracene	5.94	J	ug/kg	8.70	4.35	1
Chrysene	4.76	J	ug/kg	8.70	4.35	1
Benzo(b)fluoranthene	ND		ug/kg	8.70	4.35	1
Benzo(k)fluoranthene	ND		ug/kg	8.70	4.35	1
Benzo(a)pyrene	ND		ug/kg	8.70	4.35	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.70	4.35	1
Dibenz(a,h)anthracene	ND		ug/kg	8.70	4.35	1
Benzo(ghi)perylene	ND		ug/kg	8.70	4.35	1
Cl2-BZ#8	ND		ug/kg	0.870	0.435	1
Cl3-BZ#18	ND		ug/kg	0.870	0.435	1
Cl3-BZ#28	ND		ug/kg	0.870	0.435	1
Cl4-BZ#44	ND		ug/kg	0.870	0.435	1
Cl4-BZ#49	ND		ug/kg	0.870	0.435	1
Cl4-BZ#52	ND		ug/kg	0.870	0.435	1
Cl4-BZ#66	ND		ug/kg	0.870	0.435	1
Cl5-BZ#87	ND		ug/kg	0.870	0.435	1
Cl5-BZ#101	ND		ug/kg	0.870	0.435	1
Cl5-BZ#105	ND		ug/kg	0.870	0.435	1
Cl5-BZ#118	ND		ug/kg	0.870	0.435	1
Cl6-BZ#128	ND		ug/kg	0.870	0.435	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-14 Date Collected: 12/21/18 09:30

Client ID: B567R01MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.870	0.435	1
Cl6-BZ#153	ND		ug/kg	0.870	0.435	1
Cl7-BZ#170	ND		ug/kg	0.870	0.435	1
Cl7-BZ#180	ND		ug/kg	0.870	0.435	1
Cl7-BZ#183	ND		ug/kg	0.870	0.435	1
Cl7-BZ#184	ND		ug/kg	0.870	0.435	1
Cl7-BZ#187	ND		ug/kg	0.870	0.435	1
Cl8-BZ#195	ND		ug/kg	0.870	0.435	1
Cl9-BZ#206	ND		ug/kg	0.870	0.435	1
Cl10-BZ#209	ND		ug/kg	0.870	0.435	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	84		30-150
DBOB	105		30-150
BZ 198	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-15
Client ID: B567R01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 21:22
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.78	4.89	1
Acenaphthylene	ND		ug/kg	9.78	4.89	1
Acenaphthene	ND		ug/kg	9.78	4.89	1
Fluorene	ND		ug/kg	9.78	4.89	1
Phenanthrene	ND		ug/kg	9.78	4.89	1
Anthracene	ND		ug/kg	9.78	4.89	1
Fluoranthene	5.34	J	ug/kg	9.78	4.89	1
Pyrene	8.11	J	ug/kg	9.78	4.89	1
Benz(a)anthracene	ND		ug/kg	9.78	4.89	1
Chrysene	ND		ug/kg	9.78	4.89	1
Benzo(b)fluoranthene	ND		ug/kg	9.78	4.89	1
Benzo(k)fluoranthene	ND		ug/kg	9.78	4.89	1
Benzo(a)pyrene	ND		ug/kg	9.78	4.89	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.78	4.89	1
Dibenz(a,h)anthracene	ND		ug/kg	9.78	4.89	1
Benzo(ghi)perylene	ND		ug/kg	9.78	4.89	1
Cl2-BZ#8	ND		ug/kg	0.978	0.489	1
Cl3-BZ#18	ND		ug/kg	0.978	0.489	1
Cl3-BZ#28	ND		ug/kg	0.978	0.489	1
Cl4-BZ#44	ND		ug/kg	0.978	0.489	1
Cl4-BZ#49	ND		ug/kg	0.978	0.489	1
Cl4-BZ#52	ND		ug/kg	0.978	0.489	1
Cl4-BZ#66	ND		ug/kg	0.978	0.489	1
Cl5-BZ#87	ND		ug/kg	0.978	0.489	1
Cl5-BZ#101	ND		ug/kg	0.978	0.489	1
Cl5-BZ#105	ND		ug/kg	0.978	0.489	1
Cl5-BZ#118	ND		ug/kg	0.978	0.489	1
Cl6-BZ#128	ND		ug/kg	0.978	0.489	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-15 Date Collected: 12/21/18 09:30

Client ID: B567R01MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.978	0.489	1
Cl6-BZ#153	ND		ug/kg	0.978	0.489	1
Cl7-BZ#170	ND		ug/kg	0.978	0.489	1
Cl7-BZ#180	ND		ug/kg	0.978	0.489	1
Cl7-BZ#183	ND		ug/kg	0.978	0.489	1
Cl7-BZ#184	ND		ug/kg	0.978	0.489	1
Cl7-BZ#187	ND		ug/kg	0.978	0.489	1
Cl8-BZ#195	ND		ug/kg	0.978	0.489	1
Cl9-BZ#206	ND		ug/kg	0.978	0.489	1
Cl10-BZ#209	ND		ug/kg	0.978	0.489	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	78		30-150
DBOB	93		30-150
BZ 198	72		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-16
Client ID: B567S01MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 21:55
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.88	4.44	1
Acenaphthylene	ND		ug/kg	8.88	4.44	1
Acenaphthene	ND		ug/kg	8.88	4.44	1
Fluorene	ND		ug/kg	8.88	4.44	1
Phenanthrene	13.8		ug/kg	8.88	4.44	1
Anthracene	4.54	J	ug/kg	8.88	4.44	1
Fluoranthene	60.8		ug/kg	8.88	4.44	1
Pyrene	50.4		ug/kg	8.88	4.44	1
Benz(a)anthracene	18.6		ug/kg	8.88	4.44	1
Chrysene	18.6		ug/kg	8.88	4.44	1
Benzo(b)fluoranthene	16.7		ug/kg	8.88	4.44	1
Benzo(k)fluoranthene	8.01	J	ug/kg	8.88	4.44	1
Benzo(a)pyrene	7.51	J	ug/kg	8.88	4.44	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.88	4.44	1
Dibenz(a,h)anthracene	ND		ug/kg	8.88	4.44	1
Benzo(ghi)perylene	ND		ug/kg	8.88	4.44	1
Cl2-BZ#8	ND		ug/kg	0.888	0.444	1
Cl3-BZ#18	ND		ug/kg	0.888	0.444	1
Cl3-BZ#28	ND		ug/kg	0.888	0.444	1
Cl4-BZ#44	0.584	J	ug/kg	0.888	0.444	1
Cl4-BZ#49	1.01		ug/kg	0.888	0.444	1
Cl4-BZ#52	1.37		ug/kg	0.888	0.444	1
Cl4-BZ#66	0.666	J	ug/kg	0.888	0.444	1
Cl5-BZ#87	ND		ug/kg	0.888	0.444	1
Cl5-BZ#101	1.30		ug/kg	0.888	0.444	1
Cl5-BZ#105	ND		ug/kg	0.888	0.444	1
Cl5-BZ#118	0.713	J	ug/kg	0.888	0.444	1
Cl6-BZ#128	ND		ug/kg	0.888	0.444	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-16 Date Collected: 12/21/18 10:30

Client ID: B567S01MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.900		ug/kg	0.888	0.444	1
Cl6-BZ#153	0.899		ug/kg	0.888	0.444	1
Cl7-BZ#170	ND		ug/kg	0.888	0.444	1
Cl7-BZ#180	ND		ug/kg	0.888	0.444	1
Cl7-BZ#183	ND		ug/kg	0.888	0.444	1
Cl7-BZ#184	ND		ug/kg	0.888	0.444	1
Cl7-BZ#187	ND		ug/kg	0.888	0.444	1
Cl8-BZ#195	ND		ug/kg	0.888	0.444	1
Cl9-BZ#206	ND		ug/kg	0.888	0.444	1
Cl10-BZ#209	ND		ug/kg	0.888	0.444	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	88		30-150
DBOB	104		30-150
BZ 198	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-17
Client ID: B567S01MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 22:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.98	4.49	1
Acenaphthylene	ND		ug/kg	8.98	4.49	1
Acenaphthene	ND		ug/kg	8.98	4.49	1
Fluorene	ND		ug/kg	8.98	4.49	1
Phenanthrene	9.61		ug/kg	8.98	4.49	1
Anthracene	ND		ug/kg	8.98	4.49	1
Fluoranthene	48.0		ug/kg	8.98	4.49	1
Pyrene	42.4		ug/kg	8.98	4.49	1
Benz(a)anthracene	17.0		ug/kg	8.98	4.49	1
Chrysene	16.2		ug/kg	8.98	4.49	1
Benzo(b)fluoranthene	16.4		ug/kg	8.98	4.49	1
Benzo(k)fluoranthene	7.47	J	ug/kg	8.98	4.49	1
Benzo(a)pyrene	7.39	J	ug/kg	8.98	4.49	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.98	4.49	1
Dibenz(a,h)anthracene	ND		ug/kg	8.98	4.49	1
Benzo(ghi)perylene	ND		ug/kg	8.98	4.49	1
Cl2-BZ#8	ND		ug/kg	0.898	0.449	1
Cl3-BZ#18	ND		ug/kg	0.898	0.449	1
Cl3-BZ#28	0.696	J	ug/kg	0.898	0.449	1
Cl4-BZ#44	0.455	J	ug/kg	0.898	0.449	1
Cl4-BZ#49	0.828	J	ug/kg	0.898	0.449	1
Cl4-BZ#52	1.26		ug/kg	0.898	0.449	1
Cl4-BZ#66	0.745	J	ug/kg	0.898	0.449	1
Cl5-BZ#87	ND		ug/kg	0.898	0.449	1
Cl5-BZ#101	1.10		ug/kg	0.898	0.449	1
Cl5-BZ#105	ND		ug/kg	0.898	0.449	1
Cl5-BZ#118	0.628	J	ug/kg	0.898	0.449	1
Cl6-BZ#128	ND		ug/kg	0.898	0.449	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-17 Date Collected: 12/21/18 10:30

Client ID: B567S01MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.694	J	ug/kg	0.898	0.449	1
Cl6-BZ#153	0.757	J	ug/kg	0.898	0.449	1
Cl7-BZ#170	ND		ug/kg	0.898	0.449	1
Cl7-BZ#180	ND		ug/kg	0.898	0.449	1
Cl7-BZ#183	ND		ug/kg	0.898	0.449	1
Cl7-BZ#184	ND		ug/kg	0.898	0.449	1
Cl7-BZ#187	ND		ug/kg	0.898	0.449	1
Cl8-BZ#195	ND		ug/kg	0.898	0.449	1
Cl9-BZ#206	ND		ug/kg	0.898	0.449	1
Cl10-BZ#209	ND		ug/kg	0.898	0.449	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	66		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	75		30-150
DBOB	84		30-150
BZ 198	70		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-18
Client ID: B567S01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 23:01
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.80	4.90	1
Acenaphthylene	ND		ug/kg	9.80	4.90	1
Acenaphthene	ND		ug/kg	9.80	4.90	1
Fluorene	ND		ug/kg	9.80	4.90	1
Phenanthrene	12.7		ug/kg	9.80	4.90	1
Anthracene	4.91	J	ug/kg	9.80	4.90	1
Fluoranthene	58.2		ug/kg	9.80	4.90	1
Pyrene	45.6		ug/kg	9.80	4.90	1
Benz(a)anthracene	19.8		ug/kg	9.80	4.90	1
Chrysene	19.6		ug/kg	9.80	4.90	1
Benzo(b)fluoranthene	18.5		ug/kg	9.80	4.90	1
Benzo(k)fluoranthene	8.94	J	ug/kg	9.80	4.90	1
Benzo(a)pyrene	8.64	J	ug/kg	9.80	4.90	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.80	4.90	1
Dibenz(a,h)anthracene	ND		ug/kg	9.80	4.90	1
Benzo(ghi)perylene	ND		ug/kg	9.80	4.90	1
Cl2-BZ#8	ND		ug/kg	0.980	0.490	1
Cl3-BZ#18	ND		ug/kg	0.980	0.490	1
Cl3-BZ#28	ND		ug/kg	0.980	0.490	1
Cl4-BZ#44	0.497	J	ug/kg	0.980	0.490	1
Cl4-BZ#49	0.936	J	ug/kg	0.980	0.490	1
Cl4-BZ#52	1.30		ug/kg	0.980	0.490	1
Cl4-BZ#66	0.580	J	ug/kg	0.980	0.490	1
Cl5-BZ#87	ND		ug/kg	0.980	0.490	1
Cl5-BZ#101	1.21		ug/kg	0.980	0.490	1
Cl5-BZ#105	ND		ug/kg	0.980	0.490	1
Cl5-BZ#118	0.648	J	ug/kg	0.980	0.490	1
Cl6-BZ#128	ND		ug/kg	0.980	0.490	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-18 Date Collected: 12/21/18 10:30

Client ID: B567S01MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.997		ug/kg	0.980	0.490	1
Cl6-BZ#153	0.893	J	ug/kg	0.980	0.490	1
Cl7-BZ#170	ND		ug/kg	0.980	0.490	1
Cl7-BZ#180	ND		ug/kg	0.980	0.490	1
Cl7-BZ#183	ND		ug/kg	0.980	0.490	1
Cl7-BZ#184	ND		ug/kg	0.980	0.490	1
Cl7-BZ#187	ND		ug/kg	0.980	0.490	1
Cl8-BZ#195	ND		ug/kg	0.980	0.490	1
Cl9-BZ#206	ND		ug/kg	0.980	0.490	1
Cl10-BZ#209	ND		ug/kg	0.980	0.490	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	87		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	87		30-150
DBOB	102		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-19
Client ID: B567S01MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 23:35
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.74	4.37	1
Acenaphthylene	ND		ug/kg	8.74	4.37	1
Acenaphthene	ND		ug/kg	8.74	4.37	1
Fluorene	ND		ug/kg	8.74	4.37	1
Phenanthrene	13.2		ug/kg	8.74	4.37	1
Anthracene	4.51	J	ug/kg	8.74	4.37	1
Fluoranthene	53.0		ug/kg	8.74	4.37	1
Pyrene	44.3		ug/kg	8.74	4.37	1
Benz(a)anthracene	16.5		ug/kg	8.74	4.37	1
Chrysene	16.1		ug/kg	8.74	4.37	1
Benzo(b)fluoranthene	15.0		ug/kg	8.74	4.37	1
Benzo(k)fluoranthene	7.07	J	ug/kg	8.74	4.37	1
Benzo(a)pyrene	7.06	J	ug/kg	8.74	4.37	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.74	4.37	1
Dibenz(a,h)anthracene	ND		ug/kg	8.74	4.37	1
Benzo(ghi)perylene	ND		ug/kg	8.74	4.37	1
Cl2-BZ#8	1.07		ug/kg	0.874	0.437	1
Cl3-BZ#18	3.57		ug/kg	0.874	0.437	1
Cl3-BZ#28	9.49		ug/kg	0.874	0.437	1
Cl4-BZ#44	ND		ug/kg	0.874	0.437	1
Cl4-BZ#49	0.720	J	ug/kg	0.874	0.437	1
Cl4-BZ#52	0.924		ug/kg	0.874	0.437	1
Cl4-BZ#66	0.541	J	ug/kg	0.874	0.437	1
Cl5-BZ#87	ND		ug/kg	0.874	0.437	1
Cl5-BZ#101	1.09		ug/kg	0.874	0.437	1
Cl5-BZ#105	ND		ug/kg	0.874	0.437	1
Cl5-BZ#118	0.486	J	ug/kg	0.874	0.437	1
Cl6-BZ#128	ND		ug/kg	0.874	0.437	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-19 Date Collected: 12/21/18 10:30

Client ID: B567S01MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.785	J	ug/kg	0.874	0.437	1
Cl6-BZ#153	0.646	J	ug/kg	0.874	0.437	1
Cl7-BZ#170	ND		ug/kg	0.874	0.437	1
Cl7-BZ#180	ND		ug/kg	0.874	0.437	1
Cl7-BZ#183	ND		ug/kg	0.874	0.437	1
Cl7-BZ#184	ND		ug/kg	0.874	0.437	1
Cl7-BZ#187	ND		ug/kg	0.874	0.437	1
Cl8-BZ#195	ND		ug/kg	0.874	0.437	1
Cl9-BZ#206	ND		ug/kg	0.874	0.437	1
Cl10-BZ#209	ND		ug/kg	0.874	0.437	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	93		30-150
Benzo(b)fluoranthene-d12	87		30-150
DBOB	96		30-150
BZ 198	79		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-20
Client ID: B567S01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 00:08
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.65	4.83	1
Acenaphthylene	ND		ug/kg	9.65	4.83	1
Acenaphthene	ND		ug/kg	9.65	4.83	1
Fluorene	ND		ug/kg	9.65	4.83	1
Phenanthrene	12.2		ug/kg	9.65	4.83	1
Anthracene	ND		ug/kg	9.65	4.83	1
Fluoranthene	52.7		ug/kg	9.65	4.83	1
Pyrene	44.6		ug/kg	9.65	4.83	1
Benz(a)anthracene	17.4		ug/kg	9.65	4.83	1
Chrysene	16.6		ug/kg	9.65	4.83	1
Benzo(b)fluoranthene	14.6		ug/kg	9.65	4.83	1
Benzo(k)fluoranthene	9.68		ug/kg	9.65	4.83	1
Benzo(a)pyrene	7.76	J	ug/kg	9.65	4.83	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.65	4.83	1
Dibenz(a,h)anthracene	ND		ug/kg	9.65	4.83	1
Benzo(ghi)perylene	ND		ug/kg	9.65	4.83	1
Cl2-BZ#8	ND		ug/kg	0.965	0.483	1
Cl3-BZ#18	ND		ug/kg	0.965	0.483	1
Cl3-BZ#28	ND		ug/kg	0.965	0.483	1
Cl4-BZ#44	ND		ug/kg	0.965	0.483	1
Cl4-BZ#49	1.02		ug/kg	0.965	0.483	1
Cl4-BZ#52	1.37		ug/kg	0.965	0.483	1
Cl4-BZ#66	0.620	J	ug/kg	0.965	0.483	1
Cl5-BZ#87	ND		ug/kg	0.965	0.483	1
Cl5-BZ#101	1.09		ug/kg	0.965	0.483	1
Cl5-BZ#105	ND		ug/kg	0.965	0.483	1
Cl5-BZ#118	0.571	J	ug/kg	0.965	0.483	1
Cl6-BZ#128	ND		ug/kg	0.965	0.483	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-20 Date Collected: 12/21/18 10:30

Client ID: B567S01MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.737	J	ug/kg	0.965	0.483	1
Cl6-BZ#153	0.756	J	ug/kg	0.965	0.483	1
Cl7-BZ#170	ND		ug/kg	0.965	0.483	1
Cl7-BZ#180	ND		ug/kg	0.965	0.483	1
Cl7-BZ#183	ND		ug/kg	0.965	0.483	1
Cl7-BZ#184	ND		ug/kg	0.965	0.483	1
Cl7-BZ#187	ND		ug/kg	0.965	0.483	1
Cl8-BZ#195	ND		ug/kg	0.965	0.483	1
Cl9-BZ#206	ND		ug/kg	0.965	0.483	1
Cl10-BZ#209	ND		ug/kg	0.965	0.483	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	86		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	100		30-150
BZ 198	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-21
Client ID: B567S02MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 00:42
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.52	4.26	1
Acenaphthylene	ND		ug/kg	8.52	4.26	1
Acenaphthene	4.42	J	ug/kg	8.52	4.26	1
Fluorene	ND		ug/kg	8.52	4.26	1
Phenanthrene	16.6		ug/kg	8.52	4.26	1
Anthracene	7.01	J	ug/kg	8.52	4.26	1
Fluoranthene	95.9		ug/kg	8.52	4.26	1
Pyrene	70.5		ug/kg	8.52	4.26	1
Benz(a)anthracene	23.4		ug/kg	8.52	4.26	1
Chrysene	22.8		ug/kg	8.52	4.26	1
Benzo(b)fluoranthene	15.9		ug/kg	8.52	4.26	1
Benzo(k)fluoranthene	10.9		ug/kg	8.52	4.26	1
Benzo(a)pyrene	7.99	J	ug/kg	8.52	4.26	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.52	4.26	1
Dibenz(a,h)anthracene	ND		ug/kg	8.52	4.26	1
Benzo(ghi)perylene	4.30	J	ug/kg	8.52	4.26	1
Cl2-BZ#8	ND		ug/kg	0.852	0.426	1
Cl3-BZ#18	1.66		ug/kg	0.852	0.426	1
Cl3-BZ#28	1.12		ug/kg	0.852	0.426	1
Cl4-BZ#44	0.468	J	ug/kg	0.852	0.426	1
Cl4-BZ#49	0.922		ug/kg	0.852	0.426	1
Cl4-BZ#52	1.56		ug/kg	0.852	0.426	1
Cl4-BZ#66	0.493	J	ug/kg	0.852	0.426	1
Cl5-BZ#87	ND		ug/kg	0.852	0.426	1
Cl5-BZ#101	0.780	J	ug/kg	0.852	0.426	1
Cl5-BZ#105	ND		ug/kg	0.852	0.426	1
Cl5-BZ#118	0.572	J	ug/kg	0.852	0.426	1
Cl6-BZ#128	ND		ug/kg	0.852	0.426	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-21 Date Collected: 12/21/18 10:45

Client ID: B567S02MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.907		ug/kg	0.852	0.426	1
Cl6-BZ#153	0.782	J	ug/kg	0.852	0.426	1
Cl7-BZ#170	ND		ug/kg	0.852	0.426	1
Cl7-BZ#180	ND		ug/kg	0.852	0.426	1
Cl7-BZ#183	ND		ug/kg	0.852	0.426	1
Cl7-BZ#184	ND		ug/kg	0.852	0.426	1
Cl7-BZ#187	ND		ug/kg	0.852	0.426	1
Cl8-BZ#195	ND		ug/kg	0.852	0.426	1
Cl9-BZ#206	ND		ug/kg	0.852	0.426	1
Cl10-BZ#209	ND		ug/kg	0.852	0.426	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	76		30-150
Pyrene-d10	88		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	99		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-22
Client ID: B567S02MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 03:21
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.40	4.70	1
Acenaphthylene	ND		ug/kg	9.40	4.70	1
Acenaphthene	ND		ug/kg	9.40	4.70	1
Fluorene	ND		ug/kg	9.40	4.70	1
Phenanthrene	14.0		ug/kg	9.40	4.70	1
Anthracene	6.02	J	ug/kg	9.40	4.70	1
Fluoranthene	89.0		ug/kg	9.40	4.70	1
Pyrene	70.0		ug/kg	9.40	4.70	1
Benz(a)anthracene	21.0		ug/kg	9.40	4.70	1
Chrysene	19.3		ug/kg	9.40	4.70	1
Benzo(b)fluoranthene	16.4		ug/kg	9.40	4.70	1
Benzo(k)fluoranthene	8.86	J	ug/kg	9.40	4.70	1
Benzo(a)pyrene	7.76	J	ug/kg	9.40	4.70	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.40	4.70	1
Dibenz(a,h)anthracene	ND		ug/kg	9.40	4.70	1
Benzo(ghi)perylene	ND		ug/kg	9.40	4.70	1
Cl2-BZ#8	ND		ug/kg	0.940	0.470	1
Cl3-BZ#18	1.19		ug/kg	0.940	0.470	1
Cl3-BZ#28	1.04		ug/kg	0.940	0.470	1
Cl4-BZ#44	ND		ug/kg	0.940	0.470	1
Cl4-BZ#49	0.772	J	ug/kg	0.940	0.470	1
Cl4-BZ#52	1.35		ug/kg	0.940	0.470	1
Cl4-BZ#66	0.596	J	ug/kg	0.940	0.470	1
Cl5-BZ#87	ND		ug/kg	0.940	0.470	1
Cl5-BZ#101	0.864	J	ug/kg	0.940	0.470	1
Cl5-BZ#105	ND		ug/kg	0.940	0.470	1
Cl5-BZ#118	ND		ug/kg	0.940	0.470	1
Cl6-BZ#128	ND		ug/kg	0.940	0.470	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-22 Date Collected: 12/21/18 10:45

Client ID: B567S02MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.581	J	ug/kg	0.940	0.470	1
Cl6-BZ#153	0.533	J	ug/kg	0.940	0.470	1
Cl7-BZ#170	ND		ug/kg	0.940	0.470	1
Cl7-BZ#180	ND		ug/kg	0.940	0.470	1
Cl7-BZ#183	ND		ug/kg	0.940	0.470	1
Cl7-BZ#184	ND		ug/kg	0.940	0.470	1
Cl7-BZ#187	ND		ug/kg	0.940	0.470	1
Cl8-BZ#195	ND		ug/kg	0.940	0.470	1
Cl9-BZ#206	ND		ug/kg	0.940	0.470	1
Cl10-BZ#209	ND		ug/kg	0.940	0.470	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	78		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	80		30-150
BZ 198	69		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-23
Client ID: B567S02MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 04:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.74	4.37	1
Acenaphthylene	ND		ug/kg	8.74	4.37	1
Acenaphthene	ND		ug/kg	8.74	4.37	1
Fluorene	ND		ug/kg	8.74	4.37	1
Phenanthrene	17.5		ug/kg	8.74	4.37	1
Anthracene	8.98		ug/kg	8.74	4.37	1
Fluoranthene	113		ug/kg	8.74	4.37	1
Pyrene	82.4		ug/kg	8.74	4.37	1
Benz(a)anthracene	29.1		ug/kg	8.74	4.37	1
Chrysene	29.1		ug/kg	8.74	4.37	1
Benzo(b)fluoranthene	19.5		ug/kg	8.74	4.37	1
Benzo(k)fluoranthene	15.1		ug/kg	8.74	4.37	1
Benzo(a)pyrene	11.4		ug/kg	8.74	4.37	1
Indeno(1,2,3-cd)Pyrene	4.52	J	ug/kg	8.74	4.37	1
Dibenz(a,h)anthracene	ND		ug/kg	8.74	4.37	1
Benzo(ghi)perylene	5.83	J	ug/kg	8.74	4.37	1
Cl2-BZ#8	ND		ug/kg	0.874	0.437	1
Cl3-BZ#18	1.80		ug/kg	0.874	0.437	1
Cl3-BZ#28	0.448	J	ug/kg	0.874	0.437	1
Cl4-BZ#44	0.619	J	ug/kg	0.874	0.437	1
Cl4-BZ#49	0.815	J	ug/kg	0.874	0.437	1
Cl4-BZ#52	1.62		ug/kg	0.874	0.437	1
Cl4-BZ#66	0.768	J	ug/kg	0.874	0.437	1
Cl5-BZ#87	ND		ug/kg	0.874	0.437	1
Cl5-BZ#101	1.03		ug/kg	0.874	0.437	1
Cl5-BZ#105	ND		ug/kg	0.874	0.437	1
Cl5-BZ#118	0.628	J	ug/kg	0.874	0.437	1
Cl6-BZ#128	ND		ug/kg	0.874	0.437	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-23 Date Collected: 12/21/18 10:45

Client ID: B567S02MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.909		ug/kg	0.874	0.437	1
Cl6-BZ#153	0.791	J	ug/kg	0.874	0.437	1
Cl7-BZ#170	ND		ug/kg	0.874	0.437	1
Cl7-BZ#180	ND		ug/kg	0.874	0.437	1
Cl7-BZ#183	ND		ug/kg	0.874	0.437	1
Cl7-BZ#184	ND		ug/kg	0.874	0.437	1
Cl7-BZ#187	ND		ug/kg	0.874	0.437	1
Cl8-BZ#195	ND		ug/kg	0.874	0.437	1
Cl9-BZ#206	ND		ug/kg	0.874	0.437	1
Cl10-BZ#209	ND		ug/kg	0.874	0.437	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	90		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	103		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-24
Client ID: B567S02MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 05:02
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.90	4.45	1
Acenaphthylene	ND		ug/kg	8.90	4.45	1
Acenaphthene	ND		ug/kg	8.90	4.45	1
Fluorene	ND		ug/kg	8.90	4.45	1
Phenanthrene	17.2		ug/kg	8.90	4.45	1
Anthracene	8.18	J	ug/kg	8.90	4.45	1
Fluoranthene	102		ug/kg	8.90	4.45	1
Pyrene	76.9		ug/kg	8.90	4.45	1
Benz(a)anthracene	28.0		ug/kg	8.90	4.45	1
Chrysene	25.0		ug/kg	8.90	4.45	1
Benzo(b)fluoranthene	19.2		ug/kg	8.90	4.45	1
Benzo(k)fluoranthene	12.6		ug/kg	8.90	4.45	1
Benzo(a)pyrene	10.1		ug/kg	8.90	4.45	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.90	4.45	1
Dibenz(a,h)anthracene	ND		ug/kg	8.90	4.45	1
Benzo(ghi)perylene	4.48	J	ug/kg	8.90	4.45	1
Cl2-BZ#8	ND		ug/kg	0.890	0.445	1
Cl3-BZ#18	2.59		ug/kg	0.890	0.445	1
Cl3-BZ#28	ND		ug/kg	0.890	0.445	1
Cl4-BZ#44	ND		ug/kg	0.890	0.445	1
Cl4-BZ#49	0.862	J	ug/kg	0.890	0.445	1
Cl4-BZ#52	1.38		ug/kg	0.890	0.445	1
Cl4-BZ#66	0.507	J	ug/kg	0.890	0.445	1
Cl5-BZ#87	ND		ug/kg	0.890	0.445	1
Cl5-BZ#101	0.861	J	ug/kg	0.890	0.445	1
Cl5-BZ#105	ND		ug/kg	0.890	0.445	1
Cl5-BZ#118	0.452	J	ug/kg	0.890	0.445	1
Cl6-BZ#128	ND		ug/kg	0.890	0.445	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-24 Date Collected: 12/21/18 10:45

Client ID: B567S02MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.664	J	ug/kg	0.890	0.445	1
Cl6-BZ#153	0.702	J	ug/kg	0.890	0.445	1
Cl7-BZ#170	ND		ug/kg	0.890	0.445	1
Cl7-BZ#180	ND		ug/kg	0.890	0.445	1
Cl7-BZ#183	ND		ug/kg	0.890	0.445	1
Cl7-BZ#184	ND		ug/kg	0.890	0.445	1
Cl7-BZ#187	ND		ug/kg	0.890	0.445	1
Cl8-BZ#195	ND		ug/kg	0.890	0.445	1
Cl9-BZ#206	ND		ug/kg	0.890	0.445	1
Cl10-BZ#209	ND		ug/kg	0.890	0.445	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	91		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	104		30-150
BZ 198	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-25
Client ID: B567S02MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 05:35
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.85	4.42	1
Acenaphthylene	ND		ug/kg	8.85	4.42	1
Acenaphthene	ND		ug/kg	8.85	4.42	1
Fluorene	ND		ug/kg	8.85	4.42	1
Phenanthrene	16.3		ug/kg	8.85	4.42	1
Anthracene	7.03	J	ug/kg	8.85	4.42	1
Fluoranthene	89.8		ug/kg	8.85	4.42	1
Pyrene	62.5		ug/kg	8.85	4.42	1
Benz(a)anthracene	19.7		ug/kg	8.85	4.42	1
Chrysene	20.4		ug/kg	8.85	4.42	1
Benzo(b)fluoranthene	13.9		ug/kg	8.85	4.42	1
Benzo(k)fluoranthene	9.77		ug/kg	8.85	4.42	1
Benzo(a)pyrene	7.12	J	ug/kg	8.85	4.42	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.85	4.42	1
Dibenz(a,h)anthracene	ND		ug/kg	8.85	4.42	1
Benzo(ghi)perylene	ND		ug/kg	8.85	4.42	1
Cl2-BZ#8	ND		ug/kg	0.885	0.442	1
Cl3-BZ#18	1.77		ug/kg	0.885	0.442	1
Cl3-BZ#28	ND		ug/kg	0.885	0.442	1
Cl4-BZ#44	ND		ug/kg	0.885	0.442	1
Cl4-BZ#49	0.680	J	ug/kg	0.885	0.442	1
Cl4-BZ#52	0.999		ug/kg	0.885	0.442	1
Cl4-BZ#66	0.457	J	ug/kg	0.885	0.442	1
Cl5-BZ#87	ND		ug/kg	0.885	0.442	1
Cl5-BZ#101	0.621	J	ug/kg	0.885	0.442	1
Cl5-BZ#105	ND		ug/kg	0.885	0.442	1
Cl5-BZ#118	ND		ug/kg	0.885	0.442	1
Cl6-BZ#128	ND		ug/kg	0.885	0.442	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-25 Date Collected: 12/21/18 10:45

Client ID: B567S02MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.560	J	ug/kg	0.885	0.442	1
Cl6-BZ#153	0.629	J	ug/kg	0.885	0.442	1
Cl7-BZ#170	ND		ug/kg	0.885	0.442	1
Cl7-BZ#180	ND		ug/kg	0.885	0.442	1
Cl7-BZ#183	ND		ug/kg	0.885	0.442	1
Cl7-BZ#184	ND		ug/kg	0.885	0.442	1
Cl7-BZ#187	ND		ug/kg	0.885	0.442	1
Cl8-BZ#195	ND		ug/kg	0.885	0.442	1
Cl9-BZ#206	ND		ug/kg	0.885	0.442	1
Cl10-BZ#209	ND		ug/kg	0.885	0.442	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	84		30-150
Pyrene-d10	86		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	101		30-150
BZ 198	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-26
Client ID: B567S03MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 06:09
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.60	4.80	1
Acenaphthylene	ND		ug/kg	9.60	4.80	1
Acenaphthene	ND		ug/kg	9.60	4.80	1
Fluorene	ND		ug/kg	9.60	4.80	1
Phenanthrene	20.7		ug/kg	9.60	4.80	1
Anthracene	6.51	J	ug/kg	9.60	4.80	1
Fluoranthene	76.0		ug/kg	9.60	4.80	1
Pyrene	55.3		ug/kg	9.60	4.80	1
Benz(a)anthracene	21.0		ug/kg	9.60	4.80	1
Chrysene	19.8		ug/kg	9.60	4.80	1
Benzo(b)fluoranthene	15.9		ug/kg	9.60	4.80	1
Benzo(k)fluoranthene	9.18	J	ug/kg	9.60	4.80	1
Benzo(a)pyrene	8.42	J	ug/kg	9.60	4.80	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.60	4.80	1
Dibenz(a,h)anthracene	ND		ug/kg	9.60	4.80	1
Benzo(ghi)perylene	ND		ug/kg	9.60	4.80	1
Cl2-BZ#8	ND		ug/kg	0.960	0.480	1
Cl3-BZ#18	1.79		ug/kg	0.960	0.480	1
Cl3-BZ#28	0.855	J	ug/kg	0.960	0.480	1
Cl4-BZ#44	0.676	J	ug/kg	0.960	0.480	1
Cl4-BZ#49	0.943	J	ug/kg	0.960	0.480	1
Cl4-BZ#52	1.57		ug/kg	0.960	0.480	1
Cl4-BZ#66	0.793	J	ug/kg	0.960	0.480	1
Cl5-BZ#87	ND		ug/kg	0.960	0.480	1
Cl5-BZ#101	1.07		ug/kg	0.960	0.480	1
Cl5-BZ#105	ND		ug/kg	0.960	0.480	1
Cl5-BZ#118	0.771	J	ug/kg	0.960	0.480	1
Cl6-BZ#128	ND		ug/kg	0.960	0.480	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-26 Date Collected: 12/21/18 11:15

Client ID: B567S03MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.958	J	ug/kg	0.960	0.480	1
Cl6-BZ#153	0.876	J	ug/kg	0.960	0.480	1
Cl7-BZ#170	ND		ug/kg	0.960	0.480	1
Cl7-BZ#180	ND		ug/kg	0.960	0.480	1
Cl7-BZ#183	ND		ug/kg	0.960	0.480	1
Cl7-BZ#184	ND		ug/kg	0.960	0.480	1
Cl7-BZ#187	ND		ug/kg	0.960	0.480	1
Cl8-BZ#195	ND		ug/kg	0.960	0.480	1
Cl9-BZ#206	ND		ug/kg	0.960	0.480	1
Cl10-BZ#209	ND		ug/kg	0.960	0.480	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	86		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	94		30-150
BZ 198	77		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-27
Client ID: B567S03MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 06:42
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.44	4.22	1
Acenaphthylene	ND		ug/kg	8.44	4.22	1
Acenaphthene	ND		ug/kg	8.44	4.22	1
Fluorene	ND		ug/kg	8.44	4.22	1
Phenanthrene	24.5		ug/kg	8.44	4.22	1
Anthracene	6.76	J	ug/kg	8.44	4.22	1
Fluoranthene	89.9		ug/kg	8.44	4.22	1
Pyrene	71.0		ug/kg	8.44	4.22	1
Benz(a)anthracene	24.0		ug/kg	8.44	4.22	1
Chrysene	25.6		ug/kg	8.44	4.22	1
Benzo(b)fluoranthene	19.6		ug/kg	8.44	4.22	1
Benzo(k)fluoranthene	9.61		ug/kg	8.44	4.22	1
Benzo(a)pyrene	10.1		ug/kg	8.44	4.22	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.44	4.22	1
Dibenz(a,h)anthracene	ND		ug/kg	8.44	4.22	1
Benzo(ghi)perylene	5.27	J	ug/kg	8.44	4.22	1
Cl2-BZ#8	ND		ug/kg	0.844	0.422	1
Cl3-BZ#18	0.936		ug/kg	0.844	0.422	1
Cl3-BZ#28	0.728	J	ug/kg	0.844	0.422	1
Cl4-BZ#44	0.666	J	ug/kg	0.844	0.422	1
Cl4-BZ#49	1.34		ug/kg	0.844	0.422	1
Cl4-BZ#52	1.66		ug/kg	0.844	0.422	1
Cl4-BZ#66	0.993		ug/kg	0.844	0.422	1
Cl5-BZ#87	ND		ug/kg	0.844	0.422	1
Cl5-BZ#101	1.61		ug/kg	0.844	0.422	1
Cl5-BZ#105	ND		ug/kg	0.844	0.422	1
Cl5-BZ#118	1.01		ug/kg	0.844	0.422	1
Cl6-BZ#128	ND		ug/kg	0.844	0.422	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-27 Date Collected: 12/21/18 11:15

Client ID: B567S03MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.27		ug/kg	0.844	0.422	1
Cl6-BZ#153	1.21		ug/kg	0.844	0.422	1
Cl7-BZ#170	ND		ug/kg	0.844	0.422	1
Cl7-BZ#180	ND		ug/kg	0.844	0.422	1
Cl7-BZ#183	ND		ug/kg	0.844	0.422	1
Cl7-BZ#184	ND		ug/kg	0.844	0.422	1
Cl7-BZ#187	ND		ug/kg	0.844	0.422	1
Cl8-BZ#195	ND		ug/kg	0.844	0.422	1
Cl9-BZ#206	ND		ug/kg	0.844	0.422	1
Cl10-BZ#209	ND		ug/kg	0.844	0.422	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	96		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-28
Client ID: B567S03MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 07:15
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.29	4.65	1
Acenaphthylene	ND		ug/kg	9.29	4.65	1
Acenaphthene	ND		ug/kg	9.29	4.65	1
Fluorene	ND		ug/kg	9.29	4.65	1
Phenanthrene	22.6		ug/kg	9.29	4.65	1
Anthracene	6.83	J	ug/kg	9.29	4.65	1
Fluoranthene	81.8		ug/kg	9.29	4.65	1
Pyrene	64.4		ug/kg	9.29	4.65	1
Benz(a)anthracene	21.4		ug/kg	9.29	4.65	1
Chrysene	23.2		ug/kg	9.29	4.65	1
Benzo(b)fluoranthene	16.2		ug/kg	9.29	4.65	1
Benzo(k)fluoranthene	9.50		ug/kg	9.29	4.65	1
Benzo(a)pyrene	8.58	J	ug/kg	9.29	4.65	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.29	4.65	1
Dibenz(a,h)anthracene	ND		ug/kg	9.29	4.65	1
Benzo(ghi)perylene	ND		ug/kg	9.29	4.65	1
Cl2-BZ#8	ND		ug/kg	0.929	0.465	1
Cl3-BZ#18	1.82		ug/kg	0.929	0.465	1
Cl3-BZ#28	0.742	J	ug/kg	0.929	0.465	1
Cl4-BZ#44	ND		ug/kg	0.929	0.465	1
Cl4-BZ#49	1.16		ug/kg	0.929	0.465	1
Cl4-BZ#52	1.63		ug/kg	0.929	0.465	1
Cl4-BZ#66	0.816	J	ug/kg	0.929	0.465	1
Cl5-BZ#87	ND		ug/kg	0.929	0.465	1
Cl5-BZ#101	1.38		ug/kg	0.929	0.465	1
Cl5-BZ#105	ND		ug/kg	0.929	0.465	1
Cl5-BZ#118	0.886	J	ug/kg	0.929	0.465	1
Cl6-BZ#128	ND		ug/kg	0.929	0.465	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-28 Date Collected: 12/21/18 11:15

Client ID: B567S03MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.27		ug/kg	0.929	0.465	1
Cl6-BZ#153	0.945		ug/kg	0.929	0.465	1
Cl7-BZ#170	ND		ug/kg	0.929	0.465	1
Cl7-BZ#180	ND		ug/kg	0.929	0.465	1
Cl7-BZ#183	ND		ug/kg	0.929	0.465	1
Cl7-BZ#184	ND		ug/kg	0.929	0.465	1
Cl7-BZ#187	ND		ug/kg	0.929	0.465	1
Cl8-BZ#195	ND		ug/kg	0.929	0.465	1
Cl9-BZ#206	ND		ug/kg	0.929	0.465	1
Cl10-BZ#209	ND		ug/kg	0.929	0.465	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	87		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	100		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-29
Client ID: B567S03MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 07:49
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.26	4.63	1
Acenaphthylene	ND		ug/kg	9.26	4.63	1
Acenaphthene	ND		ug/kg	9.26	4.63	1
Fluorene	ND		ug/kg	9.26	4.63	1
Phenanthrene	18.4		ug/kg	9.26	4.63	1
Anthracene	5.81	J	ug/kg	9.26	4.63	1
Fluoranthene	74.5		ug/kg	9.26	4.63	1
Pyrene	58.6		ug/kg	9.26	4.63	1
Benz(a)anthracene	22.4		ug/kg	9.26	4.63	1
Chrysene	22.9		ug/kg	9.26	4.63	1
Benzo(b)fluoranthene	15.9		ug/kg	9.26	4.63	1
Benzo(k)fluoranthene	11.8		ug/kg	9.26	4.63	1
Benzo(a)pyrene	10.1		ug/kg	9.26	4.63	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.26	4.63	1
Dibenz(a,h)anthracene	ND		ug/kg	9.26	4.63	1
Benzo(ghi)perylene	5.48	J	ug/kg	9.26	4.63	1
Cl2-BZ#8	ND		ug/kg	0.926	0.463	1
Cl3-BZ#18	1.63		ug/kg	0.926	0.463	1
Cl3-BZ#28	0.814	J	ug/kg	0.926	0.463	1
Cl4-BZ#44	0.515	J	ug/kg	0.926	0.463	1
Cl4-BZ#49	0.978		ug/kg	0.926	0.463	1
Cl4-BZ#52	1.65		ug/kg	0.926	0.463	1
Cl4-BZ#66	0.872	J	ug/kg	0.926	0.463	1
Cl5-BZ#87	ND		ug/kg	0.926	0.463	1
Cl5-BZ#101	1.30		ug/kg	0.926	0.463	1
Cl5-BZ#105	ND		ug/kg	0.926	0.463	1
Cl5-BZ#118	0.807	J	ug/kg	0.926	0.463	1
Cl6-BZ#128	ND		ug/kg	0.926	0.463	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-29 Date Collected: 12/21/18 11:15

Client ID: B567S03MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.06		ug/kg	0.926	0.463	1
Cl6-BZ#153	0.961		ug/kg	0.926	0.463	1
Cl7-BZ#170	ND		ug/kg	0.926	0.463	1
Cl7-BZ#180	0.611	J	ug/kg	0.926	0.463	1
Cl7-BZ#183	ND		ug/kg	0.926	0.463	1
Cl7-BZ#184	ND		ug/kg	0.926	0.463	1
Cl7-BZ#187	ND		ug/kg	0.926	0.463	1
Cl8-BZ#195	ND		ug/kg	0.926	0.463	1
Cl9-BZ#206	ND		ug/kg	0.926	0.463	1
Cl10-BZ#209	ND		ug/kg	0.926	0.463	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	102		30-150
BZ 198	77		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-30
Client ID: B567S03MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 08:22
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.86	4.43	1
Acenaphthylene	ND		ug/kg	8.86	4.43	1
Acenaphthene	ND		ug/kg	8.86	4.43	1
Fluorene	ND		ug/kg	8.86	4.43	1
Phenanthrene	23.2		ug/kg	8.86	4.43	1
Anthracene	7.32	J	ug/kg	8.86	4.43	1
Fluoranthene	92.6		ug/kg	8.86	4.43	1
Pyrene	72.6		ug/kg	8.86	4.43	1
Benz(a)anthracene	25.3		ug/kg	8.86	4.43	1
Chrysene	26.4		ug/kg	8.86	4.43	1
Benzo(b)fluoranthene	17.3		ug/kg	8.86	4.43	1
Benzo(k)fluoranthene	13.8		ug/kg	8.86	4.43	1
Benzo(a)pyrene	10.8		ug/kg	8.86	4.43	1
Indeno(1,2,3-cd)Pyrene	4.65	J	ug/kg	8.86	4.43	1
Dibenz(a,h)anthracene	ND		ug/kg	8.86	4.43	1
Benzo(ghi)perylene	5.50	J	ug/kg	8.86	4.43	1
Cl2-BZ#8	ND		ug/kg	0.886	0.443	1
Cl3-BZ#18	1.20		ug/kg	0.886	0.443	1
Cl3-BZ#28	0.884	J	ug/kg	0.886	0.443	1
Cl4-BZ#44	0.903		ug/kg	0.886	0.443	1
Cl4-BZ#49	1.28		ug/kg	0.886	0.443	1
Cl4-BZ#52	2.32		ug/kg	0.886	0.443	1
Cl4-BZ#66	1.02		ug/kg	0.886	0.443	1
Cl5-BZ#87	ND		ug/kg	0.886	0.443	1
Cl5-BZ#101	1.53		ug/kg	0.886	0.443	1
Cl5-BZ#105	ND		ug/kg	0.886	0.443	1
Cl5-BZ#118	1.02		ug/kg	0.886	0.443	1
Cl6-BZ#128	ND		ug/kg	0.886	0.443	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-30 Date Collected: 12/21/18 11:15

Client ID: B567S03MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.43		ug/kg	0.886	0.443	1
Cl6-BZ#153	1.14		ug/kg	0.886	0.443	1
Cl7-BZ#170	ND		ug/kg	0.886	0.443	1
Cl7-BZ#180	ND		ug/kg	0.886	0.443	1
Cl7-BZ#183	ND		ug/kg	0.886	0.443	1
Cl7-BZ#184	ND		ug/kg	0.886	0.443	1
Cl7-BZ#187	ND		ug/kg	0.886	0.443	1
Cl8-BZ#195	ND		ug/kg	0.886	0.443	1
Cl9-BZ#206	ND		ug/kg	0.886	0.443	1
Cl10-BZ#209	ND		ug/kg	0.886	0.443	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	89		30-150
Pyrene-d10	94		30-150
Benzo(b)fluoranthene-d12	88		30-150
DBOB	107		30-150
BZ 198	81		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-31
Client ID: B567S04MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 08:56
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.73	4.86	1
Acenaphthylene	ND		ug/kg	9.73	4.86	1
Acenaphthene	ND		ug/kg	9.73	4.86	1
Fluorene	ND		ug/kg	9.73	4.86	1
Phenanthrene	7.75	J	ug/kg	9.73	4.86	1
Anthracene	ND		ug/kg	9.73	4.86	1
Fluoranthene	27.3		ug/kg	9.73	4.86	1
Pyrene	21.9		ug/kg	9.73	4.86	1
Benz(a)anthracene	6.58	J	ug/kg	9.73	4.86	1
Chrysene	6.80	J	ug/kg	9.73	4.86	1
Benzo(b)fluoranthene	7.09	J	ug/kg	9.73	4.86	1
Benzo(k)fluoranthene	ND		ug/kg	9.73	4.86	1
Benzo(a)pyrene	ND		ug/kg	9.73	4.86	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.73	4.86	1
Dibenz(a,h)anthracene	ND		ug/kg	9.73	4.86	1
Benzo(ghi)perylene	ND		ug/kg	9.73	4.86	1
Cl2-BZ#8	ND		ug/kg	0.973	0.486	1
Cl3-BZ#18	1.17		ug/kg	0.973	0.486	1
Cl3-BZ#28	ND		ug/kg	0.973	0.486	1
Cl4-BZ#44	ND		ug/kg	0.973	0.486	1
Cl4-BZ#49	ND		ug/kg	0.973	0.486	1
Cl4-BZ#52	ND		ug/kg	0.973	0.486	1
Cl4-BZ#66	ND		ug/kg	0.973	0.486	1
Cl5-BZ#87	ND		ug/kg	0.973	0.486	1
Cl5-BZ#101	ND		ug/kg	0.973	0.486	1
Cl5-BZ#105	ND		ug/kg	0.973	0.486	1
Cl5-BZ#118	ND		ug/kg	0.973	0.486	1
Cl6-BZ#128	ND		ug/kg	0.973	0.486	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-31 Date Collected: 12/21/18 11:15

Client ID: B567S04MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.973	0.486	1
Cl6-BZ#153	ND		ug/kg	0.973	0.486	1
Cl7-BZ#170	ND		ug/kg	0.973	0.486	1
Cl7-BZ#180	ND		ug/kg	0.973	0.486	1
Cl7-BZ#183	ND		ug/kg	0.973	0.486	1
Cl7-BZ#184	ND		ug/kg	0.973	0.486	1
Cl7-BZ#187	ND		ug/kg	0.973	0.486	1
Cl8-BZ#195	ND		ug/kg	0.973	0.486	1
Cl9-BZ#206	ND		ug/kg	0.973	0.486	1
Cl10-BZ#209	ND		ug/kg	0.973	0.486	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	88		30-150
Pyrene-d10	91		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	103		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-32
Client ID: B567S04MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 09:30
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.93	4.46	1
Acenaphthylene	ND		ug/kg	8.93	4.46	1
Acenaphthene	ND		ug/kg	8.93	4.46	1
Fluorene	ND		ug/kg	8.93	4.46	1
Phenanthrene	7.32	J	ug/kg	8.93	4.46	1
Anthracene	ND		ug/kg	8.93	4.46	1
Fluoranthene	32.0		ug/kg	8.93	4.46	1
Pyrene	26.9		ug/kg	8.93	4.46	1
Benz(a)anthracene	9.25		ug/kg	8.93	4.46	1
Chrysene	8.87	J	ug/kg	8.93	4.46	1
Benzo(b)fluoranthene	9.04		ug/kg	8.93	4.46	1
Benzo(k)fluoranthene	6.29	J	ug/kg	8.93	4.46	1
Benzo(a)pyrene	4.49	J	ug/kg	8.93	4.46	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.93	4.46	1
Dibenz(a,h)anthracene	ND		ug/kg	8.93	4.46	1
Benzo(ghi)perylene	ND		ug/kg	8.93	4.46	1
Cl2-BZ#8	ND		ug/kg	0.893	0.446	1
Cl3-BZ#18	1.27		ug/kg	0.893	0.446	1
Cl3-BZ#28	ND		ug/kg	0.893	0.446	1
Cl4-BZ#44	ND		ug/kg	0.893	0.446	1
Cl4-BZ#49	ND		ug/kg	0.893	0.446	1
Cl4-BZ#52	ND		ug/kg	0.893	0.446	1
Cl4-BZ#66	ND		ug/kg	0.893	0.446	1
Cl5-BZ#87	ND		ug/kg	0.893	0.446	1
Cl5-BZ#101	0.505	J	ug/kg	0.893	0.446	1
Cl5-BZ#105	ND		ug/kg	0.893	0.446	1
Cl5-BZ#118	ND		ug/kg	0.893	0.446	1
Cl6-BZ#128	ND		ug/kg	0.893	0.446	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-32 Date Collected: 12/21/18 11:15

Client ID: B567S04MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.468	J	ug/kg	0.893	0.446	1
Cl6-BZ#153	0.449	J	ug/kg	0.893	0.446	1
Cl7-BZ#170	ND		ug/kg	0.893	0.446	1
Cl7-BZ#180	ND		ug/kg	0.893	0.446	1
Cl7-BZ#183	ND		ug/kg	0.893	0.446	1
Cl7-BZ#184	ND		ug/kg	0.893	0.446	1
Cl7-BZ#187	ND		ug/kg	0.893	0.446	1
Cl8-BZ#195	ND		ug/kg	0.893	0.446	1
Cl9-BZ#206	ND		ug/kg	0.893	0.446	1
Cl10-BZ#209	ND		ug/kg	0.893	0.446	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	84		30-150
DBOB	106		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-33
Client ID: B567S04MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 10:04
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.65	4.32	1
Acenaphthylene	ND		ug/kg	8.65	4.32	1
Acenaphthene	ND		ug/kg	8.65	4.32	1
Fluorene	ND		ug/kg	8.65	4.32	1
Phenanthrene	6.63	J	ug/kg	8.65	4.32	1
Anthracene	ND		ug/kg	8.65	4.32	1
Fluoranthene	30.0		ug/kg	8.65	4.32	1
Pyrene	24.6		ug/kg	8.65	4.32	1
Benz(a)anthracene	7.71	J	ug/kg	8.65	4.32	1
Chrysene	7.94	J	ug/kg	8.65	4.32	1
Benzo(b)fluoranthene	9.07		ug/kg	8.65	4.32	1
Benzo(k)fluoranthene	4.68	J	ug/kg	8.65	4.32	1
Benzo(a)pyrene	ND		ug/kg	8.65	4.32	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.65	4.32	1
Dibenz(a,h)anthracene	ND		ug/kg	8.65	4.32	1
Benzo(ghi)perylene	ND		ug/kg	8.65	4.32	1
Cl2-BZ#8	ND		ug/kg	0.865	0.432	1
Cl3-BZ#18	ND		ug/kg	0.865	0.432	1
Cl3-BZ#28	ND		ug/kg	0.865	0.432	1
Cl4-BZ#44	ND		ug/kg	0.865	0.432	1
Cl4-BZ#49	ND		ug/kg	0.865	0.432	1
Cl4-BZ#52	ND		ug/kg	0.865	0.432	1
Cl4-BZ#66	ND		ug/kg	0.865	0.432	1
Cl5-BZ#87	ND		ug/kg	0.865	0.432	1
Cl5-BZ#101	ND		ug/kg	0.865	0.432	1
Cl5-BZ#105	ND		ug/kg	0.865	0.432	1
Cl5-BZ#118	0.453	J	ug/kg	0.865	0.432	1
Cl6-BZ#128	ND		ug/kg	0.865	0.432	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-33 Date Collected: 12/21/18 11:15

Client ID: B567S04MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.865	0.432	1
Cl6-BZ#153	ND		ug/kg	0.865	0.432	1
Cl7-BZ#170	ND		ug/kg	0.865	0.432	1
Cl7-BZ#180	ND		ug/kg	0.865	0.432	1
Cl7-BZ#183	ND		ug/kg	0.865	0.432	1
Cl7-BZ#184	ND		ug/kg	0.865	0.432	1
Cl7-BZ#187	ND		ug/kg	0.865	0.432	1
Cl8-BZ#195	ND		ug/kg	0.865	0.432	1
Cl9-BZ#206	ND		ug/kg	0.865	0.432	1
Cl10-BZ#209	ND		ug/kg	0.865	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		30-150
Pyrene-d10	91		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	101		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-34
Client ID: B567S04MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 10:37
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.63	4.82	1
Acenaphthylene	ND		ug/kg	9.63	4.82	1
Acenaphthene	ND		ug/kg	9.63	4.82	1
Fluorene	ND		ug/kg	9.63	4.82	1
Phenanthrene	6.12	J	ug/kg	9.63	4.82	1
Anthracene	ND		ug/kg	9.63	4.82	1
Fluoranthene	23.8		ug/kg	9.63	4.82	1
Pyrene	17.6		ug/kg	9.63	4.82	1
Benz(a)anthracene	6.09	J	ug/kg	9.63	4.82	1
Chrysene	6.39	J	ug/kg	9.63	4.82	1
Benzo(b)fluoranthene	6.74	J	ug/kg	9.63	4.82	1
Benzo(k)fluoranthene	ND		ug/kg	9.63	4.82	1
Benzo(a)pyrene	ND		ug/kg	9.63	4.82	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.63	4.82	1
Dibenz(a,h)anthracene	ND		ug/kg	9.63	4.82	1
Benzo(ghi)perylene	ND		ug/kg	9.63	4.82	1
Cl2-BZ#8	ND		ug/kg	0.963	0.482	1
Cl3-BZ#18	ND		ug/kg	0.963	0.482	1
Cl3-BZ#28	ND		ug/kg	0.963	0.482	1
Cl4-BZ#44	ND		ug/kg	0.963	0.482	1
Cl4-BZ#49	ND		ug/kg	0.963	0.482	1
Cl4-BZ#52	ND		ug/kg	0.963	0.482	1
Cl4-BZ#66	ND		ug/kg	0.963	0.482	1
Cl5-BZ#87	ND		ug/kg	0.963	0.482	1
Cl5-BZ#101	ND		ug/kg	0.963	0.482	1
Cl5-BZ#105	ND		ug/kg	0.963	0.482	1
Cl5-BZ#118	ND		ug/kg	0.963	0.482	1
Cl6-BZ#128	ND		ug/kg	0.963	0.482	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-34 Date Collected: 12/21/18 11:15

Client ID: B567S04MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.963	0.482	1
Cl6-BZ#153	ND		ug/kg	0.963	0.482	1
Cl7-BZ#170	ND		ug/kg	0.963	0.482	1
Cl7-BZ#180	ND		ug/kg	0.963	0.482	1
Cl7-BZ#183	ND		ug/kg	0.963	0.482	1
Cl7-BZ#184	ND		ug/kg	0.963	0.482	1
Cl7-BZ#187	ND		ug/kg	0.963	0.482	1
Cl8-BZ#195	ND		ug/kg	0.963	0.482	1
Cl9-BZ#206	ND		ug/kg	0.963	0.482	1
Cl10-BZ#209	ND		ug/kg	0.963	0.482	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	95		30-150
BZ 198	72		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-35
Client ID: B567S04MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 11:11
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.85	4.42	1
Acenaphthylene	ND		ug/kg	8.85	4.42	1
Acenaphthene	ND		ug/kg	8.85	4.42	1
Fluorene	ND		ug/kg	8.85	4.42	1
Phenanthrene	6.78	J	ug/kg	8.85	4.42	1
Anthracene	ND		ug/kg	8.85	4.42	1
Fluoranthene	29.6		ug/kg	8.85	4.42	1
Pyrene	24.6		ug/kg	8.85	4.42	1
Benz(a)anthracene	7.62	J	ug/kg	8.85	4.42	1
Chrysene	8.08	J	ug/kg	8.85	4.42	1
Benzo(b)fluoranthene	7.22	J	ug/kg	8.85	4.42	1
Benzo(k)fluoranthene	6.25	J	ug/kg	8.85	4.42	1
Benzo(a)pyrene	ND		ug/kg	8.85	4.42	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.85	4.42	1
Dibenz(a,h)anthracene	ND		ug/kg	8.85	4.42	1
Benzo(ghi)perylene	ND		ug/kg	8.85	4.42	1
Cl2-BZ#8	ND		ug/kg	0.885	0.442	1
Cl3-BZ#18	ND		ug/kg	0.885	0.442	1
Cl3-BZ#28	ND		ug/kg	0.885	0.442	1
Cl4-BZ#44	ND		ug/kg	0.885	0.442	1
Cl4-BZ#49	ND		ug/kg	0.885	0.442	1
Cl4-BZ#52	ND		ug/kg	0.885	0.442	1
Cl4-BZ#66	ND		ug/kg	0.885	0.442	1
Cl5-BZ#87	ND		ug/kg	0.885	0.442	1
Cl5-BZ#101	0.677	J	ug/kg	0.885	0.442	1
Cl5-BZ#105	ND		ug/kg	0.885	0.442	1
Cl5-BZ#118	ND		ug/kg	0.885	0.442	1
Cl6-BZ#128	ND		ug/kg	0.885	0.442	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-35 Date Collected: 12/21/18 11:15

Client ID: B567S04MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.460	J	ug/kg	0.885	0.442	1
Cl6-BZ#153	0.463	J	ug/kg	0.885	0.442	1
Cl7-BZ#170	ND		ug/kg	0.885	0.442	1
Cl7-BZ#180	ND		ug/kg	0.885	0.442	1
Cl7-BZ#183	ND		ug/kg	0.885	0.442	1
Cl7-BZ#184	ND		ug/kg	0.885	0.442	1
Cl7-BZ#187	ND		ug/kg	0.885	0.442	1
Cl8-BZ#195	ND		ug/kg	0.885	0.442	1
Cl9-BZ#206	ND		ug/kg	0.885	0.442	1
Cl10-BZ#209	ND		ug/kg	0.885	0.442	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	98		30-150
BZ 198	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-36
Client ID: B567S05MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 11:45
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.71	4.85	1
Acenaphthylene	ND		ug/kg	9.71	4.85	1
Acenaphthene	ND		ug/kg	9.71	4.85	1
Fluorene	ND		ug/kg	9.71	4.85	1
Phenanthrene	8.76	J	ug/kg	9.71	4.85	1
Anthracene	ND		ug/kg	9.71	4.85	1
Fluoranthene	67.9		ug/kg	9.71	4.85	1
Pyrene	102		ug/kg	9.71	4.85	1
Benz(a)anthracene	23.9		ug/kg	9.71	4.85	1
Chrysene	24.8		ug/kg	9.71	4.85	1
Benzo(b)fluoranthene	21.2		ug/kg	9.71	4.85	1
Benzo(k)fluoranthene	16.1		ug/kg	9.71	4.85	1
Benzo(a)pyrene	13.7		ug/kg	9.71	4.85	1
Indeno(1,2,3-cd)Pyrene	5.28	J	ug/kg	9.71	4.85	1
Dibenz(a,h)anthracene	ND		ug/kg	9.71	4.85	1
Benzo(ghi)perylene	5.95	J	ug/kg	9.71	4.85	1
Cl2-BZ#8	ND		ug/kg	0.971	0.485	1
Cl3-BZ#18	ND		ug/kg	0.971	0.485	1
Cl3-BZ#28	ND		ug/kg	0.971	0.485	1
Cl4-BZ#44	ND		ug/kg	0.971	0.485	1
Cl4-BZ#49	ND		ug/kg	0.971	0.485	1
Cl4-BZ#52	ND		ug/kg	0.971	0.485	1
Cl4-BZ#66	ND		ug/kg	0.971	0.485	1
Cl5-BZ#87	ND		ug/kg	0.971	0.485	1
Cl5-BZ#101	ND		ug/kg	0.971	0.485	1
Cl5-BZ#105	ND		ug/kg	0.971	0.485	1
Cl5-BZ#118	ND		ug/kg	0.971	0.485	1
Cl6-BZ#128	ND		ug/kg	0.971	0.485	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-36 Date Collected: 12/21/18 12:30

Client ID: B567S05MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.971	0.485	1
Cl6-BZ#153	ND		ug/kg	0.971	0.485	1
Cl7-BZ#170	ND		ug/kg	0.971	0.485	1
Cl7-BZ#180	ND		ug/kg	0.971	0.485	1
Cl7-BZ#183	ND		ug/kg	0.971	0.485	1
Cl7-BZ#184	ND		ug/kg	0.971	0.485	1
Cl7-BZ#187	ND		ug/kg	0.971	0.485	1
Cl8-BZ#195	ND		ug/kg	0.971	0.485	1
Cl9-BZ#206	ND		ug/kg	0.971	0.485	1
Cl10-BZ#209	ND		ug/kg	0.971	0.485	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	89		30-150
Pyrene-d10	94		30-150
Benzo(b)fluoranthene-d12	88		30-150
DBOB	104		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-37
Client ID: B567S05MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 12:19
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.78	4.89	1
Acenaphthylene	ND		ug/kg	9.78	4.89	1
Acenaphthene	ND		ug/kg	9.78	4.89	1
Fluorene	ND		ug/kg	9.78	4.89	1
Phenanthrene	15.0		ug/kg	9.78	4.89	1
Anthracene	6.18	J	ug/kg	9.78	4.89	1
Fluoranthene	111		ug/kg	9.78	4.89	1
Pyrene	156		ug/kg	9.78	4.89	1
Benz(a)anthracene	38.4		ug/kg	9.78	4.89	1
Chrysene	42.5		ug/kg	9.78	4.89	1
Benzo(b)fluoranthene	29.6		ug/kg	9.78	4.89	1
Benzo(k)fluoranthene	24.3		ug/kg	9.78	4.89	1
Benzo(a)pyrene	25.3		ug/kg	9.78	4.89	1
Indeno(1,2,3-cd)Pyrene	8.35	J	ug/kg	9.78	4.89	1
Dibenz(a,h)anthracene	ND		ug/kg	9.78	4.89	1
Benzo(ghi)perylene	10.7		ug/kg	9.78	4.89	1
Cl2-BZ#8	ND		ug/kg	0.978	0.489	1
Cl3-BZ#18	1.65		ug/kg	0.978	0.489	1
Cl3-BZ#28	ND		ug/kg	0.978	0.489	1
Cl4-BZ#44	ND		ug/kg	0.978	0.489	1
Cl4-BZ#49	ND		ug/kg	0.978	0.489	1
Cl4-BZ#52	ND		ug/kg	0.978	0.489	1
Cl4-BZ#66	ND		ug/kg	0.978	0.489	1
Cl5-BZ#87	ND		ug/kg	0.978	0.489	1
Cl5-BZ#101	0.566	J	ug/kg	0.978	0.489	1
Cl5-BZ#105	ND		ug/kg	0.978	0.489	1
Cl5-BZ#118	0.533	J	ug/kg	0.978	0.489	1
Cl6-BZ#128	ND		ug/kg	0.978	0.489	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-37 Date Collected: 12/21/18 12:30

Client ID: B567S05MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.622	J	ug/kg	0.978	0.489	1
Cl6-BZ#153	0.491	J	ug/kg	0.978	0.489	1
Cl7-BZ#170	ND		ug/kg	0.978	0.489	1
Cl7-BZ#180	ND		ug/kg	0.978	0.489	1
Cl7-BZ#183	ND		ug/kg	0.978	0.489	1
Cl7-BZ#184	ND		ug/kg	0.978	0.489	1
Cl7-BZ#187	ND		ug/kg	0.978	0.489	1
Cl8-BZ#195	ND		ug/kg	0.978	0.489	1
Cl9-BZ#206	ND		ug/kg	0.978	0.489	1
Cl10-BZ#209	ND		ug/kg	0.978	0.489	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	86		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	103		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-38
Client ID: B567S05MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 12:54
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.88	4.44	1
Acenaphthylene	ND		ug/kg	8.88	4.44	1
Acenaphthene	ND		ug/kg	8.88	4.44	1
Fluorene	ND		ug/kg	8.88	4.44	1
Phenanthrene	13.4		ug/kg	8.88	4.44	1
Anthracene	6.06	J	ug/kg	8.88	4.44	1
Fluoranthene	95.0		ug/kg	8.88	4.44	1
Pyrene	127		ug/kg	8.88	4.44	1
Benz(a)anthracene	32.2		ug/kg	8.88	4.44	1
Chrysene	35.3		ug/kg	8.88	4.44	1
Benzo(b)fluoranthene	24.9		ug/kg	8.88	4.44	1
Benzo(k)fluoranthene	18.0		ug/kg	8.88	4.44	1
Benzo(a)pyrene	18.0		ug/kg	8.88	4.44	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.88	4.44	1
Dibenz(a,h)anthracene	ND		ug/kg	8.88	4.44	1
Benzo(ghi)perylene	7.92	J	ug/kg	8.88	4.44	1
Cl2-BZ#8	ND		ug/kg	0.888	0.444	1
Cl3-BZ#18	ND		ug/kg	0.888	0.444	1
Cl3-BZ#28	ND		ug/kg	0.888	0.444	1
Cl4-BZ#44	ND		ug/kg	0.888	0.444	1
Cl4-BZ#49	ND		ug/kg	0.888	0.444	1
Cl4-BZ#52	ND		ug/kg	0.888	0.444	1
Cl4-BZ#66	ND		ug/kg	0.888	0.444	1
Cl5-BZ#87	ND		ug/kg	0.888	0.444	1
Cl5-BZ#101	ND		ug/kg	0.888	0.444	1
Cl5-BZ#105	ND		ug/kg	0.888	0.444	1
Cl5-BZ#118	ND		ug/kg	0.888	0.444	1
Cl6-BZ#128	ND		ug/kg	0.888	0.444	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-38 Date Collected: 12/21/18 12:30

Client ID: B567S05MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.888	0.444	1
Cl6-BZ#153	ND		ug/kg	0.888	0.444	1
Cl7-BZ#170	ND		ug/kg	0.888	0.444	1
Cl7-BZ#180	ND		ug/kg	0.888	0.444	1
Cl7-BZ#183	ND		ug/kg	0.888	0.444	1
Cl7-BZ#184	ND		ug/kg	0.888	0.444	1
Cl7-BZ#187	ND		ug/kg	0.888	0.444	1
Cl8-BZ#195	ND		ug/kg	0.888	0.444	1
Cl9-BZ#206	ND		ug/kg	0.888	0.444	1
Cl10-BZ#209	ND		ug/kg	0.888	0.444	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	71		30-150
Pyrene-d10	90		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	100		30-150
BZ 198	73		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-39
Client ID: B567S05MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 13:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.62	4.81	1
Acenaphthylene	ND		ug/kg	9.62	4.81	1
Acenaphthene	ND		ug/kg	9.62	4.81	1
Fluorene	ND		ug/kg	9.62	4.81	1
Phenanthrene	9.61	J	ug/kg	9.62	4.81	1
Anthracene	5.12	J	ug/kg	9.62	4.81	1
Fluoranthene	67.1		ug/kg	9.62	4.81	1
Pyrene	99.0		ug/kg	9.62	4.81	1
Benz(a)anthracene	26.4		ug/kg	9.62	4.81	1
Chrysene	27.1		ug/kg	9.62	4.81	1
Benzo(b)fluoranthene	22.0		ug/kg	9.62	4.81	1
Benzo(k)fluoranthene	17.4		ug/kg	9.62	4.81	1
Benzo(a)pyrene	18.7		ug/kg	9.62	4.81	1
Indeno(1,2,3-cd)Pyrene	6.80	J	ug/kg	9.62	4.81	1
Dibenz(a,h)anthracene	ND		ug/kg	9.62	4.81	1
Benzo(ghi)perylene	7.89	J	ug/kg	9.62	4.81	1
Cl2-BZ#8	ND		ug/kg	0.962	0.481	1
Cl3-BZ#18	ND		ug/kg	0.962	0.481	1
Cl3-BZ#28	ND		ug/kg	0.962	0.481	1
Cl4-BZ#44	ND		ug/kg	0.962	0.481	1
Cl4-BZ#49	ND		ug/kg	0.962	0.481	1
Cl4-BZ#52	ND		ug/kg	0.962	0.481	1
Cl4-BZ#66	ND		ug/kg	0.962	0.481	1
Cl5-BZ#87	ND		ug/kg	0.962	0.481	1
Cl5-BZ#101	ND		ug/kg	0.962	0.481	1
Cl5-BZ#105	ND		ug/kg	0.962	0.481	1
Cl5-BZ#118	ND		ug/kg	0.962	0.481	1
Cl6-BZ#128	ND		ug/kg	0.962	0.481	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-39 Date Collected: 12/21/18 12:30

Client ID: B567S05MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.962	0.481	1
Cl6-BZ#153	ND		ug/kg	0.962	0.481	1
Cl7-BZ#170	ND		ug/kg	0.962	0.481	1
Cl7-BZ#180	ND		ug/kg	0.962	0.481	1
Cl7-BZ#183	ND		ug/kg	0.962	0.481	1
Cl7-BZ#184	ND		ug/kg	0.962	0.481	1
Cl7-BZ#187	ND		ug/kg	0.962	0.481	1
Cl8-BZ#195	ND		ug/kg	0.962	0.481	1
Cl9-BZ#206	ND		ug/kg	0.962	0.481	1
Cl10-BZ#209	ND		ug/kg	0.962	0.481	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	91		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	97		30-150
BZ 198	75		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-40
Client ID: B567S05MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 14:03
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.04	4.52	1
Acenaphthylene	ND		ug/kg	9.04	4.52	1
Acenaphthene	ND		ug/kg	9.04	4.52	1
Fluorene	ND		ug/kg	9.04	4.52	1
Phenanthrene	6.67	J	ug/kg	9.04	4.52	1
Anthracene	ND		ug/kg	9.04	4.52	1
Fluoranthene	48.3		ug/kg	9.04	4.52	1
Pyrene	80.5		ug/kg	9.04	4.52	1
Benz(a)anthracene	17.0		ug/kg	9.04	4.52	1
Chrysene	18.5		ug/kg	9.04	4.52	1
Benzo(b)fluoranthene	16.4		ug/kg	9.04	4.52	1
Benzo(k)fluoranthene	11.5		ug/kg	9.04	4.52	1
Benzo(a)pyrene	11.4		ug/kg	9.04	4.52	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.04	4.52	1
Dibenz(a,h)anthracene	ND		ug/kg	9.04	4.52	1
Benzo(ghi)perylene	5.59	J	ug/kg	9.04	4.52	1
Cl2-BZ#8	ND		ug/kg	0.904	0.452	1
Cl3-BZ#18	ND		ug/kg	0.904	0.452	1
Cl3-BZ#28	ND		ug/kg	0.904	0.452	1
Cl4-BZ#44	ND		ug/kg	0.904	0.452	1
Cl4-BZ#49	ND		ug/kg	0.904	0.452	1
Cl4-BZ#52	ND		ug/kg	0.904	0.452	1
Cl4-BZ#66	ND		ug/kg	0.904	0.452	1
Cl5-BZ#87	ND		ug/kg	0.904	0.452	1
Cl5-BZ#101	ND		ug/kg	0.904	0.452	1
Cl5-BZ#105	ND		ug/kg	0.904	0.452	1
Cl5-BZ#118	ND		ug/kg	0.904	0.452	1
Cl6-BZ#128	ND		ug/kg	0.904	0.452	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-40 Date Collected: 12/21/18 12:30

Client ID: B567S05MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	ND		ug/kg	0.904	0.452	1
Cl6-BZ#153	ND		ug/kg	0.904	0.452	1
Cl7-BZ#170	ND		ug/kg	0.904	0.452	1
Cl7-BZ#180	ND		ug/kg	0.904	0.452	1
Cl7-BZ#183	ND		ug/kg	0.904	0.452	1
Cl7-BZ#184	ND		ug/kg	0.904	0.452	1
Cl7-BZ#187	ND		ug/kg	0.904	0.452	1
Cl8-BZ#195	ND		ug/kg	0.904	0.452	1
Cl9-BZ#206	ND		ug/kg	0.904	0.452	1
Cl10-BZ#209	ND		ug/kg	0.904	0.452	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	77		30-150
Pyrene-d10	89		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	102		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 10:10
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194644-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 10:10
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3611B
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194644-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	93		30-150
Benzo(b)fluoranthene-d12	100		30-150
DBOB	71		30-150
BZ 198	66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 10:43
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1194647-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/22/19 10:43
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3611B
Cleanup Date: 01/07/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1194647-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	69		30-150
Pyrene-d10	84		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	74		30-150
BZ 198	62		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194644-2 WG1194644-3								
Naphthalene	73		70		50-120	4		30
Acenaphthylene	68		66		50-120	3		30
Acenaphthene	73		69		50-120	6		30
Fluorene	77		71		50-120	8		30
Phenanthrene	77		72		50-120	7		30
Anthracene	78		74		50-120	5		30
Fluoranthene	86		84		50-120	2		30
Pyrene	79		80		50-120	1		30
Benz(a)anthracene	85		83		50-120	2		30
Chrysene	85		86		50-120	1		30
Benzo(b)fluoranthene	93		91		50-120	2		30
Benzo(k)fluoranthene	82		82		50-120	0		30
Benzo(a)pyrene	84		86		50-120	2		30
Indeno(1,2,3-cd)Pyrene	81		78		50-120	4		30
Dibenz(a,h)anthracene	85		83		50-120	2		30
Benzo(ghi)perylene	83		80		50-120	4		30
Cl2-BZ#8	70		67		50-120	4		30
Cl3-BZ#18	70		68		50-120	3		30
Cl3-BZ#28	70		70		50-120	0		30
Cl4-BZ#44	76		76		50-120	0		30
Cl4-BZ#49	76		77		50-120	1		30
Cl4-BZ#52	75		74		50-120	1		30
Cl4-BZ#66	77		77		50-120	0		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194644-2 WG1194644-3								
Cl5-BZ#87	76		77		50-120	1		30
Cl5-BZ#101	80		80		50-120	0		30
Cl5-BZ#105	78		79		50-120	1		30
Cl5-BZ#118	76		76		50-120	0		30
Cl6-BZ#128	72		71		50-120	1		30
Cl6-BZ#138	77		75		50-120	3		30
Cl6-BZ#153	76		76		50-120	0		30
Cl7-BZ#170	69		68		50-120	1		30
Cl7-BZ#180	74		73		50-120	1		30
Cl7-BZ#183	68		68		50-120	0		30
Cl7-BZ#184	76		75		50-120	1		30
Cl7-BZ#187	70		69		50-120	1		30
Cl8-BZ#195	70		69		50-120	1		30
Cl9-BZ#206	71		70		50-120	1		30
Cl10-BZ#209	77		78		50-120	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	75		76		30-150
Pyrene-d10	86		87		30-150
Benzo(b)fluoranthene-d12	93		90		30-150
DBOB	70		64		30-150
BZ 198	67		65		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194647-2 WG1194647-3

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Naphthalene	66		62		50-120	6		30
Acenaphthylene	65		62		50-120	5		30
Acenaphthene	68		65		50-120	5		30
Fluorene	70		67		50-120	4		30
Phenanthrene	71		68		50-120	4		30
Anthracene	75		70		50-120	7		30
Fluoranthene	79		77		50-120	3		30
Pyrene	74		72		50-120	3		30
Benz(a)anthracene	77		74		50-120	4		30
Chrysene	79		76		50-120	4		30
Benzo(b)fluoranthene	83		82		50-120	1		30
Benzo(k)fluoranthene	74		71		50-120	4		30
Benzo(a)pyrene	77		74		50-120	4		30
Indeno(1,2,3-cd)Pyrene	72		69		50-120	4		30
Dibenz(a,h)anthracene	76		73		50-120	4		30
Benzo(ghi)perylene	75		72		50-120	4		30
Cl2-BZ#8	68		62		50-120	9		30
Cl3-BZ#18	68		62		50-120	9		30
Cl3-BZ#28	69		64		50-120	8		30
Cl4-BZ#44	76		70		50-120	8		30
Cl4-BZ#49	74		69		50-120	7		30
Cl4-BZ#52	72		67		50-120	7		30
Cl4-BZ#66	72		68		50-120	6		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194647-2 WG1194647-3								
Cl5-BZ#87	73		69		50-120	6		30
Cl5-BZ#101	75		71		50-120	5		30
Cl5-BZ#105	73		69		50-120	6		30
Cl5-BZ#118	71		68		50-120	4		30
Cl6-BZ#128	67		63		50-120	6		30
Cl6-BZ#138	70		67		50-120	4		30
Cl6-BZ#153	71		67		50-120	6		30
Cl7-BZ#170	64		61		50-120	5		30
Cl7-BZ#180	68		65		50-120	5		30
Cl7-BZ#183	64		60		50-120	6		30
Cl7-BZ#184	70		67		50-120	4		30
Cl7-BZ#187	65		62		50-120	5		30
Cl8-BZ#195	64		62		50-120	3		30
Cl9-BZ#206	66		64		50-120	3		30
Cl10-BZ#209	73		70		50-120	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	67		64		30-150
Pyrene-d10	79		76		30-150
Benzo(b)fluoranthene-d12	80		79		30-150
DBOB	63		61		30-150
BZ 198	60		59		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194644-6 WG1194644-7 QC Sample: L1853052-01 Client ID: B567PREMNA												
Naphthalene	ND	498	383	77		384	81		50-120	0		30
Acenaphthylene	ND	498	394	79		384	81		50-120	3		30
Acenaphthene	ND	498	390	78		381	80		50-120	2		30
Fluorene	ND	498	406	82		395	83		50-120	3		30
Phenanthrene	ND	498	438	88		422	89		50-120	4		30
Anthracene	ND	498	388	78		380	80		50-120	2		30
Fluoranthene	ND	498	441	89		427	90		50-120	3		30
Pyrene	ND	498	390	78		381	80		50-120	2		30
Benz(a)anthracene	ND	498	473	95		464	98		50-120	2		30
Chrysene	ND	498	383	77		358	75		50-120	7		30
Benzo(b)fluoranthene	ND	498	453	91		433	91		50-120	5		30
Benzo(k)fluoranthene	ND	498	361	73		361	76		50-120	0		30
Benzo(a)pyrene	ND	498	408	82		383	81		50-120	6		30
Indeno(1,2,3-cd)Pyrene	ND	498	509	102		487	102		50-120	4		30
Dibenz(a,h)anthracene	ND	498	426	86		418	88		50-120	2		30
Benzo(ghi)perylene	ND	498	406	82		398	84		50-120	2		30
Cl2-BZ#8	ND	99.6	73.1	73		70.6	74		50-120	3		30
Cl3-BZ#18	ND	99.6	79.1	79		76.8	81		50-120	3		30
Cl3-BZ#28	ND	99.6	78.8	79		76.6	81		50-120	3		30
Cl4-BZ#44	ND	99.6	76.4	77		72.2	76		50-120	6		30
Cl4-BZ#49	ND	99.6	65.6	66		58.5	62		50-120	11		30
Cl4-BZ#52	ND	99.6	79.6	80		78.8	83		50-120	1		30
Cl4-BZ#66	ND	99.6	75.4	76		71.9	76		50-120	5		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194644-6 WG1194644-7 QC Sample: L1853052-01 Client ID: B567PREMNA												
Cl5-BZ#87	ND	99.6	73.8	74		70.9	75		50-120	4		30
Cl5-BZ#101	ND	99.6	75.4	76		72.7	77		50-120	4		30
Cl5-BZ#105	ND	99.6	69.2	70		64.7	68		50-120	7		30
Cl5-BZ#118	ND	99.6	70.0	70		66.6	70		50-120	5		30
Cl6-BZ#128	ND	99.6	77.9	78		74.9	79		50-120	4		30
Cl6-BZ#138	ND	99.6	76.7	77		73.8	78		50-120	4		30
Cl6-BZ#153	ND	99.6	77.9	78		74.7	79		50-120	4		30
Cl7-BZ#170	ND	99.6	78.4	79		74.8	79		50-120	5		30
Cl7-BZ#180	ND	99.6	74.0	74		70.4	74		50-120	5		30
Cl7-BZ#183	ND	99.6	63.1	63		59.1	62		50-120	7		30
Cl7-BZ#184	ND	99.6	75.1	75		72.6	76		50-120	3		30
Cl7-BZ#187	ND	99.6	83.9	84		79.8	84		50-120	5		30
Cl8-BZ#195	ND	99.6	79.7	80		76.5	81		50-120	4		30
Cl9-BZ#206	ND	99.6	75.8	76		72.5	76		50-120	4		30
Cl10-BZ#209	ND	99.6	75.5	76		71.6	75		50-120	5		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		83		30-150
BZ 198	79		79		30-150
Benzo(b)fluoranthene-d12	85		88		30-150
DBOB	97		98		30-150
Pyrene-d10	86		89		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194647-6 WG1194647-7 QC Sample: L1853052-21 Client ID: B567S02MNA												
Naphthalene	ND	471	371	79		414	85		50-120	11		30
Acenaphthylene	ND	471	393	84		416	86		50-120	6		30
Acenaphthene	4.42J	471	395	84		427	88		50-120	8		30
Fluorene	ND	471	413	88		468	97		50-120	12		30
Phenanthrene	16.6	471	429	88		478	95		50-120	11		30
Anthracene	7.01J	471	392	83		433	89		50-120	10		30
Fluoranthene	95.9	471	509	88		568	97		50-120	11		30
Pyrene	70.5	471	450	81		519	93		50-120	14		30
Benz(a)anthracene	23.4	471	486	98		535	106		50-120	10		30
Chrysene	22.8	471	378	75		404	79		50-120	7		30
Benzo(b)fluoranthene	15.9	471	461	95		439	87		50-120	5		30
Benzo(k)fluoranthene	10.9	471	324	67		382	77		50-120	16		30
Benzo(a)pyrene	7.99J	471	375	80		416	86		50-120	10		30
Indeno(1,2,3-cd)Pyrene	ND	471	440	94		460	95		50-120	4		30
Dibenz(a,h)anthracene	ND	471	396	84		455	94		50-120	14		30
Benzo(ghi)perylene	4.30J	471	375	80		431	89		50-120	14		30
Cl2-BZ#8	ND	94.2	70.1	74		84.7	87		50-120	19		30
Cl3-BZ#18	1.66	94.2	83.2	87		94.8	96		50-120	13		30
Cl3-BZ#28	1.12	94.2	68.5	72		82.3	84		50-120	18		30
Cl4-BZ#44	0.468J	94.2	70.5	75		86.0	89		50-120	20		30
Cl4-BZ#49	0.922	94.2	60.8	64		74.6	76		50-120	20		30
Cl4-BZ#52	1.56	94.2	74.4	77		90.1	91		50-120	19		30
Cl4-BZ#66	0.493J	94.2	70.7	75		85.8	89		50-120	19		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194647-6 WG1194647-7 QC Sample: L1853052-21 Client ID: B567S02MNA												
Cl5-BZ#87	ND	94.2	68.5	73		83.4	86		50-120	20		30
Cl5-BZ#101	0.780J	94.2	71.2	76		86.5	89		50-120	19		30
Cl5-BZ#105	ND	94.2	70.9	75		81.8	84		50-120	14		30
Cl5-BZ#118	0.572J	94.2	65.3	69		79.3	82		50-120	19		30
Cl6-BZ#128	ND	94.2	70.7	75		85.0	88		50-120	18		30
Cl6-BZ#138	0.907	94.2	71.8	75		87.5	89		50-120	20		30
Cl6-BZ#153	0.782J	94.2	73.7	78		89.2	92		50-120	19		30
Cl7-BZ#170	ND	94.2	73.2	78		75.4	78		50-120	3		30
Cl7-BZ#180	ND	94.2	68.6	73		72.7	75		50-120	6		30
Cl7-BZ#183	ND	94.2	61.1	65		73.4	76		50-120	18		30
Cl7-BZ#184	ND	94.2	71.0	75		85.9	89		50-120	19		30
Cl7-BZ#187	ND	94.2	75.3	80		95.1	98		50-120	23		30
Cl8-BZ#195	ND	94.2	73.5	78		74.5	77		50-120	1		30
Cl9-BZ#206	ND	94.2	68.0	72		71.6	74		50-120	5		30
Cl10-BZ#209	ND	94.2	70.5	75		79.4	82		50-120	12		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	85		90		30-150
BZ 198	78		78		30-150
Benzo(b)fluoranthene-d12	85		86		30-150
DBOB	99		105		30-150
Pyrene-d10	89		100		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194644-5 QC Sample: L1853052-02 Client ID: B567PREMNB						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	5.70J	4.91J	ug/kg	NC		30
Pyrene	5.02J	ND	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	0.934J	0.682J	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194644-5 QC Sample: L1853052-02 Client ID: B567PREMNB						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	ND	ND	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	ND	ND	ug/kg	NC		30
Cl6-BZ#153	ND	ND	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	0.489J	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	87		90		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194644-5 QC Sample: L1853052-02 Client ID: B567PREMNB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	96		97		30-150
Benzo(b)fluoranthene-d12	90		91		30-150
DBOB	103		104		30-150
BZ 198	80		82		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194647-5 QC Sample: L1853052-22 Client ID: B567S02MNB						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	14.0	14.8	ug/kg	6		30
Anthracene	6.02J	6.44J	ug/kg	NC		30
Fluoranthene	89.0	92.9	ug/kg	4		30
Pyrene	70.0	72.4	ug/kg	3		30
Benz(a)anthracene	21.0	22.7	ug/kg	8		30
Chrysene	19.3	21.8	ug/kg	12		30
Benzo(b)fluoranthene	16.4	16.5	ug/kg	1		30
Benzo(k)fluoranthene	8.86J	10.3	ug/kg	NC		30
Benzo(a)pyrene	7.76J	8.53J	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	4.90J	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	1.19	1.85	ug/kg	**43**	Q	30
Cl3-BZ#28	1.04	ND	ug/kg	NC		30
Cl4-BZ#44	ND	0.476J	ug/kg	NC		30
Cl4-BZ#49	0.772J	0.743J	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194647-5 QC Sample: L1853052-22 Client ID: B567S02MNB						
Cl4-BZ#52	1.35	1.47	ug/kg	9		30
Cl4-BZ#66	0.596J	0.512J	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	0.864J	0.699J	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	0.581J	0.655J	ug/kg	NC		30
Cl6-BZ#153	0.533J	0.663J	ug/kg	NC		30
Cl7-BZ#170	ND	ND	ug/kg	NC		30
Cl7-BZ#180	ND	ND	ug/kg	NC		30
Cl7-BZ#183	ND	ND	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	ND	ND	ug/kg	NC		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	78		86		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194647-5 QC Sample: L1853052-22 Client ID: B567S02MNB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	87		90		30-150
Benzo(b)fluoranthene-d12	79		85		30-150
DBOB	80		103		30-150
BZ 198	69		79		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194644-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	80		40-140
Fluoranthene	89		40-140
Pyrene	86		40-140
Chrysene	70		40-140
Cl3-BZ#28	63		40-140
Cl4-BZ#44	110		40-140
Cl4-BZ#49	76		40-140
Cl4-BZ#52	83		40-140
Cl4-BZ#66	100		40-140
Cl5-BZ#87	54		40-140
Cl5-BZ#101	52		40-140
Cl5-BZ#105	93		40-140
Cl5-BZ#118	82		40-140
Cl6-BZ#138	109		40-140
Cl6-BZ#153	73		40-140
Cl7-BZ#187	51		40-140
2-Methylnaphthalene-d10 (Surrogate)	85		75-125
Pyrene-d10 (Surrogate)	99		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	97		75-125
DBOB (Surrogate)	101		75-125
BZ 198 (Surrogate)	83		75-125

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194647-4

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	74		40-140
Fluoranthene	82		40-140
Pyrene	79		40-140
Chrysene	66		40-140
Cl3-BZ#28	71		40-140
Cl4-BZ#44	101		40-140
Cl4-BZ#49	82		40-140
Cl4-BZ#52	101		40-140
Cl4-BZ#66	94		40-140
Cl5-BZ#87	68		40-140
Cl5-BZ#101	59		40-140
Cl5-BZ#105	93		40-140
Cl5-BZ#118	80		40-140
Cl6-BZ#138	105		40-140
Cl6-BZ#153	67		40-140
Cl7-BZ#187	56		40-140
2-Methylnaphthalene-d10 (Surrogate)	81		75-125
Pyrene-d10 (Surrogate)	87		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	83		75-125
DBOB (Surrogate)	96		75-125
BZ 198 (Surrogate)	80		75-125

PESTICIDES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-01
Client ID: B567PREMNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/10/19 21:40
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.990	0.990	1	A
gamma-BHC	ND		ug/kg	0.495	0.495	1	A
Heptachlor	ND		ug/kg	0.495	0.495	1	A
Aldrin	ND		ug/kg	0.495	0.495	1	A
Heptachlor epoxide	ND		ug/kg	0.990	0.990	1	B
Oxychlordane	ND		ug/kg	0.990	0.990	1	B
trans-Chlordane	ND		ug/kg	0.495	0.495	1	A
Endosulfan I	ND		ug/kg	0.495	0.495	1	A
cis-Chlordane	ND		ug/kg	0.495	0.495	1	A
trans-Nonachlor	ND		ug/kg	0.495	0.495	1	A
4,4'-DDE	ND		ug/kg	0.495	0.495	1	A
Dieldrin	ND		ug/kg	0.495	0.495	1	A
Endrin	ND		ug/kg	0.495	0.495	1	A
Endosulfan II	ND		ug/kg	0.495	0.495	1	A
4,4'-DDD	ND		ug/kg	0.495	0.495	1	A
cis-Nonachlor	ND		ug/kg	0.495	0.495	1	A
4,4'-DDT	ND		ug/kg	0.495	0.495	1	A
Methoxychlor	ND		ug/kg	1.98	1.98	1	A
Toxaphene	ND		ug/kg	24.8	24.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	87		30-150	B
BZ 198	122		30-150	B
DBOB	93		30-150	A
BZ 198	81		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-02
Client ID: B567PREMNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/10/19 23:22
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.938	0.938	1	A
gamma-BHC	ND		ug/kg	0.469	0.469	1	A
Heptachlor	ND		ug/kg	0.469	0.469	1	B
Aldrin	ND		ug/kg	0.469	0.469	1	B
Heptachlor epoxide	ND		ug/kg	0.938	0.938	1	B
Oxychlordane	ND		ug/kg	0.938	0.938	1	B
trans-Chlordane	ND		ug/kg	0.469	0.469	1	A
Endosulfan I	ND		ug/kg	0.469	0.469	1	A
cis-Chlordane	ND		ug/kg	0.469	0.469	1	B
trans-Nonachlor	ND		ug/kg	0.469	0.469	1	B
4,4'-DDE	ND		ug/kg	0.469	0.469	1	A
Dieldrin	ND		ug/kg	0.469	0.469	1	A
Endrin	ND		ug/kg	0.469	0.469	1	A
Endosulfan II	ND		ug/kg	0.469	0.469	1	A
4,4'-DDD	ND		ug/kg	0.469	0.469	1	A
cis-Nonachlor	ND		ug/kg	0.469	0.469	1	A
4,4'-DDT	ND		ug/kg	0.469	0.469	1	B
Methoxychlor	ND		ug/kg	1.88	1.88	1	A
Toxaphene	ND		ug/kg	23.5	23.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	83		30-150	B
BZ 198	83		30-150	B
DBOB	91		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-03
Client ID: B567PREMNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 00:30
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.906	0.906	1	A
gamma-BHC	ND		ug/kg	0.453	0.453	1	A
Heptachlor	ND		ug/kg	0.453	0.453	1	A
Aldrin	ND		ug/kg	0.453	0.453	1	A
Heptachlor epoxide	ND		ug/kg	0.906	0.906	1	B
Oxychlordane	ND		ug/kg	0.906	0.906	1	B
trans-Chlordane	ND		ug/kg	0.453	0.453	1	A
Endosulfan I	ND		ug/kg	0.453	0.453	1	A
cis-Chlordane	ND		ug/kg	0.453	0.453	1	A
trans-Nonachlor	ND		ug/kg	0.453	0.453	1	A
4,4'-DDE	ND		ug/kg	0.453	0.453	1	A
Dieldrin	ND		ug/kg	0.453	0.453	1	A
Endrin	ND		ug/kg	0.453	0.453	1	A
Endosulfan II	ND		ug/kg	0.453	0.453	1	A
4,4'-DDD	ND		ug/kg	0.453	0.453	1	A
cis-Nonachlor	ND		ug/kg	0.453	0.453	1	A
4,4'-DDT	ND		ug/kg	0.453	0.453	1	A
Methoxychlor	ND		ug/kg	1.81	1.81	1	A
Toxaphene	ND		ug/kg	22.7	22.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	88		30-150	B
BZ 198	140		30-150	B
DBOB	94		30-150	A
BZ 198	72		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-11
Client ID: B567R01MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 01:04
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.975	0.975	1	A
gamma-BHC	ND		ug/kg	0.487	0.487	1	A
Heptachlor	ND		ug/kg	0.487	0.487	1	A
Aldrin	ND		ug/kg	0.487	0.487	1	A
Heptachlor epoxide	ND		ug/kg	0.975	0.975	1	B
Oxychlordane	ND		ug/kg	0.975	0.975	1	B
trans-Chlordane	ND		ug/kg	0.487	0.487	1	A
Endosulfan I	ND		ug/kg	0.487	0.487	1	A
cis-Chlordane	ND		ug/kg	0.487	0.487	1	A
trans-Nonachlor	ND		ug/kg	0.487	0.487	1	A
4,4'-DDE	0.497		ug/kg	0.487	0.487	1	A
Dieldrin	ND		ug/kg	0.487	0.487	1	A
Endrin	ND		ug/kg	0.487	0.487	1	A
Endosulfan II	ND		ug/kg	0.487	0.487	1	A
4,4'-DDD	ND		ug/kg	0.487	0.487	1	A
cis-Nonachlor	ND		ug/kg	0.487	0.487	1	A
4,4'-DDT	ND		ug/kg	0.487	0.487	1	A
Methoxychlor	ND		ug/kg	1.95	1.95	1	A
Toxaphene	ND		ug/kg	24.5	24.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	84		30-150	B
BZ 198	85		30-150	B
DBOB	91		30-150	A
BZ 198	78		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-12
Client ID: B567R01MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 01:38
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.956	0.956	1	A
gamma-BHC	ND		ug/kg	0.478	0.478	1	A
Heptachlor	ND		ug/kg	0.478	0.478	1	A
Aldrin	ND		ug/kg	0.478	0.478	1	A
Heptachlor epoxide	ND		ug/kg	0.956	0.956	1	B
Oxychlordane	ND		ug/kg	0.956	0.956	1	B
trans-Chlordane	ND		ug/kg	0.478	0.478	1	A
Endosulfan I	ND		ug/kg	0.478	0.478	1	A
cis-Chlordane	ND		ug/kg	0.478	0.478	1	A
trans-Nonachlor	ND		ug/kg	0.478	0.478	1	A
4,4'-DDE	ND		ug/kg	0.478	0.478	1	A
Dieldrin	ND		ug/kg	0.478	0.478	1	A
Endrin	ND		ug/kg	0.478	0.478	1	A
Endosulfan II	ND		ug/kg	0.478	0.478	1	A
4,4'-DDD	ND		ug/kg	0.478	0.478	1	A
cis-Nonachlor	ND		ug/kg	0.478	0.478	1	A
4,4'-DDT	ND		ug/kg	0.478	0.478	1	A
Methoxychlor	ND		ug/kg	1.91	1.91	1	A
Toxaphene	ND		ug/kg	24.0	24.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	93		30-150	B
BZ 198	87		30-150	B
DBOB	98		30-150	A
BZ 198	81		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-13
Client ID: B567R01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 02:12
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.853	0.853	1	A
gamma-BHC	ND		ug/kg	0.427	0.427	1	A
Heptachlor	ND		ug/kg	0.427	0.427	1	A
Aldrin	ND		ug/kg	0.427	0.427	1	A
Heptachlor epoxide	ND		ug/kg	0.853	0.853	1	B
Oxychlordane	ND		ug/kg	0.853	0.853	1	B
trans-Chlordane	ND		ug/kg	0.427	0.427	1	A
Endosulfan I	ND		ug/kg	0.427	0.427	1	A
cis-Chlordane	ND		ug/kg	0.427	0.427	1	A
trans-Nonachlor	ND		ug/kg	0.427	0.427	1	A
4,4'-DDE	ND		ug/kg	0.427	0.427	1	A
Dieldrin	ND		ug/kg	0.427	0.427	1	A
Endrin	ND		ug/kg	0.427	0.427	1	A
Endosulfan II	ND		ug/kg	0.427	0.427	1	A
4,4'-DDD	ND		ug/kg	0.427	0.427	1	A
cis-Nonachlor	ND		ug/kg	0.427	0.427	1	A
4,4'-DDT	ND		ug/kg	0.427	0.427	1	A
Methoxychlor	ND		ug/kg	1.71	1.71	1	A
Toxaphene	ND		ug/kg	21.4	21.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	84		30-150	B
BZ 198	81		30-150	B
DBOB	91		30-150	A
BZ 198	75		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-14
Client ID: B567R01MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 02:46
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.870	0.870	1	A
gamma-BHC	ND		ug/kg	0.435	0.435	1	A
Heptachlor	ND		ug/kg	0.435	0.435	1	A
Aldrin	ND		ug/kg	0.435	0.435	1	A
Heptachlor epoxide	ND		ug/kg	0.870	0.870	1	B
Oxychlordane	ND		ug/kg	0.870	0.870	1	B
trans-Chlordane	ND		ug/kg	0.435	0.435	1	A
Endosulfan I	ND		ug/kg	0.435	0.435	1	A
cis-Chlordane	ND		ug/kg	0.435	0.435	1	A
trans-Nonachlor	ND		ug/kg	0.435	0.435	1	A
4,4'-DDE	0.439	P	ug/kg	0.435	0.435	1	A
Dieldrin	ND		ug/kg	0.435	0.435	1	A
Endrin	ND		ug/kg	0.435	0.435	1	A
Endosulfan II	ND		ug/kg	0.435	0.435	1	A
4,4'-DDD	ND		ug/kg	0.435	0.435	1	A
cis-Nonachlor	ND		ug/kg	0.435	0.435	1	A
4,4'-DDT	ND		ug/kg	0.435	0.435	1	A
Methoxychlor	ND		ug/kg	1.74	1.74	1	A
Toxaphene	ND		ug/kg	21.8	21.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	88		30-150	B
BZ 198	82		30-150	B
DBOB	90		30-150	A
BZ 198	75		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-15
Client ID: B567R01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 03:20
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.978	0.978	1	A
gamma-BHC	ND		ug/kg	0.489	0.489	1	A
Heptachlor	ND		ug/kg	0.489	0.489	1	A
Aldrin	ND		ug/kg	0.489	0.489	1	A
Heptachlor epoxide	ND		ug/kg	0.978	0.978	1	B
Oxychlordane	ND		ug/kg	0.978	0.978	1	B
trans-Chlordane	ND		ug/kg	0.489	0.489	1	A
Endosulfan I	ND		ug/kg	0.489	0.489	1	A
cis-Chlordane	ND		ug/kg	0.489	0.489	1	A
trans-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDE	ND		ug/kg	0.489	0.489	1	A
Dieldrin	ND		ug/kg	0.489	0.489	1	A
Endrin	ND		ug/kg	0.489	0.489	1	A
Endosulfan II	ND		ug/kg	0.489	0.489	1	A
4,4'-DDD	ND		ug/kg	0.489	0.489	1	A
cis-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDT	ND		ug/kg	0.489	0.489	1	A
Methoxychlor	ND		ug/kg	1.96	1.96	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	B
BZ 198	76		30-150	B
DBOB	88		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-16
Client ID: B567S01MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 03:54
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	0.888	1	A
gamma-BHC	ND		ug/kg	0.444	0.444	1	A
Heptachlor	ND		ug/kg	0.444	0.444	1	A
Aldrin	ND		ug/kg	0.444	0.444	1	A
Heptachlor epoxide	ND		ug/kg	0.888	0.888	1	B
Oxychlordane	ND		ug/kg	0.888	0.888	1	B
trans-Chlordane	ND		ug/kg	0.444	0.444	1	A
Endosulfan I	ND		ug/kg	0.444	0.444	1	A
cis-Chlordane	ND		ug/kg	0.444	0.444	1	A
trans-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDE	0.665		ug/kg	0.444	0.444	1	B
Dieldrin	ND		ug/kg	0.444	0.444	1	A
Endrin	ND		ug/kg	0.444	0.444	1	A
Endosulfan II	ND		ug/kg	0.444	0.444	1	A
4,4'-DDD	ND		ug/kg	0.444	0.444	1	A
cis-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDT	ND		ug/kg	0.444	0.444	1	A
Methoxychlor	ND		ug/kg	1.78	1.78	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	82		30-150	B
BZ 198	79		30-150	B
DBOB	85		30-150	A
BZ 198	70		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-17
Client ID: B567S01MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 04:28
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.898	0.898	1	A
gamma-BHC	ND		ug/kg	0.449	0.449	1	A
Heptachlor	ND		ug/kg	0.449	0.449	1	A
Aldrin	ND		ug/kg	0.449	0.449	1	A
Heptachlor epoxide	ND		ug/kg	0.898	0.898	1	B
Oxychlordane	ND		ug/kg	0.898	0.898	1	B
trans-Chlordane	ND		ug/kg	0.449	0.449	1	A
Endosulfan I	ND		ug/kg	0.449	0.449	1	A
cis-Chlordane	ND		ug/kg	0.449	0.449	1	A
trans-Nonachlor	ND		ug/kg	0.449	0.449	1	A
4,4'-DDE	0.814		ug/kg	0.449	0.449	1	A
Dieldrin	ND		ug/kg	0.449	0.449	1	A
Endrin	ND		ug/kg	0.449	0.449	1	A
Endosulfan II	ND		ug/kg	0.449	0.449	1	B
4,4'-DDD	ND		ug/kg	0.449	0.449	1	B
cis-Nonachlor	ND		ug/kg	0.449	0.449	1	A
4,4'-DDT	ND		ug/kg	0.449	0.449	1	A
Methoxychlor	ND		ug/kg	1.80	1.80	1	A
Toxaphene	ND		ug/kg	22.5	22.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	B
BZ 198	64		30-150	B
DBOB	69		30-150	A
BZ 198	59		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-18
Client ID: B567S01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 05:02
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.980	0.980	1	A
gamma-BHC	ND		ug/kg	0.490	0.490	1	A
Heptachlor	ND		ug/kg	0.490	0.490	1	A
Aldrin	ND		ug/kg	0.490	0.490	1	A
Heptachlor epoxide	ND		ug/kg	0.980	0.980	1	B
Oxychlordane	ND		ug/kg	0.980	0.980	1	B
trans-Chlordane	ND		ug/kg	0.490	0.490	1	A
Endosulfan I	ND		ug/kg	0.490	0.490	1	A
cis-Chlordane	ND		ug/kg	0.490	0.490	1	B
trans-Nonachlor	ND		ug/kg	0.490	0.490	1	A
4,4'-DDE	0.776		ug/kg	0.490	0.490	1	A
Dieldrin	ND		ug/kg	0.490	0.490	1	A
Endrin	ND		ug/kg	0.490	0.490	1	A
Endosulfan II	ND		ug/kg	0.490	0.490	1	B
4,4'-DDD	ND		ug/kg	0.490	0.490	1	A
cis-Nonachlor	ND		ug/kg	0.490	0.490	1	A
4,4'-DDT	ND		ug/kg	0.490	0.490	1	A
Methoxychlor	ND		ug/kg	1.96	1.96	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	81		30-150	B
BZ 198	79		30-150	B
DBOB	91		30-150	A
BZ 198	75		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-19
Client ID: B567S01MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 05:36
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.874	0.874	1	A
gamma-BHC	ND		ug/kg	0.437	0.437	1	A
Heptachlor	ND		ug/kg	0.437	0.437	1	A
Aldrin	ND		ug/kg	0.437	0.437	1	A
Heptachlor epoxide	ND		ug/kg	0.874	0.874	1	B
Oxychlordane	1.23		ug/kg	0.874	0.874	1	B
trans-Chlordane	ND		ug/kg	0.437	0.437	1	A
Endosulfan I	ND		ug/kg	0.437	0.437	1	A
cis-Chlordane	ND		ug/kg	0.437	0.437	1	A
trans-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDE	0.642		ug/kg	0.437	0.437	1	A
Dieldrin	ND		ug/kg	0.437	0.437	1	A
Endrin	ND		ug/kg	0.437	0.437	1	A
Endosulfan II	ND		ug/kg	0.437	0.437	1	B
4,4'-DDD	ND		ug/kg	0.437	0.437	1	A
cis-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDT	ND		ug/kg	0.437	0.437	1	A
Methoxychlor	ND		ug/kg	1.75	1.75	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	92		30-150	B
BZ 198	75		30-150	B
DBOB	93		30-150	A
BZ 198	68		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-20
Client ID: B567S01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 06:09
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.965	0.965	1	A
gamma-BHC	ND		ug/kg	0.483	0.483	1	A
Heptachlor	ND		ug/kg	0.483	0.483	1	A
Aldrin	ND		ug/kg	0.483	0.483	1	A
Heptachlor epoxide	ND		ug/kg	0.965	0.965	1	B
Oxychlordane	ND		ug/kg	0.965	0.965	1	B
trans-Chlordane	ND		ug/kg	0.483	0.483	1	A
Endosulfan I	ND		ug/kg	0.483	0.483	1	A
cis-Chlordane	ND		ug/kg	0.483	0.483	1	A
trans-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDE	0.742		ug/kg	0.483	0.483	1	A
Dieldrin	ND		ug/kg	0.483	0.483	1	A
Endrin	ND		ug/kg	0.483	0.483	1	A
Endosulfan II	ND		ug/kg	0.483	0.483	1	B
4,4'-DDD	ND		ug/kg	0.483	0.483	1	A
cis-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDT	ND		ug/kg	0.483	0.483	1	A
Methoxychlor	ND		ug/kg	1.93	1.93	1	A
Toxaphene	ND		ug/kg	24.2	24.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		30-150	B
BZ 198	79		30-150	B
DBOB	88		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-21
Client ID: B567S02MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 18:39
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.852	0.852	1	A
gamma-BHC	ND		ug/kg	0.426	0.426	1	A
Heptachlor	ND		ug/kg	0.426	0.426	1	A
Aldrin	ND		ug/kg	0.426	0.426	1	A
Heptachlor epoxide	ND		ug/kg	0.852	0.852	1	B
Oxychlordane	ND		ug/kg	0.852	0.852	1	B
trans-Chlordane	1.80	P	ug/kg	0.426	0.426	1	A
Endosulfan I	ND		ug/kg	0.426	0.426	1	A
cis-Chlordane	ND		ug/kg	0.426	0.426	1	B
trans-Nonachlor	ND		ug/kg	0.426	0.426	1	B
4,4'-DDE	0.612		ug/kg	0.426	0.426	1	A
Dieldrin	ND		ug/kg	0.426	0.426	1	A
Endrin	ND		ug/kg	0.426	0.426	1	A
Endosulfan II	ND		ug/kg	0.426	0.426	1	B
4,4'-DDD	ND		ug/kg	0.426	0.426	1	A
cis-Nonachlor	ND		ug/kg	0.426	0.426	1	A
4,4'-DDT	ND		ug/kg	0.426	0.426	1	A
Methoxychlor	ND		ug/kg	1.70	1.70	1	A
Toxaphene	ND		ug/kg	21.4	21.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	86		30-150	B
BZ 198	85		30-150	B
DBOB	90		30-150	A
BZ 198	74		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-22
Client ID: B567S02MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 20:21
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.940	0.940	1	A
gamma-BHC	ND		ug/kg	0.470	0.470	1	A
Heptachlor	ND		ug/kg	0.470	0.470	1	A
Aldrin	ND		ug/kg	0.470	0.470	1	A
Heptachlor epoxide	ND		ug/kg	0.940	0.940	1	B
Oxychlordane	ND		ug/kg	0.940	0.940	1	B
trans-Chlordane	2.26	P	ug/kg	0.470	0.470	1	A
Endosulfan I	ND		ug/kg	0.470	0.470	1	A
cis-Chlordane	ND		ug/kg	0.470	0.470	1	A
trans-Nonachlor	ND		ug/kg	0.470	0.470	1	A
4,4'-DDE	0.597		ug/kg	0.470	0.470	1	A
Dieldrin	ND		ug/kg	0.470	0.470	1	A
Endrin	ND		ug/kg	0.470	0.470	1	A
Endosulfan II	ND		ug/kg	0.470	0.470	1	A
4,4'-DDD	ND		ug/kg	0.470	0.470	1	A
cis-Nonachlor	ND		ug/kg	0.470	0.470	1	A
4,4'-DDT	ND		ug/kg	0.470	0.470	1	A
Methoxychlor	ND		ug/kg	1.88	1.88	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	97		30-150	B
BZ 198	84		30-150	B
DBOB	89		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-23
Client ID: B567S02MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 21:28
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.874	0.874	1	A
gamma-BHC	ND		ug/kg	0.437	0.437	1	A
Heptachlor	ND		ug/kg	0.437	0.437	1	A
Aldrin	ND		ug/kg	0.437	0.437	1	A
Heptachlor epoxide	ND		ug/kg	0.874	0.874	1	B
Oxychlordane	ND		ug/kg	0.874	0.874	1	B
trans-Chlordane	2.16	P	ug/kg	0.437	0.437	1	A
Endosulfan I	ND		ug/kg	0.437	0.437	1	A
cis-Chlordane	ND		ug/kg	0.437	0.437	1	A
trans-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDE	0.802		ug/kg	0.437	0.437	1	B
Dieldrin	ND		ug/kg	0.437	0.437	1	A
Endrin	ND		ug/kg	0.437	0.437	1	A
Endosulfan II	ND		ug/kg	0.437	0.437	1	A
4,4'-DDD	ND		ug/kg	0.437	0.437	1	A
cis-Nonachlor	ND		ug/kg	0.437	0.437	1	A
4,4'-DDT	ND		ug/kg	0.437	0.437	1	A
Methoxychlor	ND		ug/kg	1.75	1.75	1	A
Toxaphene	ND		ug/kg	21.9	21.9	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	93		30-150	B
BZ 198	88		30-150	B
DBOB	96		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-24
Client ID: B567S02MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 22:02
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.890	0.890	1	A
gamma-BHC	ND		ug/kg	0.445	0.445	1	A
Heptachlor	ND		ug/kg	0.445	0.445	1	A
Aldrin	ND		ug/kg	0.445	0.445	1	A
Heptachlor epoxide	ND		ug/kg	0.890	0.890	1	B
Oxychlordane	1.03		ug/kg	0.890	0.890	1	B
trans-Chlordane	2.07	P	ug/kg	0.445	0.445	1	A
Endosulfan I	ND		ug/kg	0.445	0.445	1	A
cis-Chlordane	ND		ug/kg	0.445	0.445	1	A
trans-Nonachlor	ND		ug/kg	0.445	0.445	1	A
4,4'-DDE	0.830		ug/kg	0.445	0.445	1	A
Dieldrin	ND		ug/kg	0.445	0.445	1	A
Endrin	ND		ug/kg	0.445	0.445	1	A
Endosulfan II	ND		ug/kg	0.445	0.445	1	A
4,4'-DDD	ND		ug/kg	0.445	0.445	1	A
cis-Nonachlor	ND		ug/kg	0.445	0.445	1	A
4,4'-DDT	ND		ug/kg	0.445	0.445	1	A
Methoxychlor	ND		ug/kg	1.78	1.78	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	103		30-150	B
BZ 198	84		30-150	B
DBOB	88		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-25
Client ID: B567S02MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 22:36
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.885	0.885	1	A
gamma-BHC	ND		ug/kg	0.442	0.442	1	A
Heptachlor	ND		ug/kg	0.442	0.442	1	A
Aldrin	ND		ug/kg	0.442	0.442	1	A
Heptachlor epoxide	ND		ug/kg	0.885	0.885	1	B
Oxychlordane	ND		ug/kg	0.885	0.885	1	B
trans-Chlordane	2.02	P	ug/kg	0.442	0.442	1	A
Endosulfan I	ND		ug/kg	0.442	0.442	1	A
cis-Chlordane	ND		ug/kg	0.442	0.442	1	A
trans-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDE	0.635		ug/kg	0.442	0.442	1	B
Dieldrin	ND		ug/kg	0.442	0.442	1	A
Endrin	ND		ug/kg	0.442	0.442	1	A
Endosulfan II	ND		ug/kg	0.442	0.442	1	A
4,4'-DDD	ND		ug/kg	0.442	0.442	1	A
cis-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDT	ND		ug/kg	0.442	0.442	1	A
Methoxychlor	ND		ug/kg	1.77	1.77	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	97		30-150	B
BZ 198	87		30-150	B
DBOB	88		30-150	A
BZ 198	76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-26
Client ID: B567S03MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 23:10
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.960	0.960	1	A
gamma-BHC	ND		ug/kg	0.480	0.480	1	A
Heptachlor	ND		ug/kg	0.480	0.480	1	A
Aldrin	ND		ug/kg	0.480	0.480	1	A
Heptachlor epoxide	ND		ug/kg	0.960	0.960	1	B
Oxychlordane	ND		ug/kg	0.960	0.960	1	B
trans-Chlordane	1.34	P	ug/kg	0.480	0.480	1	A
Endosulfan I	ND		ug/kg	0.480	0.480	1	A
cis-Chlordane	ND		ug/kg	0.480	0.480	1	B
trans-Nonachlor	ND		ug/kg	0.480	0.480	1	B
4,4'-DDE	0.808		ug/kg	0.480	0.480	1	B
Dieldrin	ND		ug/kg	0.480	0.480	1	A
Endrin	ND		ug/kg	0.480	0.480	1	A
Endosulfan II	ND		ug/kg	0.480	0.480	1	A
4,4'-DDD	ND		ug/kg	0.480	0.480	1	A
cis-Nonachlor	ND		ug/kg	0.480	0.480	1	A
4,4'-DDT	ND		ug/kg	0.480	0.480	1	A
Methoxychlor	ND		ug/kg	1.92	1.92	1	A
Toxaphene	ND		ug/kg	24.1	24.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	82		30-150	B
BZ 198	82		30-150	B
DBOB	85		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-27
Client ID: B567S03MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/11/19 23:44
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.844	0.844	1	A
gamma-BHC	ND		ug/kg	0.422	0.422	1	A
Heptachlor	ND		ug/kg	0.422	0.422	1	A
Aldrin	ND		ug/kg	0.422	0.422	1	A
Heptachlor epoxide	ND		ug/kg	0.844	0.844	1	B
Oxychlordane	ND		ug/kg	0.844	0.844	1	B
trans-Chlordane	1.54	P	ug/kg	0.422	0.422	1	A
Endosulfan I	ND		ug/kg	0.422	0.422	1	A
cis-Chlordane	ND		ug/kg	0.422	0.422	1	A
trans-Nonachlor	ND		ug/kg	0.422	0.422	1	B
4,4'-DDE	1.03		ug/kg	0.422	0.422	1	B
Dieldrin	0.470	IP	ug/kg	0.422	0.422	1	A
Endrin	ND		ug/kg	0.422	0.422	1	A
Endosulfan II	ND		ug/kg	0.422	0.422	1	B
4,4'-DDD	0.470		ug/kg	0.422	0.422	1	A
cis-Nonachlor	ND		ug/kg	0.422	0.422	1	A
4,4'-DDT	ND		ug/kg	0.422	0.422	1	A
Methoxychlor	ND		ug/kg	1.69	1.69	1	A
Toxaphene	ND		ug/kg	21.2	21.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	84		30-150	B
BZ 198	85		30-150	B
DBOB	85		30-150	A
BZ 198	75		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-28
Client ID: B567S03MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/12/19 00:18
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.929	0.929	1	A
gamma-BHC	ND		ug/kg	0.465	0.465	1	A
Heptachlor	ND		ug/kg	0.465	0.465	1	A
Aldrin	ND		ug/kg	0.465	0.465	1	A
Heptachlor epoxide	ND		ug/kg	0.929	0.929	1	B
Oxychlordane	ND		ug/kg	0.929	0.929	1	B
trans-Chlordane	1.46	P	ug/kg	0.465	0.465	1	A
Endosulfan I	ND		ug/kg	0.465	0.465	1	A
cis-Chlordane	ND		ug/kg	0.465	0.465	1	A
trans-Nonachlor	ND		ug/kg	0.465	0.465	1	A
4,4'-DDE	0.815		ug/kg	0.465	0.465	1	B
Dieldrin	ND		ug/kg	0.465	0.465	1	A
Endrin	ND		ug/kg	0.465	0.465	1	A
Endosulfan II	ND		ug/kg	0.465	0.465	1	B
4,4'-DDD	ND		ug/kg	0.465	0.465	1	A
cis-Nonachlor	ND		ug/kg	0.465	0.465	1	A
4,4'-DDT	ND		ug/kg	0.465	0.465	1	A
Methoxychlor	ND		ug/kg	1.86	1.86	1	A
Toxaphene	ND		ug/kg	23.3	23.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	81		30-150	B
BZ 198	81		30-150	B
DBOB	81		30-150	A
BZ 198	72		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-29
Client ID: B567S03MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/12/19 00:52
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.926	0.926	1	A
gamma-BHC	ND		ug/kg	0.463	0.463	1	A
Heptachlor	ND		ug/kg	0.463	0.463	1	A
Aldrin	ND		ug/kg	0.463	0.463	1	A
Heptachlor epoxide	ND		ug/kg	0.926	0.926	1	B
Oxychlordane	ND		ug/kg	0.926	0.926	1	B
trans-Chlordane	1.38	P	ug/kg	0.463	0.463	1	A
Endosulfan I	ND		ug/kg	0.463	0.463	1	A
cis-Chlordane	ND		ug/kg	0.463	0.463	1	A
trans-Nonachlor	ND		ug/kg	0.463	0.463	1	A
4,4'-DDE	0.905		ug/kg	0.463	0.463	1	B
Dieldrin	ND		ug/kg	0.463	0.463	1	A
Endrin	ND		ug/kg	0.463	0.463	1	A
Endosulfan II	ND		ug/kg	0.463	0.463	1	A
4,4'-DDD	ND		ug/kg	0.463	0.463	1	A
cis-Nonachlor	ND		ug/kg	0.463	0.463	1	A
4,4'-DDT	ND		ug/kg	0.463	0.463	1	A
Methoxychlor	ND		ug/kg	1.85	1.85	1	A
Toxaphene	ND		ug/kg	23.2	23.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	86		30-150	B
BZ 198	85		30-150	B
DBOB	87		30-150	A
BZ 198	77		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-30
Client ID: B567S03MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/12/19 01:26
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.886	0.886	1	A
gamma-BHC	ND		ug/kg	0.443	0.443	1	A
Heptachlor	ND		ug/kg	0.443	0.443	1	A
Aldrin	ND		ug/kg	0.443	0.443	1	A
Heptachlor epoxide	ND		ug/kg	0.886	0.886	1	B
Oxychlordane	ND		ug/kg	0.886	0.886	1	B
trans-Chlordane	1.58	P	ug/kg	0.443	0.443	1	A
Endosulfan I	ND		ug/kg	0.443	0.443	1	A
cis-Chlordane	ND		ug/kg	0.443	0.443	1	A
trans-Nonachlor	ND		ug/kg	0.443	0.443	1	A
4,4'-DDE	0.967		ug/kg	0.443	0.443	1	B
Dieldrin	ND		ug/kg	0.443	0.443	1	A
Endrin	ND		ug/kg	0.443	0.443	1	A
Endosulfan II	ND		ug/kg	0.443	0.443	1	A
4,4'-DDD	ND		ug/kg	0.443	0.443	1	A
cis-Nonachlor	ND		ug/kg	0.443	0.443	1	A
4,4'-DDT	ND		ug/kg	0.443	0.443	1	A
Methoxychlor	ND		ug/kg	1.77	1.77	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		30-150	B
BZ 198	88		30-150	B
DBOB	94		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-31
Client ID: B567S04MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/12/19 02:00
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.973	0.973	1	A
gamma-BHC	ND		ug/kg	0.486	0.486	1	A
Heptachlor	ND		ug/kg	0.486	0.486	1	A
Aldrin	ND		ug/kg	0.486	0.486	1	A
Heptachlor epoxide	ND		ug/kg	0.973	0.973	1	B
Oxychlordane	ND		ug/kg	0.973	0.973	1	B
trans-Chlordane	0.590	P	ug/kg	0.486	0.486	1	A
Endosulfan I	ND		ug/kg	0.486	0.486	1	A
cis-Chlordane	ND		ug/kg	0.486	0.486	1	A
trans-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDE	ND		ug/kg	0.486	0.486	1	B
Dieldrin	ND		ug/kg	0.486	0.486	1	A
Endrin	ND		ug/kg	0.486	0.486	1	A
Endosulfan II	ND		ug/kg	0.486	0.486	1	A
4,4'-DDD	ND		ug/kg	0.486	0.486	1	A
cis-Nonachlor	ND		ug/kg	0.486	0.486	1	A
4,4'-DDT	ND		ug/kg	0.486	0.486	1	A
Methoxychlor	ND		ug/kg	1.94	1.94	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	84		30-150	B
BZ 198	80		30-150	B
DBOB	94		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-32
Client ID: B567S04MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/21/19 15:13
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.893	0.893	1	A
gamma-BHC	ND		ug/kg	0.446	0.446	1	A
Heptachlor	ND		ug/kg	0.446	0.446	1	A
Aldrin	ND		ug/kg	0.446	0.446	1	A
Heptachlor epoxide	ND		ug/kg	0.893	0.893	1	B
Oxychlordane	ND		ug/kg	0.893	0.893	1	B
trans-Chlordane	2.05	P	ug/kg	0.446	0.446	1	A
Endosulfan I	ND		ug/kg	0.446	0.446	1	A
cis-Chlordane	0.578	P	ug/kg	0.446	0.446	1	B
trans-Nonachlor	ND		ug/kg	0.446	0.446	1	A
4,4'-DDE	0.528		ug/kg	0.446	0.446	1	A
Dieldrin	ND		ug/kg	0.446	0.446	1	A
Endrin	ND		ug/kg	0.446	0.446	1	A
Endosulfan II	ND		ug/kg	0.446	0.446	1	B
4,4'-DDD	ND		ug/kg	0.446	0.446	1	A
cis-Nonachlor	ND		ug/kg	0.446	0.446	1	A
4,4'-DDT	0.533	IP	ug/kg	0.446	0.446	1	A
Methoxychlor	ND		ug/kg	1.78	1.78	1	A
Toxaphene	ND		ug/kg	22.4	22.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	98		30-150	B
BZ 198	84		30-150	B
DBOB	95		30-150	A
BZ 198	80		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-33
Client ID: B567S04MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/21/19 15:47
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.865	0.865	1	A
gamma-BHC	ND		ug/kg	0.432	0.432	1	A
Heptachlor	ND		ug/kg	0.432	0.432	1	A
Aldrin	ND		ug/kg	0.432	0.432	1	A
Heptachlor epoxide	ND		ug/kg	0.865	0.865	1	B
Oxychlordane	ND		ug/kg	0.865	0.865	1	B
trans-Chlordane	1.00	P	ug/kg	0.432	0.432	1	A
Endosulfan I	ND		ug/kg	0.432	0.432	1	A
cis-Chlordane	ND		ug/kg	0.432	0.432	1	B
trans-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDE	0.509		ug/kg	0.432	0.432	1	A
Dieldrin	ND		ug/kg	0.432	0.432	1	A
Endrin	ND		ug/kg	0.432	0.432	1	A
Endosulfan II	ND		ug/kg	0.432	0.432	1	A
4,4'-DDD	ND		ug/kg	0.432	0.432	1	B
cis-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDT	ND		ug/kg	0.432	0.432	1	A
Methoxychlor	ND		ug/kg	1.73	1.73	1	A
Toxaphene	ND		ug/kg	21.7	21.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	103		30-150	B
BZ 198	90		30-150	B
DBOB	94		30-150	A
BZ 198	76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-34
Client ID: B567S04MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 16:48
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.963	0.963	1	A
gamma-BHC	ND		ug/kg	0.482	0.482	1	A
Heptachlor	ND		ug/kg	0.482	0.482	1	A
Aldrin	ND		ug/kg	0.482	0.482	1	A
Heptachlor epoxide	ND		ug/kg	0.963	0.963	1	B
Oxychlordane	ND		ug/kg	0.963	0.963	1	B
trans-Chlordane	ND		ug/kg	0.482	0.482	1	A
Endosulfan I	ND		ug/kg	0.482	0.482	1	A
cis-Chlordane	ND		ug/kg	0.482	0.482	1	A
trans-Nonachlor	ND		ug/kg	0.482	0.482	1	A
4,4'-DDE	ND		ug/kg	0.482	0.482	1	A
Dieldrin	ND		ug/kg	0.482	0.482	1	A
Endrin	ND		ug/kg	0.482	0.482	1	A
Endosulfan II	ND		ug/kg	0.482	0.482	1	A
4,4'-DDD	ND		ug/kg	0.482	0.482	1	A
cis-Nonachlor	ND		ug/kg	0.482	0.482	1	A
4,4'-DDT	ND		ug/kg	0.482	0.482	1	A
Methoxychlor	ND		ug/kg	1.93	1.93	1	A
Toxaphene	ND		ug/kg	24.2	24.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	90		30-150	B
BZ 198	82		30-150	B
DBOB	93		30-150	A
BZ 198	77		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-35
Client ID: B567S04MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 17:22
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.885	0.885	1	A
gamma-BHC	ND		ug/kg	0.442	0.442	1	A
Heptachlor	ND		ug/kg	0.442	0.442	1	A
Aldrin	ND		ug/kg	0.442	0.442	1	A
Heptachlor epoxide	ND		ug/kg	0.885	0.885	1	B
Oxychlordane	ND		ug/kg	0.885	0.885	1	B
trans-Chlordane	1.19	P	ug/kg	0.442	0.442	1	A
Endosulfan I	ND		ug/kg	0.442	0.442	1	A
cis-Chlordane	ND		ug/kg	0.442	0.442	1	A
trans-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDE	ND		ug/kg	0.442	0.442	1	B
Dieldrin	ND		ug/kg	0.442	0.442	1	A
Endrin	ND		ug/kg	0.442	0.442	1	A
Endosulfan II	ND		ug/kg	0.442	0.442	1	A
4,4'-DDD	ND		ug/kg	0.442	0.442	1	A
cis-Nonachlor	ND		ug/kg	0.442	0.442	1	A
4,4'-DDT	ND		ug/kg	0.442	0.442	1	A
Methoxychlor	ND		ug/kg	1.77	1.77	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	90		30-150	B
BZ 198	90		30-150	B
DBOB	92		30-150	A
BZ 198	81		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-36
Client ID: B567S05MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 17:56
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.971	0.971	1	A
gamma-BHC	ND		ug/kg	0.485	0.485	1	A
Heptachlor	ND		ug/kg	0.485	0.485	1	A
Aldrin	ND		ug/kg	0.485	0.485	1	A
Heptachlor epoxide	ND		ug/kg	0.971	0.971	1	B
Oxychlordane	ND		ug/kg	0.971	0.971	1	B
trans-Chlordane	ND		ug/kg	0.485	0.485	1	A
Endosulfan I	ND		ug/kg	0.485	0.485	1	A
cis-Chlordane	ND		ug/kg	0.485	0.485	1	A
trans-Nonachlor	ND		ug/kg	0.485	0.485	1	A
4,4'-DDE	ND		ug/kg	0.485	0.485	1	B
Dieldrin	ND		ug/kg	0.485	0.485	1	A
Endrin	ND		ug/kg	0.485	0.485	1	A
Endosulfan II	ND		ug/kg	0.485	0.485	1	A
4,4'-DDD	ND		ug/kg	0.485	0.485	1	A
cis-Nonachlor	ND		ug/kg	0.485	0.485	1	A
4,4'-DDT	ND		ug/kg	0.485	0.485	1	A
Methoxychlor	ND		ug/kg	1.94	1.94	1	A
Toxaphene	ND		ug/kg	24.4	24.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	87		30-150	B
BZ 198	81		30-150	B
DBOB	84		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-37
Client ID: B567S05MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 18:30
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.978	0.978	1	A
gamma-BHC	ND		ug/kg	0.489	0.489	1	A
Heptachlor	ND		ug/kg	0.489	0.489	1	A
Aldrin	ND		ug/kg	0.489	0.489	1	A
Heptachlor epoxide	ND		ug/kg	0.978	0.978	1	B
Oxychlordane	ND		ug/kg	0.978	0.978	1	B
trans-Chlordane	ND		ug/kg	0.489	0.489	1	A
Endosulfan I	ND		ug/kg	0.489	0.489	1	A
cis-Chlordane	ND		ug/kg	0.489	0.489	1	A
trans-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDE	ND		ug/kg	0.489	0.489	1	B
Dieldrin	ND		ug/kg	0.489	0.489	1	A
Endrin	ND		ug/kg	0.489	0.489	1	A
Endosulfan II	ND		ug/kg	0.489	0.489	1	A
4,4'-DDD	ND		ug/kg	0.489	0.489	1	A
cis-Nonachlor	ND		ug/kg	0.489	0.489	1	A
4,4'-DDT	ND		ug/kg	0.489	0.489	1	A
Methoxychlor	ND		ug/kg	1.96	1.96	1	A
Toxaphene	ND		ug/kg	24.6	24.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	91		30-150	B
BZ 198	83		30-150	B
DBOB	92		30-150	A
BZ 198	77		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-38
Client ID: B567S05MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 19:04
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.888	0.888	1	A
gamma-BHC	ND		ug/kg	0.444	0.444	1	A
Heptachlor	ND		ug/kg	0.444	0.444	1	A
Aldrin	ND		ug/kg	0.444	0.444	1	A
Heptachlor epoxide	ND		ug/kg	0.888	0.888	1	B
Oxychlordane	ND		ug/kg	0.888	0.888	1	B
trans-Chlordane	ND		ug/kg	0.444	0.444	1	A
Endosulfan I	ND		ug/kg	0.444	0.444	1	A
cis-Chlordane	ND		ug/kg	0.444	0.444	1	A
trans-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDE	ND		ug/kg	0.444	0.444	1	B
Dieldrin	ND		ug/kg	0.444	0.444	1	A
Endrin	ND		ug/kg	0.444	0.444	1	A
Endosulfan II	ND		ug/kg	0.444	0.444	1	A
4,4'-DDD	ND		ug/kg	0.444	0.444	1	A
cis-Nonachlor	ND		ug/kg	0.444	0.444	1	A
4,4'-DDT	ND		ug/kg	0.444	0.444	1	A
Methoxychlor	ND		ug/kg	1.78	1.78	1	A
Toxaphene	ND		ug/kg	22.3	22.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		30-150	B
BZ 198	88		30-150	B
DBOB	91		30-150	A
BZ 198	78		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-39
Client ID: B567S05MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 19:38
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.962	0.962	1	A
gamma-BHC	ND		ug/kg	0.481	0.481	1	A
Heptachlor	ND		ug/kg	0.481	0.481	1	A
Aldrin	ND		ug/kg	0.481	0.481	1	A
Heptachlor epoxide	ND		ug/kg	0.962	0.962	1	B
Oxychlordane	ND		ug/kg	0.962	0.962	1	B
trans-Chlordane	ND		ug/kg	0.481	0.481	1	A
Endosulfan I	ND		ug/kg	0.481	0.481	1	A
cis-Chlordane	ND		ug/kg	0.481	0.481	1	A
trans-Nonachlor	ND		ug/kg	0.481	0.481	1	A
4,4'-DDE	ND		ug/kg	0.481	0.481	1	A
Dieldrin	ND		ug/kg	0.481	0.481	1	A
Endrin	ND		ug/kg	0.481	0.481	1	A
Endosulfan II	ND		ug/kg	0.481	0.481	1	A
4,4'-DDD	ND		ug/kg	0.481	0.481	1	A
cis-Nonachlor	ND		ug/kg	0.481	0.481	1	A
4,4'-DDT	ND		ug/kg	0.481	0.481	1	A
Methoxychlor	ND		ug/kg	1.92	1.92	1	A
Toxaphene	ND		ug/kg	24.1	24.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	86		30-150	B
BZ 198	84		30-150	B
DBOB	89		30-150	A
BZ 198	74		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-40
Client ID: B567S05MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Analytical Method: 1,8081B
Analytical Date: 01/14/19 20:12
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.904	0.904	1	A
gamma-BHC	ND		ug/kg	0.452	0.452	1	A
Heptachlor	ND		ug/kg	0.452	0.452	1	A
Aldrin	ND		ug/kg	0.452	0.452	1	A
Heptachlor epoxide	ND		ug/kg	0.904	0.904	1	B
Oxychlordane	ND		ug/kg	0.904	0.904	1	B
trans-Chlordane	ND		ug/kg	0.452	0.452	1	A
Endosulfan I	ND		ug/kg	0.452	0.452	1	A
cis-Chlordane	ND		ug/kg	0.452	0.452	1	A
trans-Nonachlor	ND		ug/kg	0.452	0.452	1	A
4,4'-DDE	ND		ug/kg	0.452	0.452	1	B
Dieldrin	ND		ug/kg	0.452	0.452	1	A
Endrin	ND		ug/kg	0.452	0.452	1	A
Endosulfan II	ND		ug/kg	0.452	0.452	1	A
4,4'-DDD	ND		ug/kg	0.452	0.452	1	A
cis-Nonachlor	ND		ug/kg	0.452	0.452	1	A
4,4'-DDT	ND		ug/kg	0.452	0.452	1	A
Methoxychlor	ND		ug/kg	1.81	1.81	1	A
Toxaphene	ND		ug/kg	22.7	22.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	99		30-150	B
BZ 198	88		30-150	B
DBOB	101		30-150	A
BZ 198	76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 01/10/19 19:24
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 05:00
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194642-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	2.00	2.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	82		30-150	B
BZ 198	80		30-150	B
DBOB	81		30-150	A
BZ 198	76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 01/11/19 16:23
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 06:45
Cleanup Method: EPA 3630
Cleanup Date: 01/04/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 21-40 Batch: WG1194645-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	2.00	2.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	B
BZ 198	83		30-150	B
DBOB	86		30-150	A
BZ 198	79		30-150	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194642-2 WG1194642-3									
Hexachlorobenzene	92		92		50-120	0		30	A
gamma-BHC	82		84		50-120	2		30	A
Heptachlor	85		87		50-120	2		30	A
Aldrin	88		90		50-120	2		30	A
trans-Chlordane	90		91		50-120	1		30	A
Endosulfan I	88		89		50-120	1		30	A
cis-Chlordane	88		90		50-120	2		30	A
trans-Nonachlor	85		86		50-120	1		30	A
4,4'-DDE	102		102		50-120	0		30	A
Dieldrin	99		100		50-120	1		30	A
Endrin	88		87		50-120	1		30	A
4,4'-DDD	86		87		50-120	1		30	A
cis-Nonachlor	94		95		50-120	1		30	A
4,4'-DDT	92		92		50-120	0		30	A
Methoxychlor	80		81		50-120	1		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	88		87		30-150	B
BZ 198	106		89		30-150	B
DBOB	89		91		30-150	A
BZ 198	92		86		30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194642-2 WG1194642-3									
Heptachlor epoxide	84		84		50-120	0		30	B
Oxychlordane	87		88		50-120	1		30	B
Endosulfan II	85		87		50-120	2		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	88		87		30-150	B
BZ 198	106		89		30-150	B
DBOB	89		91		30-150	A
BZ 198	92		86		30-150	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194645-2 WG1194645-3									
Hexachlorobenzene	96		90		50-120	6		30	A
gamma-BHC	86		83		50-120	4		30	A
Heptachlor	92		87		50-120	6		30	A
Aldrin	97		91		50-120	6		30	A
trans-Chlordane	99		94		50-120	5		30	A
Endosulfan I	94		89		50-120	5		30	A
cis-Chlordane	97		92		50-120	5		30	A
trans-Nonachlor	94		89		50-120	5		30	A
4,4'-DDE	113		106		50-120	6		30	A
Dieldrin	107		101		50-120	6		30	A
Endrin	92		89		50-120	3		30	A
4,4'-DDD	94		89		50-120	5		30	A
cis-Nonachlor	105		100		50-120	5		30	A
4,4'-DDT	96		92		50-120	4		30	A
Methoxychlor	72		71		50-120	1		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	86		81		30-150	B
BZ 198	95		94		30-150	B
DBOB	91		88		30-150	A
BZ 198	87		84		30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194645-2 WG1194645-3									
Heptachlor epoxide	90		85		50-120	6		30	B
Oxychlordane	95		89		50-120	7		30	B
Endosulfan II	88		85		50-120	3		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	86		81		30-150	B
BZ 198	95		94		30-150	B
DBOB	91		88		30-150	A
BZ 198	87		84		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194642-6 WG1194642-7 QC Sample: L1853052-01 Client ID: B567PREMNA													
Hexachlorobenzene	ND	99.6	88.8	89		80.6	85		50-120	10		30	A
gamma-BHC	ND	99.6	83.8	84		78.7	83		50-120	6		30	A
Heptachlor	ND	99.6	83.2	84		77.1	81		50-120	8		30	A
Aldrin	ND	99.6	84.9	85		78.2	82		50-120	8		30	A
Heptachlor epoxide	ND	99.6	70.8	71		65.9	69		50-120	7		30	B
Oxychlordane	ND	99.6	73.2	74		68.2	72		50-120	7		30	B
trans-Chlordane	ND	99.6	81.4	82		77.7	82		50-120	5		30	A
Endosulfan I	ND	99.6	80.6	81		77.5	82		50-120	4		30	A
cis-Chlordane	ND	99.6	75.6	76		73.7	78		50-120	3		30	A
trans-Nonachlor	ND	99.6	71.6	72		69.8	73		50-120	3		30	A
4,4'-DDE	ND	99.6	83.8	84		81.3	86		50-120	3		30	A
Dieldrin	ND	99.6	83.3	84		78.9	83		50-120	5		30	A
Endrin	ND	99.6	77.4	78		71.1	75		50-120	8		30	A
Endosulfan II	ND	99.6	76.6	77		70.1	74		50-120	9		30	B
4,4'-DDD	ND	99.6	78.3	79		72.3	76		50-120	8		30	A
cis-Nonachlor	ND	99.6	77.2	78		72.1	76		50-120	7		30	A
4,4'-DDT	ND	99.6	72.7	73		68.1	72		50-120	7		30	A
Methoxychlor	ND	99.6	67.4	68		61.1	64		50-120	10		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	76		75		30-150	B
DBOB	84		77		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194642-6 WG1194642-7 QC Sample: L1853052-01 Client ID: B567PREMNA												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	72		70		30-150	A
DBOB	95		80		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194645-6 WG1194645-7 QC Sample: L1853052-21 Client ID: B567S02MNA													
Hexachlorobenzene	ND	94.2	102	108		91.4	94		50-120	11		30	A
gamma-BHC	ND	94.2	100	106		90.0	93		50-120	11		30	A
Heptachlor	ND	94.2	99.2	105		87.7	91		50-120	12		30	A
Aldrin	ND	94.2	96.6	103		86.1	89		50-120	11		30	A
Heptachlor epoxide	ND	94.2	83.7	89		76.7	79		50-120	9		30	B
Oxychlordane	ND	94.2	84.2	89		77.5	80		50-120	8		30	B
trans-Chlordane	1.80P	94.2	91.3	95		83.5	84		50-120	9		30	A
Endosulfan I	ND	94.2	91.4	97		83.8	87		50-120	9		30	A
cis-Chlordane	ND	94.2	78.6	84		72.7	75		50-120	8		30	B
trans-Nonachlor	ND	94.2	77.7	83		71.8	74		50-120	8		30	B
4,4'-DDE	0.612	94.2	99.2	105		89.8	92		50-120	10		30	A
Dieldrin	ND	94.2	99.9	106		90.8	94		50-120	10		30	A
Endrin	ND	94.2	91.8	98		85.3	88		50-120	7		30	A
Endosulfan II	ND	94.2	89.2	95		82.7	85		50-120	8		30	B
4,4'-DDD	ND	94.2	90.9	97		85.6	88		50-120	6		30	A
cis-Nonachlor	ND	94.2	92.8	99		84.2	87		50-120	10		30	A
4,4'-DDT	ND	94.2	87.4	93		80.3	83		50-120	8		30	A
Methoxychlor	ND	94.2	82.4	88		78.8	81		50-120	4		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	92		87		30-150	B
DBOB	118		93		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194645-6 WG1194645-7 QC Sample: L1853052-21 Client ID: B567S02MNA												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	87		79		30-150	A
DBOB	114		92		30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194642-5 QC Sample: L1853052-02 Client ID: B567PREMNB							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	B
Aldrin	ND	ND	ug/kg	NC		30	B
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	B
trans-Nonachlor	ND	ND	ug/kg	NC		30	B
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	B
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194642-5 QC Sample: L1853052-02 Client ID: B567PREMNB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	83		81		30-150	B
BZ 198	83		102		30-150	B
DBOB	91		89		30-150	A
BZ 198	71		71		30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194645-5 QC Sample: L1853052-22 Client ID: B567S02MNB							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	2.26P	1.73P	ug/kg	27		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDE	0.597	0.616	ug/kg	3		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194645-5 QC Sample: L1853052-22 Client ID: B567S02MNB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	97		90		30-150	B
BZ 198	84		86		30-150	B
DBOB	89		91		30-150	A
BZ 198	73		76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194642-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	70		40-140
4,4'-DDE	74		40-140
4,4'-DDD	92		40-140
DBOB (Surrogate)	97		30-150
DBOB (Surrogate)	102		30-150
BZ 198 (Surrogate)	79		30-150
BZ 198 (Surrogate)	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194645-4

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	79		40-140
4,4'-DDE	82		40-140
4,4'-DDD	98		40-140
DBOB (Surrogate)	86		30-150
DBOB (Surrogate)	90		30-150
BZ 198 (Surrogate)	76		30-150
BZ 198 (Surrogate)	81		30-150

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-01 Date Collected: 12/21/18 10:15

Client ID: B567PREMNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.76		mg/kg	0.086	0.029	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.034	0.009	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM
Chromium, Total	0.461		mg/kg	0.342	0.031	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM
Copper, Total	1.50		mg/kg	0.086	0.029	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM
Lead, Total	0.274		mg/kg	0.034	0.005	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM
Mercury, Total	0.003	J	mg/kg	0.011	0.003	5	01/04/19 11:40	01/05/19 16:03	EPA 7474	1,7474	BV
Nickel, Total	0.378		mg/kg	0.086	0.032	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM
Zinc, Total	11.1		mg/kg	0.855	0.127	2	01/04/19 11:40	01/09/19 15:46	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-02 Date Collected: 12/21/18 10:15

Client ID: B567PREMNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.97		mg/kg	0.095	0.033	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM
Cadmium, Total	0.031	J	mg/kg	0.038	0.010	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM
Chromium, Total	0.500		mg/kg	0.381	0.034	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM
Copper, Total	1.75		mg/kg	0.095	0.032	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM
Lead, Total	0.296		mg/kg	0.038	0.006	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.012	0.003	5	01/04/19 11:40	01/05/19 16:20	EPA 7474	1,7474	BV
Nickel, Total	0.413		mg/kg	0.095	0.035	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM
Zinc, Total	9.86		mg/kg	0.952	0.142	2	01/04/19 11:40	01/09/19 16:51	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-03
Client ID: B567PREMNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.72		mg/kg	0.090	0.031	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM
Cadmium, Total	0.025	J	mg/kg	0.036	0.009	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM
Chromium, Total	0.433		mg/kg	0.360	0.032	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM
Copper, Total	1.54		mg/kg	0.090	0.030	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM
Lead, Total	0.260		mg/kg	0.036	0.005	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/04/19 11:40	01/05/19 16:25	EPA 7474	1,7474	BV
Nickel, Total	0.349		mg/kg	0.090	0.034	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM
Zinc, Total	8.26		mg/kg	0.901	0.134	2	01/04/19 11:40	01/09/19 16:55	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-11 Date Collected: 12/21/18 09:30

Client ID: B567R01MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.78		mg/kg	0.088	0.030	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.035	0.009	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM
Chromium, Total	0.393		mg/kg	0.351	0.032	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM
Copper, Total	1.96		mg/kg	0.088	0.029	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM
Lead, Total	0.410		mg/kg	0.035	0.005	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.011	0.003	5	01/04/19 11:40	01/05/19 16:28	EPA 7474	1,7474	BV
Nickel, Total	0.422		mg/kg	0.088	0.033	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM
Zinc, Total	10.5		mg/kg	0.877	0.131	2	01/04/19 11:40	01/09/19 17:00	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-12 Date Collected: 12/21/18 09:30

Client ID: B567R01MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.10		mg/kg	0.089	0.030	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.035	0.009	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM
Chromium, Total	0.439		mg/kg	0.354	0.032	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM
Copper, Total	1.75		mg/kg	0.089	0.030	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM
Lead, Total	0.419		mg/kg	0.035	0.005	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM
Mercury, Total	0.005	J	mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:30	EPA 7474	1,7474	BV
Nickel, Total	0.440		mg/kg	0.089	0.033	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM
Zinc, Total	8.31		mg/kg	0.885	0.132	2	01/04/19 13:00	01/09/19 17:04	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-13
Client ID: B567R01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.94		mg/kg	0.093	0.032	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.037	0.010	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM
Chromium, Total	0.314	J	mg/kg	0.374	0.034	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM
Copper, Total	1.96		mg/kg	0.093	0.031	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM
Lead, Total	0.370		mg/kg	0.037	0.005	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM
Mercury, Total	0.005	J	mg/kg	0.012	0.003	5	01/04/19 13:00	01/05/19 16:33	EPA 7474	1,7474	BV
Nickel, Total	0.318		mg/kg	0.093	0.035	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM
Zinc, Total	10.2		mg/kg	0.934	0.139	2	01/04/19 13:00	01/09/19 17:09	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-14
Client ID: B567R01MND
Sample Location: NEW HAVEN, CT
Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.62		mg/kg	0.089	0.030	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM
Cadmium, Total	0.026	J	mg/kg	0.035	0.009	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM
Chromium, Total	0.676		mg/kg	0.354	0.032	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM
Copper, Total	1.90		mg/kg	0.089	0.030	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM
Lead, Total	0.542		mg/kg	0.035	0.005	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM
Mercury, Total	0.007	J	mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:35	EPA 7474	1,7474	BV
Nickel, Total	0.484		mg/kg	0.089	0.033	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM
Zinc, Total	10.1		mg/kg	0.885	0.132	2	01/04/19 13:00	01/09/19 17:13	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-15
Client ID: B567R01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.29		mg/kg	0.086	0.029	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM
Cadmium, Total	0.020	J	mg/kg	0.034	0.009	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM
Chromium, Total	0.610		mg/kg	0.342	0.031	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM
Copper, Total	2.05		mg/kg	0.086	0.029	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM
Lead, Total	0.564		mg/kg	0.034	0.005	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM
Mercury, Total	0.007	J	mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:38	EPA 7474	1,7474	BV
Nickel, Total	0.442		mg/kg	0.086	0.032	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM
Zinc, Total	8.13		mg/kg	0.855	0.127	2	01/04/19 13:00	01/09/19 17:18	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-16 Date Collected: 12/21/18 10:30

Client ID: B567S01MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.90		mg/kg	0.085	0.029	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM
Cadmium, Total	0.024	J	mg/kg	0.034	0.009	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM
Chromium, Total	0.452		mg/kg	0.339	0.031	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM
Copper, Total	1.98		mg/kg	0.085	0.028	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM
Lead, Total	0.425		mg/kg	0.034	0.005	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:40	EPA 7474	1,7474	BV
Nickel, Total	0.285		mg/kg	0.085	0.032	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM
Zinc, Total	7.63		mg/kg	0.847	0.126	2	01/04/19 13:00	01/09/19 17:46	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-17 Date Collected: 12/21/18 10:30

Client ID: B567S01MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.85		mg/kg	0.083	0.028	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.033	0.009	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM
Chromium, Total	0.402		mg/kg	0.330	0.030	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM
Copper, Total	2.16		mg/kg	0.083	0.028	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM
Lead, Total	0.419		mg/kg	0.033	0.005	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM
Mercury, Total	0.003	J	mg/kg	0.010	0.003	5	01/04/19 13:00	01/05/19 16:49	EPA 7474	1,7474	BV
Nickel, Total	0.324		mg/kg	0.083	0.031	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM
Zinc, Total	11.2		mg/kg	0.826	0.123	2	01/04/19 13:00	01/09/19 17:50	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-18 Date Collected: 12/21/18 10:30

Client ID: B567S01MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.92		mg/kg	0.085	0.029	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM
Cadmium, Total	0.031	J	mg/kg	0.034	0.009	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM
Chromium, Total	0.550		mg/kg	0.339	0.031	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM
Copper, Total	1.96		mg/kg	0.085	0.028	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM
Lead, Total	0.622		mg/kg	0.034	0.005	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:51	EPA 7474	1,7474	BV
Nickel, Total	0.374		mg/kg	0.085	0.032	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM
Zinc, Total	10.2		mg/kg	0.847	0.126	2	01/04/19 13:00	01/09/19 17:55	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-19 Date Collected: 12/21/18 10:30

Client ID: B567S01MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.23		mg/kg	0.088	0.030	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM
Cadmium, Total	0.033	J	mg/kg	0.035	0.009	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM
Chromium, Total	0.446		mg/kg	0.351	0.032	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM
Copper, Total	2.22		mg/kg	0.088	0.029	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM
Lead, Total	0.331		mg/kg	0.035	0.005	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:54	EPA 7474	1,7474	BV
Nickel, Total	0.281		mg/kg	0.088	0.033	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM
Zinc, Total	9.41		mg/kg	0.877	0.131	2	01/04/19 13:00	01/09/19 17:59	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-20 Date Collected: 12/21/18 10:30

Client ID: B567S01MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.46		mg/kg	0.089	0.031	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM
Cadmium, Total	0.032	J	mg/kg	0.036	0.009	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM
Chromium, Total	0.506		mg/kg	0.357	0.032	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM
Copper, Total	1.99		mg/kg	0.089	0.030	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM
Lead, Total	0.446		mg/kg	0.036	0.005	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM
Mercury, Total	0.003	J	mg/kg	0.011	0.003	5	01/04/19 13:00	01/05/19 16:56	EPA 7474	1,7474	BV
Nickel, Total	0.418		mg/kg	0.089	0.033	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM
Zinc, Total	10.7		mg/kg	0.893	0.133	2	01/04/19 13:00	01/09/19 18:48	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-21 Date Collected: 12/21/18 10:45

Client ID: B567S02MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.25		mg/kg	0.095	0.033	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM
Cadmium, Total	0.025	J	mg/kg	0.038	0.010	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM
Chromium, Total	0.363	J	mg/kg	0.381	0.034	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM
Copper, Total	2.01		mg/kg	0.095	0.032	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM
Lead, Total	0.399		mg/kg	0.038	0.006	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 15:15	01/09/19 12:07	EPA 7474	1,7474	BV
Nickel, Total	0.329		mg/kg	0.095	0.035	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM
Zinc, Total	10.5		mg/kg	0.952	0.142	2	01/04/19 15:15	01/14/19 15:59	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-22 Date Collected: 12/21/18 10:45

Client ID: B567S02MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.03		mg/kg	0.089	0.030	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM
Cadmium, Total	0.022	J	mg/kg	0.035	0.009	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM
Chromium, Total	0.355		mg/kg	0.354	0.032	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM
Copper, Total	2.07		mg/kg	0.089	0.030	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM
Lead, Total	0.384		mg/kg	0.035	0.005	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/04/19 15:15	01/09/19 12:14	EPA 7474	1,7474	BV
Nickel, Total	0.350		mg/kg	0.089	0.033	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM
Zinc, Total	8.67		mg/kg	0.885	0.132	2	01/04/19 15:15	01/14/19 15:54	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-23 Date Collected: 12/21/18 10:45

Client ID: B567S02MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.40		mg/kg	0.089	0.031	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM
Cadmium, Total	0.038		mg/kg	0.036	0.009	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM
Chromium, Total	0.509		mg/kg	0.357	0.032	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM
Copper, Total	2.32		mg/kg	0.089	0.030	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM
Lead, Total	0.470		mg/kg	0.036	0.005	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM
Mercury, Total	0.003	J	mg/kg	0.011	0.003	5	01/04/19 15:15	01/09/19 12:26	EPA 7474	1,7474	BV
Nickel, Total	0.438		mg/kg	0.089	0.033	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM
Zinc, Total	13.6		mg/kg	0.893	0.133	2	01/04/19 15:15	01/14/19 16:50	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-24 Date Collected: 12/21/18 10:45

Client ID: B567S02MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.66		mg/kg	0.084	0.029	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.034	0.009	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM
Chromium, Total	0.419		mg/kg	0.336	0.030	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM
Copper, Total	2.04		mg/kg	0.084	0.028	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM
Lead, Total	0.442		mg/kg	0.034	0.005	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/04/19 15:15	01/09/19 12:29	EPA 7474	1,7474	BV
Nickel, Total	0.350		mg/kg	0.084	0.031	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM
Zinc, Total	10.6		mg/kg	0.840	0.125	2	01/04/19 15:15	01/14/19 16:55	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-25 Date Collected: 12/21/18 10:45

Client ID: B567S02MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.21		mg/kg	0.094	0.032	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.038	0.010	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM
Chromium, Total	0.273	J	mg/kg	0.377	0.034	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM
Copper, Total	1.93		mg/kg	0.094	0.032	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM
Lead, Total	0.294		mg/kg	0.038	0.005	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 12:31	EPA 7474	1,7474	BV
Nickel, Total	0.315		mg/kg	0.094	0.035	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM
Zinc, Total	10.3		mg/kg	0.943	0.140	2	01/04/19 18:20	01/14/19 16:59	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-26 Date Collected: 12/21/18 11:15

Client ID: B567S03MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.78		mg/kg	0.084	0.029	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.034	0.009	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM
Chromium, Total	0.392		mg/kg	0.336	0.030	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM
Copper, Total	2.18		mg/kg	0.084	0.028	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM
Lead, Total	0.351		mg/kg	0.034	0.005	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM
Mercury, Total	0.003	J	mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 12:34	EPA 7474	1,7474	BV
Nickel, Total	0.260		mg/kg	0.084	0.031	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM
Zinc, Total	8.02		mg/kg	0.840	0.125	2	01/04/19 18:20	01/14/19 17:04	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-27 Date Collected: 12/21/18 11:15

Client ID: B567S03MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.25		mg/kg	0.089	0.030	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM
Cadmium, Total	0.024	J	mg/kg	0.035	0.009	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM
Chromium, Total	0.410		mg/kg	0.354	0.032	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM
Copper, Total	1.94		mg/kg	0.089	0.030	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM
Lead, Total	0.371		mg/kg	0.035	0.005	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 12:36	EPA 7474	1,7474	BV
Nickel, Total	0.350		mg/kg	0.089	0.033	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM
Zinc, Total	10.4		mg/kg	0.885	0.132	2	01/04/19 18:20	01/14/19 17:08	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-28 Date Collected: 12/21/18 11:15

Client ID: B567S03MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.89		mg/kg	0.095	0.033	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.038	0.010	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM
Chromium, Total	0.591		mg/kg	0.381	0.034	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM
Copper, Total	2.55		mg/kg	0.095	0.032	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM
Lead, Total	0.451		mg/kg	0.038	0.006	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 12:39	EPA 7474	1,7474	BV
Nickel, Total	0.405		mg/kg	0.095	0.035	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM
Zinc, Total	8.94		mg/kg	0.952	0.142	2	01/04/19 18:20	01/14/19 17:13	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-29 Date Collected: 12/21/18 11:15

Client ID: B567S03MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.40		mg/kg	0.092	0.032	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM
Cadmium, Total	0.022	J	mg/kg	0.037	0.010	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM
Chromium, Total	0.416		mg/kg	0.367	0.033	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM
Copper, Total	2.04		mg/kg	0.092	0.031	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM
Lead, Total	0.371		mg/kg	0.037	0.005	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 12:41	EPA 7474	1,7474	BV
Nickel, Total	0.285		mg/kg	0.092	0.034	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM
Zinc, Total	7.70		mg/kg	0.917	0.137	2	01/04/19 18:20	01/14/19 17:17	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-30 Date Collected: 12/21/18 11:15

Client ID: B567S03MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.88		mg/kg	0.086	0.029	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.034	0.009	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM
Chromium, Total	0.513		mg/kg	0.342	0.031	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM
Copper, Total	2.24		mg/kg	0.086	0.029	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM
Lead, Total	0.444		mg/kg	0.034	0.005	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 12:43	EPA 7474	1,7474	BV
Nickel, Total	0.362		mg/kg	0.086	0.032	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM
Zinc, Total	10.4		mg/kg	0.855	0.127	2	01/04/19 18:20	01/14/19 17:22	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-31 Date Collected: 12/21/18 11:15

Client ID: B567S04MNA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.94		mg/kg	0.092	0.032	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.037	0.010	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM
Chromium, Total	0.314	J	mg/kg	0.367	0.033	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM
Copper, Total	1.83		mg/kg	0.092	0.031	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM
Lead, Total	0.282		mg/kg	0.037	0.005	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 12:46	EPA 7474	1,7474	BV
Nickel, Total	0.299		mg/kg	0.092	0.034	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM
Zinc, Total	8.70		mg/kg	0.917	0.137	2	01/04/19 18:20	01/14/19 17:46	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-32
Client ID: B567S04MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.11		mg/kg	0.085	0.029	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM
Cadmium, Total	0.029	J	mg/kg	0.034	0.009	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM
Chromium, Total	0.383		mg/kg	0.339	0.031	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM
Copper, Total	1.54		mg/kg	0.085	0.028	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM
Lead, Total	0.375		mg/kg	0.034	0.005	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 12:55	EPA 7474	1,7474	BV
Nickel, Total	0.342		mg/kg	0.085	0.032	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM
Zinc, Total	9.50		mg/kg	0.847	0.126	2	01/04/19 18:20	01/14/19 17:51	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-33 Date Collected: 12/21/18 11:15

Client ID: B567S04MNC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.96		mg/kg	0.093	0.032	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM
Cadmium, Total	0.033	J	mg/kg	0.037	0.010	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM
Chromium, Total	0.300	J	mg/kg	0.374	0.034	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM
Copper, Total	1.46		mg/kg	0.093	0.031	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM
Lead, Total	0.283		mg/kg	0.037	0.005	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 12:57	EPA 7474	1,7474	BV
Nickel, Total	0.327		mg/kg	0.093	0.035	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM
Zinc, Total	9.33		mg/kg	0.934	0.139	2	01/04/19 18:20	01/14/19 17:55	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-34
Client ID: B567S04MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.76		mg/kg	0.085	0.029	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM
Cadmium, Total	0.027	J	mg/kg	0.034	0.009	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM
Chromium, Total	0.271	J	mg/kg	0.339	0.031	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM
Copper, Total	1.45		mg/kg	0.085	0.028	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM
Lead, Total	0.254		mg/kg	0.034	0.005	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 13:00	EPA 7474	1,7474	BV
Nickel, Total	0.299		mg/kg	0.085	0.032	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM
Zinc, Total	9.01		mg/kg	0.847	0.126	2	01/04/19 18:20	01/14/19 18:00	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-35 Date Collected: 12/21/18 11:15

Client ID: B567S04MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.47		mg/kg	0.095	0.033	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM
Cadmium, Total	0.019	J	mg/kg	0.038	0.010	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM
Chromium, Total	0.347	J	mg/kg	0.381	0.034	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM
Copper, Total	1.36		mg/kg	0.095	0.032	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM
Lead, Total	0.364		mg/kg	0.038	0.006	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 13:02	EPA 7474	1,7474	BV
Nickel, Total	0.310		mg/kg	0.095	0.035	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM
Zinc, Total	7.63		mg/kg	0.952	0.142	2	01/04/19 18:20	01/14/19 18:05	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-36
Client ID: B567S05MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.88		mg/kg	0.085	0.029	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM
Cadmium, Total	0.022	J	mg/kg	0.034	0.009	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM
Chromium, Total	0.359		mg/kg	0.339	0.031	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM
Copper, Total	2.30		mg/kg	0.085	0.028	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM
Lead, Total	0.582		mg/kg	0.034	0.005	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 13:05	EPA 7474	1,7474	BV
Nickel, Total	0.337		mg/kg	0.085	0.032	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM
Zinc, Total	8.53		mg/kg	0.847	0.126	2	01/04/19 18:20	01/14/19 18:09	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-37 Date Collected: 12/21/18 12:30

Client ID: B567S05MNB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.69		mg/kg	0.081	0.028	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM
Cadmium, Total	0.031	J	mg/kg	0.033	0.009	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM
Chromium, Total	0.927		mg/kg	0.325	0.029	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM
Copper, Total	2.65		mg/kg	0.081	0.027	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM
Lead, Total	0.794		mg/kg	0.033	0.005	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM
Mercury, Total	0.009	J	mg/kg	0.010	0.003	5	01/04/19 14:55	01/09/19 13:07	EPA 7474	1,7474	BV
Nickel, Total	0.449		mg/kg	0.081	0.030	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM
Zinc, Total	10.0		mg/kg	0.813	0.121	2	01/04/19 18:56	01/14/19 18:14	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853052
Project Number: 60588790 TASK 10.0
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-38
Client ID: B567S05MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.79		mg/kg	0.093	0.032	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM
Cadmium, Total	0.031	J	mg/kg	0.037	0.010	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM
Chromium, Total	0.431		mg/kg	0.374	0.034	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM
Copper, Total	2.27		mg/kg	0.093	0.031	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM
Lead, Total	0.561		mg/kg	0.037	0.005	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.003	5	01/04/19 14:55	01/09/19 13:10	EPA 7474	1,7474	BV
Nickel, Total	0.371		mg/kg	0.093	0.035	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM
Zinc, Total	11.5		mg/kg	0.934	0.139	2	01/04/19 18:56	01/14/19 18:18	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-39 Date Collected: 12/21/18 12:30

Client ID: B567S05MND Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.61		mg/kg	0.090	0.031	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.036	0.009	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM
Chromium, Total	0.361		mg/kg	0.360	0.032	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM
Copper, Total	1.90		mg/kg	0.090	0.030	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM
Lead, Total	0.522		mg/kg	0.036	0.005	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM
Mercury, Total	0.007	J	mg/kg	0.011	0.003	5	01/04/19 14:55	01/09/19 13:12	EPA 7474	1,7474	BV
Nickel, Total	0.296		mg/kg	0.090	0.034	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM
Zinc, Total	9.84		mg/kg	0.901	0.134	2	01/04/19 18:56	01/14/19 18:23	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-40 Date Collected: 12/21/18 12:30

Client ID: B567S05MNE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Macoma

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.58		mg/kg	0.083	0.028	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.033	0.009	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM
Chromium, Total	0.363		mg/kg	0.330	0.030	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM
Copper, Total	1.75		mg/kg	0.083	0.028	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM
Lead, Total	0.574		mg/kg	0.033	0.005	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM
Mercury, Total	0.007	J	mg/kg	0.010	0.003	5	01/04/19 14:55	01/09/19 13:14	EPA 7474	1,7474	BV
Nickel, Total	0.307		mg/kg	0.083	0.031	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM
Zinc, Total	8.37		mg/kg	0.826	0.123	2	01/04/19 18:56	01/14/19 18:55	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194805-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	01/04/19 11:40	01/09/19 15:37	1,6020B	AM

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194808-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	01/04/19 11:40	01/05/19 15:56	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21-40 Batch: WG1194857-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	01/04/19 15:15	01/14/19 15:40	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21-40 Batch: WG1194861-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	01/04/19 15:15	01/09/19 11:59	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194805-2								
Arsenic, Total	88		-		75-125	-		20
Cadmium, Total	92		-		75-125	-		20
Chromium, Total	86		-		75-125	-		20
Copper, Total	84		-		75-125	-		20
Lead, Total	96		-		75-125	-		20
Nickel, Total	86		-		75-125	-		20
Zinc, Total	87		-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194808-2 SRM Lot Number: HPHGAF								
Mercury, Total	**122**	Q	-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194857-2								
Arsenic, Total	101		-		75-125	-		20
Cadmium, Total	104		-		75-125	-		20
Chromium, Total	98		-		75-125	-		20
Copper, Total	97		-		75-125	-		20
Lead, Total	109		-		75-125	-		20
Nickel, Total	100		-		75-125	-		20
Zinc, Total	99		-		75-125	-		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194861-2 SRM Lot Number: HPHGAF					
Mercury, Total	113	-	80-120	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853052
Report Date: 01/24/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194805-3 WG1194805-4 QC Sample: L1853052-01 Client ID: B567PREMNA												
Arsenic, Total	1.76	10.5	11.5	92		10.8	85		75-125	6		20
Cadmium, Total	0.030J	4.47	4.14	92		3.88	86		75-125	6		20
Chromium, Total	0.461	17.5	15.1	83		14.2	78		75-125	6		20
Copper, Total	1.50	21.9	20.7	88		19.1	80		75-125	8		20
Lead, Total	0.274	44.7	45.5	101		43.0	95		75-125	6		20
Nickel, Total	0.378	43.8	39.0	88		35.9	80		75-125	8		20
Zinc, Total	11.1	43.8	48.6	86		44.9	76		75-125	8		20
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194808-3 WG1194808-4 QC Sample: L1853052-01 Client ID: B567PREMNA												
Mercury, Total	0.003J	0.543	0.551	101		0.575	102		80-120	4		20
Total Metals - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194857-3 WG1194857-4 QC Sample: L1853052-21 Client ID: B567S02MNA												
Arsenic, Total	2.25	10.8	13.0	99		12.2	102		75-125	6		20
Cadmium, Total	0.025J	4.59	4.69	102		4.27	103		75-125	9		20
Chromium, Total	0.363J	18	17.8	99		16.0	98		75-125	11		20
Copper, Total	2.01	22.5	23.4	95		21.6	96		75-125	8		20
Lead, Total	0.399	45.9	50.5	109		46.4	111		75-125	8		20
Nickel, Total	0.329	45	44.8	99		40.5	99		75-125	10		20
Zinc, Total	10.5	45	55.7	100		53.1	105		75-125	5		20
Total Metals - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194861-3 WG1194861-4 QC Sample: L1853052-21 Client ID: B567S02MNA												
Mercury, Total	ND	0.568	0.623	110		0.586	111		80-120	6		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194805-5 QC Sample: L1853052-02 Client ID: B567PREMNB						
Arsenic, Total	1.97	1.87	mg/kg	5		20
Cadmium, Total	0.031J	0.031J	mg/kg	NC		20
Chromium, Total	0.500	0.468	mg/kg	7		20
Copper, Total	1.75	1.83	mg/kg	4		20
Lead, Total	0.296	0.291	mg/kg	2		20
Nickel, Total	0.413	0.387	mg/kg	6		20
Zinc, Total	9.86	9.71	mg/kg	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194808-5 QC Sample: L1853052-02 Client ID: B567PREMNB						
Mercury, Total	0.004J	0.004J	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194857-5 QC Sample: L1853052-22 Client ID: B567S02MNB						
Arsenic, Total	2.03	2.02	mg/kg	0		20
Cadmium, Total	0.022J	0.021J	mg/kg	NC		20
Chromium, Total	0.355	0.342J	mg/kg	NC		20
Copper, Total	2.07	2.18	mg/kg	5		20
Lead, Total	0.384	0.374	mg/kg	3		20
Nickel, Total	0.350	0.338	mg/kg	3		20
Zinc, Total	8.67	8.85	mg/kg	2		20
Total Metals - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194861-5 QC Sample: L1853052-22 Client ID: B567S02MNB						
Mercury, Total	ND	ND	mg/kg	NC		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194805-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	60	Q	65-139
Cadmium, Total	66	Q	67-135
Copper, Total	101		65-138
Lead, Total	96		56-155
Zinc, Total	58	Q	66-136

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194808-13

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	49		41-183

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194857-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	60	Q	65-139
Cadmium, Total	66	Q	67-135
Copper, Total	90		65-138
Lead, Total	91		56-155
Zinc, Total	60	Q	66-136

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194861-6

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	95		41-183

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-01
Client ID: B567PREMNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.792		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-02
Client ID: B567PREMNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.563		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-03
Client ID: B567PREMNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.688		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-11
Client ID: B567R01MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	84.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.897		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-12
Client ID: B567R01MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.650		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-13
Client ID: B567R01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.648		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-14
Client ID: B567R01MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	84.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.730		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-15
Client ID: B567R01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	85.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.705		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-16
Client ID: B567S01MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.604		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-17
Client ID: B567S01MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.575		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-18
Client ID: B567S01MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.706		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-19
Client ID: B567S01MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.664		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-20
Client ID: B567S01MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.695		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-21
Client ID: B567S02MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.647		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-22
Client ID: B567S02MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.639		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-23
Client ID: B567S02MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.734		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-24
Client ID: B567S02MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.676		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-25
Client ID: B567S02MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.743		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-26
Client ID: B567S03MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.653		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-27
Client ID: B567S03MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.541		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-28
Client ID: B567S03MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.743		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-29
Client ID: B567S03MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.593		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-30
Client ID: B567S03MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.674		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-31
Client ID: B567S04MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.661		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-32
Client ID: B567S04MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.714		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-33
Client ID: B567S04MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.692		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-34
Client ID: B567S04MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.539		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-35
Client ID: B567S04MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 11:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.637		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-36
Client ID: B567S05MNA
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.660		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-37
Client ID: B567S05MNB
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.783		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-38
Client ID: B567S05MNC
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.710		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-39
Client ID: B567S05MND
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.577		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

SAMPLE RESULTS

Lab ID: L1853052-40
Client ID: B567S05MNE
Sample Location: NEW HAVEN, CT

Date Collected: 12/21/18 12:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Macoma

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.506		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1853052

Project Number: 60588790 TASK 10.0 **Report Date:** 01/24/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194954-1										
Percent Lipids	ND		%	0.100	NA	1	-	01/05/19 00:00	111,-	KO
General Chemistry - Mansfield Lab for sample(s): 21-40 Batch: WG1195120-1										
Percent Lipids	ND		%	0.100	NA	1	-	01/06/19 00:00	111,-	AL

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853052

Report Date: 01/24/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194765-1 QC Sample: L1853052-02 Client ID: B567PREMNB						
Moisture	87.0	87.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 21-30 QC Batch ID: WG1194766-1 QC Sample: L1853052-22 Client ID: B567S02MNB						
Moisture	87.0	87.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 31-40 QC Batch ID: WG1194768-1 QC Sample: L1853052-31 Client ID: B567S04MNA						
Moisture	88.0	88.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194954-2 QC Sample: L1853052-02 Client ID: B567PREMNB						
Percent Lipids	0.563	0.600	%	6		20
General Chemistry - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1195120-2 QC Sample: L1853052-22 Client ID: B567S02MNB						
Percent Lipids	0.639	0.714	%	11		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-01A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-02A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-03A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-04A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-ARCHIVE()
L1853052-05A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-06A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-07A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-08A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-09A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-10A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-11A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-12A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-13A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-14A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-15A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-16A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-17A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-18A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-19A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-20A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-21A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-22A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-23A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-24A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
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Report Date: 01/24/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-25A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-26A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-27A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-28A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-29A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-30A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
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Lab Number: L1853052
Report Date: 01/24/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-31A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-32A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-33A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-34A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-35A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-36A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853052
Report Date: 01/24/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853052-37A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-38A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-39A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853052-40A	Glass 250ml/8oz unpreserved	A	NA		-5.2	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853052
Project Number:	60588790 TASK 10.0	**Report Date:**	01/24/19

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853052
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Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

111 NOAA Technical Memorandum NOS ORCA 130: Sampling and Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993-196 Update. March 1998.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No – See case narrative.
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – See case narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	Yes
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – See case narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No All within SOP criteria	CCV: associated with L1853052-01 through -03, 11 through -20: Hexachlorobenzene @ 17% on column B CCV: associated with L1853052-21 through -31: Column A: Methoxychlor @16% Column B: 4,4'-DDT @ 16%, Methoxychlor @ 19% CCV: associated with L1853052-34 through -40: Column A: Methoxychlor @ 18% Column B: cis-Nonachlor @ 17%, 4,4'-DDT @ 19%, Methoxychlor @ 18% CCV: associated with L1853052-32 and -33: Column A: Methoxychlor @ 17% Column B: cis-Nonachlor @ 17%, 4,4'-DDT @ 16%, Methoxychlor @ 18%	Retained at Lab

Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No All within SOP criteria	CCV associated with Batch QCs: Cl7-BZ#170 @ 18%, Cl6-BZ#126 @ 17%, Cl9-BZ#206 @ 18%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1853052-22Dup: Cl3-BZ#18 @ 43%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	No	Annual	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	WG1194805-8 As(60%), Cd(66%), Zn(58%) WG1194857-8 As(60%), Cd(66%), Zn(60%)	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

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Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018 31249 (Mn)	
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	B567PreMnA	12/21/18	1015	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
002	B567PreMnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
003	B567PreMnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
004	B567PreMnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
005	B567PreMnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
006	B567LabMnA	12/21/18	0910	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
007	B567LabMnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
008	B567LabMnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
009	B567LabMnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
010	B567LabMnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
011	B567R01MnA	12/21/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
012	B567R01MnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By: [signature]	Date: 12/26/18 Time: 1100	Received By: T. Hurlbut AAL	Date: 12/26/18 Time: 1100
Relinquished By: T. Hurlbut	Date: 12/26/18 Time: 1320	Received at Lab By: [signature]	Date: 12/26/18 Time: 1320

Comments:

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COC Number: A1017071

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Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
013	B567R01MnC	12/21/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
014	B567R01MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
015	B567R01MnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
016	B567S01MnA	12/21/18	1030	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
017	B567S01MnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
018	B567S01MnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
019	B567S01MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
020	B567S01MnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
021	B567S02MnA	12/21/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
022	B567S02MnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
023	B567S02MnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
024	B567S02MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/26/18 Time: 1100	Received By: T. Hubbell AAL	Date: 12/26/18 Time: 1100
Relinquished By: T. Hubbell	Date: 12/26/18 Time: 1320	Received at Lab By:	Date: 12/26/18 Time: 1320

Comments:

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CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018 31249 (Mn)	
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
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Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
025	B567S02MnE	12/21/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
026	B567S03MnA	12/21/18	1115	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
027	B567S03MnB	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
028	B567S03MnC	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
029	B567S03MnD	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
030	B567S03MnE	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
031	B567S04MnA	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
032	B567S04MnB	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
033	B567S04MnC	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
034	B567S04MnD	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
035	B567S04MnE	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
036	B567S05MnA	12/21/18	1230	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By: [signature]	Date: 12/26/18 Time: 1100	Received By: T. Hubbell AH	Date: 12/26/18 Time: 1102
Relinquished By: T. Hubbell	Date: 12/26/18 Time: 1320	Received at Lab By: [signature]	Date: 12/26/18 Time: 1320

Comments:

ERR

COC Number: A1017071

Sample Delivery Group No: December 2018	Page of

ESI EnviroSystems, Inc.
1 Lafayette Road
Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: L1853052

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018 31249 (Mn)	
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
037	B567S05MnB	12/21/18	1230	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
038	B567S05MnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
039	B567S05MnD	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
040	B567S05MnE	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By: [signature]	Date: 12/26/18 Time: 1100	Received By: [signature]	Date: 12/26/18 Time: 1100
Relinquished By: [signature]	Date: 12/26/18 Time: 1320	Received at Lab By: [signature]	Date: 12/26/18 Time: 1320

Comments:
ERR

COC Number: A1017071

Sample Delivery Group No: December 2018 | Page of

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

28-Day Bioassay Preliminary Tissue Report

- ***Nereis virens* Data**

ANALYTICAL REPORT

Lab Number:	L1853059
Client:	AECOM 250 Apollo Drive Chelmsford, MA 01824
ATTN:	Kris VanNaerssen
Phone:	(978) 833-6950
Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL
Project Number:	60588790 TASK 10.0
Report Date:	01/25/19

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1853059-01	B567PRENVA	NEREIS	NEW HAVEN, CT	12/20/18 09:00	12/26/18
L1853059-02	B567PRENVB	NEREIS	NEW HAVEN, CT	12/20/18 09:00	12/26/18
L1853059-03	B567PRENVC	NEREIS	NEW HAVEN, CT	12/20/18 09:00	12/26/18
L1853059-04	B567PRENVD	NEREIS	NEW HAVEN, CT	12/20/18 09:00	12/26/18
L1853059-05	B567PRENVE	NEREIS	NEW HAVEN, CT	12/20/18 09:00	12/26/18
L1853059-06	B567LABNVA	NEREIS	NEW HAVEN, CT	12/20/18 09:15	12/26/18
L1853059-07	B567LABNVB	NEREIS	NEW HAVEN, CT	12/20/18 09:15	12/26/18
L1853059-08	B567LABNVC	NEREIS	NEW HAVEN, CT	12/20/18 09:15	12/26/18
L1853059-09	B567LABNVD	NEREIS	NEW HAVEN, CT	12/20/18 09:15	12/26/18
L1853059-10	B567LABNVE	NEREIS	NEW HAVEN, CT	12/20/18 09:15	12/26/18
L1853059-11	B567R01NVA	NEREIS	NEW HAVEN, CT	12/20/18 09:30	12/26/18
L1853059-12	B567R01NVB	NEREIS	NEW HAVEN, CT	12/20/18 09:30	12/26/18
L1853059-13	B567R01NVC	NEREIS	NEW HAVEN, CT	12/20/18 09:30	12/26/18
L1853059-14	B567R01NVD	NEREIS	NEW HAVEN, CT	12/20/18 09:30	12/26/18
L1853059-15	B567R01NVE	NEREIS	NEW HAVEN, CT	12/20/18 09:30	12/26/18
L1853059-16	B567S01NVA	NEREIS	NEW HAVEN, CT	12/20/18 09:45	12/26/18
L1853059-17	B567S01NVB	NEREIS	NEW HAVEN, CT	12/20/18 09:45	12/26/18
L1853059-18	B567S01NVC	NEREIS	NEW HAVEN, CT	12/20/18 09:45	12/26/18
L1853059-19	B567S01NVD	NEREIS	NEW HAVEN, CT	12/20/18 09:45	12/26/18
L1853059-20	B567S01NVE	NEREIS	NEW HAVEN, CT	12/20/18 09:45	12/26/18
L1853059-21	B567S02NVA	NEREIS	NEW HAVEN, CT	12/20/18 10:00	12/26/18
L1853059-22	B567S02NVB	NEREIS	NEW HAVEN, CT	12/20/18 10:00	12/26/18
L1853059-23	B567S02NVC	NEREIS	NEW HAVEN, CT	12/20/18 10:00	12/26/18
L1853059-24	B567S02NVD	NEREIS	NEW HAVEN, CT	12/20/18 10:00	12/26/18

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1853059-25	B567S02NVE	NEREIS	NEW HAVEN, CT	12/20/18 10:00	12/26/18
L1853059-26	B567S03NVA	NEREIS	NEW HAVEN, CT	12/20/18 10:15	12/26/18
L1853059-27	B567S03NVB	NEREIS	NEW HAVEN, CT	12/20/18 10:15	12/26/18
L1853059-28	B567S03NVC	NEREIS	NEW HAVEN, CT	12/20/18 10:15	12/26/18
L1853059-29	B567S03NVD	NEREIS	NEW HAVEN, CT	12/20/18 10:15	12/26/18
L1853059-30	B567S03NVE	NEREIS	NEW HAVEN, CT	12/20/18 10:15	12/26/18
L1853059-31	B567S04NVA	NEREIS	NEW HAVEN, CT	12/20/18 10:30	12/26/18
L1853059-32	B567S04NVB	NEREIS	NEW HAVEN, CT	12/20/18 10:30	12/26/18
L1853059-33	B567S04NVC	NEREIS	NEW HAVEN, CT	12/20/18 10:30	12/26/18
L1853059-34	B567S04NVD	NEREIS	NEW HAVEN, CT	12/20/18 10:30	12/26/18
L1853059-35	B567S04NVE	NEREIS	NEW HAVEN, CT	12/20/18 10:30	12/26/18
L1853059-36	B567S05NVA	NEREIS	NEW HAVEN, CT	12/20/18 10:45	12/26/18
L1853059-37	B567S05NVB	NEREIS	NEW HAVEN, CT	12/20/18 10:45	12/26/18
L1853059-38	B567S05NVC	NEREIS	NEW HAVEN, CT	12/20/18 10:45	12/26/18
L1853059-39	B567S05NVD	NEREIS	NEW HAVEN, CT	12/20/18 10:45	12/26/18
L1853059-40	B567S05NVE	NEREIS	NEW HAVEN, CT	12/20/18 10:45	12/26/18

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853059
Project Number:	60588790 TASK 10.0	**Report Date:**	01/25/19

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

The samples were received at the laboratory below the required temperature range. The samples were transported to the laboratory in a cooler with ice and were noted to be frozen.

Semivolatile Organics

L1853059: PCB Congeners did not achieve the requested regulatory limits due to the current lab RL, however results were reported to the MDL.

The WG1194727-4 MS recovery, performed on L1853059-01, is outside the acceptance criteria for cl4-bz#49 (49%); however, the associated LCS/LCSD recoveries are within overall method allowances. No further action was required.

The WG1194727-5 MSD recovery, performed on L1853059-01, is outside the acceptance criteria for cl3-bz#18 (193%); however, the associated LCS/LCSD recoveries are within overall method allowances. No further action was required.

The WG1194727-4/-5 MS/MSD RPD for cl3-bz#18 (55%), performed on L1853059-12, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1194727-6 Laboratory Duplicate RPDs for cl6-bz#153 (32%), cl7-bz#180 (35%), and cl7-bz#187 (39%), performed on L1853059-02, are outside the acceptance criteria. The elevated RPDs have been attributed to the non-homogeneous nature of the native sample.

The WG1194731-7 Standard Reference Material is outside the QC limits for Cl3-BZ#28 (35%).

Pesticides

L1853059: Methoxychlor did not achieve the requested regulatory limits due to the current lab RL, however

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853059
Project Number:	60588790 TASK 10.0	**Report Date:**	01/25/19

Case Narrative (continued)

results were reported to the MDL.

The WG1194728-2 LCS recoveries, associated with L1853059-01, -02, -03, -11, -12, -13, 14, -15, -16, -17, -18, -19, and -20, are outside the acceptance criteria for methoxychlor (17%) and endosulfan II (45%); however, the LCSD/MS/MSD recoveries are within the method criteria. The results of the associated samples are reported.

The WG1194728-2/-3 LCS/LCSD RPD(s), associated with L1853059-01, -02, -03, -11, -12, -13, -14, -15, -16, -17, -18, -19, and -20, are above the acceptance criteria for endosulfan i (31%), endrin (40%), methoxychlor (122%) and endosulfan II (52%).

Total Metals

The WG1195377-5 Laboratory Duplicate RPD for zinc (26%), performed on L1853059-02, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1195380-5 Laboratory Duplicate RPD for zinc (107%), performed on L1853059-22, is outside the acceptance criteria. The elevated RPD has been attributed to the non-homogeneous nature of the native sample.

The WG1195377-6 SRM recoveries, assoicated with L1853059-01 through -03, -11 through -20 and -38 through -40 are outside the acceptance criteria for arsenic (55%), cadmium (61%) and zinc (54%); however, the associated LCS recovery is within criteria. No further action was taken.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 01/25/19

ORGANICS

SEMIVOLATILES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-01
Client ID: B567PRENVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 22:49
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.49	4.74	1
Acenaphthylene	ND		ug/kg	9.49	4.74	1
Acenaphthene	ND		ug/kg	9.49	4.74	1
Fluorene	ND		ug/kg	9.49	4.74	1
Phenanthrene	5.45	J	ug/kg	9.49	4.74	1
Anthracene	ND		ug/kg	9.49	4.74	1
Fluoranthene	5.49	J	ug/kg	9.49	4.74	1
Pyrene	4.94	J	ug/kg	9.49	4.74	1
Benz(a)anthracene	ND		ug/kg	9.49	4.74	1
Chrysene	ND		ug/kg	9.49	4.74	1
Benzo(b)fluoranthene	ND		ug/kg	9.49	4.74	1
Benzo(k)fluoranthene	ND		ug/kg	9.49	4.74	1
Benzo(a)pyrene	ND		ug/kg	9.49	4.74	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.49	4.74	1
Dibenz(a,h)anthracene	ND		ug/kg	9.49	4.74	1
Benzo(ghi)perylene	ND		ug/kg	9.49	4.74	1
Cl2-BZ#8	ND		ug/kg	0.949	0.474	1
Cl3-BZ#18	ND		ug/kg	0.949	0.474	1
Cl3-BZ#28	ND		ug/kg	0.949	0.474	1
Cl4-BZ#44	ND		ug/kg	0.949	0.474	1
Cl4-BZ#49	ND		ug/kg	0.949	0.474	1
Cl4-BZ#52	ND		ug/kg	0.949	0.474	1
Cl4-BZ#66	ND		ug/kg	0.949	0.474	1
Cl5-BZ#87	ND		ug/kg	0.949	0.474	1
Cl5-BZ#101	0.496	J	ug/kg	0.949	0.474	1
Cl5-BZ#105	ND		ug/kg	0.949	0.474	1
Cl5-BZ#118	ND		ug/kg	0.949	0.474	1
Cl6-BZ#128	ND		ug/kg	0.949	0.474	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-01 Date Collected: 12/20/18 09:00

Client ID: B567PRENVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.80		ug/kg	0.949	0.474	1
Cl6-BZ#153	2.56		ug/kg	0.949	0.474	1
Cl7-BZ#170	0.882	J	ug/kg	0.949	0.474	1
Cl7-BZ#180	2.51		ug/kg	0.949	0.474	1
Cl7-BZ#183	0.832	J	ug/kg	0.949	0.474	1
Cl7-BZ#184	ND		ug/kg	0.949	0.474	1
Cl7-BZ#187	2.09		ug/kg	0.949	0.474	1
Cl8-BZ#195	ND		ug/kg	0.949	0.474	1
Cl9-BZ#206	ND		ug/kg	0.949	0.474	1
Cl10-BZ#209	ND		ug/kg	0.949	0.474	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	70		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	68		30-150
DBOB	79		30-150
BZ 198	61		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-02
Client ID: B567PRENVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 23:23
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.42	4.71	1
Acenaphthylene	ND		ug/kg	9.42	4.71	1
Acenaphthene	ND		ug/kg	9.42	4.71	1
Fluorene	ND		ug/kg	9.42	4.71	1
Phenanthrene	ND		ug/kg	9.42	4.71	1
Anthracene	ND		ug/kg	9.42	4.71	1
Fluoranthene	ND		ug/kg	9.42	4.71	1
Pyrene	ND		ug/kg	9.42	4.71	1
Benz(a)anthracene	ND		ug/kg	9.42	4.71	1
Chrysene	ND		ug/kg	9.42	4.71	1
Benzo(b)fluoranthene	ND		ug/kg	9.42	4.71	1
Benzo(k)fluoranthene	ND		ug/kg	9.42	4.71	1
Benzo(a)pyrene	ND		ug/kg	9.42	4.71	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.42	4.71	1
Dibenz(a,h)anthracene	ND		ug/kg	9.42	4.71	1
Benzo(ghi)perylene	ND		ug/kg	9.42	4.71	1
Cl2-BZ#8	ND		ug/kg	0.942	0.471	1
Cl3-BZ#18	ND		ug/kg	0.942	0.471	1
Cl3-BZ#28	ND		ug/kg	0.942	0.471	1
Cl4-BZ#44	ND		ug/kg	0.942	0.471	1
Cl4-BZ#49	ND		ug/kg	0.942	0.471	1
Cl4-BZ#52	ND		ug/kg	0.942	0.471	1
Cl4-BZ#66	ND		ug/kg	0.942	0.471	1
Cl5-BZ#87	ND		ug/kg	0.942	0.471	1
Cl5-BZ#101	ND		ug/kg	0.942	0.471	1
Cl5-BZ#105	ND		ug/kg	0.942	0.471	1
Cl5-BZ#118	ND		ug/kg	0.942	0.471	1
Cl6-BZ#128	ND		ug/kg	0.942	0.471	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-02 Date Collected: 12/20/18 09:00

Client ID: B567PRENVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	2.28		ug/kg	0.942	0.471	1
Cl6-BZ#153	2.58		ug/kg	0.942	0.471	1
Cl7-BZ#170	1.01		ug/kg	0.942	0.471	1
Cl7-BZ#180	2.70		ug/kg	0.942	0.471	1
Cl7-BZ#183	0.880	J	ug/kg	0.942	0.471	1
Cl7-BZ#184	ND		ug/kg	0.942	0.471	1
Cl7-BZ#187	1.79		ug/kg	0.942	0.471	1
Cl8-BZ#195	ND		ug/kg	0.942	0.471	1
Cl9-BZ#206	ND		ug/kg	0.942	0.471	1
Cl10-BZ#209	ND		ug/kg	0.942	0.471	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	76		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	84		30-150
BZ 198	65		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-03
Client ID: B567PRENVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 00:31
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.28	4.64	1
Acenaphthylene	ND		ug/kg	9.28	4.64	1
Acenaphthene	9.87		ug/kg	9.28	4.64	1
Fluorene	ND		ug/kg	9.28	4.64	1
Phenanthrene	ND		ug/kg	9.28	4.64	1
Anthracene	ND		ug/kg	9.28	4.64	1
Fluoranthene	ND		ug/kg	9.28	4.64	1
Pyrene	ND		ug/kg	9.28	4.64	1
Benz(a)anthracene	ND		ug/kg	9.28	4.64	1
Chrysene	ND		ug/kg	9.28	4.64	1
Benzo(b)fluoranthene	ND		ug/kg	9.28	4.64	1
Benzo(k)fluoranthene	ND		ug/kg	9.28	4.64	1
Benzo(a)pyrene	ND		ug/kg	9.28	4.64	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.28	4.64	1
Dibenz(a,h)anthracene	ND		ug/kg	9.28	4.64	1
Benzo(ghi)perylene	ND		ug/kg	9.28	4.64	1
Cl2-BZ#8	1.68		ug/kg	0.928	0.464	1
Cl3-BZ#18	5.28		ug/kg	0.928	0.464	1
Cl3-BZ#28	ND		ug/kg	0.928	0.464	1
Cl4-BZ#44	ND		ug/kg	0.928	0.464	1
Cl4-BZ#49	0.611	J	ug/kg	0.928	0.464	1
Cl4-BZ#52	0.582	J	ug/kg	0.928	0.464	1
Cl4-BZ#66	ND		ug/kg	0.928	0.464	1
Cl5-BZ#87	ND		ug/kg	0.928	0.464	1
Cl5-BZ#101	0.525	J	ug/kg	0.928	0.464	1
Cl5-BZ#105	ND		ug/kg	0.928	0.464	1
Cl5-BZ#118	ND		ug/kg	0.928	0.464	1
Cl6-BZ#128	ND		ug/kg	0.928	0.464	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-03 Date Collected: 12/20/18 09:00

Client ID: B567PRENVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	2.78		ug/kg	0.928	0.464	1
Cl6-BZ#153	4.15		ug/kg	0.928	0.464	1
Cl7-BZ#170	1.71		ug/kg	0.928	0.464	1
Cl7-BZ#180	3.76		ug/kg	0.928	0.464	1
Cl7-BZ#183	0.995		ug/kg	0.928	0.464	1
Cl7-BZ#184	ND		ug/kg	0.928	0.464	1
Cl7-BZ#187	2.89		ug/kg	0.928	0.464	1
Cl8-BZ#195	ND		ug/kg	0.928	0.464	1
Cl9-BZ#206	ND		ug/kg	0.928	0.464	1
Cl10-BZ#209	ND		ug/kg	0.928	0.464	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	84		30-150
Benzo(b)fluoranthene-d12	77		30-150
DBOB	98		30-150
BZ 198	72		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-11
Client ID: B567R01NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 01:05
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.11	4.55	1
Acenaphthylene	ND		ug/kg	9.11	4.55	1
Acenaphthene	ND		ug/kg	9.11	4.55	1
Fluorene	ND		ug/kg	9.11	4.55	1
Phenanthrene	ND		ug/kg	9.11	4.55	1
Anthracene	ND		ug/kg	9.11	4.55	1
Fluoranthene	ND		ug/kg	9.11	4.55	1
Pyrene	ND		ug/kg	9.11	4.55	1
Benz(a)anthracene	ND		ug/kg	9.11	4.55	1
Chrysene	ND		ug/kg	9.11	4.55	1
Benzo(b)fluoranthene	ND		ug/kg	9.11	4.55	1
Benzo(k)fluoranthene	ND		ug/kg	9.11	4.55	1
Benzo(a)pyrene	ND		ug/kg	9.11	4.55	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.11	4.55	1
Dibenz(a,h)anthracene	ND		ug/kg	9.11	4.55	1
Benzo(ghi)perylene	ND		ug/kg	9.11	4.55	1
Cl2-BZ#8	ND		ug/kg	0.911	0.455	1
Cl3-BZ#18	ND		ug/kg	0.911	0.455	1
Cl3-BZ#28	ND		ug/kg	0.911	0.455	1
Cl4-BZ#44	ND		ug/kg	0.911	0.455	1
Cl4-BZ#49	ND		ug/kg	0.911	0.455	1
Cl4-BZ#52	ND		ug/kg	0.911	0.455	1
Cl4-BZ#66	ND		ug/kg	0.911	0.455	1
Cl5-BZ#87	ND		ug/kg	0.911	0.455	1
Cl5-BZ#101	ND		ug/kg	0.911	0.455	1
Cl5-BZ#105	ND		ug/kg	0.911	0.455	1
Cl5-BZ#118	ND		ug/kg	0.911	0.455	1
Cl6-BZ#128	ND		ug/kg	0.911	0.455	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-11 Date Collected: 12/20/18 09:30

Client ID: B567R01NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.42		ug/kg	0.911	0.455	1
Cl6-BZ#153	2.13		ug/kg	0.911	0.455	1
Cl7-BZ#170	0.757	J	ug/kg	0.911	0.455	1
Cl7-BZ#180	2.30		ug/kg	0.911	0.455	1
Cl7-BZ#183	0.626	J	ug/kg	0.911	0.455	1
Cl7-BZ#184	ND		ug/kg	0.911	0.455	1
Cl7-BZ#187	1.84		ug/kg	0.911	0.455	1
Cl8-BZ#195	ND		ug/kg	0.911	0.455	1
Cl9-BZ#206	ND		ug/kg	0.911	0.455	1
Cl10-BZ#209	ND		ug/kg	0.911	0.455	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	75		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	86		30-150
BZ 198	67		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-12
Client ID: B567R01NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 01:39
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.59	4.30	1
Acenaphthylene	ND		ug/kg	8.59	4.30	1
Acenaphthene	ND		ug/kg	8.59	4.30	1
Fluorene	ND		ug/kg	8.59	4.30	1
Phenanthrene	ND		ug/kg	8.59	4.30	1
Anthracene	ND		ug/kg	8.59	4.30	1
Fluoranthene	ND		ug/kg	8.59	4.30	1
Pyrene	ND		ug/kg	8.59	4.30	1
Benz(a)anthracene	ND		ug/kg	8.59	4.30	1
Chrysene	ND		ug/kg	8.59	4.30	1
Benzo(b)fluoranthene	ND		ug/kg	8.59	4.30	1
Benzo(k)fluoranthene	ND		ug/kg	8.59	4.30	1
Benzo(a)pyrene	ND		ug/kg	8.59	4.30	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.59	4.30	1
Dibenz(a,h)anthracene	ND		ug/kg	8.59	4.30	1
Benzo(ghi)perylene	ND		ug/kg	8.59	4.30	1
Cl2-BZ#8	ND		ug/kg	0.859	0.430	1
Cl3-BZ#18	ND		ug/kg	0.859	0.430	1
Cl3-BZ#28	ND		ug/kg	0.859	0.430	1
Cl4-BZ#44	ND		ug/kg	0.859	0.430	1
Cl4-BZ#49	ND		ug/kg	0.859	0.430	1
Cl4-BZ#52	ND		ug/kg	0.859	0.430	1
Cl4-BZ#66	ND		ug/kg	0.859	0.430	1
Cl5-BZ#87	ND		ug/kg	0.859	0.430	1
Cl5-BZ#101	ND		ug/kg	0.859	0.430	1
Cl5-BZ#105	ND		ug/kg	0.859	0.430	1
Cl5-BZ#118	ND		ug/kg	0.859	0.430	1
Cl6-BZ#128	ND		ug/kg	0.859	0.430	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-12 Date Collected: 12/20/18 09:30

Client ID: B567R01NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.921		ug/kg	0.859	0.430	1
Cl6-BZ#153	1.42		ug/kg	0.859	0.430	1
Cl7-BZ#170	ND		ug/kg	0.859	0.430	1
Cl7-BZ#180	0.818	J	ug/kg	0.859	0.430	1
Cl7-BZ#183	ND		ug/kg	0.859	0.430	1
Cl7-BZ#184	ND		ug/kg	0.859	0.430	1
Cl7-BZ#187	0.582	J	ug/kg	0.859	0.430	1
Cl8-BZ#195	ND		ug/kg	0.859	0.430	1
Cl9-BZ#206	ND		ug/kg	0.859	0.430	1
Cl10-BZ#209	ND		ug/kg	0.859	0.430	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		30-150
Pyrene-d10	75		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	90		30-150
BZ 198	65		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-13
Client ID: B567R01NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 02:12
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.45	4.72	1
Acenaphthylene	ND		ug/kg	9.45	4.72	1
Acenaphthene	ND		ug/kg	9.45	4.72	1
Fluorene	ND		ug/kg	9.45	4.72	1
Phenanthrene	ND		ug/kg	9.45	4.72	1
Anthracene	ND		ug/kg	9.45	4.72	1
Fluoranthene	ND		ug/kg	9.45	4.72	1
Pyrene	ND		ug/kg	9.45	4.72	1
Benz(a)anthracene	ND		ug/kg	9.45	4.72	1
Chrysene	ND		ug/kg	9.45	4.72	1
Benzo(b)fluoranthene	ND		ug/kg	9.45	4.72	1
Benzo(k)fluoranthene	ND		ug/kg	9.45	4.72	1
Benzo(a)pyrene	ND		ug/kg	9.45	4.72	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.45	4.72	1
Dibenz(a,h)anthracene	ND		ug/kg	9.45	4.72	1
Benzo(ghi)perylene	ND		ug/kg	9.45	4.72	1
Cl2-BZ#8	ND		ug/kg	0.945	0.472	1
Cl3-BZ#18	ND		ug/kg	0.945	0.472	1
Cl3-BZ#28	ND		ug/kg	0.945	0.472	1
Cl4-BZ#44	ND		ug/kg	0.945	0.472	1
Cl4-BZ#49	ND		ug/kg	0.945	0.472	1
Cl4-BZ#52	ND		ug/kg	0.945	0.472	1
Cl4-BZ#66	ND		ug/kg	0.945	0.472	1
Cl5-BZ#87	ND		ug/kg	0.945	0.472	1
Cl5-BZ#101	ND		ug/kg	0.945	0.472	1
Cl5-BZ#105	ND		ug/kg	0.945	0.472	1
Cl5-BZ#118	ND		ug/kg	0.945	0.472	1
Cl6-BZ#128	ND		ug/kg	0.945	0.472	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-13 Date Collected: 12/20/18 09:30

Client ID: B567R01NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.821	J	ug/kg	0.945	0.472	1
Cl6-BZ#153	1.31		ug/kg	0.945	0.472	1
Cl7-BZ#170	ND		ug/kg	0.945	0.472	1
Cl7-BZ#180	1.19		ug/kg	0.945	0.472	1
Cl7-BZ#183	ND		ug/kg	0.945	0.472	1
Cl7-BZ#184	ND		ug/kg	0.945	0.472	1
Cl7-BZ#187	0.606	J	ug/kg	0.945	0.472	1
Cl8-BZ#195	ND		ug/kg	0.945	0.472	1
Cl9-BZ#206	ND		ug/kg	0.945	0.472	1
Cl10-BZ#209	ND		ug/kg	0.945	0.472	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	68		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	67		30-150
DBOB	82		30-150
BZ 198	61		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-14
Client ID: B567R01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 02:46
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.47	4.73	1
Acenaphthylene	ND		ug/kg	9.47	4.73	1
Acenaphthene	ND		ug/kg	9.47	4.73	1
Fluorene	ND		ug/kg	9.47	4.73	1
Phenanthrene	ND		ug/kg	9.47	4.73	1
Anthracene	ND		ug/kg	9.47	4.73	1
Fluoranthene	ND		ug/kg	9.47	4.73	1
Pyrene	ND		ug/kg	9.47	4.73	1
Benz(a)anthracene	ND		ug/kg	9.47	4.73	1
Chrysene	ND		ug/kg	9.47	4.73	1
Benzo(b)fluoranthene	ND		ug/kg	9.47	4.73	1
Benzo(k)fluoranthene	ND		ug/kg	9.47	4.73	1
Benzo(a)pyrene	ND		ug/kg	9.47	4.73	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.47	4.73	1
Dibenz(a,h)anthracene	ND		ug/kg	9.47	4.73	1
Benzo(ghi)perylene	ND		ug/kg	9.47	4.73	1
Cl2-BZ#8	ND		ug/kg	0.947	0.473	1
Cl3-BZ#18	ND		ug/kg	0.947	0.473	1
Cl3-BZ#28	ND		ug/kg	0.947	0.473	1
Cl4-BZ#44	ND		ug/kg	0.947	0.473	1
Cl4-BZ#49	ND		ug/kg	0.947	0.473	1
Cl4-BZ#52	ND		ug/kg	0.947	0.473	1
Cl4-BZ#66	ND		ug/kg	0.947	0.473	1
Cl5-BZ#87	ND		ug/kg	0.947	0.473	1
Cl5-BZ#101	ND		ug/kg	0.947	0.473	1
Cl5-BZ#105	ND		ug/kg	0.947	0.473	1
Cl5-BZ#118	ND		ug/kg	0.947	0.473	1
Cl6-BZ#128	ND		ug/kg	0.947	0.473	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-14 Date Collected: 12/20/18 09:30

Client ID: B567R01NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.40		ug/kg	0.947	0.473	1
Cl6-BZ#153	2.06		ug/kg	0.947	0.473	1
Cl7-BZ#170	0.537	J	ug/kg	0.947	0.473	1
Cl7-BZ#180	1.76		ug/kg	0.947	0.473	1
Cl7-BZ#183	0.519	J	ug/kg	0.947	0.473	1
Cl7-BZ#184	ND		ug/kg	0.947	0.473	1
Cl7-BZ#187	1.51		ug/kg	0.947	0.473	1
Cl8-BZ#195	ND		ug/kg	0.947	0.473	1
Cl9-BZ#206	ND		ug/kg	0.947	0.473	1
Cl10-BZ#209	ND		ug/kg	0.947	0.473	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	73		30-150
DBOB	87		30-150
BZ 198	63		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-15
Client ID: B567R01NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 03:20
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.43	4.72	1
Acenaphthylene	ND		ug/kg	9.43	4.72	1
Acenaphthene	ND		ug/kg	9.43	4.72	1
Fluorene	ND		ug/kg	9.43	4.72	1
Phenanthrene	ND		ug/kg	9.43	4.72	1
Anthracene	ND		ug/kg	9.43	4.72	1
Fluoranthene	ND		ug/kg	9.43	4.72	1
Pyrene	ND		ug/kg	9.43	4.72	1
Benz(a)anthracene	ND		ug/kg	9.43	4.72	1
Chrysene	ND		ug/kg	9.43	4.72	1
Benzo(b)fluoranthene	ND		ug/kg	9.43	4.72	1
Benzo(k)fluoranthene	ND		ug/kg	9.43	4.72	1
Benzo(a)pyrene	ND		ug/kg	9.43	4.72	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.43	4.72	1
Dibenz(a,h)anthracene	ND		ug/kg	9.43	4.72	1
Benzo(ghi)perylene	ND		ug/kg	9.43	4.72	1
Cl2-BZ#8	ND		ug/kg	0.943	0.472	1
Cl3-BZ#18	ND		ug/kg	0.943	0.472	1
Cl3-BZ#28	ND		ug/kg	0.943	0.472	1
Cl4-BZ#44	ND		ug/kg	0.943	0.472	1
Cl4-BZ#49	ND		ug/kg	0.943	0.472	1
Cl4-BZ#52	ND		ug/kg	0.943	0.472	1
Cl4-BZ#66	ND		ug/kg	0.943	0.472	1
Cl5-BZ#87	ND		ug/kg	0.943	0.472	1
Cl5-BZ#101	ND		ug/kg	0.943	0.472	1
Cl5-BZ#105	ND		ug/kg	0.943	0.472	1
Cl5-BZ#118	ND		ug/kg	0.943	0.472	1
Cl6-BZ#128	ND		ug/kg	0.943	0.472	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-15 Date Collected: 12/20/18 09:30

Client ID: B567R01NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.870	J	ug/kg	0.943	0.472	1
Cl6-BZ#153	1.63		ug/kg	0.943	0.472	1
Cl7-BZ#170	ND		ug/kg	0.943	0.472	1
Cl7-BZ#180	1.10		ug/kg	0.943	0.472	1
Cl7-BZ#183	ND		ug/kg	0.943	0.472	1
Cl7-BZ#184	ND		ug/kg	0.943	0.472	1
Cl7-BZ#187	0.660	J	ug/kg	0.943	0.472	1
Cl8-BZ#195	ND		ug/kg	0.943	0.472	1
Cl9-BZ#206	ND		ug/kg	0.943	0.472	1
Cl10-BZ#209	ND		ug/kg	0.943	0.472	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	71		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	68		30-150
DBOB	79		30-150
BZ 198	57		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-16
Client ID: B567S01NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 03:54
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:26
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.65	4.32	1
Acenaphthylene	ND		ug/kg	8.65	4.32	1
Acenaphthene	ND		ug/kg	8.65	4.32	1
Fluorene	ND		ug/kg	8.65	4.32	1
Phenanthrene	ND		ug/kg	8.65	4.32	1
Anthracene	ND		ug/kg	8.65	4.32	1
Fluoranthene	4.54	J	ug/kg	8.65	4.32	1
Pyrene	ND		ug/kg	8.65	4.32	1
Benz(a)anthracene	ND		ug/kg	8.65	4.32	1
Chrysene	ND		ug/kg	8.65	4.32	1
Benzo(b)fluoranthene	ND		ug/kg	8.65	4.32	1
Benzo(k)fluoranthene	ND		ug/kg	8.65	4.32	1
Benzo(a)pyrene	ND		ug/kg	8.65	4.32	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.65	4.32	1
Dibenz(a,h)anthracene	ND		ug/kg	8.65	4.32	1
Benzo(ghi)perylene	ND		ug/kg	8.65	4.32	1
Cl2-BZ#8	ND		ug/kg	0.865	0.432	1
Cl3-BZ#18	ND		ug/kg	0.865	0.432	1
Cl3-BZ#28	ND		ug/kg	0.865	0.432	1
Cl4-BZ#44	ND		ug/kg	0.865	0.432	1
Cl4-BZ#49	ND		ug/kg	0.865	0.432	1
Cl4-BZ#52	0.501	J	ug/kg	0.865	0.432	1
Cl4-BZ#66	ND		ug/kg	0.865	0.432	1
Cl5-BZ#87	ND		ug/kg	0.865	0.432	1
Cl5-BZ#101	ND		ug/kg	0.865	0.432	1
Cl5-BZ#105	ND		ug/kg	0.865	0.432	1
Cl5-BZ#118	ND		ug/kg	0.865	0.432	1
Cl6-BZ#128	ND		ug/kg	0.865	0.432	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-16 Date Collected: 12/20/18 09:45

Client ID: B567S01NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.16		ug/kg	0.865	0.432	1
Cl6-BZ#153	1.42		ug/kg	0.865	0.432	1
Cl7-BZ#170	ND		ug/kg	0.865	0.432	1
Cl7-BZ#180	1.21		ug/kg	0.865	0.432	1
Cl7-BZ#183	ND		ug/kg	0.865	0.432	1
Cl7-BZ#184	ND		ug/kg	0.865	0.432	1
Cl7-BZ#187	0.772	J	ug/kg	0.865	0.432	1
Cl8-BZ#195	ND		ug/kg	0.865	0.432	1
Cl9-BZ#206	ND		ug/kg	0.865	0.432	1
Cl10-BZ#209	ND		ug/kg	0.865	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	82		30-150
Benzo(b)fluoranthene-d12	75		30-150
DBOB	86		30-150
BZ 198	63		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-17
Client ID: B567S01NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 04:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:26
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.77	4.38	1
Acenaphthylene	ND		ug/kg	8.77	4.38	1
Acenaphthene	ND		ug/kg	8.77	4.38	1
Fluorene	ND		ug/kg	8.77	4.38	1
Phenanthrene	ND		ug/kg	8.77	4.38	1
Anthracene	ND		ug/kg	8.77	4.38	1
Fluoranthene	6.56	J	ug/kg	8.77	4.38	1
Pyrene	5.06	J	ug/kg	8.77	4.38	1
Benz(a)anthracene	ND		ug/kg	8.77	4.38	1
Chrysene	ND		ug/kg	8.77	4.38	1
Benzo(b)fluoranthene	ND		ug/kg	8.77	4.38	1
Benzo(k)fluoranthene	ND		ug/kg	8.77	4.38	1
Benzo(a)pyrene	ND		ug/kg	8.77	4.38	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.77	4.38	1
Dibenz(a,h)anthracene	ND		ug/kg	8.77	4.38	1
Benzo(ghi)perylene	ND		ug/kg	8.77	4.38	1
Cl2-BZ#8	ND		ug/kg	0.877	0.438	1
Cl3-BZ#18	1.02		ug/kg	0.877	0.438	1
Cl3-BZ#28	ND		ug/kg	0.877	0.438	1
Cl4-BZ#44	ND		ug/kg	0.877	0.438	1
Cl4-BZ#49	ND		ug/kg	0.877	0.438	1
Cl4-BZ#52	0.691	J	ug/kg	0.877	0.438	1
Cl4-BZ#66	ND		ug/kg	0.877	0.438	1
Cl5-BZ#87	ND		ug/kg	0.877	0.438	1
Cl5-BZ#101	0.506	J	ug/kg	0.877	0.438	1
Cl5-BZ#105	0.476	J	ug/kg	0.877	0.438	1
Cl5-BZ#118	ND		ug/kg	0.877	0.438	1
Cl6-BZ#128	0.455	J	ug/kg	0.877	0.438	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-17 Date Collected: 12/20/18 09:45

Client ID: B567S01NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	3.26		ug/kg	0.877	0.438	1
Cl6-BZ#153	5.46		ug/kg	0.877	0.438	1
Cl7-BZ#170	2.62		ug/kg	0.877	0.438	1
Cl7-BZ#180	5.86		ug/kg	0.877	0.438	1
Cl7-BZ#183	1.38		ug/kg	0.877	0.438	1
Cl7-BZ#184	ND		ug/kg	0.877	0.438	1
Cl7-BZ#187	3.67		ug/kg	0.877	0.438	1
Cl8-BZ#195	ND		ug/kg	0.877	0.438	1
Cl9-BZ#206	ND		ug/kg	0.877	0.438	1
Cl10-BZ#209	ND		ug/kg	0.877	0.438	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	77		30-150
DBOB	85		30-150
BZ 198	67		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-18
Client ID: B567S01NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 05:02
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:26
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.88	4.94	1
Acenaphthylene	ND		ug/kg	9.88	4.94	1
Acenaphthene	ND		ug/kg	9.88	4.94	1
Fluorene	ND		ug/kg	9.88	4.94	1
Phenanthrene	ND		ug/kg	9.88	4.94	1
Anthracene	ND		ug/kg	9.88	4.94	1
Fluoranthene	6.07	J	ug/kg	9.88	4.94	1
Pyrene	ND		ug/kg	9.88	4.94	1
Benz(a)anthracene	ND		ug/kg	9.88	4.94	1
Chrysene	ND		ug/kg	9.88	4.94	1
Benzo(b)fluoranthene	ND		ug/kg	9.88	4.94	1
Benzo(k)fluoranthene	ND		ug/kg	9.88	4.94	1
Benzo(a)pyrene	ND		ug/kg	9.88	4.94	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.88	4.94	1
Dibenz(a,h)anthracene	ND		ug/kg	9.88	4.94	1
Benzo(ghi)perylene	ND		ug/kg	9.88	4.94	1
Cl2-BZ#8	ND		ug/kg	0.988	0.494	1
Cl3-BZ#18	ND		ug/kg	0.988	0.494	1
Cl3-BZ#28	ND		ug/kg	0.988	0.494	1
Cl4-BZ#44	ND		ug/kg	0.988	0.494	1
Cl4-BZ#49	ND		ug/kg	0.988	0.494	1
Cl4-BZ#52	0.817	J	ug/kg	0.988	0.494	1
Cl4-BZ#66	ND		ug/kg	0.988	0.494	1
Cl5-BZ#87	ND		ug/kg	0.988	0.494	1
Cl5-BZ#101	ND		ug/kg	0.988	0.494	1
Cl5-BZ#105	ND		ug/kg	0.988	0.494	1
Cl5-BZ#118	ND		ug/kg	0.988	0.494	1
Cl6-BZ#128	ND		ug/kg	0.988	0.494	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-18 Date Collected: 12/20/18 09:45

Client ID: B567S01NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.43		ug/kg	0.988	0.494	1
Cl6-BZ#153	1.78		ug/kg	0.988	0.494	1
Cl7-BZ#170	ND		ug/kg	0.988	0.494	1
Cl7-BZ#180	1.64		ug/kg	0.988	0.494	1
Cl7-BZ#183	ND		ug/kg	0.988	0.494	1
Cl7-BZ#184	ND		ug/kg	0.988	0.494	1
Cl7-BZ#187	0.790	J	ug/kg	0.988	0.494	1
Cl8-BZ#195	ND		ug/kg	0.988	0.494	1
Cl9-BZ#206	ND		ug/kg	0.988	0.494	1
Cl10-BZ#209	ND		ug/kg	0.988	0.494	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	79		30-150
DBOB	91		30-150
BZ 198	68		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-19
Client ID: B567S01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 05:36
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:26
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.65	4.32	1
Acenaphthylene	ND		ug/kg	8.65	4.32	1
Acenaphthene	ND		ug/kg	8.65	4.32	1
Fluorene	ND		ug/kg	8.65	4.32	1
Phenanthrene	ND		ug/kg	8.65	4.32	1
Anthracene	ND		ug/kg	8.65	4.32	1
Fluoranthene	ND		ug/kg	8.65	4.32	1
Pyrene	ND		ug/kg	8.65	4.32	1
Benz(a)anthracene	ND		ug/kg	8.65	4.32	1
Chrysene	ND		ug/kg	8.65	4.32	1
Benzo(b)fluoranthene	ND		ug/kg	8.65	4.32	1
Benzo(k)fluoranthene	ND		ug/kg	8.65	4.32	1
Benzo(a)pyrene	ND		ug/kg	8.65	4.32	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.65	4.32	1
Dibenz(a,h)anthracene	ND		ug/kg	8.65	4.32	1
Benzo(ghi)perylene	ND		ug/kg	8.65	4.32	1
Cl2-BZ#8	ND		ug/kg	0.865	0.432	1
Cl3-BZ#18	ND		ug/kg	0.865	0.432	1
Cl3-BZ#28	ND		ug/kg	0.865	0.432	1
Cl4-BZ#44	ND		ug/kg	0.865	0.432	1
Cl4-BZ#49	ND		ug/kg	0.865	0.432	1
Cl4-BZ#52	0.528	J	ug/kg	0.865	0.432	1
Cl4-BZ#66	ND		ug/kg	0.865	0.432	1
Cl5-BZ#87	ND		ug/kg	0.865	0.432	1
Cl5-BZ#101	ND		ug/kg	0.865	0.432	1
Cl5-BZ#105	ND		ug/kg	0.865	0.432	1
Cl5-BZ#118	ND		ug/kg	0.865	0.432	1
Cl6-BZ#128	ND		ug/kg	0.865	0.432	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-19 Date Collected: 12/20/18 09:45

Client ID: B567S01NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.90		ug/kg	0.865	0.432	1
Cl6-BZ#153	3.31		ug/kg	0.865	0.432	1
Cl7-BZ#170	0.830	J	ug/kg	0.865	0.432	1
Cl7-BZ#180	3.46		ug/kg	0.865	0.432	1
Cl7-BZ#183	0.999		ug/kg	0.865	0.432	1
Cl7-BZ#184	ND		ug/kg	0.865	0.432	1
Cl7-BZ#187	2.38		ug/kg	0.865	0.432	1
Cl8-BZ#195	ND		ug/kg	0.865	0.432	1
Cl9-BZ#206	ND		ug/kg	0.865	0.432	1
Cl10-BZ#209	ND		ug/kg	0.865	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	80		30-150
Pyrene-d10	81		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	84		30-150
BZ 198	66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-20
Client ID: B567S01NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 06:10
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:26
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.76	4.88	1
Acenaphthylene	ND		ug/kg	9.76	4.88	1
Acenaphthene	ND		ug/kg	9.76	4.88	1
Fluorene	ND		ug/kg	9.76	4.88	1
Phenanthrene	ND		ug/kg	9.76	4.88	1
Anthracene	ND		ug/kg	9.76	4.88	1
Fluoranthene	ND		ug/kg	9.76	4.88	1
Pyrene	ND		ug/kg	9.76	4.88	1
Benz(a)anthracene	ND		ug/kg	9.76	4.88	1
Chrysene	ND		ug/kg	9.76	4.88	1
Benzo(b)fluoranthene	ND		ug/kg	9.76	4.88	1
Benzo(k)fluoranthene	ND		ug/kg	9.76	4.88	1
Benzo(a)pyrene	ND		ug/kg	9.76	4.88	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.76	4.88	1
Dibenz(a,h)anthracene	ND		ug/kg	9.76	4.88	1
Benzo(ghi)perylene	ND		ug/kg	9.76	4.88	1
Cl2-BZ#8	ND		ug/kg	0.976	0.488	1
Cl3-BZ#18	ND		ug/kg	0.976	0.488	1
Cl3-BZ#28	ND		ug/kg	0.976	0.488	1
Cl4-BZ#44	ND		ug/kg	0.976	0.488	1
Cl4-BZ#49	ND		ug/kg	0.976	0.488	1
Cl4-BZ#52	0.636	J	ug/kg	0.976	0.488	1
Cl4-BZ#66	ND		ug/kg	0.976	0.488	1
Cl5-BZ#87	ND		ug/kg	0.976	0.488	1
Cl5-BZ#101	0.602	J	ug/kg	0.976	0.488	1
Cl5-BZ#105	ND		ug/kg	0.976	0.488	1
Cl5-BZ#118	ND		ug/kg	0.976	0.488	1
Cl6-BZ#128	ND		ug/kg	0.976	0.488	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-20 Date Collected: 12/20/18 09:45

Client ID: B567S01NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.90		ug/kg	0.976	0.488	1
Cl6-BZ#153	3.30		ug/kg	0.976	0.488	1
Cl7-BZ#170	1.43		ug/kg	0.976	0.488	1
Cl7-BZ#180	3.23		ug/kg	0.976	0.488	1
Cl7-BZ#183	0.989		ug/kg	0.976	0.488	1
Cl7-BZ#184	ND		ug/kg	0.976	0.488	1
Cl7-BZ#187	1.68		ug/kg	0.976	0.488	1
Cl8-BZ#195	ND		ug/kg	0.976	0.488	1
Cl9-BZ#206	ND		ug/kg	0.976	0.488	1
Cl10-BZ#209	ND		ug/kg	0.976	0.488	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	69		30-150
Pyrene-d10	78		30-150
Benzo(b)fluoranthene-d12	72		30-150
DBOB	83		30-150
BZ 198	68		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-21
Client ID: B567S02NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 06:44
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.98	4.49	1
Acenaphthylene	ND		ug/kg	8.98	4.49	1
Acenaphthene	ND		ug/kg	8.98	4.49	1
Fluorene	ND		ug/kg	8.98	4.49	1
Phenanthrene	ND		ug/kg	8.98	4.49	1
Anthracene	ND		ug/kg	8.98	4.49	1
Fluoranthene	10.0		ug/kg	8.98	4.49	1
Pyrene	7.18	J	ug/kg	8.98	4.49	1
Benz(a)anthracene	ND		ug/kg	8.98	4.49	1
Chrysene	ND		ug/kg	8.98	4.49	1
Benzo(b)fluoranthene	ND		ug/kg	8.98	4.49	1
Benzo(k)fluoranthene	ND		ug/kg	8.98	4.49	1
Benzo(a)pyrene	ND		ug/kg	8.98	4.49	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.98	4.49	1
Dibenz(a,h)anthracene	ND		ug/kg	8.98	4.49	1
Benzo(ghi)perylene	ND		ug/kg	8.98	4.49	1
Cl2-BZ#8	ND		ug/kg	0.898	0.449	1
Cl3-BZ#18	ND		ug/kg	0.898	0.449	1
Cl3-BZ#28	ND		ug/kg	0.898	0.449	1
Cl4-BZ#44	ND		ug/kg	0.898	0.449	1
Cl4-BZ#49	ND		ug/kg	0.898	0.449	1
Cl4-BZ#52	0.594	J	ug/kg	0.898	0.449	1
Cl4-BZ#66	ND		ug/kg	0.898	0.449	1
Cl5-BZ#87	ND		ug/kg	0.898	0.449	1
Cl5-BZ#101	0.633	J	ug/kg	0.898	0.449	1
Cl5-BZ#105	0.585	J	ug/kg	0.898	0.449	1
Cl5-BZ#118	ND		ug/kg	0.898	0.449	1
Cl6-BZ#128	ND		ug/kg	0.898	0.449	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-21 Date Collected: 12/20/18 10:00

Client ID: B567S02NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	3.44		ug/kg	0.898	0.449	1
Cl6-BZ#153	5.83		ug/kg	0.898	0.449	1
Cl7-BZ#170	2.28		ug/kg	0.898	0.449	1
Cl7-BZ#180	5.56		ug/kg	0.898	0.449	1
Cl7-BZ#183	1.70		ug/kg	0.898	0.449	1
Cl7-BZ#184	ND		ug/kg	0.898	0.449	1
Cl7-BZ#187	3.81		ug/kg	0.898	0.449	1
Cl8-BZ#195	0.693	J	ug/kg	0.898	0.449	1
Cl9-BZ#206	ND		ug/kg	0.898	0.449	1
Cl10-BZ#209	ND		ug/kg	0.898	0.449	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	92		30-150
BZ 198	74		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-22
Client ID: B567S02NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 10:35
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.69	4.84	1
Acenaphthylene	ND		ug/kg	9.69	4.84	1
Acenaphthene	ND		ug/kg	9.69	4.84	1
Fluorene	ND		ug/kg	9.69	4.84	1
Phenanthrene	ND		ug/kg	9.69	4.84	1
Anthracene	ND		ug/kg	9.69	4.84	1
Fluoranthene	8.77	J	ug/kg	9.69	4.84	1
Pyrene	6.21	J	ug/kg	9.69	4.84	1
Benz(a)anthracene	ND		ug/kg	9.69	4.84	1
Chrysene	ND		ug/kg	9.69	4.84	1
Benzo(b)fluoranthene	ND		ug/kg	9.69	4.84	1
Benzo(k)fluoranthene	ND		ug/kg	9.69	4.84	1
Benzo(a)pyrene	ND		ug/kg	9.69	4.84	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.69	4.84	1
Dibenz(a,h)anthracene	ND		ug/kg	9.69	4.84	1
Benzo(ghi)perylene	ND		ug/kg	9.69	4.84	1
Cl2-BZ#8	ND		ug/kg	0.969	0.484	1
Cl3-BZ#18	ND		ug/kg	0.969	0.484	1
Cl3-BZ#28	ND		ug/kg	0.969	0.484	1
Cl4-BZ#44	ND		ug/kg	0.969	0.484	1
Cl4-BZ#49	ND		ug/kg	0.969	0.484	1
Cl4-BZ#52	ND		ug/kg	0.969	0.484	1
Cl4-BZ#66	ND		ug/kg	0.969	0.484	1
Cl5-BZ#87	ND		ug/kg	0.969	0.484	1
Cl5-BZ#101	0.566	J	ug/kg	0.969	0.484	1
Cl5-BZ#105	ND		ug/kg	0.969	0.484	1
Cl5-BZ#118	ND		ug/kg	0.969	0.484	1
Cl6-BZ#128	ND		ug/kg	0.969	0.484	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-22 Date Collected: 12/20/18 10:00

Client ID: B567S02NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.88		ug/kg	0.969	0.484	1
Cl6-BZ#153	3.15		ug/kg	0.969	0.484	1
Cl7-BZ#170	1.13		ug/kg	0.969	0.484	1
Cl7-BZ#180	2.76		ug/kg	0.969	0.484	1
Cl7-BZ#183	0.758	J	ug/kg	0.969	0.484	1
Cl7-BZ#184	ND		ug/kg	0.969	0.484	1
Cl7-BZ#187	2.04		ug/kg	0.969	0.484	1
Cl8-BZ#195	ND		ug/kg	0.969	0.484	1
Cl9-BZ#206	ND		ug/kg	0.969	0.484	1
Cl10-BZ#209	ND		ug/kg	0.969	0.484	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		30-150
Pyrene-d10	72		30-150
Benzo(b)fluoranthene-d12	74		30-150
DBOB	78		30-150
BZ 198	63		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-23
Client ID: B567S02NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 11:45
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.64	4.32	1
Acenaphthylene	ND		ug/kg	8.64	4.32	1
Acenaphthene	ND		ug/kg	8.64	4.32	1
Fluorene	ND		ug/kg	8.64	4.32	1
Phenanthrene	ND		ug/kg	8.64	4.32	1
Anthracene	ND		ug/kg	8.64	4.32	1
Fluoranthene	6.59	J	ug/kg	8.64	4.32	1
Pyrene	4.98	J	ug/kg	8.64	4.32	1
Benz(a)anthracene	ND		ug/kg	8.64	4.32	1
Chrysene	ND		ug/kg	8.64	4.32	1
Benzo(b)fluoranthene	ND		ug/kg	8.64	4.32	1
Benzo(k)fluoranthene	ND		ug/kg	8.64	4.32	1
Benzo(a)pyrene	ND		ug/kg	8.64	4.32	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.64	4.32	1
Dibenz(a,h)anthracene	ND		ug/kg	8.64	4.32	1
Benzo(ghi)perylene	ND		ug/kg	8.64	4.32	1
Cl2-BZ#8	ND		ug/kg	0.864	0.432	1
Cl3-BZ#18	ND		ug/kg	0.864	0.432	1
Cl3-BZ#28	ND		ug/kg	0.864	0.432	1
Cl4-BZ#44	ND		ug/kg	0.864	0.432	1
Cl4-BZ#49	ND		ug/kg	0.864	0.432	1
Cl4-BZ#52	ND		ug/kg	0.864	0.432	1
Cl4-BZ#66	ND		ug/kg	0.864	0.432	1
Cl5-BZ#87	ND		ug/kg	0.864	0.432	1
Cl5-BZ#101	0.596	J	ug/kg	0.864	0.432	1
Cl5-BZ#105	ND		ug/kg	0.864	0.432	1
Cl5-BZ#118	ND		ug/kg	0.864	0.432	1
Cl6-BZ#128	ND		ug/kg	0.864	0.432	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-23 Date Collected: 12/20/18 10:00

Client ID: B567S02NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.13		ug/kg	0.864	0.432	1
Cl6-BZ#153	1.67		ug/kg	0.864	0.432	1
Cl7-BZ#170	ND		ug/kg	0.864	0.432	1
Cl7-BZ#180	1.33		ug/kg	0.864	0.432	1
Cl7-BZ#183	0.442	J	ug/kg	0.864	0.432	1
Cl7-BZ#184	ND		ug/kg	0.864	0.432	1
Cl7-BZ#187	0.882		ug/kg	0.864	0.432	1
Cl8-BZ#195	ND		ug/kg	0.864	0.432	1
Cl9-BZ#206	ND		ug/kg	0.864	0.432	1
Cl10-BZ#209	ND		ug/kg	0.864	0.432	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	54		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	54		30-150
DBOB	65		30-150
BZ 198	51		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-24
Client ID: B567S02NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 12:19
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.94	4.97	1
Acenaphthylene	ND		ug/kg	9.94	4.97	1
Acenaphthene	ND		ug/kg	9.94	4.97	1
Fluorene	ND		ug/kg	9.94	4.97	1
Phenanthrene	ND		ug/kg	9.94	4.97	1
Anthracene	ND		ug/kg	9.94	4.97	1
Fluoranthene	6.49	J	ug/kg	9.94	4.97	1
Pyrene	ND		ug/kg	9.94	4.97	1
Benz(a)anthracene	ND		ug/kg	9.94	4.97	1
Chrysene	ND		ug/kg	9.94	4.97	1
Benzo(b)fluoranthene	ND		ug/kg	9.94	4.97	1
Benzo(k)fluoranthene	ND		ug/kg	9.94	4.97	1
Benzo(a)pyrene	ND		ug/kg	9.94	4.97	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.94	4.97	1
Dibenz(a,h)anthracene	ND		ug/kg	9.94	4.97	1
Benzo(ghi)perylene	ND		ug/kg	9.94	4.97	1
Cl2-BZ#8	ND		ug/kg	0.994	0.497	1
Cl3-BZ#18	ND		ug/kg	0.994	0.497	1
Cl3-BZ#28	ND		ug/kg	0.994	0.497	1
Cl4-BZ#44	ND		ug/kg	0.994	0.497	1
Cl4-BZ#49	ND		ug/kg	0.994	0.497	1
Cl4-BZ#52	ND		ug/kg	0.994	0.497	1
Cl4-BZ#66	ND		ug/kg	0.994	0.497	1
Cl5-BZ#87	ND		ug/kg	0.994	0.497	1
Cl5-BZ#101	ND		ug/kg	0.994	0.497	1
Cl5-BZ#105	ND		ug/kg	0.994	0.497	1
Cl5-BZ#118	ND		ug/kg	0.994	0.497	1
Cl6-BZ#128	ND		ug/kg	0.994	0.497	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-24 Date Collected: 12/20/18 10:00

Client ID: B567S02NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.57		ug/kg	0.994	0.497	1
Cl6-BZ#153	2.53		ug/kg	0.994	0.497	1
Cl7-BZ#170	0.856	J	ug/kg	0.994	0.497	1
Cl7-BZ#180	2.59		ug/kg	0.994	0.497	1
Cl7-BZ#183	0.872	J	ug/kg	0.994	0.497	1
Cl7-BZ#184	ND		ug/kg	0.994	0.497	1
Cl7-BZ#187	1.91		ug/kg	0.994	0.497	1
Cl8-BZ#195	ND		ug/kg	0.994	0.497	1
Cl9-BZ#206	ND		ug/kg	0.994	0.497	1
Cl10-BZ#209	ND		ug/kg	0.994	0.497	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	56		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	62		30-150
DBOB	70		30-150
BZ 198	62		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-25
Client ID: B567S02NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 12:54
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.60	4.80	1
Acenaphthylene	ND		ug/kg	9.60	4.80	1
Acenaphthene	ND		ug/kg	9.60	4.80	1
Fluorene	ND		ug/kg	9.60	4.80	1
Phenanthrene	ND		ug/kg	9.60	4.80	1
Anthracene	ND		ug/kg	9.60	4.80	1
Fluoranthene	ND		ug/kg	9.60	4.80	1
Pyrene	ND		ug/kg	9.60	4.80	1
Benz(a)anthracene	ND		ug/kg	9.60	4.80	1
Chrysene	ND		ug/kg	9.60	4.80	1
Benzo(b)fluoranthene	ND		ug/kg	9.60	4.80	1
Benzo(k)fluoranthene	ND		ug/kg	9.60	4.80	1
Benzo(a)pyrene	ND		ug/kg	9.60	4.80	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.60	4.80	1
Dibenz(a,h)anthracene	ND		ug/kg	9.60	4.80	1
Benzo(ghi)perylene	ND		ug/kg	9.60	4.80	1
Cl2-BZ#8	ND		ug/kg	0.960	0.480	1
Cl3-BZ#18	ND		ug/kg	0.960	0.480	1
Cl3-BZ#28	ND		ug/kg	0.960	0.480	1
Cl4-BZ#44	ND		ug/kg	0.960	0.480	1
Cl4-BZ#49	ND		ug/kg	0.960	0.480	1
Cl4-BZ#52	ND		ug/kg	0.960	0.480	1
Cl4-BZ#66	ND		ug/kg	0.960	0.480	1
Cl5-BZ#87	ND		ug/kg	0.960	0.480	1
Cl5-BZ#101	ND		ug/kg	0.960	0.480	1
Cl5-BZ#105	ND		ug/kg	0.960	0.480	1
Cl5-BZ#118	ND		ug/kg	0.960	0.480	1
Cl6-BZ#128	ND		ug/kg	0.960	0.480	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-25 Date Collected: 12/20/18 10:00

Client ID: B567S02NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.15		ug/kg	0.960	0.480	1
Cl6-BZ#153	1.94		ug/kg	0.960	0.480	1
Cl7-BZ#170	ND		ug/kg	0.960	0.480	1
Cl7-BZ#180	1.61		ug/kg	0.960	0.480	1
Cl7-BZ#183	0.564	J	ug/kg	0.960	0.480	1
Cl7-BZ#184	ND		ug/kg	0.960	0.480	1
Cl7-BZ#187	1.12		ug/kg	0.960	0.480	1
Cl8-BZ#195	ND		ug/kg	0.960	0.480	1
Cl9-BZ#206	ND		ug/kg	0.960	0.480	1
Cl10-BZ#209	ND		ug/kg	0.960	0.480	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	59		30-150
Pyrene-d10	67		30-150
Benzo(b)fluoranthene-d12	63		30-150
DBOB	72		30-150
BZ 198	61		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-26
Client ID: B567S03NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 13:28
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.94	4.47	1
Acenaphthylene	ND		ug/kg	8.94	4.47	1
Acenaphthene	ND		ug/kg	8.94	4.47	1
Fluorene	ND		ug/kg	8.94	4.47	1
Phenanthrene	ND		ug/kg	8.94	4.47	1
Anthracene	ND		ug/kg	8.94	4.47	1
Fluoranthene	7.25	J	ug/kg	8.94	4.47	1
Pyrene	6.42	J	ug/kg	8.94	4.47	1
Benz(a)anthracene	ND		ug/kg	8.94	4.47	1
Chrysene	ND		ug/kg	8.94	4.47	1
Benzo(b)fluoranthene	ND		ug/kg	8.94	4.47	1
Benzo(k)fluoranthene	ND		ug/kg	8.94	4.47	1
Benzo(a)pyrene	ND		ug/kg	8.94	4.47	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.94	4.47	1
Dibenz(a,h)anthracene	ND		ug/kg	8.94	4.47	1
Benzo(ghi)perylene	ND		ug/kg	8.94	4.47	1
Cl2-BZ#8	ND		ug/kg	0.894	0.447	1
Cl3-BZ#18	1.69		ug/kg	0.894	0.447	1
Cl3-BZ#28	ND		ug/kg	0.894	0.447	1
Cl4-BZ#44	ND		ug/kg	0.894	0.447	1
Cl4-BZ#49	ND		ug/kg	0.894	0.447	1
Cl4-BZ#52	0.820	J	ug/kg	0.894	0.447	1
Cl4-BZ#66	ND		ug/kg	0.894	0.447	1
Cl5-BZ#87	ND		ug/kg	0.894	0.447	1
Cl5-BZ#101	0.714	J	ug/kg	0.894	0.447	1
Cl5-BZ#105	ND		ug/kg	0.894	0.447	1
Cl5-BZ#118	ND		ug/kg	0.894	0.447	1
Cl6-BZ#128	ND		ug/kg	0.894	0.447	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-26 Date Collected: 12/20/18 10:15

Client ID: B567S03NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	2.36		ug/kg	0.894	0.447	1
Cl6-BZ#153	3.82		ug/kg	0.894	0.447	1
Cl7-BZ#170	1.33		ug/kg	0.894	0.447	1
Cl7-BZ#180	3.56		ug/kg	0.894	0.447	1
Cl7-BZ#183	0.957		ug/kg	0.894	0.447	1
Cl7-BZ#184	ND		ug/kg	0.894	0.447	1
Cl7-BZ#187	2.37		ug/kg	0.894	0.447	1
Cl8-BZ#195	ND		ug/kg	0.894	0.447	1
Cl9-BZ#206	ND		ug/kg	0.894	0.447	1
Cl10-BZ#209	ND		ug/kg	0.894	0.447	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		30-150
Pyrene-d10	83		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	86		30-150
BZ 198	71		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-27
Client ID: B567S03NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 14:03
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.07	4.54	1
Acenaphthylene	ND		ug/kg	9.07	4.54	1
Acenaphthene	ND		ug/kg	9.07	4.54	1
Fluorene	ND		ug/kg	9.07	4.54	1
Phenanthrene	ND		ug/kg	9.07	4.54	1
Anthracene	ND		ug/kg	9.07	4.54	1
Fluoranthene	5.19	J	ug/kg	9.07	4.54	1
Pyrene	ND		ug/kg	9.07	4.54	1
Benz(a)anthracene	ND		ug/kg	9.07	4.54	1
Chrysene	ND		ug/kg	9.07	4.54	1
Benzo(b)fluoranthene	ND		ug/kg	9.07	4.54	1
Benzo(k)fluoranthene	ND		ug/kg	9.07	4.54	1
Benzo(a)pyrene	ND		ug/kg	9.07	4.54	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.07	4.54	1
Dibenz(a,h)anthracene	ND		ug/kg	9.07	4.54	1
Benzo(ghi)perylene	ND		ug/kg	9.07	4.54	1
Cl2-BZ#8	ND		ug/kg	0.907	0.454	1
Cl3-BZ#18	1.26		ug/kg	0.907	0.454	1
Cl3-BZ#28	ND		ug/kg	0.907	0.454	1
Cl4-BZ#44	ND		ug/kg	0.907	0.454	1
Cl4-BZ#49	ND		ug/kg	0.907	0.454	1
Cl4-BZ#52	1.14		ug/kg	0.907	0.454	1
Cl4-BZ#66	ND		ug/kg	0.907	0.454	1
Cl5-BZ#87	ND		ug/kg	0.907	0.454	1
Cl5-BZ#101	0.685	J	ug/kg	0.907	0.454	1
Cl5-BZ#105	ND		ug/kg	0.907	0.454	1
Cl5-BZ#118	ND		ug/kg	0.907	0.454	1
Cl6-BZ#128	ND		ug/kg	0.907	0.454	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-27 Date Collected: 12/20/18 10:15

Client ID: B567S03NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	2.08		ug/kg	0.907	0.454	1
Cl6-BZ#153	2.63		ug/kg	0.907	0.454	1
Cl7-BZ#170	ND		ug/kg	0.907	0.454	1
Cl7-BZ#180	2.08		ug/kg	0.907	0.454	1
Cl7-BZ#183	0.763	J	ug/kg	0.907	0.454	1
Cl7-BZ#184	ND		ug/kg	0.907	0.454	1
Cl7-BZ#187	1.68		ug/kg	0.907	0.454	1
Cl8-BZ#195	ND		ug/kg	0.907	0.454	1
Cl9-BZ#206	ND		ug/kg	0.907	0.454	1
Cl10-BZ#209	ND		ug/kg	0.907	0.454	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	57		30-150
Pyrene-d10	63		30-150
Benzo(b)fluoranthene-d12	58		30-150
DBOB	82		30-150
BZ 198	67		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-28
Client ID: B567S03NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 14:37
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.86	4.43	1
Acenaphthylene	ND		ug/kg	8.86	4.43	1
Acenaphthene	ND		ug/kg	8.86	4.43	1
Fluorene	ND		ug/kg	8.86	4.43	1
Phenanthrene	ND		ug/kg	8.86	4.43	1
Anthracene	ND		ug/kg	8.86	4.43	1
Fluoranthene	9.86		ug/kg	8.86	4.43	1
Pyrene	7.10	J	ug/kg	8.86	4.43	1
Benz(a)anthracene	ND		ug/kg	8.86	4.43	1
Chrysene	ND		ug/kg	8.86	4.43	1
Benzo(b)fluoranthene	ND		ug/kg	8.86	4.43	1
Benzo(k)fluoranthene	ND		ug/kg	8.86	4.43	1
Benzo(a)pyrene	ND		ug/kg	8.86	4.43	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.86	4.43	1
Dibenz(a,h)anthracene	ND		ug/kg	8.86	4.43	1
Benzo(ghi)perylene	ND		ug/kg	8.86	4.43	1
Cl2-BZ#8	1.71		ug/kg	0.886	0.443	1
Cl3-BZ#18	2.05		ug/kg	0.886	0.443	1
Cl3-BZ#28	ND		ug/kg	0.886	0.443	1
Cl4-BZ#44	ND		ug/kg	0.886	0.443	1
Cl4-BZ#49	1.30		ug/kg	0.886	0.443	1
Cl4-BZ#52	1.07		ug/kg	0.886	0.443	1
Cl4-BZ#66	ND		ug/kg	0.886	0.443	1
Cl5-BZ#87	ND		ug/kg	0.886	0.443	1
Cl5-BZ#101	0.993		ug/kg	0.886	0.443	1
Cl5-BZ#105	ND		ug/kg	0.886	0.443	1
Cl5-BZ#118	ND		ug/kg	0.886	0.443	1
Cl6-BZ#128	ND		ug/kg	0.886	0.443	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-28 Date Collected: 12/20/18 10:15

Client ID: B567S03NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.94		ug/kg	0.886	0.443	1
Cl6-BZ#153	2.40		ug/kg	0.886	0.443	1
Cl7-BZ#170	ND		ug/kg	0.886	0.443	1
Cl7-BZ#180	1.60		ug/kg	0.886	0.443	1
Cl7-BZ#183	0.598	J	ug/kg	0.886	0.443	1
Cl7-BZ#184	ND		ug/kg	0.886	0.443	1
Cl7-BZ#187	1.59		ug/kg	0.886	0.443	1
Cl8-BZ#195	ND		ug/kg	0.886	0.443	1
Cl9-BZ#206	ND		ug/kg	0.886	0.443	1
Cl10-BZ#209	ND		ug/kg	0.886	0.443	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	78		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	81		30-150
DBOB	93		30-150
BZ 198	80		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-29
Client ID: B567S03NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 15:11
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.17	4.59	1
Acenaphthylene	ND		ug/kg	9.17	4.59	1
Acenaphthene	ND		ug/kg	9.17	4.59	1
Fluorene	ND		ug/kg	9.17	4.59	1
Phenanthrene	ND		ug/kg	9.17	4.59	1
Anthracene	ND		ug/kg	9.17	4.59	1
Fluoranthene	ND		ug/kg	9.17	4.59	1
Pyrene	ND		ug/kg	9.17	4.59	1
Benz(a)anthracene	ND		ug/kg	9.17	4.59	1
Chrysene	ND		ug/kg	9.17	4.59	1
Benzo(b)fluoranthene	ND		ug/kg	9.17	4.59	1
Benzo(k)fluoranthene	ND		ug/kg	9.17	4.59	1
Benzo(a)pyrene	ND		ug/kg	9.17	4.59	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.17	4.59	1
Dibenz(a,h)anthracene	ND		ug/kg	9.17	4.59	1
Benzo(ghi)perylene	ND		ug/kg	9.17	4.59	1
Cl2-BZ#8	ND		ug/kg	0.917	0.459	1
Cl3-BZ#18	ND		ug/kg	0.917	0.459	1
Cl3-BZ#28	ND		ug/kg	0.917	0.459	1
Cl4-BZ#44	ND		ug/kg	0.917	0.459	1
Cl4-BZ#49	ND		ug/kg	0.917	0.459	1
Cl4-BZ#52	0.614	J	ug/kg	0.917	0.459	1
Cl4-BZ#66	ND		ug/kg	0.917	0.459	1
Cl5-BZ#87	ND		ug/kg	0.917	0.459	1
Cl5-BZ#101	ND		ug/kg	0.917	0.459	1
Cl5-BZ#105	ND		ug/kg	0.917	0.459	1
Cl5-BZ#118	ND		ug/kg	0.917	0.459	1
Cl6-BZ#128	ND		ug/kg	0.917	0.459	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-29 Date Collected: 12/20/18 10:15

Client ID: B567S03NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.39		ug/kg	0.917	0.459	1
Cl6-BZ#153	2.42		ug/kg	0.917	0.459	1
Cl7-BZ#170	ND		ug/kg	0.917	0.459	1
Cl7-BZ#180	1.70		ug/kg	0.917	0.459	1
Cl7-BZ#183	0.577	J	ug/kg	0.917	0.459	1
Cl7-BZ#184	ND		ug/kg	0.917	0.459	1
Cl7-BZ#187	1.60		ug/kg	0.917	0.459	1
Cl8-BZ#195	ND		ug/kg	0.917	0.459	1
Cl9-BZ#206	ND		ug/kg	0.917	0.459	1
Cl10-BZ#209	ND		ug/kg	0.917	0.459	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	63		30-150
Pyrene-d10	73		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	78		30-150
BZ 198	68		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-30
Client ID: B567S03NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 15:46
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	8.86	4.43	1
Acenaphthylene	ND		ug/kg	8.86	4.43	1
Acenaphthene	ND		ug/kg	8.86	4.43	1
Fluorene	ND		ug/kg	8.86	4.43	1
Phenanthrene	ND		ug/kg	8.86	4.43	1
Anthracene	ND		ug/kg	8.86	4.43	1
Fluoranthene	10.2		ug/kg	8.86	4.43	1
Pyrene	7.60	J	ug/kg	8.86	4.43	1
Benz(a)anthracene	ND		ug/kg	8.86	4.43	1
Chrysene	ND		ug/kg	8.86	4.43	1
Benzo(b)fluoranthene	ND		ug/kg	8.86	4.43	1
Benzo(k)fluoranthene	ND		ug/kg	8.86	4.43	1
Benzo(a)pyrene	ND		ug/kg	8.86	4.43	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	8.86	4.43	1
Dibenz(a,h)anthracene	ND		ug/kg	8.86	4.43	1
Benzo(ghi)perylene	ND		ug/kg	8.86	4.43	1
Cl2-BZ#8	ND		ug/kg	0.886	0.443	1
Cl3-BZ#18	ND		ug/kg	0.886	0.443	1
Cl3-BZ#28	ND		ug/kg	0.886	0.443	1
Cl4-BZ#44	ND		ug/kg	0.886	0.443	1
Cl4-BZ#49	ND		ug/kg	0.886	0.443	1
Cl4-BZ#52	1.25		ug/kg	0.886	0.443	1
Cl4-BZ#66	ND		ug/kg	0.886	0.443	1
Cl5-BZ#87	ND		ug/kg	0.886	0.443	1
Cl5-BZ#101	1.27		ug/kg	0.886	0.443	1
Cl5-BZ#105	ND		ug/kg	0.886	0.443	1
Cl5-BZ#118	ND		ug/kg	0.886	0.443	1
Cl6-BZ#128	ND		ug/kg	0.886	0.443	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-30 Date Collected: 12/20/18 10:15

Client ID: B567S03NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	5.00		ug/kg	0.886	0.443	1
Cl6-BZ#153	7.49		ug/kg	0.886	0.443	1
Cl7-BZ#170	3.51		ug/kg	0.886	0.443	1
Cl7-BZ#180	7.35		ug/kg	0.886	0.443	1
Cl7-BZ#183	2.09		ug/kg	0.886	0.443	1
Cl7-BZ#184	ND		ug/kg	0.886	0.443	1
Cl7-BZ#187	4.82		ug/kg	0.886	0.443	1
Cl8-BZ#195	ND		ug/kg	0.886	0.443	1
Cl9-BZ#206	ND		ug/kg	0.886	0.443	1
Cl10-BZ#209	ND		ug/kg	0.886	0.443	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	83		30-150
Pyrene-d10	95		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	103		30-150
BZ 198	86		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-31
Client ID: B567S04NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 16:20
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.65	4.83	1
Acenaphthylene	ND		ug/kg	9.65	4.83	1
Acenaphthene	ND		ug/kg	9.65	4.83	1
Fluorene	ND		ug/kg	9.65	4.83	1
Phenanthrene	ND		ug/kg	9.65	4.83	1
Anthracene	ND		ug/kg	9.65	4.83	1
Fluoranthene	ND		ug/kg	9.65	4.83	1
Pyrene	ND		ug/kg	9.65	4.83	1
Benz(a)anthracene	ND		ug/kg	9.65	4.83	1
Chrysene	ND		ug/kg	9.65	4.83	1
Benzo(b)fluoranthene	ND		ug/kg	9.65	4.83	1
Benzo(k)fluoranthene	ND		ug/kg	9.65	4.83	1
Benzo(a)pyrene	ND		ug/kg	9.65	4.83	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.65	4.83	1
Dibenz(a,h)anthracene	ND		ug/kg	9.65	4.83	1
Benzo(ghi)perylene	ND		ug/kg	9.65	4.83	1
Cl2-BZ#8	ND		ug/kg	0.965	0.483	1
Cl3-BZ#18	ND		ug/kg	0.965	0.483	1
Cl3-BZ#28	ND		ug/kg	0.965	0.483	1
Cl4-BZ#44	ND		ug/kg	0.965	0.483	1
Cl4-BZ#49	ND		ug/kg	0.965	0.483	1
Cl4-BZ#52	ND		ug/kg	0.965	0.483	1
Cl4-BZ#66	ND		ug/kg	0.965	0.483	1
Cl5-BZ#87	ND		ug/kg	0.965	0.483	1
Cl5-BZ#101	0.644	J	ug/kg	0.965	0.483	1
Cl5-BZ#105	ND		ug/kg	0.965	0.483	1
Cl5-BZ#118	ND		ug/kg	0.965	0.483	1
Cl6-BZ#128	ND		ug/kg	0.965	0.483	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-31 Date Collected: 12/20/18 10:30

Client ID: B567S04NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	2.45		ug/kg	0.965	0.483	1
Cl6-BZ#153	3.69		ug/kg	0.965	0.483	1
Cl7-BZ#170	1.50		ug/kg	0.965	0.483	1
Cl7-BZ#180	3.65		ug/kg	0.965	0.483	1
Cl7-BZ#183	1.13		ug/kg	0.965	0.483	1
Cl7-BZ#184	ND		ug/kg	0.965	0.483	1
Cl7-BZ#187	2.40		ug/kg	0.965	0.483	1
Cl8-BZ#195	ND		ug/kg	0.965	0.483	1
Cl9-BZ#206	ND		ug/kg	0.965	0.483	1
Cl10-BZ#209	ND		ug/kg	0.965	0.483	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	67		30-150
Pyrene-d10	76		30-150
Benzo(b)fluoranthene-d12	70		30-150
DBOB	81		30-150
BZ 198	66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-32
Client ID: B567S04NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 16:55
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.33	4.66	1
Acenaphthylene	ND		ug/kg	9.33	4.66	1
Acenaphthene	ND		ug/kg	9.33	4.66	1
Fluorene	ND		ug/kg	9.33	4.66	1
Phenanthrene	ND		ug/kg	9.33	4.66	1
Anthracene	ND		ug/kg	9.33	4.66	1
Fluoranthene	ND		ug/kg	9.33	4.66	1
Pyrene	ND		ug/kg	9.33	4.66	1
Benz(a)anthracene	ND		ug/kg	9.33	4.66	1
Chrysene	ND		ug/kg	9.33	4.66	1
Benzo(b)fluoranthene	ND		ug/kg	9.33	4.66	1
Benzo(k)fluoranthene	ND		ug/kg	9.33	4.66	1
Benzo(a)pyrene	ND		ug/kg	9.33	4.66	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.33	4.66	1
Dibenz(a,h)anthracene	ND		ug/kg	9.33	4.66	1
Benzo(ghi)perylene	ND		ug/kg	9.33	4.66	1
Cl2-BZ#8	ND		ug/kg	0.933	0.466	1
Cl3-BZ#18	ND		ug/kg	0.933	0.466	1
Cl3-BZ#28	ND		ug/kg	0.933	0.466	1
Cl4-BZ#44	ND		ug/kg	0.933	0.466	1
Cl4-BZ#49	ND		ug/kg	0.933	0.466	1
Cl4-BZ#52	ND		ug/kg	0.933	0.466	1
Cl4-BZ#66	ND		ug/kg	0.933	0.466	1
Cl5-BZ#87	ND		ug/kg	0.933	0.466	1
Cl5-BZ#101	ND		ug/kg	0.933	0.466	1
Cl5-BZ#105	ND		ug/kg	0.933	0.466	1
Cl5-BZ#118	ND		ug/kg	0.933	0.466	1
Cl6-BZ#128	ND		ug/kg	0.933	0.466	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-32 Date Collected: 12/20/18 10:30

Client ID: B567S04NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.54		ug/kg	0.933	0.466	1
Cl6-BZ#153	2.52		ug/kg	0.933	0.466	1
Cl7-BZ#170	0.715	J	ug/kg	0.933	0.466	1
Cl7-BZ#180	2.23		ug/kg	0.933	0.466	1
Cl7-BZ#183	0.674	J	ug/kg	0.933	0.466	1
Cl7-BZ#184	ND		ug/kg	0.933	0.466	1
Cl7-BZ#187	1.57		ug/kg	0.933	0.466	1
Cl8-BZ#195	ND		ug/kg	0.933	0.466	1
Cl9-BZ#206	ND		ug/kg	0.933	0.466	1
Cl10-BZ#209	ND		ug/kg	0.933	0.466	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	68		30-150
Benzo(b)fluoranthene-d12	63		30-150
DBOB	72		30-150
BZ 198	59		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-33
Client ID: B567S04NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 17:29
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.54	4.77	1
Acenaphthylene	ND		ug/kg	9.54	4.77	1
Acenaphthene	ND		ug/kg	9.54	4.77	1
Fluorene	ND		ug/kg	9.54	4.77	1
Phenanthrene	ND		ug/kg	9.54	4.77	1
Anthracene	ND		ug/kg	9.54	4.77	1
Fluoranthene	ND		ug/kg	9.54	4.77	1
Pyrene	ND		ug/kg	9.54	4.77	1
Benz(a)anthracene	ND		ug/kg	9.54	4.77	1
Chrysene	ND		ug/kg	9.54	4.77	1
Benzo(b)fluoranthene	ND		ug/kg	9.54	4.77	1
Benzo(k)fluoranthene	ND		ug/kg	9.54	4.77	1
Benzo(a)pyrene	ND		ug/kg	9.54	4.77	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.54	4.77	1
Dibenz(a,h)anthracene	ND		ug/kg	9.54	4.77	1
Benzo(ghi)perylene	ND		ug/kg	9.54	4.77	1
Cl2-BZ#8	ND		ug/kg	0.954	0.477	1
Cl3-BZ#18	ND		ug/kg	0.954	0.477	1
Cl3-BZ#28	ND		ug/kg	0.954	0.477	1
Cl4-BZ#44	ND		ug/kg	0.954	0.477	1
Cl4-BZ#49	ND		ug/kg	0.954	0.477	1
Cl4-BZ#52	ND		ug/kg	0.954	0.477	1
Cl4-BZ#66	ND		ug/kg	0.954	0.477	1
Cl5-BZ#87	ND		ug/kg	0.954	0.477	1
Cl5-BZ#101	ND		ug/kg	0.954	0.477	1
Cl5-BZ#105	ND		ug/kg	0.954	0.477	1
Cl5-BZ#118	ND		ug/kg	0.954	0.477	1
Cl6-BZ#128	ND		ug/kg	0.954	0.477	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-33 Date Collected: 12/20/18 10:30

Client ID: B567S04NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.612	J	ug/kg	0.954	0.477	1
Cl6-BZ#153	1.10		ug/kg	0.954	0.477	1
Cl7-BZ#170	ND		ug/kg	0.954	0.477	1
Cl7-BZ#180	0.975		ug/kg	0.954	0.477	1
Cl7-BZ#183	ND		ug/kg	0.954	0.477	1
Cl7-BZ#184	ND		ug/kg	0.954	0.477	1
Cl7-BZ#187	ND		ug/kg	0.954	0.477	1
Cl8-BZ#195	ND		ug/kg	0.954	0.477	1
Cl9-BZ#206	ND		ug/kg	0.954	0.477	1
Cl10-BZ#209	ND		ug/kg	0.954	0.477	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	55		30-150
Pyrene-d10	65		30-150
Benzo(b)fluoranthene-d12	60		30-150
DBOB	68		30-150
BZ 198	56		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-34
Client ID: B567S04NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 18:04
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.67	4.84	1
Acenaphthylene	ND		ug/kg	9.67	4.84	1
Acenaphthene	ND		ug/kg	9.67	4.84	1
Fluorene	ND		ug/kg	9.67	4.84	1
Phenanthrene	ND		ug/kg	9.67	4.84	1
Anthracene	ND		ug/kg	9.67	4.84	1
Fluoranthene	ND		ug/kg	9.67	4.84	1
Pyrene	ND		ug/kg	9.67	4.84	1
Benz(a)anthracene	ND		ug/kg	9.67	4.84	1
Chrysene	ND		ug/kg	9.67	4.84	1
Benzo(b)fluoranthene	ND		ug/kg	9.67	4.84	1
Benzo(k)fluoranthene	ND		ug/kg	9.67	4.84	1
Benzo(a)pyrene	ND		ug/kg	9.67	4.84	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.67	4.84	1
Dibenz(a,h)anthracene	ND		ug/kg	9.67	4.84	1
Benzo(ghi)perylene	ND		ug/kg	9.67	4.84	1
Cl2-BZ#8	ND		ug/kg	0.967	0.484	1
Cl3-BZ#18	ND		ug/kg	0.967	0.484	1
Cl3-BZ#28	ND		ug/kg	0.967	0.484	1
Cl4-BZ#44	ND		ug/kg	0.967	0.484	1
Cl4-BZ#49	ND		ug/kg	0.967	0.484	1
Cl4-BZ#52	ND		ug/kg	0.967	0.484	1
Cl4-BZ#66	ND		ug/kg	0.967	0.484	1
Cl5-BZ#87	ND		ug/kg	0.967	0.484	1
Cl5-BZ#101	ND		ug/kg	0.967	0.484	1
Cl5-BZ#105	ND		ug/kg	0.967	0.484	1
Cl5-BZ#118	ND		ug/kg	0.967	0.484	1
Cl6-BZ#128	ND		ug/kg	0.967	0.484	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-34 Date Collected: 12/20/18 10:30

Client ID: B567S04NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.05		ug/kg	0.967	0.484	1
Cl6-BZ#153	1.74		ug/kg	0.967	0.484	1
Cl7-BZ#170	0.761	J	ug/kg	0.967	0.484	1
Cl7-BZ#180	0.848	J	ug/kg	0.967	0.484	1
Cl7-BZ#183	ND		ug/kg	0.967	0.484	1
Cl7-BZ#184	ND		ug/kg	0.967	0.484	1
Cl7-BZ#187	0.687	J	ug/kg	0.967	0.484	1
Cl8-BZ#195	ND		ug/kg	0.967	0.484	1
Cl9-BZ#206	ND		ug/kg	0.967	0.484	1
Cl10-BZ#209	ND		ug/kg	0.967	0.484	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		30-150
Pyrene-d10	81		30-150
Benzo(b)fluoranthene-d12	76		30-150
DBOB	84		30-150
BZ 198	70		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-35
Client ID: B567S04NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 18:39
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.45	4.72	1
Acenaphthylene	ND		ug/kg	9.45	4.72	1
Acenaphthene	ND		ug/kg	9.45	4.72	1
Fluorene	ND		ug/kg	9.45	4.72	1
Phenanthrene	ND		ug/kg	9.45	4.72	1
Anthracene	ND		ug/kg	9.45	4.72	1
Fluoranthene	ND		ug/kg	9.45	4.72	1
Pyrene	ND		ug/kg	9.45	4.72	1
Benz(a)anthracene	ND		ug/kg	9.45	4.72	1
Chrysene	ND		ug/kg	9.45	4.72	1
Benzo(b)fluoranthene	ND		ug/kg	9.45	4.72	1
Benzo(k)fluoranthene	ND		ug/kg	9.45	4.72	1
Benzo(a)pyrene	ND		ug/kg	9.45	4.72	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.45	4.72	1
Dibenz(a,h)anthracene	ND		ug/kg	9.45	4.72	1
Benzo(ghi)perylene	ND		ug/kg	9.45	4.72	1
Cl2-BZ#8	ND		ug/kg	0.945	0.472	1
Cl3-BZ#18	ND		ug/kg	0.945	0.472	1
Cl3-BZ#28	ND		ug/kg	0.945	0.472	1
Cl4-BZ#44	ND		ug/kg	0.945	0.472	1
Cl4-BZ#49	ND		ug/kg	0.945	0.472	1
Cl4-BZ#52	ND		ug/kg	0.945	0.472	1
Cl4-BZ#66	ND		ug/kg	0.945	0.472	1
Cl5-BZ#87	ND		ug/kg	0.945	0.472	1
Cl5-BZ#101	ND		ug/kg	0.945	0.472	1
Cl5-BZ#105	ND		ug/kg	0.945	0.472	1
Cl5-BZ#118	ND		ug/kg	0.945	0.472	1
Cl6-BZ#128	ND		ug/kg	0.945	0.472	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-35 Date Collected: 12/20/18 10:30

Client ID: B567S04NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.75		ug/kg	0.945	0.472	1
Cl6-BZ#153	3.24		ug/kg	0.945	0.472	1
Cl7-BZ#170	1.36		ug/kg	0.945	0.472	1
Cl7-BZ#180	3.08		ug/kg	0.945	0.472	1
Cl7-BZ#183	0.858	J	ug/kg	0.945	0.472	1
Cl7-BZ#184	ND		ug/kg	0.945	0.472	1
Cl7-BZ#187	2.24		ug/kg	0.945	0.472	1
Cl8-BZ#195	ND		ug/kg	0.945	0.472	1
Cl9-BZ#206	ND		ug/kg	0.945	0.472	1
Cl10-BZ#209	ND		ug/kg	0.945	0.472	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	74		30-150
Pyrene-d10	85		30-150
Benzo(b)fluoranthene-d12	80		30-150
DBOB	91		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-36
Client ID: B567S05NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 19:13
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.56	4.78	1
Acenaphthylene	ND		ug/kg	9.56	4.78	1
Acenaphthene	ND		ug/kg	9.56	4.78	1
Fluorene	ND		ug/kg	9.56	4.78	1
Phenanthrene	ND		ug/kg	9.56	4.78	1
Anthracene	ND		ug/kg	9.56	4.78	1
Fluoranthene	5.04	J	ug/kg	9.56	4.78	1
Pyrene	7.59	J	ug/kg	9.56	4.78	1
Benz(a)anthracene	ND		ug/kg	9.56	4.78	1
Chrysene	ND		ug/kg	9.56	4.78	1
Benzo(b)fluoranthene	ND		ug/kg	9.56	4.78	1
Benzo(k)fluoranthene	ND		ug/kg	9.56	4.78	1
Benzo(a)pyrene	ND		ug/kg	9.56	4.78	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.56	4.78	1
Dibenz(a,h)anthracene	ND		ug/kg	9.56	4.78	1
Benzo(ghi)perylene	ND		ug/kg	9.56	4.78	1
Cl2-BZ#8	ND		ug/kg	0.956	0.478	1
Cl3-BZ#18	ND		ug/kg	0.956	0.478	1
Cl3-BZ#28	ND		ug/kg	0.956	0.478	1
Cl4-BZ#44	ND		ug/kg	0.956	0.478	1
Cl4-BZ#49	ND		ug/kg	0.956	0.478	1
Cl4-BZ#52	ND		ug/kg	0.956	0.478	1
Cl4-BZ#66	ND		ug/kg	0.956	0.478	1
Cl5-BZ#87	ND		ug/kg	0.956	0.478	1
Cl5-BZ#101	ND		ug/kg	0.956	0.478	1
Cl5-BZ#105	ND		ug/kg	0.956	0.478	1
Cl5-BZ#118	ND		ug/kg	0.956	0.478	1
Cl6-BZ#128	ND		ug/kg	0.956	0.478	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-36 Date Collected: 12/20/18 10:45

Client ID: B567S05NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.685	J	ug/kg	0.956	0.478	1
Cl6-BZ#153	1.29		ug/kg	0.956	0.478	1
Cl7-BZ#170	ND		ug/kg	0.956	0.478	1
Cl7-BZ#180	0.640	J	ug/kg	0.956	0.478	1
Cl7-BZ#183	ND		ug/kg	0.956	0.478	1
Cl7-BZ#184	ND		ug/kg	0.956	0.478	1
Cl7-BZ#187	ND		ug/kg	0.956	0.478	1
Cl8-BZ#195	ND		ug/kg	0.956	0.478	1
Cl9-BZ#206	ND		ug/kg	0.956	0.478	1
Cl10-BZ#209	ND		ug/kg	0.956	0.478	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	85		30-150
DBOB	96		30-150
BZ 198	78		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-37
Client ID: B567S05NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 19:48
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.49	4.74	1
Acenaphthylene	ND		ug/kg	9.49	4.74	1
Acenaphthene	ND		ug/kg	9.49	4.74	1
Fluorene	ND		ug/kg	9.49	4.74	1
Phenanthrene	ND		ug/kg	9.49	4.74	1
Anthracene	ND		ug/kg	9.49	4.74	1
Fluoranthene	6.85	J	ug/kg	9.49	4.74	1
Pyrene	9.66		ug/kg	9.49	4.74	1
Benz(a)anthracene	ND		ug/kg	9.49	4.74	1
Chrysene	ND		ug/kg	9.49	4.74	1
Benzo(b)fluoranthene	ND		ug/kg	9.49	4.74	1
Benzo(k)fluoranthene	ND		ug/kg	9.49	4.74	1
Benzo(a)pyrene	ND		ug/kg	9.49	4.74	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.49	4.74	1
Dibenz(a,h)anthracene	ND		ug/kg	9.49	4.74	1
Benzo(ghi)perylene	ND		ug/kg	9.49	4.74	1
Cl2-BZ#8	ND		ug/kg	0.949	0.474	1
Cl3-BZ#18	ND		ug/kg	0.949	0.474	1
Cl3-BZ#28	ND		ug/kg	0.949	0.474	1
Cl4-BZ#44	ND		ug/kg	0.949	0.474	1
Cl4-BZ#49	ND		ug/kg	0.949	0.474	1
Cl4-BZ#52	ND		ug/kg	0.949	0.474	1
Cl4-BZ#66	ND		ug/kg	0.949	0.474	1
Cl5-BZ#87	ND		ug/kg	0.949	0.474	1
Cl5-BZ#101	ND		ug/kg	0.949	0.474	1
Cl5-BZ#105	ND		ug/kg	0.949	0.474	1
Cl5-BZ#118	ND		ug/kg	0.949	0.474	1
Cl6-BZ#128	ND		ug/kg	0.949	0.474	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-37 Date Collected: 12/20/18 10:45

Client ID: B567S05NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	0.863	J	ug/kg	0.949	0.474	1
Cl6-BZ#153	1.33		ug/kg	0.949	0.474	1
Cl7-BZ#170	ND		ug/kg	0.949	0.474	1
Cl7-BZ#180	0.638	J	ug/kg	0.949	0.474	1
Cl7-BZ#183	ND		ug/kg	0.949	0.474	1
Cl7-BZ#184	ND		ug/kg	0.949	0.474	1
Cl7-BZ#187	0.564	J	ug/kg	0.949	0.474	1
Cl8-BZ#195	ND		ug/kg	0.949	0.474	1
Cl9-BZ#206	ND		ug/kg	0.949	0.474	1
Cl10-BZ#209	ND		ug/kg	0.949	0.474	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	86		30-150
DBOB	98		30-150
BZ 198	76		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-38
Client ID: B567S05NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 20:22
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.02	4.51	1
Acenaphthylene	ND		ug/kg	9.02	4.51	1
Acenaphthene	ND		ug/kg	9.02	4.51	1
Fluorene	ND		ug/kg	9.02	4.51	1
Phenanthrene	ND		ug/kg	9.02	4.51	1
Anthracene	ND		ug/kg	9.02	4.51	1
Fluoranthene	4.61	J	ug/kg	9.02	4.51	1
Pyrene	6.57	J	ug/kg	9.02	4.51	1
Benz(a)anthracene	ND		ug/kg	9.02	4.51	1
Chrysene	ND		ug/kg	9.02	4.51	1
Benzo(b)fluoranthene	ND		ug/kg	9.02	4.51	1
Benzo(k)fluoranthene	ND		ug/kg	9.02	4.51	1
Benzo(a)pyrene	ND		ug/kg	9.02	4.51	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.02	4.51	1
Dibenz(a,h)anthracene	ND		ug/kg	9.02	4.51	1
Benzo(ghi)perylene	ND		ug/kg	9.02	4.51	1
Cl2-BZ#8	ND		ug/kg	0.902	0.451	1
Cl3-BZ#18	3.47		ug/kg	0.902	0.451	1
Cl3-BZ#28	ND		ug/kg	0.902	0.451	1
Cl4-BZ#44	ND		ug/kg	0.902	0.451	1
Cl4-BZ#49	ND		ug/kg	0.902	0.451	1
Cl4-BZ#52	ND		ug/kg	0.902	0.451	1
Cl4-BZ#66	ND		ug/kg	0.902	0.451	1
Cl5-BZ#87	ND		ug/kg	0.902	0.451	1
Cl5-BZ#101	ND		ug/kg	0.902	0.451	1
Cl5-BZ#105	ND		ug/kg	0.902	0.451	1
Cl5-BZ#118	ND		ug/kg	0.902	0.451	1
Cl6-BZ#128	ND		ug/kg	0.902	0.451	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-38 Date Collected: 12/20/18 10:45

Client ID: B567S05NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.25		ug/kg	0.902	0.451	1
Cl6-BZ#153	1.98		ug/kg	0.902	0.451	1
Cl7-BZ#170	ND		ug/kg	0.902	0.451	1
Cl7-BZ#180	1.37		ug/kg	0.902	0.451	1
Cl7-BZ#183	0.549	J	ug/kg	0.902	0.451	1
Cl7-BZ#184	ND		ug/kg	0.902	0.451	1
Cl7-BZ#187	1.28		ug/kg	0.902	0.451	1
Cl8-BZ#195	ND		ug/kg	0.902	0.451	1
Cl9-BZ#206	ND		ug/kg	0.902	0.451	1
Cl10-BZ#209	ND		ug/kg	0.902	0.451	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	89		30-150
Benzo(b)fluoranthene-d12	83		30-150
DBOB	94		30-150
BZ 198	77		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-39
Client ID: B567S05NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 20:56
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.21	4.60	1
Acenaphthylene	ND		ug/kg	9.21	4.60	1
Acenaphthene	ND		ug/kg	9.21	4.60	1
Fluorene	ND		ug/kg	9.21	4.60	1
Phenanthrene	ND		ug/kg	9.21	4.60	1
Anthracene	ND		ug/kg	9.21	4.60	1
Fluoranthene	7.95	J	ug/kg	9.21	4.60	1
Pyrene	10.3		ug/kg	9.21	4.60	1
Benz(a)anthracene	ND		ug/kg	9.21	4.60	1
Chrysene	ND		ug/kg	9.21	4.60	1
Benzo(b)fluoranthene	ND		ug/kg	9.21	4.60	1
Benzo(k)fluoranthene	ND		ug/kg	9.21	4.60	1
Benzo(a)pyrene	ND		ug/kg	9.21	4.60	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.21	4.60	1
Dibenz(a,h)anthracene	ND		ug/kg	9.21	4.60	1
Benzo(ghi)perylene	ND		ug/kg	9.21	4.60	1
Cl2-BZ#8	ND		ug/kg	0.921	0.460	1
Cl3-BZ#18	ND		ug/kg	0.921	0.460	1
Cl3-BZ#28	ND		ug/kg	0.921	0.460	1
Cl4-BZ#44	ND		ug/kg	0.921	0.460	1
Cl4-BZ#49	ND		ug/kg	0.921	0.460	1
Cl4-BZ#52	ND		ug/kg	0.921	0.460	1
Cl4-BZ#66	ND		ug/kg	0.921	0.460	1
Cl5-BZ#87	ND		ug/kg	0.921	0.460	1
Cl5-BZ#101	ND		ug/kg	0.921	0.460	1
Cl5-BZ#105	ND		ug/kg	0.921	0.460	1
Cl5-BZ#118	ND		ug/kg	0.921	0.460	1
Cl6-BZ#128	ND		ug/kg	0.921	0.460	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-39 Date Collected: 12/20/18 10:45

Client ID: B567S05NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.34		ug/kg	0.921	0.460	1
Cl6-BZ#153	2.03		ug/kg	0.921	0.460	1
Cl7-BZ#170	ND		ug/kg	0.921	0.460	1
Cl7-BZ#180	1.57		ug/kg	0.921	0.460	1
Cl7-BZ#183	0.513	J	ug/kg	0.921	0.460	1
Cl7-BZ#184	ND		ug/kg	0.921	0.460	1
Cl7-BZ#187	1.07		ug/kg	0.921	0.460	1
Cl8-BZ#195	ND		ug/kg	0.921	0.460	1
Cl9-BZ#206	ND		ug/kg	0.921	0.460	1
Cl10-BZ#209	ND		ug/kg	0.921	0.460	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	82		30-150
Pyrene-d10	92		30-150
Benzo(b)fluoranthene-d12	84		30-150
DBOB	106		30-150
BZ 198	83		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-40
Client ID: B567S05NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/24/19 21:29
Analyst: GP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:12
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Naphthalene	ND		ug/kg	9.33	4.66	1
Acenaphthylene	ND		ug/kg	9.33	4.66	1
Acenaphthene	ND		ug/kg	9.33	4.66	1
Fluorene	ND		ug/kg	9.33	4.66	1
Phenanthrene	ND		ug/kg	9.33	4.66	1
Anthracene	ND		ug/kg	9.33	4.66	1
Fluoranthene	5.74	J	ug/kg	9.33	4.66	1
Pyrene	7.52	J	ug/kg	9.33	4.66	1
Benz(a)anthracene	ND		ug/kg	9.33	4.66	1
Chrysene	ND		ug/kg	9.33	4.66	1
Benzo(b)fluoranthene	ND		ug/kg	9.33	4.66	1
Benzo(k)fluoranthene	ND		ug/kg	9.33	4.66	1
Benzo(a)pyrene	ND		ug/kg	9.33	4.66	1
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	9.33	4.66	1
Dibenz(a,h)anthracene	ND		ug/kg	9.33	4.66	1
Benzo(ghi)perylene	ND		ug/kg	9.33	4.66	1
Cl2-BZ#8	ND		ug/kg	0.933	0.466	1
Cl3-BZ#18	ND		ug/kg	0.933	0.466	1
Cl3-BZ#28	ND		ug/kg	0.933	0.466	1
Cl4-BZ#44	ND		ug/kg	0.933	0.466	1
Cl4-BZ#49	ND		ug/kg	0.933	0.466	1
Cl4-BZ#52	ND		ug/kg	0.933	0.466	1
Cl4-BZ#66	ND		ug/kg	0.933	0.466	1
Cl5-BZ#87	ND		ug/kg	0.933	0.466	1
Cl5-BZ#101	ND		ug/kg	0.933	0.466	1
Cl5-BZ#105	ND		ug/kg	0.933	0.466	1
Cl5-BZ#118	ND		ug/kg	0.933	0.466	1
Cl6-BZ#128	ND		ug/kg	0.933	0.466	1

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-40 Date Collected: 12/20/18 10:45

Client ID: B567S05NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab						
Cl6-BZ#138	1.54		ug/kg	0.933	0.466	1
Cl6-BZ#153	2.69		ug/kg	0.933	0.466	1
Cl7-BZ#170	ND		ug/kg	0.933	0.466	1
Cl7-BZ#180	1.92		ug/kg	0.933	0.466	1
Cl7-BZ#183	0.527	J	ug/kg	0.933	0.466	1
Cl7-BZ#184	ND		ug/kg	0.933	0.466	1
Cl7-BZ#187	1.08		ug/kg	0.933	0.466	1
Cl8-BZ#195	ND		ug/kg	0.933	0.466	1
Cl9-BZ#206	ND		ug/kg	0.933	0.466	1
Cl10-BZ#209	ND		ug/kg	0.933	0.466	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	81		30-150
Pyrene-d10	99		30-150
Benzo(b)fluoranthene-d12	90		30-150
DBOB	101		30-150
BZ 198	84		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 17:51
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194727-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 17:51
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:33
Cleanup Method: EPA 3611B
Cleanup Date: 01/08/19

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194727-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	45		30-150
Pyrene-d10	60		30-150
Benzo(b)fluoranthene-d12	57		30-150
DBOB	53		30-150
BZ 198	49		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 17:17
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1194731-1					
Naphthalene	ND		ug/kg	10.0	5.00
Acenaphthylene	ND		ug/kg	10.0	5.00
Acenaphthene	ND		ug/kg	10.0	5.00
Fluorene	ND		ug/kg	10.0	5.00
Phenanthrene	ND		ug/kg	10.0	5.00
Anthracene	ND		ug/kg	10.0	5.00
Fluoranthene	ND		ug/kg	10.0	5.00
Pyrene	ND		ug/kg	10.0	5.00
Benz(a)anthracene	ND		ug/kg	10.0	5.00
Chrysene	ND		ug/kg	10.0	5.00
Benzo(b)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(k)fluoranthene	ND		ug/kg	10.0	5.00
Benzo(a)pyrene	ND		ug/kg	10.0	5.00
Indeno(1,2,3-cd)Pyrene	ND		ug/kg	10.0	5.00
Dibenz(a,h)anthracene	ND		ug/kg	10.0	5.00
Benzo(ghi)perylene	ND		ug/kg	10.0	5.00
Cl2-BZ#8	ND		ug/kg	1.00	0.500
Cl3-BZ#18	ND		ug/kg	1.00	0.500
Cl3-BZ#28	ND		ug/kg	1.00	0.500
Cl4-BZ#44	ND		ug/kg	1.00	0.500
Cl4-BZ#49	ND		ug/kg	1.00	0.500
Cl4-BZ#52	ND		ug/kg	1.00	0.500
Cl4-BZ#66	ND		ug/kg	1.00	0.500
Cl5-BZ#87	ND		ug/kg	1.00	0.500
Cl5-BZ#101	ND		ug/kg	1.00	0.500
Cl5-BZ#105	ND		ug/kg	1.00	0.500
Cl5-BZ#118	ND		ug/kg	1.00	0.500
Cl6-BZ#128	ND		ug/kg	1.00	0.500
Cl6-BZ#138	ND		ug/kg	1.00	0.500

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 105,8270D-SIM/680(M)
Analytical Date: 01/23/19 17:17
Analyst: GP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3611B
Cleanup Date: 01/09/18

Parameter	Result	Qualifier	Units	RL	MDL
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab for sample(s): 21-40 Batch: WG1194731-1					
Cl6-BZ#153	ND		ug/kg	1.00	0.500
Cl7-BZ#170	ND		ug/kg	1.00	0.500
Cl7-BZ#180	ND		ug/kg	1.00	0.500
Cl7-BZ#183	ND		ug/kg	1.00	0.500
Cl7-BZ#184	ND		ug/kg	1.00	0.500
Cl7-BZ#187	ND		ug/kg	1.00	0.500
Cl8-BZ#195	ND		ug/kg	1.00	0.500
Cl9-BZ#206	ND		ug/kg	1.00	0.500
Cl10-BZ#209	ND		ug/kg	1.00	0.500

Surrogate	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	61		30-150
Pyrene-d10	71		30-150
Benzo(b)fluoranthene-d12	69		30-150
DBOB	79		30-150
BZ 198	63		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194727-2 WG1194727-3								
Naphthalene	69		70		50-120	1		30
Acenaphthylene	71		73		50-120	3		30
Acenaphthene	70		72		50-120	3		30
Fluorene	72		75		50-120	4		30
Phenanthrene	69		74		50-120	7		30
Anthracene	75		80		50-120	6		30
Fluoranthene	68		81		50-120	17		30
Pyrene	68		77		50-120	12		30
Benz(a)anthracene	75		89		50-120	17		30
Chrysene	74		86		50-120	15		30
Benzo(b)fluoranthene	63		80		50-120	24		30
Benzo(k)fluoranthene	73		84		50-120	14		30
Benzo(a)pyrene	71		85		50-120	18		30
Indeno(1,2,3-cd)Pyrene	69		80		50-120	15		30
Dibenz(a,h)anthracene	73		86		50-120	16		30
Benzo(ghi)perylene	71		84		50-120	17		30
Cl2-BZ#8	59		59		50-120	0		30
Cl3-BZ#18	55		57		50-120	4		30
Cl3-BZ#28	57		60		50-120	5		30
Cl4-BZ#44	60		64		50-120	6		30
Cl4-BZ#49	59		64		50-120	8		30
Cl4-BZ#52	55		58		50-120	5		30
Cl4-BZ#66	60		65		50-120	8		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194727-2 WG1194727-3								
Cl5-BZ#87	61		67		50-120	9		30
Cl5-BZ#101	62		68		50-120	9		30
Cl5-BZ#105	64		72		50-120	12		30
Cl5-BZ#118	58		64		50-120	10		30
Cl6-BZ#128	63		70		50-120	11		30
Cl6-BZ#138	63		71		50-120	12		30
Cl6-BZ#153	63		71		50-120	12		30
Cl7-BZ#170	67		75		50-120	11		30
Cl7-BZ#180	62		69		50-120	11		30
Cl7-BZ#183	60		68		50-120	13		30
Cl7-BZ#184	61		69		50-120	12		30
Cl7-BZ#187	60		68		50-120	13		30
Cl8-BZ#195	66		74		50-120	11		30
Cl9-BZ#206	62		70		50-120	12		30
Cl10-BZ#209	68		76		50-120	11		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	74		75		30-150
Pyrene-d10	77		86		30-150
Benzo(b)fluoranthene-d12	71		85		30-150
DBOB	81		89		30-150
BZ 198	64		71		30-150

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194731-2 WG1194731-3								
Naphthalene	72		70		50-120	3		30
Acenaphthylene	76		76		50-120	0		30
Acenaphthene	74		75		50-120	1		30
Fluorene	78		77		50-120	1		30
Phenanthrene	77		77		50-120	0		30
Anthracene	87		86		50-120	1		30
Fluoranthene	78		78		50-120	0		30
Pyrene	81		81		50-120	0		30
Benz(a)anthracene	92		92		50-120	0		30
Chrysene	90		88		50-120	2		30
Benzo(b)fluoranthene	87		79		50-120	10		30
Benzo(k)fluoranthene	81		85		50-120	5		30
Benzo(a)pyrene	87		87		50-120	0		30
Indeno(1,2,3-cd)Pyrene	88		93		50-120	6		30
Dibenz(a,h)anthracene	89		97		50-120	9		30
Benzo(ghi)perylene	87		89		50-120	2		30
Cl2-BZ#8	64		68		50-120	6		30
Cl3-BZ#18	63		65		50-120	3		30
Cl3-BZ#28	68		69		50-120	1		30
Cl4-BZ#44	73		74		50-120	1		30
Cl4-BZ#49	72		73		50-120	1		30
Cl4-BZ#52	66		69		50-120	4		30
Cl4-BZ#66	72		74		50-120	3		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194731-2 WG1194731-3								
Cl5-BZ#87	74		76		50-120	3		30
Cl5-BZ#101	75		77		50-120	3		30
Cl5-BZ#105	79		80		50-120	1		30
Cl5-BZ#118	71		71		50-120	0		30
Cl6-BZ#128	78		80		50-120	3		30
Cl6-BZ#138	78		79		50-120	1		30
Cl6-BZ#153	78		78		50-120	0		30
Cl7-BZ#170	84		83		50-120	1		30
Cl7-BZ#180	77		75		50-120	3		30
Cl7-BZ#183	75		75		50-120	0		30
Cl7-BZ#184	76		76		50-120	0		30
Cl7-BZ#187	75		75		50-120	0		30
Cl8-BZ#195	82		79		50-120	4		30
Cl9-BZ#206	77		76		50-120	1		30
Cl10-BZ#209	83		86		50-120	4		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
2-Methylnaphthalene-d10	77		75		30-150
Pyrene-d10	89		88		30-150
Benzo(b)fluoranthene-d12	86		83		30-150
DBOB	95		87		30-150
BZ 198	77		76		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194727-4 WG1194727-5 QC Sample: L1853059-01 Client ID: B567PRENVA												
Naphthalene	ND	489	340	70		364	73		50-120	7		30
Acenaphthylene	ND	489	346	71		362	73		50-120	5		30
Acenaphthene	ND	489	336	69		355	72		50-120	5		30
Fluorene	ND	489	347	71		367	74		50-120	6		30
Phenanthrene	5.45J	489	384	79		383	77		50-120	0		30
Anthracene	ND	489	335	69		357	72		50-120	6		30
Fluoranthene	5.49J	489	373	76		382	77		50-120	2		30
Pyrene	4.94J	489	337	69		343	69		50-120	2		30
Benz(a)anthracene	ND	489	429	88		449	91		50-120	5		30
Chrysene	ND	489	318	65		312	63		50-120	2		30
Benzo(b)fluoranthene	ND	489	380	78		407	82		50-120	7		30
Benzo(k)fluoranthene	ND	489	304	62		283	57		50-120	7		30
Benzo(a)pyrene	ND	489	349	71		343	69		50-120	2		30
Indeno(1,2,3-cd)Pyrene	ND	489	459	94		463	93		50-120	1		30
Dibenz(a,h)anthracene	ND	489	383	78		390	79		50-120	2		30
Benzo(ghi)perylene	ND	489	366	75		365	74		50-120	0		30
Cl2-BZ#8	ND	97.8	55.9	57		60.0	61		50-120	7		30
Cl3-BZ#18	ND	97.8	109	111		191	**193**	Q	50-120	**55**	Q	30
Cl3-BZ#28	ND	97.8	55.8	57		59.3	60		50-120	6		30
Cl4-BZ#44	ND	97.8	58.5	60		61.4	62		50-120	5		30
Cl4-BZ#49	ND	97.8	48.3	**49**	Q	49.2	**50**		50-120	2		30
Cl4-BZ#52	ND	97.8	60.5	62		66.0	67		50-120	9		30
Cl4-BZ#66	ND	97.8	57.4	59		60.9	61		50-120	6		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194727-4 WG1194727-5 QC Sample: L1853059-01 Client ID: B567PRENVA												
Cl5-BZ#87	ND	97.8	59.4	61		61.7	62		50-120	4		30
Cl5-BZ#101	0.496J	97.8	60.7	62		63.4	64		50-120	4		30
Cl5-BZ#105	ND	97.8	56.8	58		60.5	61		50-120	6		30
Cl5-BZ#118	ND	97.8	55.7	57		58.4	59		50-120	5		30
Cl6-BZ#128	ND	97.8	62.3	64		63.7	64		50-120	2		30
Cl6-BZ#138	1.80	97.8	63.0	63		65.6	64		50-120	4		30
Cl6-BZ#153	2.56	97.8	65.0	64		67.4	65		50-120	4		30
Cl7-BZ#170	0.882J	97.8	65.9	67		67.8	68		50-120	3		30
Cl7-BZ#180	2.51	97.8	63.2	62		65.8	64		50-120	4		30
Cl7-BZ#183	0.832J	97.8	51.1	52		51.5	52		50-120	1		30
Cl7-BZ#184	ND	97.8	58.8	60		60.7	61		50-120	3		30
Cl7-BZ#187	2.09	97.8	67.6	67		72.0	71		50-120	6		30
Cl8-BZ#195	ND	97.8	61.7	63		63.6	64		50-120	3		30
Cl9-BZ#206	ND	97.8	57.4	59		60.0	61		50-120	4		30
Cl10-BZ#209	ND	97.8	62.9	64		66.4	67		50-120	5		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		76		30-150
BZ 198	67		70		30-150
Benzo(b)fluoranthene-d12	72		72		30-150
DBOB	78		84		30-150
Pyrene-d10	76		76		30-150

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194731-4 WG1194731-5 QC Sample: L1853059-21 Client ID: B567S02NVA												
Naphthalene	ND	496	347	70		298	67		50-120	15		30
Acenaphthylene	ND	496	363	73		316	71		50-120	14		30
Acenaphthene	ND	496	364	73		316	71		50-120	14		30
Fluorene	ND	496	380	77		329	74		50-120	14		30
Phenanthrene	ND	496	386	78		328	74		50-120	16		30
Anthracene	ND	496	401	81		340	76		50-120	16		30
Fluoranthene	10.0	496	414	81		359	79		50-120	14		30
Pyrene	7.18J	496	367	74		321	72		50-120	13		30
Benz(a)anthracene	ND	496	440	89		390	88		50-120	12		30
Chrysene	ND	496	370	75		307	69		50-120	19		30
Benzo(b)fluoranthene	ND	496	411	83		328	74		50-120	22		30
Benzo(k)fluoranthene	ND	496	349	70		316	71		50-120	10		30
Benzo(a)pyrene	ND	496	382	77		320	72		50-120	18		30
Indeno(1,2,3-cd)Pyrene	ND	496	434	88		352	79		50-120	21		30
Dibenz(a,h)anthracene	ND	496	402	81		343	77		50-120	16		30
Benzo(ghi)perylene	ND	496	388	78		331	74		50-120	16		30
Cl2-BZ#8	ND	99.2	62.7	63		55.0	62		50-120	13		30
Cl3-BZ#18	ND	99.2	74.1	75		65.4	74		50-120	12		30
Cl3-BZ#28	ND	99.2	64.2	65		57.0	64		50-120	12		30
Cl4-BZ#44	ND	99.2	65.6	66		59.8	67		50-120	9		30
Cl4-BZ#49	ND	99.2	59.3	60		52.7	59		50-120	12		30
Cl4-BZ#52	0.594J	99.2	63.6	64		58.8	66		50-120	8		30
Cl4-BZ#66	ND	99.2	63.5	64		56.7	64		50-120	11		30

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194731-4 WG1194731-5 QC Sample: L1853059-21 Client ID: B567S02NVA												
Cl5-BZ#87	ND	99.2	67.8	68		60.1	68		50-120	12		30
Cl5-BZ#101	0.633J	99.2	69.7	70		61.8	70		50-120	12		30
Cl5-BZ#105	0.585J	99.2	67.7	68		57.8	65		50-120	16		30
Cl5-BZ#118	ND	99.2	64.2	65		55.8	63		50-120	14		30
Cl6-BZ#128	ND	99.2	70.5	71		60.9	69		50-120	15		30
Cl6-BZ#138	3.44	99.2	74.5	72		64.2	68		50-120	15		30
Cl6-BZ#153	5.83	99.2	77.3	72		68.1	70		50-120	13		30
Cl7-BZ#170	2.28	99.2	79.4	78		66.0	72		50-120	18		30
Cl7-BZ#180	5.56	99.2	75.0	70		63.8	66		50-120	16		30
Cl7-BZ#183	1.70	99.2	61.6	60		53.7	58		50-120	14		30
Cl7-BZ#184	ND	99.2	67.5	68		59.0	66		50-120	13		30
Cl7-BZ#187	3.81	99.2	76.9	74		65.5	69		50-120	16		30
Cl8-BZ#195	0.693J	99.2	74.0	75		61.7	69		50-120	18		30
Cl9-BZ#206	ND	99.2	68.0	69		56.2	63		50-120	19		30
Cl10-BZ#209	ND	99.2	74.2	75		62.8	71		50-120	17		30

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	73		71		30-150
BZ 198	77		71		30-150
Benzo(b)fluoranthene-d12	78		74		30-150
DBOB	86		84		30-150
Pyrene-d10	80		78		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194727-6 QC Sample: L1853059-02 Client ID: B567PRENVB						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	ND	ND	ug/kg	NC		30
Pyrene	ND	ND	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194727-6 QC Sample: L1853059-02 Client ID: B567PRENVB						
Cl4-BZ#52	ND	ND	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	ND	0.574J	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	2.28	2.64	ug/kg	15		30
Cl6-BZ#153	2.58	3.56	ug/kg	**32**	Q	30
Cl7-BZ#170	1.01	1.18	ug/kg	16		30
Cl7-BZ#180	2.70	3.83	ug/kg	**35**	Q	30
Cl7-BZ#183	0.880J	1.03	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	1.79	2.67	ug/kg	**39**	Q	30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	72		82		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194727-6 QC Sample: L1853059-02 Client ID: B567PRENVB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	76		85		30-150
Benzo(b)fluoranthene-d12	69		79		30-150
DBOB	84		97		30-150
BZ 198	65		70		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194731-6 QC Sample: L1853059-22 Client ID: B567S02NVB						
Naphthalene	ND	ND	ug/kg	NC		30
Acenaphthylene	ND	ND	ug/kg	NC		30
Acenaphthene	ND	ND	ug/kg	NC		30
Fluorene	ND	ND	ug/kg	NC		30
Phenanthrene	ND	ND	ug/kg	NC		30
Anthracene	ND	ND	ug/kg	NC		30
Fluoranthene	8.77J	8.17J	ug/kg	NC		30
Pyrene	6.21J	5.98J	ug/kg	NC		30
Benz(a)anthracene	ND	ND	ug/kg	NC		30
Chrysene	ND	ND	ug/kg	NC		30
Benzo(b)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(k)fluoranthene	ND	ND	ug/kg	NC		30
Benzo(a)pyrene	ND	ND	ug/kg	NC		30
Indeno(1,2,3-cd)Pyrene	ND	ND	ug/kg	NC		30
Dibenz(a,h)anthracene	ND	ND	ug/kg	NC		30
Benzo(ghi)perylene	ND	ND	ug/kg	NC		30
Cl2-BZ#8	ND	ND	ug/kg	NC		30
Cl3-BZ#18	ND	ND	ug/kg	NC		30
Cl3-BZ#28	ND	ND	ug/kg	NC		30
Cl4-BZ#44	ND	ND	ug/kg	NC		30
Cl4-BZ#49	ND	ND	ug/kg	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194731-6 QC Sample: L1853059-22 Client ID: B567S02NVB						
Cl4-BZ#52	ND	0.464J	ug/kg	NC		30
Cl4-BZ#66	ND	ND	ug/kg	NC		30
Cl5-BZ#87	ND	ND	ug/kg	NC		30
Cl5-BZ#101	0.566J	0.591J	ug/kg	NC		30
Cl5-BZ#105	ND	ND	ug/kg	NC		30
Cl5-BZ#118	ND	ND	ug/kg	NC		30
Cl6-BZ#128	ND	ND	ug/kg	NC		30
Cl6-BZ#138	1.88	1.86	ug/kg	1		30
Cl6-BZ#153	3.15	3.08	ug/kg	2		30
Cl7-BZ#170	1.13	1.23	ug/kg	8		30
Cl7-BZ#180	2.76	3.10	ug/kg	12		30
Cl7-BZ#183	0.758J	1.03	ug/kg	NC		30
Cl7-BZ#184	ND	ND	ug/kg	NC		30
Cl7-BZ#187	2.04	2.30	ug/kg	12		30
Cl8-BZ#195	ND	ND	ug/kg	NC		30
Cl9-BZ#206	ND	ND	ug/kg	NC		30
Cl10-BZ#209	ND	ND	ug/kg	NC		30

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
2-Methylnaphthalene-d10	62		65		30-150

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM PAHs/PCB Congeners by GC/MS - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194731-6 QC Sample: L1853059-22 Client ID: B567S02NVB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Pyrene-d10	72		76		30-150
Benzo(b)fluoranthene-d12	74		70		30-150
DBOB	78		82		30-150
BZ 198	63		66		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194727-7

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	65		40-140
Fluoranthene	68		40-140
Pyrene	70		40-140
Chrysene	60		40-140
Cl3-BZ#28	40		40-140
Cl4-BZ#44	76		40-140
Cl4-BZ#49	68		40-140
Cl4-BZ#52	71		40-140
Cl4-BZ#66	81		40-140
Cl5-BZ#87	49		40-140
Cl5-BZ#101	43		40-140
Cl5-BZ#105	78		40-140
Cl5-BZ#118	73		40-140
Cl6-BZ#138	86		40-140
Cl6-BZ#153	54		40-140
Cl7-BZ#187	44		40-140
2-Methylnaphthalene-d10 (Surrogate)	67		75-125
Pyrene-d10 (Surrogate)	71		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	66		75-125
DBOB (Surrogate)	84		75-125
BZ 198 (Surrogate)	60		75-125

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194731-7

Parameter	% Recovery	Qual	QC Criteria
Phenanthrene	62		40-140
Fluoranthene	65		40-140
Pyrene	67		40-140
Chrysene	58		40-140
Cl3-BZ#28	35	Q	40-140
Cl4-BZ#44	79		40-140
Cl4-BZ#49	59		40-140
Cl4-BZ#52	67		40-140
Cl4-BZ#66	79		40-140
Cl5-BZ#87	46		40-140
Cl5-BZ#101	42		40-140
Cl5-BZ#105	69		40-140
Cl5-BZ#118	57		40-140
Cl6-BZ#138	83		40-140
Cl6-BZ#153	51		40-140
Cl7-BZ#187	40		40-140
2-Methylnaphthalene-d10 (Surrogate)	63		75-125
Pyrene-d10 (Surrogate)	72		75-125
Benzo(b)fluoranthene-d12 (Surrogate)	71		75-125
DBOB (Surrogate)	82		75-125
BZ 198 (Surrogate)	60		75-125

PESTICIDES

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-01
Client ID: B567PRENVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 19:38
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.949	0.949	1	A
gamma-BHC	ND		ug/kg	0.474	0.474	1	A
Heptachlor	ND		ug/kg	0.474	0.474	1	A
Aldrin	ND		ug/kg	0.474	0.474	1	A
Heptachlor epoxide	ND		ug/kg	0.949	0.949	1	B
Oxychlordane	ND		ug/kg	0.949	0.949	1	B
trans-Chlordane	ND		ug/kg	0.474	0.474	1	A
Endosulfan I	ND		ug/kg	0.474	0.474	1	A
cis-Chlordane	ND		ug/kg	0.474	0.474	1	A
trans-Nonachlor	ND		ug/kg	0.474	0.474	1	B
4,4'-DDE	ND		ug/kg	0.474	0.474	1	A
Dieldrin	ND		ug/kg	0.474	0.474	1	A
Endrin	ND		ug/kg	0.474	0.474	1	A
Endosulfan II	ND		ug/kg	0.474	0.474	1	A
4,4'-DDD	ND		ug/kg	0.474	0.474	1	A
cis-Nonachlor	ND		ug/kg	0.474	0.474	1	A
4,4'-DDT	ND		ug/kg	0.474	0.474	1	A
Methoxychlor	ND		ug/kg	1.90	1.90	1	A
Toxaphene	ND		ug/kg	23.8	23.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	73		30-150	B
BZ 198	75		30-150	B
DBOB	119		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-02
Client ID: B567PRENVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 21:20
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.942	0.942	1	A
gamma-BHC	ND		ug/kg	0.471	0.471	1	A
Heptachlor	ND		ug/kg	0.471	0.471	1	A
Aldrin	ND		ug/kg	0.471	0.471	1	A
Heptachlor epoxide	ND		ug/kg	0.942	0.942	1	B
Oxychlordane	ND		ug/kg	0.942	0.942	1	B
trans-Chlordane	ND		ug/kg	0.471	0.471	1	A
Endosulfan I	ND		ug/kg	0.471	0.471	1	A
cis-Chlordane	ND		ug/kg	0.471	0.471	1	A
trans-Nonachlor	ND		ug/kg	0.471	0.471	1	B
4,4'-DDE	ND		ug/kg	0.471	0.471	1	A
Dieldrin	ND		ug/kg	0.471	0.471	1	A
Endrin	ND		ug/kg	0.471	0.471	1	A
Endosulfan II	ND		ug/kg	0.471	0.471	1	A
4,4'-DDD	ND		ug/kg	0.471	0.471	1	A
cis-Nonachlor	ND		ug/kg	0.471	0.471	1	A
4,4'-DDT	ND		ug/kg	0.471	0.471	1	A
Methoxychlor	ND		ug/kg	1.88	1.88	1	A
Toxaphene	ND		ug/kg	23.6	23.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	74		30-150	B
BZ 198	84		30-150	B
DBOB	120		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-03
Client ID: B567PRENVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 22:28
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.928	0.928	1	A
gamma-BHC	ND		ug/kg	0.464	0.464	1	A
Heptachlor	ND		ug/kg	0.464	0.464	1	A
Aldrin	ND		ug/kg	0.464	0.464	1	A
Heptachlor epoxide	ND		ug/kg	0.928	0.928	1	B
Oxychlordane	ND		ug/kg	0.928	0.928	1	B
trans-Chlordane	ND		ug/kg	0.464	0.464	1	A
Endosulfan I	ND		ug/kg	0.464	0.464	1	A
cis-Chlordane	ND		ug/kg	0.464	0.464	1	A
trans-Nonachlor	ND		ug/kg	0.464	0.464	1	B
4,4'-DDE	ND		ug/kg	0.464	0.464	1	A
Dieldrin	ND		ug/kg	0.464	0.464	1	A
Endrin	ND		ug/kg	0.464	0.464	1	A
Endosulfan II	ND		ug/kg	0.464	0.464	1	A
4,4'-DDD	ND		ug/kg	0.464	0.464	1	A
cis-Nonachlor	ND		ug/kg	0.464	0.464	1	A
4,4'-DDT	ND		ug/kg	0.464	0.464	1	A
Methoxychlor	ND		ug/kg	1.86	1.86	1	A
Toxaphene	ND		ug/kg	23.3	23.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		30-150	B
BZ 198	86		30-150	B
DBOB	120		30-150	A
BZ 198	75		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-11
Client ID: B567R01NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 23:02
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.911	0.911	1	A
gamma-BHC	ND		ug/kg	0.455	0.455	1	A
Heptachlor	ND		ug/kg	0.455	0.455	1	A
Aldrin	ND		ug/kg	0.455	0.455	1	A
Heptachlor epoxide	ND		ug/kg	0.911	0.911	1	B
Oxychlordane	ND		ug/kg	0.911	0.911	1	B
trans-Chlordane	ND		ug/kg	0.455	0.455	1	A
Endosulfan I	ND		ug/kg	0.455	0.455	1	A
cis-Chlordane	ND		ug/kg	0.455	0.455	1	A
trans-Nonachlor	ND		ug/kg	0.455	0.455	1	B
4,4'-DDE	ND		ug/kg	0.455	0.455	1	B
Dieldrin	ND		ug/kg	0.455	0.455	1	A
Endrin	ND		ug/kg	0.455	0.455	1	A
Endosulfan II	ND		ug/kg	0.455	0.455	1	A
4,4'-DDD	ND		ug/kg	0.455	0.455	1	A
cis-Nonachlor	ND		ug/kg	0.455	0.455	1	A
4,4'-DDT	ND		ug/kg	0.455	0.455	1	A
Methoxychlor	ND		ug/kg	1.82	1.82	1	A
Toxaphene	ND		ug/kg	22.8	22.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	80		30-150	B
BZ 198	81		30-150	B
DBOB	87		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-12
Client ID: B567R01NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 23:36
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.859	0.859	1	A
gamma-BHC	ND		ug/kg	0.430	0.430	1	A
Heptachlor	ND		ug/kg	0.430	0.430	1	A
Aldrin	ND		ug/kg	0.430	0.430	1	A
Heptachlor epoxide	ND		ug/kg	0.859	0.859	1	B
Oxychlordane	ND		ug/kg	0.859	0.859	1	B
trans-Chlordane	ND		ug/kg	0.430	0.430	1	A
Endosulfan I	ND		ug/kg	0.430	0.430	1	A
cis-Chlordane	ND		ug/kg	0.430	0.430	1	A
trans-Nonachlor	ND		ug/kg	0.430	0.430	1	B
4,4'-DDE	ND		ug/kg	0.430	0.430	1	B
Dieldrin	ND		ug/kg	0.430	0.430	1	A
Endrin	ND		ug/kg	0.430	0.430	1	A
Endosulfan II	ND		ug/kg	0.430	0.430	1	A
4,4'-DDD	ND		ug/kg	0.430	0.430	1	A
cis-Nonachlor	ND		ug/kg	0.430	0.430	1	A
4,4'-DDT	ND		ug/kg	0.430	0.430	1	A
Methoxychlor	ND		ug/kg	1.72	1.72	1	A
Toxaphene	ND		ug/kg	21.6	21.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	B
BZ 198	73		30-150	B
DBOB	80		30-150	A
BZ 198	62		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-13
Client ID: B567R01NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 00:10
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.945	0.945	1	A
gamma-BHC	ND		ug/kg	0.472	0.472	1	A
Heptachlor	ND		ug/kg	0.472	0.472	1	A
Aldrin	ND		ug/kg	0.472	0.472	1	A
Heptachlor epoxide	ND		ug/kg	0.945	0.945	1	B
Oxychlordane	ND		ug/kg	0.945	0.945	1	B
trans-Chlordane	ND		ug/kg	0.472	0.472	1	A
Endosulfan I	ND		ug/kg	0.472	0.472	1	A
cis-Chlordane	ND		ug/kg	0.472	0.472	1	A
trans-Nonachlor	ND		ug/kg	0.472	0.472	1	B
4,4'-DDE	ND		ug/kg	0.472	0.472	1	A
Dieldrin	ND		ug/kg	0.472	0.472	1	A
Endrin	ND		ug/kg	0.472	0.472	1	A
Endosulfan II	ND		ug/kg	0.472	0.472	1	A
4,4'-DDD	ND		ug/kg	0.472	0.472	1	A
cis-Nonachlor	ND		ug/kg	0.472	0.472	1	A
4,4'-DDT	ND		ug/kg	0.472	0.472	1	A
Methoxychlor	ND		ug/kg	1.89	1.89	1	A
Toxaphene	ND		ug/kg	23.7	23.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	66		30-150	B
BZ 198	75		30-150	B
DBOB	69		30-150	A
BZ 198	64		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-14
Client ID: B567R01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 00:44
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.947	0.947	1	A
gamma-BHC	ND		ug/kg	0.473	0.473	1	A
Heptachlor	ND		ug/kg	0.473	0.473	1	A
Aldrin	ND		ug/kg	0.473	0.473	1	A
Heptachlor epoxide	ND		ug/kg	0.947	0.947	1	B
Oxychlordane	ND		ug/kg	0.947	0.947	1	B
trans-Chlordane	ND		ug/kg	0.473	0.473	1	A
Endosulfan I	ND		ug/kg	0.473	0.473	1	A
cis-Chlordane	ND		ug/kg	0.473	0.473	1	A
trans-Nonachlor	ND		ug/kg	0.473	0.473	1	B
4,4'-DDE	ND		ug/kg	0.473	0.473	1	B
Dieldrin	ND		ug/kg	0.473	0.473	1	A
Endrin	ND		ug/kg	0.473	0.473	1	A
Endosulfan II	ND		ug/kg	0.473	0.473	1	A
4,4'-DDD	ND		ug/kg	0.473	0.473	1	A
cis-Nonachlor	ND		ug/kg	0.473	0.473	1	A
4,4'-DDT	ND		ug/kg	0.473	0.473	1	A
Methoxychlor	ND		ug/kg	1.89	1.89	1	A
Toxaphene	ND		ug/kg	23.8	23.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	B
BZ 198	75		30-150	B
DBOB	71		30-150	A
BZ 198	59		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-15
Client ID: B567R01NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 01:18
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.943	0.943	1	A
gamma-BHC	ND		ug/kg	0.472	0.472	1	A
Heptachlor	ND		ug/kg	0.472	0.472	1	A
Aldrin	ND		ug/kg	0.472	0.472	1	A
Heptachlor epoxide	ND		ug/kg	0.943	0.943	1	B
Oxychlordane	ND		ug/kg	0.943	0.943	1	B
trans-Chlordane	ND		ug/kg	0.472	0.472	1	A
Endosulfan I	ND		ug/kg	0.472	0.472	1	A
cis-Chlordane	ND		ug/kg	0.472	0.472	1	A
trans-Nonachlor	ND		ug/kg	0.472	0.472	1	B
4,4'-DDE	ND		ug/kg	0.472	0.472	1	B
Dieldrin	ND		ug/kg	0.472	0.472	1	A
Endrin	ND		ug/kg	0.472	0.472	1	A
Endosulfan II	ND		ug/kg	0.472	0.472	1	A
4,4'-DDD	ND		ug/kg	0.472	0.472	1	A
cis-Nonachlor	ND		ug/kg	0.472	0.472	1	A
4,4'-DDT	ND		ug/kg	0.472	0.472	1	A
Methoxychlor	ND		ug/kg	1.89	1.89	1	A
Toxaphene	ND		ug/kg	23.7	23.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	B
BZ 198	63		30-150	B
DBOB	78		30-150	A
BZ 198	58		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-16
Client ID: B567S01NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 01:51
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:31
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.865	0.865	1	A
gamma-BHC	ND		ug/kg	0.432	0.432	1	A
Heptachlor	ND		ug/kg	0.432	0.432	1	A
Aldrin	ND		ug/kg	0.432	0.432	1	A
Heptachlor epoxide	ND		ug/kg	0.865	0.865	1	B
Oxychlordane	ND		ug/kg	0.865	0.865	1	B
trans-Chlordane	ND		ug/kg	0.432	0.432	1	A
Endosulfan I	ND		ug/kg	0.432	0.432	1	A
cis-Chlordane	ND		ug/kg	0.432	0.432	1	A
trans-Nonachlor	ND		ug/kg	0.432	0.432	1	B
4,4'-DDE	ND		ug/kg	0.432	0.432	1	A
Dieldrin	ND		ug/kg	0.432	0.432	1	A
Endrin	ND		ug/kg	0.432	0.432	1	A
Endosulfan II	ND		ug/kg	0.432	0.432	1	A
4,4'-DDD	ND		ug/kg	0.432	0.432	1	A
cis-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDT	ND		ug/kg	0.432	0.432	1	A
Methoxychlor	ND		ug/kg	1.73	1.73	1	A
Toxaphene	ND		ug/kg	21.7	21.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	B
BZ 198	106		30-150	B
DBOB	78		30-150	A
BZ 198	66		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-17
Client ID: B567S01NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 02:25
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:31
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.877	0.877	1	A
gamma-BHC	ND		ug/kg	0.438	0.438	1	A
Heptachlor	ND		ug/kg	0.438	0.438	1	A
Aldrin	ND		ug/kg	0.438	0.438	1	A
Heptachlor epoxide	ND		ug/kg	0.877	0.877	1	B
Oxychlordane	ND		ug/kg	0.877	0.877	1	B
trans-Chlordane	ND		ug/kg	0.438	0.438	1	A
Endosulfan I	ND		ug/kg	0.438	0.438	1	A
cis-Chlordane	ND		ug/kg	0.438	0.438	1	A
trans-Nonachlor	ND		ug/kg	0.438	0.438	1	B
4,4'-DDE	ND		ug/kg	0.438	0.438	1	A
Dieldrin	ND		ug/kg	0.438	0.438	1	A
Endrin	ND		ug/kg	0.438	0.438	1	A
Endosulfan II	ND		ug/kg	0.438	0.438	1	A
4,4'-DDD	ND		ug/kg	0.438	0.438	1	A
cis-Nonachlor	ND		ug/kg	0.438	0.438	1	A
4,4'-DDT	1.22	IP	ug/kg	0.438	0.438	1	A
Methoxychlor	ND		ug/kg	1.75	1.75	1	A
Toxaphene	ND		ug/kg	22.0	22.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	70		30-150	B
BZ 198	74		30-150	B
DBOB	75		30-150	A
BZ 198	62		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-18
Client ID: B567S01NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 02:59
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:31
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.988	0.988	1	A
gamma-BHC	ND		ug/kg	0.494	0.494	1	A
Heptachlor	ND		ug/kg	0.494	0.494	1	A
Aldrin	ND		ug/kg	0.494	0.494	1	A
Heptachlor epoxide	ND		ug/kg	0.988	0.988	1	B
Oxychlordane	ND		ug/kg	0.988	0.988	1	B
trans-Chlordane	ND		ug/kg	0.494	0.494	1	A
Endosulfan I	ND		ug/kg	0.494	0.494	1	A
cis-Chlordane	ND		ug/kg	0.494	0.494	1	A
trans-Nonachlor	ND		ug/kg	0.494	0.494	1	B
4,4'-DDE	ND		ug/kg	0.494	0.494	1	B
Dieldrin	ND		ug/kg	0.494	0.494	1	A
Endrin	ND		ug/kg	0.494	0.494	1	A
Endosulfan II	ND		ug/kg	0.494	0.494	1	A
4,4'-DDD	ND		ug/kg	0.494	0.494	1	A
cis-Nonachlor	ND		ug/kg	0.494	0.494	1	A
4,4'-DDT	ND		ug/kg	0.494	0.494	1	A
Methoxychlor	ND		ug/kg	1.98	1.98	1	A
Toxaphene	ND		ug/kg	24.8	24.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	76		30-150	B
BZ 198	77		30-150	B
DBOB	79		30-150	A
BZ 198	64		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-19
Client ID: B567S01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 03:33
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:31
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.865	0.865	1	A
gamma-BHC	ND		ug/kg	0.432	0.432	1	A
Heptachlor	ND		ug/kg	0.432	0.432	1	A
Aldrin	ND		ug/kg	0.432	0.432	1	A
Heptachlor epoxide	ND		ug/kg	0.865	0.865	1	B
Oxychlordane	ND		ug/kg	0.865	0.865	1	B
trans-Chlordane	ND		ug/kg	0.432	0.432	1	A
Endosulfan I	ND		ug/kg	0.432	0.432	1	A
cis-Chlordane	ND		ug/kg	0.432	0.432	1	A
trans-Nonachlor	ND		ug/kg	0.432	0.432	1	B
4,4'-DDE	ND		ug/kg	0.432	0.432	1	A
Dieldrin	ND		ug/kg	0.432	0.432	1	A
Endrin	ND		ug/kg	0.432	0.432	1	A
Endosulfan II	ND		ug/kg	0.432	0.432	1	A
4,4'-DDD	ND		ug/kg	0.432	0.432	1	A
cis-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDT	ND		ug/kg	0.432	0.432	1	A
Methoxychlor	ND		ug/kg	1.73	1.73	1	A
Toxaphene	ND		ug/kg	21.7	21.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	77		30-150	B
BZ 198	75		30-150	B
DBOB	81		30-150	A
BZ 198	65		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-20
Client ID: B567S01NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 04:07
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 10:31
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.976	0.976	1	A
gamma-BHC	ND		ug/kg	0.488	0.488	1	A
Heptachlor	ND		ug/kg	0.488	0.488	1	A
Aldrin	ND		ug/kg	0.488	0.488	1	A
Heptachlor epoxide	ND		ug/kg	0.976	0.976	1	B
Oxychlordane	ND		ug/kg	0.976	0.976	1	B
trans-Chlordane	ND		ug/kg	0.488	0.488	1	A
Endosulfan I	ND		ug/kg	0.488	0.488	1	A
cis-Chlordane	ND		ug/kg	0.488	0.488	1	A
trans-Nonachlor	ND		ug/kg	0.488	0.488	1	B
4,4'-DDE	ND		ug/kg	0.488	0.488	1	B
Dieldrin	ND		ug/kg	0.488	0.488	1	A
Endrin	ND		ug/kg	0.488	0.488	1	A
Endosulfan II	ND		ug/kg	0.488	0.488	1	A
4,4'-DDD	ND		ug/kg	0.488	0.488	1	A
cis-Nonachlor	ND		ug/kg	0.488	0.488	1	A
4,4'-DDT	ND		ug/kg	0.488	0.488	1	A
Methoxychlor	ND		ug/kg	1.95	1.95	1	A
Toxaphene	ND		ug/kg	24.5	24.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	68		30-150	B
BZ 198	74		30-150	B
DBOB	78		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-21
Client ID: B567S02NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 21:04
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.898	0.898	1	A
gamma-BHC	ND		ug/kg	0.449	0.449	1	A
Heptachlor	ND		ug/kg	0.449	0.449	1	A
Aldrin	ND		ug/kg	0.449	0.449	1	A
Heptachlor epoxide	ND		ug/kg	0.898	0.898	1	B
Oxychlordane	ND		ug/kg	0.898	0.898	1	B
trans-Chlordane	0.494		ug/kg	0.449	0.449	1	B
Endosulfan I	ND		ug/kg	0.449	0.449	1	A
cis-Chlordane	ND		ug/kg	0.449	0.449	1	A
trans-Nonachlor	ND		ug/kg	0.449	0.449	1	B
4,4'-DDE	ND		ug/kg	0.449	0.449	1	B
Dieldrin	ND		ug/kg	0.449	0.449	1	A
Endrin	ND		ug/kg	0.449	0.449	1	A
Endosulfan II	ND		ug/kg	0.449	0.449	1	A
4,4'-DDD	ND		ug/kg	0.449	0.449	1	A
cis-Nonachlor	ND		ug/kg	0.449	0.449	1	A
4,4'-DDT	ND		ug/kg	0.449	0.449	1	A
Methoxychlor	ND		ug/kg	1.80	1.80	1	A
Toxaphene	ND		ug/kg	22.5	22.5	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	97		30-150	B
BZ 198	125		30-150	B
DBOB	89		30-150	A
BZ 198	85		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-22
Client ID: B567S02NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 22:45
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.969	0.969	1	A
gamma-BHC	ND		ug/kg	0.484	0.484	1	A
Heptachlor	ND		ug/kg	0.484	0.484	1	A
Aldrin	ND		ug/kg	0.484	0.484	1	A
Heptachlor epoxide	ND		ug/kg	0.969	0.969	1	B
Oxychlordane	ND		ug/kg	0.969	0.969	1	B
trans-Chlordane	ND		ug/kg	0.484	0.484	1	A
Endosulfan I	ND		ug/kg	0.484	0.484	1	A
cis-Chlordane	ND		ug/kg	0.484	0.484	1	A
trans-Nonachlor	ND		ug/kg	0.484	0.484	1	B
4,4'-DDE	0.484	P	ug/kg	0.484	0.484	1	A
Dieldrin	ND		ug/kg	0.484	0.484	1	A
Endrin	ND		ug/kg	0.484	0.484	1	A
Endosulfan II	ND		ug/kg	0.484	0.484	1	A
4,4'-DDD	ND		ug/kg	0.484	0.484	1	A
cis-Nonachlor	ND		ug/kg	0.484	0.484	1	A
4,4'-DDT	ND		ug/kg	0.484	0.484	1	A
Methoxychlor	ND		ug/kg	1.94	1.94	1	A
Toxaphene	ND		ug/kg	24.3	24.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		30-150	B
BZ 198	71		30-150	B
DBOB	75		30-150	A
BZ 198	67		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-23
Client ID: B567S02NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/15/19 23:51
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.864	0.864	1	A
gamma-BHC	ND		ug/kg	0.432	0.432	1	A
Heptachlor	ND		ug/kg	0.432	0.432	1	A
Aldrin	ND		ug/kg	0.432	0.432	1	A
Heptachlor epoxide	ND		ug/kg	0.864	0.864	1	B
Oxychlordane	ND		ug/kg	0.864	0.864	1	B
trans-Chlordane	ND		ug/kg	0.432	0.432	1	A
Endosulfan I	ND		ug/kg	0.432	0.432	1	A
cis-Chlordane	ND		ug/kg	0.432	0.432	1	A
trans-Nonachlor	ND		ug/kg	0.432	0.432	1	B
4,4'-DDE	ND		ug/kg	0.432	0.432	1	A
Dieldrin	ND		ug/kg	0.432	0.432	1	A
Endrin	ND		ug/kg	0.432	0.432	1	A
Endosulfan II	ND		ug/kg	0.432	0.432	1	A
4,4'-DDD	ND		ug/kg	0.432	0.432	1	A
cis-Nonachlor	ND		ug/kg	0.432	0.432	1	A
4,4'-DDT	ND		ug/kg	0.432	0.432	1	A
Methoxychlor	ND		ug/kg	1.73	1.73	1	A
Toxaphene	ND		ug/kg	21.7	21.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	61		30-150	B
BZ 198	57		30-150	B
DBOB	56		30-150	A
BZ 198	52		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-24
Client ID: B567S02NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 00:25
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.994	0.994	1	A
gamma-BHC	ND		ug/kg	0.497	0.497	1	A
Heptachlor	ND		ug/kg	0.497	0.497	1	A
Aldrin	ND		ug/kg	0.497	0.497	1	A
Heptachlor epoxide	ND		ug/kg	0.994	0.994	1	B
Oxychlordane	ND		ug/kg	0.994	0.994	1	B
trans-Chlordane	ND		ug/kg	0.497	0.497	1	A
Endosulfan I	ND		ug/kg	0.497	0.497	1	A
cis-Chlordane	ND		ug/kg	0.497	0.497	1	A
trans-Nonachlor	ND		ug/kg	0.497	0.497	1	A
4,4'-DDE	ND		ug/kg	0.497	0.497	1	A
Dieldrin	ND		ug/kg	0.497	0.497	1	A
Endrin	ND		ug/kg	0.497	0.497	1	A
Endosulfan II	ND		ug/kg	0.497	0.497	1	A
4,4'-DDD	ND		ug/kg	0.497	0.497	1	A
cis-Nonachlor	ND		ug/kg	0.497	0.497	1	A
4,4'-DDT	ND		ug/kg	0.497	0.497	1	A
Methoxychlor	ND		ug/kg	1.99	1.99	1	A
Toxaphene	ND		ug/kg	25.0	25.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	B
BZ 198	60		30-150	B
DBOB	62		30-150	A
BZ 198	58		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-25
Client ID: B567S02NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 00:58
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.960	0.960	1	A
gamma-BHC	ND		ug/kg	0.480	0.480	1	A
Heptachlor	ND		ug/kg	0.480	0.480	1	A
Aldrin	ND		ug/kg	0.480	0.480	1	A
Heptachlor epoxide	ND		ug/kg	0.960	0.960	1	B
Oxychlordane	ND		ug/kg	0.960	0.960	1	B
trans-Chlordane	ND		ug/kg	0.480	0.480	1	B
Endosulfan I	ND		ug/kg	0.480	0.480	1	A
cis-Chlordane	ND		ug/kg	0.480	0.480	1	A
trans-Nonachlor	ND		ug/kg	0.480	0.480	1	A
4,4'-DDE	ND		ug/kg	0.480	0.480	1	A
Dieldrin	ND		ug/kg	0.480	0.480	1	A
Endrin	ND		ug/kg	0.480	0.480	1	A
Endosulfan II	ND		ug/kg	0.480	0.480	1	A
4,4'-DDD	ND		ug/kg	0.480	0.480	1	A
cis-Nonachlor	ND		ug/kg	0.480	0.480	1	A
4,4'-DDT	ND		ug/kg	0.480	0.480	1	A
Methoxychlor	ND		ug/kg	1.92	1.92	1	A
Toxaphene	ND		ug/kg	24.1	24.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	69		30-150	B
BZ 198	59		30-150	B
DBOB	62		30-150	A
BZ 198	57		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-26
Client ID: B567S03NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 01:32
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.894	0.894	1	A
gamma-BHC	ND		ug/kg	0.447	0.447	1	A
Heptachlor	ND		ug/kg	0.447	0.447	1	A
Aldrin	ND		ug/kg	0.447	0.447	1	A
Heptachlor epoxide	ND		ug/kg	0.894	0.894	1	B
Oxychlordane	ND		ug/kg	0.894	0.894	1	B
trans-Chlordane	0.493		ug/kg	0.447	0.447	1	B
Endosulfan I	ND		ug/kg	0.447	0.447	1	A
cis-Chlordane	ND		ug/kg	0.447	0.447	1	A
trans-Nonachlor	ND		ug/kg	0.447	0.447	1	B
4,4'-DDE	ND		ug/kg	0.447	0.447	1	A
Dieldrin	ND		ug/kg	0.447	0.447	1	A
Endrin	ND		ug/kg	0.447	0.447	1	A
Endosulfan II	ND		ug/kg	0.447	0.447	1	A
4,4'-DDD	ND		ug/kg	0.447	0.447	1	A
cis-Nonachlor	ND		ug/kg	0.447	0.447	1	A
4,4'-DDT	ND		ug/kg	0.447	0.447	1	A
Methoxychlor	ND		ug/kg	1.79	1.79	1	A
Toxaphene	ND		ug/kg	22.4	22.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	96		30-150	B
BZ 198	77		30-150	B
DBOB	78		30-150	A
BZ 198	75		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-27
Client ID: B567S03NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 02:05
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	4.47	P	ug/kg	0.907	0.907	1	B
gamma-BHC	2.45	P	ug/kg	0.454	0.454	1	B
Heptachlor	0.645		ug/kg	0.454	0.454	1	B
Aldrin	0.526		ug/kg	0.454	0.454	1	B
Heptachlor epoxide	ND		ug/kg	0.907	0.907	1	B
Oxychlordane	ND		ug/kg	0.907	0.907	1	B
trans-Chlordane	ND		ug/kg	0.454	0.454	1	B
Endosulfan I	1.60	P	ug/kg	0.454	0.454	1	A
cis-Chlordane	1.56	P	ug/kg	0.454	0.454	1	A
trans-Nonachlor	ND		ug/kg	0.454	0.454	1	B
4,4'-DDE	ND		ug/kg	0.454	0.454	1	B
Dieldrin	0.937		ug/kg	0.454	0.454	1	B
Endrin	ND		ug/kg	0.454	0.454	1	B
Endosulfan II	1.33		ug/kg	0.454	0.454	1	B
4,4'-DDD	ND		ug/kg	0.454	0.454	1	B
cis-Nonachlor	1.48	P	ug/kg	0.454	0.454	1	B
4,4'-DDT	2.25		ug/kg	0.454	0.454	1	B
Methoxychlor	ND		ug/kg	1.81	1.81	1	A
Toxaphene	ND		ug/kg	22.8	22.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	112		30-150	B
BZ 198	68		30-150	B
DBOB	60		30-150	A
BZ 198	59		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-28
Client ID: B567S03NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 02:39
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.886	0.886	1	A
gamma-BHC	ND		ug/kg	0.443	0.443	1	A
Heptachlor	ND		ug/kg	0.443	0.443	1	A
Aldrin	ND		ug/kg	0.443	0.443	1	A
Heptachlor epoxide	ND		ug/kg	0.886	0.886	1	B
Oxychlordane	ND		ug/kg	0.886	0.886	1	B
trans-Chlordane	0.470		ug/kg	0.443	0.443	1	B
Endosulfan I	ND		ug/kg	0.443	0.443	1	A
cis-Chlordane	ND		ug/kg	0.443	0.443	1	A
trans-Nonachlor	ND		ug/kg	0.443	0.443	1	B
4,4'-DDE	ND		ug/kg	0.443	0.443	1	A
Dieldrin	ND		ug/kg	0.443	0.443	1	A
Endrin	ND		ug/kg	0.443	0.443	1	A
Endosulfan II	ND		ug/kg	0.443	0.443	1	A
4,4'-DDD	ND		ug/kg	0.443	0.443	1	A
cis-Nonachlor	ND		ug/kg	0.443	0.443	1	A
4,4'-DDT	ND		ug/kg	0.443	0.443	1	A
Methoxychlor	ND		ug/kg	1.77	1.77	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	97		30-150	B
BZ 198	80		30-150	B
DBOB	90		30-150	A
BZ 198	73		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-29
Client ID: B567S03NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 03:12
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.917	0.917	1	A
gamma-BHC	ND		ug/kg	0.459	0.459	1	A
Heptachlor	ND		ug/kg	0.459	0.459	1	A
Aldrin	ND		ug/kg	0.459	0.459	1	A
Heptachlor epoxide	ND		ug/kg	0.917	0.917	1	B
Oxychlordane	ND		ug/kg	0.917	0.917	1	B
trans-Chlordane	ND		ug/kg	0.459	0.459	1	A
Endosulfan I	ND		ug/kg	0.459	0.459	1	A
cis-Chlordane	ND		ug/kg	0.459	0.459	1	A
trans-Nonachlor	ND		ug/kg	0.459	0.459	1	B
4,4'-DDE	ND		ug/kg	0.459	0.459	1	A
Dieldrin	ND		ug/kg	0.459	0.459	1	A
Endrin	ND		ug/kg	0.459	0.459	1	A
Endosulfan II	ND		ug/kg	0.459	0.459	1	A
4,4'-DDD	ND		ug/kg	0.459	0.459	1	A
cis-Nonachlor	ND		ug/kg	0.459	0.459	1	A
4,4'-DDT	ND		ug/kg	0.459	0.459	1	A
Methoxychlor	ND		ug/kg	1.83	1.83	1	A
Toxaphene	ND		ug/kg	23.0	23.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	76		30-150	B
BZ 198	64		30-150	B
DBOB	75		30-150	A
BZ 198	62		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-30
Client ID: B567S03NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 03:46
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.886	0.886	1	A
gamma-BHC	ND		ug/kg	0.443	0.443	1	A
Heptachlor	ND		ug/kg	0.443	0.443	1	A
Aldrin	ND		ug/kg	0.443	0.443	1	A
Heptachlor epoxide	ND		ug/kg	0.886	0.886	1	B
Oxychlordane	ND		ug/kg	0.886	0.886	1	B
trans-Chlordane	0.566		ug/kg	0.443	0.443	1	B
Endosulfan I	ND		ug/kg	0.443	0.443	1	A
cis-Chlordane	ND		ug/kg	0.443	0.443	1	A
trans-Nonachlor	ND		ug/kg	0.443	0.443	1	B
4,4'-DDE	ND		ug/kg	0.443	0.443	1	A
Dieldrin	1.68	P	ug/kg	0.443	0.443	1	B
Endrin	ND		ug/kg	0.443	0.443	1	A
Endosulfan II	ND		ug/kg	0.443	0.443	1	A
4,4'-DDD	ND		ug/kg	0.443	0.443	1	A
cis-Nonachlor	ND		ug/kg	0.443	0.443	1	A
4,4'-DDT	ND		ug/kg	0.443	0.443	1	A
Methoxychlor	ND		ug/kg	1.77	1.77	1	A
Toxaphene	ND		ug/kg	22.2	22.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	90		30-150	B
BZ 198	86		30-150	B
DBOB	91		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-31
Client ID: B567S04NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 04:19
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.965	0.965	1	A
gamma-BHC	ND		ug/kg	0.483	0.483	1	A
Heptachlor	ND		ug/kg	0.483	0.483	1	A
Aldrin	ND		ug/kg	0.483	0.483	1	A
Heptachlor epoxide	ND		ug/kg	0.965	0.965	1	B
Oxychlordane	ND		ug/kg	0.965	0.965	1	B
trans-Chlordane	ND		ug/kg	0.483	0.483	1	A
Endosulfan I	ND		ug/kg	0.483	0.483	1	A
cis-Chlordane	ND		ug/kg	0.483	0.483	1	A
trans-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDE	ND		ug/kg	0.483	0.483	1	A
Dieldrin	ND		ug/kg	0.483	0.483	1	A
Endrin	ND		ug/kg	0.483	0.483	1	A
Endosulfan II	ND		ug/kg	0.483	0.483	1	A
4,4'-DDD	ND		ug/kg	0.483	0.483	1	A
cis-Nonachlor	ND		ug/kg	0.483	0.483	1	A
4,4'-DDT	ND		ug/kg	0.483	0.483	1	A
Methoxychlor	ND		ug/kg	1.93	1.93	1	A
Toxaphene	ND		ug/kg	24.2	24.2	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	75		30-150	B
BZ 198	68		30-150	B
DBOB	72		30-150	A
BZ 198	67		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-32
Client ID: B567S04NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 04:52
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.933	0.933	1	A
gamma-BHC	ND		ug/kg	0.466	0.466	1	A
Heptachlor	ND		ug/kg	0.466	0.466	1	A
Aldrin	ND		ug/kg	0.466	0.466	1	A
Heptachlor epoxide	ND		ug/kg	0.933	0.933	1	B
Oxychlordane	ND		ug/kg	0.933	0.933	1	B
trans-Chlordane	ND		ug/kg	0.466	0.466	1	A
Endosulfan I	ND		ug/kg	0.466	0.466	1	A
cis-Chlordane	ND		ug/kg	0.466	0.466	1	A
trans-Nonachlor	ND		ug/kg	0.466	0.466	1	B
4,4'-DDE	ND		ug/kg	0.466	0.466	1	A
Dieldrin	ND		ug/kg	0.466	0.466	1	A
Endrin	ND		ug/kg	0.466	0.466	1	A
Endosulfan II	ND		ug/kg	0.466	0.466	1	A
4,4'-DDD	ND		ug/kg	0.466	0.466	1	A
cis-Nonachlor	ND		ug/kg	0.466	0.466	1	A
4,4'-DDT	ND		ug/kg	0.466	0.466	1	A
Methoxychlor	ND		ug/kg	1.86	1.86	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	72		30-150	B
BZ 198	64		30-150	B
DBOB	64		30-150	A
BZ 198	63		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-33
Client ID: B567S04NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 05:26
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.954	0.954	1	A
gamma-BHC	ND		ug/kg	0.477	0.477	1	A
Heptachlor	ND		ug/kg	0.477	0.477	1	A
Aldrin	ND		ug/kg	0.477	0.477	1	A
Heptachlor epoxide	ND		ug/kg	0.954	0.954	1	B
Oxychlordane	ND		ug/kg	0.954	0.954	1	B
trans-Chlordane	ND		ug/kg	0.477	0.477	1	A
Endosulfan I	ND		ug/kg	0.477	0.477	1	A
cis-Chlordane	ND		ug/kg	0.477	0.477	1	A
trans-Nonachlor	ND		ug/kg	0.477	0.477	1	A
4,4'-DDE	ND		ug/kg	0.477	0.477	1	A
Dieldrin	ND		ug/kg	0.477	0.477	1	A
Endrin	ND		ug/kg	0.477	0.477	1	A
Endosulfan II	ND		ug/kg	0.477	0.477	1	A
4,4'-DDD	ND		ug/kg	0.477	0.477	1	A
cis-Nonachlor	ND		ug/kg	0.477	0.477	1	A
4,4'-DDT	ND		ug/kg	0.477	0.477	1	A
Methoxychlor	ND		ug/kg	1.91	1.91	1	A
Toxaphene	ND		ug/kg	24.0	24.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	65		30-150	B
BZ 198	62		30-150	B
DBOB	61		30-150	A
BZ 198	55		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-34
Client ID: B567S04NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 05:59
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.967	0.967	1	A
gamma-BHC	ND		ug/kg	0.484	0.484	1	A
Heptachlor	ND		ug/kg	0.484	0.484	1	A
Aldrin	ND		ug/kg	0.484	0.484	1	A
Heptachlor epoxide	ND		ug/kg	0.967	0.967	1	B
Oxychlordane	ND		ug/kg	0.967	0.967	1	B
trans-Chlordane	ND		ug/kg	0.484	0.484	1	A
Endosulfan I	ND		ug/kg	0.484	0.484	1	A
cis-Chlordane	ND		ug/kg	0.484	0.484	1	A
trans-Nonachlor	ND		ug/kg	0.484	0.484	1	A
4,4'-DDE	ND		ug/kg	0.484	0.484	1	A
Dieldrin	ND		ug/kg	0.484	0.484	1	A
Endrin	ND		ug/kg	0.484	0.484	1	A
Endosulfan II	ND		ug/kg	0.484	0.484	1	A
4,4'-DDD	ND		ug/kg	0.484	0.484	1	A
cis-Nonachlor	ND		ug/kg	0.484	0.484	1	A
4,4'-DDT	ND		ug/kg	0.484	0.484	1	A
Methoxychlor	ND		ug/kg	1.93	1.93	1	A
Toxaphene	ND		ug/kg	24.3	24.3	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	78		30-150	B
BZ 198	71		30-150	B
DBOB	78		30-150	A
BZ 198	71		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-35
Client ID: B567S04NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 06:33
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.945	0.945	1	A
gamma-BHC	ND		ug/kg	0.472	0.472	1	A
Heptachlor	ND		ug/kg	0.472	0.472	1	A
Aldrin	ND		ug/kg	0.472	0.472	1	A
Heptachlor epoxide	ND		ug/kg	0.945	0.945	1	B
Oxychlordane	ND		ug/kg	0.945	0.945	1	B
trans-Chlordane	ND		ug/kg	0.472	0.472	1	A
Endosulfan I	ND		ug/kg	0.472	0.472	1	A
cis-Chlordane	ND		ug/kg	0.472	0.472	1	A
trans-Nonachlor	ND		ug/kg	0.472	0.472	1	B
4,4'-DDE	ND		ug/kg	0.472	0.472	1	A
Dieldrin	ND		ug/kg	0.472	0.472	1	A
Endrin	ND		ug/kg	0.472	0.472	1	A
Endosulfan II	ND		ug/kg	0.472	0.472	1	A
4,4'-DDD	ND		ug/kg	0.472	0.472	1	A
cis-Nonachlor	ND		ug/kg	0.472	0.472	1	A
4,4'-DDT	ND		ug/kg	0.472	0.472	1	A
Methoxychlor	ND		ug/kg	1.89	1.89	1	A
Toxaphene	ND		ug/kg	23.7	23.7	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	86		30-150	B
BZ 198	72		30-150	B
DBOB	75		30-150	A
BZ 198	70		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-36
Client ID: B567S05NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 07:06
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.956	0.956	1	A
gamma-BHC	ND		ug/kg	0.478	0.478	1	A
Heptachlor	ND		ug/kg	0.478	0.478	1	A
Aldrin	ND		ug/kg	0.478	0.478	1	A
Heptachlor epoxide	ND		ug/kg	0.956	0.956	1	B
Oxychlordane	ND		ug/kg	0.956	0.956	1	B
trans-Chlordane	ND		ug/kg	0.478	0.478	1	A
Endosulfan I	ND		ug/kg	0.478	0.478	1	A
cis-Chlordane	ND		ug/kg	0.478	0.478	1	A
trans-Nonachlor	ND		ug/kg	0.478	0.478	1	B
4,4'-DDE	ND		ug/kg	0.478	0.478	1	A
Dieldrin	ND		ug/kg	0.478	0.478	1	A
Endrin	ND		ug/kg	0.478	0.478	1	A
Endosulfan II	ND		ug/kg	0.478	0.478	1	A
4,4'-DDD	ND		ug/kg	0.478	0.478	1	A
cis-Nonachlor	ND		ug/kg	0.478	0.478	1	A
4,4'-DDT	ND		ug/kg	0.478	0.478	1	A
Methoxychlor	ND		ug/kg	1.91	1.91	1	A
Toxaphene	ND		ug/kg	24.0	24.0	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	82		30-150	B
BZ 198	76		30-150	B
DBOB	83		30-150	A
BZ 198	74		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-37
Client ID: B567S05NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 19:03
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.949	0.949	1	A
gamma-BHC	ND		ug/kg	0.474	0.474	1	A
Heptachlor	ND		ug/kg	0.474	0.474	1	A
Aldrin	ND		ug/kg	0.474	0.474	1	A
Heptachlor epoxide	ND		ug/kg	0.949	0.949	1	B
Oxychlordane	ND		ug/kg	0.949	0.949	1	B
trans-Chlordane	ND		ug/kg	0.474	0.474	1	A
Endosulfan I	ND		ug/kg	0.474	0.474	1	A
cis-Chlordane	ND		ug/kg	0.474	0.474	1	A
trans-Nonachlor	ND		ug/kg	0.474	0.474	1	A
4,4'-DDE	ND		ug/kg	0.474	0.474	1	A
Dieldrin	ND		ug/kg	0.474	0.474	1	A
Endrin	ND		ug/kg	0.474	0.474	1	A
Endosulfan II	ND		ug/kg	0.474	0.474	1	A
4,4'-DDD	ND		ug/kg	0.474	0.474	1	A
cis-Nonachlor	ND		ug/kg	0.474	0.474	1	A
4,4'-DDT	ND		ug/kg	0.474	0.474	1	A
Methoxychlor	ND		ug/kg	1.90	1.90	1	A
Toxaphene	ND		ug/kg	23.8	23.8	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	101		30-150	B
BZ 198	85		30-150	B
DBOB	106		30-150	A
BZ 198	83		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-38
Client ID: B567S05NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 19:37
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.902	0.902	1	A
gamma-BHC	ND		ug/kg	0.451	0.451	1	A
Heptachlor	ND		ug/kg	0.451	0.451	1	A
Aldrin	ND		ug/kg	0.451	0.451	1	A
Heptachlor epoxide	ND		ug/kg	0.902	0.902	1	B
Oxychlordane	ND		ug/kg	0.902	0.902	1	B
trans-Chlordane	ND		ug/kg	0.451	0.451	1	A
Endosulfan I	ND		ug/kg	0.451	0.451	1	A
cis-Chlordane	ND		ug/kg	0.451	0.451	1	A
trans-Nonachlor	ND		ug/kg	0.451	0.451	1	B
4,4'-DDE	ND		ug/kg	0.451	0.451	1	A
Dieldrin	ND		ug/kg	0.451	0.451	1	A
Endrin	ND		ug/kg	0.451	0.451	1	A
Endosulfan II	ND		ug/kg	0.451	0.451	1	A
4,4'-DDD	ND		ug/kg	0.451	0.451	1	A
cis-Nonachlor	ND		ug/kg	0.451	0.451	1	A
4,4'-DDT	ND		ug/kg	0.451	0.451	1	A
Methoxychlor	ND		ug/kg	1.80	1.80	1	A
Toxaphene	ND		ug/kg	22.6	22.6	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	81		30-150	B
BZ 198	82		30-150	B
DBOB	70		30-150	A
BZ 198	76		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-39
Client ID: B567S05NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 20:10
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.921	0.921	1	A
gamma-BHC	ND		ug/kg	0.460	0.460	1	A
Heptachlor	ND		ug/kg	0.460	0.460	1	A
Aldrin	ND		ug/kg	0.460	0.460	1	A
Heptachlor epoxide	ND		ug/kg	0.921	0.921	1	B
Oxychlordane	ND		ug/kg	0.921	0.921	1	B
trans-Chlordane	ND		ug/kg	0.460	0.460	1	A
Endosulfan I	ND		ug/kg	0.460	0.460	1	A
cis-Chlordane	ND		ug/kg	0.460	0.460	1	A
trans-Nonachlor	ND		ug/kg	0.460	0.460	1	B
4,4'-DDE	ND		ug/kg	0.460	0.460	1	A
Dieldrin	ND		ug/kg	0.460	0.460	1	A
Endrin	ND		ug/kg	0.460	0.460	1	A
Endosulfan II	ND		ug/kg	0.460	0.460	1	A
4,4'-DDD	ND		ug/kg	0.460	0.460	1	A
cis-Nonachlor	ND		ug/kg	0.460	0.460	1	A
4,4'-DDT	ND		ug/kg	0.460	0.460	1	A
Methoxychlor	ND		ug/kg	1.84	1.84	1	A
Toxaphene	ND		ug/kg	23.1	23.1	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	93		30-150	B
BZ 198	85		30-150	B
DBOB	90		30-150	A
BZ 198	83		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-40
Client ID: B567S05NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Analytical Method: 1,8081B
Analytical Date: 01/16/19 20:44
Analyst: DP
Percent Solids: Results reported on an 'AS RECEIVED' basis.

Extraction Method: EPA 3570
Extraction Date: 01/04/19 12:13
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Column
RIM Organochlorine Pesticides - Mansfield Lab							
Hexachlorobenzene	ND		ug/kg	0.933	0.933	1	A
gamma-BHC	ND		ug/kg	0.466	0.466	1	A
Heptachlor	ND		ug/kg	0.466	0.466	1	A
Aldrin	ND		ug/kg	0.466	0.466	1	A
Heptachlor epoxide	ND		ug/kg	0.933	0.933	1	B
Oxychlordane	ND		ug/kg	0.933	0.933	1	B
trans-Chlordane	ND		ug/kg	0.466	0.466	1	A
Endosulfan I	ND		ug/kg	0.466	0.466	1	A
cis-Chlordane	ND		ug/kg	0.466	0.466	1	A
trans-Nonachlor	ND		ug/kg	0.466	0.466	1	B
4,4'-DDE	ND		ug/kg	0.466	0.466	1	A
Dieldrin	ND		ug/kg	0.466	0.466	1	A
Endrin	ND		ug/kg	0.466	0.466	1	A
Endosulfan II	ND		ug/kg	0.466	0.466	1	A
4,4'-DDD	ND		ug/kg	0.466	0.466	1	A
cis-Nonachlor	ND		ug/kg	0.466	0.466	1	A
4,4'-DDT	ND		ug/kg	0.466	0.466	1	A
Methoxychlor	ND		ug/kg	1.86	1.86	1	A
Toxaphene	ND		ug/kg	23.4	23.4	1	A

Surrogate	% Recovery	Qualifier	Acceptance Criteria	Column
DBOB	91		30-150	B
BZ 198	81		30-150	B
DBOB	87		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 01/15/19 17:22
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:34
Cleanup Method: EPA 3630
Cleanup Date: 01/05/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1194728-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	2.00	2.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	79		30-150	B
BZ 198	82		30-150	B
DBOB	86		30-150	A
BZ 198	79		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8081B
Analytical Date: 01/15/19 17:44
Analyst: DP

Extraction Method: EPA 3570
Extraction Date: 01/04/19 09:35
Cleanup Method: EPA 3630
Cleanup Date: 01/06/19

Parameter	Result	Qualifier	Units	RL	MDL	Column
RIM Organochlorine Pesticides - Mansfield Lab for sample(s): 21-40 Batch: WG1194732-1						
Hexachlorobenzene	ND		ug/kg	1.00	1.00	A
gamma-BHC	ND		ug/kg	0.500	0.500	A
Heptachlor	ND		ug/kg	0.500	0.500	A
Aldrin	ND		ug/kg	0.500	0.500	A
trans-Chlordane	ND		ug/kg	0.500	0.500	A
Endosulfan I	ND		ug/kg	0.500	0.500	A
cis-Chlordane	ND		ug/kg	0.500	0.500	A
trans-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDE	ND		ug/kg	0.500	0.500	A
Dieldrin	ND		ug/kg	0.500	0.500	A
Endrin	ND		ug/kg	0.500	0.500	A
Endosulfan II	ND		ug/kg	0.500	0.500	A
4,4'-DDD	ND		ug/kg	0.500	0.500	A
cis-Nonachlor	ND		ug/kg	0.500	0.500	A
4,4'-DDT	ND		ug/kg	0.500	0.500	A
Methoxychlor	ND		ug/kg	2.00	2.00	A
Toxaphene	ND		ug/kg	25.1	25.1	A
Heptachlor epoxide	ND		ug/kg	1.00	1.00	B
Oxychlordane	ND		ug/kg	1.00	1.00	B

Surrogate	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	67		30-150	B
BZ 198	67		30-150	B
DBOB	61		30-150	A
BZ 198	66		30-150	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194728-2 WG1194728-3									
Hexachlorobenzene	86		86		50-120	0		30	A
gamma-BHC	70		82		50-120	16		30	A
Heptachlor	78		82		50-120	5		30	A
Aldrin	82		85		50-120	4		30	A
trans-Chlordane	81		87		50-120	7		30	A
Endosulfan I	62		85		50-120	**31**	Q	30	A
cis-Chlordane	79		85		50-120	7		30	A
trans-Nonachlor	78		82		50-120	5		30	A
4,4'-DDE	93		97		50-120	4		30	A
Dieldrin	69		93		50-120	30		30	A
Endrin	56		84		50-120	**40**	Q	30	A
4,4'-DDD	73		82		50-120	12		30	A
cis-Nonachlor	83		90		50-120	8		30	A
4,4'-DDT	74		85		50-120	14		30	A
Methoxychlor	**17**	Q	70		50-120	**122**	Q	30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	85		80		30-150	B
BZ 198	83		85		30-150	B
DBOB	84		86		30-150	A
BZ 198	83		81		30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 Batch: WG1194728-2 WG1194728-3									
Heptachlor epoxide	63		79		50-120	23		30	B
Oxychlordane	76		82		50-120	8		30	B
Endosulfan II	**45**	Q	77		50-120	**52**	Q	30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	85		80		30-150	B
BZ 198	83		85		30-150	B
DBOB	84		86		30-150	A
BZ 198	83		81		30-150	A

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194732-2 WG1194732-3									
Hexachlorobenzene	81		83		50-120	2		30	A
gamma-BHC	74		77		50-120	4		30	A
Heptachlor	79		82		50-120	4		30	A
Aldrin	87		88		50-120	1		30	A
trans-Chlordane	85		87		50-120	2		30	A
Endosulfan I	80		80		50-120	0		30	A
cis-Chlordane	86		88		50-120	2		30	A
trans-Nonachlor	80		82		50-120	2		30	A
4,4'-DDE	99		97		50-120	2		30	A
Dieldrin	92		94		50-120	2		30	A
Endrin	78		82		50-120	5		30	A
4,4'-DDD	85		85		50-120	0		30	A
cis-Nonachlor	87		88		50-120	1		30	A
4,4'-DDT	93		92		50-120	1		30	A
Methoxychlor	82		80		50-120	2		30	A

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	85		89		30-150	B
BZ 198	87		85		30-150	B
DBOB	74		76		30-150	A
BZ 198	84		83		30-150	A

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 Batch: WG1194732-2 WG1194732-3									
Heptachlor epoxide	86		89		50-120	3		30	B
Oxychlordane	86		88		50-120	2		30	B
Endosulfan II	81		85		50-120	5		30	B

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria	Column
DBOB	85		89		30-150	B
BZ 198	87		85		30-150	B
DBOB	74		76		30-150	A
BZ 198	84		83		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194728-4 WG1194728-5 QC Sample: L1853059-01 Client ID: B567PRENVA													
Hexachlorobenzene	ND	97.8	77.7	79		72.5	73		50-120	7		30	A
gamma-BHC	ND	97.8	76.5	78		72.7	73		50-120	5		30	A
Heptachlor	ND	97.8	77.2	79		72.4	73		50-120	6		30	A
Aldrin	ND	97.8	79.2	81		74.4	75		50-120	6		30	A
Heptachlor epoxide	ND	97.8	66.0	68		67.6	68		50-120	2		30	B
Oxychlordane	ND	97.8	72.4	74		73.2	74		50-120	1		30	B
trans-Chlordane	ND	97.8	84.6	87		79.9	81		50-120	6		30	A
Endosulfan I	ND	97.8	80.9	83		76.3	77		50-120	6		30	A
cis-Chlordane	ND	97.8	89.9P	92		80.0	81		50-120	12		30	A
trans-Nonachlor	ND	97.8	62.6	64		63.5	64		50-120	1		30	B
4,4'-DDE	ND	97.8	87.7	90		82.4	83		50-120	6		30	A
Dieldrin	ND	97.8	85.4	87		80.2	81		50-120	6		30	A
Endrin	ND	97.8	76.3	78		72.5	73		50-120	5		30	A
Endosulfan II	ND	97.8	70.6	72		72.7	73		50-120	3		30	B
4,4'-DDD	ND	97.8	75.2	77		71.5	72		50-120	5		30	A
cis-Nonachlor	ND	97.8	77.5	79		72.9	74		50-120	6		30	A
4,4'-DDT	ND	97.8	91.1	93		80.1	81		50-120	13		30	A
Methoxychlor	ND	97.8	72.3	74		70.1	71		50-120	3		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	78		87		30-150	B
DBOB	73		74		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194728-4 WG1194728-5 QC Sample: L1853059-01 Client ID: B567PRENVA												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	73		71		30-150	A
DBOB	120		106		30-150	A

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits	Column
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194732-4 WG1194732-5 QC Sample: L1853059-21 Client ID: B567S02NVA													
Hexachlorobenzene	ND	99.2	80.5	81		83.1	93		50-120	3		30	A
gamma-BHC	ND	99.2	79.7	80		78.5	88		50-120	2		30	A
Heptachlor	ND	99.2	76.1	77		77.0	87		50-120	1		30	A
Aldrin	ND	99.2	80.2	81		78.0	88		50-120	3		30	A
Heptachlor epoxide	ND	99.2	67.5	68		67.2	76		50-120	0		30	B
Oxychlordane	ND	99.2	65.8	66		69.3	78		50-120	5		30	B
trans-Chlordane	0.494	99.2	74.2	74		78.0	87		50-120	5		30	B
Endosulfan I	ND	99.2	65.2	66		63.8	72		50-120	2		30	A
cis-Chlordane	ND	99.2	68.0	69		68.7	77		50-120	1		30	A
trans-Nonachlor	ND	99.2	62.6	63		63.6	72		50-120	2		30	B
4,4'-DDE	ND	99.2	70.4	71		66.3	75		50-120	6		30	B
Dieldrin	ND	99.2	73.3	74		69.8	79		50-120	5		30	A
Endrin	ND	99.2	74.3	75		69.4	78		50-120	7		30	A
Endosulfan II	ND	99.2	58.9	59		56.3	63		50-120	5		30	B
4,4'-DDD	ND	99.2	76.2	77		69.3	78		50-120	9		30	A
cis-Nonachlor	ND	99.2	68.9	70		65.0	73		50-120	6		30	A
4,4'-DDT	ND	99.2	65.5	66		53.1	60		50-120	21		30	A
Methoxychlor	ND	99.2	64.4	65		56.6	64		50-120	13		30	A

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	88		96		30-150	B
DBOB	89		69		30-150	B

Matrix Spike Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194732-4 WG1194732-5 QC Sample: L1853059-21 Client ID: B567S02NVA												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria	Column
BZ 198	76		76		30-150	A
DBOB	82		66		30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194728-6 QC Sample: L1853059-02 Client ID: B567PRENVB							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
trans-Chlordane	ND	ND	ug/kg	NC		30	A
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	B
4,4'-DDE	ND	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194728-6 QC Sample: L1853059-02 Client ID: B567PRENVB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	74		77		30-150	B
BZ 198	84		88		30-150	B
DBOB	120		124		30-150	A
BZ 198	73		76		30-150	A

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194732-6 QC Sample: L1853059-22 Client ID: B567S02NVB							
Hexachlorobenzene	ND	ND	ug/kg	NC		30	A
gamma-BHC	ND	ND	ug/kg	NC		30	A
Heptachlor	ND	ND	ug/kg	NC		30	A
Aldrin	ND	ND	ug/kg	NC		30	A
Heptachlor epoxide	ND	ND	ug/kg	NC		30	B
Oxychlordane	ND	ND	ug/kg	NC		30	B
Endosulfan I	ND	ND	ug/kg	NC		30	A
cis-Chlordane	ND	ND	ug/kg	NC		30	A
trans-Nonachlor	ND	ND	ug/kg	NC		30	B
4,4'-DDE	0.484P	ND	ug/kg	NC		30	A
Dieldrin	ND	ND	ug/kg	NC		30	A
Endrin	ND	ND	ug/kg	NC		30	A
Endosulfan II	ND	ND	ug/kg	NC		30	A
4,4'-DDD	ND	ND	ug/kg	NC		30	A
cis-Nonachlor	ND	ND	ug/kg	NC		30	A
4,4'-DDT	ND	ND	ug/kg	NC		30	A
Methoxychlor	ND	ND	ug/kg	NC		30	A
Toxaphene	ND	ND	ug/kg	NC		30	A

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column

Lab Duplicate Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

RIM Organochlorine Pesticides - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1194732-6 QC Sample: L1853059-22 Client ID: B567S02NVB

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	Column
DBOB	89		92		30-150	B
BZ 198	71		79		30-150	B
DBOB	75		76		30-150	A
BZ 198	67		74		30-150	A

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194728-7

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	61		40-140
4,4'-DDE	72		40-140
4,4'-DDD	97		40-140
DBOB (Surrogate)	78		30-150
DBOB (Surrogate)	86		30-150
BZ 198 (Surrogate)	69		30-150
BZ 198 (Surrogate)	72		30-150

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1194732-7

Parameter	% Recovery	Qual	QC Criteria
cis-Chlordane	82		40-140
4,4'-DDE	64		40-140
4,4'-DDD	58		40-140
DBOB (Surrogate)	68		30-150
DBOB (Surrogate)	78		30-150
BZ 198 (Surrogate)	66		30-150
BZ 198 (Surrogate)	70		30-150

METALS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-01 Date Collected: 12/20/18 09:00

Client ID: B567PRENVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.07		mg/kg	0.083	0.029	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.033	0.009	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM
Chromium, Total	0.297	J	mg/kg	0.333	0.030	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM
Copper, Total	1.11		mg/kg	0.083	0.028	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM
Lead, Total	0.254		mg/kg	0.033	0.005	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM
Mercury, Total	0.003	J	mg/kg	0.010	0.003	5	01/07/19 12:48	01/08/19 12:45	EPA 7474	1,7474	BV
Nickel, Total	0.291		mg/kg	0.083	0.031	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM
Zinc, Total	7.70		mg/kg	0.833	0.124	2	01/07/19 12:48	01/11/19 16:35	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-02 Date Collected: 12/20/18 09:00

Client ID: B567PRENVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.08		mg/kg	0.093	0.032	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.037	0.010	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM
Chromium, Total	0.288	J	mg/kg	0.374	0.034	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM
Copper, Total	1.18		mg/kg	0.093	0.031	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM
Lead, Total	0.264		mg/kg	0.037	0.005	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/07/19 12:48	01/08/19 12:53	EPA 7474	1,7474	BV
Nickel, Total	0.314		mg/kg	0.093	0.035	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM
Zinc, Total	7.75		mg/kg	0.934	0.139	2	01/07/19 12:48	01/11/19 17:02	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-03 Date Collected: 12/20/18 09:00

Client ID: B567PRENVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	2.03		mg/kg	0.093	0.032	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.037	0.010	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM
Chromium, Total	0.289	J	mg/kg	0.370	0.033	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM
Copper, Total	1.12		mg/kg	0.093	0.031	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM
Lead, Total	0.248		mg/kg	0.037	0.005	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/07/19 12:48	01/08/19 13:04	EPA 7474	1,7474	BV
Nickel, Total	0.307		mg/kg	0.093	0.034	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM
Zinc, Total	7.59		mg/kg	0.926	0.138	2	01/07/19 12:48	01/11/19 17:07	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-11 Date Collected: 12/20/18 09:30

Client ID: B567R01NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.56		mg/kg	0.089	0.030	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.035	0.009	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM
Chromium, Total	0.081	J	mg/kg	0.354	0.032	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM
Copper, Total	1.32		mg/kg	0.089	0.030	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM
Lead, Total	0.163		mg/kg	0.035	0.005	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:07	EPA 7474	1,7474	BV
Nickel, Total	0.138		mg/kg	0.089	0.033	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM
Zinc, Total	14.0		mg/kg	0.885	0.132	2	01/07/19 12:48	01/11/19 17:12	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-12 Date Collected: 12/20/18 09:30

Client ID: B567R01NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.49		mg/kg	0.091	0.031	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM
Cadmium, Total	0.033	J	mg/kg	0.036	0.010	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM
Chromium, Total	0.065	J	mg/kg	0.364	0.033	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM
Copper, Total	1.09		mg/kg	0.091	0.030	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM
Lead, Total	0.165		mg/kg	0.036	0.005	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:09	EPA 7474	1,7474	BV
Nickel, Total	0.118		mg/kg	0.091	0.034	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM
Zinc, Total	20.2		mg/kg	0.909	0.135	2	01/07/19 12:48	01/11/19 17:16	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-13 Date Collected: 12/20/18 09:30

Client ID: B567R01NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.31		mg/kg	0.099	0.034	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM
Cadmium, Total	0.026	J	mg/kg	0.040	0.010	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM
Chromium, Total	0.056	J	mg/kg	0.396	0.036	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM
Copper, Total	1.16		mg/kg	0.099	0.033	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM
Lead, Total	0.181		mg/kg	0.040	0.006	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	01/07/19 12:48	01/08/19 13:12	EPA 7474	1,7474	BV
Nickel, Total	0.114		mg/kg	0.099	0.037	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM
Zinc, Total	5.57		mg/kg	0.990	0.148	2	01/07/19 12:48	01/11/19 17:21	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853059
Project Number: 60588790 TASK 10.0
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-14
Client ID: B567R01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.50		mg/kg	0.084	0.029	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM
Cadmium, Total	0.027	J	mg/kg	0.034	0.009	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM
Chromium, Total	0.111	J	mg/kg	0.336	0.030	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM
Copper, Total	1.05		mg/kg	0.084	0.028	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM
Lead, Total	0.161		mg/kg	0.034	0.005	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:14	EPA 7474	1,7474	BV
Nickel, Total	0.144		mg/kg	0.084	0.031	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM
Zinc, Total	5.71		mg/kg	0.840	0.125	2	01/07/19 12:48	01/11/19 17:25	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-15 Date Collected: 12/20/18 09:30

Client ID: B567R01NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.65		mg/kg	0.088	0.030	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.035	0.009	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM
Chromium, Total	0.052	J	mg/kg	0.351	0.032	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM
Copper, Total	1.20		mg/kg	0.088	0.029	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM
Lead, Total	0.178		mg/kg	0.035	0.005	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:17	EPA 7474	1,7474	BV
Nickel, Total	0.096		mg/kg	0.088	0.033	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM
Zinc, Total	6.75		mg/kg	0.877	0.131	2	01/07/19 12:48	01/11/19 17:30	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-16 Date Collected: 12/20/18 09:45

Client ID: B567S01NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.16		mg/kg	0.093	0.032	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.037	0.010	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM
Chromium, Total	0.039	J	mg/kg	0.370	0.033	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM
Copper, Total	0.787		mg/kg	0.093	0.031	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM
Lead, Total	0.102		mg/kg	0.037	0.005	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.003	5	01/07/19 12:48	01/08/19 13:19	EPA 7474	1,7474	BV
Nickel, Total	0.074	J	mg/kg	0.093	0.034	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM
Zinc, Total	4.88		mg/kg	0.926	0.138	2	01/07/19 12:48	01/11/19 17:48	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-17 Date Collected: 12/20/18 09:45

Client ID: B567S01NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.40		mg/kg	0.090	0.031	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM
Cadmium, Total	0.032	J	mg/kg	0.036	0.009	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM
Chromium, Total	0.087	J	mg/kg	0.360	0.032	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM
Copper, Total	1.09		mg/kg	0.090	0.030	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM
Lead, Total	0.201		mg/kg	0.036	0.005	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:22	EPA 7474	1,7474	BV
Nickel, Total	0.102		mg/kg	0.090	0.034	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM
Zinc, Total	6.31		mg/kg	0.901	0.134	2	01/07/19 12:48	01/11/19 17:53	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-18 Date Collected: 12/20/18 09:45

Client ID: B567S01NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.57		mg/kg	0.086	0.029	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM
Cadmium, Total	0.029	J	mg/kg	0.034	0.009	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM
Chromium, Total	0.083	J	mg/kg	0.342	0.031	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM
Copper, Total	1.05		mg/kg	0.086	0.029	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM
Lead, Total	0.163		mg/kg	0.034	0.005	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:24	EPA 7474	1,7474	BV
Nickel, Total	0.140		mg/kg	0.086	0.032	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM
Zinc, Total	29.4		mg/kg	0.855	0.127	2	01/07/19 12:48	01/11/19 17:57	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-19 Date Collected: 12/20/18 09:45

Client ID: B567S01NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.01		mg/kg	0.098	0.034	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM
Cadmium, Total	0.027	J	mg/kg	0.039	0.010	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM
Chromium, Total	0.037	J	mg/kg	0.392	0.035	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM
Copper, Total	0.743		mg/kg	0.098	0.033	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM
Lead, Total	0.161		mg/kg	0.039	0.006	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.012	0.004	5	01/07/19 12:48	01/08/19 13:35	EPA 7474	1,7474	BV
Nickel, Total	0.088	J	mg/kg	0.098	0.037	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM
Zinc, Total	4.50		mg/kg	0.980	0.146	2	01/07/19 12:48	01/11/19 18:02	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-20 Date Collected: 12/20/18 09:45

Client ID: B567S01NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.21		mg/kg	0.085	0.029	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM
Cadmium, Total	0.029	J	mg/kg	0.034	0.009	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM
Chromium, Total	0.058	J	mg/kg	0.339	0.031	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM
Copper, Total	0.920		mg/kg	0.085	0.028	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM
Lead, Total	0.211		mg/kg	0.034	0.005	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:37	EPA 7474	1,7474	BV
Nickel, Total	0.107		mg/kg	0.085	0.032	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM
Zinc, Total	5.39		mg/kg	0.847	0.126	2	01/07/19 12:48	01/11/19 18:07	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-21 Date Collected: 12/20/18 10:00

Client ID: B567S02NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.62		mg/kg	0.088	0.030	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM
Cadmium, Total	0.041		mg/kg	0.035	0.009	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM
Chromium, Total	0.047	J	mg/kg	0.351	0.032	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM
Copper, Total	1.06		mg/kg	0.088	0.029	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM
Lead, Total	0.302		mg/kg	0.035	0.005	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:05	EPA 7474	1,7474	BV
Nickel, Total	0.103		mg/kg	0.088	0.033	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM
Zinc, Total	7.09		mg/kg	0.877	0.131	2	01/07/19 16:24	01/11/19 14:48	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-22 Date Collected: 12/20/18 10:00

Client ID: B567S02NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.38		mg/kg	0.089	0.030	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM
Cadmium, Total	0.037		mg/kg	0.035	0.009	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM
Chromium, Total	0.074	J	mg/kg	0.354	0.032	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM
Copper, Total	0.928		mg/kg	0.089	0.030	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM
Lead, Total	0.199		mg/kg	0.035	0.005	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:12	EPA 7474	1,7474	BV
Nickel, Total	0.127		mg/kg	0.089	0.033	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM
Zinc, Total	5.88		mg/kg	0.885	0.132	2	01/07/19 16:24	01/11/19 15:09	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-23 Date Collected: 12/20/18 10:00

Client ID: B567S02NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.47		mg/kg	0.093	0.032	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM
Cadmium, Total	0.019	J	mg/kg	0.037	0.010	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM
Chromium, Total	0.075	J	mg/kg	0.374	0.034	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM
Copper, Total	0.978		mg/kg	0.093	0.031	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM
Lead, Total	0.109		mg/kg	0.037	0.005	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	01/07/19 16:24	01/08/19 14:17	EPA 7474	1,7474	BV
Nickel, Total	0.105		mg/kg	0.093	0.035	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM
Zinc, Total	6.05		mg/kg	0.934	0.139	2	01/07/19 17:21	01/11/19 15:13	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-24 Date Collected: 12/20/18 10:00

Client ID: B567S02NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.52		mg/kg	0.090	0.031	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM
Cadmium, Total	0.027	J	mg/kg	0.036	0.009	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM
Chromium, Total	0.067	J	mg/kg	0.360	0.032	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM
Copper, Total	1.27		mg/kg	0.090	0.030	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM
Lead, Total	0.191		mg/kg	0.036	0.005	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM
Mercury, Total	0.006	J	mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:20	EPA 7474	1,7474	BV
Nickel, Total	0.105		mg/kg	0.090	0.034	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM
Zinc, Total	7.49		mg/kg	0.901	0.134	2	01/07/19 17:21	01/11/19 15:17	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-25 Date Collected: 12/20/18 10:00

Client ID: B567S02NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.46		mg/kg	0.086	0.029	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.034	0.009	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM
Chromium, Total	0.094	J	mg/kg	0.342	0.031	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM
Copper, Total	1.10		mg/kg	0.086	0.029	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM
Lead, Total	0.159		mg/kg	0.034	0.005	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM
Mercury, Total	0.007	J	mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:22	EPA 7474	1,7474	BV
Nickel, Total	0.120		mg/kg	0.086	0.032	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM
Zinc, Total	6.75		mg/kg	0.855	0.127	2	01/07/19 17:21	01/11/19 15:34	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-26 Date Collected: 12/20/18 10:15

Client ID: B567S03NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.08		mg/kg	0.091	0.031	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM
Cadmium, Total	0.024	J	mg/kg	0.036	0.010	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM
Chromium, Total	0.042	J	mg/kg	0.364	0.033	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM
Copper, Total	0.790		mg/kg	0.091	0.030	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM
Lead, Total	0.120		mg/kg	0.036	0.005	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM
Mercury, Total	ND		mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:25	EPA 7474	1,7474	BV
Nickel, Total	0.096		mg/kg	0.091	0.034	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM
Zinc, Total	4.70		mg/kg	0.909	0.135	2	01/07/19 17:21	01/11/19 15:38	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-27 Date Collected: 12/20/18 10:15

Client ID: B567S03NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.56		mg/kg	0.093	0.032	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM
Cadmium, Total	0.032	J	mg/kg	0.037	0.010	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM
Chromium, Total	0.063	J	mg/kg	0.374	0.034	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM
Copper, Total	1.30		mg/kg	0.093	0.031	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM
Lead, Total	0.185		mg/kg	0.037	0.005	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM
Mercury, Total	0.006	J	mg/kg	0.012	0.003	5	01/07/19 16:24	01/08/19 14:33	EPA 7474	1,7474	BV
Nickel, Total	0.137		mg/kg	0.093	0.035	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM
Zinc, Total	22.3		mg/kg	0.934	0.139	2	01/07/19 17:21	01/11/19 15:42	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-28 Date Collected: 12/20/18 10:15

Client ID: B567S03NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.64		mg/kg	0.093	0.032	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM
Cadmium, Total	0.028	J	mg/kg	0.037	0.010	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM
Chromium, Total	0.075	J	mg/kg	0.374	0.034	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM
Copper, Total	1.22		mg/kg	0.093	0.031	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM
Lead, Total	0.142		mg/kg	0.037	0.005	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.012	0.003	5	01/07/19 16:24	01/08/19 14:36	EPA 7474	1,7474	BV
Nickel, Total	0.164		mg/kg	0.093	0.035	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM
Zinc, Total	7.23		mg/kg	0.934	0.139	2	01/07/19 17:21	01/11/19 15:46	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-29 Date Collected: 12/20/18 10:15

Client ID: B567S03NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.47		mg/kg	0.083	0.028	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM
Cadmium, Total	0.026	J	mg/kg	0.033	0.009	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM
Chromium, Total	0.080	J	mg/kg	0.330	0.030	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM
Copper, Total	1.30		mg/kg	0.083	0.028	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM
Lead, Total	0.204		mg/kg	0.033	0.005	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.010	0.003	5	01/07/19 16:24	01/08/19 14:38	EPA 7474	1,7474	BV
Nickel, Total	0.154		mg/kg	0.083	0.031	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM
Zinc, Total	6.96		mg/kg	0.826	0.123	2	01/07/19 17:21	01/11/19 15:50	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-30 Date Collected: 12/20/18 10:15

Client ID: B567S03NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.48		mg/kg	0.090	0.031	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM
Cadmium, Total	0.031	J	mg/kg	0.036	0.009	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM
Chromium, Total	0.057	J	mg/kg	0.360	0.032	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM
Copper, Total	1.11		mg/kg	0.090	0.030	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM
Lead, Total	0.196		mg/kg	0.036	0.005	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:41	EPA 7474	1,7474	BV
Nickel, Total	0.109		mg/kg	0.090	0.034	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM
Zinc, Total	12.3		mg/kg	0.901	0.134	2	01/07/19 17:21	01/11/19 15:54	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-31 Date Collected: 12/20/18 10:30

Client ID: B567S04NVA Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.61		mg/kg	0.099	0.034	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM
Cadmium, Total	0.023	J	mg/kg	0.040	0.010	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM
Chromium, Total	0.083	J	mg/kg	0.396	0.036	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM
Copper, Total	1.14		mg/kg	0.099	0.033	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM
Lead, Total	0.130		mg/kg	0.040	0.006	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.004	5	01/07/19 16:24	01/08/19 14:43	EPA 7474	1,7474	BV
Nickel, Total	0.142		mg/kg	0.099	0.037	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM
Zinc, Total	7.24		mg/kg	0.990	0.148	2	01/07/19 17:21	01/11/19 15:59	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-32 Date Collected: 12/20/18 10:30

Client ID: B567S04NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.51		mg/kg	0.086	0.030	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM
Cadmium, Total	0.022	J	mg/kg	0.035	0.009	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM
Chromium, Total	0.097	J	mg/kg	0.345	0.031	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM
Copper, Total	1.22		mg/kg	0.086	0.029	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM
Lead, Total	0.133		mg/kg	0.035	0.005	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:46	EPA 7474	1,7474	BV
Nickel, Total	0.126		mg/kg	0.086	0.032	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM
Zinc, Total	6.74		mg/kg	0.862	0.128	2	01/07/19 17:21	01/11/19 16:03	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-33 Date Collected: 12/20/18 10:30

Client ID: B567S04NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.10		mg/kg	0.087	0.030	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM
Cadmium, Total	0.019	J	mg/kg	0.035	0.009	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM
Chromium, Total	0.050	J	mg/kg	0.348	0.031	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM
Copper, Total	0.928		mg/kg	0.087	0.029	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM
Lead, Total	0.137		mg/kg	0.035	0.005	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM
Mercury, Total	0.004	J	mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:53	EPA 7474	1,7474	BV
Nickel, Total	0.076	J	mg/kg	0.087	0.032	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM
Zinc, Total	26.9		mg/kg	0.870	0.130	2	01/07/19 17:21	01/11/19 16:07	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853059
Project Number: 60588790 TASK 10.0
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-34
Client ID: B567S04NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.46		mg/kg	0.089	0.031	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM
Cadmium, Total	0.020	J	mg/kg	0.036	0.009	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM
Chromium, Total	0.076	J	mg/kg	0.357	0.032	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM
Copper, Total	1.14		mg/kg	0.089	0.030	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM
Lead, Total	0.120		mg/kg	0.036	0.005	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM
Mercury, Total	0.006	J	mg/kg	0.011	0.003	5	01/07/19 16:24	01/08/19 14:56	EPA 7474	1,7474	BV
Nickel, Total	0.118		mg/kg	0.089	0.033	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM
Zinc, Total	6.47		mg/kg	0.893	0.133	2	01/07/19 17:21	01/11/19 16:32	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853059
Project Number: 60588790 TASK 10.0
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-35
Client ID: B567S04NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.52		mg/kg	0.086	0.030	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM
Cadmium, Total	0.025	J	mg/kg	0.035	0.009	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM
Chromium, Total	0.081	J	mg/kg	0.345	0.031	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM
Copper, Total	1.17		mg/kg	0.086	0.029	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM
Lead, Total	0.146		mg/kg	0.035	0.005	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM
Mercury, Total	0.010	J	mg/kg	0.011	0.003	5	01/07/19 18:18	01/08/19 14:58	EPA 7474	1,7474	BV
Nickel, Total	0.123		mg/kg	0.086	0.032	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM
Zinc, Total	20.7		mg/kg	0.862	0.128	2	01/07/19 18:18	01/11/19 16:36	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Lab Number: L1853059
Project Number: 60588790 TASK 10.0
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-36
Client ID: B567S05NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis
Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.70		mg/kg	0.095	0.033	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM
Cadmium, Total	0.030	J	mg/kg	0.038	0.010	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM
Chromium, Total	0.072	J	mg/kg	0.381	0.034	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM
Copper, Total	1.73		mg/kg	0.095	0.032	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM
Lead, Total	0.186		mg/kg	0.038	0.006	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM
Mercury, Total	0.010	J	mg/kg	0.012	0.003	5	01/07/19 18:18	01/08/19 15:01	EPA 7474	1,7474	BV
Nickel, Total	0.245		mg/kg	0.095	0.035	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM
Zinc, Total	8.07		mg/kg	0.952	0.142	2	01/07/19 18:18	01/11/19 16:40	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-37 Date Collected: 12/20/18 10:45

Client ID: B567S05NVB Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.58		mg/kg	0.086	0.029	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM
Cadmium, Total	0.026	J	mg/kg	0.034	0.009	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM
Chromium, Total	0.073	J	mg/kg	0.342	0.031	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM
Copper, Total	1.49		mg/kg	0.086	0.029	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM
Lead, Total	0.160		mg/kg	0.034	0.005	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.011	0.003	5	01/07/19 18:18	01/08/19 15:03	EPA 7474	1,7474	BV
Nickel, Total	0.145		mg/kg	0.086	0.032	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM
Zinc, Total	7.97		mg/kg	0.855	0.127	2	01/07/19 18:18	01/11/19 16:44	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-38 Date Collected: 12/20/18 10:45

Client ID: B567S05NVC Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.35		mg/kg	0.085	0.029	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM
Cadmium, Total	0.021	J	mg/kg	0.034	0.009	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM
Chromium, Total	0.075	J	mg/kg	0.339	0.031	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM
Copper, Total	1.18		mg/kg	0.085	0.028	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM
Lead, Total	0.099		mg/kg	0.034	0.005	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM
Mercury, Total	0.009	J	mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:40	EPA 7474	1,7474	BV
Nickel, Total	0.117		mg/kg	0.085	0.032	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM
Zinc, Total	32.6		mg/kg	0.847	0.126	2	01/07/19 12:48	01/11/19 18:11	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-39 Date Collected: 12/20/18 10:45

Client ID: B567S05NVD Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.62		mg/kg	0.089	0.030	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM
Cadmium, Total	0.025	J	mg/kg	0.035	0.009	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM
Chromium, Total	0.090	J	mg/kg	0.354	0.032	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM
Copper, Total	1.28		mg/kg	0.089	0.030	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM
Lead, Total	0.151		mg/kg	0.035	0.005	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM
Mercury, Total	0.010	J	mg/kg	0.011	0.003	5	01/07/19 12:48	01/08/19 13:42	EPA 7474	1,7474	BV
Nickel, Total	0.125		mg/kg	0.089	0.033	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM
Zinc, Total	6.93		mg/kg	0.885	0.132	2	01/07/19 12:48	01/11/19 19:02	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-40 Date Collected: 12/20/18 10:45

Client ID: B567S05NVE Date Received: 12/26/18

Sample Location: NEW HAVEN, CT Field Prep: Not Specified

Sample Depth:

Matrix: Nereis

Percent Solids: Results are reported on an 'AS RECEIVED' basis.

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	1.46		mg/kg	0.093	0.032	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM
Cadmium, Total	0.020	J	mg/kg	0.037	0.010	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM
Chromium, Total	0.087	J	mg/kg	0.370	0.033	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM
Copper, Total	1.28		mg/kg	0.093	0.031	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM
Lead, Total	0.143		mg/kg	0.037	0.005	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM
Mercury, Total	0.008	J	mg/kg	0.012	0.003	5	01/07/19 12:48	01/08/19 13:45	EPA 7474	1,7474	BV
Nickel, Total	0.128		mg/kg	0.093	0.034	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM
Zinc, Total	15.0		mg/kg	0.926	0.138	2	01/07/19 12:48	01/11/19 19:06	EPA 3051A	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03,11-20,38-40 Batch: WG1195377-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	01/07/19 14:05	01/11/19 15:58	1,6020B	AM

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 01-03,11-20,38-40 Batch: WG1195379-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	01/07/19 12:18	01/08/19 12:38	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21-37 Batch: WG1195380-1										
Arsenic, Total	ND		mg/kg	0.100	0.034	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM
Cadmium, Total	ND		mg/kg	0.040	0.011	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM
Chromium, Total	ND		mg/kg	0.400	0.036	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM
Copper, Total	ND		mg/kg	0.100	0.033	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM
Lead, Total	ND		mg/kg	0.040	0.006	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM
Nickel, Total	ND		mg/kg	0.100	0.037	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM
Zinc, Total	ND		mg/kg	1.00	0.149	2	01/07/19 16:24	01/11/19 13:57	1,6020B	AM

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3051A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 21-37 Batch: WG1195383-1										
Mercury, Total	ND		mg/kg	0.013	0.004	5	01/07/19 16:24	01/08/19 13:47	1,7474	BV

Prep Information

Digestion Method: EPA 7474

Lab Control Sample Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20,38-40 Batch: WG1195377-2								
Arsenic, Total	98		-		75-125	-		20
Cadmium, Total	99		-		75-125	-		20
Chromium, Total	92		-		75-125	-		20
Copper, Total	87		-		75-125	-		20
Lead, Total	103		-		75-125	-		20
Nickel, Total	91		-		75-125	-		20
Zinc, Total	94		-		75-125	-		20
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20,38-40 Batch: WG1195379-2 SRM Lot Number: HPHGAF								
Mercury, Total	110		-		80-120	-		20
Total Metals - Mansfield Lab Associated sample(s): 21-37 Batch: WG1195380-2								
Arsenic, Total	100		-		75-125	-		20
Cadmium, Total	101		-		75-125	-		20
Chromium, Total	94		-		75-125	-		20
Copper, Total	92		-		75-125	-		20
Lead, Total	100		-		75-125	-		20
Nickel, Total	95		-		75-125	-		20
Zinc, Total	97		-		75-125	-		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 21-37 Batch: WG1195383-2 SRM Lot Number: HPHGAF					
Mercury, Total	104	-	80-120	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0
Lab Number: L1853059
Report Date: 01/25/19

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20,38-40 QC Batch ID: WG1195377-3 WG1195377-4 QC Sample: L1853059-01 Client ID: B567PRENVA												
Arsenic, Total	2.07	11	12.3	93		13.6	102		75-125	10		20
Cadmium, Total	0.030J	4.68	4.33	92		4.86	101		75-125	12		20
Chromium, Total	0.297J	18.3	15.7	86		17.8	94		75-125	13		20
Copper, Total	1.11	22.9	20.4	84		23.2	94		75-125	13		20
Lead, Total	0.254	46.8	45.0	96		51.0	105		75-125	13		20
Nickel, Total	0.291	45.9	39.8	86		44.6	94		75-125	11		20
Zinc, Total	7.70	45.9	53.6	100		54.9	100		75-125	2		20
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20,38-40 QC Batch ID: WG1195379-4 WG1195379-5 QC Sample: L1853059-01 Client ID: B567PRENVA												
Mercury, Total	0.003J	0.584	0.589	101		0.609	105		80-120	3		20
Total Metals - Mansfield Lab Associated sample(s): 21-37 QC Batch ID: WG1195380-3 WG1195380-4 QC Sample: L1853059-21 Client ID: B567S02NVA												
Arsenic, Total	1.62	10.8	12.0	96		12.3	98		75-125	2		20
Cadmium, Total	0.041	4.59	4.68	101		4.55	97		75-125	3		20
Chromium, Total	0.047J	18	16.8	93		16.9	93		75-125	1		20
Copper, Total	1.06	22.5	21.8	92		21.6	90		75-125	1		20
Lead, Total	0.302	45.9	46.4	100		47.1	101		75-125	1		20
Nickel, Total	0.103	45	42.5	94		41.8	92		75-125	2		20
Zinc, Total	7.09	45	50.5	96		49.9	94		75-125	1		20
Total Metals - Mansfield Lab Associated sample(s): 21-37 QC Batch ID: WG1195383-3 WG1195383-4 QC Sample: L1853059-21 Client ID: B567S02NVA												
Mercury, Total	ND	0.53	0.617	116		0.592	103		80-120	4		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20,38-40 QC Batch ID: WG1195377-5 QC Sample: L1853059-02 Client ID: B567PRENVB						
Arsenic, Total	2.08	2.13	mg/kg	2		20
Cadmium, Total	0.030J	0.031J	mg/kg	NC		20
Chromium, Total	0.288J	0.293J	mg/kg	NC		20
Copper, Total	1.18	1.13	mg/kg	4		20
Lead, Total	0.264	0.257	mg/kg	3		20
Nickel, Total	0.314	0.312	mg/kg	1		20
Zinc, Total	7.75	10.1	mg/kg	**26**	Q	20
Total Metals - Mansfield Lab Associated sample(s): 01-03,11-20,38-40 QC Batch ID: WG1195379-6 QC Sample: L1853059-02 Client ID: B567PRENVB						
Mercury, Total	ND	ND	mg/kg	NC		20
Total Metals - Mansfield Lab Associated sample(s): 21-37 QC Batch ID: WG1195380-5 QC Sample: L1853059-22 Client ID: B567S02NVB						
Arsenic, Total	1.38	1.48	mg/kg	7		20
Cadmium, Total	0.037	0.035J	mg/kg	NC		20
Chromium, Total	0.074J	0.053J	mg/kg	NC		20
Copper, Total	0.928	0.991	mg/kg	7		20
Lead, Total	0.199	0.215	mg/kg	8		20
Nickel, Total	0.127	0.132	mg/kg	4		20
Zinc, Total	5.88	19.4	mg/kg	**107**	Q	20
Total Metals - Mansfield Lab Associated sample(s): 21-37 QC Batch ID: WG1195383-5 QC Sample: L1853059-22 Client ID: B567S02NVB						
Mercury, Total	ND	ND	mg/kg	NC		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1195377-6

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	55	Q	65-139
Cadmium, Total	61	Q	67-135
Copper, Total	85		65-138
Lead, Total	99		56-155
Zinc, Total	54	Q	66-136

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1195379-3

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	69		41-183

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1195380-8

Parameter	% Recovery	Qual	QC Criteria
Arsenic, Total	68		65-139
Cadmium, Total	78		67-135
Copper, Total	97		65-138
Lead, Total	125		56-155
Zinc, Total	66		66-136

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

S.R.M. Standard Quality Control

Standard Reference Material (SRM): WG1195383-6

Parameter	% Recovery	Qual	QC Criteria
Mercury, Total	91		41-183

INORGANICS
&
MISCELLANEOUS

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-01
Client ID: B567PRENVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.683		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-02
Client ID: B567PRENVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.791		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-03
Client ID: B567PRENVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.891		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-11
Client ID: B567R01NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.656		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-12
Client ID: B567R01NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.790		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-13
Client ID: B567R01NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.529		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-14
Client ID: B567R01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.758		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-15
Client ID: B567R01NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.830		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-16
Client ID: B567S01NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.657		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-17
Client ID: B567S01NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.807		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-18
Client ID: B567S01NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.830		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-19
Client ID: B567S01NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.519		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-20
Client ID: B567S01NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 09:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	90.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.625		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-21
Client ID: B567S02NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.646		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-22
Client ID: B567S02NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.736		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-23
Client ID: B567S02NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.553		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-24
Client ID: B567S02NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.676		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-25
Client ID: B567S02NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:00
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.537		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-26
Client ID: B567S03NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.716		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-27
Client ID: B567S03NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.472		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-28
Client ID: B567S03NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.851		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-29
Client ID: B567S03NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.624		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-30
Client ID: B567S03NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:15
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.922		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-31
Client ID: B567S04NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.695		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-32
Client ID: B567S04NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.597		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-33
Client ID: B567S04NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	91.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.382		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-34
Client ID: B567S04NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	89.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.503		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-35
Client ID: B567S04NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:30
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	88.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.681		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-36
Client ID: B567S05NVA
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.688		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-37
Client ID: B567S05NVB
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.759		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-38
Client ID: B567S05NVC
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.758		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-39
Client ID: B567S05NVD
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	86.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.958		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

SAMPLE RESULTS

Lab ID: L1853059-40
Client ID: B567S05NVE
Sample Location: NEW HAVEN, CT

Date Collected: 12/20/18 10:45
Date Received: 12/26/18
Field Prep: Not Specified

Sample Depth:
Matrix: Nereis

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab										
Moisture	87.0		%	0.100	0.100	1	-	01/04/19 13:00	121,2540G	GD
Percent Lipids	0.821		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Project Name: NEW HAVEN HARBOR SUPPLEMENT **Lab Number:** L1853059

Project Number: 60588790 TASK 10.0 **Report Date:** 01/25/19

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mansfield Lab for sample(s): 01-03,11-20 Batch: WG1195192-1										
Percent Lipids	ND		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL
General Chemistry - Mansfield Lab for sample(s): 21-40 Batch: WG1195205-1										
Percent Lipids	ND		%	0.100	NA	1	-	01/07/19 00:00	111,-	AL

Lab Duplicate Analysis

Batch Quality Control

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL

Project Number: 60588790 TASK 10.0

Lab Number: L1853059

Report Date: 01/25/19

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1194770-1 QC Sample: L1853059-02 Client ID: B567PRENVB						
Moisture	86.0	86.0	%	0		10
General Chemistry - Mansfield Lab Associated sample(s): 21-32 QC Batch ID: WG1194771-1 QC Sample: L1853059-22 Client ID: B567S02NVB						
Moisture	89.0	88.0	%	1		10
General Chemistry - Mansfield Lab Associated sample(s): 33-40 QC Batch ID: WG1194772-1 QC Sample: L1853059-33 Client ID: B567S04NVC						
Moisture	91.0	92.0	%	1		10
General Chemistry - Mansfield Lab Associated sample(s): 01-03,11-20 QC Batch ID: WG1195192-2 QC Sample: L1853059-02 Client ID: B567PRENVB						
Percent Lipids	0.791	0.791	%	0		20
General Chemistry - Mansfield Lab Associated sample(s): 21-40 QC Batch ID: WG1195205-2 QC Sample: L1853059-22 Client ID: B567S02NVB						
Percent Lipids	0.736	0.775	%	5		20

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
B	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-01A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-02A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-03A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-04A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-05A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-06A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-07A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-08A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-09A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-10A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-ARCHIVE(),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-11A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-12A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-13A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-14A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-15A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-16A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-17A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-18A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-19A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-20A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-21A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-22A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-23A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-24A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-25A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-26A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-27A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-28A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-29A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-30A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-31A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-32A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-33A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-34A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-35A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name: NEW HAVEN HARBOR SUPPLEMENTAL
Project Number: 60588790 TASK 10.0

Lab Number: L1853059
Report Date: 01/25/19

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L1853059-36A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-37A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-38A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-39A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)
L1853059-40A	Glass 250ml/8oz unpreserved	B	NA		-6.7	Y	Absent		A2-PB-6020T(180),A2-RIM-PAH/PCBCONG(14),A2-MOISTURE-2540(7),A2-NI-6020T(180),A2-ZN-6020T(180),A2-LIPIDS(7),A2-CR-6020T(180),A2-AS-6020T(180),A2-CD-6020T(180),A2-HG-7474T(365),A2-HGPREP-AF(28),A2-PREP-3051(180),A2-CU-6020T(180),A2-RIM-PEST-8081(14)

*Values in parentheses indicate holding time in days

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853059
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GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Report Format: DU Report with 'J' Qualifiers

Project Name:	NEW HAVEN HARBOR SUPPLEMENTAL	**Lab Number:**	L1853059
Project Number:	60588790 TASK 10.0	**Report Date:**	01/25/19

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

Report Format: DU Report with 'J' Qualifiers

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

105 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IIIA, 1997 in conjunction with NOAA Technical Memorandum NMFS-NWFSC-59: Extraction, Cleanup and GC/MS Analysis of Sediments and Tissues for Organic Contaminants, March 2004 and the Determination of Pesticides and PCBs in Water and Oil/Sediment by GC/MS: Method 680, EPA 01A0005295, November 1985.

111 NOAA Technical Memorandum NOS ORCA 130: Sampling and Analytical Methods of the National Status and Trends Program Mussel Watch Project: 1993-196 Update. March 1998.

121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), Methyl methacrylate, 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.

EPA 6860: SCM: Perchlorate

SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	N/A
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	No – see case narrative
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	Yes
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	Yes
15. Were the SRM/CRM analyses within acceptance criteria?	No – see case narrative
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	No – see case narrative
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	No – see case narrative
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	Yes
19. Were surrogate recoveries within the required acceptance criteria?	Yes

Table II-1 (*Continued*): Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
20. Were corrective action forms provided for all non-conforming data?	Yes
21. Were all the species-specific test conditions in Appendix V met?	
22. Were the test-specific age requirements met for each test species?	
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	

Table II-2: Quality Control Summary for Analyses of Polyaromatic Hydrocarbons (PAHs) and other base-neutrals in Sediment and Tissue Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package
Internal Standard Areas	Within 50 to 200% of internal standards in continuing calibration check	Yes		Retained at Lab

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-3: Quality Control Summary for the Analyses of Pesticides in Sediment, Tissue, and Water Matrices

Method Reference Number: 8081B

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No All within SOP criteria	CCV associated with L1853059-01 through -03, -11 through -20: Column B: cis-Nonachlor @ 19%, 4,4'-DDT @ 18%, Methoxychlor @ 17%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	Yes		In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	Yes		In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-4: Quality Control Summary for Analyses of Polychlorinated Biphenyls (PCB Congeners) in Sediment, Tissue, and Water Matrices

Method Reference Number: 8270D

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)	Yes		Retained at Lab
Continuing Calibration	Every 20 injections (± 15 % D)	No All within SOP limits	CCV associated with batch QC: Cl3-BZ#18 @ 16%, Cl4-BZ#52 @ 18% CCV associated with L1853059-01 through -03, 11 through -21: Cl4-BZ#52 @ 17% CCV associated with L1853059-22 through -40: Cl4-BZ#52 @ 16%	Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	Cl3-BZ#28 @ 35%	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)	No	L1853059-01MS: Cl4-BZ#49 @ 49% L1853059-01MSD: Cl3-BZ#18 @ 193% %RPD: Cl3-BZ#18 @ 55%	In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1853059-02D: Cl6-BZ#153 @ 32%, Cl7-BZ#180 @ 35%, Cl7-BZ#187 @ 39%	In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)	Yes		In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-5: Quality Control Summary for Analyses of Metals in Sediments, Tissue, and Water Matrices

Method Reference Numbers: Various Reference Numbers

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Linear Range Determination for ICP	Performed Quarterly	No	Annually	Retained at Lab
Initial Calibration for AA, Hg	Performed Daily (Correlation Coefficient ≥0.995)	Yes		Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)	Yes		Retained at Lab and On file at USACoE-NED
Initial Calibration Verification/ Continuing Calibration Verification	Hg: 80 to 120% recovery Other metals: 90 to 110% recovery	Yes		Retained at Lab
Initial Calibration Blank/ Continuing Calibration Blank	No target analytes > Instrument Detection Limit (IDL)	Yes		Retained at Lab
Standard Reference Materials	Within the limits provided by vendor	No	WG1195377-6 As(55%), Cd(61%), Zn(54%)	In Data Package
Method Blank	No target analytes > RL	Yes		In Data Package
Sample Spike/ Sample Duplicate	One set per group of field samples. Must contain all target analytes. Recovery Limits (75 to 125%; RPD < 20% or < 35%)	Yes		In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)	No	L1853059-02D: Zn (26%) L1853059-22D: Zn (107%)	In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-6: Quality Control Summary for Analyses of other Organic Chemicals not listed in Sediment, Tissue, and Water Matrices

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Initial Calibration	Must be performed prior to the analysis of any QC sample or field sample (<20 % RSD for each compound)			Retained at Lab
Calculation of Method Detection Limits (MDLs)	For each matrix, analyzed once per 12 month period (see Section 5.2 for MDL procedure)			In Data Package
Calibration Verification (Second Source)	Once, after initial calibration (80 to 120% recovery of each compound)			Retained at Lab
Continuing Calibration	At the beginning of every 12 hour shift (± 15 % D)			Retained at Lab
Standard Reference Materials	Within the limits provided by vendor			In Data Package
Method Blank	No target analytes > RL			In Data Package
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	One set (MS/MSD) per group of field samples. Must contain all target analytes. (Recovery Limits 50 to 120%; RPD <30%)			In Data Package
Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 30%)			In Data Package
Surrogate Recoveries	Calculate % recovery (30 to 150% recovery)			In Data Package
Internal Standard Areas (if applicable)	Within 50 to 200% of internal standards in continuing calibration check			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-7: Quality Control Summary for Analyses of Sediment Grain Size and Total Organic Carbon

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Grain Size: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD < 25%)			In Data Package
Total Organic Carbon: Standard Reference Materials	Within the limits provided by vendor			In Data Package
Total Organic Carbon: Analytical Replicates	Analyze one sample in duplicate for each group of field samples (RPD <30%)			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species			In Data Package
Test species age	Age/health within guidelines for each species (Appendix V)			In Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No			In Data Package
Water column toxicity test: Control mortality Control abnormality	 < 10% mean < 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae			In Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 < 10% mean (no chamber >20%) See EPA (1994a) Section 9; Table 11.3			In Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

Reference:

Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters, U.S. EPA and U.S. Army Corps of Engineers, New England District, April 2004.

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Serial_No:01251915:41

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31250(NV)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
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Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
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011	B567R01NvA	12/20/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
012	B567R01NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

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Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
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017	B567S01NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
018	B567S01NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
019	B567S01NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
020	B567S01NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
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023	B567S02NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
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Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
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Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
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029	B567S03NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
030	B567S03NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
031	B567S04NvA	12/20/18	1030	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
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034	B567S04NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
035	B567S04NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
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Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
037	B567S05NvB	12/20/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
038	B567S05NvC	12/20/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
039	B567S05NvD	12/20/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
040	B567S05NvE	12/20/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
				ESI	C							
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Relinquished By: T. Hubbell	Date: 12/26/18 Time: 1350	Received at Lab By: [signature]	Date: 12/26/18 Time: 1350

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Appendix D: Biology Data

Appendix D.1: Suspended Particulate Phase Evaluation

AECOM Imagine it. Delivered.

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

January 14, 2019

SPP Final Report (Base and Ammonia-Reduced Tasks)

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003 TO#5
Delivery Order No.: W912WJ18F0109

Suspended Particulate Phase Evaluation

Prepared For:

AECOM
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Prepared By:

EnviroSystems, an affiliate of Enthalpy Analytical LLC
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EnviroSystems, Inc. Master Reference 31242
Study Specific References 31248 / 31291
Report Issue Date: January 8, 2019
Assay Start: October 2018

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, an affiliate of Enthalpy Analytical LLC, at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal In New England Waters* (RIM) with relevant updates. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation section of this report.

For EnviroSystems, Inc._____ January 8, 2019

Kirk Cram — Date

Laboratory Director

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor 2018 Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003 TO#5
Delivery Order No.: W912WJ18F0109

Suspended Particulate Phase Evaluation

1.0 INTRODUCTION

As part of a comprehensive plan to reduce adverse environmental impacts of ocean dumping, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 specifies that all sediments to be discharged into ocean waters must be evaluated to define their potential impact on existing benthic communities. The United States Environmental Protection Agency (US EPA) has determined that the most effective means to make such an assessment is through the use of bioassay tests, which provide a relatively direct estimate of potential impact.

This project was designed to evaluate the potential toxicity of sediments from the area of dredging proposed for the New Haven Harbor 2018 Federal Navigation Project (FNP) located in New Haven, Connecticut. Placement of dredge materials is proposed at the Central Long Island Sound Disposal Site (CLDS).

Testing involved conduct of Suspended Particulate Phase (SPP) assays using the mysid, *Americamysis bahia*, inland silverside minnow, *Menidia beryllina*, and larvae of the sea urchin, *Arbacia punctulata*. Testing followed procedures established by the US EPA and the US Army Corps of Engineers (US ACE) for testing of dredged material, including *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE 2004), *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual* (US EPA, US ACE 1991) and *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual* (US EPA, US ACE 1998).

2.0 MATERIALS AND METHODS

2.1 Sample Collection, Preservation and Storage

Sediment cores for toxicological analysis were collected by the US ACE New England District (CENAE) using vibracoring equipment from locations identified in the dredge footprint specified in the project Work Plan (AECOM, 2018). Site water samples were also collected by the CENAE. Samples were received from AECOM, Chelmsford, Massachusetts under chain of custody in 3.5 gallon polyethylene buckets for sediment and in 5 gallon cubitainers for water. Sediment samples were composited based on the compositing scheme outlined in the Work Plan. Reference sediment and water samples were collected by the AECOM field team from the CLDS. Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Prior to testing, samples were placed in a secure refrigerator and stored at a temperature of $4 \pm 2°C$ until test initiation. Sample identification, collection and receipt information is summarized in Table 1. Sample compositing information is provided in Table 2.

Water for the internal laboratory control is pumped in daily from the Hampton-Seabrook Estuary and stored in holding tanks. Seawater is obtained through a filter system located on the bottom of the

estuary at a point approximately 1 mile from the open ocean. The estuary receives no direct industrial discharges. Laboratory water is aerated through the collection system and in individual storage containers and test chambers. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. The laboratory control (0%) was included to verify the health of the test organisms, and as a relative benchmark for reference site toxicity.

2.2 Sediment Preparation

Sediments were press sieved through a 2-mm stainless steel screen to remove large stones, sticks, roots, man-made material and indigenous organisms. Once sieved, a portion of each sample was used to initiate elutriate sample preparation for use in "unmitigated" assays. Unionized ammonia levels were determined in the undiluted "unmitigated" elutriate samples prior to test initiation. CENAE was notified that the unionized ammonia concentrations were greater than 0.1 mg/L and ESI was authorized to prepare additional elutriate samples from sediments treated to reduce ammonia levels and conduct additional SPP toxicity testing for all six composites.

The process for treating the sediments to reduce ammonia levels followed the Ferretti method (Ferretti et al, 2000), which involved loading a portion of each composite sediment sample into clean HDPE vessels to a depth of 7-11 mm and adding clean overlying water in a 1:3 ratio of sediment to water. A thin piece of plastic was placed over the sediment prior to adding the overlying water in an effort to keep the sediment from becoming suspended during the addition. The thin piece of plastic was slowly removed after the overlying water was added. Each mitigation vessel was aerated and the temperature, pH, specific conductivity, salinity and dissolved oxygen were recorded daily prior to siphoning off the overlying water.

A small sub-sample was removed daily from each sediment composite and centrifuged to extract pore water. Temperature, pH and salinity of the extract were recorded and the pore water was subsequently analyzed for total ammonia. These data were used to calculate the pore water unionized ammonia levels daily. When the daily value of any composite was below the target threshold of 0.1 mg/L unionized ammonia (AECOM, 2018), composites were removed from their mitigation vessels, placed in clean HDPE 1-gallon buckets and refridgerated prior to preparing elutriate solutions for use in "mitigated" assays. A summary of the pore water quality and ammonia data generated during the mitigation phase is provided in Table 3 and in Appendix A.

2.3 Elutriate Sample Preparation

Elutriate samples were prepared by placing one volume of test sediment and four volumes of overlying site water in a stainless steel container and mixing with a mechanical stirring blade, both made of inert materials, for 30 minutes. Speed of the stirring motor was set so that the sample did not cavitate, entrain air, and oxidize the sample, while at the same time keeping the sediment in suspension. After mixing, the sediment and water mixture was allowed to settle for an hour. The resulting supernatant solution was then removed by siphon and centrifuged for up to 20 minutes at 3,000 rpm for the SPP evaluation and at 5,000 rpm for chemical analysis. A summary of the elutriate preparation is provided in Table 4, and original elutriate preparation forms are provided in Appendix A.

Test concentrations were mixed by diluting the respective elutriate samples with overlying water collected from the CLDS reference site with one exception as described in Section 3.3.2, dilutions for an *A. punctulata* re-test were mixed using laboratory control seawater in lieu of CLDS reference water, which had exceeded its hold time. Test concentrations for all assays were 0% (laboratory control), 0% (CLDS reference water) except as noted for the *A. punctulata* re-test, 1%, 10%, 50% and 100% (undiluted) elutriate.

2.4 Test Species

A. bahia were ≤5 days old and were obtained from cultures maintained by Aquatic Research Organisms (ARO), Hampton, New Hampshire. *M. beryllina* were 9-14 days old at the start of the assay and

were also obtained from ARO. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. Organisms were transferred to test vessels using a large bore pipet to minimize the amount of water added to test solutions.

Adult *A. punctulata* were from cultures maintained by ESI, and original stock was obtained from ARO. Adult sea urchins are maintained in the laboratory for as long as they are viable. Male and female urchins are maintained in separate chambers at a temperature of approximately 12±3°C after spawning.

2.5 Suspended Particulate Phase Assays

Two sets of SPP assays were completed using the unmitigated and mitigated sediment prepared as described in Section 2.2, each with their own paired laboratory control and CLDS reference. The ammonia mitigated assays were run as a result of observed toxicity in the unmitigated studies, as determined by CENAE. Conduct of these assays, and implementation of the Ferretti method for ammonia mitigation in the sediments, is driven by the high probability that observed effects in the unmitigated studies are a function of test solution ammonia content. Other than the different sediment preparations, assay conduct for both the unmitigated and mitigated sediment was the same. In addition, the unmitigated assays were completed in two batches, each with their own paired laboratory control and CLDS reference with elutriate solutions 1, 2 and 6 included in the first batch and elutriate solutions 3, 4 and 5 included in the second batch. The mitigated assays were completed using all six elutriate solutions, one shared laboratory control and one shared CLDS reference for each species.

2.5.1 SPP Evaluations - *A. bahia* and *M. beryllina*

The 96 hour static acute toxicity tests were conducted at 20±2°C with a photoperiod of 16:8 hours light:dark. Test chambers were 250 mL beakers containing 200 mL of test solution in each of 5 replicates with 10 organisms/replicate. Survival in all test replicates was recorded after 1, 24, 48, 72, and 96 hours of exposure. Dissolved oxygen, pH, temperature and salinity were measured daily in one replicate of each treatment. *A. bahia* and *M. beryllina* were fed twice daily throughout testing. Salinity was checked daily and adjusted down as needed using de-ionized water.

2.5.2 Embryo Survival and Development SPP Evaluation - *A. punctulata*

The *A. punctulata* embryo survival and development assays were conducted at 20±1°C with a photoperiod of 16:8 hours light:dark. Test chambers for the acute assays were 250 mL glass beakers containing 200 mL test solution in each of 5 replicates. Dissolved oxygen, pH, temperature and salinity were measured in one replicate of each treatment at the start and end of the test. Gametes were obtained by potassium chloride injection to induce spawning. Gametes were collected and diluted with filtered laboratory seawater to yield approximate stock concentrations. Measured aliquots of gamete stock solutions were combined, fertilization success was monitored 15 minutes later, and the density of embryos was calculated. Sufficient embryos were removed from the stock solution and added to each test vessel to achieve a final concentration of approximately 20 to 30 embryos/mL of solution (US EPA Region 1, CENAE. 2004). Prior to transferring embryos from the holding vessel to the individual test vessels, the embryo stock solution was thoroughly homogenized to ensure even distribution. Embryo counts in three surrogate vessels were conducted just after the addition of the embryos for comparison with the actual embryo concentrations in the final elutriate solutions.

Observations in surrogate vessels were used to evaluate test completion. The test is terminated when approximately 90% of the fertilized embryos have reached the pluteus larval stage in the controls (between 48 and 96 hours). On termination, 5 mL aliquots of each test replicate were preserved with 10% buffered formalin solution. All larvae in the 5 mL aliquot were counted to determine survival and normal development. The period of assay conduct is presented in Table 5.

2.6 Data Analysis

Survival and development data were analyzed using CETIS™ (Comprehensive Environmental Toxicity Information System) v1.9.3.0 software to calculate the concentration that elicited a response in 50% of the test population, referred to as the median lethal concentration (LC-50) and/or effect concentration (EC-50). These point estimates were calculated using the non-parametric Spearman-Kärber method when a response was observed in 50% or more of the tested organisms. In situations where less than 50% of the tested population was affected, point estimates were calculated by linear interpolation.

2.7 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Summaries of reference toxicant assays conducted in support of this study are provided in Table 6.

3.0 RESULTS AND DISCUSSION

A summary of assay acceptability and laboratory control performance for the unmitigated and mitigated assays is provided in Tables 7 and 8, respectively, and calculated endpoints for each species are provided in Table 9. Water quality characteristics for the unmitigated and mitigated assays are summarized in Tables 10 and 11. Laboratory bench sheets, water quality data, and associated statistical support data are included in Appendix A.

3.1 SPP Evaluations - *A. bahia*

3.1.1 Unmitigated Sediment

At the end of the 96 hour exposure period, *A. bahia* survival was 100% in the laboratory control and 100% in the CLDS reference water treatment for both batches of unmitigated assays completed. These assays meet the minimum test acceptability criterion of ≥90% survival in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

Review of data generated at the end of the assays documented that the mysid LC-50s were >100% following exposure to elutriate solutions 1, 2, 4 and 6, however there were significant negative effects on mysid survival after exposure to elutriate solutions 3 and 5, which were prepared using unmitigated sediment. LC-50s for these elutriate solutions were 74% and 73%, respectively.

3.1.2 Mitigated Sediment

At the end of the 96 hour exposure period, *A. bahia* survival was 100% in the laboratory control and 100% in the CLDS reference water treatment. This assay meets the minimum test acceptability criterion of ≥90% survival in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

Review of data generated at the end of the assays documented that the mysid LC-50s were >100% for all the elutriate solutions prepared using mitigated sediments.

3.2 SPP Evaluations - *M. beryllina*

3.2.1 Unmitigated Sediment

The first batch of *M. beryllina* assays conducted using unmitigated sediment for elutriate solutions

1, 2 and 6 demonstrated poor performance in the laboratory control within 24 hours, therefore that assay was terminated and re-started using the same elutriate sample (within hold time) and lot of test organisms. The bench sheets for the terminated (failed) assay are included in Appendix A.

At the end of the 96 hour exposure period, *M. beryllina* survival was 96% in the laboratory control and 98% in the CLDS reference water treatment for the assays completed on elutriate solutions 1, 2 and 6. *M. beryllina* survival was 90% in the laboratory control and 98% in the CLDS reference water treatment for the assays completed on elutriate solutions 3, 4 and 5.These assays meet the minimum test acceptability criterion of ≥90% survival in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

Review of data generated at the end of the assays documented that there were significant negative effects on minnow survival from elutriate solutions 1, 2, 3, 4 and 5, which were prepared using unmitigated sediments. LC-50s for these elutriate solutions ranged from 56% to 69%. The minnow LC-50 was >100% for elutriate solution 6.

3.2.2 Mitigated Sediment

At the end of the 96 hour exposure period, *M. beryllina* survival was 90% in the laboratory control and 92% in the CLDS reference water treatment. This assay meets the minimum test acceptability criterion of ≥90% survival in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

Review of data generated at the end of the assays documented that the minnow LC-50s were >100% for all the elutriate solutions prepared using mitigated sediments.

3.3 SPP Evaluations - *A. punctulata*

3.3.1 Unmitigated Sediment

Counts made in the laboratory control surrogate test vessels at the initiation of the *A. punctulata* assay for elutriate solutions 1, 2 and 6 indicated an average initial embryo concentration of 121 embryos/5mL, equal to approximately 24 embryos/mL. The assay was terminated after 90 hours exposure when it was determined that the majority of the larvae (>90%) in the surrogate chambers had reached the pluteus larval stage. Embryo counts in the laboratory control treatment showed 78% of the embryos survived at the end of the assay. Of the original embryos, 77% were normally developed pluteus larvae. This meets the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

Counts made in the laboratory control surrogate test vessels at the initiation of the *A. punctulata* assay for elutriate solutions 3, 4 and 5 indicated an average initial embryo concentration of 132 embryos/5mL, equal to approximately 26 embryos/mL. The assay was terminated after 74 hours exposure when it was determined that the majority of the larvae (>90%) in the surrogate chambers had reached the pluteus larval stage. Embryo counts in the laboratory control treatment showed 86% of the embryos survived at the end of the assay. Of the original embryos, 85% were normally developed pluteus larvae. This meets the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

Review of the data generated at the end of the assays indicate that all the elutriate solutions prepared using unmitigated sediment had significant negative impacts on urchin embryonic survival and/or development, with LC-50s and EC-50s based on Spearman-Kärber calculation ranging from 3-22% for both

survival and development.

3.3.2 Mitigated Sediment

The *A. punctulata* assay initiated on October 31, 2018 using the same elutriate sample as the *A. bahia* and *M. beryllina* assays failed to meet test acceptability in the laboratory control. A passing assay was initiated on November 21, 2018 using a different lot of test organisms and a second set of elutriate samples generated using a new site water sample because the original sample had exceeded its hold time. The dilutions for the SPP were mixed using laboratory control seawater in lieu of CLDS reference water, which had also exceeded its hold time. Refer to Appendix A for a copy of the email communication regarding use of laboratory water to mix the dilutions for this assay.

Counts made in the laboratory control surrogate test vessels at the initiation of the *A. punctulata* assay indicated an average initial embryo concentration of 105 embryos/5mL, equal to approximately 21 embryos/mL. The assay was terminated after 68 hours exposure when it was determined that the majority of the larvae (>90%) in the surrogate chambers had reached the pluteus larval stage. Embryo counts in the laboratory control treatment showed 76% of the embryos survived at the end of the assay. Of the original embryos, 74% were normally developed pluteus larvae. This meets the minimum test acceptability criteria of ≥70% embryo survival and ≥70% normal development in the laboratory control indicating that the test organisms were healthy and not stressed by handling. These data are considered valid for evaluating impacts associated with the elutriate samples.

The EC-50s for development and LC-50s for survival generated from the urchin assay data were >100% in all the elutriate solutions prepared using mitigated sediment.

3.4 Water Quality Data

3.4.1 Unmitigated Sediment

Temperature data collected during daily water quality observations documented values ranging from 14°C to 23°C, salinity levels ranging from 28 to 33‰ and dissolved oxygen levels ranging from 5.5 to 10.1 mg/L (Table 7). Test acceptability criteria requires a mean temperature of 20±2°C (20±1°C for *A. punctulata*), salinity within a range of 30±2‰ and dissolved oxygen of ≥40% (approximately equal to 3.3 mg/L for assays maintained at 20°C, 30‰ and a barometric pressure of 760 inches Hg). Please see section 3.5 for a discussion of protocol deviations related to salinity and temperature.

Total ammonia levels were elevated (12 to 37 mg/L) at the start of the assays in all six elutriate solutions prepared using unmitigated sediment, which is equivalent to calculated unionized ammonia levels of 0.35 to 0.53 mg/L depending on sample pH and temperature (Table 10). These levels are higher than the target threshold of 0.1 mg/L unionized ammonia for assay initiation. Total ammonia levels decreased somewhat throughout the life of the assays, but because the pH drifted upwards of approximately 8 SU in the composite elutriate solutions this resulted in higher unionized ammonia levels at assay end (generally >0.8 mg/L in the undiluted elutriate). Ammonia was not detected in either the laboratory control or CLDS reference water at the start, and while it was detected by assay end the calculated unionized ammonia levels remained ≤0.03 mg/L in the controls.

US EPA guidance suggests ammonia, generally in the unionized form, can be a source of toxicity when total ammonia values are >5 mg/l (USEPA 2002). US EPA Ambient Water Quality Criteria (AWQC) for unionized ammonia in saltwater references LC-50 values for two of the species tested: *A. bahia* (1.04 mg/L) and *M. beryllina* (0.88 mg/L) (USEPA 1989). AWQC for unionized ammonia in saltwater are not available for *A. punctulata*, however effects levels are available in the literature for urchin species ranging from 0.06 mg/L for an EC-50 for development (Maguire Group Inc., 2003) to approximately 0.336 mg/L for a 96-hour LC-50 (Chang-Hoon Lee et al., 2013). Based on the calculated unionized ammonia levels, it seems likely that the total and/or unionized ammonia content contributed to the observed toxicity.

3.4.2 Mitigated Sediment

Temperature data collected during daily water quality observations documented values ranging from 19°C to 22°C, salinity levels ranging from 28 to 34‰ (values >32‰ only at assay end) and dissolved oxygen levels ranging from 5.6 to 8.7 mg/L (Table 8). Test acceptability criteria requires a mean temperature of 20±2°C (20±1°C for *A. punctulata*), salinity within a range of 30±2‰ and dissolved oxygen of ≥40% (approximately equal to 3.3 mg/L for assays maintained at 20°C, 30‰ and a barometric pressure of 760 inches Hg). There are no water quality deviations noted for any of the assays using mitigated sediment.

Total ammonia levels ranged from 1.1 to 3.4 mg/L at the start of the assays in all six elutriate solutions prepared using mitigated sediment, which is equivalent to calculated unionized ammonia levels of 0.022 to 0.090 mg/L depending on sample pH and temperature. These levels are below the target threshold of 0.1 mg/L for assay initiation. Total ammonia levels remained fairly level and in some cases slightly increased throughout the life of the assays, but pH levels generally remained level in the elutriate solutions and therefore unionized ammonia levels only slightly increased to a maximum of 0.12 mg/L (elutriate solution 5) by assay end.

3.5 Protocol Deviations

Review of the data collected for these assays documented the following deviations from the method protocol and/or ESI's standard procedures:

Protocol requires, and it is common laboratory procedure, that a reference toxicant assay be completed concurrently with any project assay (at a minimum frequency of once per month). However, the *A. punctulata* assay completed using mitigated sediment (study 31291) does not have an associated reference toxicant assay, and there are no reference toxicant data available for that lot of organisms due in part to the time of year and organism viability. While this remains a data gap, it is the opinion of ESI's technical manager that this deviation had no adverse impact on the outcome of the assay as the project assay met all acceptability criteria and there were no impacts on embryonic survival or development in the project elutriates. There are reference toxicant data available that are concurrent with the unmitigated assay (study 31248) started approximately one month prior, however these data were generated using a different lot of organisms.

Protocol requires that the *A. bahia* and *M. beryllina* assays be conducted at 20±2°C, and the *A. punctulata* assay be conducted at 20±1°C. Although the assays were maintained in incubators set at their target temperature, the minimum temperatures recorded during the unmitigated assays for elutriate solutions 3, 4 and 5 fell below the protocol range to a low of 17°C on day 2 of the mysid assay, a low of 14°C on day 2 of the minnow assay and a low of 18°C at the start of the urchin assay. There were no notations on the bench sheets indicating a reason for the low temperatures, therefore the drop below the threshold is likely due to the ambient laboratory temperature at the time that water quality measurements were taken. There was also an isolated exceedence of the upper threshold in the laboratory control of the unmitigated minnow assay for elutriate solutions 1, 2 and 6, which reached a maximum of 23°C on day 0. These species can tolerate temperatures within the ranges measured. It is the opinion of ESI's technical manager that these deviations had no adverse impact on the outcome of the assay.

In addition, the protocol requires that the assays be conducted at 30±2‰. It is not uncommon for the salinity to drift upwards during assay conduct due to evaporation and exceed the protocol requirement, but the salinities are adjusted daily as needed to account for this occurrence, except at assay termination. These occurrences at test termination are not considered deviations. In one instance the salinity in the mysid laboratory control for the mitigated assay for elutriate solutions 3, 4 and 5 was inadvertently overlooked and not adjusted down from 33 ppt at 72 hours. This was an isolated incident and all other in-life assay measurements >32 ppt were adjusted accordingly. It is the opinion of ESI's technical manager that this deviation had no adverse impact on the outcome of the assay.

3.6 Summary

This program utilized protocols developed by the US EPA and the CENAE to assess the potential impact that the proposed dredge material collected from the New Haven Harbor FNP would have on the marine environment. Impacts were evaluated using two different sediment preparations to address residual ammonia in the elutriate solutions, and results are presented for both unmitigated and mitigated sediment.

Review of the data indicates that there were significant negative effects on all three species from exposure to elutriate solutions that were prepared using unmitigated sediment from composites 3 and 5, and significant negative effects on both the minnow and urchin from most/all of the elutriate solutions prepared using unmitigated sediment. Total ammonia levels in the elutriate solutions prepared using unmitigated sediment measured ≥12 mg/L (equivalent to approximately ≥0.35 mg/L unionized ammonia) at the start of the assays and levels rose to a maximum of 31 mg/L total ammonia (2.8 mg/L unionized ammonia) by assay end. These ammonia levels likely contributed to the observed toxicity.

In contrast, there were no negative effects on any species following exposure to any of the elutriate solutions prepared using mitigated sediments, with measured total ammonia levels of up to 3.3 mg/L (equivalent to 0.090 mg/L unionized ammonia) at assay start and up to 3.7 mg/L at assay end (the maximum unionized ammonia level of 0.12 mg/L was calculated for a different sample in which the pH level increased during the life of the assay).

4.0 REFERENCES

AECOM. 2018. *Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Project Work Plan, New Haven, Connecticut [Work Plan]*. Chelmsford, Massachusetts. October 2018.

Chang-Hoon Lee, Chan-Gyoung Sung, Seong-Dae Moon and Jong-Hyeon Lee. 2013. *Effects of Ammonia on Fertilization, Development, and Larval Survival in the Northern Pacific Asteroid, Asterias amurensis (See Urchin)*. Bulletin of Environmental Contamination and Toxicology (2013) 91:102-106.

Ferretti, J.A. D.F. Calesso, and T.R. Hermon. 2000. *Evaluation of Methods to Remove Ammonia Interference in Marine Sediment Toxicity Tests*. Environmental Toxicology and Chemistry 19(8): 1935-1941.

Maguire Group, Inc. 2003. *Laboratory Testing in Support of Site Specific Water Quality Criteria Assessment and Hydrographic Data Collection for New Bedford Harbor*. Toxicity Identification Evaluation Testing with Mysids and Sea Urchins.

US EPA Region 1, CENAE. 2004. *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters*. September 2004.

US EPA. 1989. *Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989*. EPA 440/5-88-004. April 1989.

US EPA, US ACE. 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual.* EPA-503/8-91/001, February 1991.

US EPA, US ACE. 1998. *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual*. EPA-823-B-98-004, February 1998.

US EPA 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

Table 1. Sample Collection and Receipt Information. SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Station ID [a]	ESI Code	Sample Type	Matrix	Collection Date	Collection Time	Receipt Date	Receipt Time
Comp V',W' Station V'	31242-001	Site	Solid	10/23/18	1125	10/24/18	1015
Comp V',W' Station W'	31242-002	Site	Solid	10/23/18	1125	10/24/18	1015
Comp R',S' Station R'	31242-003	Site	Solid	10/23/18	1215	10/24/18	1015
Comp R',S' Station S'	31242-004	Site	Solid	10/23/18	1215	10/24/18	1015
Comp CAD 1-3 Station CAD 1	31242-005	Site	Solid	10/23/18	1527	10/24/18	1015
Comp CAD 1-3 Station CAD 2	31242-006	Site	Solid	10/23/18	1527	10/24/18	1015
Comp CAD 1-3 Station CAD 3	31242-007	Site	Solid	10/23/18	1527	10/24/18	1015
NHH-CLDS	31242-008	Reference	Solid	10/23/18	1028	10/24/18	1015
NHH-CLDS	31242-009	Reference	Water	10/23/18	1312	10/24/18	1015
Comp TB-1-2, Station TB-1	31242-010	Site	Solid	10/24/18	1146	10/25/18	0835
Comp TB-1-2, Station TB-2	31242-011	Site	Solid	10/24/18	1146	10/25/18	0835
Comp DS-1-2, Station DS-1	31242-012	Site	Solid	10/24/18	1006	10/25/18	0835
Comp DS-1-2, Station DS-2	31242-013	Site	Solid	10/24/18	1006	10/25/18	0835
Comp US 1-2	31242-014	Site	Water	10/24/18	1130	10/25/18	0835
Comp DS 1-2	31242-015	Site	Water	10/24/18	1145	10/25/18	0835
Comp TB 1-2	31242-016	Site	Water	10/24/18	1200	10/25/18	0835
Comp CAD 1,2,3	31242-017	Site	Water	10/24/18	1215	10/25/18	0835
Comp V',W'	31242-018	Site	Water	10/24/18	1230	10/25/18	0835
Comp US-1-2, Station US-1	31242-019	Site	Solid	10/25/18	1023	10/25/18	1820
Comp US-1-2, Station US-2	31242-020	Site	Solid	10/25/18	1023	10/25/18	1820
New Haven [b]	31242-021	Site	Water	11/14/18	1413	11/14/18	1545
Comp R',S'	31242-022	Site	Water	10/24/18	1245	10/25/18	0835
Comp DS-1-2, Station DS-2	31242-023	Site	Solid	10/25/18	0946	10/25/18	1820

Notes:
[a] The Station IDs listed include detailed information written on individual sample buckets.
[b] This water was used only for the repeated *A. punctulata* assay.

Table 2. Summary of Sample Compositing Information. SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Composite ID	ESI Code	Components Station ID	Components ESI Code	Final Amount	Composite Date	Composite Time
Composite 1	31243-100	Comp V',W' Station V' Comp V',W' Station W'	31242-001 31242-002	~7 gal	10/24/18	1100
Composite 2	31243-101	Comp R',S' Station R' Comp R',S' Station S'	31242-003 31242-004	~28 gal	10/24/18	1545
Composite 3	31243-102	Comp US-1-2, Station US-1 Comp US-1-2, Station US-2	31242-019 31242-020	~28 gal	10/25/18	2030
Composite 4	31243-103	Comp DS-1-2, Station DS-1 Comp DS-1-2, Station DS-2 Comp DS-1-2, Station DS-2	31242-012 31242-013 31242-023	~28 gal	10/25/18	2000
Composite 5	31243-104	Comp TB-1-2, Station TB-1 Comp TB-1-2, Station TB-2	31242-010 31242-011	~28 gal	10/25/18	1110
Composite 6	31243-105	Comp CAD 1-3 Station CAD 1 Comp CAD 1-3 Station CAD 2 Comp CAD 1-3 Station CAD 3	31242-005 31242-006 31242-007	~31 gal	10/24/18	1115

Table 3. Summary of Ammonia Mitigation Data. SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Composite ID	Hour	Date & Time Sampled	Temperature (°C)	pH (SU)	Salinity (‰)	Pore Water Ammonia (mg/L)	
						Total	Unionized
Comp 001 (V', W')	24	10/25/18 1000	18.9	7.46	30	38	0.3361
Comp 001 (V', W')	48	10/26/18 1000	20.0	7.71	30	14	0.2371
Comp 001 (V', W')	72	10/27/18 1350	20.3	7.44	30	15	0.1406
Comp 001 (V', W')	96	10/28/18 1145	17.0	7.43	30	7.8	0.0560
Comp 001 (V', W')	120	10/29/18 1130	19.5	7.37	32	5.2	0.0387
Comp 002 (R', S')	24	10/25/18 1000	18.4	7.59	30	27	0.3095
Comp 002 (R', S')	48	10/26/18 1000	20.0	7.64	30	15	0.2168
Comp 002 (R', S')	72	10/27/18 1350	19.8	7.43	30	16	0.1413
Comp 002 (R', S')	96	10/28/18 1145	17.0	7.37	32	8.4	0.0520
Comp 002 (R', S')	120	10/29/18 1130	19.7	7.39	32	7.3	0.0577
Comp 003 (US-1, US-2)	24	10/27/18 1350	21.0	7.48	30	38	0.4108
Comp 003 (US-1, US-2)	48	10/28/18 1145	18.0	7.38	32	22	0.1499
Comp 003 (US-1, US-2)	72	10/29/18 1130	19.8	7.44	32	14	0.1250
Comp 003 (US-1, US-2)	96	10/30/18 0915	13.8	7.39	32	8	0.0409
Comp 004 (DS-1, DS-2)	24	10/27/18 1350	20.0	7.61	30	31.8	0.4293
Comp 004 (DS-1, DS-2)	48	10/28/18 1145	18.0	7.56	32	15	0.1542
Comp 004 (DS-1, DS-2)	72	10/29/18 1130	19.9	7.51	32	13	0.1372
Comp 004 (DS-1, DS-2)	96	10/30/18 0915	13.5	7.54	32	6.6	0.0465
Comp 005 (TB-1, TB-2)	24	10/25/18 1000	20.0	7.70	30	31	0.5132
Comp 005 (TB-1, TB-2)	48	10/27/18 1350	20.0	7.38	30	18	0.1439
Comp 005 (TB-1, TB-2)	72	10/28/18 1145	18.0	7.39	30	13	0.0917
Comp 005 (TB-1, TB-2)	96	10/29/18 1130	20.0	7.35	32	13	0.0959
Comp 006 (CAD-1, 2 & 3)	24	10/26/18 1000	18.9	7.92	30	12	0.3011
Comp 006 (CAD-1, 2 & 3)	48	10/26/18 1000	20.0	7.62	30	5.5	0.0760
Comp 006 (CAD-1, 2 & 3)	72	10/27/18 1350	20.0	7.63	31	4.2	0.0590
Comp 006 (CAD-1, 2 & 3)	96	10/28/18 1145	19.0	7.55	32	3	0.0325
Comp 006 (CAD-1, 2 & 3)	120	10/29/18 1130	20.0	7.58	32	3	0.0374

Notes:
A complete summary of all the water quality measurements and ammonia data generated during the mitigation phase is provided in Appendix A.

Table 4. Elutriate Solution Preparation. SPP Evaluation.
New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Water		Sediment		Elutriate Preparation			
Station ID	ESI Code	Composite ID	ESI Code	Elutriate ID	ESI Code	Date	Time
Unmitigated Assays - 31248							
Comp V',W'	31242-018	Composite 1	31243-100	Composite 1 Elutriate	31246-101	10/25/18	1310
Comp R',S'	31242-022	Composite 2	31243-101	Composite 2 Elutriate	31246-103	10/25/18	1405 [a]
Comp R',S'	31242-022	Composite 2	31243-101	Composite 2 Elutriate	31246-103	10/25/18	1700
Comp US 1-2	31242-014	Composite 3	31243-102	Composite 3 Elutriate	31246-105	10/26/18	1615 [a]
Comp US 1-2	31242-014	Composite 3	31243-102	Composite 3 Elutriate	31246-105	10/26/18	1810
Comp DS 1-2	31242-015	Composite 4	31243-103	Composite 4 Elutriate	31246-107	10/26/18	1310
Comp TB 1-2	31242-016	Composite 5	31243-104	Composite 5 Elutriate	31246-109	10/26/18	1525
Comp CAD 1,2,3	31242-017	Composite 6	31243-105	Composite 6 Elutriate	31246-111	10/25/18	1520
Mitigated Assays - 31291							
Comp V',W'	31242-018	Composite 1	31243-100	Composite 1 Elutriate	31246-112	10/31/18	1040
Comp R',S'	31242-022	Composite 2	31243-101	Composite 2 Elutriate	31246-113	10/31/18	1040
Comp US 1-2	31242-014	Composite 3	31243-102	Composite 3 Elutriate	31246-114	10/31/18	1250
Comp DS 1-2	31242-015	Composite 4	31243-103	Composite 4 Elutriate	31246-115	10/31/18	1250
Comp TB 1-2	31242-016	Composite 5	31243-104	Composite 5 Elutriate	31246-116	10/31/18	1125
Comp CAD 1,2,3	31242-017	Composite 6	31243-105	Composite 6 Elutriate	31246-117	10/31/18	1125
Mitigated – *A. punctulata* repeated assay - 31291							
New Haven	31242-021	Composite 1	31243-100	Composite 1 Elutriate	31246-118	11/21/18	0900
New Haven	31242-021	Composite 2	31243-101	Composite 2 Elutriate	31246-119	11/21/18	0900
New Haven	31242-021	Composite 3	31243-102	Composite 3 Elutriate	31246-120	11/21/18	0939
New Haven	31242-021	Composite 4	31243-103	Composite 4 Elutriate	31246-121	11/21/18	0939
New Haven	31242-021	Composite 5	31243-104	Composite 5 Elutriate	31246-122	11/21/18	1030
New Haven	31242-021	Composite 6	31243-105	Composite 6 Elutriate	31246-123	11/21/18	1030

Notes:
[a] This sample was used for the unmitigated SPP assay. Additional elutriate was prepared to meet the volume requirements for chemical analysis and the required QC.

Table 5. Period of Assay Conduct. SPP Evaluation.
New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Elutriate Comp/Elutriate ID	ESI Code	Test Species	Assay Start Date	Assay Start Time [a]	Assay End Date	Assay End Time [a]
Unmitigated Assays - 31248						
Composite 1 Elutriate Composite 2 Elutriate Composite 6 Elutriate	31246-101 31246-103 31246-111	*A. bahia*	10/25/18	1645	10/29/18	1600
		M. beryllina	10/25/18	1720	Failed [b]	
			10/26/18	1430	10/30/18	1253
		A. punctulata	10/25/18	1735	10/29/18	1140
Composite 3 Elutriate	31246-105	*A. bahia*	10/26/18	1815	10/30/18	1615
Composite 4 Elutriate	31246-107	*M. beryllina*	10/26/18	1710	10/30/18	1311
Composite 5 Elutriate	31246-109	*A. punctulata*	10/27/18	1330	10/30/18	1600
Mitigated Assays - 31291						
Composite 1 Elutriate Composite 2 Elutriate Composite 3 Elutriate Composite 4 Elutriate Composite 5 Elutriate Composite 6 Elutriate	31246-112 31246-113 31246-114 31246-115 31246-116 31246-117	*A. bahia*	10/31/18	1510	11/04/18	1250
		M. beryllina	10/31/18	1605	11/04/18	1325
		A. punctulata	10/31/18	1820	Failed [c]	
	31246-118 31246-119 31246-120 31246-121 31246-122 31246-123		11/21/18	1310	11/24/18	0935

Notes:
[a] Start and end times are based on when the controls were started and ended.
[b] The failed *M. beryllina* assay was repeated starting on 10/26/18 using the same elutriate samples (within the hold time) and lot of test organisms.
[c] The failed *A. punctulata* assay was repeated starting on 11/21/18 using newly prepared elutriate solutions and a new lot of test organisms.

Table 6. Reference Toxicant Data Summary. SPP Evaluation.
New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
10/25/18	03AbARO102418	96Hr LC-50	65.6	59.2	35.3 - 84.1	NH4Cl (mg/L)
10/31/18	02AbARO102918	96Hr LC-50	75.5	60.2	35.8 - 84.6	NH4Cl (mg/L)
M. beryllina						
10/25/18	08MbARO102418	96Hr LC-50	46.7	48.8 [a]	16.5 - 81.0 [a]	NH4Cl (mg/L)
10/31/18	08MbARO102918	96Hr LC-50	40.0	46.9	18.4 - 75.5	NH4Cl (mg/L)
A. punctulata						
10/25/18	99ApARO080118	96Hr EC-50	5.9	4.1 [b]	0.0-8.4 [b]	NH4Cl (mg/L)
11/21/18	No data [c]					

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays unless otherwise noted.

Notes:
[a] Values based on the results of 19 assays.
[b] Values based on the results of 7 assays.
[c] Reference toxicant data are not available. See Section 3.5 for a discussion of the deviation.

Table 7. Summary of Assay Acceptability and Laboratory Control Performance – Unmitigated Assays (31248). SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Endpoint	Protocol Criteria	Elut ID	*A. bahia*		*M. beryllina*		*A. punctulata*	
Mean Survival	Lab Control survival ≥90% (≥70% surv/norm Ap)	Lab	Surv 100% (1,2,6) 100% (3,4,5)		Surv 96% (1,2,6) 90% (3,4,5)		Surv 78% (1,2,6) 86% (3,4,5)	Norm 77% (1,2,6) 85% (3,4,5)
Salinity [a]	Minimum: 28‰ Maximum: 32‰		Min‰	Max‰	Min‰	Max‰	Min‰	Max‰
		Lab [b]	30	33 [c]	29	33 [a]	30	32
		CLDS [b]	28	32	28	31	28	31
		1	29	32	28	31	29	29
		2	29	31	28	31	29	29
		3	28	32	28	33 [a]	30	32
		4	28	31	28	32	29	30
		5	28	32	28	32	29	31
		6	29	33 [a]	28	32	29	31
Temperature	Minimum: 18°C (19°C Ap) Maximum: 22°C (21°C Ap)		Min°C	Max°C	Min°C	Max°C	Min°C	Max°C
		Lab [b]	18	21	17 [c]	23 [c]	19	21
		CLDS [b]	18	20	18	20	19	21
		1	18	20	18	21	19	21
		2	18	20	18	20	20	21
		3	17 [c]	20	14 [c]	20	19	20
		4	17 [c]	20	16 [c]	20	19	20
		5	17 [c]	19	15 [c]	19	18 [c]	20
		6	19	21	18	20	20	21
pH	No requirement		Min SU	Max SU	Min SU	Max SU	Min SU	Max SU
		Lab [b]	7.73	7.96	7.75	7.97	7.92	8.04
		CLDS [b]	7.69	7.98	7.80	7.92	7.91	8.08
		1	7.68	8.30	7.63	8.31	7.68	8.43
		2	7.74	8.34	7.74	8.26	7.73	8.42
		3	7.70	8.32	7.69	8.27	7.76	8.32
		4	7.77	8.34	7.76	8.30	7.87	8.36
		5	7.62	8.33	7.66	8.25	7.70	8.35
		6	7.85	8.25	7.78	8.20	7.86	8.35
Dissolved oxygen	Minimum: ≥40% [d] (No requirement for Ap)		Min mg/L	Max mg/L	Min mg/L	Max mg/L	Min mg/L	Max mg/L
		Lab [b]	5.9	8.8	6.5	8.8	7.4	8.0
		CLDS [b]	5.9	10.1	6.8	10.1	7.6	8.9
		1	5.5	8.2	6.2	8.3	6.6	8.4
		2	6.5	8.2	5.8	8.2	7.3	8.4
		3	6.0	9.8	7.0	9.8	7.5	8.7
		4	6.5	9.8	6.7	9.8	7.6	8.7
		5	6.2	9.6	6.6	9.6	7.5	8.8
		6	6.4	8.1	6.6	8.1	7.2	8.2

Notes:

Ap = *Arbacia punctulata*

[a] Adjustments were made, as needed, to bring salinity values back within the acceptable range and values reported herein represent the adjusted value, except for final readings at 96 hours that typically are not adjusted and are not considered a deviation.

[b] The range of values provided is inclusive of both laboratory controls and reference samples associated with the two batches of unmitigated assays that were completed.

[c] Refer to Section 3.5 for a discussion of the deviation.

[d] Dissolved oxygen measurements were collected in mg/L, rather than % saturation. The minimum requirement of ≥40% is approximately equal to 3.3 mg/L for assays maintained at 20°C, 30‰ and a barometric pressure of 760 inches Hg.

Table 8. Summary of Assay Acceptability and Laboratory Control Performance – Mitigated Assays (31291). SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Endpoint	Protocol Criteria	Elut ID	*A. bahia*		*M. beryllina*		*A. punctulata*	
Mean Survival	Lab Control survival ≥90% (≥70% surv/norm Ap)	Lab	Surv 100%		Surv 90%		Surv 76%	Norm 74%
			Min‰	Max‰	Min‰	Max‰	Min‰	Max‰
Salinity [a]	Minimum: 28‰ Maximum: 32‰	Lab	31	34 [a]	31	32	31	33 [a]
		CLDS	29	33 [a]	29	32	[b]	[b]
		1	28	32	28	31	30	33 [a]
		2	28	31	28	32	30	33 [a]
		3	28	31	28	31	30	34 [a]
		4	28	31	28	31	30	34 [a]
		5	28	31	28	31	31	33 [a]
		6	28	31	28	31	30	33 [a]
			Min°C	Max°C	Min°C	Max°C	Min°C	Max°C
Temperature	Minimum: 18°C (19°C Ap) Maximum: 22°C (21°C Ap)	Lab	19	20	19	20	19	20
		CLDS	19	20	19	20	[b]	[b]
		1	20	21	20	21	20	21
		2	19	20	19	20	19	21
		3	20	21	20	21	20	20
		4	19	20	19	20	20	20
		5	19	20	19	20	20	20
		6	20	22	20	22	20	21
			Min SU	Max SU	Min SU	Max SU	Min SU	Max SU
pH	No requirement	Lab	7.70	8.00	7.60	8.00	7.91	8.00
		CLDS	7.71	7.97	7.82	7.97	[b]	[b]
		1	7.76	7.96	7.77	7.96	7.79	8.05
		2	7.64	7.97	7.74	7.97	7.72	8.13
		3	7.69	7.98	7.77	7.98	7.98	8.11
		4	7.68	7.97	7.73	7.97	7.95	8.15
		5	7.74	7.97	7.74	7.97	7.74	8.14
		6	7.68	7.97	7.76	7.97	7.88	8.12
			Min mg/L	Max mg/L	Min mg/L	Max mg/L	Min mg/L	Max mg/L
Dissolved oxygen	Minimum: ≥40% [c] (No requirement for Ap)	Lab	6.2	7.3	5.8	7.3	7.5	7.8
		CLDS	5.8	8.7	6.3	8.7	[b]	[b]
		1	5.9	8.4	6.1	8.4	7.2	7.6
		2	5.8	8.4	5.8	8.4	7.0	7.5
		3	5.6	8.4	5.6	8.4	6.8	7.6
		4	5.7	8.3	5.7	8.3	6.7	7.6
		5	5.7	8.2	5.8	8.2	6.4	7.6
		6	5.7	8.4	5.8	8.4	7.3	7.6

Notes:

Ap = *Arbacia punctulata*

[a] Adjustments were made, as needed, to bring salinity values back within the acceptable range and values reported herein represent the adjusted value, except for final readings at 96 hours that typically are not adjusted and are not considered a deviation.

[b] The CLDS reference was not included with the *A. punctulata* re-test because the sample had exceeded its hold time.

[c] Dissolved oxygen measurements were collected in mg/L, rather than % saturation. The minimum requirement of ≥40% is approximately equal to 3.3 mg/L for assays maintained at 20°C, 30‰ and a barometric pressure of 760 inches Hg.

Table 9. Summary of Endpoints and Adverse Effects. SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Station	Comp/Elutriate ID	ESI Code	*A. bahia* LC-50 (Survival)	*M. beryllina* LC-50 (Survival)	*A. punctulata* LC-50 (Survival)	*A. punctulata* EC-50 (Development)
Unmitigated Assays						
V',W'	Composite 1 Elutriate	31246-101	>100%	65%	7%	4%
R',S'	Composite 2 Elutriate	31246-103	>100%	57%	13%	4%
US-1,US-2	Composite 3 Elutriate	31246-105	74%	58%	3%	3%
DS-1,DS-2	Composite 4 Elutriate	31246-107	>100%	69%	10%	7%
TB-1,TB-2	Composite 5 Elutriate	31246-109	73%	56%	5%	4%
CAD-1,CAD-2,CAD-3	Composite 6 Elutriate	31246-111	>100%	>100%	22%	22%
Mitigated Assays						
V',W'	Composite 1 Elutriate	31246-112	>100%	>100%	>100%	>100%
R',S'	Composite 2 Elutriate	31246-113	>100%	>100%	>100%	>100%
US-1,US-2	Composite 3 Elutriate	31246-114	>100%	>100%	>100%	>100%
DS-1,DS-2	Composite 4 Elutriate	31246-115	>100%	>100%	>100%	>100%
TB-1,TB-2	Composite 5 Elutriate	31246-116	>100%	>100%	>100%	>100%
CAD-1,CAD-2,CAD-3	Composite 6 Elutriate	31246-117	>100%	>100%	>100%	>100%

Table 10.Summary of Water Quality Data – Unmitigated Assays. SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Elutriate ID	Temperature Start	Temperature End	pH (SU) Start	pH (SU) End	Salinity (‰) Start	Salinity (‰) End	Ammonia (mg/L) Start Total	Ammonia (mg/L) Start Unionized	Ammonia (mg/L) End Total	Ammonia (mg/L) End Unionized
A. bahia										
Lab Control	20	19	7.96	7.76	31	31	<0.1	<0.0030	1.6	0.0280
CLDS Reference	20	19	7.91	7.74	29	32	<0.1	<0.0027	1.6	0.0267
Comp 1 Elutriate	20	19	7.68	8.30	29	32	33	0.5251	17	0.9850
Comp 2 Elutriate	19	19	7.78	8.34	29	31	35	0.6489	19	1.2067
Comp 6 Elutriate	20	19	7.97	8.25	31	31	12	0.3627	6	0.3135
Lab Control	21.0	19	7.95	7.73	30.4	33	<0.1	<0.0031	1.4	0.0227
CLDS Reference	20.0	19	7.87	7.69	27.6	30	<0.1	<0.0025	1.5	0.0226
Comp 3 Elutriate	19.8	19	7.70	8.32	28.0	32	34	0.5609	25	1.5126
Comp 4 Elutriate	19.9	19	7.77	8.34	28.2	31	27	0.5251	22	1.3973
Comp 5 Elutriate	19.3	19	7.62	8.33	28.7	32	37	0.4888	28	1.7311
M. beryllina										
Lab Control	23	19	7.92	7.75	30	30	<0.1	<0.0034	1.6	0.0276
CLDS Reference	19	19	7.89	7.80	28	31	<0.1	<0.0024	1.7	0.0326
Comp 1 Elutriate	21	19	7.63	8.31	28	31	35	0.5381	25	1.4881
Comp 2 Elutriate	20	19	7.74	8.26	28	30	33	0.6048	25	1.3421
Comp 6 Elutriate	19	19	7.98	8.20	28	32	12	0.3508	9.3	0.4332
Lab Control	22.0	18	7.97	7.86	30.3	33	<0.1	<0.0035	1.4	0.0283
CLDS Reference	20.0	18	7.88	7.82	27.5	31	<0.1	<0.0025	1.3	0.0243
Comp 3 Elutriate	19.8	17	7.69	8.27	29.0	32	34	0.5453	24	1.1307
Comp 4 Elutriate	20.0	18	7.76	8.30	28.1	32	27	0.5174	20	1.0800
Comp 5 Elutriate	19.2	15	7.66	8.25	28.7	31	37	0.5314	29	1.1396
A. punctulata										
Lab Control	20	21	7.98	8.02	31	32	<0.1	<0.0031	0.36	0.0130
CLDS Reference	19	21	7.91	8.06	29	31	<0.1	<0.0025	0.3	0.0119
Comp 1 Elutriate	21	21	7.68	8.43	29	29	33	0.5650	31	2.7659
Comp 2 Elutriate	20	21	7.73	8.42	29	29	35	0.6236	29	2.5337
Comp 6 Elutriate	20	21	7.97	8.35	31	31	12	0.3627	11	0.8202
Lab Control	19.0	20.4	7.92	8.04	31	30.3	<0.1	<0.0025	0.9	0.0328
CLDS Reference	18.5	20.5	7.95	8.08	30	28.1	<0.1	<0.0026	0.14	0.0057
Comp 3 Elutriate	19.9	19.9	7.76	8.32	30	30.9	34	0.6400	20	1.2963
Comp 4 Elutriate	20.1	20.0	7.87	8.36	30	30.0	30	0.7342	23	1.6434
Comp 5 Elutriate	20.1	19.9	7.70	8.35	30	29.8	36	0.6004	22	1.5296

Notes:
Water quality measurements and ammonia samples were obtained from replicate A, and a summary of these data is provided in Appendix A.

Table 11. Summary of Water Quality Data – Mitigated Assays. SPP Evaluation. New Haven Harbor FNP. New Haven, Connecticut. October 2018.

Elutriate ID	Temperature Start	Temperature End	pH (SU) Start	pH (SU) End	Salinity (‰) Start	Salinity (‰) End	Ammonia (mg/L) Start Total	Ammonia (mg/L) Start Unionized	Ammonia (mg/L) End Total	Ammonia (mg/L) End Unionized
A. bahia										
Lab Control	19	20	8.00	7.84	31	34	<0.1	<0.0030	1.4	0.0311
CLDS Reference	19	20	7.97	7.73	29	33	<0.1	<0.0028	1.7	0.0296
Comp 1 Elutriate	21	20	7.83	7.82	28	30	2	0.0483	2.9	0.0630
Comp 2 Elutriate	19	20	7.85	7.80	28	30	3.1	0.0677	3.7	0.0768
Comp 3 Elutriate	21	20	7.79	7.83	28	30	3.4	0.0750	3.5	0.0777
Comp 4 Elutriate	19	20	7.95	7.89	28	30	3.3	0.0902	3.5	0.0889
Comp 5 Elutriate	19	20	7.86	7.91	28	30	2.9	0.0648	3	0.0797
Comp 6 Elutriate	22	20	7.97	7.86	28	29	1.2	0.0426	2.6	0.0621
M. beryllina										
Lab Control	19	20	8.00	7.73	31	32	<0.1	<0.0030	2	0.0350
CLDS Reference	19	20	7.97	7.82	29	32	<0.1	<0.0028	2.2	0.0472
Comp 1 Elutriate	21	20	7.83	7.86	28	30	2	0.0483	2.9	0.0689
Comp 2 Elutriate	19	20	7.85	7.92	28	32	3.1	0.0677	3.3	0.0887
Comp 3 Elutriate	21	20	7.79	7.84	28	30	3.4	0.0750	3.7	0.0840
Comp 4 Elutriate	19	20	7.95	7.89	28	30	3.3	0.0902	3.5	0.0889
Comp 5 Elutriate	19	20	7.80	7.88	28	30	2.9	0.0566	3.2	0.0795
Comp 6 Elutriate	22	20	7.97	7.81	28	29	1.2	0.0426	2.6	0.0555
A. punctulata										
Lab Control	19	20	7.91	8.00	31	33	<0.1	<0.0025	0.15	0.0048
Comp 1 Elutriate	20	21	7.79	8.04	30	31	1.1	0.0223	1.2	0.0456
Comp 2 Elutriate	19	21	7.72	8.13	30	32	2.4	0.0386	2.4	0.1105
Comp 3 Elutriate	20	20	8.01	8.11	30	31	1.4	0.0465	1.4	0.0578
Comp 4 Elutriate	20	20	8.01	8.15	30	32	2.3	0.0764	2.2	0.0986
Comp 5 Elutriate	20	20	7.74	8.14	32	32	2.6	0.0466	2.7	0.1184
Comp 6 Elutriate	20	21	7.88	8.12	30	30	1.7	0.0422	1.8	0.0820

Notes:
Water quality measurements and ammonia samples were obtained from replicate A, and a summary of these data is provided in Appendix A.

APPENDIX A:

RAW DATA & STATISTICAL SUPPORT

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STUDY NUMBER RECORD

Issue and complete this form for studies that will require multiple tasks and directly associated support studies. Issue consecutive study numbers at the start of the project to cover all potential elements of the project.

CLIENT: AECOM

CONTACT(S): Kris Van Naerssen

PROJECT: New Haven Harbor 2018

APP. NUMBER:

	Species / Analysis Parameters:		STUDY:
Sample Receipt:			**31242**
Rinseate Sample Analysis:	**Reference Site Analyzed x 3**		
Grain Size Analysis:			
Composite Prep/NH3 Mit:			**31243**
Bulk Sediment Analysis:			
10 Day Assay:	***Leptocheirus plumulosus***		**31244**
	Americamysis bahia		**31245**
Elutriate Preparation:	**Type:**		**31246**
Elutriate Analysis:	**Pentachlorophenol**	**Yes / No**	**31247**
	Trace Metals	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	
SPP Assays/NH3 Mit:	***Menidia beryllina***		**31248**
	Americamysis bahia		
	Arbacia punctulata		
Bioaccumulation Study:	***Macoma nasuta***		**31249**
	Nereis virens		**31250**
Tissue Analysis:	**Trace Metals**	**Yes / No**	
	PAH Compounds	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	

Tissue analyses completed by Alpha Analytical

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\Study Number Log.wpd

U.S. ARMY C[illegible] OF ENGINEERS

31292

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (*Signature*) RICHARD LOYD [signature]

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE TESTING	SUSPENDED PHASE TOX.	10-DAY WHOLE SED. TOX.	28-DAY BIOACCUM.			REMARKS
1	10/23	11:25	/		COMP V',W'	2	/	/					STATIONS V',W'
2	10/23	12:15	/		COMP R',S'	8	/	/	/	/			STATIONS R',S'
3	10/23	15:27	/		~~COMP~~ CAD 1-3	9	/	/	/	/			STATIONS CAD-1, CAD-2, CAD-3

Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
[signature]	10/23 1800	[signature]	[signature]	10/24/18 1015	[signature]
Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
Relinquished by: (*Signature*)	Date/Time	Received for Laboratory by: (*Signature*)	Date/Time	REMARKS	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

31242

ENSR

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE / AECOM

Project Location: New Haven Harbor / CONTRAC CT Disposal Sites

Project Number: 60588790

Field Logbook No.:

Sampler (Print Name)/(Affiliation): K. van Naarssen / AECOM

Chain of Custody Tape Nos.: N/A

Signature:

Send Results/Report to: K. van Naarssen

TAT: As per work plan

Analysis Requested

Container Type: P – Plastic, A – Amber Glass, G – Clear Glass, V – VOA Vial, O – Other, E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water, WW – Wastewater, GW – Groundwater, SW – Surface Water, ST – Storm Water, W – Water, S – Soil, SL – Sludge, SD – Sediment, SO – Solid, A – Air, L – Liquid, P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Elutriate Prep	SPP Assay	10-Day Tox	28-Day Tox/Tissue							Lab I.D.	Remarks
* NHH-CLDS	10/23/18	10:28	X	X	3.5 G (6)	SD	7	No	X	X	X	X								For work plan / Rim
* NHH-CLDS	10/23/18	13:12	X	X	5 G (10)	SW	7	No	X	X										

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
K. van Naarssen / AECOM Signature:	10/23/18 Time: 17:15	Charles Nixon Signature:	10/23 Time: 1715
Relinquished by: (Print Name)/(Affiliation) Charles Nixon AECOM Signature:	Date: 10/24 Time: 1015	Received by: (Print Name)/(Affiliation) Signature:	Date: 10/24/18 Time: 1015
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 02668

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/24/18 1015	Date and TIme Logged into Lab:	10/31/18 1630
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	5	Custody Seals intact?	NA
Number of COC Pages:	2		
COC Serial Number(s):	02668		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp V',W' Station V'	31242-001	S	Elutriate Prep, SPP Assay	1x3.5gal	4 C	Yes
Comp V',W' Station W'	31242-002	S	Elutriate Prep, SPP Assay	1x3.5gal	4 C	Yes
Comp R',S' Station R'	31242-003	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp R',S' Station S'	31242-004	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 1	31242-005	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 2	31242-006	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 3	31242-007	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
NHH-CLDS	31242-008	S	10-Day Solid Phase, 28-Day Bioaccumulation	6x3.5gal	4 C	Yes
NHH-CLDS	31242-009	W	SPP Assay, 10-Day Solid Phase, 28-Day Bioaccumulation	10x3.5gal	4 C	Yes

Notes and qualifications:

See COC

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOID [illegible] B. Loid

	STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE PREP	SUSPENDED PHASE TOX	10-DAY WHOLE SED TOX	28-DAY BIOACCUM			REMARKS
10/611	1	10/24		/		COMP TB 1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
112/613	2	10/24		/		COMP DS 1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
614	3					COMP US 1-2	8	/	/					WATER FROM NEW HAVEN HBR
615	4					COMP DS 1-2	8	/	/					
616	5					COMP TB 1-2	6	/	/					
617	6					COMP CAD 1,2,3	6	/	/					
-618 617	7					COMP V' W'	6	/	/					
-622 618	8					COMP R' S'	8	/	/					
E3 MR 12/11/18														

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[illegible] B. Loid	10/24 1545	Charles Nixon 10/24 1525	[illegible]	10/25 0935	[illegible]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	
				CAD 1,2,3 7 subsamples received DS 1-2 6 subsamples received	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUST[illegible]DY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOID [signature]

	STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE PREP	SUSPENDED PARTICULATE PREP	10-DAY WHOLE SEDIMENT TOX	28-DAY BIOACCUM			REMARKS
0/11	1	10/24	11:46	/		COMP TB1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
11/12	2	10/24	10:06	/		COMP DS1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
0:4	3	10/24	11:30			COMP US1-2	8	/	/					WATER FROM NEW HAVEN HBR
0:5	4	10/24	11:45			COMP DS1-2	8	/	/					
0:6	5	10/24	12:00			COMP TB1-2	6	/	/					
0:7	6	10/24	12:15			COMP CAD1,2,3	6	/	/					
0:7	7	10/24	12:30			COMP V'W'	6	/	/					
0:8	8	10/24	12:45			COMP R'S'	8	/	/					

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	10/24 1545	Charles N. Von 10/24 1525	[signature]	10/24 [illegible]	[signature]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	
				CAD 1,2,3 7 cubitainers received DS1-2 6 cubitainers received	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

[signature] Digitally signed by LOID.RICHARD.B.1274603340 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=LOID.RICHARD.B.1274603340 Date: 2018.11.01 11:03:22 -04'00'

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/25/18 0835	Date and TIme Logged into Lab:	11/27/18 1240
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp TB-1-2, Station TB-1	31242-010	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp TB-1-2, Station TB-2	31242-011	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-1	31242-012	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-2	31242-013	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	1x3.5gal	4 C	Yes
Comp US 1-2	31242-014	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes
Comp DS 1-2	31242-015	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes
Comp TB 1-2	31242-016	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp CAD 1,2,3	31242-017	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp V',W'	31242-018	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp R',S'	31242-022	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes

Notes and qualifications:

See COC

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA Analytical

8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab:

~~ALPHA Job #:~~

Project Information

Project Name: NEW HAVEN HARBOR
Project Location: NEW HAVEN, CT
Project #:
Project Manager: RICHARD LOYD
ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: US ARMY CORPS OF ENG.
Address: 696 VIRGINIA RD CONCORD, MA 01742
Phone: 978-318-8048
Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:

ANALYSIS: ELUTRIATE PREP; SPP TOX.; 10-DAY WHOLE SED TOX; 28-DAY BIOACCUM

SAMPLE INFO
Filtration: ☐ Field ☐ Lab to do
Preservation: ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ELUTRIATE PREP	SPP TOX.	10-DAY WHOLE SED TOX	28-DAY BIOACCUM	Sample Comments	TOTAL # BOTTLES
	COMP DS 1-2	10/25	9:46	SE	RBL	/	/	/	/	STATION DS-23	
	COMP US 1-2	10/25	10:23	SE	RBL	/	/	/	/	STATION US 19-28	
	Container Type					P	P	P	P		
	Preservative					A	A	A	A		

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/25 13:30	[signature]	10/25 1350
[signature]	10/25 1820	[signature]	10/25/18 1820

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/25/18 1820	Date and TIme Logged into Lab:	11/27/18 1245
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp US-1-2, Station US-1	31242-019	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp US-1-2, Station US-2	31242-020	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-2	31242-023	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes

Notes and qualifications:

See COC

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

ESI
EnviroSystems, Inc.
1 Lafayette Road
P.O. Box 778
Hampton, N.H. 03843

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 31242

CHAIN OF CUSTODY DOCUMENTATION

Client: USACE NAE	Contact: Ben Lloyd	Project Name: New Haven	Page of
Report to:	Address:	Project Number:	
Invoice to:	Address:	Project Manager:	
Voice:	Fax:	email: Richard.B.Lloyd@usace.army.mil	P.O. No: Quote No:

Protocol: RCRA SDWA NPDES USCOE Other

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posit (G/C)	Container Size (ml.)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
-01 (DW 11/27)	New HAVEN	11/14	2:13	BB/ST	G	5gal Cubitainers	P	4°C	W	N	(7 cubitainers) SPP/Elutriate Prep

Relinquished By: Sarah Turner	Date: 11/14/18 Time: 3:45	Received By: R Smith	Date: 11/14/18 Time: 1545
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

Sample Delivery Group No: Page of

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	ESI		
Date and Time Received:	11/14/18 1545	Date and TIme Logged into Lab:	11/27/18 1250
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
New Haven	31242-021	W	Elutriate Prep, SPP Assay	7x5gal	4 C	Yes

Notes and qualifications:

See COC

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 1

Composite Lab ID.: 31243-100 Composite Final Volume: ≈7gal

Composite Matrix: Solid Composite Container(s): 2×3.5gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1100

Initials: CFS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
V	31242-001	S	Na	1 Shell	≈3.5gal	
W	31242-002	S	Na	Na	≈3.5gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 31243-101 Composite Final Volume: ~28g

Composite Matrix: Solid Composite Container(s): 8x3.5gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1545

Initials: MS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
R	31242-003	Solid	None	50mL	~14g	moist dark gray mud, some shells excluded
S	31242-004	Solid	None	50mL	~14g	moist dark gray mud, some shells exclude

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 31243-102 Composite Final Volume: ≈ 28 gal

Composite Matrix: Solid Composite Container(s): 8x 3.5 gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 2030

Initials: GRS/MS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
US-1	31242-019	S	—	≈ 10mL	≈ 1/4 gal	Leaves, sticks
US-2	31242-020	S	—	≈ 10mL	≈ 1/4 gal	Leaves, sticks

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 31243-103 Composite Final Volume: ≈28gal

Composite Matrix: Solid Composite Container(s): 8x3.5gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 1000

Initials: BG/LAG

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
DS-1	31242-012	S	—	≈ 60mL	≈14gal	
DS-2	31242-08-023	S	—	≈ 100mL rocks	≈14gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 31243-104 Composite Final Volume: ≈25 gal

Composite Matrix: Solid Composite Container(s): 8 x 2.5 gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 1110

Initials: CFS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
TB-1	31243-104	S	Na	2 Shells	≈14gal	
TB-2	31243-104	S	Na	Leaves	≈14gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 31243-105 Composite Final Volume: ≈31 gal

Composite Matrix: Solid Composite Container(s): 9×3.5 gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1115

Initials: BH

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
CAD-1	31242-005	S	—	≈1L	≈10 gal	shells and rocks excluded
CAD-2	31242-006	S	—	≈500 mL	≈7 gal	↓
CAD-3	31242-007	S	—	≈1L	≈14 gal	↓
						All black sediment with a petroleum smell

Subsamples Removed:

Lab Number	Sample Use
31246	Elutriate Preparation

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Pre-Test Ammonia Mitigation Pore Water Data

Pore Water pH Record

Study: 31243
Client: AECOM
Project: New Haven

Pore Water Quality

Sample	Salinity	Temperature	pH value
Composite 1 (VW)	30	18.9	7.46 ~~18.9~~ (e3MS 10/25
Composite 2 (RS)	30	18.4	7.59
Composite 6 (CADS)	30	18.9	7.92

Date: 10/25/18
Initial: MS
pH Meter ID: ML01

Pore Water pH Record

Study: 31243
Client: AECOM
Project: New Haven

Pore Water Quality

	Sample	Salinity	Temperature °C	pH value
203	Composite 1 (VW)	30	20.3	7.71
204	Composite 2 (RS)	30	19.8	7.64
	~~Composite 3 (US)~~			
205	Composite ~~4 (DS)~~ 5 (TB)	30	19.9	7.70
	~~Composite 5 (TB)~~			
206	Composite 6 (CADS)	30	19.7	7.62

Date: 10/26/18 **pH Meter ID:** ML02
Initial: MS **Salinity Meter:** ESI #1

	Sample	Salinity	Temperature °C	pH value
209 207	Composite 1 (VW)	30	20	7.44
210 208	Composite 2 (RS)	30	20	7.43
211 209	Composite ~~6 (CADS)~~ 3 (US)	30	21	7.48
212 210	Composite 4 (DS)	30	20	7.61
213 211	Composite 5 (TB)	30	20	7.38
214 212	Composite 6 (CADS)	31	20	7.63

Date: 10/27/18 **pH Meter ID:** ML01
Initial: GRS **Salinity Meter:** ESI #1

	Sample	Salinity	Temperature °C	pH value
215 213	Composite 1 (VW)	30	17	7.43
216 214	Composite 2 (RS)	32	17	7.37
217 215	Composite ~~5 (CADS)~~ 3 (US)	32	18	7.38
218 216	Composite 4 (DS)	32	18	7.56
219 217	Composite 5 (TB)	30	18	7.39
220 218	Composite 6 (CADS)	32	19	7.55

Date: 10/28/18 **pH Meter ID:** ML01
Initial: BG **Salinity Meter:** ESI #1

Pore Water pH Record

Study: 31243
Client: AECOM
Project: New Haven

Pore Water Quality

	Sample	Salinity	Temperature	pH value
221 219	Composite 1 (VW)	32	19.5	(ES) 10/29 ~~19.5~~ 7.37
222 220	Composite 2 (RS)	32	19.7	7.39
223 221	Composite 3 (US)	32	19.8	7.44
224 222	Composite 4 (DS)	32	19.9	7.51
225 223	Composite 5 (TB)	32	20.0	7.35
226 224	Composite 6 (CADS)	32	20.0	7.58

(ES) 10/29 **Date:** 10/29/12 **pH Meter ID:** ML01
Initial: MS **Salinity Meter:** ESI #1

	Sample	Salinity	Temperature	pH value
	Composite 1 (VW)			
	Composite 2 (RS)			
227	Composite ~~6 (CADS)~~ 3 (US) (ES) 10/30	32	13.8	7.39
228	Composite 4 (DS)	32	13.5	7.54
	Composite 5 (TB)			
	Composite 6 (CADS)			

Date: 10/30/12 **pH Meter ID:** ML01
Initial: MS **Salinity Meter:** ESI #1

Sample	Salinity	Temperature	pH value
Composite 1 (VW)			
Composite 2 (RS)			
Composite ~~6 (CADS)~~ 3 (US) (ES) 10/30			
Composite 4 (DS)			
Composite 5 (TB)			
Composite 6 (CADS)			

Date: **pH Meter ID:**
Initial: **Salinity Meter:**

Study: 31243 2 11/03

Client: AECOM

Project: New Haven

Day 01 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature °C	Salinity	pH value
Comp R,S	31243-101	605	19.7	28	7.56
Comp U,S	31243-102	606	19.4	30	7.47
Comp D,S	31243-103	607	19.8	32	7.61
Comp T,B	31243-104	608	19.9	30	7.59
Comp CAD	31243-105	609	20.0	32	7.75

Date: 11/03/18 pH Meter ID: ML02 Salinity Meter ID: ESI #1

Initial: BG

Day 01 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature °C	Salinity	pH value
Comp R,S	31243-101	610	20.2	30	7.62
Comp U,S	31243-102	611	20.2	30	7.57
Comp D,S	31243-103	612	20.2	30	7.64
Comp T,B	31243-104	613	20.4	30	7.60
Comp CAD	31243-105	614	20.2	30	7.75

Date: 11/03/18 pH Meter ID: ML02 Salinity Meter ID: ESI #1

Initial: BG

Study: 31242

Client: AECOM

Project: New Haven

Day 01 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Lab Control	31243-000	700	19.3	31	4.37
CLDS Ref	31242-009	701	11/07 18.4 20.1	31 30	4.61 7.68
Lab Control	31243-000	11/07 702 708	18.4	31	4.61
~~CLDS Ref~~ Lab Control	31242-009	703 709	21.0	~~36~~ 30	4.19
Comp V, W	31243-001	704 702	20.1	30	7.64
Comp R, S	31243-002	705 703	19.7	30	7.55
Comp U, S	31243-003	706 704	19.8	30	7.61
Comp D, S	31243-004	707 705	20.3	30	7.68
Comp T, B	31243-005	708 706	20.6	30	7.76
Comp CAD	31243-006	709 707	20.2	30	7.70

Date: 11/07/18 **pH Meter ID:** ML02 **Salinity Meter ID:** ESI #1

Initial: MS

Day 02 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	710	21.1	30	7.58
Comp R, S	31243-002	711	21.0	30	7.60
Comp U, S	31243-003	712	21.1	30	7.59
Comp D, S	31243-004	713	21.1	30	7.69
Comp T, B	31243-005	714	21.0	30	7.56
Comp CAD	31243-006	715	21.1	30	7.70

Date: 11/08/18 **pH Meter ID:** ML02 **Salinity Meter ID:** ESI#1

Initial: BV

Day 03 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	716	17.6	28	7.38
Comp R, S	31243-002	717	18.0	28	7.53
Comp U, S	31243-003	718	18.4	28	7.51
Comp D, S	31243-004	719	18.5	30	7.57
Comp T, B	31243-005	720	18.7	30	7.37
Comp CAD	31243-006	721	18.3	28	7.68

Date: 11/09/18 **pH Meter ID:** ML02 **Salinity Meter ID:** ESI#1

Initial: BV

Study: 31242

Client: AECOM

Project: New Haven

Day 04 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	722	20.7	30	7.40
Comp R, S	31243-002	723	20.1	32	7.48
Comp U, S	31243-003	724	20.1	30	7.42
Comp D, S	31243-004	725	20.1	30	7.48
Comp T, B	31243-005	726	20.2	32	7.38
Comp CAD	31243-006	727	20.4	30	7.58

Date: 11/10/18 **pH Meter ID:** MLO2 **Salinity Meter ID:** ESI #1

Initial: BG

Day 05 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	728	20.5	30	7.33
Comp R, S	31243-002	729	19.5	30	7.38
Comp U, S	31243-003	730	19.5	30	7.43
Comp D, S	31243-004	731	19.5	30	7.43
Comp T, B	31243-005	732	19.5	30	7.38
Comp CAD	31243-006	733	19.0	31	7.57

Date: 11/11/18 **pH Meter ID:** MLO2 **Salinity Meter ID:** ESI #1

Initial: MS

Study: 31242

Client: AECOM

Project: New Haven

Day 06 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp U,S	31243-102	734	18.4	30	7.36
Comp T, B	31243-104	735	18.4	30	7.35

Date: 11/12/18 **pH Meter ID:** MLOZ **Salinity Meter ID:** ESI#1

Initial: BG

Day 07 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp U, S	31243-102	736	17.8	28	7.29

Date: 11/13/18 **pH Meter ID:** ML#L **Salinity Meter ID:** ESI#1

Initial: BG

STUDY: 31243
CLIENT: AECOM
PROJECT: New Haven Harbor Supplemental 2018
TASK: Ammonia Mitigation - Pore Water Summary
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and U
Consistent with USEPA AWQC (1989) and Whitfield (1974).
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.2
F_{NH3} = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P11)-
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

			Ammonia							L	M	N	O	P	Q	R	S
Sample ID	**Hour**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (EC)	pH (SU)	salinity (ppt)	Tot NH3	Temp (EK)	I	pKa	F_{NH3}
Lab Day 01	24	31243-700	0.81		6.0E-06	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	19.3	4.37	31	0.81	292.45	0.64	9.319	7.4E-06
Lab Day 01	24	31243-708	0.78		9.4E-06	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	18.4	4.61	31	0.78	291.55	0.64	9.319	1.2E-05
Lab Day 02	48	31243-709	1.3		7.3E-06	0.5	mg/L as N	11/07/18 1100	11/09/18 1300	21.0	4.19	30	1.3	294.15	0.62	9.317	5.6E-06
Ref/CLDS Day 01	24	31243-701	2.3		0.0367	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.1	7.68	30	2.3	293.25	0.62	9.317	0.01594
Comp 001 (V', W')	24	31243-100	38		0.3361	0.2	mg/L as N	10/25/18 1000	10/25/18 1130	18.9	7.46	30	38	292.05	0.62	9.317	0.00885
Comp 001 (V', W')	48	31243-203	14		0.2371	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	20.0	7.71	30	14	293.15	0.62	9.317	0.01694
Comp 001 (V', W')	72	31243-209	15		0.1406	0.1	mg/L as N	10/27/18 1350	10/28/18	20.3	7.44	30	15	293.45	0.62	9.317	0.00937
Comp 001 (V', W')	96	31243-215	7.8		0.0560	0.1	mg/L as N	10/28/18 1145	10/28/18	17.0	7.43	30	7.8	290.15	0.62	9.317	0.00718
Comp 001 (V', W')	120	31243-221	5.2		0.0387	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.5	7.37	32	5.2	292.65	0.66	9.321	0.00744
Comp 001 (V', W')	24	31243-702	44		0.6405	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.1	7.64	30	44	293.25	0.62	9.317	0.01456
Comp 001 (V', W')	48	31243-710	25		0.3418	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.58	30	25	294.25	0.62	9.317	0.01367
Comp 001 (V', W')	72	31243-716	11		0.0744	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	17.6	7.38	28	11	290.75	0.57	9.312	0.00677
Comp 001 (V', W')	96	31243-722	6		0.0529	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.7	7.40	30	6	293.85	0.62	9.317	0.00881
Comp 001 (V', W')	120	31243-728	6		0.0444	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	20.5	7.33	30	6	293.65	0.62	9.317	0.0074
Comp 002 (R', S')	24	31243-101	27		0.3095	0.2	mg/L as N	10/25/18 1000	10/25/18 1130	18.4	7.59	30	27	291.55	0.62	9.317	0.01146
Comp 002 (R', S')	48	31243-204	15		0.2168	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	20.0	7.64	30	15	293.15	0.62	9.317	0.01445
Comp 002 (R', S')	72	31243-210	16		0.1413	0.1	mg/L as N	10/27/18 1350	10/28/18	19.8	7.43	30	16	292.95	0.62	9.317	0.00883
Comp 002 (R', S')	96	31243-216	8.4		0.0520	0.1	mg/L as N	10/28/18 1145	10/28/18	17.0	7.37	32	8.4	290.15	0.66	9.321	0.00619
Comp 002 (R', S')	120	31243-222	7.3		0.0577	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.7	7.39	32	7.3	292.85	0.66	9.321	0.00791
Comp 002 (R', S')	24	31243-600	33			0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			33	#VALUE!	0	9.245	#VALUE!
Comp 002 (R', S')	48	31243-605	30		0.3575	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.7	7.56	28	30	292.85	0.57	9.312	0.01192
Comp 002 (R', S')	48	31243-610	34		0.4765	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.62	30	34	293.35	0.62	9.317	0.01401
Comp 002 (R', S')	24	31243-703	40		0.4608	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	19.7	7.55	30	40	292.85	0.62	9.317	0.01152
Comp 002 (R', S')	48	31243-711	25		0.3551	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.0	7.60	30	25	294.15	0.62	9.317	0.0142
Comp 002 (R', S')	72	31243-717	12		0.1178	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.0	7.53	28	12	291.15	0.57	9.312	0.00982
Comp 002 (R', S')	96	31243-723	8.7		0.0870	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.1	7.48	32	8.7	293.25	0.66	9.321	0.01
Comp 002 (R', S')	120	31243-729	8		0.0616	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.38	30	8	292.65	0.62	9.317	0.0077
Comp 003 (US-1, US-2)	24	31243-211	38		0.4108	0.2	mg/L as N	10/27/18 1350	10/28/18	21.0	7.48	30	38	294.15	0.62	9.317	0.01081
Comp 003 (US-1, US-2)	48	31243-217	22		0.1499	0.2	mg/L as N	10/28/18 1145	10/28/18	18.0	7.38	32	22	291.15	0.66	9.321	0.00682
Comp 003 (US-1, US-2)	72	31243-223	14		0.1250	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.8	7.44	32	14	292.95	0.66	9.321	0.00893
Comp 003 (US-1, US-2)	96	31243-227	8		0.0409	0.2	mg/L as N	10/30/18 0915	10/30/18 1345	13.8	7.39	32	8	286.95	0.66	9.321	0.00511
Comp 003 (US-1, US-2)	24	31243-601	40			0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			40	#VALUE!	0	9.245	#VALUE!
Comp 003 (US-1, US-2)	48	31243-606	40		0.3756	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.4	7.47	30	40	292.55	0.62	9.317	0.00939
Comp 003 (US-1, US-2)	48	31243-611	40		0.5004	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.57	30	40	293.35	0.62	9.317	0.01251
Comp 003 (US-1, US-2)	24	31243-704	51		0.6784	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	19.8	7.61	30	51	292.95	0.62	9.317	0.0133
Comp 003 (US-1, US-2)	48	31243-712	32		0.4476	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.59	30	32	294.25	0.62	9.317	0.01399
Comp 003 (US-1, US-2)	72	31243-718	21		0.2029	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.4	7.51	28	21	291.55	0.57	9.312	0.00966
Comp 003 (US-1, US-2)	96	31243-724	11		0.0971	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.1	7.42	30	11	293.25	0.62	9.317	0.00882
Comp 003 (US-1, US-2)	120	31243-730	14		0.1209	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.43	30	14	292.65	0.62	9.317	0.00863
Comp 003 (US-1, US-2)	144	31243-734	10		0.0678	0.2	mg/L as N	11/12/18 1500	11/13/18 1100	18.4	7.36	30	10	291.55	0.62	9.317	0.00678
Comp 003 (US-1, US-2)	168	31243-736	4.6		0.0257	0.2	mg/L as N	11/13/18 1400	11/16/18 1330	17.8	7.29	28	4.6	290.95	0.57	9.312	0.00559
Comp 004 (DS-1, DS-2)	24	31243-212	31.8		0.4293	0.2	mg/L as N	10/27/18 1350	10/28/18	20.0	7.61	30	31.8	293.15	0.62	9.317	0.0135
Comp 004 (DS-1, DS-2)	48	31243-218	15		0.1542	0.1	mg/L as N	10/28/18 1145	10/28/18	18.0	7.56	32	15	291.15	0.66	9.321	0.01028

STUDY: 31243
CLIENT: AECOM
PROJECT: New Haven Harbor Supplemental 2018
TASK: Ammonia Mitigation - Pore Water Summary
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and U

Consistent with USEPA AWQC (1989) and Whitfield (1974).

Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)

pKa = ionization constant of ammonium ion in aqueous saline solution (+9.2

F_{NH3} = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P11)-I

Tot NH3 = total ammonia, or QLimit if ND

pressure in FNH3 assumed to be 1 atm

			Ammonia							L	M	N	O	P	Q	R	S
Sample ID	**Hour**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (EC)	pH (SU)	salinity (ppt)	Tot NH3	Temp (EK)	I	pKa	F_{NH3}
Comp 004 (DS-1, DS-2)	72	31243-224	13		0.1372	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.9	7.51	32	13	293.05	0.66	9.321	0.01055
Comp 004 (DS-1, DS-2)	96	31243-228	6.6		0.0465	0.2	mg/L as N	10/30/18 0915	10/30/18 1345	13.5	7.54	32	6.6	286.65	0.66	9.321	0.00704
Comp 004 (DS-1, DS-2)	24	31243-602	36			0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			36	#VALUE!	0	9.245	#VALUE!
Comp 004 (DS-1, DS-2)	48	31243-607	40		0.5262	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.8	7.61	32	40	292.95	0.66	9.321	0.01315
Comp 004 (DS-1, DS-2)	48	31243-612	31		0.4546	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.64	30	31	293.35	0.62	9.317	0.01466
Comp 004 (DS-1, DS-2)	24	31243-705	48		0.7764	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.3	7.68	30	48	293.45	0.62	9.317	0.01618
Comp 004 (DS-1, DS-2)	48	31243-713	32		0.5615	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.69	30	32	294.25	0.62	9.317	0.01755
Comp 004 (DS-1, DS-2)	72	31243-719	16		0.1766	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.5	7.57	30	16	291.65	0.62	9.317	0.01104
Comp 004 (DS-1, DS-2)	96	31243-725	8.4		0.0850	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.1	7.48	30	8.4	293.25	0.62	9.317	0.01012
Comp 004 (DS-1, DS-2)	120	31243-731	10		0.0863	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.43	30	10	292.65	0.62	9.317	0.00863
Comp 005 (TB-1, TB-2)	24	31243-205	31		0.5132	0.5	mg/L as N	10/25/18 1000	10/25/18 1130	20.0	7.70	30	31	293.15	0.62	9.317	0.01656
Comp 005 (TB-1, TB-2)	48	31243-213	18		0.1439	0.1	mg/L as N	10/27/18 1350	10/28/18	20.0	7.38	30	18	293.15	0.62	9.317	0.00799
Comp 005 (TB-1, TB-2)	72	31243-219	13		0.0917	0.1	mg/L as N	10/28/18 1145	10/28/18	18.0	7.39	30	13	291.15	0.62	9.317	0.00705
Comp 005 (TB-1, TB-2)	96	31243-225	13		0.0959	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	20.0	7.35	32	13	293.15	0.66	9.321	0.00738
Comp 005 (TB-1, TB-2)	24	31243-603	45			0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			45	#VALUE!	0	9.245	#VALUE!
Comp 005 (TB-1, TB-2)	48	31243-608	38		0.4866	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.9	7.59	30	38	293.05	0.62	9.317	0.0128
Comp 005 (TB-1, TB-2)	48	31243-613	40		0.5436	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.4	7.60	30	40	293.55	0.62	9.317	0.01359
Comp 005 (TB-1, TB-2)	24	31243-706	50		0.9907	1	mg/L as N	11/07/18 1100	11/08/18 1030	20.6	7.76	30	50	293.75	0.62	9.317	0.01981
Comp 005 (TB-1, TB-2)	48	31243-714	23		0.2983	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.0	7.56	30	23	294.15	0.62	9.317	0.01297
Comp 005 (TB-1, TB-2)	72	31243-720	9.5		0.0674	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.7	7.37	30	9.5	291.85	0.62	9.317	0.0071
Comp 005 (TB-1, TB-2)	96	31243-726	9.5		0.0762	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.2	7.38	32	9.5	293.35	0.66	9.321	0.00802
Comp 005 (TB-1, TB-2)	120	31243-732	12		0.0924	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.38	30	12	292.65	0.62	9.317	0.0077
Comp 005 (TB-1, TB-2)	144	31243-735	6.1		0.0404	0.2	mg/L as N	11/12/18 1500	11/13/18 1100	18.4	7.35	30	6.1	291.55	0.62	9.317	0.00663
Comp 006 (CAD-1, CAD-2, CAD-3)	24	31243-102	12		0.3011	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	18.9	7.92	30	12	292.05	0.62	9.317	0.02509
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-206	5.5		0.0760	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	20.0	7.62	30	5.5	293.15	0.62	9.317	0.01381
Comp 006 (CAD-1, CAD-2, CAD-3)	72	31243-214	4.2		0.0590	0.1	mg/L as N	10/27/18 1350	10/28/18	20.0	7.63	31	4.2	293.15	0.64	9.319	0.01405
Comp 006 (CAD-1, CAD-2, CAD-3)	96	31243-220	3		0.0325	0.1	mg/L as N	10/28/18 1145	10/28/18	19.0	7.55	32	3	292.15	0.66	9.321	0.01082
Comp 006 (CAD-1, CAD-2, CAD-3)	120	31243-226	3		0.0374	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	20.0	7.58	32	3	293.15	0.66	9.321	0.01247
Comp 006 (CAD-1, CAD-2, CAD-3)	24	31243-604	13			0.1	mg/L as N	11/02/18 1250	11/02/18 1000	No data			13	#VALUE!	0	9.245	#VALUE!
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-609	14		0.2567	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.0	7.75	32	14	293.15	0.66	9.321	0.01833
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-614	18		0.3386	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.75	30	18	293.35	0.62	9.317	0.01881
Comp 006 (CAD-1, CAD-2, CAD-3)	24	31243-707	16		0.2688	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.2	7.70	30	16	293.35	0.62	9.317	0.0168
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-715	11		0.1974	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.70	30	11	294.25	0.62	9.317	0.01795
Comp 006 (CAD-1, CAD-2, CAD-3)	72	31243-721	6		0.0847	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.3	7.68	28	6	291.45	0.57	9.312	0.01412
Comp 006 (CAD-1, CAD-2, CAD-3)	96	31243-727	4.2		0.0545	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.4	7.58	30	4.2	293.55	0.62	9.317	0.01299
Comp 006 (CAD-1, CAD-2, CAD-3)	120	31243-733	3.5		0.0399	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.0	7.57	31	3.5	292.15	0.64	9.319	0.01139

MONTROSE ENVIRONMENTAL

Nancy Roka <nancy.roka@enthalpy.com>

RE: New Haven SPP Effort & Milford 28-Day Studies

Van Naerssen, Kris <Kris.VanNaerssen@aecom.com> Thu, Nov 15, 2018 at 11:10 PM
To: James Provencher <james.provencher@enthalpy.com>, Kirk Cram <kirk.cram@enthalpy.com>, "Surprenant, Maura" <Maura.Surprenant@aecom.com>
Cc: "Archer, Christine" <Christine.Archer@aecom.com>, Nancy Roka <nroka@envirosystems.com>

Thanks much Jim –

Will include this COC in our submittal to NAE.

Please note that I connected with Ben tonight – please do plan to proceed as noted below:

- Use of the provided NHH waters to create the elutriates for the SPP re-dos
- Use of the New Hampshire lab water as their dilutant

Thanks much & let us know if any additional questions or concerns.

Best, Kris

From: James Provencher [mailto:james.provencher@enthalpy.com]
Sent: Thursday, November 15, 2018 3:50 PM

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ELUTRIATE PREPARATION SUMMARY

Date: 10/25/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 1 Elutriate	Time Mixing Started	1140
Amount of Sediment	13L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	52L	Time Mixing Stopped	1210
		Time Elutriate Siphoned Off	1310
		Centrifuged?	(Yes) No
Preparer's Initials	BG/		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 1 Elutriate	31246-101	~~3124~~ Comp V,W	31243-100 -	Comp V,W	31242-018

Subsamples Removed

Lab Code	Elutriate Use	Volume
Alpha	Chemical Elutriate Analysis	~ ~~35~~ 21 L
31248	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/25/18 ESI Study: 31242

Client: Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 2 Elutriate	Time Mixing Started	1235/1530
Amount of Sediment	6.5/12 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	26/48 L	Time Mixing Stopped	1305/1600
		Time Elutriate Siphoned Off	1405/1700
		Centrifuged?	(Yes) No
Preparer's Initials	BK		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 2 Elutriate	31246-103	Comp R,S -	31243-101 -	Comp R,S	31242-022

Subsamples Removed

Lab Code	Elutriate Use	Volume
Alpha	Chemical Elutriate Analysis	~ ~~21~~ 35 L @ 1605
31248	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/26/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 3 Elutriate	Time Mixing Started	1445 / 1640
Amount of Sediment	55 / 13 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	22 / 52 L	Time Mixing Stopped	1515 / 1710
		Time Elutriate Siphoned Off	1615 / 1810
		Centrifuged?	(Yes) No
Preparer's Initials	TK		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 3 Elutriate	31246-105	Comp U,S	31243-102	Comp U,S	31242-014

Subsamples Removed

Lab Code	Elutriate Use	Volume
Alpha	Chemical Elutriate Analysis	~35 L
31248	SPP Assays	~6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/25/18 6 (10/26) 10/26 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 4 Elutriate	Time Mixing Started	1140
Amount of Sediment	12 ~~15~~ (10/26) 10/25 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4854 L	Time Mixing Stopped	1210
		Time Elutriate Siphoned Off	1310
		Centrifuged?	(Yes) No
Preparer's Initials	DK		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 4 Elutriate	31246-107	Comp D,S	31243-103	Comp (D,S)	31242-015

Subsamples Removed

Lab Code	Elutriate Use	Volume
Alpha	Chemical Elutriate Analysis	~ 21 L
31248	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/26/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 5 Elutriate	Time Mixing Started	1155 10/26
Amount of Sediment	13 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	52 L	Time Mixing Stopped	1225
		Time Elutriate Siphoned Off	1325 10/26
		Centrifuged?	(Yes) No

Preparer's Initials TBL

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 5 Elutriate	31246-109	Comp T/B -	31243-104 -	Comp T/B	31242-016

Subsamples Removed

Lab Code	Elutriate Use	Volume
Alpha	Chemical Elutriate Analysis	~ 21 L
31248	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/25/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 6 Elutriate	Time Mixing Started	1350
Amount of Sediment	13 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	~~52 L~~ 60 mls	Time Mixing Stopped	1420
		Time Elutriate Siphoned Off	1520
		Centrifuged?	(Yes) No
Preparer's Initials	TJG		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 6 Elutriate	31246-111	Comp CAD1,2,3 -	31243-105 -	Comp CAD1,2,3	31242-017

Subsamples Removed

Lab Code	Elutriate Use	Volume
Alpha	Chemical Elutriate Analysis	~ 21 L
31248	SPP Assays	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/31/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 1 Elutriate	Time Mixing Started	0910
Amount of Sediment	3 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	0940
		Time Elutriate Siphoned Off	1040
		Centrifuged?	(Yes) No
Preparer's Initials	MS		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 1 Elutriate	31246-112	Composite 1	31243-100	Comp V,W	31242-017 018 (B) MR 12/19/18

Subsamples Removed

Lab Code	Elutriate Use	Volume
31291	SPP - Ammonia Mitigated	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/31/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 2 Elutriate	Time Mixing Started	0910
Amount of Sediment	3 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	0940
		Time Elutriate Siphoned Off	1040
		Centrifuged?	(Yes) No
Preparer's Initials	MS		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 2 Elutriate	31246-113	Composite 2	31243-101	Comp R,S	31242-~~018~~ 022 BR 11/29

Subsamples Removed

Lab Code	Elutriate Use	Volume
31291	SPP - Ammonia Mitigated	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/31/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 3 Elutriate	Time Mixing Started	1120
Amount of Sediment	3 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	1150
		Time Elutriate Siphoned Off	1250
		Centrifuged?	(Yes) No
Preparer's Initials	MS		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 3 Elutriate	31246-114	Composite 3	31243-102	Comp US 1-2	31242-014

Subsamples Removed

Lab Code	Elutriate Use	Volume
31291	SPP - Ammonia Mitigated	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/31/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 4 Elutriate	Time Mixing Started	1120
Amount of Sediment	3 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	1150
		Time Elutriate Siphoned Off	1250
		Centrifuged?	(Yes) No
Preparer's Initials	BG		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 4 Elutriate	31246-115	Composite 4	31243-103	Comp DS 1-2	31242-015

Subsamples Removed

Lab Code	Elutriate Use	Volume
31291	SPP - Ammonia Mitigated	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/31/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 5 Elutriate	Time Mixing Started	0955
Amount of Sediment	3 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	1025
		Time Elutriate Siphoned Off	1125
		Centrifuged?	(Yes) No
Preparer's Initials	MS		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 5 Elutriate	31246-116	Composite 5	31243-104	Comp TB 1-2	31242-016

Subsamples Removed

Lab Code	Elutriate Use	Volume
31291	SPP - Ammonia Mitigated	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 10/31/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 6 Elutriate	Time Mixing Started	0955
Amount of Sediment	3 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	12 L	Time Mixing Stopped	1025
		Time Elutriate Siphoned Off	1125
		Centrifuged?	(Yes) No
Preparer's Initials	BG		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 6 Elutriate	31246-117	Composite 6	31243-105	Comp CAD 1,2,3	31242-017

Subsamples Removed

Lab Code	Elutriate Use	Volume
31291	SPP - Ammonia Mitigated	~ 6 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/21/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 1 Elutriate	Time Mixing Started	0730
Amount of Sediment	L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4 L	Time Mixing Stopped	0800
		Time Elutriate Siphoned Off	0900
		Centrifuged?	(Yes) No

Preparer's Initials BG

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 1 Elutriate	31246-118	Comp V.W	31243-100	New Haven	31242-021

Subsamples Removed

Lab Code	Elutriate Use	Volume
	A.p. SPP Repeat	~2 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/21/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 2 Elutriate	Time Mixing Started	0730
Amount of Sediment	1 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4 L	Time Mixing Stopped	0800
		Time Elutriate Siphoned Off	0900
		Centrifuged?	(Yes) No
Preparer's Initials	BG		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 2 Elutriate	31246-119	Comp R,S	31243-101	New Haven	31242-021

Subsamples Removed

Lab Code	Elutriate Use	Volume
	A.p. SPP Repeat	~2 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/21/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 3 Elutriate	Time Mixing Started	0809
Amount of Sediment	1 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4 L	Time Mixing Stopped	0839
		Time Elutriate Siphoned Off	0939
		Centrifuged?	(Yes) No

Preparer's Initials BG

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 3 Elutriate	31246-120	Comp 4, 5	31243-102	New Haven	31242-021

Subsamples Removed

Lab Code	Elutriate Use	Volume
	A.p. SPP Repeat	~2 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/21/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 4 Elutriate	Time Mixing Started	0809
Amount of Sediment	1 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4 L	Time Mixing Stopped	0839
		Time Elutriate Siphoned Off	0939
		Centrifuged?	(Yes) No
Preparer's Initials	BC		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 4 Elutriate	31246-121	Comp D,S	31243-103	New Haven	31242-021

Subsamples Removed

Lab Code	Elutriate Use	Volume
	A.p. SPP Repeat	~2 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/21/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 5 Elutriate	Time Mixing Started	0900
Amount of Sediment	1 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4 L	Time Mixing Stopped	0930
		Time Elutriate Siphoned Off	1030
		Centrifuged?	(Yes) No
Preparer's Initials	BG		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 5 Elutriate	31246-122	Comp T,B	31243-104	New Haven	31242-021

Subsamples Removed

Lab Code	Elutriate Use	Volume
	A.p. SPP Repeat	~2 L

NOTES:

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ELUTRIATE PREPARATION SUMMARY

Date: 11/21/18 ESI Study: 31242

Client: AECOM Project: New Haven Harbor

VOLUMES		TIMES	
Sample ID	Composite 6 Elutriate	Time Mixing Started	0900
Amount of Sediment	1 L	Hand Mixed Every 10 Minutes?	Yes (No)
Amount of Overlying	4 L	Time Mixing Stopped	0930
		Time Elutriate Siphoned Off	1030
		Centrifuged?	(Yes) No
Preparer's Initials	BG		

Elutriate ID	ESI Elutriate Code	Sediment ID	ESI Sediment Code	Overlying Water ID	ESI Overlying Water Code
Composite 6 Elutriate	31246-123	Comp CAD1&3	31243-105	New Haven	31242-021

Subsamples Removed

Lab Code	Elutriate Use	Volume
	A.p. SPP Repeat	~2 L

NOTES:

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Americamysis bahia
Suspended Particulate Phase

Bench Sheets

Unmitigated Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	1 & 2 0
Project:	New Haven	**Client:**	AECOM

Composites 1, 2, & 6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☒ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) NR 11/2/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20 ± 1°C (E3) NR 11/2/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☒ other 200mL Tumbler (P)	(Check box for all that apply) ☒ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/25/18 Initial GRS

63AbAR0102418

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS bahia

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date: 10-21-18 Receipt date: ____

Lot number: 102118MS Strain: ____

Brood origination: FLORIDA

II. Water Quality

Temperature: 25 °C Salinity: ~28 ppt D.O.: — ppm

pH: 7-8 su Hardness: — ppm Alkalinity: — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ____ YCT ____ Other Encap. Shrimp DIET

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: EST # of Organisms: 2800+

Carrier: ____ Date shipped: 10-24-18

Biologist: Mark [illegible]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION of DILUTIONS

STUDY: 31248 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: A.bahia and M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: CLDS		Composite #: comp1		Composite #: comp2		Composite #: comp6	
	Elutriate ID: 31242-009		Elutriate ID: 31246-101		Elutriate ID: 31246-~~102~~ 103 (Closing)		Elutriate ID: 31246-111	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab			0	2,000	0	2,000	0	2,000
(RW)			0		0		0	
1 %			20		20		200	
10 %			200		200		200	
50 %			1,000		1,000		1,000	
100 %			2,000		2,000		2,000	
Initial			MW		MW		LAG	
Date			10/25/18		10/25/18		10/25/18	
Time			1505		1550		1655	
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	27.4		24.9		24.8		24.2	
Vol of Elutriate (mL)	50,000		8,000		8,000		5,500	
Grams of Salt (g)	149.8		47.0		47.9		36.7	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	27.9		28.1		27.9		29.9	
Date & Initial	10/25/18	MW	10/25/18	MW	10/25/18	MW	10/25/18	CFS

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	1 & 2
Test Species:	*Americamysis bahia*	**Lot ID:**	03ABAR0102418	**Sample:**	Controls	**Diluent:**	CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MW	MT	GRS	CFS	LAG	GRS
Date		10/25/18	10/25	~~10/26~~ GRS 10/26/18	10/27	10/28	10/29/18
Time		1645	1730	1625	1450	1525	1600

@CFS 10/27

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
@GRS 10/30 200 + ~~261~~ 213	@GRS 10/30 ~~246 + 247~~ 260 + 261

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.7	8.0	7.1	7.1	6.7	7.96	7.91	7.89	7.90	7.76	20	20	19	19	19	31	32	32	34	31				31	
(RW)	A	8.5	7.7	7.0	6.8	6.3	7.91	7.98	7.81	7.85	7.74	20	20	19	19	19	29	29	30	31	32					
Initials		MT	MW	LAG	CFS	MT																				
Date		10/25	10/26	10/27	10/28	10/29																				
Time		1515	0935	1345	1345	1505																				
Incub. Temp		21	21	21	21	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MT	GRS	~~LAG~~ CFS	LAG																					

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	2	1	1
Thermometer or Probe #	MLO2	MLO2	MLO1	MLO2	MLO2
Initial	MT	MW	LAG	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	MLO2	DO Meter #	MLO1
DO Probe #	160	DO Probe #	96
pH Meter #	MLO2	pH Meter #	MLO1
pH Probe #	163	pH Probe #	158
Salinity Meter #	MLO2	Salinity Meter #	MLO1

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	Project:	New Haven	Client:	AECOM	Incubator ID:	1 & 2
Test Species:	*Americamysis bahia*	Lot ID:	03AB AR010241 8	Sample:	Composite #1	Diluent:	CLDS

SURVIVAL - ~~Composite #1~~ (E3) MR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	9	9	9
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MW	MT	GRS	CFS	LAG	MS
Date		10/25/18	10/25	10/26/18	10/27	10/28	10/29/18
Time		1650	1730	1635	1455 (E3 CFS 10/27)	1535	1600

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	6
	B	10	10	11	10	10	9
	C	10	10	10	10	10	7
	D	10	10	11	11	9	8
	E	10	10	10	9	9	9

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
201 - 204	(E3 GRS 10/30) ~~248 - 251~~ 262 - 265

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.1	7.3	7.1	6.6	5.8	7.91	8.00	7.93	7.84	7.65	20	20	20	18	19	29	29	30	31	32					
10 %	A	8.2	6.9	6.9	6.7	5.5	7.88	7.99	7.95	7.97	7.84	20	20	20	18	19	29	29	30	31	32					
50 %	A	8.1	7.1	6.8	6.5	5.9	7.82	8.10	8.08	8.17	8.13	20	20	19	18	19	29	29	30	31	32					
100 %	A	6.7	6.9	6.7	6.4	5.9	7.68	8.09	8.15	8.29	8.30	20	20	19	18	19	29	29	30	31	32					
Initials		MT	MW	LAG	CFS	MT																				
Date		10/25	10/26	10/27	10/28	10/29																				
Time		1515	0940	1400	1350	1505																				
Incub. Temp		21	21	21	21	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MT	GRS	~~LAG~~ CFS	LAG																					

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	1	1	2	1	1
Thermometer or Probe #	ML02	ML02	ML01	ML02	ML02
Initial	MT	MW	LAG	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	1 & 2
Test Species:	*Americamysis bahia*	**Lot ID:**	03A6AR01024 18	**Sample:**	Composite #2	**Diluent:**	CLDS

SURVIVAL - Composite #~~1~~2 (E2) 10/31/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MW	MT	GRS	CFS	LAG	GRS
Date		10/25/18	10/25	(E3) GRS 10/26 ~~10/26~~ 10/26/18	10/27	10/28	10/29/18
Time		1655	1730	1700	1605	1545	1605

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	(E3) GRS 10/29 ~~8~~ 10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	8
	B	10	10	10	10	10	9
	C	10	10	10	10	9	7
	D	10	10	10	10	9	9
	E	10	10	9	9	9	9

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
205 - 208	(E3) GRS 10/30 ~~252 - 255~~ 266 - 269

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.1	7.0	6.9	6.8	6.5	7.87	7.96	7.87	7.83	7.82	20	20	19	19	19	29	30	30	31	31					
10 %	A	8.2	7.1	6.8	6.8	6.5	7.84	8.01	7.95	7.95	7.95	19	20	19	19	19	29	30	30	31	31					
50 %	A	7.5	6.8	6.7	6.8	6.7	7.74	8.03	8.08	8.18	8.20	18	20	19	19	19	29	29	30	31	31					
100 %	A	8.0	6.9	6.7	7.2	6.7	7.78	8.08	8.14	8.30	8.34	19	20	20	19	19	29	29	30	31	31					
Initials		MT	MW	LAG	CFS	MT																				
Date		10/25	10/26	10/27	10/28	10/29																				
Time		1555	0945	1425	1405	1505																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MT	~~GRS~~ (E3) LAG 10/27	(E3) GRS 10/28 ~~DG~~ CFS	LAG	

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	2	1	1
Thermometer or Probe #	ML02	ML02	ML01	ML02	ML02
Initial	MT	MW	LAG	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

(E10) GRS 10/29 Rep C in the 100% concentration was dripped into during the test process by the incubator the test was stored in.

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	Project:	New Haven	Client:	AECOM	Incubator ID:	1 & 2
Test Species:	*Americamysis bahia*	Lot ID:	03 ABARO 102418	Sample:	Composite #6	Diluent:	CLDS

SURVIVAL - Composite #~~1~~6 (E3) MR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MW	MT	GRS	CFS	LAG	MS
Date		10/24/18	10/25	10/26/18	10/27	10/28	10/29
Time		1710	1730	1720	1610	1555	1615

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	11	11	11
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

(E10) MR 11/2/18

Comments:

(E10) MR 11/2/18 11 orgs used from start in stats

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
209 - 212	270 - 273

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.1	7.1	7.1	6.9	6.5	7.85	8.03	7.88	7.89	7.80	21	20	19	19	19	29	30	31	32	32					
10 %	A	8.1	7.2	6.9	6.7	6.4	7.88	8.04	7.94	7.91	7.89	21	20	19	19	19	29	30	30	31	32					
50 %	A	7.9	7.1	6.9	6.7	6.7	7.95	8.11	8.08	8.10	8.07	20	20	19	19	19	30	30	31	32	33					
100 %	A	7.4	7.1	6.9	6.8	6.5	7.97	8.15	8.15	8.25	8.25	20	20	19	19	19	31	31	32	33	31				31	
Initials		MT	MW	LAG	CFS	MT																				
Date		10/25	10/26	10/27	10/28	10/29																				
Time		1610	0955	1435	1415	1505																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MT	GRS	~~LAG~~ CFS	LAG	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	2	1	1
Thermometer or Probe #	ML02	ML02	ML01	ML02	ML02
Initial	MT	MW	LAG	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML07	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

Assay Review Checklist

DATE IN: 10/25/18
DATE DUE:

STUDY#: 31248
CLIENT: AECOM
PROJECT: New Haven
ASSAY: AB96 SPP

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	10/25/18	MT	
Day 1	10/26/18	GRS	
Day 2	10/27	CFS	
Day 3	10/28	LAG	
Day 4	10/29/18	MS	
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	11/16/18	JTP	
Sample Receipt Complete	11/16/18	↓	
Organism Culture Sheet(s)	10/30/18	GRS	
Bench Sheets Complete (dates, times, initials, etc...)	10/30/18	GRS	
Water Quality Data Complete	↓	↓	
TRC Values & Bottle Numbers	↓	↓	
Daphnid Calculations Complete	N/A	N/A	
Weights Reported	N/A	N/A	
Assay Acceptability Review	10/30/18	GRS	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/2/18	MR	
Statistical Analysis Reviewed	11/6/18	LF	
Data Acceptability Review	11/6/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

P:\GENERAL PROJECTS\FORMS\LABFORMS\$ Assay Review Checklist.wpd

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	2 Q
Project:	New Haven	**Client:**	AECOM

Composites 3,4 & 5

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☑ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) NR 11/2/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20±1°C (E3) NR 11/2/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☑ other 200 mL Tumbler/Beaker	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/26/18 Initial BK

63AbAR0102418

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS bahia

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date: 10-21-18 Receipt date: ____

Lot number: 102118MS Strain: ____

Brood origination: FLORIDA

II. Water Quality

Temperature: 25 °C Salinity: ≈28 ppt D.O.: — ppm

pH: 7-8 su Hardness: — ppm Alkalinity: — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ____ YCT ____ Other Ewcps. Shrimp Diet

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: EST # of Organisms: 28004

Carrier: ____ Date shipped: 10-24-18

Biologist: Mark Dorsey

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION of DILUTIONS

STUDY: 31248 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: M. beryllina & A. bahia **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 3		Composite #: 4		Composite #: 5		Composite #:	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2,000	0	2,000	0	2,000		
(RW)	0	↓	0	↓	0	↓		
1 %	20	↓	20	↓	20	↓		
10 %	200	↓	200	↓	200	↓		
50 %	1,000	↓	1,000	↓	1,000	↓		
100 %	2,000	↓	2,000	↓	2,000	↓		
Initial	CFS		CFS		CFS			
Date	10/26/18		10/26/18		10/26/18			
Time	1755		1645		1710			
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		Reference Site **Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	24.5		24.2		24.4		27.6	
Vol of Elutriate (mL)	5,340		4,290		4,000			
Grams of Salt (g)	21.5		18.8g		16.6g		—	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	28.9		28.2		28.7		27.6	
Date & Initial	10/26/18	CFS	10/26/18	CFS	10/26/18	MW	10/26/18	CFS

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	A. bahia ~~Menidia beryllina~~ (C) LCI 10/26/18	**Lot ID:**	03AbAR0102418	**Sample:**	Controls	**Diluent:**	CLDS

SURVIVAL - Controls - beakers

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		CFS	MW	GRS	GRS	MS	MS
Date		10/26/18	10/26/18	10/27/18	10/28/18	10/29/18	10/30/18
Time		1815	1920	1650	1700	1650	1615

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
-226 -227	316-317

NOTES	
Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (If required) 0	24	48	72	96
LAB	A	8.8	7.1	6.9	6.2	5.9	7.95	7.92	7.87	7.84	7.73	21.0	20	18	19	19	30.4	32	32	33	33				(E10) MT 12/11	
(RW)	A	~~7.8~~ 6.8	6.3	7.0	6.6	5.9	7.87	7.78	7.85	7.76	7.69	20.0	20	18	19	19	27.6	29	30	30	30					
Initials		LCI	LCI	CFS	MT	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1640	1345	1530	1540	1205																				
Incub. Temp		~~26~~ 21	21	21	~~21~~ 21	21																				

FEEDING: *Artemia nauplii* (A 5179)

Fed By:	MW	GRS	GRS	MS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	2	1	1
Thermometer or Probe #	159	1	159	ML02	ML02
Initial	LCI	LCI	CFS	MT	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML012	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

12/11 MT (E10) Salinity not modified

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Americamysis bahia*	**Lot ID:**	034bAR0102418	**Sample:**	Composite #3	**Diluent:**	CLDS

SURVIVAL - ~~Composite # 1~~ (13) NR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	9	9
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		CFS	MW	GRS	GRS	MS	MS
Date		10/26/18	10/26/18	10/27/18	10/28/18	10/29/18	10/30/18
Time		1845	1933	1710	1715	1700	1650

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	9	4
	B	10	10	10	10	4	1
	C	10	10	10	10	6	0
	D	10	10	10	10	7	1
	E	10	10	10	10	2	0

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
228-231	318-321

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	9.8	7.4	7.3	7.0	6.8	7.86	7.92	7.87	7.85	7.84	19.5	19	17	19	19	~~38~~ 28	29	29	30	30					
10 %	A	9.7	7.2	7.3	6.5	6.6	7.83	7.97	7.96	7.93	7.95	19.9	19	17	19	19	~~39~~ 28	29	30	30	31					
50 %	A	9.4	7.2	7.4	6.4	6.2	7.74	8.01	8.16	8.19	8.20	20.0	19	17	19	19	~~40~~ 28	30	30	31	31					
100 %	A	8.6	7.1	7.3	6.6	6.0	7.70	8.05	8.24	8.30	8.32	19.8	19	17	19	19	~~40~~ 28	31	32	32	32					
Initials		LCI	LCI	CFS	MT	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1810	1430	1540	1540	1205																				
Incub. Temp		~~26~~ 21	21	21	21	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	GRS	GRS	MS																					

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	2	1	1	1	1
Thermometer or Probe #	159	1	1	ML02	ML02
Initial	LCI	LCI	CFS	MT	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	Project:	New Haven	Client:	AECOM	Incubator ID:	
Test Species:	*Americamysis bahia*	Lot ID:	03AbAR0102418	Sample:	Composite #4	Diluent:	CLDS

SURVIVAL - ~~Composite # 1~~ (E) NR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		CFS	MW	GRS	GRS	MS	MS
Date		10/26/18	10/26/18	10/27/18	10/28/18	10/29/18	10/30/18
Time		1855	1940	1725	1730	1710	1700

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	8	6
	B	10	10	10	10	10	7
	C	10	10	10	10	8	8
	D	10	10	10	10	10	7
	E	10	10	10	8	6	5

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
232-235	322-325

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	9.8	7.6	7.4	7.0	6.9	7.82	7.93	7.95	7.87	7.87	18.2	19	17	19	19	27.5	29	29	30	30					
10 %	A	9.7	7.4	7.4	6.9	6.5	7.87	8.00	8.02	7.98	7.95	19.1	20	17	19	19	28.0	29	30	30	31					
50 %	A	9.3	7.2	7.3	6.8	6.5	7.80	8.05	8.18	8.22	8.22	19.5	19	17	19	19	28.1	30	30	30	31					
100 %	A	8.7	6.9	7.3	6.6	6.5	7.77	8.08	8.26	8.32	8.34	19.9	19	17	19	19	28.2	30	30	31	31					
Initials		LCI	LCI	CFS	MT	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1705	1505	1545	1540	1205																				
Incub. Temp		22	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-579)

Fed By:	MW	GRS	GRS	MS	

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	1	1	1
Thermometer or Probe #	159	1	1	ML02	ML02
Initial	LCI	LCI	CFS	MT	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Americamysis bahia*	**Lot ID:**	03A6ARO102418	**Sample:**	Composite #5	**Diluent:**	CLDS

SURVIVAL - ~~Composite # 1~~ (E3) NR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	9	9
Initials		CFS	MW	GRS	MS	MS	MS
Date		10/26/18	10/26/18	10/27/18	10/28/18	10/29/18	10/30/18
Time		1910	1945	1745	1730	1720	1710

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	9 (10/28)	4	1
	B	10	10	10	10	5	2
	C	10	10	10	10	6	0
	D	10	10	10	10	5	1
	E	10	10	10	10	5	0

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
236-239	326-329

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	9.6	7.2	7.3	7.0	6.6	7.89	7.91	7.93	7.86	7.80	19.1	19	17	19	19	27.8	30	30	30	31					
10 %	A	9.6	7.1	7.1	6.8	6.2	7.82	7.95	7.98	7.98	7.92	19.2	19	17	19	18	28.0	30	30	31	31					
50 %	A	9.0	7.1	6.9	6.5	6.2	7.64	8.01	8.17	8.20	8.22	19.3	19	17	19	18	28.3	30	30	31	31					
100 %	A	8.5	6.8	6.8	6.6	6.2	7.62	8.04	8.25	8.30	8.33	19.3	19	17	19	19	28.7	30	31	32	32					
Initials		LCI	LCI	CFS	MT	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1715	1430	1540	1540	1205																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MW	GRS	MS	MS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	1	1	1
Thermometer or Probe #	159	1	1	ML02	ML02
Initial	LCI	LCI	CFS	MT	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

Assay Review Checklist

DATE IN: 10/26/18

DATE DUE:

STUDY#: 31248

CLIENT: AECOM

PROJECT: NHH-2018

ASSAY: A696SPP

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	10/26/18	MW	
Day 1	10/27/18	GRS	
Day 2	10/28/18	MS	
Day 3	10/29/18	MS	
Day 4	10/30/18	MS	
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/2/18	NR	
Statistical Analysis Reviewed	11/6/18	LF	
Data Acceptability Review	11/6/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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Americamysis bahia
Suspended Particulate Phase

Statistical Analysis Reports

Survival

Unmitigated Assays

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:09 (p 1 of 1)
Test Code/ID: 03-6925-9825/31248Ab-Comp1

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Oct-18 16:45	**Species:**	Americamysis bahia	**Sample Code:**	31246-101
End Date:	29 Oct-18 16:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Sample Station:**	Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	3	10				10			
0	LS	2	12	10				10			
0	LS	3	13	10				10			
0	LS	4	22	10				10			
0	LS	5	27	10				10			
0	R	1	4	10				10			
0	R	2	8	10				10			
0	R	3	18	10				10			
0	R	4	20	10				10			
0	R	5	29	10				10			
1		1	5	10				10			
1		2	9	10				9			
1		3	17	10				10			
1		4	24	10				10			
1		5	30	10				10			
10		1	1	10				10			
10		2	11	10				10			
10		3	15	10				10			
10		4	21	10				10			
10		5	25	10				10			
50		1	2	10				10			
50		2	7	10				10			
50		3	16	10				10			
50		4	23	10				10			
50		5	28	10				10			
100		1	6	10				6			
100		2	10	10				9			
100		3	14	10				7			
100		4	19	10				8			
100		5	26	10				9			

CETIS Summary Report

Report Date: 07 Nov-18 14:09 (p 1 of 1)
Test Code: 31248Ab-Comp1 | 03-6925-9825

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5537-8861	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	25 Oct-18 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	29 Oct-18 16:00	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
11-3830-8362	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
13-2569-7197	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.780	0.618	0.942	0.600	0.900	0.058	0.130	16.72%	22.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.600	0.900	0.700	0.800	0.900

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	11-3830-8362	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1507163	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.94	2.82	0.0290	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		5	0.780	0.600	0.900	0.130	16.70%	22.0%	39/50	0.78	22.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.600	0.900	0.700	0.800	0.900

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	13-2569-7197	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2056829	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		4	0.825	0.700	0.900	0.096	11.60%	17.5%	33/40	0.825	17.5%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		Outlier	0.900	0.700	0.800	0.900

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:09 (p 1 of 1)
Test Code/ID: 02-4816-7480/31248Ab-Comp2

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Oct-18 16:45	**Species:**	Americamysis bahia	**Sample Code:**	31246-103
End Date:	29 Oct-18 16:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Sample Station:**	Comp 2 Elutriate (R',S')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				10			
0	LS	2	7	10				10			
0	LS	3	13	10				10			
0	LS	4	23	10				10			
0	LS	5	28	10				10			
0	R	1	4	10				10			
0	R	2	10	10				10			
0	R	3	18	10				10			
0	R	4	19	10				10			
0	R	5	26	10				10			
1		1	2	10				10			
1		2	12	10				10			
1		3	14	10				10			
1		4	24	10				10			
1		5	25	10				10			
10		1	3	10				10			
10		2	8	10				10			
10		3	16	10				10			
10		4	22	10				10			
10		5	30	10				10			
50		1	6	10				10			
50		2	9	10				10			
50		3	17	10				10			
50		4	21	10				10			
50		5	27	10				10			
100		1	5	10				8			
100		2	11	10				9			
100		3	15	10				7			
100		4	20	10				9			
100		5	29	10				9			

CETIS Summary Report

Report Date: 07 Nov-18 14:10 (p 1 of 1)
Test Code: 31248Ab-Comp2 | 02-4816-7480

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5537-8861	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	25 Oct-18 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	29 Oct-18 16:00	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 2 Elutriate (R',S')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-7912-3948	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
06-2039-3296	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.840	0.729	0.951	0.700	0.900	0.040	0.089	10.65%	16.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.800	0.900	0.700	0.900	0.900

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-7912-3948	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:44	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1943220	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.73	2.82	1.3E-04	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		5	0.840	0.700	0.900	0.089	10.60%	16.0%	42/50	0.84	16.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.800	0.900	0.700	0.900	0.900

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	06-2039-3296	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:44	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	751373	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		4	0.875	0.800	0.900	0.050	5.71%	12.5%	35/40	0.875	12.5%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.800	0.900	Outlier	0.900	0.900

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:10 (p 1 of 1)
Test Code/ID: 17-5048-7704/31248Ab-Comp3

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date: 26 Oct-18 18:15 **Species:** Americamysis bahia **Sample Code:** 31246-105
End Date: 30 Oct-18 16:15 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** New Haven Harbor 2018
Sample Date: 26 Oct-18 16:15 **Material:** Elutriate Solution **Sample Station:** Comp 3 Elutriate (US-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	3	10				10			
0	LS	2	7	10				10			
0	LS	3	14	10				10			
0	LS	4	22	10				10			
0	LS	5	25	10				10			
0	R	1	4	10				10			
0	R	2	11	10				10			
0	R	3	16	10				10			
0	R	4	21	10				10			
0	R	5	28	10				10			
1		1	6	10				10			
1		2	9	10				10			
1		3	15	10				10			
1		4	23	10				10			
1		5	30	10				9			
10		1	2	10				10			
10		2	8	10				10			
10		3	13	10				10			
10		4	20	10				10			
10		5	27	10				10			
50		1	1	10				10			
50		2	12	10				10			
50		3	18	10				10			
50		4	19	10				10			
50		5	26	10				10			
100		1	5	10				4			
100		2	10	10				1			
100		3	17	10				0			
100		4	24	10				1			
100		5	29	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:11 (p 1 of 1)
Test Code: 31248Ab-Comp3 | 17-5048-7704

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	17-2306-3977	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 18:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 16:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	120m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-0845-5917	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	71.9	70	74.1	1.391	
13-3464-6310	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	74	69.6	82.9	1.351	
00-6464-8008	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	74	70.9	77.1	1.352	
19-6034-0505	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	71.8	69.9	73.9	1.392	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.120	0.000	0.324	0.000	0.400	0.074	0.164	136.93%	88.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.400	0.100	0.000	0.100	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-6464-8008	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:46	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	120m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	12.00%	1.87	0.00911	74	70.9	77.1

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.84	2.82	4.0E-05	Outlier Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		5	0.120	0.000	0.400	0.164	137.00%	88.0%	6/50	0.12	88.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.400	0.100	0.000	0.100	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-6034-0505	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:46	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	120m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	5.00%	1.86	0.00601	71.8	69.9	73.9

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		4	0.050	0.000	0.100	0.058	115.00%	95.0%	2/40	0.05	95.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		Outlier	0.100	0.000	0.100	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	13-3464-6310	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	120m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1177057	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.84	2.82	4.0E-05	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	74	69.6	82.9	1.351	1.207	1.436

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		5	0.120	0.000	0.400	0.164	137.00%	88.0%	6/50	0.12	88.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.400	0.100	0.000	0.100	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-0845-5917	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	120m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1635402	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	71.9	70	74.1	1.391	1.349	1.429

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%
100		4	0.050	0.000	0.100	0.058	115.00%	95.0%	2/40	0.05	95.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		Outlier	0.100	0.000	0.100	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:11 (p 1 of 1)
Test Code/ID: 02-4344-2163/31248Ab-Comp4

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 18:15	**Species:**	Americamysis bahia	**Sample Code:**	31246-107
End Date:	30 Oct-18 16:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Sample Station:**	Comp 4 Elutriate (DS-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	4	10				10			
0	LS	2	9	10				10			
0	LS	3	13	10				10			
0	LS	4	23	10				10			
0	LS	5	28	10				10			
0	R	1	1	10				10			
0	R	2	8	10				10			
0	R	3	16	10				10			
0	R	4	19	10				10			
0	R	5	29	10				10			
1		1	6	10				10			
1		2	7	10				10			
1		3	14	10				10			
1		4	20	10				10			
1		5	26	10				10			
10		1	2	10				10			
10		2	11	10				10			
10		3	18	10				10			
10		4	21	10				10			
10		5	27	10				10			
50		1	3	10				10			
50		2	12	10				10			
50		3	15	10				10			
50		4	24	10				10			
50		5	30	10				10			
100		1	5	10				6			
100		2	10	10				7			
100		3	17	10				8			
100		4	22	10				7			
100		5	25	10				5			

CETIS Summary Report

Report Date: 07 Nov-18 14:12 (p 1 of 1)
Test Code: 31248Ab-Comp4 | 02-4344-2163

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	17-2306-3977	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 18:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 16:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
07-3362-1766	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
21-2491-4378	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.660	0.518	0.802	0.500	0.800	0.051	0.114	17.28%	34.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.600	0.700	0.800	0.700	0.500

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	07-3362-1766	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	984719	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.36	2.82	0.0025	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		5	0.660	0.500	0.800	0.114	17.30%	34.0%	33/50	0.66	34.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.600	0.700	0.800	0.700	0.500

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	21-2491-4378	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	887546	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		4	0.700	0.600	0.800	0.082	11.70%	30.0%	28/40	0.7	30.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		0.600	0.700	0.800	0.700	Outlier

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:12 (p 1 of 1)
Test Code/ID: 12-0424-5958/31248Ab-Comp5

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 18:15	**Species:**	Americamysis bahia	**Sample Code:**	31246-109
End Date:	30 Oct-18 16:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 5 Elutriate (TB-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				10			
0	LS	2	10	10				10			
0	LS	3	15	10				10			
0	LS	4	20	10				10			
0	LS	5	29	10				10			
0	R	1	4	10				10			
0	R	2	9	10				10			
0	R	3	13	10				10			
0	R	4	19	10				10			
0	R	5	27	10				10			
1		1	5	10				10			
1		2	7	10				10			
1		3	17	10				10			
1		4	22	10				10			
1		5	30	10				10			
10		1	6	10				10			
10		2	12	10				10			
10		3	14	10				10			
10		4	21	10				10			
10		5	28	10				9			
50		1	3	10				10			
50		2	8	10				10			
50		3	16	10				10			
50		4	23	10				10			
50		5	26	10				10			
100		1	2	10				1			
100		2	11	10				2			
100		3	18	10				0			
100		4	24	10				1			
100		5	25	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:13 (p 1 of 1)
Test Code: 31248Ab-Comp5 | 12-0424-5958

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	17-2306-3977	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 18:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 16:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-2011-4730	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	72.7	69.8	76	1.376	
17-2720-7226	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	71.8	69.9	74	1.392	
02-0213-8458	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	71.8	69.8	73.8	1.394	✓
11-4657-4370	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	72.6	70.3	75.1	1.377	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.080	0.000	0.184	0.000	0.200	0.037	0.084	104.58%	92.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.100	0.200	0.000	0.100	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:12 (p 1 of 1)
Test Code: 31248Ab-Comp5 | 12-0424-5958

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	02-0213-8458	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:49	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	5.00%	1.86	0.00614	71.8	69.8	73.8

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		4	0.050	0.000	0.100	0.058	115.00%	95.0%	2/40	0.05	95.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.100	Outlier	0.000	0.100	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	01-2011-4730	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1089198	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.96	2.82	0.0262	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	72.7	69.8	76	1.376	1.316	1.432

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		5	0.080	0.000	0.200	0.084	105.00%	92.0%	4/50	0.08	92.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.100	0.200	0.000	0.100	0.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	17-2720-7226	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	578977	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	71.8	69.9	74	1.392	1.351	1.431

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		4	0.050	0.000	0.100	0.058	115.00%	95.0%	2/40	0.05	95.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.100	Outlier	0.000	0.100	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:13 (p 1 of 1)
Test Code/ID: 00-4152-1557/31248Ab-Comp6

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	25 Oct-18 16:45	**Species:**	Americamysis bahia	**Sample Code:**	31246-111
End Date:	29 Oct-18 16:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Sample Station:**	Comp 6 Elutriate (CAD-1,-2,-3)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	6	10				10			
0	LS	2	11	10				10			
0	LS	3	18	10				10			
0	LS	4	21	10				10			
0	LS	5	28	10				10			
0	R	1	2	10				10			
0	R	2	12	10				10			
0	R	3	16	10				10			
0	R	4	23	10				10			
0	R	5	30	10				10			
1		1	5	10				10			
1		2	10	10				10			
1		3	17	10				10			
1		4	20	10				10			
1		5	27	10				10			
10		1	3	10				9			
10		2	8	10				10			
10		3	13	10				10			
10		4	19	10				10			
10		5	29	10				10			
50		1	4	11				11			
50		2	7	10				10			
50		3	15	10				10			
50		4	22	10				10			
50		5	25	10				10			
100		1	1	10				10			
100		2	9	10				10			
100		3	14	10				10			
100		4	24	10				10			
100		5	26	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 14:13 (p 1 of 1)
Test Code: 31248Ab-Comp6 | 00-4152-1557

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5537-8861	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	25 Oct-18 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	29 Oct-18 16:00	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	95h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	85m	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
02-5492-5632	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
04-7969-6571	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	02-5492-5632	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	85m	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1807598	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.38	2.82	1.8E-07	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	2.0%	49/50	0.993	0.67%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	51/51	0.993	0.67%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.993	0.67%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	04-7969-6571	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	85m	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1527669	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	51/51	1	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		Outlier	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Americamysis bahia
Suspended Particulate Phase

Bench Sheets

Mitigated Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31291	**Incubator ID:**	2
Project:	New Haven	**Client:**	AECOM

Composites 1,2,3,4,5 & 6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☑ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) JTP 12/07/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2°C~~ 20 ± 1°C (E3) JTP 12/07/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☑ other 200mL Tumbler	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/31/18 Initial BG

02AOARO102918

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species AMERICAMYSIS bahia

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date 10-27-18 Receipt date ____

Lot number 102718MS Strain ____

Brood origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ____ YCT ____ Other Encap. Shrimp Diet

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: EST # of Organisms 2800+

Carrier: ____ Date shipped 10-29-18

Biologist: [signature]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION of DILUTIONS

STUDY: 31291 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 1		Composite #: 2		Composite #: Ref water		Composite #: 5	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2000	0	2,000			0	2,000
(RW)	0	↓	0	↓			0	↓
1 %	20	↓	20	↓			20	↓
10 %	200	↓	200	↓			200	↓
50 %	1000	↓	1,000	↓			1,000	↓
100 %	2000	↓	2,000	↓			2,000	↓
Initial	MW		MW				MW	
Date	10/31/18		10/31/18				10/31/18	
Time	1250		1258				1415	
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	24.5		25.1		27.4		25.1	
Vol of Elutriate (mL)	5,000		5,000		75,000		5,000 mL	
Grams of Salt (g)	31.7g		28.2		224.6g		28.2g	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	28.0		28.2		28.4		28.4	
Date & Initial	10/31/18	MW	10/31/18	MW	10/31/18	LAG	10/31/18	

PREPARATION of DILUTIONS

STUDY: 31291 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent: →	Composite #: 4		Composite #: 4		Composite #: 3		Composite #:	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2,000	0	2000	0	2,000		
(RW)	0	↓	0	↓	0	↓		
1 %	20	↓	20	↓	20	↓		
10 %	200	↓	200	↓	200	↓		
50 %	1,000	↓	1,000	↓	1,000	↓		
100 %	2,000	↓	2,000	↓	2,000	↓		
Initial	MW		MW		MW			
Date	10/31/18		10/31/18		10/31/18			
Time	1505		1450		1530			
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	25.4		25.1		25.7		~~4~~ 3 MW 10/31	
Vol of Elutriate (mL)	5,000		5,000		5,000			
Grams of Salt (g)	10.3g		28.2g		24.8g			
Lot number of Salt	A- 5117		A- 5117		A- 5117		A-	
Final Salinity	28.1		28.3		28.1			
Date & Initial	10/31/18	MW	10/31/18	MW	10/31/18	MW		

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	I
Test Species:	*Americamysis bahia*	**Lot ID:**	02AbAR0102918	**Sample:**	Controls	**Diluent:**	CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/01/18	11/2/18	11/03	11/04
Time		1510	1630	1310	1430	1350	1250

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

Comments:

~~10~~ 11/04 MT 11/04 Daylight savings

(E10)

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
345-346	397-398

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.3	7.0	6.5	6.2	6.9	8.00	7.93	7.85	7.70	7.84	19	20	20	20	26	31	33	32	34	34				32	
(RW)	A	8.7	6.8	6.1	5.8	6.2	7.97	7.88	7.79	7.71	7.73	19	20	20	20	20	29	30	30	31	33					
Initials		MT	MT	CFS	MW	LAG																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1330	0900	1045	1100	0935																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED													
Exposure (Hours)	0	24	48	72	96	Water Quality Station #1		Water Quality Station #2	
Water Quality Station #	2	1	2	1	1	DO Meter #	MLO2	DO Meter #	MLO1
Thermometer or Probe #	MLO1	MLO2	MLO1	MLO2	MLO2	DO Probe #	160	DO Probe #	96
Initial	MT	MT	CFS	MW	LAG	pH Meter #	MLO2	pH Meter #	MLO1
						pH Probe #	163	pH Probe #	158
						Salinity Meter #	MLO2	Salinity Meter #	MLO1

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	Project:	New Haven	Client:	AECOM	Incubator ID:	
Test Species:	*Americamysis bahia*	Lot ID:	02AbAR0102918	Sample:	Composite #1	Diluent:	CLDS

SURVIVAL - Composite #6 | (1) 10/31

Conc	Rep	0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	9 (2) 11/04 10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	9	9
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	9 10 (3) MT 11/04
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/01/18	11/02/18	11/03	11/04
Time		~~1540~~ 1635	1635	1325	1435	1355	1300

(3) MW 10/31

Conc	Rep	0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

(10)

Comments:

(3) MT 11/04 Daylight Savings

(3) MT 11/04

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
347-350	399-402

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	7.2	6.6	6.2	6.5	7.92	7.94	7.90	7.82	7.76	20	20	20	20	20	29	30	30	31	32					
10 %	A	8.2	7.1	6.7	6.3	6.7	7.96	7.94	7.88	7.80	7.82	20	20	20	20	20	29	30	30	31	32					
50 %	A	7.7	7.1	6.2	6.3	6.6	7.91	7.92	7.85	7.76	7.80	20	20	20	20	20	28	29	29	30	31					
100 %	A	6.6	6.8	6.2	5.9	6.4	7.83	7.87	7.82	7.80	7.82	21	20	20	20	20	28	29	28	29	30					
Initials		MT	MT	CFS	MW	LHG																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1350	0910	1050	1105	0940																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED						
Exposure (Hours)	0	24	48	72	96	
Water Quality Station #	2	1	2	(3) MW 11/3 1	1	
Thermometer or Probe #	ML01	ML02	ML01	ML02	ML02	
Initial	MT	MT	CFS	MW	LHG	

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Americamysis bahia*	**Lot ID:**	02A6ARD102918	**Sample:**	Composite #2	**Diluent:**	CLDS

SURVIVAL - Composite #~~6~~ 2 (E) DG 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	9	9	9	9
	E	10	10	10	9	9	9
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/01	11/02	11/03	11/04
Time		1530	1640	1345	1445	1410	1315

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

(E) MT 11/04

Comments:

(E) MT 11/04 Daylight Savings

(E10)

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
351 - 354	403-406

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	6.8	6.2	6.2	6.0	7.96	7.85	7.74	7.70	7.64	19	20	20	20	20	29	30	29	31	31					
10 %	A	8.2	7.0	6.2	6.1	6.4	7.97	7.90	7.79	7.74	7.79	19	20	20	20	20	29	30	29	31	31					
50 %	A	7.4	6.9	6.0	6.1	6.2	7.91	7.91	7.79	7.72	7.77	19	20	20	20	20	28	29	29	30	31					
100 %	A5	5.8	6.8	5.9	5.8	6.1	7.85	7.90	7.76	7.73	7.80	19	20	20	20	20	28	29	28	30	30					
Initials		MT	MT	CFS	MW	LAG																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1340	0915	1105	1115	1410																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	2	1	1
Thermometer or Probe #	ML01	ML02	ML01	ML02	ML02
Initial	MT	MT	CFS	MW	LAG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	Project:	New Haven	Client:	AECOM	Incubator ID:	
Test Species:	*Americamysis bahia*	Lot ID:	02AbAR0102918	Sample:	Composite #3	Diluent:	CLDS

SURVIVAL - Composite #~~6~~3 DG 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	9	9	9
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	9	9	9
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/1/18	11/2/18	11/03	11/04
Time		1545	1645	1425	1450	1420	1310

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
355 - 358	407 - 410

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

Comments:

MT 11/04

MT 11/04 Daylight Savings

EIO

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	7.3	6.3	5.8	6.3	7.98	7.95	7.80	7.71	7.69	20	20	20	20	20	29	30	30	31	31					
10 %	A	8.3	7.3	6.3	5.8	6.7	7.97	7.96	7.83	7.73	7.79	20	20	20	20	20	29	30	30	31	31					
50 %	A	7.6	7.0	6.1	5.7	6.5	7.90	7.91	7.80	7.74	7.79	20	20	20	20	20	29	29	29	30	31					
100 %	A	5.6	6.8	6.2	5.7	6.4	7.79	7.89	7.85	7.79	7.83	21	20	20	20	20	28	29	28	29	30					
Initials		LAG	MT	CFS	MW	LAG																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1545	0920	1115	1120	1000																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	1	1	2	~~2~~ 1	1
Thermometer or Probe #	ML02	ML02	ML01	MW 11/3 ML02	~~LAG 10/31 ML02~~
Initial	LAG	MT	CFS	MW	LAG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML07	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Americamysis bahia*	**Lot ID:**	02AbARO102918	**Sample:**	Composite #4	**Diluent:**	CLDS

SURVIVAL - Composite #~~5~~4 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/01/18	11/2	11/03	11/04
Time		1600	1700	1435	1505	1430	1350

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

(8) MT 11/04

Comments:

~~(10)~~ (10) MT 11/04 Daylight Savings

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
359-362	411-414

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	7.0	6.4	6.2	7.2	7.95	7.88	7.81	7.76	7.86	~~20~~ 19	20	20	20	20	30	30	~~32~~ 29	30	31					
10 %	A	8.3	6.4	5.7	5.8	6.5	7.97	7.82	7.73	7.68	7.78	20	20	20	20	20	29	30	~~30~~ 29	30	31					
50 %	A	7.6	6.5	6.1	6.0	6.5	7.97	7.88	7.83	7.80	7.82	19	20	20	20	20	29	29	29	30	30					
100 %	A	5.7	6.4	6.2	6.0	6.7	7.95	7.88	7.82	7.84	7.89	19	20	20	20	20	28	29	28	29	30					
Initials		LAG	MT	MCFS	MW	LAG																				
Date		10/31	11/01	11/02	11/03	11/05																				
Time		1515	0925	1120 ~~1015~~	1127	1005 ~~1010~~																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	1	1	2	1	1
Thermometer or Probe #	ML02	ML02	ML02	ML02	ML02
Initial	LAG	MT	CFS	MW	LAG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	#1
Test Species:	*Americamysis bahia*	**Lot ID:**	02A6AR0102918	**Sample:**	Composite #5	**Diluent:**	CLDS

SURVIVAL - Composite #~~8~~5 (#8) 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/1/18	11/2	11/03	11/04
Time		1615	1715	1445	1515	1445	1340

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	9	9	9

(8) MT 11/04

Comments:

(9) MT 11/04 Daylight Savings

(10)

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
363-366	415-418

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	7.1	6.9	6.2	7.0	7.97	7.91	7.94	7.83	7.79	20	20	20	20	19	30	30	30	31	31					
10 %	A	8.2	7.1	6.7	5.8	6.6	7.96	7.95	7.91	7.74	7.82	19	19	20	20	20	29	30	30	31	31					
50 %	A	7.5	7.0	6.7	5.7	6.7	7.92	7.93	7.92	7.84	7.88	19	19	20	20	20	29	30	29	30	31					
100 %	A	6.0	7.0	6.7	5.7	6.7	7.80	7.94	7.96	7.87	7.91	19	20	20	20	20	28	29	28	30	30					
Initials		LAG	MT	CFS	MW	LAG																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1510	0935	1125	1150	1020																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1	2	1	1
Thermometer or Probe #	ML02	ML02	ML01	ML02	ML02
Initial	LAG	MT	CFS	MW	LAG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	Project:	New Haven	Client:	AECOM	Incubator ID:	
Test Species:	*Americamysis bahia*	Lot ID:	02AbARO102918	Sample:	Composite #6	Diluent:	CLDS

SURVIVAL - Composite # 6

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MS	MW	MW	MW	CFS	MT
Date		10/31/18	10/31/18	11/1/18	11/2/18	11/02	11/04
Time		1635	1720	1522	1525	1455	1330

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	9	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	11	11
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

EID 11/6/18 MR

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
367-370	419-422

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

Comments:

~~EID 11/6/18~~

MT 11/04 Daylight Savings

EID 11/6/18 MR 11 orgs used from start in stats

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	7.0	5.9	5.7	6.7	7.94	7.90	7.73	7.68	7.76	20	20	20	20	20	29	30	29	30	30					
10 %	A	8.3	7.0	5.8	6.0	6.6	7.97	7.92	7.73	7.75	7.80	20	20	20	20	20	29	30	29	31	30					
50 %	A	7.6	6.6	6.0	5.9	6.6	7.97	7.89	7.80	7.77	7.82	21	20	20	20	20	29	29	29	30	30					
100 %	A	5.8	6.6	6.3	5.7	6.5	7.97	7.93	7.88	7.80	7.86	22	20	20	20	20	28	29	28	30	29					
Initials		LAG	MT	CFS	MW	LAG																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1530	0930	1135	1158	1025																				
Incub. Temp		21	20	20	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	MW	CFS																					

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	1	1	2	1	2
Thermometer or Probe #	ML02	ML02	ML01	ML02	ML01
Initial	LAG	MT	CFS	MW	LAG

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

Assay Review Checklist

DATE IN: 10/31/18

DATE DUE:

STUDY#: 31291

CLIENT: AECOM

PROJECT: NHH-2018

ASSAY: A696SPP

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	10/31/18	MW	
Day 1	11/01/18	MW	
Day 2	11/02/18	MW	
Day 3	11/03	CFS	
Day 4	11/04	MT	
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/6/18	MR	
Statistical Analysis Reviewed	11/7/18	LF	
Data Acceptability Review	11/7/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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Americamysis bahia
Suspended Particulate Phase

Statistical Analysis Reports

Survival

Mitigated Assays

CETIS Test Data Worksheet

Report Date: 06 Nov-18 15:58 (p 1 of 1)
Test Code/ID: 20-8258-0644/31291Ab-Comp1

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date: 31 Oct-18 15:30 **Species:** Americamysis bahia **Sample Code:** 31246-112
End Date: 04 Nov-18 13:15 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** New Haven Harbor 2018
Sample Date: 31 Oct-18 10:40 **Material:** Elutriate Solution **Sample Station:** Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	3	10				10			
0	LS	2	10	10				10			
0	LS	3	13	10				10			
0	LS	4	23	10				10			
0	LS	5	30	10				10			
0	R	1	4	10				10			
0	R	2	7	10				10			
0	R	3	17	10				10			
0	R	4	21	10				10			
0	R	5	28	10				10			
1		1	5	10				10			
1		2	8	10				10			
1		3	16	10				10			
1		4	22	10				10			
1		5	29	10				9			
10		1	6	10				10			
10		2	9	10				10			
10		3	15	10				10			
10		4	24	10				10			
10		5	26	10				10			
50		1	1	10				10			
50		2	12	10				10			
50		3	14	10				10			
50		4	20	10				10			
50		5	25	10				10			
100		1	2	10				10			
100		2	11	10				10			
100		3	18	10				10			
100		4	19	10				10			
100		5	27	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:15 (p 1 of 1)
Test Code: 31291Ab-Comp1 | 20-8258-0644

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	15-2590-5812	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 15:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	12-3991-1381	**Code:**	31246-112	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-7930-0591	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
20-0808-6694	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:15 (p 1 of 1)
Test Code: 31291Ab-Comp1 | 20-8258-0644

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	09-7930-0591	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	12-3991-1381	**Code:**	31246-112	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	221686	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	Outlier
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 15:59 (p 1 of 1)
Test Code/ID: 16-1316-1315/31291Ab-Comp2

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 15:30	**Species:**	Americamysis bahia	**Sample Code:**	31246-113
End Date:	04 Nov-18 13:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Sample Station:**	Comp 2 Elutriate (R',S')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	5	10				10			
0	LS	2	8	10				10			
0	LS	3	18	10				10			
0	LS	4	24	10				10			
0	LS	5	26	10				10			
0	R	1	6	10				10			
0	R	2	9	10				10			
0	R	3	16	10				10			
0	R	4	20	10				10			
0	R	5	27	10				10			
1		1	3	10				10			
1		2	10	10				10			
1		3	15	10				10			
1		4	21	10				9			
1		5	30	10				9			
10		1	1	10				10			
10		2	11	10				10			
10		3	17	10				10			
10		4	22	10				10			
10		5	28	10				10			
50		1	4	10				10			
50		2	12	10				10			
50		3	13	10				10			
50		4	23	10				10			
50		5	29	10				10			
100		1	2	10				10			
100		2	7	10				10			
100		3	14	10				10			
100		4	19	10				10			
100		5	25	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:16 (p 1 of 1)
Test Code: 31291Ab-Comp2 | 16-1316-1315

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	15-2590-5812	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 15:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	21-3473-6624	**Code:**	31246-113	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 2 Elutriate (R',S')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-5076-6875	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	0.900	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:16 (p 1 of 1)
Test Code: 31291Ab-Comp2 | 16-1316-1315

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-5076-6875	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	21-3473-6624	**Code:**	31246-113	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	125693	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.82	0.0918	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.99	1.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	0.900	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:00 (p 1 of 1)
Test Code/ID: 02-7220-5392/31291Ab-Comp3

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 15:30	**Species:**	Americamysis bahia	**Sample Code:**	31246-114
End Date:	04 Nov-18 13:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Sample Station:**	Comp 3 Elutriate (US-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				10			
0	LS	2	9	10				10			
0	LS	3	14	10				10			
0	LS	4	23	10				10			
0	LS	5	27	10				10			
0	R	1	2	10				10			
0	R	2	11	10				10			
0	R	3	18	10				10			
0	R	4	24	10				10			
0	R	5	29	10				10			
1		1	3	10				10			
1		2	12	10				9			
1		3	13	10				10			
1		4	22	10				10			
1		5	26	10				9			
10		1	6	10				10			
10		2	8	10				10			
10		3	16	10				10			
10		4	20	10				10			
10		5	25	10				10			
50		1	4	10				10			
50		2	10	10				10			
50		3	17	10				10			
50		4	19	10				10			
50		5	30	10				10			
100		1	5	10				10			
100		2	7	10				10			
100		3	15	10				10			
100		4	21	10				10			
100		5	28	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:17 (p 1 of 1)
Test Code: 31291Ab-Comp3 | 02-7220-5392

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	15-2590-5812	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 15:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	08-9579-5849	**Code:**	31246-114	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-9084-4740	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	4.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:17 (p 1 of 1)
Test Code: 31291Ab-Comp3 | 02-7220-5392

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	01-9084-4740	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-9579-5849	**Code:**	31246-114	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1725243	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.82	0.0918	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	0.960	0.900	1.000	0.055	5.71%	4.0%	48/50	0.99	1.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	0.99	1.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	0.900	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:01 (p 1 of 1)
Test Code/ID: 13-3161-0080/31291Ab-Comp4

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date: 31 Oct-18 15:30 **Species:** Americamysis bahia **Sample Code:** 31246-115
End Date: 04 Nov-18 13:15 **Protocol:** EPA/821/R-02-012 (2002) **Sample Source:** New Haven Harbor 2018
Sample Date: 31 Oct-18 12:50 **Material:** Elutriate Solution **Sample Station:** Comp 4 Elutriate (DS-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	6	10				10			
0	LS	2	12	10				10			
0	LS	3	16	10				10			
0	LS	4	21	10				10			
0	LS	5	28	10				10			
0	R	1	5	10				10			
0	R	2	9	10				10			
0	R	3	15	10				10			
0	R	4	19	10				10			
0	R	5	30	10				10			
1		1	3	10				10			
1		2	11	10				10			
1		3	18	10				10			
1		4	22	10				10			
1		5	25	10				10			
10		1	4	10				10			
10		2	7	10				10			
10		3	14	10				10			
10		4	23	10				10			
10		5	27	10				10			
50		1	1	10				10			
50		2	8	10				10			
50		3	13	10				10			
50		4	20	10				10			
50		5	29	10				10			
100		1	2	10				10			
100		2	10	10				10			
100		3	17	10				10			
100		4	24	10				10			
100		5	26	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:18 (p 1 of 1)
Test Code: 31291Ab-Comp4 | 13-3161-0080

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	15-2590-5812	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 15:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	13-1258-1800	**Code:**	31246-115	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-4809-5839	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:18 (p 1 of 1)
Test Code: 31291Ab-Comp4 | 13-3161-0080

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	09-4809-5839	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:17	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	13-1258-1800	**Code:**	31246-115	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	152548	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:02 (p 1 of 1)
Test Code/ID: 09-2457-9639/31291Ab-Comp5

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 15:30	**Species:**	Americamysis bahia	**Sample Code:**	31246-116
End Date:	04 Nov-18 13:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 5 Elutriate (TB-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				10			
0	LS	2	12	10				10			
0	LS	3	16	10				10			
0	LS	4	19	10				10			
0	LS	5	26	10				10			
0	R	1	3	10				10			
0	R	2	7	10				10			
0	R	3	13	10				10			
0	R	4	22	10				10			
0	R	5	28	10				10			
1		1	6	10				10			
1		2	10	10				10			
1		3	14	10				10			
1		4	21	10				10			
1		5	25	10				10			
10		1	2	10				10			
10		2	8	10				10			
10		3	18	10				10			
10		4	24	10				10			
10		5	27	10				10			
50		1	4	10				10			
50		2	11	10				10			
50		3	15	10				10			
50		4	20	10				10			
50		5	29	10				10			
100		1	5	10				10			
100		2	9	10				10			
100		3	17	10				10			
100		4	23	10				10			
100		5	30	10				9			

CETIS Summary Report

Report Date: 07 Nov-18 10:19 (p 1 of 1)
Test Code: 31291Ab-Comp5 | 09-2457-9639

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	15-2590-5812	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 15:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	09-1743-2857	**Code:**	31246-116	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-0024-9460	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
15-8346-2971	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
100		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	0.900

CETIS Analytical Report

Report Date: 07 Nov-18 10:19 (p 1 of 1)
Test Code: 31291Ab-Comp5 | 09-2457-9639

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	15-8346-2971	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	09-1743-2857	**Code:**	31246-116	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	82587	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
100		4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	Outlier

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:04 (p 1 of 1)
Test Code/ID: 16-7832-8989/31291Ab-Comp6

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 15:30	**Species:**	Americamysis bahia	**Sample Code:**	31246-117
End Date:	04 Nov-18 13:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 6 Elutriate (CAD-1,-2,-3)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	6	10				10			
0	LS	2	10	10				10			
0	LS	3	14	10				10			
0	LS	4	23	10				10			
0	LS	5	27	10				10			
0	R	1	5	10				10			
0	R	2	8	10				10			
0	R	3	17	10				10			
0	R	4	22	10				10			
0	R	5	26	10				10			
1		1	3	10				10			
1		2	11	10				10			
1		3	18	10				10			
1		4	21	10				10			
1		5	25	10				10			
10		1	2	10				10			
10		2	12	10				10			
10		3	15	10				10			
10		4	19	10				10			
10		5	29	10				10			
50		1	4	10				9			
50		2	9	10				10			
50		3	13	10				10			
50		4	20	10				10			
50		5	30	10				10			
100		1	1	10				10			
100		2	7	11				11			
100		3	16	10				10			
100		4	24	10				10			
100		5	28	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:20 (p 1 of 1)
Test Code: 31291Ab-Comp6 | 16-7832-8989

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	15-2590-5812	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 15:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:15	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	4 d

Sample ID:	07-9158-2244	**Code:**	31246-117	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
10-5547-9027	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
13-2967-6639	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
0	R	5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%
50		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	2.00%
100		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	1.000	1.000	1.000
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		0.900	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:20 (p 1 of 1)
Test Code: 31291Ab-Comp6 | 16-7832-8989

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	10-5547-9027	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:20	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	07-9158-2244	**Code:**	31246-117	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	679504	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	0.0%	50/50	1	0.0%
50		4	1.000	1.000	1.000	0.000	0.00%	0.0%	40/40	1	0.0%
100		5	1.000	1.000	1.000	0.000	0.00%	0.0%	51/51	1	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	1.000	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		Outlier	1.000	1.000	1.000	1.000
100		1.000	1.000	1.000	1.000	1.000

Menidia beryllina
Suspended Particulate Phase

Bench Sheets

Unmitigated Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	2
Project:	New Haven	**Client:**	AECOM

Composites 1,2 & 6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☑ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) MR 11/2/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20 ± 1 °C (E3) MR 11/2/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☑ other 200 mL tumbler	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/26/18 Initial BG

CS ~~ARO~~ MB ARO102418

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: MENIDIA BERYLLINA

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date: 10-16-18 Receipt date ____

Lot number: 101318 MB Strain ____

Brood origination: CAPE COD MA

II. Water Quality

Temperature: 25 °C Salinity: ~28 ppt D.O. — ppm

pH: 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ✓ YCT ____ Other Ewos Shrimp Diet

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: EST / Enthalpy # of Organisms 2800+

Carrier: ____ Date shipped 10-24-18

Biologist: Mark Dameron

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven
ASSAY: MB96SPP
SPECIES: *M. beryllina*

BALANCE: Ohaus Discovery Balance Model DV215CD
Serial #: 1124024313

Date / Intials:	10/26/18 LCI RGL
Rep	
1	0.00422
2	0.00292
3	0.00228
4	0.0039
5	0.00217
6	0.00324
7	0.00403
8	0.00217
9	0.00209
10	0.00211
11	0.00191
12	0.00235
13	0.00178
14	0.00196
15	0.00087
16	0.00128
17	0.001
18	0.00205
19	0.00151
20	0.00096
Mean Weight (g):	0.00224
Test Volume (L):	0.2
Loading Rate(g/L):	0.11200

PREPARATION of DILUTIONS

STUDY: 31248 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 1		Composite #: 2		Composite #: 6		Composite #: CLDS	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1,000	0	1,000	0	1,000	0	1000
(RW)	0	↓	0	↓	0	↓	CFS 10/26 ~~100~~	↓
1 %	10	↓	10	↓	10	↓		
10 %	100	↓	100	↓	100	↓		
50 %	500	↓	500	↓	500	↓		
100 %	1000	↓	1,000	↓	1,000	↓		
Initial	MW		CFS		CFS		CFS	
Date	10/26/18		10/26		10/26		10/26	
Time	1255		1325		1350		1300	
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	24.7		24.6		24.2		27.4	
Vol of Elutriate (mL)	4,000		4,000		4,000		4,000	
Grams of Salt (g)	24.4g		24.9g		26.7		11.9g	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	28.3		28.2		28.1		27.9	
Date & Initial	10/26/18	MW	10/26/18	MW	10/26/18	MW	10/26/18	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbARO102418	**Sample:**	Controls	**Diluent:**	CLDS

SURVIVAL - Controls – Beakers

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	9
	D	10	10	10	10	10	10
	E	10	10	10	10	9	9
Initials		MW	GRS	MW	LAG	MT	MW
Date		10/26/18	10/26/18	10/27/18	10/28	10/29	10/30 ~~10/29~~
Time		1430	1520	1310	1445	1640	1253

(3) MW 10/30

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10
	B	10	10	10	10	EIO LAG 10/29 10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	9
	E	10	10	10	10	10	10

Comments:

EIO LAG 10/29 Beaker tipped over, lost ~100 ml

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
226 - 227	~~298~~ 249 - (3) JTP 12/13/18; 280 - 281

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	~~3.6~~ 7.5 DO/TRC	6.5	6.9	6.8	6.7	7.92	7.83	7.87	7.80	7.75	23	20	19	19	19	30	32	33	29	30			32		
(RW)	A	8.3	7.0	6.8	6.8	6.8	7.89	7.89	7.89	7.81	7.80	19	20	19	19	19	28	30	30	30	31					
Initials		MT	LCI	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1330	1144	1310	1520	1015																				
Incub. Temp		21	21	21	21	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MW	MW	GRS	MS																					

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	1	2	1
Thermometer or Probe #	MLO1	MLO2	MLO2	MLO1	MLO2
Initial	MT	LCI	CFS	LAG	MT

Water Quality Station #1 (2)		Water Quality Station #2 (1)	
DO Meter #	MLO1	DO Meter #	MLO2
DO Probe #	96	DO Probe #	160
pH Meter #	MLO1	pH Meter #	MLO2
pH Probe #	158	pH Probe #	163
Salinity Meter #	MLO1	Salinity Meter #	MLO2

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbARO 102418	**Sample:**	Composite #1	**Diluent:**	CLDS

SURVIVAL - Composite # 1

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		GBS	CFS	MW	LAG	MT	MW
Date		10/26/18	10/26	10/27	10/28	10/29	10/30
Time		1310	1520	1234	1450	1640	1255

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	8	8
	D	10	10	10	10	10	10
	E	10	10	10	10	10	9
100 %	A	10	10	10	0	0	0
	B	10	10	10	1	0	0
	C	10	10	10	3	0	0
	D	10	10	10	4	0	0
	E	10	10	9	1	0	0

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
214-217	282-284, 274

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	8.3	6.8	6.5	6.2	7.89	7.84	7.88	7.73	7.70	21 19	20	18	19	19	41	29	30	30	31					
10 %	A	8.1	8.3	6.9	6.4	6.5	7.86	7.92	8.01	7.91	7.91	19	20	18	19	19	28	29	30	30	31					
50 %	A	7.7	8.0	6.9	6.4	6.4	7.77	8.00	8.17	8.18	8.18	19	20	18	19	19	28	29	30	30	31					
100 %	A	7.5 6.6	7.7	6.7	6.8		7.63	8.02	8.23	8.31		21	20	18	19		41 28	29	30	31						
Initials		LCI	LAG	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1300	1145	1320	1540	1015																				
Incub. Temp		26	28	20	21	21																				

FEEDING: *Artemia nauplii* (A - 5179)

Fed By:	CFS	MW	GBS	MS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #		2	1	2	1
Thermometer or Probe #	12/12	MLO1	MLO2	MLO1	MLO2
Initial	LCI	LAG	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	MLO2	DO Meter #	MLO1
DO Probe #	1630	DO Probe #	96
pH Meter #	MLO2	pH Meter #	MLO1
pH Probe #	1693	pH Probe #	158
Salinity Meter #	MLO2	Salinity Meter #	MLO1

12/12 BG water quality station and thermometer overlooked on 10/26.

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbARO102418	**Sample:**	Composite #2	**Diluent:**	CLDS

SURVIVAL - Composite # 2

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	9
Initials		MW	GRS	MW	LAG	MT	MW
Date		10/26/18	10/27/18	10/28/18	10/28	10/29	10/30
Time		1500	1540	1312	1500	1640	1305

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	9	8
	B	10	10	10	10	10	10
	C	10	10	10	10	8	8
	D	10	10	10	10	8	8
	E	10	10	10	10	8	7
100 %	A	10	10	10	5	0	0
	B	10	10	10	2	0	0
	C	10	10	10	0	0	0
	D	10	10	10	4	0	0
	E	10	10	10	4	0	0

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
218-221	286-288, 275

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	6.8	7.1	6.9	6.6	7.89	7.83	7.90	7.78	7.81	19	20	18	19	19	28	29	30	29	30					
10 %	A	8.1	6.7	7.0	6.9	6.2	7.88	7.91	8.00	7.94	7.91	19	20	18	19	19	28	29	30	30	31					
50 %	A	7.7	6.6	7.0	6.7	6.1	7.82	8.00	8.20	8.19	8.18	19	20	18	19	19	28	29	30	30	31					
100 %	A	7.0	6.6	6.8	5.8		7.74	8.03	8.25	8.26		20	20	18	19		28	29	30	30						
Initials		MT	LAG	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1355	1210	1330	1635	1015																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MW	MW	GRS	MS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	2	1	2	1
Thermometer or Probe #	ML01	ML01	ML02	ML01	ML02
Initial	MT	LAG	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbAR0102418	**Sample:**	Composite #6	**Diluent:**	CLDS

SURVIVAL - Composite # 6

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	9	7	7	7
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	9	9	9	9
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MW	CFS	MW	LAG	MT	MW
Date		10/26/18	10/26	10/27	10/28	10/29	10/30
Time		1555	2005	1355	1515	1640	1355

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	9	9
	C	10	10	10	10	10	10
	D	10	10	10	10	9	9
	E	10	10	10	9	8	8
100 %	A	10	10	10	10	10	6
	B	10	10	10	10	10	8
	C	10	10	10	10	10	7
	D	10	10	10	10	9	9
	E	10	10	10	10	7	7

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
222-225	290-293

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.0	6.7	6.9	7.0	6.7	7.93	7.78	7.88	7.82	7.81	19	19	18	19	19	28	28	30	30	31					
10 %	A	8.1	7.0	7.0	6.9	6.7	7.91	7.93	7.97	7.81	7.89	19	20	18	19	19	28	29	30	30	31					
50 %	A	8.0	7.1	7.0	6.9	6.6	7.96	7.98	8.08	8.07	8.07	19	20	18	19	19	28	29	31	30	31					
100 %	A	7.4	7.0	6.8	6.9	6.6	7.98	8.01	8.17	8.20	8.20	19	20	19	19	19	28	29	31	30	32					
Initials		CFS	LAG	CFS	LAG	MT																				
Date		10/26/18	10/27	10/28	10/29	10/30																				
Time		1410	1220	1335	1645	1015																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	CFS	MW	GRS	MS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	2	1	2	1
Thermometer or Probe #	159	ML01	ML02	ML01	ML02
Initial	CFS	LAG	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

Assay Review Checklist

DATE IN: 10/26/18

DATE DUE:

STUDY#: 31248

CLIENT: NHH-2018

PROJECT: AECOM

ASSAY: M696SPP

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	10/26/18	CFS	
Day 1	10/27/18	MW	
Day 2	10/28	LAG	
Day 3	10/29	MT	
Day 4	10/30	MW	
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/2/18	MR	
Statistical Analysis Reviewed	11/6/18	LF	
Data Acceptability Review	11/6/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

P:\GENERAL PROJECTS\FORMS\LABFORMS\$ Assay Review Checklist.wpd

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	2
Project:	New Haven	**Client:**	AECOM

Composites 3,4 & 5

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☑ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt NR 11/2/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20±1°C NR 11/2/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☑ other 200mL Tumbler	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/26/18 Initial BG

ES LAB 10124

CS ~~ARO~~ MD ARO102418

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species MENIDIA BERYLLINA

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date 10-16-18 Receipt date ____

Lot number 101318 MB Strain ____

Brood origination CAPE COD MA

II. Water Quality

Temperature 25 °C Salinity ~28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ✓ YCT ____ Other EWCAS SHRIMP DIET

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: EST / Enthalpy # of Organisms 2800+

Carrier: ____ Date shipped 10-24-18

Biologist: Mark [illegible]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven
ASSAY: MB96SPP
SPECIES: *M. beryllina*
TASK: **Wet Weight Data - Balance Output File**
BALANCE: **Ohaus Discovery Balance Model DV215CD**
Serial #: **1124024313**

Date / Intials:	10/25/18 GRS GRS
Rep	
1	0.00546
2	0.00414
3	0.00636
4	0.00218
5	0.00336
6	0.00176
7	0.00147
8	0.00214
9	0.00202
10	0.00286
11	0.00232
12	0.00345
13	0.00338
14	0.00585
15	0.00222
16	0.00169
17	0.00114
18	0.00174
19	0.00105
20	0.00333
Mean Weight (g):	0.00290
Test Volume (L):	0.2
Loading Rate(g/L):	0.14480

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08 M6ARD 102418	**Sample:**	Controls	**Diluent:**	CLDS

SURVIVAL - Controls- beakers

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10	10	10	8
	B	10	10	10	10	~~10~~ 9	9
	C	10	10	10	10	10	9
	D	10	10	10	10	10	10
	E	10	10	10	10	10	9
Initials		MW	GRS	MW	LAG	LAG	MW
Date		10/26/18	10/26/18	10/27	10/28	10/29	10/30
Time		1710	1835	1630	1625	1750	1311

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	~~9~~ 10	9
	E	10	10	10	10	10	10
Comments:							

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
-226	-298
-227	-299

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	8.8	6.9	7.2	7.2	7.1	7.97	7.87	7.90	7.84	7.86	22	20	18	17	18	30.3	32	32	32	33	/	/	/	/	/
(RW)	A	10.1	7.0	7.4	7.1	7.2	7.88	7.84	7.92	7.81	7.82	20	20	18	18	18	27.5	29	30	29	31	/	/	/	/	/
Initials		LCI	LCI	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1635	1308	1435	1700	1120																				
Incub. Temp		~~26~~ 21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A - 5179)

Fed By:	CFS	MW	LAG	LAG	/

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	1	2	1
Thermometer or Probe #	159	1	1	ML01	ML02
Initial	LCI	LCI	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	Project:	New Haven	Client:	AECOM	Incubator ID:	
Test Species:	*Menidia beryllina*	Lot ID:	08MbARO102418	Sample:	Composite #3	Diluent:	CLDS

SURVIVAL - ~~Composite # 1~~ (E3) MR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	7	0	0
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	9	9	9
	E	10	10	10	9	9	9
Initials		MW	CFS	MW	LAG	LAG	MW
Date		10/26/18	10/26	10/27	10/28	10/29	10/30
Time		1830	1935	1632	1635	1755	1630

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	9	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	9	8
	D	10	10	10	10	10	9
	E	10	10	10	10	9	9
100 %	A	10	10	9	2	0	0
	B	10	10	8	1	0	0
	C	10	10	10	3	0	0
	D	10	10	10	6	0	0
	E	10	10	10	3	6	0

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
228-231	300-302, 330

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	9.8	7.3	8.2	7.3	7.4	7.86	7.95	7.94	7.81	7.88	20.4	19	15	18	18	31 29	29	30	30	32					
10 %	A	9.7	7.0	8.3	7.3	7.2	7.82	7.92	8.01	7.91	7.99	20.0	19	14	17	18	31 29	29	30	30	32					
50 %	A	9.4	7.1	8.2	7.3	7.1	7.73	7.98	8.17	8.18	8.20	20.2	19	14	17	18	31 29	29	31	31	33					
100 %	A	8.6	7.1	8.0	7.3		7.69	8.01	8.24	8.27		19.8	19	14	17		41 29	30	32	32						
Initials		LCI	LAG	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1805	1305	1445	1705	1120																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	CFS	MW	LAG	LAG	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	(E10) 12/13	(E10) LAG 12/11	(E10) 1
Thermometer or Probe #	159	MLO2	↓	MT 12/11	
Initial		~~MT~~ LAG (E3) MT 12/1	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	MLO2	DO Meter #	MLO1
DO Probe #	160	DO Probe #	96
pH Meter #	MLO2	pH Meter #	MLO1
pH Probe #	163	pH Probe #	158
Salinity Meter #	MLO2	Salinity Meter #	MLO1

12/11 MT (E10) water quality station used over looked
12/11 MT (E11) information written accidently on hour 24 instead of 96.
(E10) LAG 12/11 water quality station used overlooked.
(E10) 12/13 - station and meter used on 48 hour was overlooked by analyst

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbARO 102418	**Sample:**	Composite #4	**Diluent:**	CLDS

SURVIVAL - ~~Composite # 1~~ (E3) NR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	9	8
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	9
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		MW	CFS	MW	LAG	LAG	MW
Date		10/26/18	10/28	10/27	10/28	10/29	10/30
Time		1730	1930	1643	1700	1500	1530

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	9	8	8
	E	10	10	10	10	10	10
100 %	A	10	10	10	3	0	0
	B	10	10	10	8	2	1
	C	10	10	8	3	0	0
	D	10	10	10	4	0	0
	E	10	10	9	3	0	0

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
232-235	304-307

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	9.8	6.7	7.7	7.3	7.1	7.83	7.80	7.87	7.85	7.85	18.4	19	16	17	19	27.5	29	30	30	32					
10 %	A	9.6	6.9	7.7	7.3	7.1	7.85	7.91	7.99	7.97	8.00	19.3	19	16	17	19	27.9	29	30	31	32					
50 %	A	9.3	6.8	7.6	7.2	7.2	7.80	7.97	8.14	8.17	8.20	19.6	19	16	17	19	28.0	29	31	31	32					
100 %	A	8.7	6.9	7.3	7.2	7.4	7.76	8.02	8.23	8.29	8.30	20.0	19	17	17	18	28.1	29	31	31	32					
Initials		LCI	LAG	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1650	1310	1445	1720	1120																				
Incub. Temp		21	20.1	21	21	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	CFS	MW	LAG	LAG	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	2	1	2	1
Thermometer or Probe #	159	159	1	ML01	ML02
Initial	LCI	LAG	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08M6ARO102418	**Sample:**	Composite #5	**Diluent:**	CLDS

SURVIVAL - ~~Composite # 1~~ (E3) MR 11/2/18

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	9	8	8	8
	E	10	10	10	10	9	9
Initials		MW	CFS	MW	LAG	GRS	MW
Date		10/26/18	10/26	10/27	10/28	10/29/6	10/30
Time		1745	1950	1647	1710	1800	1545

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	9	8	8
	B	10	10	10	10	9	9
	C	10	10	10	10	10	10
	D	10	10	10	9	8	8
	E	10	10	10	10	10	10
100 %	A	10	10	9	0	0	0
	B	10	10	6	0	0	0
	C	10	10	8	0	0	0
	D	10	10	10	0	0	0
	E	10	10	10	0	0	0

Comments:

Ammonia pulled on 100% and Controls	
** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **	
Start	**End**
236-239	308-310, 245

NOTES	
Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	9.6	7.2	7.6	7.1	7.2	7.90	7.87	7.84	7.85	7.88	18.9	19	16	18	18	27.9	30	30	30	31					
10 %	A	9.6	7.3	7.6	7.2	7.2	7.83	7.94	7.99	8.00	8.01	19.1	19	15	17	18	28.0	30	30	30	32					
50 %	A	9.2	7.4	7.6	7.2	7.3	7.68	8.00	8.18	8.22	8.22	19.2	19	15	17	18	28.3	30	31	31	32					
100 %	A	8.8	6.6	7.1			7.66	8.03	8.25			19.2	19	15			28.7	30	31							
Initials		LCI	LCI	CFS	LAG	MT																				
Date		10/26	10/27	10/28	10/29	10/30																				
Time		1724	1320	1500	1615	1120																				
Incub. Temp		21	21	21	21	21																				

FEEDING: *Artemia nauplii* (A-579)

Fed By:	CFS	MW	LAG	LAG	

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	1	1	2	1
Thermometer or Probe #	159	1	1	ML01	ML02
Initial	LCI	LCI	CFS	LAG	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	~~158~~ 96 (E3) LCI 10/2
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	~~96~~ 158 (E3) LCI 10/
Salinity Meter #	ML02	Salinity Meter #	ML01

Assay Review Checklist

DATE IN: 10/26/18
DATE DUE:

STUDY#: 31248
CLIENT: AECOM
PROJECT: NHH-2018
ASSAY: Mb96SPP

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	10/26/18	CFS	
Day 1	10/27/18	MW	
Day 2	10/28	LAG	
Day 3	10/29/18	GRS	
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/2/18	MR	
Statistical Analysis Reviewed	11/6/18	LF	
Data Acceptability Review	11/6/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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Menidia beryllina
Suspended Particulate Phase

Statistical Analysis Reports

Survival

Unmitigated Assays

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:14 (p 1 of 1)
Test Code/ID: 14-2857-5239/31248Mb-Comp1

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 14:30	**Species:**	Menidia beryllina	**Sample Code:**	31246-101
End Date:	30 Oct-18 12:53	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Sample Station:**	Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	6	10				10			
0	LS	2	10	10				10			
0	LS	3	18	10				9			
0	LS	4	24	10				10			
0	LS	5	29	10				9			
0	R	1	4	10				10			
0	R	2	12	10				10			
0	R	3	15	10				10			
0	R	4	23	10				9			
0	R	5	27	10				10			
1		1	3	10				10			
1		2	11	10				10			
1		3	14	10				10			
1		4	20	10				10			
1		5	30	10				10			
10		1	1	10				10			
10		2	7	10				10			
10		3	13	10				10			
10		4	19	10				10			
10		5	28	10				10			
50		1	5	10				9			
50		2	8	10				10			
50		3	17	10				8			
50		4	22	10				10			
50		5	26	10				9			
100		1	2	10				0			
100		2	9	10				0			
100		3	16	10				0			
100		4	21	10				0			
100		5	25	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:14 (p 1 of 1)
Test Code: 31248Mb-Comp1 | 14-2857-5239

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	01-6326-0175	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 14:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 12:53	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	25h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
04-0435-2581	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	69.7	67.6	71.3	1.436	
18-7922-6412	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	68.8	65.9	71.2	1.453	
09-3280-4033	96h Proportion Survived	Spearman-Kärber	EC50	67.2	62.4	72.4	1.487	
10-4395-2859	96h Proportion Survived	Spearman-Kärber	EC50	64.9	59.6	70.7	1.54	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	0.00%
0	R	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
50		5	0.920	0.816	1.000	0.800	1.000	0.037	0.084	9.09%	4.17%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	0.900	1.000	0.900
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		0.900	1.000	0.800	1.000	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:14 (p 1 of 1)
Test Code: 31248Mb-Comp1 | 14-2857-5239

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	09-3280-4033	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:55	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	25h	**Station:**	Comp 1 Elutriate (V',W')		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02	0.00%	1.83	0.0161	67.2	62.4	72.4

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.993	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.993	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.993	0.0%
50		4	0.950	0.900	1.000	0.058	6.08%	3.06%	38/40	0.95	4.36%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		0.900	1.000	Outlier	1.000	0.900
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	18-7922-6412	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	25h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	160616	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.96	2.82	0.0262	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	68.8	65.9	71.2	1.453	1.404	1.517

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.993	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.993	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.993	0.0%
50		5	0.920	0.800	1.000	0.084	9.09%	6.12%	46/50	0.92	7.38%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		0.900	1.000	0.800	1.000	0.900
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	04-0435-2581	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	25h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	696372	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	69.7	67.6	71.3	1.436	1.402	1.48

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.993	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.993	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.993	0.0%
50		4	0.950	0.900	1.000	0.058	6.08%	3.06%	38/40	0.95	4.36%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		0.900	1.000	Outlier	1.000	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:15 (p 1 of 1)
Test Code/ID: 17-0851-6428/31248Mb-Comp2

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 14:30	**Species:**	Menidia beryllina	**Sample Code:**	31246-103
End Date:	30 Oct-18 12:53	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 17:00	**Material:**	Elutriate Solution	**Sample Station:**	Comp 2 Elutriate (R',S')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	5	10				10			
0	LS	2	8	10				10			
0	LS	3	14	10				9			
0	LS	4	21	10				10			
0	LS	5	27	10				9			
0	R	1	1	10				10			
0	R	2	10	10				10			
0	R	3	16	10				10			
0	R	4	19	10				9			
0	R	5	25	10				10			
1		1	3	10				10			
1		2	12	10				10			
1		3	17	10				10			
1		4	23	10				10			
1		5	30	10				10			
10		1	2	10				10			
10		2	7	10				10			
10		3	18	10				10			
10		4	24	10				10			
10		5	26	10				9			
50		1	6	10				8			
50		2	9	10				10			
50		3	13	10				8			
50		4	22	10				8			
50		5	28	10				7			
100		1	4	10				0			
100		2	11	10				0			
100		3	15	10				0			
100		4	20	10				0			
100		5	29	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:15 (p 1 of 1)
Test Code: 31248Mb-Comp2 | 17-0851-6428

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	01-6326-0175	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 14:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 12:53	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	09-3501-8494	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 17:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 17:00	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 2 Elutriate (R',S')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
10-8584-4772	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	65.9	62.2	69.5	1.518	
19-2963-5879	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	64.3	61.2	66	1.556	
03-1415-6896	96h Proportion Survived	Spearman-Kärber	EC50	56.9	49.7	65.1	1.758	
20-6742-2686	96h Proportion Survived	Spearman-Kärber	EC50	54	46	63.4	1.852	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	0.00%
0	R	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%
50		5	0.820	0.684	0.956	0.700	1.000	0.049	0.110	13.36%	14.58%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	0.900	1.000	0.900
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		0.800	1.000	0.800	0.800	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:15 (p 1 of 1)
Test Code: 31248Mb-Comp2 | 17-0851-6428

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	20-6742-2686	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:57	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	09-3501-8494	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 17:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 17:00	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 2 Elutriate (R',S')		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02	0.00%	1.73	0.0347	54	46	63.4

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.99	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	1.01%
50		4	0.775	0.700	0.800	0.050	6.45%	20.9%	31/40	0.775	21.7%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		0.800	Outlier	0.800	0.800	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:15 (p 1 of 1)
Test Code: 31248Mb-Comp2 | 17-0851-6428

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-2963-5879	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	09-3501-8494	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 17:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 17:00	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	60657	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	64.3	61.2	66	1.556	1.514	1.633

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.99	0.0%
10		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	1.01%
50		4	0.775	0.700	0.800	0.050	6.45%	20.9%	31/40	0.775	21.7%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	0.900
50		0.800	Outlier	0.800	0.800	0.700
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:16 (p 1 of 1)
Test Code/ID: 01-2260-0424/31248Mb-Comp3

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 17:10	**Species:**	Menidia beryllina	**Sample Code:**	31246-105
End Date:	30 Oct-18 13:11	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Sample Station:**	Comp 3 Elutriate (US-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	3	10				8			
0	LS	2	12	10				9			
0	LS	3	17	10				9			
0	LS	4	19	10				10			
0	LS	5	30	10				9			
0	R	1	5	10				10			
0	R	2	10	10				10			
0	R	3	13	10				10			
0	R	4	21	10				9			
0	R	5	29	10				10			
1		1	6	10				10			
1		2	11	10				10			
1		3	18	10				0			
1		4	23	10				10			
1		5	26	10				10			
10		1	2	10				9			
10		2	8	10				10			
10		3	15	10				10			
10		4	24	10				9			
10		5	27	10				9			
50		1	4	10				9			
50		2	9	10				10			
50		3	14	10				8			
50		4	20	10				9			
50		5	28	10				9			
100		1	1	10				0			
100		2	7	10				0			
100		3	16	10				0			
100		4	22	10				0			
100		5	25	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:16 (p 1 of 1)
Test Code: 31248Mb-Comp3 | 01-2260-0424

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	01-7364-8859	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 17:10	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 13:11	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	92h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	55m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
14-8261-7479	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	68.4	65.4	70.6	1.463	
19-5195-8413	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	68	62.1	70.3	1.47	
21-0105-2704	96h Proportion Survived	Spearman-Kärber	EC50	57.7	49.5	67.2	1.733	✓
13-8998-6039	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	68	65.5	70.5	1.471	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
1		5	0.800	0.245	1.000	0.000	1.000	0.200	0.447	55.90%	11.11%
10		5	0.940	0.872	1.000	0.900	1.000	0.025	0.055	5.83%	-4.44%
50		5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	0.900	1.000	0.900
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	0.000	1.000	1.000
10		0.900	1.000	1.000	0.900	0.900
50		0.900	1.000	0.800	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 08 Nov-18 16:19 (p 1 of 1)
Test Code: 31248Mb-Comp3 | 01-2260-0424

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	13-8998-6039	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:59	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	55m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02	10.20%	1.83	0.00799	68	65.5	70.5

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.22	2.82	1.7E-07	Outlier Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.800	0.000	1.000	0.447	55.90%	18.4%	40/50	0.88	10.2%
10		5	0.940	0.900	1.000	0.055	5.83%	4.08%	47/50	0.88	10.2%
50		5	0.900	0.800	1.000	0.071	7.86%	8.16%	45/50	0.88	10.2%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	0.000	1.000	1.000
10		0.900	1.000	1.000	0.900	0.900
50		0.900	1.000	0.800	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:16 (p 1 of 1)
Test Code: 31248Mb-Comp3 | 01-2260-0424

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	21-0105-2704	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:59	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	55m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02	0.00%	1.76	0.0332	57.7	49.5	67.2

96h Proportion Survived Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		4	1.000	1.000	1.000	0.000	0.00%	-2.04%	40/40	0.99	0.0%
10		5	0.940	0.900	1.000	0.055	5.83%	4.08%	47/50	0.94	5.05%
50		5	0.900	0.800	1.000	0.071	7.86%	8.16%	45/50	0.9	9.09%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	Outlier	1.000	1.000
10		0.900	1.000	1.000	0.900	0.900
50		0.900	1.000	0.800	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-5195-8413	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	55m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1274472	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.22	2.82	1.7E-07	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	68	62.1	70.3	1.47	1.422	1.61

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.800	0.000	1.000	0.447	55.90%	18.4%	40/50	0.88	10.2%
10		5	0.940	0.900	1.000	0.055	5.83%	4.08%	47/50	0.88	10.2%
50		5	0.900	0.800	1.000	0.071	7.86%	8.16%	45/50	0.88	10.2%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	0.000	1.000	1.000
10		0.900	1.000	1.000	0.900	0.900
50		0.900	1.000	0.800	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	14-8261-7479	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 9:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	55m	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	304840	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	68.4	65.4	70.6	1.463	1.417	1.529

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		4	1.000	1.000	1.000	0.000	0.00%	-2.04%	40/40	0.99	0.0%
10		5	0.940	0.900	1.000	0.055	5.83%	4.08%	47/50	0.94	5.05%
50		5	0.900	0.800	1.000	0.071	7.86%	8.16%	45/50	0.9	9.09%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	Outlier	1.000	1.000
10		0.900	1.000	1.000	0.900	0.900
50		0.900	1.000	0.800	0.900	0.900
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:16 (p 1 of 1)
Test Code/ID: 09-8334-2126/31248Mb-Comp4

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 17:10	**Species:**	Menidia beryllina	**Sample Code:**	31246-107
End Date:	30 Oct-18 13:11	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Sample Station:**	Comp 4 Elutriate (DS-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	5	10				8			
0	LS	2	9	10				9			
0	LS	3	15	10				9			
0	LS	4	24	10				10			
0	LS	5	29	10				9			
0	R	1	2	10				10			
0	R	2	12	10				10			
0	R	3	17	10				10			
0	R	4	19	10				9			
0	R	5	28	10				10			
1		1	1	10				10			
1		2	8	10				10			
1		3	16	10				10			
1		4	23	10				10			
1		5	27	10				8			
10		1	6	10				10			
10		2	11	10				9			
10		3	13	10				10			
10		4	22	10				10			
10		5	25	10				10			
50		1	4	10				9			
50		2	7	10				10			
50		3	14	10				10			
50		4	20	10				8			
50		5	30	10				10			
100		1	3	10				0			
100		2	10	10				1			
100		3	18	10				0			
100		4	21	10				0			
100		5	26	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:17 (p 1 of 1)
Test Code: 31248Mb-Comp4 | 09-8334-2126

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	01-7364-8859	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 17:10	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 13:11	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	92h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-8507-1599	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	70.2	66.1	72.6	1.424	
15-1336-9750	96h Proportion Survived	Trimmed Spearman-Kärber	EC50	69.4	64.4	74.8	1.441	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
1		5	0.960	0.849	1.000	0.800	1.000	0.040	0.089	9.32%	-6.67%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
50		5	0.940	0.829	1.000	0.800	1.000	0.040	0.089	9.52%	-4.44%
100		5	0.020	0.000	0.076	0.000	0.100	0.020	0.045	223.61%	97.78%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	0.900	1.000	0.900
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	0.800
10		1.000	0.900	1.000	1.000	1.000
50		0.900	1.000	1.000	0.800	1.000
100		0.000	0.100	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:17 (p 1 of 1)
Test Code: 31248Mb-Comp4 | 09-8334-2126

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	15-1336-9750	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:00	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02	2.04%	1.84	0.0162	69.4	64.4	74.8

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.58	2.82	0.1376	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.960	0.800	1.000	0.089	9.32%	2.04%	48/50	0.97	1.02%
10		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.97	1.02%
50		5	0.940	0.800	1.000	0.089	9.52%	4.08%	47/50	0.94	4.08%
100		5	0.020	0.000	0.100	0.045	224.00%	98.0%	1/50	0.02	98.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	0.800
10		1.000	0.900	1.000	1.000	1.000
50		0.900	1.000	1.000	0.800	1.000
100		0.000	0.100	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:17 (p 1 of 1)
Test Code: 31248Mb-Comp4 | 09-8334-2126

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	00-8507-1599	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1145294	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.58	2.82	0.1376	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	70.2	66.1	72.6	1.424	1.377	1.512

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.960	0.800	1.000	0.089	9.32%	2.04%	48/50	0.97	1.02%
10		5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.97	1.02%
50		5	0.940	0.800	1.000	0.089	9.52%	4.08%	47/50	0.94	4.08%
100		5	0.020	0.000	0.100	0.045	224.00%	98.0%	1/50	0.02	98.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	0.800
10		1.000	0.900	1.000	1.000	1.000
50		0.900	1.000	1.000	0.800	1.000
100		0.000	0.100	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:17 (p 1 of 1)
Test Code/ID: 05-8212-5063/31248Mb-Comp5

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 17:10	**Species:**	Menidia beryllina	**Sample Code:**	31246-109
End Date:	30 Oct-18 13:11	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 5 Elutriate (TB-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	5	10				8			
0	LS	2	8	10				9			
0	LS	3	16	10				9			
0	LS	4	19	10				10			
0	LS	5	27	10				9			
0	R	1	3	10				10			
0	R	2	9	10				10			
0	R	3	17	10				10			
0	R	4	24	10				9			
0	R	5	28	10				10			
1		1	6	10				10			
1		2	7	10				10			
1		3	14	10				10			
1		4	21	10				10			
1		5	29	10				10			
10		1	4	10				9			
10		2	12	10				10			
10		3	13	10				10			
10		4	22	10				8			
10		5	25	10				9			
50		1	2	10				8			
50		2	11	10				9			
50		3	18	10				10			
50		4	23	10				8			
50		5	26	10				10			
100		1	1	10				0			
100		2	10	10				0			
100		3	15	10				0			
100		4	20	10				0			
100		5	30	10				0			

CETIS Summary Report

Report Date: 07 Nov-18 14:18 (p 1 of 1)
Test Code: 31248Mb-Comp5 | 05-8212-5063

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	01-7364-8859	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 17:10	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 13:11	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	92h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	105m	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
03-5814-5184	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	68.4	65.6	70.5	1.463	
19-2874-8105	96h Proportion Survived	Spearman-Kärber	EC50	55.5	46.8	65.7	1.803	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
1		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
10		5	0.920	0.816	1.000	0.800	1.000	0.037	0.084	9.09%	-2.22%
50		5	0.900	0.776	1.000	0.800	1.000	0.045	0.100	11.11%	0.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	0.900	1.000	0.900
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	0.800	0.900
50		0.800	0.900	1.000	0.800	1.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:18 (p 1 of 1)
Test Code: 31248Mb-Comp5 | 05-8212-5063

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-2874-8105	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:01	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	105m	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.02	0.00%	1.74	0.0369	55.5	46.8	65.7

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.82	0.8091	No Outliers Detected

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.99	0.0%
10		5	0.920	0.800	1.000	0.084	9.09%	6.12%	46/50	0.92	7.07%
50		5	0.900	0.800	1.000	0.100	11.10%	8.16%	45/50	0.9	9.09%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	0.800	0.900
50		0.800	0.900	1.000	0.800	1.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Analytical Report

Report Date: 07 Nov-18 14:17 (p 1 of 1)
Test Code: 31248Mb-Comp5 | 05-8212-5063

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	03-5814-5184	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	105m	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1301754	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.82	0.8091	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	68.4	65.6	70.5	1.463	1.419	1.524

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.99	0.0%
1		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.99	0.0%
10		5	0.920	0.800	1.000	0.084	9.09%	6.12%	46/50	0.92	7.07%
50		5	0.900	0.800	1.000	0.100	11.10%	8.16%	45/50	0.9	9.09%
100		5	0.000	0.000	0.000	0.000		100.0%	0/50	0	100.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		1.000	1.000	1.000	1.000	1.000
10		0.900	1.000	1.000	0.800	0.900
50		0.800	0.900	1.000	0.800	1.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:18 (p 1 of 1)
Test Code/ID: 08-2426-7778/31248Mb-Comp6

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	26 Oct-18 14:30	**Species:**	Menidia beryllina	**Sample Code:**	31246-111
End Date:	30 Oct-18 12:53	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Sample Station:**	Comp 6 Elutriate (CAD-1,-2,-3)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	3	10				10			
0	LS	2	12	10				10			
0	LS	3	16	10				9			
0	LS	4	21	10				10			
0	LS	5	29	10				9			
0	R	1	5	10				10			
0	R	2	8	10				10			
0	R	3	18	10				10			
0	R	4	20	10				9			
0	R	5	28	10				10			
1		1	4	10				7			
1		2	11	10				10			
1		3	17	10				10			
1		4	19	10				10			
1		5	25	10				9			
10		1	2	10				10			
10		2	9	10				10			
10		3	14	10				10			
10		4	22	10				10			
10		5	26	10				10			
50		1	1	10				10			
50		2	10	10				9			
50		3	15	10				10			
50		4	24	10				9			
50		5	27	10				8			
100		1	6	10				6			
100		2	7	10				8			
100		3	13	10				7			
100		4	23	10				9			
100		5	30	10				7			

CETIS Summary Report

Report Date: 07 Nov-18 14:19 (p 1 of 1)
Test Code: 31248Mb-Comp6 | 08-2426-7778

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	01-6326-0175	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	26 Oct-18 14:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 12:53	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	94h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	23h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
19-3796-1521	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	0.00%
0	R	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-2.08%
1		5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	4.17%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-4.17%
50		5	0.920	0.816	1.000	0.800	1.000	0.037	0.084	9.09%	4.17%
100		5	0.740	0.598	0.882	0.600	0.900	0.051	0.114	15.41%	22.92%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	1.000	1.000	0.900	1.000	0.900
0	R	1.000	1.000	1.000	0.900	1.000
1		0.700	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	0.900	1.000	0.900	0.800
100		0.600	0.800	0.700	0.900	0.700

CETIS Analytical Report

Report Date: 07 Nov-18 14:19 (p 1 of 1)
Test Code: 31248Mb-Comp6 | 08-2426-7778

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	19-3796-1521	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	23h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	787098	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.72	2.82	0.0783	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.980	0.900	1.000	0.045	4.56%	0.0%	49/50	0.98	0.0%
1		5	0.920	0.700	1.000	0.130	14.20%	6.12%	46/50	0.96	2.04%
10		5	1.000	1.000	1.000	0.000	0.00%	-2.04%	50/50	0.96	2.04%
50		5	0.920	0.800	1.000	0.084	9.09%	6.12%	46/50	0.92	6.12%
100		5	0.740	0.600	0.900	0.114	15.40%	24.5%	37/50	0.74	24.5%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	1.000	1.000	0.900	1.000
1		0.700	1.000	1.000	1.000	0.900
10		1.000	1.000	1.000	1.000	1.000
50		1.000	0.900	1.000	0.900	0.800
100		0.600	0.800	0.700	0.900	0.700

Menidia beryllina
Suspended Particulate Phase

Bench Sheets

Mitigated Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31291	**Incubator ID:**	2
Project:	New Haven	**Client:**	AECOM

Composites 1, 2, 3, 4, 5 & 6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☑ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) JTP 12/07/18 **pH:** 7.8 ± 0.5	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20±1°C (E3) JTP 12/07/18 **Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☑ other 200mL tumblers	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/31/18 Initial RSS

08MBARO1029 18

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species MENIDIA BERYLLINA

Source: Lab reared ✓ Hatchery reared _____ Field collected _____

Hatch date 10-21-18 Receipt date _____

Lot number 101818MB Strain _____

Brood origination CAPE COD MA

II. Water Quality

Temperature 25 °C Salinity ≈28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating ✓ Flow through _____ Static renewal _____

DIET: Flake food ✓ Phytoplankton _____ Trout chow _____

Artemia ✓ Rotifers ✓ YCT _____ Other ENCAP. SHRIMP DIET

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 2800+

Carrier: _____ Date shipped 10-29-18

Biologist: Mark Morengarth

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

STUDY: 31291
CLIENT: AECOM
PROJECT: New Haven
ASSAY: Mb96AD
SPECIES: *M. beryllina*

BALANCE: Ohaus Discovery Balance Model DV215CD
Serial #: 1124024313

Date / Intials:	10/31/18 MW MW
Rep	
1	0.00361
2	0.00189
3	0.00345
4	0.00484
5	0.00469
6	0.00524
7	0.00429
8	0.00333
9	0.00147
10	0.0057
11	0.00322
12	0.0024
13	0.00626
14	0.00305
15	0.00328
16	0.00416
17	0.00396
18	0.00245
19	0.00178
20	0.00669
Mean Weight (g):	0.00379
Test Volume (L):	0.2
Loading Rate(g/L):	0.18940

COPY

PREPARATION of DILUTIONS

STUDY: 31291 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 1		Composite #: 2		Composite #: Ref water		Composite #: 5	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2000	0	2,000			0	2,000
(RW)	0	↓	0	↓			0	↓
1 %	20	↓	20	↓			20	↓
10 %	200	↓	200	↓			200	↓
50 %	1000	↓	1,000	↓			1,000	↓
100 %	2000	↓	2,000	↓			2,000	↓
Initial	MW		MW				MW	
Date	10/31/18		10/31/18				10/31/18	
Time	1250		1258				1415	
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	24.5		25.1		27.4		25.1	
Vol of Elutriate (mL)	5,000		5,000		75,000		5,000 mL	
Grams of Salt (g)	31.7g		28.2		224.6g		28.2g	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	28.0		28.2		28.4		28.4	
Date & Initial	10/31/18 MW		10/31/18 MW		10/31/18 LAG		10/31/18	

COPY

PREPARATION of DILUTIONS

STUDY: 31291 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 4		Composite #: 4		Composite #: 3		Composite #:	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	2,000	0	2000	0	2,000		
(RW)	0	↓	0	↓	0	↓		
1 %	20	↓	20	↓	20	↓		
10 %	200	↓	200	↓	200	↓		
50 %	1,000	↓	1,000	↓	1,000	↓		
100 %	2,000	↓	2,000	↓	2,000	↓		
Initial	MW		MW		MW			
Date	10/31/18		10/31/18		10/31/18			
Time	1505		1450		1530			
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	25.4		25.1		25.7		~~4~~ 3 MW 10/31	
Vol of Elutriate (mL)	5,000		5,000		5,000			
Grams of Salt (g)	10.3g		28.2g		24.8g			
Lot number of Salt	A- 5117		A- 5117		A- 5117		A-	
Final Salinity	28.1		28.3		28.1			
Date & Initial	10/31/18 MW		10/31/18 MW		10/31/18 MW			

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	#1
Test Species:	*Menidia beryllina*	**Lot ID:**	08MBAR0102918	**Sample:**	Controls	**Diluent:**	CLDS

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10	8	8	8
	B	10	10	10	10	10	9
	C	10	10	10	10	10	10
	D	10	10	10	10	9	9
	E	10	10	10	9	9	9
Initials		LAG	MS	LAG	CFS	CFS	LAG
Date		10/31/18	10/31/18	11/1/18	11/02	11/03	11/04
Time		1605	17 @ MS 1530	1435	1535	1535	1325

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	10	10	10	10
	B	10	10	10	9	9	9
	C	10	10	9	8	7	7
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

Comments:

EIO LAG 11/04 Daylight Savings

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
345-346	371 - 372

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.3	6.7	6.7	5.8	6.0	8.00	7.87	7.80	7.60	7.73	19	20	20	20	20	31	32	32	33	32				30	
(RW)	A	8.7	6.8	6.7	6.3	6.6	7.97	7.85	7.84	7.83	7.82	19	20	20	20	20	29	29	30	31	32					
Initials		MT	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1530	0830	0955	1025	0930																				
Incub. Temp		MT 21	21.0	21.0	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MS	LAG	CFS	CFS																					

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	ML01	~~ML01~~ 2	~~ML01~~ 2	2	2
Thermometer or Probe #	2	~~ML01~~ 2	ML01	ML01	ML01
Initial	MT	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	# 1
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbARO102918	**Sample:**	Composite #1	**Diluent:**	CLDS

SURVIVAL - Composite #6 | ⑬ DO 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	8	8	8	7
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	9	9	9	9
	E	10	10	9	9	9	9
10 %	A	10	10	9	7	7	7
	B	10	10	9	8	8	8
	C	10	10	9	9	9	9
	D	10	10	10	10	9	9
	E	10	10	10	10	10	10
Initials		LAG	MS	LAG	CFS	CFS	LAG
Date		10/31	10/31/18	11/01/18	11/02	11/03	11/04
Time		1615	1740	1450	1540	1540	1330

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	9	9	9	8
	B	10	10	8	7	7	7
	C	10	10	10	10	10	10
	D	10	10	9	9	8	8
	E	10	10	9	9	9	8
100 %	A	10	10	10	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	9
	D	10	10	10	10	10	9
	E	10	10	10	10	10	10

Comments:

EIG LAG 11/04 Daylight Savings

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
347-350	373-376

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	6.8	6.1	6.4	6.8	7.92	7.88	7.77	7.80	7.80	20	20	20	20	20	29	29	30	30	31					
10 %	A	8.2	7.0	6.6	6.3	6.9	7.96	7.91	7.83	7.81	7.85	20	20	20	20	20	29	29	30	30	31					
50 %	A	7.7	7.0	6.7	6.3	6.9	7.91	7.85	7.86	7.82	7.86	20	20	20	20	20	28	28	29	30	31					
100 %	A	6.6	6.7	6.6	6.5	6.8	7.83	7.85	7.86	7.85	7.86	21	20	20	20	20	28	28	28	29	30					
Initials		MT	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1350	0840	1000	1030	0940																				
Incub. Temp		21	21.0	21.0	20	21																				
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MS	LAG	CFS	CFS																					

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	2	2	2	2	2
Thermometer or Probe #	MLO1	MLO1	MLO1	MLO1	MLO1
Initial	MT	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #		DO Meter #	MLO1
DO Probe #		DO Probe #	96
pH Meter #		pH Meter #	MLO1
pH Probe #		pH Probe #	158
Salinity Meter #		Salinity Meter #	MLO1

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	#1
Test Species:	*Menidia beryllina*	**Lot ID:**	08M6AR0102918	**Sample:**	Composite #2	**Diluent:**	CLDS

SURVIVAL - Composite # ~~6~~ 2 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	9
	E	10	10	10	8	8	8
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	9	9	9	9
	E	10	10	10	10	10	10
Initials		LAG	MS	LAG	CFS	CFS	LAG
Date		10/31	10/31/18	11/01/18	11/02	11/03	11/04
Time		1630	1750	1520	1550	1550	1345

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	9	9	9
	C	10	10	10	10	10	9
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10

Comments:

EIO LAG 11/04 Daylight Savings

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
351-354	377-380

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	6.4	6.3	6.5	6.7	7.96	7.82	7.75	7.77	7.74	19	20	20	20	20	29	29	30	31	32					
10 %	A	8.2	6.7	6.5	6.6	6.8	7.97	7.89	7.85	7.83	7.84	19	20	20	20	20	29	29	30	31	32					
50 %	A	7.4	6.7	6.7	6.5	7.0	7.91	7.85	7.85	7.84	7.88	19	20	20	20	20	28	29	30	30	32					
100 %	A	5.8	6.6	6.7	6.6	7.0	7.85	7.81	7.83	7.88	7.92	19	20	20	20	20	28	28	29	30	32					
Initials		MT	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1340	0950	1005	1035	1000																				
Incub. Temp		21	20	20	20	21																				

FEEDING: *Artemia nauplii* (A - 5179)

Fed By:	MS	LAG	CFS	CFS	

RECORD OF METERS USED	Exposure (Hours) 0	24	48	72	96
Water Quality Station #	ML01	ML01 2	2	2	2
Thermometer or Probe #	2	2 ML01	ML01	ML01	ML01
Initial	MT	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #		DO Meter #	ML01
DO Probe #		DO Probe #	96
pH Meter #		pH Meter #	ML01
pH Probe #		pH Probe #	158
Salinity Meter #		Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	#1
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbAR0102918	**Sample:**	Composite #3	**Diluent:**	CLDS

SURVIVAL - Composite #~~6~~3 (2) 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	~~9~~ 10	9	9	9
	B	10	10	9	8	8	8
	C	10	10	10	10	10	10
	D	10	10	10	10	10	9
	E	10	10	~~10~~ 9	9	9	9
10 %	A	10	10	9	9	9	9
	B	10	10	~~9~~ 10	9	9	9
	C	10	10	~~10~~ 9	8	8	8
	D	10	10	~~10~~ 9	9	9	9
	E	10	10	9	9	9	9
Initials		LAG	MS	LAG	CFS	CFS	LAG
Date		10/31	10/31/18	11/01	11/02	11/03	11/04
Time		1645	1800	~~1545~~ 1600	1600	1555	1555

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	~~9~~ 10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	9	8	8	8
	B	10	10	10	10	10	10
	C	10	10	10	10	9	9
	D	10	10	~~9~~ 10	10	10	9
	E	10	10	10	10	9	9

Comments:

EC LAG 11/04 Daylight Savings

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
355-358	381-384

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ± 1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	6.5	6.7	6.5	6.7	7.98	7.80	7.82	7.83	7.78	20	20	20	20	20	29	29	29	30	31					
10 %	A	8.3	6.3	6.7	6.5	6.8	7.97	7.78	7.83	7.84	7.84	20	20	20	20	20	29	29	30	30	31					
50 %	A	7.6	6.4	6.7	6.5	6.6	7.90	7.77	7.82	7.83	7.83	20	20	20	20	20	29	28	29	30	31					
100 %	A	5.6	6.6	6.5	6.4	6.6	7.79	7.83	7.82	7.84	7.84	21	20	20	20	20	28	28	29	29	30					
Initials		LAG	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1545	0855	1015	1040	0950																				
Incub. Temp		21	20	~~21~~ 20	20	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MS	LAG	CFS	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	2	2	2	2
Thermometer or Probe #	ML02	ML01	ML01	ML01	ML02
Initial	LAG	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	# 1
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbAR0102918	**Sample:**	Composite #4	**Diluent:**	CLDS

SURVIVAL - Composite #~~6~~4 10/31

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	9	7	7	7
	B	10	10	9	9	9	9
	C	10	10	10	10	10	9
	D	10	10	10	10	9	9
	E	10	10	10	8	8	8
10 %	A	10	10	~~10~~ 9	9	9	9
	B	10	10	9	9	9	9
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		LAG	MS	LAG	CFS	CFS	LAG
Date		10/31	10/31/18	11/01/18	11/02	11/03	11/04
Time		1705	1810	1545	1610	1605	1410

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	9	8	8	8
	B	10	10	10	9	9	9
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	9	9	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	9	9	9	9
	E	10	10	10	10	10	10

Comments:

Daylight Savings

EIO

LAG 11/04

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
359-362	385-388

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	7.0	6.7	6.4	6.5	7.95	7.89	7.86	7.80	7.73	19	20	20	20	20	30	29	30	30	31					
10 %	A	8.3	6.7	6.6	6.4	6.6	7.97	7.87	7.85	7.82	7.83	20	20	20	20	20	29	29	30	30	31					
50 %	A	7.6	6.7	6.4	6.4	6.7	7.97	7.86	7.84	7.86	7.87	19	20	20	20	20	29	29	29	30	31					
100 %	A	5.7	6.6	6.4	6.6	6.7	7.95	7.88	7.85	7.90	7.89	19	20	20	20	20	28	28	29	29	30					
Initials		LAG	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1515	0900	1020	1045	1015																				
Incub. Temp		21	20	~~21~~ 20	20	21																				

FEEDING: *Artemia nauplii* (A - 5179)

Fed By:	MS	LAG	CFS	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	2	2	2	2
Thermometer or Probe #	ML02	ML01	ML01	ML01	ML01 Dishwasher
Initial	LAG	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	#1
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbAR0107918	**Sample:**	Composite #5	**Diluent:**	CLDS

SURVIVAL - Composite # 65

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	9	9	9
	B	10	10	9	9	9	7
	C	10	10	9	9	8	8
	D	10	10	10	10	10	10
	E	10	10	10	9	9	9
10 %	A	10	10	10	10	10	10
	B	10	10	10	9	9	9
	C	10	10	9	9	9	9
	D	10	10	10	10	10	10
	E	10	10	9 (EIC)	9	9	9
Initials		LAG	MS	MS	CFS	CFS	LAG
Date		10/31	10/31/18	11/01/18	11/02	11/03	11/04
Time		1730	1830	1600	1620	1610	1435

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	9	9	9
	D	10	10	10	9	9	9
	E	10	10	10	10	10	10

Comments:

(EIC) LAG 11/04 Daylight savings.

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
363-366	389-392

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.2	6.7	6.6	6.2	6.2	7.97	7.83	7.83	7.78	7.74	20	20	20	20	20	36	29	30	30	31					
10 %	A	8.2	6.2	6.3	5.8	6.2	7.96	7.79	7.75	7.74	7.76	19	20	20	20	20	29	29	30	30	31					
50 %	A	7.5	6.5	6.4	6.1	6.7	7.92	7.86	7.85	7.83	7.88	19	20	20	20	20	29	28	29	30	31					
100 %	A	6.0	6.4	6.5	6.2	6.5	7.80	7.87	7.88	7.89	7.88	19	20	20	20	20	28	28	28	29	30					
Initials		LAG	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1510	0920	1025	1050	(EIC) MT 1215																				
Incub. Temp		21	20	21 (EIC)	20	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MS	LAG	CFS	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	2	2	2	2
Thermometer or Probe #	ML02	ML01	ML01	ML01	ML01 (EIC)
Initial	LAG	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

12/13 MT (EIC) Time for water qualities overlooked

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	#1
Test Species:	*Menidia beryllina*	**Lot ID:**	08MbAR0102918	**Sample:**	Composite #6	**Diluent:**	CLDS

SURVIVAL - Composite # 6

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	9
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
10 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	10
	E	10	10	10	10	10	10
Initials		LAG	MS	LAG	CFS	CFS	MT
Date		10/31	10/31/18	11/01/18	11/02	11/03	11/04
Time		1650	1830	1610	1630	1615	1410

(23) MS 10/31

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10	10	10	10	10
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	9
	E	10	10	10	10	10	10
100 %	A	10	10	10	10	9	9
	B	10	10	10	10	10	10
	C	10	10	10	10	10	10
	D	10	10	10	10	10	9
	E	10	10	10	10	10	10

Comments:

(23) MT 11/04 Daylight Savings

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
367-370	393-396

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.4	6.7	6.4	6.6	6.9	7.94	7.87	7.76	7.82	7.82	20	20	20	20	20	29	29	29	30	31					
10 %	A	8.3	6.6	6.4	6.2	6.5	7.97	7.85	7.79	7.78	7.80	20	20	20	20	20	29	29	29	30	31					
50 %	A	7.6	6.3	6.1	6.0	6.2	7.97	7.84	7.78	7.80	7.51	21	20	20	20	20	29	28	29	29	30					
100 %	A	5.8	6.4	6.4	6.0	6.0	7.97	7.89	7.87	7.81	7.81	22	20	20	20	20	28	28	28	29	29					
Initials		LAG	CFS	CFS	CFS	MT																				
Date		10/31	11/01	11/02	11/03	11/04																				
Time		1580	0925	1030	1055	1025																				
Incub. Temp		21	20	20	20	21																				

FEEDING: *Artemia nauplii* (A-5179)

Fed By:	MS	LAG	CFS	CFS	

RECORD OF METERS USED

Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	2	2	2	2
Thermometer or Probe #	ML02	ML01	ML01	ML01	ML01
Initial	LAG	CFS	CFS	CFS	MT

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	ML01
DO Probe #	160	DO Probe #	96
pH Meter #	ML02	pH Meter #	ML01
pH Probe #	163	pH Probe #	158
Salinity Meter #	ML02	Salinity Meter #	ML01

Assay Review Checklist

DATE IN: 10/31/18 **STUDY#:** 31291

DATE DUE: **CLIENT:** AECOM

PROJECT: New Haven

ASSAY: SPPMB96AD

Project Paperwork Check for Completeness			
	Date	**Initials**	**Comments**
Day 0	10/31/18	MS	
Day 1	11/01/18	LAG	
Day 2	11/02/18	CFS	
Day 3	11/03/18	CFS	
Day 4	11/04/18	MT	
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/6/18	MR	
Statistical Analysis Reviewed	11/7/18	LF (MR)	
Data Acceptability Review	11/7/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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Menidia beryllina
Suspended Particulate Phase

Statistical Analysis Reports

Survival

Mitigated Assays

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:05 (p 1 of 1)
Test Code/ID: 20-0044-5747/31291Mb-Comp1

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 16:05	**Species:**	Menidia beryllina	**Sample Code:**	31246-112
End Date:	04 Nov-18 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Sample Station:**	Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	4	10				8			
0	LS	2	9	10				9			
0	LS	3	13	10				10			
0	LS	4	20	10				9			
0	LS	5	25	10				9			
0	R	1	5	10				10			
0	R	2	7	10				9			
0	R	3	15	10				7			
0	R	4	22	10				10			
0	R	5	28	10				10			
1		1	3	10				7			
1		2	12	10				10			
1		3	17	10				10			
1		4	19	10				9			
1		5	27	10				9			
10		1	1	10				7			
10		2	8	10				8			
10		3	18	10				9			
10		4	23	10				9			
10		5	30	10				10			
50		1	6	10				8			
50		2	11	10				7			
50		3	14	10				10			
50		4	21	10				8			
50		5	29	10				8			
100		1	2	10				9			
100		2	10	10				10			
100		3	16	10				9			
100		4	24	10				9			
100		5	26	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:21 (p 1 of 1)
Test Code: 31291Mb-Comp1 | 20-0044-5747

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5096-4794	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 16:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:25	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	93h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	12-3991-1381	**Code:**	31246-112	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-7382-5907	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	-2.22%
1		5	0.900	0.748	1.000	0.700	1.000	0.055	0.122	13.61%	0.00%
10		5	0.860	0.718	1.000	0.700	1.000	0.051	0.114	13.26%	4.44%
50		5	0.820	0.684	0.956	0.700	1.000	0.049	0.110	13.36%	8.89%
100		5	0.940	0.872	1.000	0.900	1.000	0.025	0.055	5.83%	-4.44%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	1.000	0.900	0.900
0	R	1.000	0.900	0.700	1.000	1.000
1		0.700	1.000	1.000	0.900	0.900
10		0.700	0.800	0.900	0.900	1.000
50		0.800	0.700	1.000	0.800	0.800
100		0.900	1.000	0.900	0.900	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:21 (p 1 of 1)
Test Code: 31291Mb-Comp1 | 20-0044-5747

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	09-7382-5907	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	12-3991-1381	**Code:**	31246-112	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1735774	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.82	0.6492	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.920	0.700	1.000	0.130	14.20%	0.0%	46/50	0.92	0.0%
1		5	0.900	0.700	1.000	0.122	13.60%	2.17%	45/50	0.9	2.17%
10		5	0.860	0.700	1.000	0.114	13.30%	6.52%	43/50	0.873	5.07%
50		5	0.820	0.700	1.000	0.110	13.40%	10.9%	41/50	0.873	5.07%
100		5	0.940	0.900	1.000	0.055	5.83%	-2.17%	47/50	0.873	5.07%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	0.700	1.000	1.000
1		0.700	1.000	1.000	0.900	0.900
10		0.700	0.800	0.900	0.900	1.000
50		0.800	0.700	1.000	0.800	0.800
100		0.900	1.000	0.900	0.900	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:07 (p 1 of 1)
Test Code/ID: 15-9533-5301/31291Mb-Comp2

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 16:05	**Species:**	Menidia beryllina	**Sample Code:**	31246-113
End Date:	04 Nov-18 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Sample Station:**	Comp 2 Elutriate (R',S')

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	3	10				8			
0	LS	2	8	10				9			
0	LS	3	17	10				10			
0	LS	4	21	10				9			
0	LS	5	25	10				9			
0	R	1	1	10				10			
0	R	2	10	10				9			
0	R	3	18	10				7			
0	R	4	20	10				10			
0	R	5	30	10				10			
1		1	6	10				9			
1		2	11	10				10			
1		3	15	10				10			
1		4	23	10				9			
1		5	28	10				8			
10		1	2	10				10			
10		2	9	10				10			
10		3	13	10				10			
10		4	19	10				9			
10		5	29	10				10			
50		1	4	10				10			
50		2	7	10				10			
50		3	14	10				10			
50		4	22	10				10			
50		5	27	10				10			
100		1	5	10				10			
100		2	12	10				9			
100		3	16	10				9			
100		4	24	10				10			
100		5	26	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:23 (p 1 of 1)
Test Code: 31291Mb-Comp2 | 15-9533-5301

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5096-4794	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 16:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:25	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	93h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	21-3473-6624	**Code:**	31246-113	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 2 Elutriate (R',S')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
10-2248-8258	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
21-2906-8636	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	-2.22%
1		5	0.920	0.816	1.000	0.800	1.000	0.037	0.084	9.09%	-2.22%
10		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
100		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-6.67%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	1.000	0.900	0.900
0	R	1.000	0.900	0.700	1.000	1.000
1		0.900	1.000	1.000	0.900	0.800
10		1.000	1.000	1.000	0.900	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	0.900	0.900	1.000	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:23 (p 1 of 1)
Test Code: 31291Mb-Comp2 | 15-9533-5301

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	10-2248-8258	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:22	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	21-3473-6624	**Code:**	31246-113	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1028462	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	4	0.975	0.900	1.000	0.050	5.13%	0.0%	39/40	0.975	0.0%
1		5	0.920	0.800	1.000	0.084	9.09%	5.64%	46/50	0.967	0.86%
10		5	0.980	0.900	1.000	0.045	4.56%	-0.51%	49/50	0.967	0.86%
50		5	1.000	1.000	1.000	0.000	0.00%	-2.56%	50/50	0.967	0.86%
100		5	0.960	0.900	1.000	0.055	5.71%	1.54%	48/50	0.96	1.54%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	Outlier	1.000	1.000
1		0.900	1.000	1.000	0.900	0.800
10		1.000	1.000	1.000	0.900	1.000
50		1.000	1.000	1.000	1.000	1.000
100		1.000	0.900	0.900	1.000	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:08 (p 1 of 1)
Test Code/ID: 19-3561-4733/31291Mb-Comp3

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 16:05	**Species:**	Menidia beryllina	**Sample Code:**	31246-114
End Date:	04 Nov-18 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Sample Station:**	Comp 3 Elutriate (US-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				8			
0	LS	2	10	10				9			
0	LS	3	18	10				10			
0	LS	4	24	10				9			
0	LS	5	26	10				9			
0	R	1	3	10				10			
0	R	2	11	10				9			
0	R	3	17	10				7			
0	R	4	22	10				10			
0	R	5	28	10				10			
1		1	2	10				9			
1		2	9	10				8			
1		3	16	10				10			
1		4	20	10				9			
1		5	25	10				9			
10		1	4	10				9			
10		2	7	10				9			
10		3	14	10				8			
10		4	19	10				9			
10		5	30	10				9			
50		1	6	10				10			
50		2	12	10				10			
50		3	15	10				10			
50		4	21	10				10			
50		5	27	10				10			
100		1	5	10				8			
100		2	8	10				10			
100		3	13	10				9			
100		4	23	10				9			
100		5	29	10				9			

CETIS Summary Report

Report Date: 07 Nov-18 10:24 (p 1 of 1)
Test Code: 31291Mb-Comp3 | 19-3561-4733

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5096-4794	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 16:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:25	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	93h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	08-9579-5849	**Code:**	31246-114	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
08-0796-8015	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
09-7705-7231	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	-2.22%
1		5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
10		5	0.880	0.824	0.936	0.800	0.900	0.020	0.045	5.08%	2.22%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
100		5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	1.000	0.900	0.900
0	R	1.000	0.900	0.700	1.000	1.000
1		0.900	0.800	1.000	0.900	0.900
10		0.900	0.900	0.800	0.900	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.800	1.000	0.900	0.900	0.900

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	08-0796-8015	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-9579-5849	**Code:**	31246-114	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	581327	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.01	2.82	0.0198	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.920	0.700	1.000	0.130	14.20%	0.0%	46/50	0.925	0.0%
1		5	0.900	0.800	1.000	0.071	7.86%	2.17%	45/50	0.925	0.0%
10		5	0.880	0.800	0.900	0.045	5.08%	4.35%	44/50	0.925	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-8.7%	50/50	0.925	0.0%
100		5	0.900	0.800	1.000	0.071	7.86%	2.17%	45/50	0.9	2.7%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	0.700	1.000	1.000
1		0.900	0.800	1.000	0.900	0.900
10		0.900	0.900	0.800	0.900	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.800	1.000	0.900	0.900	0.900

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	09-7705-7231	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-9579-5849	**Code:**	31246-114	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1041688	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	4	0.975	0.900	1.000	0.050	5.13%	0.0%	39/40	0.975	0.0%
1		5	0.900	0.800	1.000	0.071	7.86%	7.69%	45/50	0.927	4.96%
10		5	0.880	0.800	0.900	0.045	5.08%	9.74%	44/50	0.927	4.96%
50		5	1.000	1.000	1.000	0.000	0.00%	-2.56%	50/50	0.927	4.96%
100		5	0.900	0.800	1.000	0.071	7.86%	7.69%	45/50	0.9	7.69%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	Outlier	1.000	1.000
1		0.900	0.800	1.000	0.900	0.900
10		0.900	0.900	0.800	0.900	0.900
50		1.000	1.000	1.000	1.000	1.000
100		0.800	1.000	0.900	0.900	0.900

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:09 (p 1 of 1)
Test Code/ID: 10-0880-3069/31291Mb-Comp4

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 16:05	**Species:**	Menidia beryllina	**Sample Code:**	31246-115
End Date:	04 Nov-18 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Sample Station:**	Comp 4 Elutriate (DS-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	4	10				8			
0	LS	2	9	10				9			
0	LS	3	15	10				10			
0	LS	4	24	10				9			
0	LS	5	25	10				9			
0	R	1	6	10				10			
0	R	2	11	10				9			
0	R	3	17	10				7			
0	R	4	22	10				10			
0	R	5	28	10				10			
1		1	1	10				7			
1		2	7	10				9			
1		3	14	10				9			
1		4	19	10				9			
1		5	30	10				8			
10		1	2	10				9			
10		2	8	10				9			
10		3	18	10				10			
10		4	21	10				10			
10		5	26	10				10			
50		1	3	10				8			
50		2	10	10				9			
50		3	16	10				10			
50		4	23	10				10			
50		5	27	10				10			
100		1	5	10				9			
100		2	12	10				10			
100		3	13	10				10			
100		4	20	10				9			
100		5	29	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:25 (p 1 of 1)
Test Code: 31291Mb-Comp4 | 10-0880-3069

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5096-4794	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 16:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:25	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	93h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	13-1258-1800	**Code:**	31246-115	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
14-4434-1967	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	-2.22%
1		5	0.840	0.729	0.951	0.700	0.900	0.040	0.089	10.65%	6.67%
10		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-6.67%
50		5	0.940	0.829	1.000	0.800	1.000	0.040	0.089	9.52%	-4.44%
100		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-6.67%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	1.000	0.900	0.900
0	R	1.000	0.900	0.700	1.000	1.000
1		0.700	0.900	0.900	0.900	0.800
10		0.900	0.900	1.000	1.000	1.000
50		0.800	0.900	1.000	1.000	1.000
100		0.900	1.000	1.000	0.900	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:24 (p 1 of 1)
Test Code: 31291Mb-Comp4 | 10-0880-3069

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	14-4434-1967	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	13-1258-1800	**Code:**	31246-115	**Client:**	AECOM
Sample Date:	31 Oct-18 12:50	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 12:50	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	84170	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.59	2.82	0.1319	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.920	0.700	1.000	0.130	14.20%	0.0%	46/50	0.924	0.0%
1		5	0.840	0.700	0.900	0.089	10.60%	8.7%	42/50	0.924	0.0%
10		5	0.960	0.900	1.000	0.055	5.71%	-4.35%	48/50	0.924	0.0%
50		5	0.940	0.800	1.000	0.089	9.52%	-2.17%	47/50	0.924	0.0%
100		5	0.960	0.900	1.000	0.055	5.71%	-4.35%	48/50	0.924	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	0.700	1.000	1.000
1		0.700	0.900	0.900	0.900	0.800
10		0.900	0.900	1.000	1.000	1.000
50		0.800	0.900	1.000	1.000	1.000
100		0.900	1.000	1.000	0.900	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:09 (p 1 of 1)
Test Code/ID: 06-1551-0814/31291Mb-Comp5

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 16:05	**Species:**	Menidia beryllina	**Sample Code:**	31246-116
End Date:	04 Nov-18 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 5 Elutriate (TB-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				8			
0	LS	2	7	10				9			
0	LS	3	16	10				10			
0	LS	4	19	10				9			
0	LS	5	30	10				9			
0	R	1	6	10				10			
0	R	2	10	10				9			
0	R	3	18	10				7			
0	R	4	22	10				10			
0	R	5	28	10				10			
1		1	3	10				9			
1		2	9	10				7			
1		3	15	10				8			
1		4	24	10				10			
1		5	25	10				9			
10		1	4	10				10			
10		2	8	10				9			
10		3	17	10				9			
10		4	21	10				10			
10		5	29	10				9			
50		1	2	10				10			
50		2	11	10				10			
50		3	13	10				10			
50		4	23	10				10			
50		5	27	10				10			
100		1	5	10				10			
100		2	12	10				10			
100		3	14	10				9			
100		4	20	10				9			
100		5	26	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:25 (p 1 of 1)
Test Code: 31291Mb-Comp5 | 06-1551-0814

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5096-4794	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 16:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:25	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	93h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	09-1743-2857	**Code:**	31246-116	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
21-2289-7376	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	-2.22%
1		5	0.860	0.718	1.000	0.700	1.000	0.051	0.114	13.26%	4.44%
10		5	0.940	0.872	1.000	0.900	1.000	0.025	0.055	5.83%	-4.44%
50		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
100		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-6.67%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	1.000	0.900	0.900
0	R	1.000	0.900	0.700	1.000	1.000
1		0.900	0.700	0.800	1.000	0.900
10		1.000	0.900	0.900	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	0.900	0.900	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:25 (p 1 of 1)
Test Code: 31291Mb-Comp5 | 06-1551-0814

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	21-2289-7376	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	09-1743-2857	**Code:**	31246-116	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1724555	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.71	2.82	0.0805	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.920	0.700	1.000	0.130	14.20%	0.0%	46/50	0.936	0.0%
1		5	0.860	0.700	1.000	0.114	13.30%	6.52%	43/50	0.936	0.0%
10		5	0.940	0.900	1.000	0.055	5.83%	-2.17%	47/50	0.936	0.0%
50		5	1.000	1.000	1.000	0.000	0.00%	-8.7%	50/50	0.936	0.0%
100		5	0.960	0.900	1.000	0.055	5.71%	-4.35%	48/50	0.936	0.0%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	0.700	1.000	1.000
1		0.900	0.700	0.800	1.000	0.900
10		1.000	0.900	0.900	1.000	0.900
50		1.000	1.000	1.000	1.000	1.000
100		1.000	1.000	0.900	0.900	1.000

CETIS Test Data Worksheet

Report Date: 06 Nov-18 16:10 (p 1 of 1)
Test Code/ID: 14-8920-5518/31291Mb-Comp6

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 16:05	**Species:**	Menidia beryllina	**Sample Code:**	31246-117
End Date:	04 Nov-18 13:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 6 Elutriate (CAD-1,-2,-3)

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	01hSurvival	02hSurvival	Notes
0	LS	1	1	10				8			
0	LS	2	10	10				9			
0	LS	3	15	10				10			
0	LS	4	21	10				9			
0	LS	5	30	10				9			
0	R	1	5	10				10			
0	R	2	9	10				9			
0	R	3	16	10				7			
0	R	4	20	10				10			
0	R	5	28	10				10			
1		1	4	10				10			
1		2	8	10				9			
1		3	14	10				10			
1		4	22	10				10			
1		5	26	10				10			
10		1	3	10				10			
10		2	11	10				10			
10		3	17	10				10			
10		4	24	10				10			
10		5	29	10				10			
50		1	6	10				10			
50		2	7	10				10			
50		3	13	10				10			
50		4	19	10				9			
50		5	27	10				10			
100		1	2	10				9			
100		2	12	10				10			
100		3	18	10				10			
100		4	23	10				9			
100		5	25	10				10			

CETIS Summary Report

Report Date: 07 Nov-18 10:26 (p 1 of 1)
Test Code: 31291Mb-Comp6 | 14-8920-5518

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Batch ID:	16-5096-4794	**Test Type:**	Survival (96h)	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 16:05	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	CLDS Reference Site
Ending Date:	04 Nov-18 13:25	**Species:**	Menidia beryllina	**Brine:**	Not Applicable
Duration:	93h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	07-9158-2244	**Code:**	31246-117	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
03-3326-3014	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
21-3497-6686	96h Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

96h Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.900	0.812	0.988	0.800	1.000	0.032	0.071	7.86%	0.00%
0	R	5	0.920	0.758	1.000	0.700	1.000	0.058	0.130	14.17%	-2.22%
1		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
10		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-11.11%
50		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	-8.89%
100		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	-6.67%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.800	0.900	1.000	0.900	0.900
0	R	1.000	0.900	0.700	1.000	1.000
1		1.000	0.900	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	0.900	1.000
100		0.900	1.000	1.000	0.900	1.000

CETIS Analytical Report

Report Date: 07 Nov-18 10:26 (p 1 of 1)
Test Code: 31291Mb-Comp6 | 14-8920-5518

Menidia beryllina 96-h Acute Survival Test — **EnviroSystems, Inc.**

Analysis ID:	21-3497-6686	**Endpoint:**	96h Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	07-9158-2244	**Code:**	31246-117	**Client:**	AECOM
Sample Date:	31 Oct-18 11:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 11:25	**Source:**	New Haven Harbor 2018		
Sample Age:	5h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	686165	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

96h Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	4	0.975	0.900	1.000	0.050	5.13%	0.0%	39/40	0.985	0.0%
1		5	0.980	0.900	1.000	0.045	4.56%	-0.51%	49/50	0.985	0.0%
10		5	1.000	1.000	1.000	0.000	0.00%	-2.56%	50/50	0.985	0.0%
50		5	0.980	0.900	1.000	0.045	4.56%	-0.51%	49/50	0.98	0.51%
100		5	0.960	0.900	1.000	0.055	5.71%	1.54%	48/50	0.96	2.54%

96h Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	1.000	0.900	Outlier	1.000	1.000
1		1.000	0.900	1.000	1.000	1.000
10		1.000	1.000	1.000	1.000	1.000
50		1.000	1.000	1.000	0.900	1.000
100		0.900	1.000	1.000	0.900	1.000

Arbacia punctulata
Suspended Particulate Phase

Bench Sheets

Unmitigated Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	1&2 0
Project:	New Haven	**Client:**	AECOM

Composites 1, 2 & 6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☒ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt E3 MR 11/2/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20±1°C E3 MR 11/2/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☒ 250 mL beaker ☐ 600 mL beaker ☐ other _____	(Check box for all that apply) ☒ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/25/18 Initial GRS

99 Ap AR0080118

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Arbacia punctulata

Source: Lab reared _____ Hatchery reared _____ Field collected ✓

Hatch date mixed ages Receipt date 08/01/18

Lot number 080118AP Strain WILD

Brood origination NC

II. Water Quality

Temperature 16 °C Salinity 30 ppt D.O. SAT ppm

pH 8.2 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating _____ Flow through ✓ Static renewal _____

DIET: Flake food _____ Phytoplankton _____ Trout chow _____

Artemia _____ Rotifers _____ YCT _____ Other MACROALGAE

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 50

Carrier: FEDEX / PICKUP Date shipped 08/01/18

Biologist: Steve Lentsha

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION of DILUTIONS

STUDY: 31248 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: A. punctulata **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 1		Composite #: 2		Composite #: 6		Composite #:	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1000	0	1,000	0	1,000		
(RW)	0		0		0			
1 %	10		10		10			
10 %	100		100		100			
50 %	500		500		500			
100 %	1000		1,000		1,000			
Initial	LAG		CFS		CFS			
Date	10/25/18		10/25/18		10/25/18			
Time	1522		1605		1650			
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record (if necessary)**		**Salinity Adjustment Record (if necessary)**		**Salinity Adjustment Record (if necessary)**	
Initial Salinity (ppt)	24.9		24.8		24.2			
Vol of Elutriate (mL)	8,000		8,000		5,500			
Grams of Salt (g)	47.0		47.9		36.7			
Lot number of Salt	A- 5117		A- 5117		A- 5117		A-	
Final Salinity	28.1		27.9		29.9			
Date & Initial	10/25/18 MW		10/25/18 MW		10/25/18 LAG			

EMBRYO WORKSHEET

DATE: '10/25/18 ESI STUDY: 31248

CLIENT: AECOM PROJECT: New Haven

Eggs Collected @: 1530 20 (GRS 10/25) Pre-assay fertilization check: 96% ANALYST: GRS

Sperm Collected @: 1520 30 (GRS 10/25) *A mated subsample of egg+sperm must achieve ≥90% fertilization in order to be used in testing.*

Egg Stock Suspension Count:

Take 1mL of egg stock suspension and using a glass graduated cylinder dilute with seawater to a final volume of 100 mL. Count a subsample of the diluted suspension to get an estimate of the egg concentration. The diluted suspension should have 40 - 50 eggs/mL, (which would represent an egg concentration of 4,000 - 5,000 in the stock suspension.)

Egg Count (per mL) of diluted suspension: 42

Sperm Stock Suspension Count:

Once added to the egg stock, the final sperm concentration should be $1x10^5$ - $1x10^7$ in solution E.

1. Hemocytometer Count (E): 110
2. Hemocytometer Count (E): 106

Average Count (E): 108 $X10^4$ = spm solution E = $1.08x10^6$

Sperm Concentrations: Solution E X 40 = Solution B = $4.32x10^7$

Solution E X 20 = Solution C = $2.16x10^7$

Solution E X 5 = Solution D = $5.40x10^6$

Sperm Count (per mL): $1.08x10^6$

mL of Eggs to Add: 175

mL of Sperm to Add: 25 Gametes mixed @: 1555

Gametes must be mixed within 1 hour of collection.

Calculated Embryo Stock Concentration (per mL): 0.875

Calculated Embryo Stock (mL) needed per chamber: 1.36

The test concentration should be 20 - 30 embryos per mL.

Add calculated amount of embryo stock to a surrogate chamber, gently mix, then count a 5mL aliquot.

Embryo Concentration Check: 113

If the check concentration is acceptable, then proceed with embryo addition to the test.

Volume Embryo Stock (mL) added to test solutions: 0.680

Embryos Added to Test Solutions @: 1735

INITIAL COUNTS:	Embryos/ 5 mL
SURROGATE A	113
SURROGATE B	130
SURROGATE C	119
Mean:	121

Organism Lot ID: 99APAR0080118

Mean per mL: 24

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99APAR0080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L) 0 hr	Dissolved Oxygen (mg/L) END 96 hr	pH (SU) 0 hr	pH (SU) END 96 hr	Temperature (C) 0 hr	Temperature (C) END 96 hr	Salinity (ppt) 0 hr	Salinity (ppt) END 96 hr	Ammonia pulled on 100% and Controls START	Ammonia pulled on 100% and Controls END
Controls	Lab	~~8.7~~ 7.7 (GRS/MT 10/25)	7.4	7.98	8.02	20	21	31	~~31~~ 32 (GRS 10/29)	200	246
	CLDS	8.5	7.6	7.91	8.06	19	21	29	31	213	247
Composite #1	1 %	8.4	7.4	7.91	8.04	19	21	29	29		
	10 %	8.3	7.4	7.85	8.18	20	21	29	29		
	50 %	7.8	7.2	7.75	8.35	20	21	29	29		
	100 %	6.6	7.2	7.68	8.43	21	21	29	29	201-204	248-251
Composite #2	1 %	~~7.5~~ 8.4 (GRS/MT 10/25)	7.5	7.87	8.02	20	21	29	29		
	10 %	~~7.5~~ 8.3 (GRS/MT 10/25)	7.5	7.85	8.18	20	21	29	29		
	50 %	7.8	7.3	7.78	8.35	20	21	29	29		
	100 %	7.3	7.3	7.73	8.42	20	21	29	29	205-208	252-255

Initials	MT	GRS
Date	10/25/18	10/29/18
Time	1540	1245
Incub. Temp	21	21

Comments:

RECORD OF METERS USED		
Exposure		
	0	24
Water Quality Station #	1	1
Thermometer or Probe #	ML02	ML02
Initial	MT	GRS

WQ Station #1		WQ Station #2	
DO Meter #	ML02	DO Meter #	
DO Probe #	160	DO Probe #	
pH Meter #	ML02	pH Meter #	
pH Probe #	163	pH Probe #	
Salinity Meter	ML02	Salinity Meter	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99APAR0080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L) 0 hr	Dissolved Oxygen (mg/L) END 96 hr	pH (SU) 0 hr	pH (SU) END 96 hr	Temperature (C) 0 hr	Temperature (C) END 96 hr	Salinity (ppt) 0 hr	Salinity (ppt) END 96 hr	Ammonia pulled on 100% and Controls START	Ammonia pulled on 100% and Controls END
Composite #6	1 %	8.1	7.5	7.86	8.08	21	21	29	29		
	10 %	8.2	7.5	7.90	8.12	21	21	29	29		
	50 %	8.0	7.2	7.95	8.26	21	21	30	30		
	100 %	7.6	7.2	7.97	8.35	20	21	31	31	209-212	256 - 259

Initials	MT	GRS	**RECORD OF METERS USED**			WQ Station #1		WQ Station #2	
Date	10/25/18	10/29/18	**Exposure**			DO Meter #	MLOZ	DO Meter #	
Time	1705	1245		0	24	DO Probe #	160	DO Probe #	
Incub. Temp	21	21	Water Quality Station #	1	1	pH Meter #	MLOZ	pH Meter #	
Comments:			Thermometer or Probe #	MLOZ	MLOZ	pH Probe #	163	pH Probe #	
			Initial	MT	GRS	Salinity Meter	MLOZ	Salinity Meter	

Arbacia Punctulata Survival / Development Assay

ESI Study: 31248 Assay Start: 10/25/18 1735

Client: AECOM Assay End: 10/29/18 1140

Count Date: 10/30/18 Initials: GRS

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Lab Control Water	99/99	~~89~~ 90/89	91/89	98/96	93/90
CLDS Reference Water	112/107	90/88	95/90	90/86	85/89

Composite 1 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	106/102	89/89	118/117	90/89	118/118
10%	41/21	70/15	43/22	27/5	33/14
50%	0/0	0/0	0/0	0/0	0/0
100%	0/0	0/0	0/0	0/0	0/0

Composite 2 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	119/117	97/95	122/121	101/100	122/122
10%	62/11	94/7	72/11	71/9	80/9
50%	0/0	0/0	0/0	0/0	0/0
100%	0/0	0/0	0/0	0/0	0/0

Composite ~~3~~ 6 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	113/113	112/112	121/120	95/95	119/119
10%	101/101	118/116	109/107	114/113	107/107
50%	0/0	0/0	0/0	0/0	0/0
100%	0/0	0/0	0/0	0/0	0/0

Composite 4 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					

Assay Review Checklist

DATE IN: 10/25/18

DATE DUE:

STUDY#: 31248

CLIENT: AECOM

PROJECT: New Haven

ASSAY: AP96 S/P

Project Paperwork Check for Completeness			
	Date	**Initials**	**Comments**
Day 0	10/25/18	GRS	Start
Day 1	10/26/18	↓	Observation
Day 2	10/29/18	↓	↓
Day 3	10/28/18	↓	↓
Day 4	10/29/18	↓	END
Day 5	10/30/18	↓	Counts
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	11/16/18	JTP	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	10/30/18	GRS	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	
Water Quality Data Complete	↓	↓	
TRC Values & Bottle Numbers	↓	↓	
Daphnid Calculations Complete	N/A	N/A	
Weights Reported	↓	↓	
Assay Acceptability Review	10/30/18	GRS	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/6/18	MR	
Statistical Analysis Reviewed	11/6/18	LF	
Data Acceptability Review	11/6/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	1-2
Project:	New Haven	**Client:**	AECOM

Composites 3,4 & 5

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☒ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) MR 11/2/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20±1°C (E3) MR 11/2/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☒ 250 mL beaker ☐ 600 mL beaker ☐ other _____	(Check box for all that apply) ☒ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/~~26~~ 27/18 (E3 MR 11/29)

Initial GRS

PREPARATION of DILUTIONS

STUDY: 31248 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: A. punctulata **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 3		Composite #: 4		Composite #: 5		Composite #:	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1,000	0	1,000	0	1,000		
(RW)	0	↓	0	↓	0	↓		
1 %	10	↓	10	↓	10	↓		
10 %	100	↓	100	↓	100	↓		
50 %	500	↓	500	↓	500	↓		
100 %	1,000	↓	1,000	↓	1,000	↓		
Initial	CFS		CFS		CFS			
Date	10/27/18		10/27/18		10/27/18			
Time	0900		0910		0920			
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Reference Site Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	24.5		24.2		24.4		@3 CFS 10/27 27.~~8~~4	
Vol of Elutriate (mL)	5,340		4,290		4,000		12 @3 CFS 10/27 4,000	
Grams of Salt (g)	21.5g		18.8g		16.6g		@3 CFS 10/27 6.~~3~~9 @3 CFS 10/27	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	28.9		28.2		28.7		29.4	
Date & Initial	10/26/18	CFS	10/26/18	CFS	10/26/18	MW	10/27/18	CFS

EMBRYO WORKSHEET

DATE: '10/25/18 21 CFS 12/13 ESI STUDY: 31248

CLIENT: AECOM PROJECT: New Haven

Eggs Collected @: 1145 Pre-assay fertilization check: ~~455~~ 94% CFS 12/13 ANALYST: CFS 94% CFS 12/13

Sperm Collected @: 1143 *A mated subsample of egg+sperm must achieve ≥90% fertilization in order to be used in testing.*

Egg Stock Suspension Count:

Take 1mL of egg stock suspension and using a glass graduated cylinder dilute with seawater to a final volume of 100 mL. Count a subsample of the diluted suspension to get an estimate of the egg concentration. The diluted suspension should have 40 - 50 eggs/mL, (which would represent an egg concentration of 4,000 - 5,000 in the stock suspension.)

Egg Count (per mL) of diluted suspension: 50

Sperm Stock Suspension Count:

Once added to the egg stock, the final sperm concentration should be $1x10^5$ - $1x10^7$ in solution E.

1. Hemocytometer Count (E): 153
2. Hemocytometer Count (E): 150

Average Count (E): 152 $X10^4$ = spm solution E = 1.52×10^6

Sperm Concentrations: Solution E X 40 = Solution B = 6.08×10^7

Solution E X 20 = Solution C = CFS 10/27 ~~30.4~~ 3.04×10^7

Solution E X 5 = Solution D = 7.6×10^6

Sperm Count (per mL): 1.52×10^6

mL of Eggs to Add: 100mL

mL of Sperm to Add: 20mL Gametes mixed @: 1235

Gametes must be mixed within 1 hour of collection.

Calculated Embryo Stock Concentration (per mL): 0.833

Calculated Embryo Stock (mL) needed per chamber: 1.2mL

The test concentration should be 20 - 30 embryos per mL.

Add calculated amount of embryo stock to a surrogate chamber, gently mix, then count a 5mL aliquot.

Embryo Concentration Check: 128 *If the check concentration is acceptable, then proceed with embryo addition to the test.*

Volume Embryo Stock (mL) added to test solutions: 0.55mL Embryos Added to Test Solutions @: 1330

INITIAL COUNTS:	Embryos/ 5 mL
SURROGATE A	137
SURROGATE B	126
SURROGATE C	133
Mean:	132

Organism Lot ID: 99ApAR0080118

Mean per mL: 26

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99ApAR0080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)		Ammonia pulled on 100% and Controls	
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	START	END
Controls	Lab	~~8.1~~ 8.0	7.6	7.92	8.04	19.0	20.4	31	30.3	-243	331
	CLDS	8.9	7.8	7.95	8.08	18.5	20.5	30	28.1	-244	332
Composite #3	1 %	8.7	7.7	7.95	8.07	18.9	20.0	30	29.6		333
	10 %	8.7	7.5	7.90	8.14	19.0	19.9	30	31.2		334
	50 %	8.3	7.6	7.82	8.25	19.3	19.9	30	31.7		335
	100 %	7.7	7.5	7.76	8.32	19.9	19.9	30	30.9	-240	336
Composite #4	1 %	8.7	7.6	7.92	8.15	19.2	20.1	30	29.4		337
	10 %	8.6	7.7	7.92	8.18	19.2	20.2	30	29.9		338
	50 %	8.4	7.8	7.89	8.31	20.0	20.1	30	29.7		339
	100 %	7.9	7.7	7.87	8.36	20.1	20.0	30	30.0	-241	340

Initials	LCI	CFS	**RECORD OF METERS USED**			WQ Station #1		WQ Station #2	
Date	10/27	10/30	**Exposure**			DO Meter #	ML02	DO Meter #	ML01
Time	1000	1650		0	24	DO Probe #	160	DO Probe #	96
Incub. Temp	~~20~~ 21	21	Water Quality Station #	1	2	pH Meter #	ML02	pH Meter #	ML01
Comments:	③CFS 10/30		Thermometer or Probe #	1	159	pH Probe #	163	pH Probe #	158
			Initial	LCI	CFS	Salinity Meter	ML02	Salinity Meter	ML01

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99ApAR0080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)		Ammonia pulled on 100% and Controls	
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	START	END
Composite #5	1 %	8.6	7.6	7.93	8.13	19.0	19.8	30	31.2		341
	10 %	8.8	7.6	7.88	8.18	18.3	19.8	29	29.8		342
	50 %	8.4	7.5	7.79	8.30	18.9	19.8	29	29.2		343
	100 %	7.7	7.5	7.70	8.35	20.1	19.9	30	29.8	-242	344
	1 %										
	10 %										
	50 %										
	100 %										

Initials	LCI	CFS	**RECORD OF METERS USED**			WQ Station #1		WQ Station #2	
Date	10/27	10/28 30	Exposure			DO Meter #	ML02	DO Meter #	ML01
Time	1000	1650		0	24	DO Probe #	160	DO Probe #	96
Incub. Temp	21	21	Water Quality Station #	1	2	pH Meter #	ML02	pH Meter #	ML01
Comments:	CFS 10/30		Thermometer or Probe #	1	~~ML01~~ 159	pH Probe #	163	pH Probe #	158
			Initial	LCI	CFS	Salinity Meter	ML02	Salinity Meter	ML01

Arbacia Punctulata Survival / Development Assay

ESI Study: 31248
Client: AECOM
Count Date: 11/01/18

Assay Start: 10/27/18 1330
Assay End: 10/30/18 CFS 11/01 CFS 11/01 1600
Initials: CFS

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Lab Control Water	112 / 110	114 / 113	112 / 109	112 / 111	117 / 116
CLDS Reference Water	101 / 101	115 / 109	109 / 105	108 / 104	112 / 108

Composite 3 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	64 / 62	85 / 83	99 / 96	73 / 72	83 / 80
10%	21 / 14	31 / 20	23 / 12	21 / 10	25 / 15
50%	4 / 3	5 / 3	5 / 4	3 / 2	2 / 0
100%	1 / 0	0 / 0	0 / 0	1 / 0	0 / 0

Composite 4 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	94 / 93	107 / 107	100 / 98	102 / 101	109 / 107
10%	74 / 72	87 / 83	69 / 39	41 / 18	37 / 23
50%	7 / 1	4 / 0	8 / 0	2 / 0	1 / 0
100%	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

Composite 5 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	113 / 112	109 / 109	116 / 114	107 / 106	110 / 110
10%	33 / 17	35 / 20	15 / 12	27 / 4	24 / 4
50%	5 / 1	4 / 0	2 / 0	3 / 1	3 / 1
100%	1 / 0	0 / 0	0 / 0	0 / 0	0 / 0

Assay Review Checklist

DATE IN: _____ **STUDY#:** 31248

DATE DUE: _____ **CLIENT:** AECOM

_____ **PROJECT:** New Haven

ASSAY: SPPAP

Project Paperwork Check for Completeness			
	Date	**Initials**	**Comments**
Day 0	10/27/18	CFS	
Day 1	10/28/18	CFS	Observations
Day 2	10/29/18	CFS	↓
Day 3	10/30/18	CFS	End
Day 4	10/31/18	CFS	Observations
Day 5	11/01/18	CFS	Count
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/6/18	MR	
Statistical Analysis Reviewed	11/6/18	LF (MR)	
Data Acceptability Review	11/6/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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Arbacia punctulata
Suspended Particulate Phase

Statistical Analysis Reports

Survival and Development

Unmitigated Assays

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:19 (p 1 of 1)
Test Code/ID: 17-5665-0183/31248Ap-Comp1

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Oct-18 17:35	**Species:**	Arbacia punctulata	**Sample Code:**	31246-101
End Date:	29 Oct-18 11:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Sample Station:**	Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	1	121	99	99	
0	LS	2	10	121	90	89	
0	LS	3	14	121	91	89	
0	LS	4	19	121	98	96	
0	LS	5	28	121	93	90	
0	R	1	3	121	112	107	
0	R	2	12	121	90	88	
0	R	3	16	121	95	90	
0	R	4	22	121	90	86	
0	R	5	29	121	85	89	
1		1	4	121	106	102	
1		2	11	121	89	89	
1		3	17	121	118	117	
1		4	23	121	90	89	
1		5	25	121	118	118	
10		1	5	121	41	21	
10		2	8	121	70	15	
10		3	13	121	43	22	
10		4	20	121	27	5	
10		5	26	121	33	14	
50		1	6	121	0	0	
50		2	9	121	0	0	
50		3	18	121	0	0	
50		4	21	121	0	0	
50		5	30	121	0	0	
100		1	2	121	0	0	
100		2	7	121	0	0	
100		3	15	121	0	0	
100		4	24	121	0	0	
100		5	27	121	0	0	

CETIS Summary Report

Report Date: 07 Nov-18 14:20 (p 1 of 1)
Test Code: 31248Ap-Comp1 | 17-5665-0183

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	01-8906-1095	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	25 Oct-18 17:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	29 Oct-18 11:40	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	90h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
10-5899-6373	Proportion Normal	Linear Interpolation (ICPIN)	EC50	4.5	3.91	5.08	22.2	
13-2295-3295	Proportion Normal	Spearman-Kärber	EC50	4.31	4.06	4.56	23.22	✓
09-8954-7466	Proportion Survived	Linear Interpolation (ICPIN)	EC50	7.95	4.88	13.3	12.58	
02-5185-4704	Proportion Survived	Spearman-Kärber	EC50	7.35	6.79	7.95	13.61	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.765	0.718	0.813	0.736	0.818	0.017	0.038	4.98%	0.00%
0	R	5	0.760	0.673	0.848	0.711	0.884	0.032	0.070	9.26%	0.65%
1		5	0.851	0.705	0.998	0.736	0.975	0.053	0.118	13.85%	-11.23%
10		5	0.127	0.057	0.197	0.041	0.182	0.025	0.056	44.18%	83.37%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.779	0.737	0.820	0.744	0.818	0.015	0.034	4.34%	0.00%
0	R	5	0.780	0.673	0.887	0.702	0.926	0.039	0.086	11.07%	-0.21%
1		5	0.861	0.715	1.000	0.736	0.975	0.053	0.118	13.71%	-10.62%
10		5	0.354	0.184	0.523	0.223	0.579	0.061	0.136	38.55%	54.56%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.818	0.736	0.736	0.793	0.744
0	R	0.884	0.727	0.744	0.711	0.736
1		0.843	0.736	0.967	0.736	0.975
10		0.174	0.124	0.182	0.041	0.116
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.818	0.744	0.752	0.810	0.769
0	R	0.926	0.744	0.785	0.744	0.702
1		0.876	0.736	0.975	0.744	0.975
10		0.339	0.579	0.355	0.223	0.273
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-2295-3295	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:04	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.24	0.00%	0.634	0.0126	4.31	4.06	4.56

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.23	2.82	0.4775	No Outliers Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.760	0.711	0.884	0.070	9.26%	0.0%	460/605	0.806	0.0%
1		5	0.851	0.736	0.975	0.118	13.80%	-12.0%	515/605	0.806	0.0%
10		5	0.127	0.041	0.182	0.056	44.20%	83.3%	77/605	0.127	84.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.884	0.727	0.744	0.711	0.736
1		0.843	0.736	0.967	0.736	0.975
10		0.174	0.124	0.182	0.041	0.116
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	02-5185-4704	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:04	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.22	0.00%	0.866	0.0171	7.35	6.79	7.95

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.82	0.6319	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.780	0.702	0.926	0.086	11.10%	0.0%	472/605	0.821	0.0%
1		5	0.861	0.736	0.975	0.118	13.70%	-10.4%	521/605	0.821	0.0%
10		5	0.354	0.223	0.579	0.136	38.50%	54.7%	214/605	0.354	56.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.926	0.744	0.785	0.744	0.702
1		0.876	0.736	0.975	0.744	0.975
10		0.339	0.579	0.355	0.223	0.273
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	10-5899-6373	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:03	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1118206	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.23	2.82	0.4775	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	4.5	3.91	5.08	22.2	19.7	25.6

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.760	0.711	0.884	0.070	9.26%	0.0%	460/605	0.806	0.0%
1		5	0.851	0.736	0.975	0.118	13.80%	-12.0%	515/605	0.806	0.0%
10		5	0.127	0.041	0.182	0.056	44.20%	83.3%	77/605	0.127	84.2%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.884	0.727	0.744	0.711	0.736
1		0.843	0.736	0.967	0.736	0.975
10		0.174	0.124	0.182	0.041	0.116
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-8954-7466	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:03	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	10-9651-6502	**Code:**	31246-101	**Client:**	AECOM
Sample Date:	25 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1844890	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.82	0.6319	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	7.95	4.88	13.3	12.58	7.527	20.5

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.780	0.702	0.926	0.086	11.10%	0.0%	472/605	0.821	0.0%
1		5	0.861	0.736	0.975	0.118	13.70%	-10.4%	521/605	0.821	0.0%
10		5	0.354	0.223	0.579	0.136	38.50%	54.7%	214/605	0.354	56.9%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.926	0.744	0.785	0.744	0.702
1		0.876	0.736	0.975	0.744	0.975
10		0.339	0.579	0.355	0.223	0.273
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:20 (p 1 of 1)
Test Code/ID: 09-9201-7337/31248Ap-Comp2

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Oct-18 17:35	**Species:**	Arbacia punctulata	**Sample Code:**	31246-103
End Date:	29 Oct-18 11:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Sample Station:**	Comp 2 Elutriate (R',S')

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	1	121	99	99	
0	LS	2	12	121	90	89	
0	LS	3	16	121	91	89	
0	LS	4	21	121	98	96	
0	LS	5	28	121	93	90	
0	R	1	5	121	112	107	
0	R	2	7	121	90	88	
0	R	3	15	121	95	90	
0	R	4	24	121	90	86	
0	R	5	27	121	85	89	
1		1	6	121	119	117	
1		2	8	121	97	95	
1		3	13	122	122	121	
1		4	19	121	101	100	
1		5	26	122	122	122	
10		1	3	121	62	11	
10		2	11	121	94	7	
10		3	17	121	72	11	
10		4	20	121	71	9	
10		5	30	121	80	9	
50		1	2	121	0	0	
50		2	9	121	0	0	
50		3	18	121	0	0	
50		4	23	121	0	0	
50		5	25	121	0	0	
100		1	4	121	0	0	
100		2	10	121	0	0	
100		3	14	121	0	0	
100		4	22	121	0	0	
100		5	29	121	0	0	

CETIS Summary Report

Report Date:	07 Nov-18 14:21 (p 1 of 1)
Test Code:	31248Ap-Comp2 | 09-9201-7337

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	01-8906-1095	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	25 Oct-18 17:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	29 Oct-18 11:40	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	90h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
00-4868-9646	Proportion Normal	Linear Interpolation (ICPIN)	EC50	4.12	4	4.22	24.29	
11-9630-4025	Proportion Normal	Spearman-Kärber	EC50	3.79	3.62	3.97	26.37	✓
11-3535-9951	Proportion Survived	Linear Interpolation (ICPIN)	EC50	17	13	20.9	5.894	
18-1116-1258	Proportion Survived	Spearman-Kärber	EC50	13.3	12.4	14.3	7.508	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.765	0.718	0.813	0.736	0.818	0.017	0.038	4.98%	0.00%
0	R	5	0.760	0.673	0.848	0.711	0.884	0.032	0.070	9.26%	0.65%
1		5	0.914	0.789	1.000	0.785	1.000	0.045	0.101	11.01%	-19.44%
10		5	0.078	0.061	0.095	0.058	0.091	0.006	0.014	17.80%	89.85%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.779	0.737	0.820	0.744	0.818	0.015	0.034	4.34%	0.00%
0	R	5	0.780	0.673	0.887	0.702	0.926	0.039	0.086	11.07%	-0.21%
1		5	0.924	0.803	1.000	0.802	1.000	0.044	0.098	10.55%	-18.68%
10		5	0.626	0.503	0.750	0.512	0.777	0.044	0.099	15.84%	19.53%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.818	0.736	0.736	0.793	0.744
0	R	0.884	0.727	0.744	0.711	0.736
1		0.967	0.785	0.992	0.826	1.000
10		0.091	0.058	0.091	0.074	0.074
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.818	0.744	0.752	0.810	0.769
0	R	0.926	0.744	0.785	0.744	0.702
1		0.983	0.802	1.000	0.835	1.000
10		0.512	0.777	0.595	0.587	0.661
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-9630-4025	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:07	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.24	0.00%	0.579	0.01	3.79	3.62	3.97

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	2.82	0.1153	No Outliers Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.760	0.711	0.884	0.070	9.26%	0.0%	460/605	0.837	0.0%
1		5	0.914	0.785	1.000	0.101	11.00%	-20.2%	555/607	0.837	0.0%
10		5	0.078	0.058	0.091	0.014	17.80%	89.8%	47/605	0.0777	90.7%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.884	0.727	0.744	0.711	0.736
1		0.967	0.785	0.992	0.826	1.000
10		0.091	0.058	0.091	0.074	0.074
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	18-1116-1258	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:07	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.22	0.00%	1.12	0.0152	13.3	12.4	14.3

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.82	0.4015	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.780	0.702	0.926	0.086	11.10%	0.0%	472/605	0.852	0.0%
1		5	0.924	0.802	1.000	0.098	10.60%	-18.4%	561/607	0.852	0.0%
10		5	0.626	0.512	0.777	0.099	15.80%	19.7%	379/605	0.626	26.5%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.926	0.744	0.785	0.744	0.702
1		0.983	0.802	1.000	0.835	1.000
10		0.512	0.777	0.595	0.587	0.661
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	00-4868-9646	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1696766	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	2.82	0.1153	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	4.12	4	4.22	24.29	23.68	25.02

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.760	0.711	0.884	0.070	9.26%	0.0%	460/605	0.837	0.0%
1		5	0.914	0.785	1.000	0.101	11.00%	-20.2%	555/607	0.837	0.0%
10		5	0.078	0.058	0.091	0.014	17.80%	89.8%	47/605	0.0777	90.7%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.884	0.727	0.744	0.711	0.736
1		0.967	0.785	0.992	0.826	1.000
10		0.091	0.058	0.091	0.074	0.074
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-3535-9951	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	01-6129-8063	**Code:**	31246-103	**Client:**	AECOM
Sample Date:	25 Oct-18 14:05	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 14:05	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2030245	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.82	0.4015	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	17	13	20.9	5.894	4.796	7.707

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.780	0.702	0.926	0.086	11.10%	0.0%	472/605	0.852	0.0%
1		5	0.924	0.802	1.000	0.098	10.60%	-18.4%	561/607	0.852	0.0%
10		5	0.626	0.512	0.777	0.099	15.80%	19.7%	379/605	0.626	26.5%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.926	0.744	0.785	0.744	0.702
1		0.983	0.802	1.000	0.835	1.000
10		0.512	0.777	0.595	0.587	0.661
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:21 (p 1 of 1)
Test Code/ID: 05-7027-4949/31248Ap-Comp3

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	27 Oct-18 13:30	**Species:**	Arbacia punctulata	**Sample Code:**	31246-105
End Date:	30 Oct-18 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Sample Station:**	Comp 3 Elutriate (US-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	1	132	112	110	
0	LS	2	8	132	114	113	
0	LS	3	14	132	112	109	
0	LS	4	19	132	112	111	
0	LS	5	30	132	117	116	
0	R	1	2	132	111	101	
0	R	2	9	132	115	109	
0	R	3	15	132	109	105	
0	R	4	22	132	108	104	
0	R	5	29	132	112	108	
1		1	3	132	64	62	
1		2	10	132	85	83	
1		3	13	132	99	96	
1		4	23	132	73	72	
1		5	25	132	83	80	
10		1	6	132	21	14	
10		2	11	132	31	20	
10		3	17	132	23	12	
10		4	21	132	21	10	
10		5	26	132	25	15	
50		1	4	132	4	3	
50		2	12	132	5	3	
50		3	16	132	5	4	
50		4	24	132	3	2	
50		5	27	132	2	0	
100		1	5	132	1	0	
100		2	7	132	0	0	
100		3	18	132	0	0	
100		4	20	132	1	0	
100		5	28	132	0	0	

CETIS Summary Report

Report Date: 07 Nov-18 14:22 (p 1 of 1)
Test Code: 31248Ap-Comp3 | 05-7027-4949

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	08-6440-3077	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	27 Oct-18 13:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 16:00	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	74h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
11-7014-6790	Proportion Normal	Linear Interpolation (ICPIN)	EC50	2.97	1.94	3.85	33.67	
14-3593-8089	Proportion Normal	Trimmed Spearman-Kärber	EC50	2.52	2.32	2.75	39.61	
18-0632-9859	Proportion Survived	Linear Interpolation (ICPIN)	EC50	3.29	2.04	4.42	30.44	
21-2593-9624	Proportion Survived	Linear Interpolation (ICPIN)	EC50	2.95	1.86	3.87	33.94	
14-0592-5898	Proportion Survived	Trimmed Spearman-Kärber	EC50	2.8	2.51	3.12	35.73	
21-3690-6453	Proportion Survived	Trimmed Spearman-Kärber	EC50	2.5	2.19	2.87	39.93	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.847	0.821	0.873	0.826	0.879	0.009	0.021	2.48%	0.00%
0	R	5	0.798	0.768	0.829	0.765	0.826	0.011	0.024	3.04%	5.72%
1		5	0.595	0.476	0.715	0.470	0.727	0.043	0.096	16.13%	29.70%
10		5	0.108	0.072	0.143	0.076	0.152	0.013	0.029	26.54%	87.30%
50		5	0.018	0.004	0.032	0.000	0.030	0.005	0.012	63.19%	97.85%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.859	0.838	0.880	0.848	0.886	0.007	0.017	1.93%	0.00%
0	R	5	0.841	0.815	0.867	0.818	0.871	0.009	0.021	2.47%	2.12%
1		5	0.612	0.488	0.736	0.485	0.750	0.045	0.100	16.33%	28.75%
10		5	0.183	0.144	0.222	0.159	0.235	0.014	0.031	17.14%	78.66%
50		5	0.029	0.017	0.041	0.015	0.038	0.004	0.010	34.31%	96.65%
100		5	0.003	0.000	0.008	0.000	0.008	0.002	0.004	136.93%	99.65%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.833	0.856	0.826	0.841	0.879
0	R	0.765	0.826	0.795	0.788	0.818
1		0.470	0.629	0.727	0.545	0.606
10		0.106	0.152	0.091	0.076	0.114
50		0.023	0.023	0.030	0.015	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.848	0.864	0.848	0.848	0.886
0	R	0.841	0.871	0.826	0.818	0.848
1		0.485	0.644	0.750	0.553	0.629
10		0.159	0.235	0.174	0.159	0.189
50		0.030	0.038	0.038	0.023	0.015
100		0.008	0.000	0.000	0.008	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-3593-8089	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:09	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.202	25.43%	0.402	0.0187	2.52	2.32	2.75

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.73	2.82	0.0762	No Outliers Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.798	0.765	0.826	0.024	3.04%	0.0%	527/660	0.798	0.0%
1		5	0.595	0.470	0.727	0.096	16.10%	25.4%	393/660	0.595	25.4%
10		5	0.108	0.076	0.152	0.029	26.50%	86.5%	71/660	0.108	86.5%
50		5	0.018	0.000	0.030	0.012	63.20%	97.7%	12/660	0.0182	97.7%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.765	0.826	0.795	0.788	0.818
1		0.470	0.629	0.727	0.545	0.606
10		0.106	0.152	0.091	0.076	0.114
50		0.023	0.023	0.030	0.015	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-0592-5898	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:09	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.159	27.21%	0.447	0.0235	2.8	2.51	3.12

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.95	2.82	0.0270	Outlier Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		5	0.612	0.485	0.750	0.100	16.30%	27.2%	404/660	0.612	27.2%
10		5	0.183	0.159	0.235	0.031	17.10%	78.2%	121/660	0.183	78.2%
50		5	0.029	0.015	0.038	0.010	34.30%	96.6%	19/660	0.0288	96.6%
100		5	0.003	0.000	0.008	0.004	137.00%	99.6%	2/660	0.00303	99.6%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.485	0.644	0.750	0.553	0.629
10		0.159	0.235	0.174	0.159	0.189
50		0.030	0.038	0.038	0.023	0.015
100		0.008	0.000	0.000	0.008	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	21-3690-6453	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:09	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.159	31.31%	0.399	0.0293	2.5	2.19	2.87

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		4	0.578	0.485	0.644	0.074	12.70%	31.3%	305/528	0.578	31.3%
10		5	0.183	0.159	0.235	0.031	17.10%	78.2%	121/660	0.183	78.2%
50		5	0.029	0.015	0.038	0.010	34.30%	96.6%	19/660	0.0288	96.6%
100		5	0.003	0.000	0.008	0.004	137.00%	99.6%	2/660	0.00303	99.6%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.485	0.644	Outlier	0.553	0.629
10		0.159	0.235	0.174	0.159	0.189
50		0.030	0.038	0.038	0.023	0.015
100		0.008	0.000	0.000	0.008	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-7014-6790	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	176549	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.73	2.82	0.0762	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	2.97	1.94	3.85	33.67	25.95	51.66

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.798	0.765	0.826	0.024	3.04%	0.0%	527/660	0.798	0.0%
1		5	0.595	0.470	0.727	0.096	16.10%	25.4%	393/660	0.595	25.4%
10		5	0.108	0.076	0.152	0.029	26.50%	86.5%	71/660	0.108	86.5%
50		5	0.018	0.000	0.030	0.012	63.20%	97.7%	12/660	0.0182	97.7%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.765	0.826	0.795	0.788	0.818
1		0.470	0.629	0.727	0.545	0.606
10		0.106	0.152	0.091	0.076	0.114
50		0.023	0.023	0.030	0.015	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	21-2593-9624	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	16-4987-4855	**Code:**	31246-105	**Client:**	AECOM
Sample Date:	26 Oct-18 16:15	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 16:15	**Source:**	New Haven Harbor 2018		
Sample Age:	21h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1565812	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	2.95	1.86	3.87	33.94	25.84	53.89

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		4	0.578	0.485	0.644	0.074	12.70%	31.3%	305/528	0.578	31.3%
10		5	0.183	0.159	0.235	0.031	17.10%	78.2%	121/660	0.183	78.2%
50		5	0.029	0.015	0.038	0.010	34.30%	96.6%	19/660	0.0288	96.6%
100		5	0.003	0.000	0.008	0.004	137.00%	99.6%	2/660	0.00303	99.6%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.485	0.644	Outlier	0.553	0.629
10		0.159	0.235	0.174	0.159	0.189
50		0.030	0.038	0.038	0.023	0.015
100		0.008	0.000	0.000	0.008	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:22 (p 1 of 1)
Test Code/ID: 10-9997-5469/31248Ap-Comp4

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	27 Oct-18 13:30	**Species:**	Arbacia punctulata	**Sample Code:**	31246-107
End Date:	30 Oct-18 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Sample Station:**	Comp 4 Elutriate (DS-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	3	132	112	110	
0	LS	2	12	132	114	113	
0	LS	3	17	132	112	109	
0	LS	4	24	132	112	111	
0	LS	5	26	132	117	116	
0	R	1	2	132	111	101	
0	R	2	7	132	115	109	
0	R	3	16	132	109	105	
0	R	4	22	132	108	104	
0	R	5	30	132	112	108	
1		1	5	132	94	93	
1		2	9	132	107	107	
1		3	15	132	100	98	
1		4	21	132	102	101	
1		5	25	132	109	107	
10		1	6	132	74	72	
10		2	8	132	97	83	
10		3	14	132	69	39	
10		4	19	132	41	18	
10		5	29	132	37	23	
50		1	1	132	7	1	
50		2	11	132	4	0	
50		3	13	132	8	0	
50		4	23	132	2	0	
50		5	27	132	1	0	
100		1	4	132	0	0	
100		2	10	132	0	0	
100		3	18	132	0	0	
100		4	20	132	0	0	
100		5	28	132	0	0	

CETIS Summary Report

Report Date: 07 Nov-18 14:23 (p 1 of 1)
Test Code: 31248Ap-Comp4 | 10-9997-5469

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	08-6440-3077	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	27 Oct-18 13:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 16:00	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	74h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	24h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
12-6821-5947	Proportion Normal	Linear Interpolation (ICPIN)	EC50	8.19	3.07	18.9	12.2	
17-3062-8048	Proportion Normal	Linear Interpolation (ICPIN)	EC50	6.4	3.53	15.1	15.63	
01-9830-2170	Proportion Normal	Trimmed Spearman-Kärber	EC50	7.27	6.68	7.91	13.75	
02-0458-4071	Proportion Normal	Trimmed Spearman-Kärber	EC50	6.07	5.54	6.64	16.48	✓
16-4918-0573	Proportion Survived	Linear Interpolation (ICPIN)	EC50	9.9	4.02	17.2	10.1	
21-2082-5713	Proportion Survived	Linear Interpolation (ICPIN)	EC50	12.6	4.8	20	7.956	
10-7448-5166	Proportion Survived	Trimmed Spearman-Kärber	EC50	9.63	8.76	10.6	10.39	
14-5854-1799	Proportion Survived	Trimmed Spearman-Kärber	EC50	8.09	7.29	8.99	12.36	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.847	0.821	0.873	0.826	0.879	0.009	0.021	2.48%	0.00%
0	R	5	0.798	0.768	0.829	0.765	0.826	0.011	0.024	3.04%	5.72%
1		5	0.767	0.710	0.823	0.705	0.811	0.020	0.046	5.95%	9.48%
10		5	0.356	0.082	0.630	0.136	0.629	0.099	0.221	62.05%	57.96%
50		5	0.002	0.000	0.006	0.000	0.008	0.002	0.003	223.61%	99.82%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.859	0.838	0.880	0.848	0.886	0.007	0.017	1.93%	0.00%
0	R	5	0.841	0.815	0.867	0.818	0.871	0.009	0.021	2.47%	2.12%
1		5	0.776	0.720	0.832	0.712	0.826	0.020	0.045	5.80%	9.70%
10		5	0.482	0.248	0.716	0.280	0.735	0.084	0.188	39.08%	43.92%
50		5	0.033	0.005	0.062	0.008	0.061	0.010	0.023	69.31%	96.12%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.833	0.856	0.826	0.841	0.879
0	R	0.765	0.826	0.795	0.788	0.818
1		0.705	0.811	0.742	0.765	0.811
10		0.545	0.629	0.295	0.136	0.174
50		0.008	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.848	0.864	0.848	0.848	0.886
0	R	0.841	0.871	0.826	0.818	0.848
1		0.712	0.811	0.758	0.773	0.826
10		0.561	0.735	0.523	0.311	0.280
50		0.053	0.030	0.061	0.015	0.008
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	02-0458-4071	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:10	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	24h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.202	3.98%	0.783	0.0196	6.07	5.54	6.64

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.798	0.765	0.826	0.024	3.04%	0.0%	527/660	0.798	0.0%
1		5	0.767	0.705	0.811	0.046	5.95%	3.98%	506/660	0.767	3.98%
10		4	0.288	0.136	0.545	0.185	64.10%	63.9%	152/528	0.288	63.9%
50		5	0.002	0.000	0.008	0.003	224.00%	99.8%	1/660	0.00152	99.8%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.765	0.826	0.795	0.788	0.818
1		0.705	0.811	0.742	0.765	0.811
10		0.545	Outlier	0.295	0.136	0.174
50		0.008	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-5854-1799	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:10	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	24h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.159	7.75%	0.908	0.0228	8.09	7.29	8.99

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		5	0.776	0.712	0.826	0.045	5.80%	7.75%	512/660	0.776	7.75%
10		4	0.419	0.280	0.561	0.144	34.30%	50.2%	221/528	0.419	50.2%
50		5	0.033	0.008	0.061	0.023	69.30%	96.0%	22/660	0.0333	96.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.712	0.811	0.758	0.773	0.826
10		0.561	Outlier	0.523	0.311	0.280
50		0.053	0.030	0.061	0.015	0.008
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	17-3062-8048	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	24h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1790955	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	6.4	3.53	15.1	15.63	6.634	28.33

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.798	0.765	0.826	0.024	3.04%	0.0%	527/660	0.798	0.0%
1		5	0.767	0.705	0.811	0.046	5.95%	3.98%	506/660	0.767	3.98%
10		4	0.288	0.136	0.545	0.185	64.10%	63.9%	152/528	0.288	63.9%
50		5	0.002	0.000	0.008	0.003	224.00%	99.8%	1/660	0.00152	99.8%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.765	0.826	0.795	0.788	0.818
1		0.705	0.811	0.742	0.765	0.811
10		0.545	Outlier	0.295	0.136	0.174
50		0.008	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	21-2082-5713	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	24h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	696206	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.99	2.82	0.0217	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	12.6	4.8	20	7.956	5.011	20.84

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		5	0.776	0.712	0.826	0.045	5.80%	7.75%	512/660	0.776	7.75%
10		5	0.482	0.280	0.735	0.188	39.10%	42.7%	318/660	0.482	42.7%
50		5	0.033	0.008	0.061	0.023	69.30%	96.0%	22/660	0.0333	96.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.712	0.811	0.758	0.773	0.826
10		0.561	0.735	0.523	0.311	0.280
50		0.053	0.030	0.061	0.015	0.008
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	16-4918-0573	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7608-3506	**Code:**	31246-107	**Client:**	AECOM
Sample Date:	26 Oct-18 13:10	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 13:10	**Source:**	New Haven Harbor 2018		
Sample Age:	24h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	439136	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	9.9	4.02	17.2	10.1	5.812	24.89

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		5	0.776	0.712	0.826	0.045	5.80%	7.75%	512/660	0.776	7.75%
10		4	0.419	0.280	0.561	0.144	34.30%	50.2%	221/528	0.419	50.2%
50		5	0.033	0.008	0.061	0.023	69.30%	96.0%	22/660	0.0333	96.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.712	0.811	0.758	0.773	0.826
10		0.561	Outlier	0.523	0.311	0.280
50		0.053	0.030	0.061	0.015	0.008
100		0.000	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:23 (p 1 of 1)
Test Code/ID: 11-6976-8011/31248Ap-Comp5

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	27 Oct-18 13:30	**Species:**	Arbacia punctulata	**Sample Code:**	31246-109
End Date:	30 Oct-18 16:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Sample Station:**	Comp 5 Elutriate (TB-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	1	132	112	110	
0	LS	2	8	132	114	113	
0	LS	3	13	132	112	109	
0	LS	4	20	132	112	111	
0	LS	5	25	132	117	116	
0	R	1	4	132	111	101	
0	R	2	7	132	115	109	
0	R	3	15	132	109	105	
0	R	4	21	132	108	104	
0	R	5	26	132	112	108	
1		1	5	132	113	112	
1		2	10	132	109	109	
1		3	17	132	116	114	
1		4	22	132	107	106	
1		5	30	132	110	110	
10		1	3	132	33	17	
10		2	11	132	35	20	
10		3	14	132	15	12	
10		4	19	132	27	4	
10		5	29	132	24	4	
50		1	2	132	5	1	
50		2	12	132	4	0	
50		3	18	132	2	0	
50		4	24	132	3	1	
50		5	27	132	3	1	
100		1	6	132	1	0	
100		2	9	132	0	0	
100		3	16	132	0	0	
100		4	23	132	0	0	
100		5	28	132	0	0	

CETIS Summary Report

Report Date: 07 Nov-18 14:24 (p 1 of 1)
Test Code: 31248Ap-Comp5 | 11-6976-8011

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	08-6440-3077	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	27 Oct-18 13:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	30 Oct-18 16:00	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	74h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	22h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
02-9580-9873	Proportion Normal	Linear Interpolation (ICPIN)	EC50	4.19	3.84	4.78	23.88	
17-2200-8161	Proportion Normal	Spearman-Kärber	EC50	3.91	3.73	4.1	25.55	✓
05-7757-9822	Proportion Survived	Linear Interpolation (ICPIN)	EC50	5.41	4.83	6.07	18.49	
18-4137-4170	Proportion Survived	Linear Interpolation (ICPIN)	EC50	5.15	4.32	5.86	19.41	
00-2978-8288	Proportion Survived	Trimmed Spearman-Kärber	EC50	5.53	5.11	5.97	18.1	
10-9281-2384	Proportion Survived	Trimmed Spearman-Kärber	EC50	5.24	4.9	5.61	19.07	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.847	0.821	0.873	0.826	0.879	0.009	0.021	2.48%	0.00%
0	R	5	0.798	0.768	0.829	0.765	0.826	0.011	0.024	3.04%	5.72%
1		5	0.835	0.806	0.863	0.803	0.864	0.010	0.023	2.75%	1.43%
10		5	0.086	0.017	0.155	0.030	0.152	0.025	0.056	64.34%	89.80%
50		5	0.005	0.000	0.010	0.000	0.008	0.002	0.004	91.29%	99.46%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.859	0.838	0.880	0.848	0.886	0.007	0.017	1.93%	0.00%
0	R	5	0.841	0.815	0.867	0.818	0.871	0.009	0.021	2.47%	2.12%
1		5	0.841	0.808	0.874	0.811	0.879	0.012	0.027	3.19%	2.12%
10		5	0.203	0.128	0.278	0.114	0.265	0.027	0.060	29.66%	76.37%
50		5	0.026	0.015	0.037	0.015	0.038	0.004	0.009	33.53%	97.00%
100		5	0.002	0.000	0.006	0.000	0.008	0.002	0.003	223.61%	99.82%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.833	0.856	0.826	0.841	0.879
0	R	0.765	0.826	0.795	0.788	0.818
1		0.848	0.826	0.864	0.803	0.833
10		0.129	0.152	0.091	0.030	0.030
50		0.008	0.000	0.000	0.008	0.008
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.848	0.864	0.848	0.848	0.886
0	R	0.841	0.871	0.826	0.818	0.848
1		0.856	0.826	0.879	0.811	0.833
10		0.250	0.265	0.114	0.205	0.182
50		0.038	0.030	0.015	0.023	0.023
100		0.008	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	17-2200-8161	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:12	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	22h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.202	0.00%	0.593	0.0103	3.91	3.73	4.1

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.42	2.82	0.2538	No Outliers Detected

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.798	0.765	0.826	0.024	3.04%	0.0%	527/660	0.817	0.0%
1		5	0.835	0.803	0.864	0.023	2.75%	-4.55%	551/660	0.817	0.0%
10		5	0.086	0.030	0.152	0.056	64.30%	89.2%	57/660	0.0864	89.4%
50		5	0.005	0.000	0.008	0.004	91.30%	99.4%	3/660	0.00455	99.4%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.765	0.826	0.795	0.788	0.818
1		0.848	0.826	0.864	0.803	0.833
10		0.129	0.152	0.091	0.030	0.030
50		0.008	0.000	0.000	0.008	0.008
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	00-2978-8288	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:12	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	22h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.159	0.18%	0.742	0.0168	5.53	5.11	5.97

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		5	0.841	0.811	0.879	0.027	3.19%	0.0%	555/660	0.841	0.0%
10		4	0.225	0.182	0.265	0.039	17.20%	73.2%	119/528	0.225	73.2%
50		5	0.026	0.015	0.038	0.009	33.50%	96.9%	17/660	0.0258	96.9%
100		5	0.002	0.000	0.008	0.003	224.00%	99.8%	1/660	0.00152	99.8%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.856	0.826	0.879	0.811	0.833
10		0.250	0.265	Outlier	0.205	0.182
50		0.038	0.030	0.015	0.023	0.023
100		0.008	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	02-9580-9873	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	22h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	819509	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.42	2.82	0.2538	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	4.19	3.84	4.78	23.88	20.93	26.05

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.798	0.765	0.826	0.024	3.04%	0.0%	527/660	0.817	0.0%
1		5	0.835	0.803	0.864	0.023	2.75%	-4.55%	551/660	0.817	0.0%
10		5	0.086	0.030	0.152	0.056	64.30%	89.2%	57/660	0.0864	89.4%
50		5	0.005	0.000	0.008	0.004	91.30%	99.4%	3/660	0.00455	99.4%
100		5	0.000	0.000	0.000	0.000		100.0%	0/660	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.765	0.826	0.795	0.788	0.818
1		0.848	0.826	0.864	0.803	0.833
10		0.129	0.152	0.091	0.030	0.030
50		0.008	0.000	0.000	0.008	0.008
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	05-7757-9822	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	02-4334-9766	**Code:**	31246-109	**Client:**	AECOM
Sample Date:	26 Oct-18 15:25	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	26 Oct-18 15:25	**Source:**	New Haven Harbor 2018		
Sample Age:	22h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	830761	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	5.41	4.83	6.07	18.49	16.48	20.69

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.841	0.818	0.871	0.021	2.47%	0.0%	555/660	0.841	0.0%
1		5	0.841	0.811	0.879	0.027	3.19%	0.0%	555/660	0.841	0.0%
10		4	0.225	0.182	0.265	0.039	17.20%	73.2%	119/528	0.225	73.2%
50		5	0.026	0.015	0.038	0.009	33.50%	96.9%	17/660	0.0258	96.9%
100		5	0.002	0.000	0.008	0.003	224.00%	99.8%	1/660	0.00152	99.8%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.841	0.871	0.826	0.818	0.848
1		0.856	0.826	0.879	0.811	0.833
10		0.250	0.265	Outlier	0.205	0.182
50		0.038	0.030	0.015	0.023	0.023
100		0.008	0.000	0.000	0.000	0.000

CETIS Test Data Worksheet

Report Date: 07 Nov-18 14:24 (p 1 of 1)
Test Code/ID: 04-3358-7078/31248Ap-Comp6

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	25 Oct-18 17:35	**Species:**	Arbacia punctulata	**Sample Code:**	31246-111
End Date:	29 Oct-18 11:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Sample Station:**	Comp 6 Elutriate (CAD-1,-2,-3)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	5	121	99	99	
0	LS	2	12	121	90	89	
0	LS	3	16	121	91	89	
0	LS	4	20	121	98	96	
0	LS	5	27	121	93	90	
0	R	1	4	121	112	107	
0	R	2	8	121	90	88	
0	R	3	15	121	95	90	
0	R	4	22	121	90	86	
0	R	5	30	121	85	89	
1		1	1	121	113	113	
1		2	11	121	112	112	
1		3	17	121	121	120	
1		4	23	121	95	95	
1		5	28	121	119	119	
10		1	6	121	101	101	
10		2	7	121	118	116	
10		3	14	121	109	107	
10		4	24	121	114	113	
10		5	25	121	107	107	
50		1	3	121	0	0	
50		2	10	121	0	0	
50		3	13	121	0	0	
50		4	19	121	0	0	
50		5	26	121	0	0	
100		1	2	121	0	0	
100		2	9	121	0	0	
100		3	18	121	0	0	
100		4	21	121	0	0	
100		5	29	121	0	0	

CETIS Summary Report

Report Date: 07 Nov-18 14:25 (p 1 of 1)
Test Code: 31248Ap-Comp6 | 04-3358-7078

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	01-8906-1095	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	25 Oct-18 17:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	29 Oct-18 11:40	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	90h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	2h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
02-0765-8969	Proportion Normal	Binomial/Graphical	EC50	22.4	10	50	4.472	✓
14-5699-9464	Proportion Normal	Binomial/Graphical	EC50	22.4	10	50	4.472	✓
16-0154-7633	Proportion Normal	Linear Interpolation (ICPIN)	EC50	22.7	22.5	22.7	4.408	
17-9337-7122	Proportion Normal	Linear Interpolation (ICPIN)	EC50	22.7	22.7	22.7	4.408	
00-8284-4327	Proportion Survived	Binomial/Graphical	EC50	22.4	10	50	4.472	✓
13-2255-0050	Proportion Survived	Linear Interpolation (ICPIN)	EC50	22.7	22.7	22.7	4.408	

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.765	0.718	0.813	0.736	0.818	0.017	0.038	4.98%	0.00%
0	R	5	0.760	0.673	0.848	0.711	0.884	0.032	0.070	9.26%	0.65%
1		5	0.924	0.821	1.000	0.785	0.992	0.037	0.083	8.98%	-20.73%
10		5	0.899	0.839	0.959	0.835	0.959	0.022	0.048	5.38%	-17.49%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.779	0.737	0.820	0.744	0.818	0.015	0.034	4.34%	0.00%
0	R	5	0.780	0.673	0.887	0.702	0.926	0.039	0.086	11.07%	-0.21%
1		5	0.926	0.820	1.000	0.785	1.000	0.038	0.085	9.15%	-18.90%
10		5	0.907	0.840	0.974	0.835	0.975	0.024	0.054	5.95%	-16.56%
50		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%
100		5	0.000	0.000	0.000	0.000	0.000	0.000	0.000		100.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.818	0.736	0.736	0.793	0.744
0	R	0.884	0.727	0.744	0.711	0.736
1		0.934	0.926	0.992	0.785	0.983
10		0.835	0.959	0.884	0.934	0.884
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.818	0.744	0.752	0.810	0.769
0	R	0.926	0.744	0.785	0.744	0.702
1		0.934	0.926	1.000	0.785	0.983
10		0.835	0.975	0.901	0.942	0.884
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	02-0765-8969	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:13	**Analysis:**	Binomial Method	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	2h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Binomial/Graphical Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.24	0.00%	1.35	0	22.4	10	50

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.760	0.711	0.884	0.070	9.26%	0.0%	460/605	0.873	0.0%
1		4	0.959	0.926	0.992	0.034	3.52%	-26.1%	464/484	0.873	0.0%
10		5	0.899	0.835	0.959	0.048	5.38%	-18.3%	544/605	0.873	0.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.884	0.727	0.744	0.711	0.736
1		0.934	0.926	0.992	Outlier	0.983
10		0.835	0.959	0.884	0.934	0.884
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	00-8284-4327	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:13	**Analysis:**	Binomial Method	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	2h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Binomial/Graphical Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.22	0.00%	1.35	0	22.4	10	50

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.62	2.82	0.1172	No Outliers Detected

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.780	0.702	0.926	0.086	11.10%	0.0%	472/605	0.871	0.0%
1		5	0.926	0.785	1.000	0.085	9.15%	-18.6%	560/605	0.871	0.0%
10		5	0.907	0.835	0.975	0.054	5.95%	-16.3%	549/605	0.871	0.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.926	0.744	0.785	0.744	0.702
1		0.934	0.926	1.000	0.785	0.983
10		0.835	0.975	0.901	0.942	0.884
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	16-0154-7633	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	2h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	482849	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	22.7	22.5	22.7	4.408	4.408	4.443

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	R	5	0.760	0.711	0.884	0.070	9.26%	0.0%	460/605	0.873	0.0%
1		4	0.959	0.926	0.992	0.034	3.52%	-26.1%	464/484	0.873	0.0%
10		5	0.899	0.835	0.959	0.048	5.38%	-18.3%	544/605	0.873	0.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.884	0.727	0.744	0.711	0.736
1		0.934	0.926	0.992	Outlier	0.983
10		0.835	0.959	0.884	0.934	0.884
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-2255-0050	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Nov-18 10:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	08-5165-6327	**Code:**	31246-111	**Client:**	AECOM
Sample Date:	25 Oct-18 15:20	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	25 Oct-18 15:20	**Source:**	New Haven Harbor 2018		
Sample Age:	2h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	142351	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.62	2.82	0.1172	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	22.7	22.7	22.7	4.408	4.408	4.408

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	R	5	0.780	0.702	0.926	0.086	11.10%	0.0%	472/605	0.871	0.0%
1		5	0.926	0.785	1.000	0.085	9.15%	-18.6%	560/605	0.871	0.0%
10		5	0.907	0.835	0.975	0.054	5.95%	-16.3%	549/605	0.871	0.0%
50		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%
100		5	0.000	0.000	0.000	0.000		100.0%	0/605	0	100.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	R	0.926	0.744	0.785	0.744	0.702
1		0.934	0.926	1.000	0.785	0.983
10		0.835	0.975	0.901	0.942	0.884
50		0.000	0.000	0.000	0.000	0.000
100		0.000	0.000	0.000	0.000	0.000

Arbacia punctulata
Suspended Particulate Phase

Bench Sheets

Mitigated Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #: 312~~19~~91 (R) BG 12/13 **Incubator ID:** 1+2 (E) 8 11/13

Project: New Haven Harbor 2018 **Client:** AECOM

Composites 1,2,3,4,5&6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☑ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) JTP 12/07/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20 ± 1 °C (E3) JTP 12/07/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☑ 250 mL beaker ☐ 600 mL beaker ☐ other _____	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 11/21/18 Initial BG

99ApAR0090618

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Arbacia punctulata

Source: Lab reared _____ Hatchery reared _____ Field collected ✓

Hatch date mixed aged adults Receipt date 09/06/18

Lot number 090618AP Strain WILD

Brood origination N. C

II. Water Quality

Temperature 15 °C Salinity 30 ppt D.O. sat ppm

pH 8.3 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating _____ Flow through ✓ Static renewal _____

DIET: Flake food _____ ~~Phyto~~MACRO-plankton _____ Trout chow _____

Artemia _____ Rotifers _____ YCT _____ Other _____

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 30

Carrier: FEDEX/PICKUP Date shipped 9/6/18

Biologist: Stan Litsche

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION of DILUTIONS

STUDY: 31248 91 12/13 **CLIENT:** AECOM **DILUENT:** ~~CLDS~~ Lab Salt JTP 11/21/18

SPECIES: *A. punctulata* **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 1		Composite #: 2		Composite #: 3		Composite #: 4	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1200	0	1200	0	1200	0	1200
	0				0		0	
1 %	12		12		12		12	
10 %	120		120		120		120	
50 %	600		600		600		600	
100 %	1,200		1,200		1,200		1,200	
Initial	CFS		CFS		GRS		GRS	
Date	11/21/18		11/21/18		11/21/18		11/21/18	
Time	1130		1145		1255		1230	
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	19.1		19.0		18.1		18.6	
Vol of Elutriate (mL)	2,900mL		2,840mL		2,160mL		2460 mL	
Grams of Salt (g)	36.4		36.0		29.6		28.0	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	29.2		28.4		29.1		29.6	
Date & Initial	11/21/18	CFS	11/21/18	CFS	11/21/18	CFS	11/21/18	GRS

PREPARATION of DILUTIONS

STUDY: 31248 91 @ 12/13 **CLIENT:** AECOM **DILUENT:** ~~CLDS~~ Lab Salt @ JTP 11/21/18

SPECIES: *A. punctulata* **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 5		Composite #: 6			
	Elutriate ID:		Elutriate ID:			
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)		
Lab	0	1200	0	1200		
	0		0			
1 %	12		12			
10 %	120		120			
50 %	600		600			
100 %	1,200		1,200			
Initial	GRS		CFS			
Date	11/21/18		11/21/18			
Time	1240		1240			
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)			
Initial Salinity (ppt)	18.4		18.0			
Vol of Elutriate (mL)	2200		2,500 mL			
Grams of Salt (g)	29.4		34.6			
Lot number of Salt	A-517		A-517			
Final Salinity	29.4		28.8			
Date & Initial	11/21/18	GRS	11/21/18	CFS		

EMBRYO WORKSHEET

DATE: 11/21/18 ESI STUDY: ~~31248~~ 91 (OBK 12/13

CLIENT: AECOM PROJECT: New Haven Harbor

Eggs Collected @: 1000 Pre-assay fertilization check: 92% ANALYST: GRS

Sperm Collected @: 1000 *A mated subsample of egg+sperm must achieve ≥90% fertilization in order to be used in testing.*

Egg Stock Suspension Count:

Take 1mL of egg stock suspension and using a glass graduated cylinder dilute with seawater to a final volume of 100 mL. Count a subsample of the diluted suspension to get an estimate of the egg concentration. The diluted suspension should have 40 - 50 eggs/mL, (which would represent an egg concentration of 4,000 - 5,000 in the stock suspension.)

Egg Count (per mL) of diluted suspension: 4000

Sperm Stock Suspension Count:

Once added to the egg stock, the final sperm concentration should be $1x10^5$ - $1x10^7$ in solution E.

1. Hemocytometer Count (E): 143
2. Hemocytometer Count (E): 130

Average Count (E): 137 $X10^4$ = spm solution E = $1.37x10^6$

Sperm Concentrations: Solution E X 40 = Solution B = $5.48x10^7$

Solution E X 20 = Solution C = $2.74x10^7$

Solution E X 5 = Solution D = $6.85x10^6$

Sperm Count (per mL): $1.37x10^6$

mL of Eggs to Add: 200

mL of Sperm to Add: 30 Gametes mixed @: 1040

Gametes must be mixed within 1 hour of collection.

Calculated Embryo Stock Concentration (per mL): (E) 11/21 ~~3480~~ 3480

The test concentration should be 20 - 30 embryos per mL.

Calculated Embryo Stock (mL) needed per chamber: 1.42

Add calculated amount of embryo stock to a surrogate chamber, gently mix, then count a 5mL aliquot.

Embryo Concentration Check: 105 *If the check concentration is acceptable, then proceed with embryo addition to the test.*

Volume Embryo Stock (mL) added to test solutions: 1.5mL Embryos Added to Test Solutions @: 1310

INITIAL COUNTS:	Embryos/ 5 mL
SURROGATE A	105
SURROGATE B	101
SURROGATE C	109
Mean:	~~21~~ 105

Organism Lot ID: 99APAR0090618

Mean per mL: 21

(E) 11/21

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 31248 91 (E3) 12/13 **Client:** AECOM **Project:** New Haven Harbor

Test Species: *A. punctulata* **Lot ID:** 99APAR0090618 **Diluent:** ~~CLDS~~ Lab Salt

(E3) NR 12/20/18

DAILY WATER QUALITIES											Ammonia pulled on 100% and Controls	
Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)				
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr		START	END
Controls	Lab	7.8	7.5	7.91	8.00	19	20	31	33		~~30~~ 5 (E3) 12/13	~~55~~ 5 (E3) 12/13
	CLDS							3 (E3) MW 11/21 (E3) MW 11/21				
Composite #1	1 %	7.6	7.5	7.91	8.02	20	21	32	33			
	10 %	7.5	7.5	7.89	8.04	20	21	32	33			
	50 %	7.4	7.5	7.87	8.05	20	21	31	33			
	100 %	7.4	7.2	7.79	8.04	20	21	30	31		~~31~~ 5 - ~~34~~ 5	~~356 - 359~~ 356 - 359
Composite #2	1 %	7.5	7.5	7.92	8.07	20	21	32	33		(E3) 12/13	(E3) 12/13
	10 %	7.5	7.5	7.95	8.08	20	21	32	33			
	50 %	7.5	7.5	7.89	8.10	20	21	32	33			~~360 - 363~~ 360-363 (E3) 12/13
	100 %	7.0	7.4	7.72	8.13	19	21	30	32		~~35~~ 5 - ~~38~~ 5 (E3) 12/13	~~362 - 365~~ 362-365 (E3) 11/27
Initials		MW	MW	RECORD OF METERS USED				WQ Station #1			WQ Station #2	
Date		11/21/18	11/24/18	Exposure				DO Meter #	MLO2		DO Meter #	
Time		1205	1140			0	(E3) GKS 11/27 ~~24~~ 72	DO Probe #	160		DO Probe #	
Incub. Temp		20	20	Water Quality Station #		1	1	pH Meter #	MLO2		pH Meter #	
Comments:				Thermometer or Probe #		MLO2	MLO2	pH Probe #	163		pH Probe #	
				Initial		MW	MW	Salinity Meter	MLO2		Salinity Meter	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 31291 (31249) **Client:** AECOM **Project:** New Haven Harbor

Test Species: *A. punctulata* **Lot ID:** 99APARC090618 **Diluent:** ~~CLDS~~ Lab Salt

E3 12/20/18 MR

DAILY WATER QUALITIES											Ammonia pulled on 100% and Controls	
Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)				
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr		START	END
Controls	Lab											
	CLDS											
Composite #3	1 %	7.5	7.5	7.99	8.07	20	20	32	33			
	10 %	7.5	7.6	7.98	8.09	20	20	32	34			
	50 %	7.4	7.5	8.00	8.10	20	20	31	33		528-542	564-567
	100 %	6.8	7.4	8.01	8.11	20	20	30	31		~~339-342~~	~~364-367~~ ~~366-369~~
Composite #4	1 %	7.6	7.4	7.95	8.09	20	20	31	34			
	10 %	7.5	7.5	7.97	8.09	20	20	31	34			
	50 %	7.5	7.5	7.99	8.10	20	20	31	33		543-546	568-571 ~~368-371~~
	100 %	6.7	7.5	8.01	8.15	20	20	30	32		~~343-346~~	~~373-375~~
Initials		MW	MW	RECORD OF METERS USED				WQ Station #1			WQ Station #2	
Date		11/21/18	11/24/18	Exposure				DO Meter #	MLOZ		DO Meter #	
Time		1235	1155			0	~~24~~ 72	DO Probe #	160		DO Probe #	
Incub. Temp		20	20	Water Quality Station #		1	1	pH Meter #	MLOZ		pH Meter #	
Comments:				Thermometer or Probe #		MLOZ	MLOZ	pH Probe #	163		pH Probe #	
				Initial		MW	MW	Salinity Meter	MLOZ		Salinity Meter	

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #: 312~~48~~91 | **Client:** AECOM | **Project:** New Haven Harbor

Test Species: *A. punctulata* | **Lot ID:** 99AIPAR0~~0706~~090618 | **Diluent:** ~~CLDS~~ Lab Salt

NR 12/20/18

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L) 0 hr	Dissolved Oxygen (mg/L) END 72 hr	pH (SU) 0 hr	pH (SU) END 72 hr	Temperature (C) 0 hr	Temperature (C) END 72 hr	Salinity (ppt) 0 hr	Salinity (ppt) END 72 hr	Ammonia pulled on 100% and Controls START	Ammonia pulled on 100% and Controls END
Controls	Lab										
	CLDS										
Composite #5	1 %	7.6	7.5	7.93	7.99	20	20	31	32		
	10 %	7.5	7.5	7.93	8.07	20	20	32	33		
	50 %	7.4	7.3	7.85	8.11	20	20	32	33	547-550	
	100 %	6.4	7.0	7.74	8.14	20	20	32	32	~~347-350~~	~~378-379~~
Composite #6	1 %	7.5	7.5	7.91	8.09	20	20	32	33		~~372-375~~ 572-575
	10 %	7.5	7.5	7.98	8.09	20	20	32	33		
	50 %	7.3	7.4	7.93	8.10	20	20	31	32	551-554	~~376-379~~ 576-579
	100 %	7.6	7.4	7.88	8.12	20	21	30	30	~~351-354~~	~~380-383~~

Initials	MW	MW	RECORD OF METERS USED			WQ Station #1	WQ Station #2
Date	11/21/18	11/24/18	Exposure			DO Meter # MLOZ	DO Meter #
Time	1140	1210		0	~~24~~ 72	DO Probe # 160	DO Probe #
Incub. Temp	20	20	Water Quality Station #	1	1	pH Meter # MLOZ	pH Meter #
Comments:			Thermometer or Probe #	MLOZ	MLOZ	pH Probe # 163	pH Probe #
			Initial	MW	MW	Salinity Meter MLOZ	Salinity Meter

Arbacia Punctulata Survival / Development Assay

ESI Study: 31248 91@0°12/13 Assay Start: 11/21/18 1310

Client: AECOM Assay End: 0905 3 @3CFS 11/24

Count Date: 11/24/18 Initials: CFS

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Lab Control Water	92/90	74/72	80/78	87/86	64/63
CLDS Reference Water	—	—	—	—	—
Composite 1 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	80/78	89/86	88/86	66/64	100/98
10%	86/84	70/62	70/60	CFS ~~10~~ 80/73	CFS 11/24 68/69
50%	77/70	71/64	72/65	11/24 66/59	72/63
100%	96/84	85/76	79/70	74/67	63/57
Composite 2 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	83/80	80/76	90/86	83/80	88/86
10%	84/80	79/74	79/72	93/85	77/70
50%	89/82	72/59	75/62	77/66	89/73
100%	67/46	75/41	79/53	75/48	69/50
Composite 3 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	112/108	84/80	89/86	79/77	90/87
10%	96/94	80/77	81/78	82/75	85/80
50%	66/62	87/81	89/83	95/84	83/78
100%	70/61	78/69	69/63	74/68	72/65

Arbacia Punctulata Survival / Development Assay

ESI Study: 31248 91 @ 06 12/13 | Assay Start: 11/21/18 1310

Client: AECOM | Assay End: 0905 3 CFS 11/24

Count Date: 11/24/18 | Initials: CFS

Composite 4 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%	92/87	99/95	92/90	89/86	83/80
10%	77 ~~99/95~~ 72 CFS 11/24	81/75	86/81	CFS 11/24 82 3/77	78/73
50%	74/66	76/68	80/70	74/67	71/62
100%	69/37	163/91 CFS 11/27 (e10)	78/46	63/36	74/41
Composite 5 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	73/69	77/76	85/83	79/78	74/70
10%	74/71	94/90	84/81	81/76	99/94
50%	84/76	80/69	92/87	78/70	89/82
100%	75/64	82/68	85/70	84/73	72/59
Composite 6 Elutriate	**REP A Alive / Normal**	**REP B Alive / Normal**	**REP C Alive / Normal**	**REP D Alive / Normal**	**REP E Alive / Normal**
1%	76/74	78/77	85/83	80/77	71/70
10%	68/66	72/69	66/62	54/49	76/69
50%	85/78	60/57	70/64	81/74	71/66
100%	75/68	89/82	86/77	86/79	89/79

(e10) GRS 11/27 Test replicate added to twice.

Assay Review Checklist

DATE IN: 11/21/18

DATE DUE:

STUDY#: 31248 91 12/13

CLIENT: AECOM

PROJECT: New Haven

ASSAY: AP96AD

Project Paperwork Check for Completeness			
	Date	Initials	Comments
Day 0	11/21/18	GRS	Start
Day 1	11/22/18	CFS	Obs
Day 2	11/23/18	CFS	Obs
Day 3	11/24/18	CFS	End/Cts
Day 4	11/25/18	—	Cts —
Day 5	11/26/18	—	—
Day 6	11/27/18	CFS	Cts
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	11/16/18	JTP	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	11/27/18	GRS	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	
Water Quality Data Complete	↓	↓	
TRC Values & Bottle Numbers	↓	↓	
Daphnid Calculations Complete	NA	NA	
Weights Reported	↓	↓	
Assay Acceptability Review	11/27/18	GRS	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete	11/28/18	MR	
Statistical Analysis Reviewed	11/29/18	LP	
Data Acceptability Review	11/29/18	MR	
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

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Arbacia punctulata
Suspended Particulate Phase

Statistical Analysis Reports

Survival and Development

Mitigated Assays

CETIS Test Data Worksheet

Report Date: 28 Nov-18 11:17 (p 1 of 1)
Test Code/ID: 19-3186-2767/31291Ap-Comp1

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	21 Nov-18 13:10	**Species:**	Arbacia punctulata	**Sample Code:**	31246-118
End Date:	24 Nov-18 09:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Sample Station:**	Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	L	1	5	105	92	90	
0	L	2	6	105	74	72	
0	L	3	14	105	80	78	
0	L	4	17	105	87	86	
0	L	5	25	105	64	63	
1		1	1	105	80	78	
1		2	9	105	89	86	
1		3	15	105	88	86	
1		4	18	105	66	64	
1		5	24	105	100	98	
10		1	4	105	86	84	
10		2	8	105	70	62	
10		3	12	105	70	60	
10		4	16	105	80	73	
10		5	21	105	78	69	
50		1	2	105	77	70	
50		2	10	105	71	64	
50		3	13	105	72	65	
50		4	19	105	66	59	
50		5	22	105	72	63	
100		1	3	105	96	84	
100		2	7	105	85	76	
100		3	11	105	79	70	
100		4	20	105	74	67	
100		5	23	105	63	57	

CETIS Summary Report

Report Date: 29 Nov-18 10:43 (p 1 of 1)
Test Code: 31291Ap-Comp1 | 19-3186-2767

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	12-6433-1735	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 13:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-18 09:35	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	68h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	13-2445-7334	**Code:**	31246-118	**Client:**	AECOM
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:00	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
11-8946-8126	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
13-2835-2713	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.741	0.613	0.869	0.600	0.857	0.046	0.103	13.92%	0.00%
1		5	0.785	0.637	0.933	0.610	0.933	0.053	0.119	15.20%	-5.91%
10		5	0.663	0.549	0.776	0.571	0.800	0.041	0.092	13.80%	10.54%
50		5	0.611	0.565	0.658	0.562	0.667	0.017	0.038	6.17%	17.48%
100		5	0.674	0.555	0.794	0.543	0.800	0.043	0.096	14.24%	9.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.756	0.626	0.886	0.610	0.876	0.047	0.105	13.84%	0.00%
1		5	0.806	0.657	0.955	0.629	0.952	0.054	0.120	14.90%	-6.55%
10		5	0.731	0.650	0.813	0.667	0.819	0.029	0.065	8.95%	3.27%
50		5	0.682	0.636	0.728	0.629	0.733	0.017	0.037	5.46%	9.82%
100		5	0.756	0.611	0.902	0.600	0.914	0.052	0.117	15.49%	0.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.743	0.819	0.819	0.610	0.933
10		0.800	0.590	0.571	0.695	0.657
50		0.667	0.610	0.619	0.562	0.600
100		0.800	0.724	0.667	0.638	0.543

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.762	0.848	0.838	0.629	0.952
10		0.819	0.667	0.667	0.762	0.743
50		0.733	0.676	0.686	0.629	0.686
100		0.914	0.810	0.752	0.705	0.600

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	11-8946-8126	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:42	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	13-2445-7334	**Code:**	31246-118	**Client:**	AECOM
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:00	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	183666	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.82	0.7317	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.741	0.600	0.857	0.103	13.90%	0.0%	389/525	0.763	0.0%
1		5	0.785	0.610	0.933	0.119	15.20%	-5.91%	412/525	0.763	0.0%
10		5	0.663	0.571	0.800	0.092	13.80%	10.5%	348/525	0.663	13.1%
50		5	0.611	0.562	0.667	0.038	6.17%	17.5%	321/525	0.643	15.7%
100		5	0.674	0.543	0.800	0.096	14.20%	9.0%	354/525	0.643	15.7%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.743	0.819	0.819	0.610	0.933
10		0.800	0.590	0.571	0.695	0.657
50		0.667	0.610	0.619	0.562	0.600
100		0.800	0.724	0.667	0.638	0.543

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-2835-2713	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:42	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	13-2445-7334	**Code:**	31246-118	**Client:**	AECOM
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:00	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 1 Elutriate (V',W')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1923830	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.82	0.8177	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.781	0.0%
1		5	0.806	0.629	0.952	0.120	14.90%	-6.55%	423/525	0.781	0.0%
10		5	0.731	0.667	0.819	0.065	8.95%	3.27%	384/525	0.731	6.34%
50		5	0.682	0.629	0.733	0.037	5.46%	9.82%	358/525	0.719	7.93%
100		5	0.756	0.600	0.914	0.117	15.50%	0.0%	397/525	0.719	7.93%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.762	0.848	0.838	0.629	0.952
10		0.819	0.667	0.667	0.762	0.743
50		0.733	0.676	0.686	0.629	0.686
100		0.914	0.810	0.752	0.705	0.600

CETIS Test Data Worksheet

Report Date: 28 Nov-18 11:22 (p 1 of 1)
Test Code/ID: 09-0904-7811/31291Ap-Comp2

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	21 Nov-18 13:10	**Species:**	Arbacia punctulata	**Sample Code:**	31246-119
End Date:	24 Nov-18 09:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Sample Station:**	Comp 2 Elutriate (R',S')

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	L	1	1	105	92	90	
0	L	2	7	105	74	72	
0	L	3	13	105	80	78	
0	L	4	18	105	87	86	
0	L	5	25	105	64	63	
1		1	5	105	83	80	
1		2	8	105	80	76	
1		3	15	105	90	86	
1		4	20	105	83	80	
1		5	22	105	88	86	
10		1	4	105	84	80	
10		2	10	105	79	74	
10		3	12	105	79	72	
10		4	16	105	93	85	
10		5	21	105	77	70	
50		1	3	105	89	82	
50		2	9	105	72	59	
50		3	14	105	75	62	
50		4	17	105	77	66	
50		5	24	105	89	73	
100		1	2	105	67	46	
100		2	6	105	75	41	
100		3	11	105	79	53	
100		4	19	105	75	48	
100		5	23	105	69	50	

CETIS Summary Report

Report Date: 29 Nov-18 10:47 (p 1 of 1)
Test Code: 31291Ap-Comp2 | 09-0904-7811

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	12-6433-1735	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 13:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-18 09:35	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	68h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	06-6889-0463	**Code:**	31246-119	**Client:**	AECOM
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:00	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
13-9756-8643	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
08-4953-6377	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.741	0.613	0.869	0.600	0.857	0.046	0.103	13.92%	0.00%
1		5	0.777	0.726	0.828	0.724	0.819	0.019	0.041	5.31%	-4.88%
10		5	0.726	0.653	0.799	0.667	0.810	0.026	0.059	8.11%	2.06%
50		5	0.651	0.542	0.761	0.562	0.781	0.039	0.088	13.50%	12.08%
100		5	0.453	0.400	0.507	0.390	0.505	0.019	0.043	9.47%	38.82%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.756	0.626	0.886	0.610	0.876	0.047	0.105	13.84%	0.00%
1		5	0.808	0.759	0.856	0.762	0.857	0.017	0.039	4.82%	-6.80%
10		5	0.785	0.708	0.861	0.733	0.886	0.028	0.062	7.85%	-3.78%
50		5	0.766	0.671	0.861	0.686	0.848	0.034	0.077	10.01%	-1.26%
100		5	0.695	0.637	0.753	0.638	0.752	0.021	0.047	6.71%	8.06%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.762	0.724	0.819	0.762	0.819
10		0.762	0.705	0.686	0.810	0.667
50		0.781	0.562	0.590	0.629	0.695
100		0.438	0.390	0.505	0.457	0.476

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.790	0.762	0.857	0.790	0.838
10		0.800	0.752	0.752	0.886	0.733
50		0.848	0.686	0.714	0.733	0.848
100		0.638	0.714	0.752	0.714	0.657

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	13-9756-8643	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	06-6889-0463	**Code:**	31246-119	**Client:**	AECOM
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:00	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1337927	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.82	0.6228	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.741	0.600	0.857	0.103	13.90%	0.0%	389/525	0.759	0.0%
1		5	0.777	0.724	0.819	0.041	5.31%	-4.88%	408/525	0.759	0.0%
10		5	0.726	0.667	0.810	0.059	8.11%	2.06%	381/525	0.726	4.39%
50		5	0.651	0.562	0.781	0.088	13.50%	12.1%	342/525	0.651	14.2%
100		5	0.453	0.390	0.505	0.043	9.47%	38.8%	238/525	0.453	40.3%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.762	0.724	0.819	0.762	0.819
10		0.762	0.705	0.686	0.810	0.667
50		0.781	0.562	0.590	0.629	0.695
100		0.438	0.390	0.505	0.457	0.476

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	08-4953-6377	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	06-6889-0463	**Code:**	31246-119	**Client:**	AECOM
Sample Date:	21 Nov-18 09:00	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:00	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 2 Elutriate (R',S')		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1438000	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.82	0.6006	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.783	0.0%
1		5	0.808	0.762	0.857	0.039	4.82%	-6.8%	424/525	0.783	0.0%
10		5	0.785	0.733	0.886	0.062	7.85%	-3.78%	412/525	0.783	0.0%
50		5	0.766	0.686	0.848	0.077	10.00%	-1.26%	402/525	0.766	2.19%
100		5	0.695	0.638	0.752	0.047	6.71%	8.06%	365/525	0.695	11.2%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.790	0.762	0.857	0.790	0.838
10		0.800	0.752	0.752	0.886	0.733
50		0.848	0.686	0.714	0.733	0.848
100		0.638	0.714	0.752	0.714	0.657

CETIS Test Data Worksheet

Report Date: 28 Nov-18 11:24 (p 1 of 1)
Test Code/ID: 05-9153-3709/31191Ap-Comp3

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	21 Nov-18 13:10	**Species:**	Arbacia punctulata	**Sample Code:**	31246-120
End Date:	24 Nov-18 09:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Sample Station:**	Comp 3 Elutriate (US-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	L	1	5	105	92	90	
0	L	2	7	105	74	72	
0	L	3	15	105	80	78	
0	L	4	18	105	87	86	
0	L	5	22	105	64	63	
1		1	4	112	112	108	
1		2	10	105	84	80	
1		3	13	105	89	86	
1		4	20	105	79	77	
1		5	23	105	90	87	
10		1	3	105	96	94	
10		2	8	105	80	77	
10		3	14	105	81	78	
10		4	16	105	82	75	
10		5	24	105	85	80	
50		1	1	105	66	62	
50		2	9	105	87	81	
50		3	11	105	89	83	
50		4	19	105	95	84	
50		5	25	105	83	78	
100		1	2	105	70	61	
100		2	6	105	78	69	
100		3	12	105	69	63	
100		4	17	105	74	68	
100		5	21	105	72	65	

CETIS Summary Report

Report Date: 29 Nov-18 10:49 (p 1 of 1)
Test Code: 31191Ap-Comp3 | 05-9153-3709

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	12-6433-1735	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 13:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-18 09:35	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	68h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	14-8384-9999	**Code:**	31246-120	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
18-5118-7170	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
03-5573-7296	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
11-9407-5239	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.741	0.613	0.869	0.600	0.857	0.046	0.103	13.92%	0.00%
1		5	0.821	0.711	0.932	0.733	0.964	0.040	0.089	10.85%	-10.86%
10		5	0.770	0.680	0.859	0.714	0.895	0.032	0.072	9.40%	-3.86%
50		5	0.739	0.632	0.846	0.590	0.800	0.038	0.086	11.62%	0.26%
100		5	0.621	0.581	0.661	0.581	0.657	0.014	0.032	5.13%	16.20%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.756	0.626	0.886	0.610	0.876	0.047	0.105	13.84%	0.00%
1		5	0.851	0.736	0.967	0.752	1.000	0.042	0.093	10.92%	-12.59%
10		5	0.808	0.730	0.885	0.762	0.914	0.028	0.062	7.71%	-6.80%
50		5	0.800	0.670	0.930	0.629	0.905	0.047	0.104	13.04%	-5.79%
100		5	0.691	0.649	0.734	0.657	0.743	0.015	0.034	4.93%	8.56%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.964	0.762	0.819	0.733	0.829
10		0.895	0.733	0.743	0.714	0.762
50		0.590	0.771	0.790	0.800	0.743
100		0.581	0.657	0.600	0.648	0.619

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		1.000	0.800	0.848	0.752	0.857
10		0.914	0.762	0.771	0.781	0.810
50		0.629	0.829	0.848	0.905	0.790
100		0.667	0.743	0.657	0.705	0.686

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	18-5118-7170	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	14-8384-9999	**Code:**	31246-120	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1583558	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.48	2.82	0.2013	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.741	0.600	0.857	0.103	13.90%	0.0%	389/525	0.781	0.0%
1		5	0.821	0.733	0.964	0.089	10.80%	-10.9%	438/532	0.781	0.0%
10		5	0.770	0.714	0.895	0.072	9.40%	-3.86%	404/525	0.77	1.49%
50		5	0.739	0.590	0.800	0.086	11.60%	0.26%	388/525	0.739	5.39%
100		5	0.621	0.581	0.657	0.032	5.13%	16.2%	326/525	0.621	20.5%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.964	0.762	0.819	0.733	0.829
10		0.895	0.733	0.743	0.714	0.762
50		0.590	0.771	0.790	0.800	0.743
100		0.581	0.657	0.600	0.648	0.619

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	03-5573-7296	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	14-8384-9999	**Code:**	31246-120	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 3 Elutriate (US-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1487057	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.795	0.0%
1		4	0.814	0.752	0.857	0.048	5.93%	-7.68%	342/420	0.795	0.0%
10		5	0.808	0.762	0.914	0.062	7.71%	-6.8%	424/525	0.795	0.0%
50		5	0.800	0.629	0.905	0.104	13.00%	-5.79%	420/525	0.795	0.0%
100		5	0.691	0.657	0.743	0.034	4.93%	8.56%	363/525	0.691	13.0%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		Outlier	0.800	0.848	0.752	0.857
10		0.914	0.762	0.771	0.781	0.810
50		0.629	0.829	0.848	0.905	0.790
100		0.667	0.743	0.657	0.705	0.686

CETIS Test Data Worksheet

Report Date: 28 Nov-18 11:26 (p 1 of 1)
Test Code/ID: 10-7275-5478/31191Ap-Comp4

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	21 Nov-18 13:10	**Species:**	Arbacia punctulata	**Sample Code:**	31246-121
End Date:	24 Nov-18 09:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Sample Station:**	Comp 4 Elutriate (DS-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	L	1	4	105	92	90	
0	L	2	7	105	74	72	
0	L	3	14	105	80	78	
0	L	4	19	105	87	86	
0	L	5	24	105	64	63	
1		1	5	105	92	87	
1		2	9	105	99	95	
1		3	15	105	92	90	
1		4	20	105	89	86	
1		5	21	105	83	80	
10		1	2	105	77	72	
10		2	8	105	81	75	
10		3	12	105	86	81	
10		4	16	105	83	77	
10		5	23	105	78	73	
50		1	3	105	74	66	
50		2	10	105	76	68	
50		3	13	105	80	70	
50		4	18	105	74	67	
50		5	25	105	71	62	
100		1	1	105	69	37	
100		2	6	163	163	91	
100		3	11	105	78	46	
100		4	17	105	63	36	
100		5	22	105	74	41	

CETIS Summary Report

Report Date: 29 Nov-18 10:50 (p 1 of 1)
Test Code: 31191Ap-Comp4 | 10-7275-5478

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	12-6433-1735	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 13:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-18 09:35	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	68h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	04-8504-2808	**Code:**	31246-121	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
01-7934-0258	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
10-1038-6604	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
14-9609-1099	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.741	0.613	0.869	0.600	0.857	0.046	0.103	13.92%	0.00%
1		5	0.834	0.769	0.899	0.762	0.905	0.023	0.052	6.28%	-12.60%
10		5	0.720	0.678	0.762	0.686	0.771	0.015	0.034	4.73%	2.83%
50		5	0.634	0.599	0.669	0.590	0.667	0.013	0.028	4.45%	14.40%
100		5	0.416	0.307	0.525	0.343	0.558	0.039	0.088	21.07%	43.80%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.756	0.626	0.886	0.610	0.876	0.047	0.105	13.84%	0.00%
1		5	0.867	0.798	0.935	0.790	0.943	0.025	0.055	6.36%	-14.61%
10		5	0.771	0.728	0.815	0.733	0.819	0.016	0.035	4.54%	-2.02%
50		5	0.714	0.675	0.754	0.676	0.762	0.014	0.032	4.42%	5.54%
100		5	0.741	0.549	0.933	0.600	1.000	0.069	0.154	20.83%	2.02%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.829	0.905	0.857	0.819	0.762
10		0.686	0.714	0.771	0.733	0.695
50		0.629	0.648	0.667	0.638	0.590
100		0.352	0.558	0.438	0.343	0.390

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.876	0.943	0.876	0.848	0.790
10		0.733	0.771	0.819	0.790	0.743
50		0.705	0.724	0.762	0.705	0.676
100		0.657	1.000	0.743	0.600	0.705

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	01-7934-0258	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-8504-2808	**Code:**	31246-121	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1197130	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.24	2.82	0.4723	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.741	0.600	0.857	0.103	13.90%	0.0%	389/525	0.788	0.0%
1		5	0.834	0.762	0.905	0.052	6.28%	-12.6%	438/525	0.788	0.0%
10		5	0.720	0.686	0.771	0.034	4.73%	2.83%	378/525	0.72	8.59%
50		5	0.634	0.590	0.667	0.028	4.45%	14.4%	333/525	0.634	19.5%
100		5	0.416	0.343	0.558	0.088	21.10%	43.8%	251/583	0.416	47.1%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.829	0.905	0.857	0.819	0.762
10		0.686	0.714	0.771	0.733	0.695
50		0.629	0.648	0.667	0.638	0.590
100		0.352	0.558	0.438	0.343	0.390

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	10-1038-6604	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-8504-2808	**Code:**	31246-121	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1376295	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.64	2.82	2.8E-04	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.811	0.0%
1		5	0.867	0.790	0.943	0.055	6.36%	-14.6%	455/525	0.811	0.0%
10		5	0.771	0.733	0.819	0.035	4.54%	-2.02%	405/525	0.771	4.93%
50		5	0.714	0.676	0.762	0.032	4.42%	5.54%	375/525	0.728	10.3%
100		5	0.741	0.600	1.000	0.154	20.80%	2.02%	447/583	0.728	10.3%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.876	0.943	0.876	0.848	0.790
10		0.733	0.771	0.819	0.790	0.743
50		0.705	0.724	0.762	0.705	0.676
100		0.657	1.000	0.743	0.600	0.705

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	14-9609-1099	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-8504-2808	**Code:**	31246-121	**Client:**	AECOM
Sample Date:	21 Nov-18 09:39	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 09:39	**Source:**	New Haven Harbor 2018		
Sample Age:	4h	**Station:**	Comp 4 Elutriate (DS-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1172322	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.811	0.0%
1		5	0.867	0.790	0.943	0.055	6.36%	-14.6%	455/525	0.811	0.0%
10		5	0.771	0.733	0.819	0.035	4.54%	-2.02%	405/525	0.771	4.93%
50		5	0.714	0.676	0.762	0.032	4.42%	5.54%	375/525	0.714	12.0%
100		4	0.676	0.600	0.743	0.062	9.13%	10.6%	284/420	0.676	16.7%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.876	0.943	0.876	0.848	0.790
10		0.733	0.771	0.819	0.790	0.743
50		0.705	0.724	0.762	0.705	0.676
100		0.657	Outlier	0.743	0.600	0.705

CETIS Test Data Worksheet

Report Date: 19 Dec-18 12:33 (p 1 of 1)
Test Code/ID: 10-8867-6865/31191Ap-Comp5

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date: 21 Nov-18 13:10 **Species:** Arbacia punctulata **Sample Code:** 31246-122
End Date: 24 Nov-18 09:35 **Protocol:** EPA/600/R-95/136 (1995) **Sample Source:** New Haven Harbor 2018
Sample Date: 21 Nov-18 10:30 **Material:** Elutriate Solution **Sample Station:** Comp 5 Elutriate (TB-1,-2)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	L	1	5	105	92	90	
0	L	2	6	105	74	72	
0	L	3	13	105	80	78	
0	L	4	20	105	87	86	
0	L	5	22	105	64	63	
1		1	3	105	73	69	
1		2	7	105	77	76	
1		3	14	105	85	83	
1		4	17	105	79	78	
1		5	21	105	74	70	
10		1	1	105	74	71	
10		2	9	105	94	90	
10		3	11	105	84	81	
10		4	16	105	81	76	
10		5	25	105	99	94	
50		1	2	105	84	76	
50		2	8	105	80	69	
50		3	15	105	92	87	
50		4	18	105	78	70	
50		5	24	105	89	82	
100		1	4	105	75	64	
100		2	10	105	82	68	
100		3	12	105	85	70	
100		4	19	105	84	73	
100		5	23	105	72	59	

CETIS Summary Report

Report Date: 29 Nov-18 10:52 (p 1 of 1)
Test Code: 31191Ap-Comp5 | 10-8867-6865

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	12-6433-1735	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 13:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-18 09:35	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	68h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	04-7993-6295	**Code:**	31246-122	**Client:**	AECOM
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 10:30	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
12-9348-4704	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
00-0356-4508	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.741	0.613	0.869	0.600	0.857	0.046	0.103	13.92%	0.00%
1		5	0.716	0.648	0.785	0.657	0.790	0.025	0.055	7.72%	3.34%
10		5	0.785	0.672	0.898	0.676	0.895	0.041	0.091	11.60%	-5.91%
50		5	0.731	0.640	0.823	0.657	0.829	0.033	0.074	10.06%	1.29%
100		5	0.636	0.572	0.701	0.562	0.695	0.023	0.052	8.16%	14.14%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.756	0.626	0.886	0.610	0.876	0.047	0.105	13.84%	0.00%
1		5	0.739	0.683	0.796	0.695	0.810	0.020	0.046	6.15%	2.27%
10		5	0.823	0.704	0.942	0.705	0.943	0.043	0.096	11.65%	-8.82%
50		5	0.806	0.736	0.875	0.743	0.876	0.025	0.056	6.97%	-6.55%
100		5	0.758	0.690	0.826	0.686	0.810	0.025	0.055	7.25%	-0.25%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.657	0.724	0.790	0.743	0.667
10		0.676	0.857	0.771	0.724	0.895
50		0.724	0.657	0.829	0.667	0.781
100		0.610	0.648	0.667	0.695	0.562

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.695	0.733	0.810	0.752	0.705
10		0.705	0.895	0.800	0.771	0.943
50		0.800	0.762	0.876	0.743	0.848
100		0.714	0.781	0.810	0.800	0.686

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	12-9348-4704	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7993-6295	**Code:**	31246-122	**Client:**	AECOM
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 10:30	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1680358	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.82	1.0000	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.741	0.600	0.857	0.103	13.90%	0.0%	389/525	0.747	0.0%
1		5	0.716	0.657	0.790	0.055	7.72%	3.34%	376/525	0.747	0.0%
10		5	0.785	0.676	0.895	0.091	11.60%	-5.91%	412/525	0.747	0.0%
50		5	0.731	0.657	0.829	0.074	10.10%	1.29%	384/525	0.731	2.12%
100		5	0.636	0.562	0.695	0.052	8.16%	14.1%	334/525	0.636	14.9%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.657	0.724	0.790	0.743	0.667
10		0.676	0.857	0.771	0.724	0.895
50		0.724	0.657	0.829	0.667	0.781
100		0.610	0.648	0.667	0.695	0.562

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	00-0356-4508	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	04-7993-6295	**Code:**	31246-122	**Client:**	AECOM
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 10:30	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 5 Elutriate (TB-1,-2)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	29971	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.07	2.82	0.7789	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.781	0.0%
1		5	0.739	0.695	0.810	0.046	6.15%	2.27%	388/525	0.781	0.0%
10		5	0.823	0.705	0.943	0.096	11.60%	-8.82%	432/525	0.781	0.0%
50		5	0.806	0.743	0.876	0.056	6.97%	-6.55%	423/525	0.781	0.0%
100		5	0.758	0.686	0.810	0.055	7.25%	-0.25%	398/525	0.758	2.93%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.695	0.733	0.810	0.752	0.705
10		0.705	0.895	0.800	0.771	0.943
50		0.800	0.762	0.876	0.743	0.848
100		0.714	0.781	0.810	0.800	0.686

CETIS Test Data Worksheet

Report Date: 28 Nov-18 11:30 (p 1 of 1)
Test Code/ID: 18-1606-1086/31191Ap-Comp6

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	21 Nov-18 13:10	**Species:**	Arbacia punctulata	**Sample Code:**	31246-123
End Date:	24 Nov-18 09:35	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Sample Station:**	Comp 6 Elutriate (CAD-1,-2,-3)

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	L	1	1	105	92	90	
0	L	2	8	105	74	72	
0	L	3	12	105	80	78	
0	L	4	19	105	87	86	
0	L	5	23	105	64	63	
1		1	3	105	76	74	
1		2	10	105	78	77	
1		3	11	105	85	83	
1		4	18	105	80	77	
1		5	25	105	71	70	
10		1	5	105	68	66	
10		2	7	105	72	69	
10		3	15	105	66	62	
10		4	17	105	54	49	
10		5	21	105	76	69	
50		1	4	105	85	78	
50		2	6	105	60	57	
50		3	13	105	70	64	
50		4	16	105	81	74	
50		5	24	105	71	66	
100		1	2	105	75	68	
100		2	9	105	89	82	
100		3	14	105	86	77	
100		4	20	105	86	79	
100		5	22	105	89	79	

CETIS Summary Report

Report Date: 29 Nov-18 10:53 (p 1 of 1)
Test Code: 31191Ap-Comp6 | 18-1606-1086

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	12-6433-1735	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 13:10	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	24 Nov-18 09:35	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	68h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	06-7274-4728	**Code:**	31246-123	**Client:**	AECOM
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 10:30	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
09-4681-0209	Proportion Normal	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓
17-2040-7663	Proportion Survived	Linear Interpolation (ICPIN)	EC50	>100	n/a	n/a	<1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.741	0.613	0.869	0.600	0.857	0.046	0.103	13.92%	0.00%
1		5	0.726	0.669	0.782	0.667	0.790	0.020	0.045	6.25%	2.06%
10		5	0.600	0.501	0.699	0.467	0.657	0.036	0.079	13.23%	19.02%
50		5	0.646	0.547	0.744	0.543	0.743	0.035	0.079	12.27%	12.85%
100		5	0.733	0.670	0.796	0.648	0.781	0.023	0.051	6.93%	1.03%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	L	5	0.756	0.626	0.886	0.610	0.876	0.047	0.105	13.84%	0.00%
1		5	0.743	0.682	0.804	0.676	0.810	0.022	0.049	6.60%	1.76%
10		5	0.640	0.542	0.738	0.514	0.724	0.035	0.079	12.38%	15.37%
50		5	0.699	0.582	0.816	0.571	0.810	0.042	0.094	13.44%	7.56%
100		5	0.810	0.741	0.878	0.714	0.848	0.025	0.055	6.81%	-7.05%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.705	0.733	0.790	0.733	0.667
10		0.629	0.657	0.590	0.467	0.657
50		0.743	0.543	0.610	0.705	0.629
100		0.648	0.781	0.733	0.752	0.752

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.724	0.743	0.810	0.762	0.676
10		0.648	0.686	0.629	0.514	0.724
50		0.810	0.571	0.667	0.771	0.676
100		0.714	0.848	0.819	0.819	0.848

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	09-4681-0209	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	06-7274-4728	**Code:**	31246-123	**Client:**	AECOM
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 10:30	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	274037	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.82	0.7106	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	L	5	0.741	0.600	0.857	0.103	13.90%	0.0%	389/525	0.741	0.0%
1		5	0.726	0.667	0.790	0.045	6.25%	2.06%	381/525	0.726	2.06%
10		5	0.600	0.467	0.657	0.079	13.20%	19.0%	315/525	0.66	11.0%
50		5	0.646	0.543	0.743	0.079	12.30%	12.9%	339/525	0.66	11.0%
100		5	0.733	0.648	0.781	0.051	6.93%	1.03%	385/525	0.66	11.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.857	0.686	0.743	0.819	0.600
1		0.705	0.733	0.790	0.733	0.667
10		0.629	0.657	0.590	0.467	0.657
50		0.743	0.543	0.610	0.705	0.629
100		0.648	0.781	0.733	0.752	0.752

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Analysis ID:	17-2040-7663	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	29 Nov-18 10:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Sample ID:	06-7274-4728	**Code:**	31246-123	**Client:**	AECOM
Sample Date:	21 Nov-18 10:30	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	21 Nov-18 10:30	**Source:**	New Haven Harbor 2018		
Sample Age:	3h	**Station:**	Comp 6 Elutriate (CAD-1,-2,-3)		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	821222	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.82	0.8996	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Survived Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	L	5	0.756	0.610	0.876	0.105	13.80%	0.0%	397/525	0.756	0.0%
1		5	0.743	0.676	0.810	0.049	6.60%	1.76%	390/525	0.743	1.76%
10		5	0.640	0.514	0.724	0.079	12.40%	15.4%	336/525	0.716	5.29%
50		5	0.699	0.571	0.810	0.094	13.40%	7.56%	367/525	0.716	5.29%
100		5	0.810	0.714	0.848	0.055	6.81%	-7.05%	425/525	0.716	5.29%

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	L	0.876	0.705	0.762	0.829	0.610
1		0.724	0.743	0.810	0.762	0.676
10		0.648	0.686	0.629	0.514	0.724
50		0.810	0.571	0.667	0.771	0.676
100		0.714	0.848	0.819	0.819	0.848

Suspended Particulate Phase

Failed Assays

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31248	**Incubator ID:**	2 0
Project:	New Haven	**Client:**	AECOM

Composites 1,2,6

Summary of Test Conditions

Exposure	Species Used
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☒ Silverside Minnow *(Menidia. beryllina)* ☐ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	Temperature:
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (E3) JTP 12/07/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20 ± 1 °C (E3) JTP 12/07/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	Solution Volume
(Check box for all that apply) ☐ 250 mL beaker ☐ 600 mL beaker ☒ other 200 mL Tumbler	(Check box for all that apply) ☒ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/25/18 **Initial** GRS

CS ~~ARO~~ MB AR0102418

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: MENIDIA BERYLLINA

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date: 10-16-18 Receipt date: ____

Lot number: 101318 MB Strain: ____

Brood origination: CAPE COD MA

II. Water Quality

Temperature: 25 °C Salinity: ~28 ppt D.O.: — ppm

pH: 7.8 su Hardness: — ppm Alkalinity: — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ✓ YCT ____ Other Ewcas. Shrimp Diet

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: EST / Enthalpy # of Organisms: 2800+

Carrier: ____ Date shipped: 10-24-18

Biologist: [signature]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven
ASSAY: MB96SPP
SPECIES: *M. beryllina*

BALANCE: Ohaus Discovery Balance Model DV215CD
Serial #: 1124024313

Date / Intials:	10/25/18 GRS GRS
Rep	
1	0.00546
2	0.00414
3	0.00636
4	0.00218
5	0.00336
6	0.00176
7	0.00147
8	0.00214
9	0.00202
10	0.00286
11	0.00232
12	0.00345
13	0.00338
14	0.00585
15	0.00222
16	0.00169
17	0.00114
18	0.00174
19	0.00105
20	0.00333
Mean Weight (g):	0.00290
Test Volume (L):	0.2
Loading Rate(g/L):	0.14480

COPY

PREPARATION of DILUTIONS

STUDY: 31248 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: A.bahia and M. beryllina **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: CLDS		Composite #: comp1		Composite #: comp2		Composite #: comp6	
	Elutriate ID: 31242-009		Elutriate ID: 31246-101		Elutriate ID: 31246-~~102~~ 103		Elutriate ID: 31246-111	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab			0	2,000	0	2,000	0	2,000
(RW)			0		0		0	
1 %			20		20		200	
10 %			200		200		200	
50 %			1,000		1,000		1,000	
100 %			2,000		2,000		2,000	
Initial			MW		MW		LAG	
Date			10/25/18		10/25/18		10/25/18	
Time			1505		1550		1655	
	Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)		Salinity Adjustment Record (if necessary)	
Initial Salinity (ppt)	27.4		24.9		24.8		24.2	
Vol of Elutriate (mL)	50,000		8,000		8,000		5,500	
Grams of Salt (g)	149.8		47.0		47.9		36.7	
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity	27.9		28.1		27.9		29.9	
Date & Initial	10/25/18	MW	10/25/18	MW	10/25/18	MW	10/25/18	CFS

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MBAR010-2418	**Sample:**	Controls	**Diluent:**	CLDS

PO GRS 10/26 Project ended due to failure in Lab Control

SURVIVAL - Controls

Conc	Rep	HOURS 0	1	24	48	72	96
LAB (control water)	A	10	10	10			
	B	10	10	8			
	C	10	10	8			
	D	10	10	8			
	E	10	10	9			
Initials		CFS	LAG	GRS			
Date		10/25/18	10/25	10/26/18			
Time		1720	1820	1100			

Conc	Rep	HOURS 0	1	24	48	72	96
CLDS (Reference Water)	A	10	10	9			
	B	10	10	10			
	C	10	10	10			
	D	10	10	9			
	E	10	10	10			

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
-200, -213	

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
LAB	A	7.7	7.0				7.96	7.88				20	20				31	32								
(RW)	A	8.5	7.2				7.91	7.91				20	20				29	30								
Initials		MT	MW																							
Date		10/25	10/26																							
Time		155	100																							
Incub. Temp		21	21																							
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MT																								

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1			
Thermometer or Probe #	ML02	ML02			
Initial	MT	MW			

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	
DO Probe #	160	DO Probe #	
pH Meter #	ML02	pH Meter #	
pH Probe #	163	pH Probe #	
Salinity Meter #	ML02	Salinity Meter #	

(ETO) GRS 10/26 Test ended early due to failure in Lab Control

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MBAR0102418	**Sample:**	Composite #1	**Diluent:**	CLDS

SURVIVAL - Composite # 1

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				
10 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				
Initials		CFS	LAG				
Date		10/25/18	10/25				
Time		1730	1830				

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				
100 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
-201-204	

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.1	7.7				7.91	7.85				20	20				29	29								
10 %	A	8.2	7.8				7.88	7.90				20	20				29	29								
50 %	A	8.1	7.8				7.82	8.02				20	20				29	29								
100 %	A	6.7	7.1				7.68	8.10				21	20				29	30								
Initials		MT	MW																							
Date		10/25	10/26																							
Time		1515	1015																							
Incub. Temp		21	21																							

FEEDING: *Artemia nauplii* (A-5175)

Fed By: MT

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1			
Thermometer or Probe #	MLO2	MLO2			
Initial	MT	MW			

Water Quality Station #1		Water Quality Station #2	
DO Meter #	MLO2	DO Meter #	
DO Probe #	160	DO Probe #	
pH Meter #	MLO2	pH Meter #	
pH Probe #	163	pH Probe #	
Salinity Meter #	MLO2	Salinity Meter #	

(10) Test ended ~~only~~ early due to failure in Lab Control (GR 10/26)

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MBAR0102418	**Sample:**	Composite #2	**Diluent:**	CLDS

SURVIVAL - Composite # ~~1~~ 2 (3) CFS 10/25

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				
10 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				
Initials		CFS	MW				
Date		10/25/18	10/25/18				
Time		1745 CFS	1815 MW				

(3) MW 10/25

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				
100 %	A	10	10				
	B	10	10				
	C	10	10				
	D	10	10				
	E	10	10				

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
-205-208	

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.1	7.4				7.87	7.83				20	20				29	29								
10 %	A	8.2	7.5				7.84	7.93				19	20				29	29								
50 %	A	7.5	7.2				7.74	8.07				18	19				29	29								
100 %	A	8.0	7.3				7.78	8.13				19	19				29	29								
Initials		MT	MW																							
Date		10/25	10/26																							
Time		1555	1020																							
Incub. Temp		21 (3) MW 10/25	21																							

FEEDING: *Artemia nauplii* (A - 0179)

Fed By: MT

RECORD OF METERS USED					
Exposure (Hours)	0	24	48	72	96
Water Quality Station #	1	1			
Thermometer or Probe #	ML02	ML02			
Initial	MT	MW			

Water Quality Station #1		Water Quality Station #2	
DO Meter #	ML02	DO Meter #	
DO Probe #	160	DO Probe #	
pH Meter #	ML02	pH Meter #	
pH Probe #	163	pH Probe #	
Salinity Meter #	ML02	Salinity Meter #	

(e10) GRS 10/26 Test ended early due to failure in Lab Control

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31248	**Project:**	New Haven	**Client:**	AECOM	**Incubator ID:**	
Test Species:	*Menidia beryllina*	**Lot ID:**	08MBAR0102418	**Sample:**	Composite #6	**Diluent:**	CLDS

SURVIVAL - Composite # XG CFS 10/25

Conc	Rep	HOURS 0	1	24	48	72	96
1 %	A	10					
	B	10					
	C	10					
	D	10					
	E	10					
10 %	A	10					
	B	10					
	C	10					
	D	10					
	E	10					
Initials		CFS					
Date		10/25/18					
Time		1800					

Conc	Rep	HOURS 0	1	24	42	72	96
50 %	A	10					
	B	10					
	C	10					
	D	10					
	E	10					
100 %	A	10					
	B	10					
	C	10					
	D	10					
	E	10					

Comments:

Ammonia pulled on 100% and Controls

** If complete mortality is observed in a treatment prior to 96 hours, pull bottles for Ammonia **

Start	End
-209-212	

NOTES

Dissolved Oxygen	> 40% saturation
Temperature	20 ±1 C
Salinity	30 ppt ± 2 ppt
pH	7.8 "0.5

DAILY WATER QUALITIES

Conc	Rep	Dissolved Oxygen (mg/L) 0	24	48	72	96	pH (SU) 0	24	48	72	96	Temperature (C) 0	24	48	72	96	Salinity (ppt) 0	24	48	72	96	Modified Salinity (if required) 0	24	48	72	96
1 %	A	8.1	7.6				7.85	7.90				21	19				29	29								
10 %	A	8.1	7.4				7.88	7.96				21	19				29	29								
50 %	A	7.9	7.4				7.95	8.04				20	19				30	30								
100 %	A	7.4	7.1				7.97	8.10				20	19				31	31								
Initials		MT	MW																							
Date		10/25	10/26																							
Time		1855	1030																							
Incub. Temp		21	21																							
FEEDING: *Artemia nauplii* (A-5179)																										
Fed By:		MT																								

RECORD OF METERS USED						
Exposure (Hours)	0	24	48	72	96	
Water Quality Station #	1	1				
Thermometer or Probe #	MLO2	MLO2				
Initial	MT	MW				

Water Quality Station #1		Water Quality Station #2	
DO Meter #	MLO2	DO Meter #	
DO Probe #	160	DO Probe #	
pH Meter #	MLO2	pH Meter #	
pH Probe #	163	pH Probe #	
Salinity Meter #	MLO2	Salinity Meter #	

Assay Review Checklist

DATE IN: _____ **STUDY#:** 31248

DATE DUE: _____ **CLIENT:** AECOM

_____ **PROJECT:** New Haven

ASSAY: Mb96AD

Project Paperwork Check for Completeness			
	Date	**Initials**	**Comments**
Day 0	10/25/18	CFS	
Day 1	10/26/18	GRS	Test ended early due to failure in lab control
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			
Day 8			

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete			
Sample Receipt Complete			
Organism Culture Sheet(s)			
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete			
TRC Values & Bottle Numbers			
Daphnid Calculations Complete			
Weights Reported			
Assay Acceptability Review			

Technical Report Review	Date	Initials	Comments
Statistical Analysis Complete			
Statistical Analysis Reviewed			
Data Acceptability Review			
Supporting Chemistry Report			
Draft Report			
QA Audit/Review Complete			
Final Report Reviewed			
Final Report Printed - PDF			
Executive Summary / Chems Sent			
Report E-mailed / Faxed			
Report Logged Out / Invoice Sent			
Report Scanned to Archive			

P:\GENERAL PROJECTS\FORMS\LABFORMS\$ Assay Review Checklist.wpd

SUSPENDED PARTICULATE PHASE ACUTE BIOASSAY

Study #:	31291	**Incubator ID:**	112
Project:	New Haven	**Client:**	AECOM

Summary of Test Conditions

Exposure	**Species Used**
Test Mode: Static, non-renewal **Length of Assay:** *A.bahia and M. beryllina:* 96 hours *Arbacia :* 48- 72 hours	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☐ Silverside Minnow *(Menidia. beryllina)* ☑ Sea Urchin *(Arbacia)*

Water Quality Parameters

Salinity:	**Temperature:**
A.bahia and M. beryllina : 30 ± 2 ppt *Arbacia:* 30 ± ~~3~~ 2 ppt (ES) MR 11/6/18	*A.bahia and M. beryllina:* 20 ± 2 °C *Arbacia:* ~~16 ± 2 °C~~ 20 ± 1 °C (ES) MR 11/6/18
pH: 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark

Test Chamber	**Solution Volume**
(Check box for all that apply) ☑ 250 mL beaker ☐ 600 mL beaker ☐ other _____	(Check box for all that apply) ☑ 200 mL/replicate ☐ 400 mL/replicate ☐ other _____

Replicate Information

A.bahia and M. beryllina:	*Arbacia:*
• 5 Reps per treatment • 10 organisms per chamber	• 5 Reps per treatment • 20-30 embryos/mL

Cleaning	**Treatments**
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed and rinsed with deionized water (EPA 2002).	Laboratory Control, disposal site reference water, undiluted elutriate solution (100%) and diluted elutriate solutions (concentrations 50%, 10%, 1%)

Feeding

A.bahia:	*M. beryllina:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii* - 0.2mL/day	Fed newly hatched, <24 hour old *Artemia nauplii* after 48 hrs - 0.2mL/day

Arbacia: NONE

Date: 10/31/18 Initial CFS

99 Ap AR0080118

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Arbacia punctulata

Source: Lab reared _____ Hatchery reared – Field collected ✓

Hatch date mixed ages Receipt date 08/01/18

Lot number 080118AP Strain WILD

Brood origination NC

II. Water Quality

Temperature 16 °C Salinity 30 ppt D.O. SAT ppm

pH 8.2 su Hardness – ppm Alkalinity – ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating _____ Flow through ✓ Static renewal _____

DIET: Flake food _____ Phytoplankton _____ Trout chow _____

Artemia _____ Rotifers _____ YCT _____ Other MACROALGAE

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms 50

Carrier: FEDEX / PICKUP Date shipped 08/01/18

Biologist: Steve Lentsha

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

PREPARATION of DILUTIONS

STUDY: 31291 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: A. punctulata **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 1		Composite #: 2		Composite #: 3		Composite #: 4	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1,000	0	1,000	0	1,000	0	1,000
(RW)	0	↓	0	↓	0	↓	0	↓
1 %	10	↓	10	↓	10	↓	10	↓
10 %	100	↓	100	↓	100	↓	100	↓
50 %	500	↓	500	↓	500	↓	500	↓
100 %	1,000	↓	1,000	↓	1,000	↓	1,000	↓
Initial	CFS		CFS		MW		CFS	
Date	10/31/18		10/31/18		10/31/18		10/31/18	
Time	1515		1530		1605		1545	
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	~~28~~ 25.6 (BG 12/13)		~~28~~ 25.5		~~28~~ 25.3		~~28~~ 25.3 (BG 12/13)	
Vol of Elutriate (mL)								
Grams of Salt (g)								
Lot number of Salt	A- 5117		A- 5117		A- 5117		A- 5117	
Final Salinity								
Date & Initial								

E10 BG 12/13

(E10) BG 12/13 salinity adjustment overlooked.
(E11) BG 12/13 salinity adjustment was done at the same time for all three assays w/ is based in the mesoba pigment.

PREPARATION of DILUTIONS

STUDY: 31291 **CLIENT:** AECOM **DILUENT:** CLDS

SPECIES: A. punctulata **TEST:** Suspended Particulate Phase (SPP)

Diluent:	Composite #: 5		Composite #: 6		Composite #: CLDS		Composite #:	
	Elutriate ID:		Elutriate ID:		Elutriate ID:		Elutriate ID:	
Concentration	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)	Vol Eff (mL)	Final Vol (mL)
Lab	0	1,000	0	1,000				
(RW)	0	↓	0	↓				
1 %	10	↓	10	↓				
10 %	100	↓	100	↓				
50 %	500	↓	500	↓				
100 %	1,000	↓	1,000	↓				
Initial	MW		MW					
Date	10/31/18		10/31/18					
Time	1555		1550					
	Salinity Adjustment Record (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)		**Salinity Adjustment Record** (if necessary)	
Initial Salinity (ppt)	~~28~~ 26.2 BE 11/1/13		~~28~~ BE 11/1/13					
Vol of Elutriate (mL)			EW TK 12/13 initial salinity and adjustment record enclosed					
Grams of Salt (g)			EW TK 12/13 salinity adjustment recorded on mixing paperwork					
Lot number of Salt	A- 5117		A- 5117		A-		A-	
Final Salinity								
Date & Initial								

EMBRYO WORKSHEET

DATE: 10/31/18 ESI STUDY: 31291

CLIENT: AECOM PROJECT: New Haven

Eggs Collected @: 1617 Pre-assay fertilization check: 92% ANALYST: CFS

Sperm Collected @: 1632 *A mated subsample of egg+sperm must achieve ≥90% fertilization in order to be used in testing.*

Egg Stock Suspension Count:

Take 1mL of egg stock suspension and using a glass graduated cylinder dilute with seawater to a final volume of 100 mL. Count a subsample of the diluted suspension to get an estimate of the egg concentration. The diluted suspension should have 40 - 50 eggs/mL, (which would represent an egg concentration of 4,000 - 5,000 in the stock suspension.)

Egg Count (per mL) of diluted suspension: 4300

Sperm Stock Suspension Count:

Once added to the egg stock, the final sperm concentration should be $1x10^5$ - $1x10^7$ in solution E.

1. Hemocytometer Count (E): 120
2. Hemocytometer Count (E): 125

Average Count (E): 122 $X10^4$ = spm solution E = 1.22 CFS 10/31 4.88×10^6

Sperm Concentrations:

Solution E X 40 = Solution B = 4.88×10^7

Solution E X 20 = Solution C = 2.44×10^7

Solution E X 5 = Solution D = 6.1×10^6

Sperm Count (per mL): 1.22×10^6

mL of Eggs to Add: 175mL

mL of Sperm to Add: 30mL Gametes mixed @: 1725

Gametes must be mixed within 1 hour of collection.

Calculated Embryo Stock Concentration (per mL): 0.854 CFS 10/31 ~~0.692mL~~

Calculated Embryo Stock (mL) needed per chamber: 1.17mL

The test concentration should be 20 - 30 embryos per mL.

Add calculated amount of embryo stock to a surrogate chamber, gently mix, then count a 5mL aliquot.

Embryo Concentration Check: 124 *If the check concentration is acceptable, then proceed with embryo addition to the test.*

Volume Embryo Stock (mL) added to test solutions: 0.692mL Embryos Added to Test Solutions @: 1820

INITIAL COUNTS:	Embryos/ 5 mL
SURROGATE A	143
SURROGATE B	137
SURROGATE C	135
Mean:	138

Organism Lot ID: 99ApAR0080118

Mean per mL: 28

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99ApAR0080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)		Ammonia pulled on 100% and Controls	
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	START	END
Controls	Lab	7.7	7.3	7.94	7.95	21	20.4	30	30.4	-345	-423
	CLDS	8.5	7.3	7.98	7.98	21	20.4	29	29.2	-346	-424
Composite #1	1 %	8.4	7.3	7.89	7.99	21	20.4	29	29.3		
	10 %	8.2	7.3	7.94	8.00	21	20.4	29	29.4		
	50 %	7.9	7.3	7.90	8.02	21	20.3	28	29.2		
	100 %	7.3	7.3	7.81	8.02	21	20.5	28	27.7	-350	-428
Composite #2	1 %	8.3	7.3	7.95	7.97	20	19.9	29	29.~~0~~2	CFS 11/03	
	10 %	8.2	7.3	7.95	8.01	20	20.5	29	29.3		
	50 %	7.6	7.3	7.91	8.03	20	20.4	29	29.0		
	100 %	6.3	7.2	7.85	8.06	20	20.4	28	28.4	-354	-432

Initials	MT	CFS	**RECORD OF METERS USED**			WQ Station #1		WQ Station #2	
Date	10/31/18	11/03	**Exposure**			DO Meter #		DO Meter #	ML01
Time	1615	1150		0	24	DO Probe #		DO Probe #	96
Incub. Temp	21	21	Water Quality Station #	2	2	pH Meter #		pH Meter #	ML01
Comments:			Thermometer or Probe #	ML01	ML01	pH Probe #		pH Probe #	158
			Initial	MT	CFS	Salinity Meter		Salinity Meter	ML01/158

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99ApARO080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)		Ammonia pulled on 100% and Controls	
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	START	END
Composite #3	1 %	8.2	7.3	7.93	8.03	20	20.5	29	29.6		
	10 %	8.3	7.3	7.94	8.03	19	20.5	30	29.6		
	50 %	7.6	7.3	7.89	8.03	20	20.5	29	30.1		
	100 %	6.2	7.3	7.79	8.07	21	20.5	28	27.9	-358	-436
Composite #4	1 %	8.3	7.2	7.94	8.04	20	20.5	29	30.4		
	10 %	8.3	7.3	7.95	8.04	20	20.5	29	29.8		
	50 %	7.6	7.3	7.92	8.05	20	20.6	28	29.2		
	100 %	6.4	7.2	7.91	8.08	21	20.5	28	28.2	-362	-440
Initials		MT	CFS	RECORD OF METERS USED				WQ Station #1		WQ Station #2	
Date		10/31/18	11/03	Exposure				DO Meter #		DO Meter #	ML01
Time		1605	1200			0	24	DO Probe #		DO Probe #	96
Incub. Temp		21	21	Water Quality Station #		2	2	pH Meter #		pH Meter #	ML01
Comments:				Thermometer or Probe #		ML01	ML01	pH Probe #		pH Probe #	158
				Initial		MT	CFS	Salinity Meter		Salinity Meter	ML01/159

SUSPENDED PHASE ACUTE BIOASSAY DATA SUMMARY

Study #:	31291	**Client:**	AECOM	**Project:**	New Haven
Test Species:	*A. punctulata*	**Lot ID:**	99ApAR0080118	**Diluent:**	CLDS

DAILY WATER QUALITIES

Concentration		Dissolved Oxygen (mg/L)		pH (SU)		Temperature (C)		Salinity (ppt)		Ammonia pulled on 100% and Controls	
		0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	0 hr	END 72 hr	START	END
Composite #5	1 %	8.1	7.3	7.91	8.03	20	20.4	29	29.4		
	10 %	8.0	7.3	7.94	8.04	20	20.4	29	29.2		
	50 %	7.4	7.3	7.89	8.06	20	20.4	28	29.8		
	100 %	6.4	7.4	7.83	8.11	20	20.5	28	28.9	-366	-444
Composite #6	1 %	8.2	7.3	7.92	8.04	20	~~8.0~~ 20.6	29	29.1		
	10 %	8.1	7.3	7.94	8.04	20	@3:25 11/03 20.6	29	29.1		
	50 %	7.4	7.3	7.93	8.05	21	20.4	28	29.4		
	100 %	6.4	7.2	7.93	8.08	22	20.5	28	27.9	-370	-448
Initials		MT	CFS	**RECORD OF METERS USED**				WQ Station #1		WQ Station #2	
Date		10/31/18	11/03	**Exposure**				DO Meter #		DO Meter #	ML01
Time		1555	1205			0	24	DO Probe #		DO Probe #	96
Incub. Temp		21	21	Water Quality Station #		2	2	pH Meter #		pH Meter #	ML01
Comments:				Thermometer or Probe #		ML01	ML01	pH Probe #		pH Probe #	158
				Initial		MT	CFS	Salinity Meter		Salinity Meter	ML01/159

Arbacia Punctulata Survival / Development Assay

ESI Study: 31291 Assay Start: 10/31/18 1820

Client: AECOM Assay End: 11/03/18 1130

Count Date: 11/05/18 Initials: GRS

CIO GRS 11/03

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Lab Control Water	70/66	60/56	57/51	77/71	76/69
CLDS Reference Water					

Composite 1 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					

Composite 2 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					

CIO GRS 11/03

Test Lab Control did not meet passing criteria, due to this the rest of the test was not counted. The test will be rerun at a later date.

Arbacia Punctulata Survival / Development Assay

ESI Study: 31291 Assay Start: 10/31/18 1820

Client: AECOM Assay End: 11/03/18 1136

Count Date: _____ Initials: _____

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Composite 3 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					
Composite 4 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					

Arbacia Punctulata Survival / Development Assay

ESI Study: 31291 Assay Start: 10/31/18 1820

Client: AECOM Assay End: 11/03/18 1130

Count Date: _____ Initials: _____

Treatment	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
Composite 5 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					
Composite 6 Elutriate	REP A Alive / Normal	REP B Alive / Normal	REP C Alive / Normal	REP D Alive / Normal	REP E Alive / Normal
1%					
10%					
50%					
100%					

CETIS Test Data Worksheet

Report Date: 29 Nov-18 10:36 (p 1 of 1)
Test Code/ID: 04-5451-2098/31291Ap-Failed

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Start Date:	31 Oct-18 18:20	**Species:**	Arbacia punctulata	**Sample Code:**	31246-112
End Date:	03 Nov-18 11:30	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Sample Station:**	Comp 1 Elutriate (V',W')

Conc-%	Code	Rep	Pos	# Exposed	# Survived	# Normal	Notes
0	LS	1	5	138	70	66	
0	LS	2	8	138	60	56	
0	LS	3	14	138	57	51	
0	LS	4	23	138	77	71	
0	LS	5	28	138	76	69	
0	R	1	4	138			
0	R	2	7	138			
0	R	3	18	138			
0	R	4	22	138			
0	R	5	27	138			
1		1	6	138			
1		2	11	138			
1		3	17	138			
1		4	19	138			
1		5	25	138			
10		1	3	138			
10		2	9	138			
10		3	15	138			
10		4	24	138			
10		5	30	138			
50		1	2	138			
50		2	12	138			
50		3	16	138			
50		4	21	138			
50		5	29	138			
100		1	1	138			
100		2	10	138			
100		3	13	138			
100		4	20	138			
100		5	26	138			

CETIS Summary Report

Report Date: 07 Nov-18 10:53 (p 1 of 1)
Test Code: 31291Ap-Failed | 04-5451-2098

Echinoid Embryo-Larval Survival and Development Test — **EnviroSystems, Inc.**

Batch ID:	11-6207-0335	**Test Type:**	Survival-Development	**Analyst:**	Nancy Roka
Start Date:	31 Oct-18 18:20	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	CLDS Reference Site
Ending Date:	03 Nov-18 11:30	**Species:**	Arbacia punctulata	**Brine:**	Not Applicable
Duration:	65h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample ID:	12-3991-1381	**Code:**	31246-112	**Client:**	AECOM
Sample Date:	31 Oct-18 10:40	**Material:**	Elutriate Solution	**Project:**	Dredged Sediment Evaluation
Receipt Date:	31 Oct-18 10:40	**Source:**	New Haven Harbor 2018		
Sample Age:	8h	**Station:**	Comp 1 Elutriate (V',W')		

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU	✓
10-3544-6999	Proportion Normal	Linear Interpolation (ICPIN)	EC50	100	100	100	1	✓
04-9379-9706	Proportion Survived	Linear Interpolation (ICPIN)	EC50	100	100	100	1	✓

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.454	0.376	0.532	0.370	0.514	0.028	0.063	13.86%	0.00%

Proportion Survived Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LS	5	0.493	0.411	0.575	0.413	0.558	0.030	0.066	13.44%	0.00%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.478	0.406	0.370	0.514	0.500
0	R					
1						
10						
50						
100						

Proportion Survived Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LS	0.507	0.435	0.413	0.558	0.551
0	R					
1						
10						
50						
100						

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Unmitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions an
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) a
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

				Ammonia						L	M	N	O	P	Q	R	S
Sample ID	**Hour**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (EC)	pH (SU)	salinity (ppt)	Tot NH3	Temp (EK)	I	pKa	FNH3
***A. bahia* Start**																	
Laboratory Control	0	31248-200	ND		0.0030	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.96	31	0.1	293.15	0.64	9.319	0.0296
CLDS Reference	0	31248-213	ND		0.0027	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.91	29	0.1	293.15	0.6	9.314	0.0267
Comp 1 (V', W') 1%	0	31248-201	0.26		0.0069	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.91	29	0.26	293.15	0.6	9.314	0.0267
Comp 1 (V', W') 10%	0	31248-202	3.1		0.0775	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.88	29	3.1	293.15	0.6	9.314	0.025
Comp 1 (V', W') 50%	0	31248-203	16		0.3493	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.82	29	16	293.15	0.6	9.314	0.0218
Comp 1 (V', W') 100%	0	31248-204	33		0.5251	0.2	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.68	29	33	293.15	0.6	9.314	0.0159
Comp 2 (R', S') 1%	0	31248-205	0.29		0.0071	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.87	29	0.29	293.15	0.6	9.314	0.0244
Comp 2 (R', S') 10%	0	31248-206	3.1		0.0658	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	19	7.84	29	3.1	292.15	0.6	9.314	0.0212
Comp 2 (R', S') 50%	0	31248-207	17		0.2676	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	18	7.74	29	17	291.15	0.6	9.314	0.0157
Comp 2 (R', S') 100%	0	31248-208	35		0.6489	0.2	mg/L as N	10/25/18 1500	10/26/18 1145	19	7.78	29	35	292.15	0.6	9.314	0.0185
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	0	31248-209	0.2		0.0050	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	21	7.85	29	0.2	294.15	0.6	9.314	0.0251
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	0	31248-210	1.1		0.0296	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	21	7.88	29	1.1	294.15	0.6	9.314	0.0269
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	0	31248-211	5.9		0.1715	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.95	30	5.9	293.15	0.62	9.317	0.0291
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	0	31248-212	12		0.3627	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.97	31	12	293.15	0.64	9.319	0.0302
Laboratory Control	0	31248-226	ND		0.0031	0.1	mg/L as N	10/26/18 1530	10/28/18	21.0	7.95	30.4	0.1	294.15	0.62	9.317	0.0312
CLDS Reference	0	31248-227	ND		0.0025	0.1	mg/L as N	10/26/18 1530	10/28/18	20.0	7.87	27.6	0.1	293.15	0.57	9.311	0.0246
Comp 3 (US-1, US-2) 1%	0	31248-228	0.28		0.0065	0.1	mg/L as N	10/26/18 1530	10/28/18	19.5	7.86	28.0	0.28	292.65	0.57	9.312	0.0232
Comp 3 (US-1, US-2) 10%	0	31248-229	3		0.0669	0.1	mg/L as N	10/26/18 1530	10/28/18	19.9	7.83	28.0	3	293.05	0.57	9.312	0.0223
Comp 3 (US-1, US-2) 50%	0	31248-230	16		0.2932	0.1	mg/L as N	10/26/18 1530	10/28/18	20.0	7.74	28.0	16	293.15	0.57	9.312	0.0183
Comp 3 (US-1, US-2) 100%	0	31248-231	34		0.5609	0.2	mg/L as N	10/26/18 1530	10/28/18	19.8	7.70	28.0	34	292.95	0.57	9.312	0.0165
Comp 4 (DS-1, DS-2) 1%	0	31248-232	0.26		0.0050	0.1	mg/L as N	10/26/18 1530	10/28/18	18.2	7.82	27.5	0.26	291.35	0.56	9.31	0.0193
Comp 4 (DS-1, DS-2) 10%	0	31248-233	2.6		0.0598	0.1	mg/L as N	10/26/18 1530	10/28/18	19.1	7.87	28.0	2.6	292.25	0.57	9.312	0.023
Comp 4 (DS-1, DS-2) 50%	0	31248-234	14.3		0.2892	0.1	mg/L as N	10/26/18 1530	10/28/18	19.5	7.80	28.1	14.3	292.65	0.58	9.312	0.0202
Comp 4 (DS-1, DS-2) 100%	0	31248-235	27		0.5251	0.1	mg/L as N	10/26/18 1530	10/28/18	19.9	7.77	28.2	27	293.05	0.58	9.312	0.0194
Comp 5 (TB-1, TB-2) 1%	0	31248-236	0.34		0.0082	0.1	mg/L as N	10/26/18 1530	10/28/18	19.1	7.89	27.8	0.34	292.25	0.57	9.311	0.0241
Comp 5 (TB-1, TB-2) 10%	0	31248-237	3.5		0.0725	0.1	mg/L as N	10/26/18 1530	10/28/18	19.2	7.82	28.0	3.5	292.35	0.57	9.312	0.0207
Comp 5 (TB-1, TB-2) 50%	0	31248-238	16		0.2217	0.1	mg/L as N	10/26/18 1530	10/28/18	19.3	7.64	28.3	16	292.45	0.58	9.312	0.0139
Comp 5 (TB-1, TB-2) 100%	0	31248-239	37		0.4888	0.2	mg/L as N	10/26/18 1530	10/28/18	19.3	7.62	28.7	37	292.45	0.59	9.313	0.0132
***M. beryllina* Start**																	
Laboratory Control	0	31248-226	ND		0.0034	0.1	mg/L as N	10/26/18 1530	10/28/18	23	7.92	30	0.1	296.15	0.62	9.317	0.0338
CLDS Reference	0	31248-227	ND		0.0024	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.89	28	0.1	292.15	0.57	9.312	0.0239
Comp 1 (V', W') 1%	0	31248-214	0.42		0.0100	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.89	28	0.42	292.15	0.57	9.312	0.0239
Comp 1 (V', W') 10%	0	31248-215	3.3		0.0737	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.86	28	3.3	292.15	0.57	9.312	0.0223
Comp 1 (V', W') 50%	0	31248-216	17		0.3099	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.77	28	17	292.15	0.57	9.312	0.0182
Comp 1 (V', W') 100%	0	31248-217	35		0.5381	0.2	mg/L as N	10/26/18 1530	10/28/18	21	7.63	28	35	294.15	0.57	9.312	0.0154
Comp 2 (R', S') 1%	0	31248-218	0.3		0.0072	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.89	28	0.3	292.15	0.57	9.312	0.0239
Comp 2 (R', S') 10%	0	31248-219	2.9		0.0677	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.88	28	2.9	292.15	0.57	9.312	0.0234
Comp 2 (R', S') 50%	0	31248-220	16		0.3265	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.82	28	16	292.15	0.57	9.312	0.0204
Comp 2 (R', S') 100%	0	31248-221	33		0.6048	0.2	mg/L as N	10/26/18 1530	10/28/18	20	7.74	28	33	293.15	0.57	9.312	0.0183
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	0	31248-222	ND		0.0026	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.93	28	0.1	292.15	0.57	9.312	0.0261
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	0	31248-223	1.1		0.0275	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.91	28	1.1	292.15	0.57	9.312	0.025
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	0	31248-224	5.6		0.1565	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.96	28	5.6	292.15	0.57	9.312	0.028
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	0	31248-225	12		0.3508	0.1	mg/L as N	10/26/18 1530	10/28/18	19	7.98	28	12	292.15	0.57	9.312	0.0292
Laboratory Control	0	31248-226	ND		0.0035	0.1	mg/L as N	10/26/18 1530	10/28/18	22.0	7.97	30.3	0.1	295.15	0.62	9.317	0.0351
CLDS Reference	0	31248-227	ND		0.0025	0.1	mg/L as N	10/26/18 1530	10/28/18	20.0	7.88	27.5	0.1	293.15	0.56	9.31	0.0252
Comp 3 (US-1, US-2) 1%	0	31248-228	0.28		0.0069	0.1	mg/L as N	10/26/18 1530	10/28/18	20.4	7.86	28	0.28	293.55	0.57	9.312	0.0247

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Unmitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions an
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) a
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

			Ammonia							L	M	N	O	P	Q	R	S
Sample ID	**Hour**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (EC)	pH (SU)	salinity (ppt)	Tot NH3	Temp (EK)	I	pKa	FNH3
Comp 3 (US-1, US-2) 10%	0	31248-229	3		0.0659	0.1	mg/L as N	10/26/18 1530	10/28/18	20.0	7.82	28	3	293.15	0.57	9.312	0.022
Comp 3 (US-1, US-2) 50%	0	31248-230	16		0.2909	0.1	mg/L as N	10/26/18 1530	10/28/18	20.2	7.73	28	16	293.35	0.57	9.312	0.0182
Comp 3 (US-1, US-2) 100%	0	31248-231	34		0.5453	0.2	mg/L as N	10/26/18 1530	10/28/18	19.8	7.69	29	34	292.95	0.6	9.314	0.016
Comp 4 (DS-1, DS-2) 1%	0	31248-232	0.26		0.0052	0.1	mg/L as N	10/26/18 1530	10/28/18	18.4	7.83	27.5	0.26	291.55	0.56	9.31	0.02
Comp 4 (DS-1, DS-2) 10%	0	31248-233	2.6		0.0581	0.1	mg/L as N	10/26/18 1530	10/28/18	19.3	7.85	27.9	2.6	292.45	0.57	9.311	0.0223
Comp 4 (DS-1, DS-2) 50%	0	31248-234	14.3		0.2914	0.1	mg/L as N	10/26/18 1530	10/28/18	19.6	7.80	28.0	14.3	292.75	0.57	9.312	0.0204
Comp 4 (DS-1, DS-2) 100%	0	31248-235	27		0.5174	0.1	mg/L as N	10/26/18 1530	10/28/18	20.0	7.76	28.1	27	293.15	0.58	9.312	0.0192
Comp 5 (TB-1, TB-2) 1%	0	31248-236	0.34		0.0083	0.1	mg/L as N	10/26/18 1530	10/28/18	18.9	7.90	27.9	0.34	292.05	0.57	9.311	0.0243
Comp 5 (TB-1, TB-2) 10%	0	31248-237	3.5		0.0736	0.1	mg/L as N	10/26/18 1530	10/28/18	19.1	7.83	28.0	3.5	292.25	0.57	9.312	0.021
Comp 5 (TB-1, TB-2) 50%	0	31248-238	16		0.2410	0.1	mg/L as N	10/26/18 1530	10/28/18	19.2	7.68	28.3	16	292.35	0.58	9.312	0.0151
Comp 5 (TB-1, TB-2) 100%	0	31248-239	37		0.5314	0.2	mg/L as N	10/26/18 1530	10/28/18	19.2	7.66	28.7	37	292.35	0.59	9.313	0.0144
***A. punctulata* Start**																	
Laboratory Control	0	31248-200	ND		0.0031	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.98	31	0.1	293.15	0.64	9.319	0.0309
CLDS Reference	0	31248-213	ND		0.0025	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	19	7.91	29	0.1	292.15	0.6	9.314	0.0249
Comp 1 (V', W') 1%	0	31248-201	0.26		0.0065	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	19	7.91	29	0.26	292.15	0.6	9.314	0.0249
Comp 1 (V', W') 10%	0	31248-202	3.1		0.0724	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.85	29	3.1	293.15	0.6	9.314	0.0234
Comp 1 (V', W') 50%	0	31248-203	16		0.2983	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.75	29	16	293.15	0.6	9.314	0.0186
Comp 1 (V', W') 100%	0	31248-204	33		0.5650	0.2	mg/L as N	10/25/18 1500	10/26/18 1145	21	7.68	29	33	294.15	0.6	9.314	0.0171
Comp 2 (R', S') 1%	0	31248-205	0.29		0.0071	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.87	29	0.29	293.15	0.6	9.314	0.0244
Comp 2 (R', S') 10%	0	31248-206	3.1		0.0724	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.85	29	3.1	293.15	0.6	9.314	0.0234
Comp 2 (R', S') 50%	0	31248-207	17		0.3391	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.78	29	17	293.15	0.6	9.314	0.0199
Comp 2 (R', S') 100%	0	31248-208	35		0.6236	0.2	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.73	29	35	293.15	0.6	9.314	0.0178
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	0	31248-209	0.2		0.0051	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	21	7.86	29	0.2	294.15	0.6	9.314	0.0257
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	0	31248-210	1.1		0.0309	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	21	7.90	29	1.1	294.15	0.6	9.314	0.0281
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	0	31248-211	5.9		0.1844	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	21	7.95	30	5.9	294.15	0.62	9.317	0.0312
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	0	31248-212	12		0.3627	0.1	mg/L as N	10/25/18 1500	10/26/18 1145	20	7.97	31	12	293.15	0.64	9.319	0.0302
Laboratory Control	0	31248-243	ND		0.0025	0.1	mg/L as N	10/27/18 1000	10/28/18	19.0	7.92	31	0.1	292.15	0.64	9.319	0.0251
CLDS Reference	0	31248-244	ND		0.0026	0.1	mg/L as N	10/27/18 1000	10/28/18	18.5	7.95	30	0.1	291.65	0.62	9.317	0.0261
Comp 3 (US-1, US-2) 100%	0	31248-240	34		0.6400	0.2	mg/L as N	10/27/18 1000	10/28/18	19.9	7.76	30	34	293.05	0.62	9.317	0.0188
Comp 4 (DS-1, DS-2) 100%	0	31248-241	30		0.7342	0.2	mg/L as N	10/27/18 1000	10/28/18	20.1	7.87	30	30	293.25	0.62	9.317	0.0245
Comp 5 (TB-1, TB-2) 100%	0	31248-242	36		0.6004	0.2	mg/L as N	10/27/18 1000	10/28/18	20.1	7.70	30	36	293.25	0.62	9.317	0.0167

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Unmitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions an
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) a
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

Sample ID	Hour	ESI Code	Ammonia Total	Qual	Unionized	QLimit	Units	Sampled	Analyzed	L temp (EC)	M pH (SU)	N salinity (ppt)	O Tot NH3	P Temp (EK)	Q I	R pKa	S FNH3
***A. bahia* End**																	
Laboratory Control	95	31248-260	1.6		0.0280	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.76	31	1.6	292.15	0.64	9.319	0.0175
CLDS Reference	95	31248-261	1.6		0.0267	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.74	32	1.6	292.15	0.66	9.321	0.0167
Comp 1 (V', W') 1%	95	31248-262	2.4		0.0349	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.68	32	2.4	292.15	0.66	9.321	0.0145
Comp 1 (V', W') 10%	95	31248-263	4		0.0835	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.84	32	4	292.15	0.66	9.321	0.0209
Comp 1 (V', W') 50%	95	31248-264	10		0.3992	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.13	32	10	292.15	0.66	9.321	0.0399
Comp 1 (V', W') 100%	95	31248-265	17		0.9850	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.30	32	17	292.15	0.66	9.321	0.0579
Comp 2 (R', S') 1%	95	31248-266	2.3		0.0462	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.82	31	2.3	292.15	0.64	9.319	0.0201
Comp 2 (R', S') 10%	95	31248-267	3.8		0.1022	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.95	31	3.8	292.15	0.64	9.319	0.0269
Comp 2 (R', S') 50%	95	31248-268	12		0.5620	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.20	31	12	292.15	0.64	9.319	0.0468
Comp 2 (R', S') 100%	95	31248-269	19		1.2067	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.34	31	19	292.15	0.64	9.319	0.0635
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	95	31248-270	2.6		0.0496	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.80	32	2.6	292.15	0.66	9.321	0.0191
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	95	31248-271	3.1		0.0724	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	7.89	32	3.1	292.15	0.66	9.321	0.0234
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	95	31248-272	4.8		0.1668	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.07	33	4.8	292.15	0.68	9.324	0.0348
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	95	31248-273	6		0.3135	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.25	31	6	292.15	0.64	9.319	0.0522
Laboratory Control	94	31248-316	1.4		0.0227	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.73	33	1.4	292.15	0.68	9.324	0.0162
CLDS Reference	94	31248-317	1.5		0.0226	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.69	30	1.5	292.15	0.62	9.317	0.015
Comp 3 (US-1, US-2) 1%	94	31248-318	1.6		0.0338	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.84	30	1.6	292.15	0.62	9.317	0.0211
Comp 3 (US-1, US-2) 10%	94	31248-319	4.2		0.1129	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.95	31	4.2	292.15	0.64	9.319	0.0269
Comp 3 (US-1, US-2) 50%	94	31248-320	14		0.6556	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	8.20	31	14	292.15	0.64	9.319	0.0468
Comp 3 (US-1, US-2) 100%	94	31248-321	25		1.5126	0.2	mg/L as N	10/30/18 1530	11/02/18 1000	19	8.32	32	25	292.15	0.66	9.321	0.0605
Comp 4 (DS-1, DS-2) 1%	94	31248-322	1.5		0.0339	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.87	30	1.5	292.15	0.62	9.317	0.0226
Comp 4 (DS-1, DS-2) 10%	94	31248-323	3.5		0.0941	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.95	31	3.5	292.15	0.64	9.319	0.0269
Comp 4 (DS-1, DS-2) 50%	94	31248-324	12		0.5871	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	8.22	31	12	292.15	0.64	9.319	0.0489
Comp 4 (DS-1, DS-2) 100%	94	31248-325	22		1.3973	0.2	mg/L as N	10/30/18 1530	11/02/18 1000	19	8.34	31	22	292.15	0.64	9.319	0.0635
Comp 5 (TB-1, TB-2) 1%	94	31248-326	2		0.0384	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	19	7.80	31	2	292.15	0.64	9.319	0.0192
Comp 5 (TB-1, TB-2) 10%	94	31248-327	4.4		0.1028	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	18	7.92	31	4.4	291.15	0.64	9.319	0.0234
Comp 5 (TB-1, TB-2) 50%	94	31248-328	16		0.7292	0.1	mg/L as N	10/30/18 1530	11/02/18 1000	18	8.22	31	16	291.15	0.64	9.319	0.0456
Comp 5 (TB-1, TB-2) 100%	94	31248-329	28		1.7311	0.2	mg/L as N	10/30/18 1530	11/02/18 1000	19	8.33	32	28	292.15	0.66	9.321	0.0618
***M. beryllina* End**																	
Laboratory Control	94	31248-280	1.6		0.0276	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.75	30	1.6	292.15	0.62	9.317	0.0172
CLDS Reference	94	31248-281	1.7		0.0326	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.80	31	1.7	292.15	0.64	9.319	0.0192
Comp 1 (V', W') 1%	94	31248-282	2.3		0.0352	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.70	31	2.3	292.15	0.64	9.319	0.0153
Comp 1 (V', W') 10%	94	31248-283	4.5		0.1106	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.91	31	4.5	292.15	0.64	9.319	0.0246
Comp 1 (V', W') 50%	94	31248-284	13		0.5826	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	8.18	31	13	292.15	0.64	9.319	0.0448
Comp 1 (V', W') 100%	72	31248-274	25		1.4881	0.2	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.31	31	25	292.15	0.64	9.319	0.0595
Comp 1 (V', W') 100%	94	No survival															
Comp 2 (R', S') 1%	94	31248-286	2		0.0000	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.81	30					
Comp 2 (R', S') 10%	94	31248-287	4.2		0.1032	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.91	31	4.2	292.15	0.64	9.319	0.0246
Comp 2 (R', S') 50%	94	31248-288	14		0.6274	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	8.18	31	14	292.15	0.64	9.319	0.0448
Comp 2 (R', S') 100%	72	31248-275	25		1.3421	0.2	mg/L as N	10/29/18 1500	10/30/18 1345	19	8.26	30	25	292.15	0.62	9.317	0.0537
Comp 2 (R', S') 100%	94	No survival															
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	94	31248-290	2.1		0.0412	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.81	31	2.1	292.15	0.64	9.319	0.0196
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	94	31248-291	2.6		0.0611	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.89	31	2.6	292.15	0.64	9.319	0.0235
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	94	31248-292	5.5		0.1933	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	8.07	31	5.5	292.15	0.64	9.319	0.0351
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	94	31248-293	9.3		0.4332	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	8.20	32	9.3	292.15	0.66	9.321	0.0466
Laboratory Control	92	31248-298	1.4		0.0283	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	7.86	33	1.4	291.15	0.68	9.324	0.0202

STUDY: 31248
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Unmitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions an
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) a
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

			Ammonia							L	M	N	O	P	Q	R	S
Sample ID	**Hour**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (EC)	pH (SU)	salinity (ppt)	Tot NH3	Temp (EK)	I	pKa	FNH3
CLDS Reference	92	31248-299	1.3		0.0243	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	7.82	31	1.3	291.15	0.64	9.319	0.0187
Comp 3 (US-1, US-2) 1%	92	31248-300	2.1		0.0446	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	7.88	32	2.1	291.15	0.66	9.321	0.0212
Comp 3 (US-1, US-2) 10%	92	31248-301	3.9		0.1061	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	7.99	32	3.9	291.15	0.66	9.321	0.0272
Comp 3 (US-1, US-2) 50%	92	31248-302	12		0.5177	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	8.20	33	12	291.15	0.68	9.324	0.0431
Comp 3 (US-1, US-2) 100%	72	31248-330	24		1.1307	0.2	mg/L as N	10/29/18 1700	10/30/18 1345	17	8.27	32	24	290.15	0.66	9.321	0.0471
Comp 3 (US-1, US-2) 100%	92	No survival															
Comp 4 (DS-1, DS-2) 1%	92	31248-304	2.2		0.0470	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	7.85	32	2.2	292.15	0.66	9.321	0.0214
Comp 4 (DS-1, DS-2) 10%	92	31248-305	3.7		0.1106	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	8.00	32	3.7	292.15	0.66	9.321	0.0299
Comp 4 (DS-1, DS-2) 50%	92	31248-306	11		0.5124	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	19	8.20	32	11	292.15	0.66	9.321	0.0466
Comp 4 (DS-1, DS-2) 100%	92	31248-307	20		1.0800	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	8.30	32	20	291.15	0.66	9.321	0.054
Comp 5 (TB-1, TB-2) 1%	92	31248-308	2		0.0427	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	7.88	31	2	291.15	0.64	9.319	0.0214
Comp 5 (TB-1, TB-2) 10%	92	31248-309	4.2		0.1195	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	8.01	32	4.2	291.15	0.66	9.321	0.0284
Comp 5 (TB-1, TB-2) 50%	92	31248-310	13		0.5892	0.1	mg/L as N	10/30/18 1500	11/02/18 1000	18	8.22	32	13	291.15	0.66	9.321	0.0453
Comp 5 (TB-1, TB-2) 100%	48	31248-245	29		1.1396	0.5	mg/L as N	10/28/18 1730	10/29/18 1130	15	8.25	31	29	288.15	0.64	9.319	0.0393
Comp 5 (TB-1, TB-2) 100%	92	No survival															
***A. punctulata* End**																	
Laboratory Control	90	31248-246	0.36		0.0130	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.02	32	0.36	294.15	0.66	9.321	0.0361
CLDS Reference	90	31248-247	0.3		0.0119	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.06	31	0.3	294.15	0.64	9.319	0.0397
Comp 1 (V', W') 1%	90	31248-248	1.5		0.0576	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.04	29	1.5	294.15	0.6	9.314	0.0384
Comp 1 (V', W') 10%	90	31248-249	2.9		0.1514	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.18	29	2.9	294.15	0.6	9.314	0.0522
Comp 1 (V', W') 50%	90	31248-250	14		1.0548	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.35	29	14	294.15	0.6	9.314	0.0753
Comp 1 (V', W') 100%	90	31248-251	31		2.7659	0.2	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.43	29	31	294.15	0.6	9.314	0.0892
Comp 2 (R', S') 1%	90	31248-252	0.77		0.0323	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.08	29	0.77	294.15	0.6	9.314	0.0419
Comp 2 (R', S') 10%	90	31248-253	3.4		0.1775	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.18	29	3.4	294.15	0.6	9.314	0.0522
Comp 2 (R', S') 50%	90	31248-254	15		1.1302	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.35	29	15	294.15	0.6	9.314	0.0753
Comp 2 (R', S') 100%	90	31248-255	29		2.5337	0.2	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.42	29	29	294.15	0.6	9.314	0.0874
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	90	31248-256	1.4		0.0587	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.08	29	1.4	294.15	0.6	9.314	0.0419
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	90	31248-257	1.5		0.0687	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.12	29	1.5	294.15	0.6	9.314	0.0458
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	90	31248-258	5.3		0.3275	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.26	30	5.3	294.15	0.62	9.317	0.0618
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	90	31248-259	11		0.8202	0.1	mg/L as N	10/29/18 1500	10/30/18 1345	21	8.35	31	11	294.15	0.64	9.319	0.0746
Laboratory Control	74	31248-331	0.9		0.0328	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	20.4	8.04	30.3	0.9	293.55	0.62	9.317	0.0365
CLDS Reference	74	31248-332	0.14		0.0057	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	20.5	8.08	28.1	0.14	293.65	0.58	9.312	0.0406
Comp 3 (US-1, US-2) 1%	74	31248-333	1.5		0.0571	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	20	8.07	29.6	1.5	293.15	0.61	9.316	0.038
Comp 3 (US-1, US-2) 10%	74	31248-334	3.9		0.1705	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	19.9	8.14	31.2	3.9	293.05	0.64	9.319	0.0437
Comp 3 (US-1, US-2) 50%	74	31248-335	11		0.6101	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	19.9	8.25	31.7	11	293.05	0.65	9.321	0.0555
Comp 3 (US-1, US-2) 100%	74	31248-336	20		1.2963	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	19.9	8.32	30.9	20	293.05	0.64	9.319	0.0648
Comp 4 (DS-1, DS-2) 1%	74	31248-337	0.4		0.0183	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	20.1	8.15	29.4	0.4	293.25	0.6	9.315	0.0458
Comp 4 (DS-1, DS-2) 10%	74	31248-338	2.6		0.1277	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	20.2	8.18	29.9	2.6	293.35	0.61	9.316	0.0491
Comp 4 (DS-1, DS-2) 50%	74	31248-339	11		0.7121	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	20.1	8.31	29.7	11	293.25	0.61	9.316	0.0647
Comp 4 (DS-1, DS-2) 100%	74	31248-340	23		1.6434	0.2	mg/L as N	10/30/18 1645	11/01/18 0900	20	8.36	30	23	293.15	0.62	9.317	0.0715
Comp 5 (TB-1, TB-2) 1%	74	31248-341	0.79		0.0335	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	19.8	8.13	31.2	0.79	292.95	0.64	9.319	0.0425
Comp 5 (TB-1, TB-2) 10%	74	31248-342	3.7		0.1767	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	19.8	8.18	29.8	3.7	292.95	0.61	9.316	0.0478
Comp 5 (TB-1, TB-2) 50%	74	31248-343	10		0.6220	0.1	mg/L as N	10/30/18 1645	11/01/18 0900	19.8	8.30	29.2	10	292.95	0.6	9.315	0.0622
Comp 5 (TB-1, TB-2) 100%	74	31248-344	22		1.5296	0.2	mg/L as N	10/30/18 1645	11/01/18 0900	19.9	8.35	29.8	22	293.05	0.61	9.316	0.0695

STUDY: 31291
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Mitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) ar
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

Sample ID	Hour	ESI Code	Ammonia Total	Qual	Unionized	QLimit	Units	Sampled	Analyzed	L temp (EC)	M pH (SU)	N salinity (ppt)	O Tot NH3	P Temp (EK)	Q I	R pKa	S FNH3
***A. bahia* Start**																	
Laboratory Control	0	31291-345	ND		0.0030	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	8.00	31	0.1	292.15	0.64	9.319	0.0301
CLDS Reference	0	31291-346	ND		0.0028	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.97	29	0.1	292.15	0.6	9.314	0.0284
Comp 1 (V', W') 1%	0	31291-347	ND		0.0027	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.92	29	0.1	293.15	0.6	9.314	0.0273
Comp 1 (V', W') 10%	0	31291-348	0.2		0.0060	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.96	29	0.2	293.15	0.6	9.314	0.0299
Comp 1 (V', W') 50%	0	31291-349	0.95		0.0255	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.91	28	0.95	293.15	0.57	9.312	0.0269
Comp 1 (V', W') 100%	0	31291-350	2		0.0483	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	21	7.83	28	2	294.15	0.57	9.312	0.0241
Comp 2 (R', S') 1%	0	31291-351	ND		0.0028	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.96	29	0.1	292.15	0.6	9.314	0.0278
Comp 2 (R', S') 10%	0	31291-352	0.34		0.0097	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.97	29	0.34	292.15	0.6	9.314	0.0284
Comp 2 (R', S') 50%	0	31291-353	1.5		0.0375	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.91	28	1.5	292.15	0.57	9.312	0.025
Comp 2 (R', S') 100%	0	31291-354	3.1		0.0677	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.85	28	3.1	292.15	0.57	9.312	0.0218
Comp 3 (US-1, US-2) 1%	0	31291-355	ND		0.0031	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.98	29	0.1	293.15	0.6	9.314	0.0313
Comp 3 (US-1, US-2) 10%	0	31291-356	0.32		0.0098	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	29	0.32	293.15	0.6	9.314	0.0306
Comp 3 (US-1, US-2) 50%	0	31291-357	1.6		0.0418	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.90	29	1.6	293.15	0.6	9.314	0.0261
Comp 3 (US-1, US-2) 100%	0	31291-358	3.4		0.0750	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	21	7.79	28	3.4	294.15	0.57	9.312	0.0221
Comp 4 (DS-1, DS-2) 1%	0	31291-359	ND		0.0027	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.95	30	0.1	292.15	0.62	9.317	0.027
Comp 4 (DS-1, DS-2) 10%	0	31291-360	0.31		0.0095	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	29	0.31	293.15	0.6	9.314	0.0306
Comp 4 (DS-1, DS-2) 50%	0	31291-361	1.6		0.0455	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.97	29	1.6	292.15	0.6	9.314	0.0284
Comp 4 (DS-1, DS-2) 100%	0	31291-362	3.3		0.0902	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.95	28	3.3	292.15	0.57	9.312	0.0273
Comp 5 (TB-1, TB-2) 1%	0	31291-363	ND		0.0030	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	30	0.1	293.15	0.62	9.317	0.0304
Comp 5 (TB-1, TB-2) 10%	0	31291-364	0.41		0.0114	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.96	29	0.41	292.15	0.6	9.314	0.0278
Comp 5 (TB-1, TB-2) 50%	0	31291-365	1.4		0.0356	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.92	29	1.4	292.15	0.6	9.314	0.0254
Comp 5 (TB-1, TB-2) 100%	0	31291-366	2.9		0.0648	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.86	28	2.9	292.15	0.57	9.312	0.0223
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	0	31291-367	ND		0.0029	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.94	29	0.1	293.15	0.6	9.314	0.0286
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	0	31291-368	0.14		0.0043	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	29	0.14	293.15	0.6	9.314	0.0306
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	0	31291-369	0.6		0.0197	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	21	7.97	29	0.6	294.15	0.6	9.314	0.0329
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	0	31291-370	1.2		0.0426	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	22	7.97	28	1.2	295.15	0.57	9.312	0.0355
***M. beryllina* Start**																	
Laboratory Control	0	31291-345	ND		0.0030	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	8.00	31	0.1	292.15	0.64	9.319	0.0301
CLDS Reference	0	31291-346	ND		0.0028	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.97	29	0.1	292.15	0.6	9.314	0.0284
Comp 1 (V', W') 1%	0	31291-347	ND		0.0027	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.92	29	0.1	293.15	0.6	9.314	0.0273
Comp 1 (V', W') 10%	0	31291-348	0.2		0.0060	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.96	29	0.2	293.15	0.6	9.314	0.0299
Comp 1 (V', W') 50%	0	31291-349	0.95		0.0255	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.91	28	0.95	293.15	0.57	9.312	0.0269
Comp 1 (V', W') 100%	0	31291-350	2		0.0483	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	21	7.83	28	2	294.15	0.57	9.312	0.0241
Comp 2 (R', S') 1%	0	31291-351	ND		0.0028	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.96	29	0.1	292.15	0.6	9.314	0.0278
Comp 2 (R', S') 10%	0	31291-352	0.34		0.0097	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.97	29	0.34	292.15	0.6	9.314	0.0284
Comp 2 (R', S') 50%	0	31291-353	1.5		0.0375	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.91	28	1.5	292.15	0.57	9.312	0.025
Comp 2 (R', S') 100%	0	31291-354	3.1		0.0677	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.85	28	3.1	292.15	0.57	9.312	0.0218
Comp 3 (US-1, US-2) 1%	0	31291-355	ND		0.0031	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.98	29	0.1	293.15	0.6	9.314	0.0313
Comp 3 (US-1, US-2) 10%	0	31291-356	0.32		0.0098	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	29	0.32	293.15	0.6	9.314	0.0306
Comp 3 (US-1, US-2) 50%	0	31291-357	1.6		0.0418	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.90	29	1.6	293.15	0.6	9.314	0.0261
Comp 3 (US-1, US-2) 100%	0	31291-358	3.4		0.0750	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	21	7.79	28	3.4	294.15	0.57	9.312	0.0221
Comp 4 (DS-1, DS-2) 1%	0	31291-359	ND		0.0027	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.95	30	0.1	292.15	0.62	9.317	0.027
Comp 4 (DS-1, DS-2) 10%	0	31291-360	0.31		0.0095	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	29	0.31	293.15	0.6	9.314	0.0306
Comp 4 (DS-1, DS-2) 50%	0	31291-361	1.6		0.0455	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.97	29	1.6	292.15	0.6	9.314	0.0284
Comp 4 (DS-1, DS-2) 100%	0	31291-362	3.3		0.0902	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.95	28	3.3	292.15	0.57	9.312	0.0273
Comp 5 (TB-1, TB-2) 1%	0	31291-363	ND		0.0030	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	30	0.1	293.15	0.62	9.317	0.0304
Comp 5 (TB-1, TB-2) 10%	0	31291-364	0.41		0.0114	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.96	29	0.41	292.15	0.6	9.314	0.0278
Comp 5 (TB-1, TB-2) 50%	0	31291-365	1.4		0.0356	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.92	29	1.4	292.15	0.6	9.314	0.0254

STUDY: 31291
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Mitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) ar
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

Sample ID	Hour	ESI Code	Ammonia Total	Qual	Unionized	QLimit	Units	Sampled	Analyzed	L temp (EC)	M pH (SU)	N salinity (ppt)	O Tot NH3	P Temp (EK)	Q I	R pKa	S FNH3
Comp 5 (TB-1, TB-2) 100%	0	31291-366	2.9		0.0566	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	19	7.80	28	2.9	292.15	0.57	9.312	0.0195
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	0	31291-367	ND		0.0029	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.94	29	0.1	293.15	0.6	9.314	0.0286
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	0	31291-368	0.14		0.0043	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	20	7.97	29	0.14	293.15	0.6	9.314	0.0306
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	0	31291-369	0.6		0.0197	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	21	7.97	29	0.6	294.15	0.6	9.314	0.0329
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	0	31291-370	1.2		0.0426	0.1	mg/L as N	10/31/18 1700	11/01/18 0900	22	7.97	28	1.2	295.15	0.57	9.312	0.0355
***A. punctulata* Start**																	
Laboratory Control	0	31291-530	ND		0.0025	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	19	7.91	31	0.1	292.15	0.64	9.319	0.0246
Comp 1 (V', W') 1%	0	31291-531	ND		0.0026	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.91	32	0.1	293.15	0.66	9.321	0.0263
Comp 1 (V', W') 10%	0	31291-532	0.2		0.0050	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.89	32	0.2	293.15	0.66	9.321	0.0251
Comp 1 (V', W') 50%	0	31291-533	0.73		0.0176	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.87	31	0.73	293.15	0.64	9.319	0.0242
Comp 1 (V', W') 100%	0	31291-534	1.1		0.0223	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.79	30	1.1	293.15	0.62	9.317	0.0203
Comp 2 (R', S') 1%	0	31291-535	0.11		0.0030	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.92	32	0.11	293.15	0.66	9.321	0.0269
Comp 2 (R', S') 10%	0	31291-536	0.43		0.0124	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.95	32	0.43	293.15	0.66	9.321	0.0287
Comp 2 (R', S') 50%	0	31291-537	1.7		0.0427	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.89	32	1.7	293.15	0.66	9.321	0.0251
Comp 2 (R', S') 100%	0	31291-538	2.4		0.0386	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	19	7.72	30	2.4	292.15	0.62	9.317	0.0161
Comp 3 (US-1, US-2) 1%	0	31291-539	ND		0.0031	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.99	32	0.1	293.15	0.66	9.321	0.0314
Comp 3 (US-1, US-2) 10%	0	31291-540	0.14		0.0043	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.98	32	0.14	293.15	0.66	9.321	0.0307
Comp 3 (US-1, US-2) 50%	0	31291-541	0.69		0.0223	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	8.00	31	0.69	293.15	0.64	9.319	0.0323
Comp 3 (US-1, US-2) 100%	0	31291-542	1.4		0.0465	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	8.01	30	1.4	293.15	0.62	9.317	0.0332
Comp 4 (DS-1, DS-2) 1%	0	31291-543	0.11		0.0032	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.95	31	0.11	293.15	0.64	9.319	0.0289
Comp 4 (DS-1, DS-2) 10%	0	31291-544	0.28		0.0085	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.97	31	0.28	293.15	0.64	9.319	0.0302
Comp 4 (DS-1, DS-2) 50%	0	31291-545	1.2		0.0379	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.99	31	1.2	293.15	0.64	9.319	0.0316
Comp 4 (DS-1, DS-2) 100%	0	31291-546	2.3		0.0764	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	8.01	30	2.3	293.15	0.62	9.317	0.0332
Comp 5 (TB-1, TB-2) 1%	0	31291-547	ND		0.0028	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.93	31	0.1	293.15	0.64	9.319	0.0276
Comp 5 (TB-1, TB-2) 10%	0	31291-548	0.34		0.0093	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.93	32	0.34	293.15	0.66	9.321	0.0275
Comp 5 (TB-1, TB-2) 50%	0	31291-549	1.3		0.0299	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.85	32	1.3	293.15	0.66	9.321	0.023
Comp 5 (TB-1, TB-2) 100%	0	31291-550	2.6		0.0466	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.74	32	2.6	293.15	0.66	9.321	0.0179
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	0	31291-551	ND		0.0026	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.91	32	0.1	293.15	0.66	9.321	0.0263
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	0	31291-552	0.24		0.0074	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.98	32	0.24	293.15	0.66	9.321	0.0307
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	0	31291-553	1		0.0276	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.93	31	1	293.15	0.64	9.319	0.0276
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	0	31291-554	1.7		0.0422	0.1	mg/L as N	11/21/18 1300	11/27/18 1315	20	7.88	30	1.7	293.15	0.62	9.317	0.0248

STUDY: 31291
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Mitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) ar
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

Sample ID	Hour	ESI Code	Ammonia Total	Qual	Unionized	QLimit	Units	Sampled	Analyzed	L temp (EC)	M pH (SU)	N salinity (ppt)	O Tot NH3	P Temp (EK)	Q I	R pKa	S FNH3
***A. bahia* End**																	
Laboratory Control	94	31291-397	1.4		0.0311	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.84	34	1.4	293.15	0.7	9.326	0.0222
CLDS Reference	94	31291-398	1.7		0.0296	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.73	33	1.7	293.15	0.68	9.324	0.0174
Comp 1 (V', W') 1%	94	31291-399	1.7		0.0319	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.76	32	1.7	293.15	0.66	9.321	0.0188
Comp 1 (V', W') 10%	94	31291-400 [a]								20	7.82	32					
Comp 1 (V', W') 50%	94	31291-401 [a]								20	7.80	31					
Comp 1 (V', W') 100%	94	31291-402	2.9		0.0630	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.82	30	2.9	293.15	0.62	9.317	0.0217
Comp 2 (R', S') 1%	94	31291-403	1.8		0.0259	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.64	31	1.8	293.15	0.64	9.319	0.0144
Comp 2 (R', S') 10%	94	31291-404	1.9		0.0383	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.79	31	1.9	293.15	0.64	9.319	0.0202
Comp 2 (R', S') 50%	94	31291-405	2.5		0.0482	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.77	31	2.5	293.15	0.64	9.319	0.0193
Comp 2 (R', S') 100%	94	31291-406	3.7		0.0768	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.80	30	3.7	293.15	0.62	9.317	0.0208
Comp 3 (US-1, US-2) 1%	94	31291-407	1.8		0.0290	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.69	31	1.8	293.15	0.64	9.319	0.0161
Comp 3 (US-1, US-2) 10%	94	31291-408	1.8		0.0363	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.79	31	1.8	293.15	0.64	9.319	0.0202
Comp 3 (US-1, US-2) 50%	94	31291-409	2.6		0.0525	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.79	31	2.6	293.15	0.64	9.319	0.0202
Comp 3 (US-1, US-2) 100%	94	31291-410	3.5		0.0777	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.83	30	3.5	293.15	0.62	9.317	0.0222
Comp 4 (DS-1, DS-2) 1%	94	31291-411	1.7		0.0402	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.86	31	1.7	293.15	0.64	9.319	0.0236
Comp 4 (DS-1, DS-2) 10%	94	31291-412	2		0.0395	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.78	31	2	293.15	0.64	9.319	0.0197
Comp 4 (DS-1, DS-2) 50%	94	31291-413	2.6		0.0564	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.82	30	2.6	293.15	0.62	9.317	0.0217
Comp 4 (DS-1, DS-2) 100%	94	31291-414	3.5		0.0889	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.89	30	3.5	293.15	0.62	9.317	0.0254
Comp 5 (TB-1, TB-2) 1%	94	31291-415	1.6		0.0300	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	19	7.79	31	1.6	292.15	0.64	9.319	0.0188
Comp 5 (TB-1, TB-2) 10%	94	31291-416	1.9		0.0410	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.82	31	1.9	293.15	0.64	9.319	0.0216
Comp 5 (TB-1, TB-2) 50%	94	31291-417	2.4		0.0593	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.88	31	2.4	293.15	0.64	9.319	0.0247
Comp 5 (TB-1, TB-2) 100%	94	31291-418	3		0.0797	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.91	30	3	293.15	0.62	9.317	0.0266
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	94	31291-419	1.9		0.0360	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.76	30	1.9	293.15	0.62	9.317	0.019
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	94	31291-420	2		0.0415	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.80	30	2	293.15	0.62	9.317	0.0208
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	94	31291-421	2.2		0.0478	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.82	30	2.2	293.15	0.62	9.317	0.0217
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	94	31291-422	2.6		0.0621	0.1	mg/L as N	11/04/18 1600	11/05/18 1330	20	7.86	29	2.6	293.15	0.6	9.314	0.0239
***M. beryllina* End**																	
Laboratory Control	93	31291-371	2		0.0350	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.73	32	2	293.15	0.66	9.321	0.0175
CLDS Reference	93	31291-372	2.2		0.0472	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.82	32	2.2	293.15	0.66	9.321	0.0215
Comp 1 (V', W') 1%	93	31291-373	2.5		0.0516	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.80	31	2.5	293.15	0.64	9.319	0.0206
Comp 1 (V', W') 10%	93	31291-374	2.4		0.0554	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.85	31	2.4	293.15	0.64	9.319	0.0231
Comp 1 (V', W') 50%	93	31291-375	2.7		0.0638	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.86	31	2.7	293.15	0.64	9.319	0.0236
Comp 1 (V', W') 100%	93	31291-376	2.9		0.0689	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.86	30	2.9	293.15	0.62	9.317	0.0238
Comp 2 (R', S') 1%	93	31291-377	2.8		0.0502	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.74	32	2.8	293.15	0.66	9.321	0.0179
Comp 2 (R', S') 10%	93	31291-378	2.5		0.0562	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.84	32	2.5	293.15	0.66	9.321	0.0225
Comp 2 (R', S') 50%	93	31291-379	2.9		0.0713	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.88	32	2.9	293.15	0.66	9.321	0.0246
Comp 2 (R', S') 100%	93	31291-380	3.3		0.0887	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.92	32	3.3	293.15	0.66	9.321	0.0269
Comp 3 (US-1, US-2) 1%	93	31291-381	2.2		0.0434	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.78	31	2.2	293.15	0.64	9.319	0.0197
Comp 3 (US-1, US-2) 10%	93	31291-382	2.4		0.0542	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.84	31	2.4	293.15	0.64	9.319	0.0226
Comp 3 (US-1, US-2) 50%	93	31291-383	3		0.0662	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.83	31	3	293.15	0.64	9.319	0.0221
Comp 3 (US-1, US-2) 100%	93	31291-384	3.7		0.0840	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.84	30	3.7	293.15	0.62	9.317	0.0227
Comp 4 (DS-1, DS-2) 1%	93	31291-385	2.1		0.0370	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.73	31	2.1	293.15	0.64	9.319	0.0176
Comp 4 (DS-1, DS-2) 10%	93	31291-386	2.1		0.0464	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.83	31	2.1	293.15	0.64	9.319	0.0221
Comp 4 (DS-1, DS-2) 50%	93	31291-387	2.8		0.0677	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.87	31	2.8	293.15	0.64	9.319	0.0242
Comp 4 (DS-1, DS-2) 100%	93	31291-388	3.5		0.0889	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.89	30	3.5	293.15	0.62	9.317	0.0254
Comp 5 (TB-1, TB-2) 1%	93	31291-389	2.1		0.0379	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.74	31	2.1	293.15	0.64	9.319	0.018
Comp 5 (TB-1, TB-2) 10%	93	31291-390	2.6		0.0490	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.76	31	2.6	293.15	0.64	9.319	0.0189

STUDY: 31291
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: Suspended Particulate Phase
TASK: Elutriate/SPP Ammonia - Mitigated Sediment
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) ar
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P1
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

Sample ID	Hour	ESI Code	Ammonia Total	Qual	Unionized	QLimit	Units	Sampled	Analyzed	L temp (EC)	M pH (SU)	N salinity (ppt)	O Tot NH3	P Temp (EK)	Q I	R pKa	S FNH3
Comp 5 (TB-1, TB-2) 50%	93	31291-391	2.7		0.0667	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.88	31	2.7	293.15	0.64	9.319	0.0247
Comp 5 (TB-1, TB-2) 100%	93	31291-392	3.2		0.0795	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.88	30	3.2	293.15	0.62	9.317	0.0248
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	93	31291-393	2.1		0.0453	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.82	31	2.1	293.15	0.64	9.319	0.0216
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	93	31291-394	2.2		0.0454	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.80	31	2.2	293.15	0.64	9.319	0.0206
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	93	31291-395	2.3		0.0488	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.81	30	2.3	293.15	0.62	9.317	0.0212
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	93	31291-396	2.6		0.0555	0.1	mg/L as N	11/04/18 1600	11/05/18 1030	20	7.81	29	2.6	293.15	0.6	9.314	0.0213
***A. punctulata* End**																	
Laboratory Control	68	31291-555	0.15		0.0048	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.00	33	0.15	293.15	0.68	9.324	0.032
Comp 1 (V', W') 1%	68	31291-556	0.27		0.0097	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.02	33	0.27	294.15	0.68	9.324	0.0359
Comp 1 (V', W') 10%	68	31291-557	0.48		0.0180	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.04	33	0.48	294.15	0.68	9.324	0.0375
Comp 1 (V', W') 50%	68	31291-558	0.85		0.0326	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.05	33	0.85	294.15	0.68	9.324	0.0384
Comp 1 (V', W') 100%	68	31291-559	1.2		0.0456	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.04	31	1.2	294.15	0.64	9.319	0.038
Comp 2 (R', S') 1%	68	31291-560	0.2		0.0080	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.07	33	0.2	294.15	0.68	9.324	0.0401
Comp 2 (R', S') 10%	68	31291-561	0.39		0.0160	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.08	33	0.39	294.15	0.68	9.324	0.041
Comp 2 (R', S') 50%	68	31291-562	0.98		0.0420	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.10	33	0.98	294.15	0.68	9.324	0.0429
Comp 2 (R', S') 100%	68	31291-563	2.4		0.1105	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.13	32	2.4	294.15	0.66	9.321	0.046
Comp 3 (US-1, US-2) 1%	68	31291-564	0.2		0.0075	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.07	33	0.2	293.15	0.68	9.324	0.0373
Comp 3 (US-1, US-2) 10%	68	31291-565	0.45		0.0175	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.09	34	0.45	293.15	0.7	9.326	0.0388
Comp 3 (US-1, US-2) 50%	68	31291-566	0.89		0.0355	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.10	33	0.89	293.15	0.68	9.324	0.0399
Comp 3 (US-1, US-2) 100%	68	31291-567	1.4		0.0578	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.11	31	1.4	293.15	0.64	9.319	0.0413
Comp 4 (DS-1, DS-2) 1%	68	31291-568	0.52		0.0202	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.09	34	0.52	293.15	0.7	9.326	0.0388
Comp 4 (DS-1, DS-2) 10%	68	31291-569	0.58		0.0225	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.09	34	0.58	293.15	0.7	9.326	0.0388
Comp 4 (DS-1, DS-2) 50%	68	31291-570	1.3		0.0519	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.10	33	1.3	293.15	0.68	9.324	0.0399
Comp 4 (DS-1, DS-2) 100%	68	31291-571	2.2		0.0986	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.15	32	2.2	293.15	0.66	9.321	0.0448
Comp 5 (TB-1, TB-2) 1%	68	31291-572	0.12		0.0038	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	7.99	32	0.12	293.15	0.66	9.321	0.0314
Comp 5 (TB-1, TB-2) 10%	68	31291-573	0.41		0.0153	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.07	33	0.41	293.15	0.68	9.324	0.0373
Comp 5 (TB-1, TB-2) 50%	68	31291-574	1.4		0.0571	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.11	33	1.4	293.15	0.68	9.324	0.0408
Comp 5 (TB-1, TB-2) 100%	68	31291-575	2.7		0.1184	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.14	32	2.7	293.15	0.66	9.321	0.0438
Comp 6 (CAD-1, CAD-2, CAD-3) 1%	68	31291-576	0.18		0.0070	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.09	33	0.18	293.15	0.68	9.324	0.039
Comp 6 (CAD-1, CAD-2, CAD-3) 10%	68	31291-577	0.28		0.0109	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.09	33	0.28	293.15	0.68	9.324	0.039
Comp 6 (CAD-1, CAD-2, CAD-3) 50%	68	31291-578	0.89		0.0357	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	20	8.10	32	0.89	293.15	0.66	9.321	0.0401
Comp 6 (CAD-1, CAD-2, CAD-3) 100%	68	31291-579	1.8		0.0820	0.1	mg/L as N	11/24/18 1200	11/27/18 1315	21	8.12	30	1.8	294.15	0.62	9.317	0.0455

Notes:
[a] Bottles were pulled for analysis, but data are missing.

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for temperature and salinity
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	Yes
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes, except as noted for temperature and salinity	Sections 3.3, 3.4 and 3.5, Tables 6 and 7, and Appendix A	Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae	Yes		Data Package
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	NA		

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ASSAY REVIEW CHECKLIST

STUDY#: 31248 & 31291

CLIENT: AECOM

PROJECT: New Haven Harbor 2018

ASSAY: Suspended Particulate Phase Evaluation

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	12/13/18	BG	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	↓	↓	
Bench Sheets Complete (dates, times, initials, etc...)	↓	↓	
Water Quality Data Complete	↓	↓	
Weights Reported	↓	↓	
Assay Acceptability Review	↓	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis			
Survival / DEV	11/2,6,28/18	NR	
Chemical	NA		
Statistical Analysis Reviewed	11/29/18	LF	
Data Acceptability Review	11/29/18	NR	
Support Documentation			
Temperature Data Logger	NA		
Daily WQ Data	12/21/18	NR	
Overlying and/or Pore Water Chemistry NH_3	12/21/18	NR	QA: LF 12/28/18
Other Chemical Analysis Data	NA		
Draft Report	12/22/18	NR	Revised per AECOM Comments 1/4 NR
Report Reviewed	~~12/21/18~~ 12/28/18	~~LF~~	Revisions reviewed 1/8/19
QA Audit/Review Complete			
Report Printed - PDF	12/28/18	NR	Final draft 1/8/19 NR
Report E-mailed / Faxed	12/28/18	NR	Final draft 1/8/19 NR
Report Logged Out	↓	↓	↓

Appendix D.2: 10-Day Whole Sediment Bioassay (10 Day Solid Phase Evaluation)

AECOM Imagine it. Delivered.

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

December 20, 2018

10-Day Bioassay Report

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003 TO#5
Delivery Order No.: W912WJ18F0109

10 Day Solid Phase Evaluation

Prepared For:

AECOM
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Prepared By:

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One Lafayette Road
Hampton, New Hampshire 03842

EnviroSystems, Inc. Master Reference 31242
Specific Studies 31244 & 31245
Report Issue Date: December 18, 2018
Assay Start: November 2018

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, an affiliate of Enthalpy Analytical LLC, at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal In New England Waters* (RIM) with relevant updates. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation section of this report.

For EnviroSystems, Inc._____ December 18, 2018

Kirk Cram — Date

Laboratory Director

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor 2018 Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003 TO#5
Delivery Order No.: W912WJ18F0109

10 Day Solid Phase Evaluation

1.0 INTRODUCTION

As part of a comprehensive plan to reduce adverse environmental impacts of ocean dumping, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 specifies that all sediments to be discharged into ocean waters must be evaluated to define their potential impact on existing benthic communities. The United States Environmental Protection Agency (US EPA) has determined that the most effective means to make such an assessment is through the use of bioassay tests, which provide a relatively direct estimate of potential impact.

This project was designed to evaluate the potential toxicity of sediments from the area of dredging proposed for the New Haven Harbor 2018 Federal Navigation Project (FNP) located in New Haven, Connecticut. Placement of dredge materials is proposed at the Central Long Island Sound Disposal Site (CLDS).

Testing involved conduct of acute exposure 10 day solid phase assays using the mysid, *Americamysis bahia*, and the amphipod, *Leptocheirus plumulosus*. Testing followed procedures established by the US EPA and the United States Army Corps of Engineers (US ACE) for testing of dredged material. Procedures are presented in *Evaluation of Dredged Material Proposed for Ocean Disposal* (US EPA, US ACE 1991), *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual* (US EPA, US ACE 1998), and the *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE, 2004). All biological testing and chemical analyses completed in support of the 10 day solid phase evaluation were performed at EnviroSystems (ESI), an affiliate of Enthalpy Analytical LLC, Hampton, New Hampshire.

2.0 MATERIALS AND METHODS

2.1 Sample Collection, Preservation and Storage

Sediment cores for toxicological analysis were collected by the US ACE New England District (CENAE) using vibracoring equipment from locations identified in the dredge footprint specified in the project Work Plan (AECOM, 2018). Sediment samples were received from AECOM, Chelmsford, Massachusetts under chain of custody in 3.5 gallon polyethylene buckets and were composited based on the compositing scheme outlined in the Work Plan. Reference sediment samples were collected by the AECOM field team from the CLDS. Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Prior to testing, samples were placed in a secure refrigerator and stored at a temperature of $4 \pm 2°C$ until test preparation. Sample identification, collection and receipt information is summarized in Table 1. Sample compositing information is provided in Table 2.

Sediment for the laboratory control treatment was collected from the Hampton Estuary, Hampton, New Hampshire. The area is not known to receive any direct industrial inputs and has been used as laboratory reference sediment in the testing of marine sediments for over 30 years. Overlying seawater is pumped in daily from the Hampton Estuary and stored in holding tanks. Seawater is obtained through a filter system located on the bottom of the estuary at a point approximately 1 mile from the open ocean. Laboratory water is aerated through the collection system and in individual storage containers and test chambers. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. The Hampton Estuary laboratory control was included to verify the health of the test organisms, and as a relative benchmark for reference site toxicity.

2.2 Sediment Preparation

Prior to testing, samples were press sieved through a 2-mm stainless steel screen for both *A. bahia* and *L. plumulosus* to remove large stones, sticks, roots, man-made material and indigenous organisms. Once sieved, individual composites were loaded into clean HDPE vessels to begin the ammonia mitigation phase based on the Ferretti (Ferretti et al, 2000) method. Sediments were loaded to a depth of 7-11mm in the vessels and clean overlying water was added in a 1:3 ratio of sediment to water. A thin piece of plastic was placed over the sediment prior to adding the overlying water in an effort to keep the sediment from becoming suspended during the addition. The thin piece of plastic was slowly removed after the overlying water was added. Each mitigation vessel was aerated and the temperature, pH, specific conductivity, salinity and dissolved oxygen were recorded daily prior to siphoning off the overlying water. A small sub-sample from each composite was removed daily and centrifuged to extract pore water. Temperature, pH and salinity of the extract were recorded and the pore water was subsequently analyzed for total ammonia. These values were used to calculate the pore water unionized ammonia levels daily. If the daily value of any composite was below the target threshold of 0.8 mg/L unionized ammonia (AECOM, 2018), two additional sub-samples were collected and analyzed to confirm the ammonia levels. Once below the unionized ammonia threshold for a 24-hour period, composites were removed from their mitigation vessels and placed in clean HDPE 1-gallon buckets until all samples were ready to be loaded into test chambers for assay initiation. Test chambers were loaded 24-hours prior to assay initiation to allow sediments and overlying water time to settle.

2.3 Bioassay Procedures

2.3.1 *A. bahia* 10 Day Solid Phase Evaluation

The 10 day exposure toxicity test was completed using *A. bahia* obtained from Aquatic Research Organisms (ARO) of Hampton, New Hampshire. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *A. bahia* used in the assay were $\leq$5 days old at the start of the test.

The assay was conducted in a static renewal mode. Test chambers were 1 liter beakers modified for static renewal testing. Each beaker contained approximately 175 mL of sediment and was filled with 725 mL of seawater. A total of 20 organisms were randomly selected from the lot received and added to each replicate by groups of 10. All treatment groups included 5 replicates. Each day during the test, chambers received 1 volume of new seawater having similar salinity and temperature as the overlying water in the vessels. This results in an approximate 50% renewal of overlying water. Water temperature was 20$\pm$1°C, and the salinity regimen was established at 30$\pm$2‰. The photoperiod was set at 16:8 hours light:dark.

Dissolved oxygen, pH, salinity, specific conductivity and temperature were measured daily in one replicate of each treatment and in all replicates on days 0 and 10 using a YSI multi-parameter probe that captures the data electronically following a pre-determined sample reading order. Data are downloaded using YSI Data Manager software and formatted into tables; there are no raw data sheets. Ammonia levels were measured in the overlying water of a representative test chamber on days 0, 3 and 10. All test

chambers were aerated throughout the assay and dissolved oxygen levels were maintained at ≥6.0 mg/L per ESI's protocol (≥40% saturation following RIM protocol). Water quality measurements were completed prior to water renewals. Test chambers were observed daily to ensure proper aeration and to note any test or treatment abnormalities. Any such observations were recorded on data sheets. Mysids were fed ≤24 hour old *Artemia* nauplii twice daily. After 10 days of exposure, the organisms were recovered for survival counts.

2.3.2 *L. plumulosus* 10 Day Solid Phase Evaluation

L. plumulosus were obtained from cultures maintained by ARO. Prior to use, test organisms were held for a minimum of 2 hours under temperature, salinity, and photoperiod conditions similar to those used in the assay. *L. plumulosus* were 2-4 mm in size and of mixed sex.

The assay was conducted in a static renewal mode. Test chambers were 1 liter beakers modified for static renewal testing. Each beaker contained approximately 175 mL of sediment and was filled with 725 mL of seawater. A total of 20 organisms were randomly selected from the lot received and added to each replicate by groups of 10. Each treatment group included 5 replicates and a surrogate test chamber that was used to obtain water qualities during the assay without disturbing the test animals. The surrogate chamber was treated the same as actual test chambers with the addition of animals, but was not used to determine endpoint data. Each day during the test, chambers received 1 volume of new seawater having similar salinity and temperature as the overlying water in the vessels. This results in an approximate 50% renewal of overlying water. Water temperature was 20±1°C, and the salinity regimen was established at 20±2‰. The photoperiod was set at 16:8 hours light:dark.

Dissolved oxygen, pH, salinity, specific conductivity and temperature were measured daily in the surrogate replicate of each treatment and in all replicates on days 0 and 10 using a YSI multi-parameter probe that captures the data electronically following a pre-determined sample reading order. Data are downloaded using YSI Data Manager software and formatted into tables; there are no raw data sheets. Ammonia levels were measured in the overlying and pore water of the surrogate test chamber on days 0, 3 and 10. All test chambers were aerated throughout the assay and dissolved oxygen levels were maintained at ≥6.0 mg/L per ESI's protocol (≥40% saturation following RIM protocol). Water quality measurements were completed prior to water renewals. Test chambers were observed daily to ensure proper aeration and to note any test or treatment abnormalities. Any such observations were recorded on data sheets. After 10 days of exposure, the organisms were recovered for survival counts.

2.4 Statistical Analysis

Survival data were analyzed using CETIS™ (Comprehensive Environmental Toxicity Information System) v1.9.3.0 software to determine significant differences between the project sediments and the CLDS reference site. Survival data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistics. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Pair-wise comparisons were made using one-way unpaired t-tests (equal or unequal variance t two-sample tests) or other appropriate statistical test as needed. Statistical difference was evaluated at $\alpha = 0.05$.

2.5 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Summaries of acute exposure reference toxicant assays conducted in support of this study are provided in Table 3.

3.0 RESULTS AND DISCUSSION

Table 4 provides a summary of assay acceptability and laboratory control performance. Tables 5 and 6 summarize the results of the statistical analysis for *A. bahia* and *L. plumulosus*, respectively. Tables 7 through 9 summarize water quality data collected during the *A. bahia* and *L. plumulosus* assays. Laboratory bench sheets, water quality data, and associated statistical support data are included in Appendix A.

3.1 *A. bahia* 10 Day Solid Phase Evaluation

Mean mysid survival in the laboratory control sediment was 98% with a coefficient of variation (CV) of 5%. Assay protocol requires that mean control survival be ≥90%. Based on this, the mysids were considered healthy and the overlying water was determined to have had no adverse impact on the outcome of the assay. Mean mysid survival in the CLDS reference sediment was 63% with an associated CV of 65%. See Section 3.3 for a discussion of this out of control event for the CLDS reference sediment.

Mean mysid survival in the site composites ranged from 91% (Composites 3 and 4) to 96% (Composite 6). The statistical analyses show that there were no negative effects on mysid survival following exposure to any of the site composite samples as compared the CLDS reference sediment.

Temperature data collected during the daily water quality observations documented a mean value of 20.9°C with a range of 19.7 to 21.7°C. Confirmation temperature data collected on an hourly basis from a data logger documented a mean value of 21.0°C with a range of 19.8 to 21.8°C. Salinity levels ranged from 24.6 to 32.9‰ with a mean value of 28.3‰. Test acceptability criteria requires a mean temperature of 20±1°C with maximum temporary fluctuations of 20±3°C, and salinity within a range of 30±2‰. Please see section 3.3 for a discussion of the salinity deviations.

3.2 *L. plumulosus* 10 Day Solid Phase Evaluation

Mean amphipod survival in the laboratory control sediment was 98% with a CV of 3%. Assay protocol requires that mean control survival be ≥90%. Based on this, the amphipods were considered healthy and the overlying water was determined to have had no adverse impact on the outcome of the assay. Mean amphipod survival in the CLDS reference sediments was 79% with an associated CV of 46%. See Section 3.3 for a discussion of this out of control event for the CLDS reference sediment.

Mean amphipod survival in the site composites ranged from 92% (Composite 4) to 99% (Composite 5). The statistical analyses show that there were no negative effects on amphipod survival following exposure to any of the site composite samples as compared the CLDS reference sediment.

Temperature data collected during the daily water quality observations documented a mean value of 20.9°C with a range of 20.0 to 21.7°C. Confirmation temperature data collected on an hourly basis from a data logger documented a mean value of 21.0°C with a range of 19.8 to 21.8°C. Salinity levels ranged from 17.2 to 23.6‰ with a mean value of 19.3‰. Test acceptability criteria requires a mean temperature of 20±1°C with maximum temporary fluctuations of 20±3°C, and salinity within a range of 20±2‰. Please see section 3.3 for a discussion of the salinity deviations.

3.3 Out of Control Event and Protocol Deviations

Review of data collected as part of the biological evaluation documented the following out of control event and deviations from the protocol and/or ESI's Standard Operating Procedures:

The CLDS reference sediment performed poorly in both the mysid and amphipod assays, achieving only 63% and 79% survival, respectively. The laboratory control and site composites achieved ≥90%

survival for both species, indicating that organisms were healthy. None of the site composites were determined to be significantly impacted as compared with the reference sediment, given this performance. Test parameters were largely within their targeted ranges, except as noted, and there were no indications that there were any issues with assay conduct. The calculated unionized ammonia levels for the CLDS reference were well below the threshold of 0.8 mg/L in both the pre-assay pore water sample and during assay conduct. There were some juvenile polychaetes found in replicates D and E of the CLDS reference sediment upon recovery of the amphipod assay. It cannot be determined if their presence adversely impacted amphipod survival in those replicates, however it is plausible that they were a stressor. All test sediments are sieved prior to use and any native organisms present in the reference sediment would have been small enough to pass through this process. Predation within these replicates is possible but the size of the polychaetes makes it unlikely. Furthermore, none of these polychaetes were recovered from the mysid reference sediment. Although there are no criteria that the reference sediment must meet, this is considered an out of control event and remains an uncertainty.

Protocol requires that the *A. bahia* and *L. plumulosus* assays be conducted at 30±2‰ and 20±2‰, respectively, and salinity values recorded on day 9 of the *A. bahia* assay and day 10 of both assays fell below their acceptable ranges to as low as 24.6‰ (*A. bahia*) and 17.2‰ (*L. plumulosus*). The analyst indicated they were experiencing low readings with one of the salinity probes and it was subsequently recalibrated. Following recalibration, measurements were generally within range however the out of range readings for this project were not able to be recaptured and may be suspect. There were also sporadic readings on days 3 (*L. plumulosus*) and 7 (both species) that exceeded the target range, however these are isolated instances and not believed to be related to any systemic causes. Mean salinity for the assays (28.3‰ for *A. bahia* and 19.3‰ for *L. plumulosus*) were within their target ranges and control survival met acceptance criteria demonstrating that the test organisms are tolerant of salinities within the ranges measured. It is the opinion of ESI's technical manager that these deviations had no adverse impact on the outcome of either assay.

The dissolved oxygen in the *L. plumulosus* assay dropped to a low of 4.9 mg/L, which is below the threshold outlined in ESI's standard operating procedures, however the minimum percent dissolved oxygen (62%) remained above the RIM's threshold of ≥40%. This was an isolated excursion that occurred in the surrogate vessel of the laboratory control on day 1, which may have resulted if an airline fell out of the test vessel and was replaced on discovery. It is the opinion of ESI's technical manager that this deviation did not adversely affect the outcome of the assay.

Due to technician oversight, no water daily water quality measurements were collected for replicates A through E for the laboratory control or the CLDS reference on day 10 of the *L. plumulosus* assay, however there were measurements collected from the surrogate vessels. While these represent data gaps, it is the opinion of ESI's technical manager that these deviations had no adverse affect on the outcome of the assay.

4.0 SUMMARY

This program utilized protocols developed by the US EPA and the CENAE to assess the potential impact the proposed dredge material collected for the New Haven Harbor 2018 FNP would have on the marine environment. Review of the data presented in Tables 5 and 6 documents that there were no significant impacts on survival for either organism tested as compared with the CLDS reference sediment. Although survival in the CLDS reference for both organisms was low, all of the site composites achieved ≥90% survival for both species.

5.0 REFERENCES

AECOM. 2018. *Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Project Work Plan, New Haven, Connecticut [Work Plan]*. Chelmsford, Massachusetts. October 2018.

Ferretti, JA, DF Calesso, T Hermon. 2000. *Evaluation of Methods to Remove Ammonia Interference in Marine Sediment Toxicity Tests.* Environ Toxicol Chem 19 (8):1935-1941.

US EPA, US ACE. 1991. *Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual*. EPA-503/8-91/001. 204 pages.

US EPA, US ACE. 1998. *Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual*. EPA-823-B-98-004, February 1998.

US EPA Region I, Corps of Engineers, New England District. 2004. *Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters*. September 2004.

Table 1. Sample Collection and Receipt Information. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Station ID [a]	ESI Code	Sample Type	Matrix	Collection		Receipt	
				Date	Time	Date	Time
Comp V',W' Station V'	31242-001	Site	Solid	10/23/18	1125	10/24/18	1015
Comp V',W' Station W'	31242-002	Site	Solid	10/23/18	1125	10/24/18	1015
Comp R',S' Station R'	31242-003	Site	Solid	10/23/18	1215	10/24/18	1015
Comp R',S' Station S'	31242-004	Site	Solid	10/23/18	1215	10/24/18	1015
Comp CAD 1-3 Station CAD 1	31242-005	Site	Solid	10/23/18	1527	10/24/18	1015
Comp CAD 1-3 Station CAD 2	31242-006	Site	Solid	10/23/18	1527	10/24/18	1015
Comp CAD 1-3 Station CAD 3	31242-007	Site	Solid	10/23/18	1527	10/24/18	1015
NHH-CLDS	31242-008	Reference	Solid	10/23/18	1028	10/24/18	1015
Comp TB-1-2, Station TB-1	31242-010	Site	Solid	10/24/18	1146	10/25/18	0835
Comp TB-1-2, Station TB-2	31242-011	Site	Solid	10/24/18	1146	10/25/18	0835
Comp DS-1-2, Station DS-1	31242-012	Site	Solid	10/24/18	1006	10/25/18	0835
Comp DS-1-2, Station DS-2	31242-013	Site	Solid	10/24/18	1006	10/25/18	0835
Comp US-1-2, Station US-1	31242-019	Site	Solid	10/25/18	1023	10/25/18	1820
Comp US-1-2, Station US-2	31242-020	Site	Solid	10/25/18	1023	10/25/18	1820
Comp DS-1-2, Station DS-2	31242-023	Site	Solid	10/25/18	0946	10/25/18	1820

Notes:
[a] The Station IDs listed include detailed information written on individual sample buckets.

Table 2. Summary of Sample Compositing Information. 10 day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Composite ID	ESI Code	Components		Final Amount	Composite	
		Station ID	ESI Code		Date	Time
Composite 1 [a]	31243-100	Comp V',W' Station V' Comp V',W' Station W'	31242-001 31242-002	~7 gal	10/24/18	1100
Composite 2	31243-101	Comp R',S' Station R' Comp R',S' Station S'	31242-003 31242-004	~28 gal	10/24/18	1545
Composite 3	31243-102	Comp US-1-2, Station US-1 Comp US-1-2, Station US-2	31242-019 31242-020	~28 gal	10/25/18	2030
Composite 4	31243-103	Comp DS-1-2, Station DS-1 Comp DS-1-2, Station DS-2 Comp DS-1-2, Station DS-2	31242-012 31242-013 31242-023	~28 gal	10/25/18	2000
Composite 5	31243-104	Comp TB-1-2, Station TB-1 Comp TB-1-2, Station TB-2	31242-010 31242-011	~28 gal	10/25/18	1110
Composite 6	31243-105	Comp CAD 1-3 Station CAD 1 Comp CAD 1-3 Station CAD 2 Comp CAD 1-3 Station CAD 3	31242-005 31242-006 31242-007	~31 gal	10/24/18	1115

Note:
[a] This sample was not included in the 10 day solid phase evaluation.

Table 3. Summary of Reference Toxicant Data Summary. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Date	Organism Lot	Endpoint	Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
Americamysis bahia						
11/09/18	03AbARO110818	96Hr LC-50	90.8 [a]	62.2	34.6 - 89.8	NH4Cl (mg/L)
Leptocheirus plumulosus						
11/09/18	19LpARO110818	96Hr LC-50	225.0	183.1 [b]	84.6 - 281.6 [b]	Ammonia (mg/L)

Notes:
Means and Acceptable Ranges based on the most recent 20 reference toxicant assays unless otherwise noted.
[a] Normal Acceptance Limits set at ±2 Std Dev of historic mean; maximum limits are ±3 Std of historic mean. The ±3 limit is acceptable, but considered high.
[b] Means and acceptable ranges are based on the results of 9 assays.

Table 4. Summary of Laboratory Control Performance. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Endpoint / Measurement		Protocol Criteria	Unit	*A. bahia*	*L. plumulosus*
Mean Survival		Laboratory Control ≥90%	%	98%	98%
			Protocol Met	Yes	Yes
Salinity	Minimum	*A. bahia* - 28ppt	ppt	24.6	17.2
		L. plumulosus - 18ppt	Protocol Met	No [a]	No [a]
	Maximum	*A. bahia* - 32ppt	ppt	32.9	23.6
		L. plumulosus - 22ppt	Protocol Met	No [a]	No [a]
Temperature		Mean: 20±1°C	Daily / Hourly°C	20.9 / 21.0	20.9 / 21.0
		Minimum: 17°C	Daily / Hourly°C	19.7 / 19.8	20.0 / 19.8
		Maximum: 23°C	Daily / Hourly°C	21.7 / 21.8	21.7 / 21.8
			Protocol Met	Yes / Yes	Yes / Yes
Dissolved Oxygen		≥6.0 mg/L (ESI)	Minimum mg/L	6.2	4.9
			Protocol Met	Yes	No [a]
		≥40% Saturation (RIM)	Minimum %	85%	62%
			Protocol Met	Yes	Yes

Notes:
[a] Refer to Section 3.3 for a discussion of the deviation.
[b] Values meets the criterion when rounded to the whole number precision reflected in the protocol.

Table 5. Summary of Survival Data: *A. bahia*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Day 10 Proportion Survived Summary

Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	31245-000	5	98%	90%	100%	5%
CLDS Reference Site	31242-008	5	63%	10%	100%	65%
Composite 2	31243-101	5	92%	85%	95%	5%
Composite 3	31243-102	5	91%	85%	100%	7%
Composite 4	31243-103	5	91%	85%	95%	5%
Composite 5	31243-104	5	95%	90%	100%	5%
Composite 6	31243-105	5	96%	90%	100%	6%

Day 10 Survival Statistical Analysis

Sample ID	ESI Code	Mean	Significantly "<" as Compared to: CLDS (31242-008)	Difference in Survival >20% as Compared to: CLDS (31242-008)	
CLDS Reference Site	31242-008	63%	-	-	-
Composite 2	31243-101	92%	No	No [a]	-29%
Composite 3	31243-102	91%	No	No [a]	-28%
Composite 4	31243-103	91%	No	No [a]	-28%
Composite 5	31243-104	95%	No	No [a]	-32%
Composite 6	31243-105	96%	No	No [a]	-33%

Note:
[a] The difference in survival is >20%, however survival is improved in the site composite samples as compared with the CLDS reference sediment.

Table 6. Summary of Survival Data: *L. plumulosus*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Day 10 Proportion Survived Summary

Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	31244-000	5	98%	95%	100%	3%
CLDS Reference Site	31242-008	5	79%	15%	100%	46%
Composite 2	31243-101	5	94%	90%	100%	6%
Composite 3	31243-102	5	96%	90%	100%	4%
Composite 4	31243-103	5	92%	85%	95%	5%
Composite 5	31243-104	5	99%	95%	100%	2%
Composite 6	31243-105	5	94%	90%	100%	4%

Day 10 Survival Statistical Analysis

Sample ID	ESI Code	Mean	Significantly "<" as Compared to: CLDS (31242-008)	Difference in Survival >20% as Compared to: CLDS (31242-008)	
CLDS Reference Site	31242-008	79%	-	-	-
Composite 2	31243-101	94%	No/No	No	-15%
Composite 3	31243-102	96%	No/No	No	-17%
Composite 4	31243-103	92%	No/No	No	-13%
Composite 5	31243-104	99%	No/No	No [a]	-20%
Composite 6	31243-105	94%	No/No	No	-15%

Note:
No/No indicates that there was no difference in outcome when an outlier was excluded from the statistical analysis (refer to Appendix A).
[a] The difference in survival is equal to 20% in Composite 5, however survival is improved in all the site composite samples as compared with the CLDS reference sediment.

Table 7. Summary of Overlying Water Quality Data: *A. bahia*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Sample ID	Day	Temperature (°C)	pH (SU)	Salinity (ppt)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
In-Life Assay Data						
Laboratory Control	00	20.3	7.71	28.02	0.15	0.0026
CLDS Reference Site	00	20.0	7.82	28.42	<0.1	<0.0022
Composite 2	00	20.1	7.89	28.39	1.6	0.0413
Composite 3	00	20.0	7.92	28.72	1.8	0.0493
Composite 4	00	20.3	7.91	28.66	2.2	0.0602
Composite 5	00	20.6	7.90	28.57	2.5	0.0684
Composite 6	00	20.7	7.89	28.64	0.61	0.0164
Laboratory Control	03	21.2	7.54	28.88	0.63	0.0080
CLDS Reference Site	03	21.0	7.67	29.19	0.13	0.0022
Composite 2	03	21.1	7.74	29.75	3	0.0590
Composite 3	03	21.1	7.77	29.20	1.6	0.0338
Composite 4	03	21.2	7.79	29.09	1.8	0.0401
Composite 5	03	21.2	7.81	29.45	3.4	0.0790
Composite 6	03	21.3	7.82	30.09	<0.1	<0.0024
Laboratory Control	10	21.2	7.57	24.75	0.56	0.0078
CLDS Reference Site	10	20.9	7.73	25.44	0.15	0.0029
Composite 2	10	21.2	7.90	25.41	0.21	0.0061
Composite 3	10	21.2	7.99	25.31	0.16	0.0057
Composite 4	10	21.2	8.03	25.67	0.31	0.0120
Composite 5	10	21.3	8.12	24.60	0.21	0.0101
Composite 6	10	21.3	7.97	25.87	<0.1	<0.0034

Note: Data in summary obtained from the "A" replicate of each treatment.

Table 8. Summary of Overlying Water Quality Data: *L. plumulosus*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Sample ID	Day	Temperature (°C)	pH (SU)	Salinity (ppt)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
In-Life Assay Data						
Laboratory Control	00	20.2	7.78	18.50	<0.1	<0.0021
CLDS Reference Site	00	20.0	7.78	19.01	<0.1	<0.0021
Composite 2	00	20.3	7.93	18.78	4.3	0.1298
Composite 3	00	20.3	7.89	18.59	2.1	0.0580
Composite 4	00	20.3	7.91	18.62	2.2	0.0636
Composite 5	00	20.3	7.90	19.12	2	0.0564
Composite 6	00	20.4	7.89	19.35	0.68	0.0189
Laboratory Control	03	21.1	6.30	18.63	0.47	0.0004
CLDS Reference Site	03	20.8	6.52	19.67	<0.1	<0.0001
Composite 2	03	21.0	7.26	21.06	5.7	0.0392
Composite 3	03	21.1	7.48	18.94	1.6	0.0185
Composite 4	03	21.1	7.54	18.93	1.7	0.0226
Composite 5	03	21.1	7.59	18.74	2.6	0.0387
Composite 6	03	21.2	7.62	19.89	0.61	0.0097
Laboratory Control	10	20.8	7.00	18.26	0.27	0.0010
CLDS Reference Site	10	20.8	7.17	18.75	<0.1	<0.0006
Composite 2	10	20.8	7.46	20.68	0.18	0.0019
Composite 3	10	21.0	7.59	18.21	<0.1	<0.0015
Composite 4	10	21.0	7.66	18.24	<0.1	<0.0017
Composite 5	10	21.1	7.75	17.36	<0.1	<0.0022
Composite 6	10	21.1	7.72	17.18	<0.1	<0.0020

Note: Data in summary obtained from the “surrogate” replicate of each treatment.

Table 9. Summary of Pore Water Quality Data: *L. plumulosus*. 10 Day Solid Phase Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Sample ID	Day	Temperature (°C)	pH (SU)	Salinity (ppt)	Total Ammonia (mg/L)	Unionized Ammonia (mg/L)
Pre-Assay Data						
Laboratory Control	-02	21.0	4.19	30	1.3	0.0000073
CLDS Reference Site	-02	20.1	7.68	30	2.3	0.0367
Composite 2	-01	21.0	7.60	30	25	0.3551
Composite 3	-01	21.1	7.59	30	32	0.4476
Composite 4	-01	21.1	7.69	30	32	0.5615
Composite 5	-01	21.0	7.56	30	23	0.2983
Composite 6	-01	21.1	7.70	30	11	0.1974
In-Life Assay Data						
Laboratory Control	00	20.9	5.82	20	0.69	0.0002
CLDS Reference Site	00	21.0	7.75	22	<0.5	<0.0104
Composite 2	00	21.0	7.65	24	15	0.2467
Composite 3	00	21.2	7.73	20	6.5	0.1329
Composite 4	00	21.2	7.79	20	6.9	0.1614
Composite 5	00	21.2	7.60	21	16	0.2424
Composite 6	00	21.1	7.84	20	3.8	0.0987
Laboratory Control	03	21.2	6.10	19	1.8	0.0009
CLDS Reference Site	03	21.1	7.63	21	0.28	0.0045
Composite 2	03	21.0	7.57	22	7.2	0.0999
Composite 3	03	20.9	7.44	20	2	0.0207
Composite 4	03	21.0	7.58	20	3.2	0.0459
Composite 5	03	21.1	7.39	20	6.7	0.0628
Composite 6	03	21.1	7.74	21	0.91	0.0188
Laboratory Control	10	21.2	6.60	20	1.2	0.0019
CLDS Reference Site	10	21.0	7.41	21	0.26	0.0025
Composite 2	10	21.2	7.24	21	0.8	0.0053
Composite 3	10	21.3	7.26	21	0.1	0.0007
Composite 4	10	21.1	7.31	21	0.36	0.0028
Composite 5	10	21.1	6.93	20	0.5	0.0016
Composite 6	10	20.9	7.51	20	0.2	0.0024

Note: Data in summary are obtained from the "Surrogate" replicate of each treatment.

APPENDIX A:

RAW DATA & STATISTICAL SUPPORT

Contents	Number of Pages
Study Number Record	1
Chain of Custody Records and Sample Receipt Logs	8
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Pre-Assay Ammonia Mitigation	6
A. bahia 10 Day Solid Phase Evaluation	
Bench Records (Summary of Test Conditions, Organism History Record, Daily Record, Daily Water Quality Summary, Ammonia Calculations, Day 10 Recovery Bench Sheets)	10
Survival Statistical Analysis Data Package	8
L. plumulosus 10 Day Solid Phase Evaluation	
Bench Records (Summary of Test Conditions, Organism History Record, Daily Record, Pore Water Quality and pH Records, Daily Water Quality Summary, Ammonia Calculations, Day 10 Recovery Bench Sheets)	11
Survival Statistical Analysis Data Package	15
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RIM QC Data Report Tables	2
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Total Appendix Pages	75

STUDY NUMBER RECORD

Issue and complete this form for studies that will require multiple tasks and directly associated support studies. Issue consecutive study numbers at the start of the project to cover all potential elements of the project.

CLIENT: AECOM

CONTACT(S): Kris Van Naerssen

PROJECT: New Haven Harbor 2018

APP. NUMBER:

	Species / Analysis Parameters:		STUDY:
Sample Receipt:			**31242**
Rinseate Sample Analysis:	**Reference Site Analyzed x 3**		
Grain Size Analysis:			
Composite Prep/NH3 Mit:			**31243**
Bulk Sediment Analysis:			
10 Day Assay:	***Leptocheirus plumulosus***		**31244**
	Americamysis bahia		**31245**
Elutriate Preparation:	**Type:**		**31246**
Elutriate Analysis:	**Pentachlorophenol**	**Yes / No**	**31247**
	Trace Metals	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	
SPP Assays/NH3 Mit:	***Menidia beryllina***		**31248**
	Americamysis bahia		
	Arbacia punctulata		
Bioaccumulation Study:	***Macoma nasuta***		**31249**
	Nereis virens		**31250**
Tissue Analysis:	**Trace Metals**	**Yes / No**	
	PAH Compounds	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	

Tissue analyses completed by Alpha Analytical

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\Study Number Log.wpd

U.S. ARMY C[illegible] OF ENGINEERS

31292

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (*Signature*) RICHARD LOYD [signature]

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE TESTING	SUSPENDED PHASE TOX.	10-DAY WHOLE SED. TOX.	28-DAY BIOACCUM.			REMARKS
1	10/23	11:25	/		COMP V',W'	2	/	/					STATIONS V',W'
2	10/23	12:15	/		COMP R',S'	8	/	/	/	/			STATIONS R',S'
3	10/23	15:27	/		~~COMP~~ CAD 1-3	9	/	/	/	/			STATIONS CAD-1, CAD-2, CAD-3

Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
[signature]	10/23 1800	[signature]	[signature]	10/24/18 1015	[signature]
Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
Relinquished by: (*Signature*)	Date/Time	Received for Laboratory by: (*Signature*)	Date/Time	REMARKS	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

31242

ENSR

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE / AECOM	Project Location: New Haven Harbor / CONTRAC CT Disposal Sites
Project Number: 60588790	Field Logbook No.:
Sampler (Print Name)/(Affiliation): K. van Naarssen / AECOM	Chain of Custody Tape Nos.: N/A
Signature:	Send Results/Report to: K. van Naarssen
	TAT: As per work plan

Analysis Requested

Container Type: P – Plastic, A – Amber Glass, G – Clear Glass, V – VOA Vial, O – Other, E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water, WW – Wastewater, GW – Groundwater, SW – Surface Water, ST – Storm Water, W – Water, S – Soil, SL – Sludge, SD – Sediment, SO – Solid, A – Air, L – Liquid, P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Elutriate Prep	SPP Assay	10-Day Tox	28-Day Tox/Tissue							Lab I.D.	Remarks
*	NHH-CLDS	10/23/18	10:28	X (6)	X	3.5 G (6)	SD	7	No	X	X	X	X								For work
*	NHH-CLDS	10/23/18	13:12	X	X	5 G (10)	SW	7	No	X	X										plan / RIM

Relinquished by: (Print Name)/(Affiliation) K. van Naarssen / AECOM	Date: 10/23/18	Received by: (Print Name)/(Affiliation) Charles Nixon	Date: 10/23
Signature:	Time: 17:15	Signature:	Time: 1715
Relinquished by: (Print Name)/(Affiliation) Charles Nixon AECOM	Date: 10/24	Received by: (Print Name)/(Affiliation)	Date: 10/24/18
Signature:	Time: 1015	Signature:	Time: 1015
Relinquished by: (Print Name)/(Affiliation)	Date:	Received by: (Print Name)/(Affiliation)	Date:
Signature:	Time:	Signature:	Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 02668

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/24/18 1015	Date and TIme Logged into Lab:	10/31/18 1630
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	5	Custody Seals intact?	NA
Number of COC Pages:	2		
COC Serial Number(s):	02668		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp V',W' Station V'	31242-001	S	Elutriate Prep, SPP Assay	1x3.5gal	4 C	Yes
Comp V',W' Station W'	31242-002	S	Elutriate Prep, SPP Assay	1x3.5gal	4 C	Yes
Comp R',S' Station R'	31242-003	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp R',S' Station S'	31242-004	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 1	31242-005	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 2	31242-006	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 3	31242-007	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
NHH-CLDS	31242-008	S	10-Day Solid Phase, 28-Day Bioaccumulation	6x3.5gal	4 C	Yes
NHH-CLDS	31242-009	W	SPP Assay, 10-Day Solid Phase, 28-Day Bioaccumulation	10x3.5gal	4 C	Yes

Notes and qualifications:

See COC

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOID [illegible] B. Loid

	STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE PREP	SUSPENDED PHASE TOX	10-DAY WHOLE SED TOX	28-DAY BIOACCUM			REMARKS
10/611	1	10/24		/		COMP TB 1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
112/013	2	10/24		/		COMP DS 1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
014	3					COMP US 1-2	8	/	/					WATER FROM NEW HAVEN HBR
015	4					COMP DS 1-2	8	/	/					
016	5					COMP TB 1-2	6	/	/					
017	6					COMP CAD 1,2,3	6	/	/					
-018 ~~017~~	7					COMP V' W'	6	/	/					
-022 ~~018~~	8					COMP R' S'	8	/	/					
(E3) NR 12/11/18														

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[illegible] B. Loid	10/24 1545	Charles Nixon 10/24 1525	[illegible]	10/25 0935	[illegible]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	
				CAD 1,2,3 7 subsamples received DS 1-2 6 subsamples received	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUST[illegible]DY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOID [signature]

	STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE TREP	SUSPENDED PARTICULATE	10 DAY WHOLE EFFLUENT	28-DAY BIOACCUM			REMARKS
0/11	1	10/24	11:46	/		COMP TB1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
1/12	2	10/24	10:06	/		COMP DS1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
0:14	3	10/24	11:30			COMP US1-2	8	/	/					WATER FROM NEW HAVEN HBR
0:15	4	10/24	11:45			COMP DS1-2	8	/	/					
0:16	5	10/24	12:00			COMP TB1-2	6	/	/					
0:17	6	10/24	12:15			COMP CAD1,2,3	6	/	/					
0:17	7	10/24	12:30			COMP U'W'	6	/	/					
0:18	8	10/24	12:45			COMP R'S'	8	/	/					

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	10/24 1545	Charles N. Von 10/24 1525	[signature]	10/24 [illegible]	[signature]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	
				CAD 1,2,3 7 cubitainers received DS1-2 6 cubitainers received	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

[signature] Digitally signed by LOID.RICHARD.B.1274603340 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=LOID.RICHARD.B.1274603340 Date: 2018.11.01 11:03:22 -04'00'

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/25/18 0835	Date and TIme Logged into Lab:	11/27/18 1240
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp TB-1-2, Station TB-1	31242-010	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp TB-1-2, Station TB-2	31242-011	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-1	31242-012	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-2	31242-013	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	1x3.5gal	4 C	Yes
Comp US 1-2	31242-014	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes
Comp DS 1-2	31242-015	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes
Comp TB 1-2	31242-016	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp CAD 1,2,3	31242-017	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp V',W'	31242-018	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp R',S'	31242-022	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes

Notes and qualifications:

See COC

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA Analytical Laboratories

8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab:

~~ALPHA Job #:~~

Project Information

Project Name: NEW HAVEN HARBOR
Project Location: NEW HAVEN, CT
Project #:
Project Manager: RICHARD LOYD
ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: US ARMY CORPS OF ENG.
Address: 696 VIRGINIA RD CONCORD, MA 01742
Phone: 978-318-8048
Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:

ANALYSIS: ELUTRIATE PREP; SPP TOX.; 10-DAY WHOLE SED TOX; 28-DAY BIOACCUM

SAMPLE INFO
Filtration: ☐ Field ☐ Lab to do
Preservation: ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ELUTRIATE PREP	SPP TOX.	10-DAY WHOLE SED TOX	28-DAY BIOACCUM	Sample Comments	TOTAL # BOTTLES
	COMP DS 1-2	10/25	9:46	SE	RBL	/	/	/	/	STATION DS-23	
	COMP US 1-2	10/25	10:23	SE	RBL	/	/	/	/	STATIONS US19-28	
Container Type						P	P	P	P		
Preservative						A	A	A	A		

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/25 13:30	[signature]	10/25 1350
[signature]	10/25 1820	[signature]	10/25/18 1820

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/25/18 1820	Date and TIme Logged into Lab:	11/27/18 1245
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp US-1-2, Station US-1	31242-019	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp US-1-2, Station US-2	31242-020	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-2	31242-023	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes

Notes and qualifications:

See COC

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 31243-101 Composite Final Volume: ~28g

Composite Matrix: Solid Composite Container(s): 8x3.5gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1545

Initials: MS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
R	31242-003	Solid	None	50mL	~14g	moist dark gray mud, some shells excluded
S	31242-004	Solid	None	50mL	~14g	moist dark gray mud, some shells exclude

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 31243-102 Composite Final Volume: ≈ 28 gal

Composite Matrix: Solid Composite Container(s): 8x 3.5 gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 2030

Initials: GRS/MS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
US-1	31242-019	S	—	≈ 10mL	≈ 1/4 gal	Leaves, sticks
US-2	31242-020	S	—	≈ 10mL	≈ 1/4 gal	Leaves, sticks

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 31243-103 Composite Final Volume: ≈28gal

Composite Matrix: Solid Composite Container(s): 8x3.5gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 1000

Initials: BG/LAG

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
DS-1	31242-012	S	—	≈ 60mL	≈14gal	
DS-2	31242-08-023	S	—	≈ 100mL rocks	≈14gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 31243-104 Composite Final Volume: ≈25 gal

Composite Matrix: Solid Composite Container(s): 8 x 2.5 gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 1110

Initials: CFS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
TB-1	31243-104	S	Na	2 Shells	≈14gal	
TB-2	31243-104	S	Na	Leaves	≈14gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 31243-105 Composite Final Volume: ≈31 gal

Composite Matrix: Solid Composite Container(s): 9×3.5 gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1115

Initials: BH

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
CAD-1	31242-005	S	—	≈1L	≈10 gal	shells and rock excluded
CAD-2	31242-006	S	—	≈500 mL	≈7 gal	↓
CAD-3	31242-007	S	—	≈1L	≈14 gal	↓
						All black sediment with a petroleum smell

Subsamples Removed:

Lab Number	Sample Use
31246	Elutriate Preparation

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Study: 31243 2 11/03

Client: AECOM

Project: New Haven

Day 01 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature °C	Salinity	pH value
Comp R,S	31243-101	605	19.7	28	7.56
Comp U,S	31243-102	606	19.4	30	7.47
Comp D,S	31243-103	607	19.8	32	7.61
Comp T,B	31243-104	608	19.9	30	7.59
Comp CAD	31243-105	609	20.0	32	7.75

Date: 11/03/18 pH Meter ID: ML02 Salinity Meter ID: ESI #1

Initial: BG

Day 01 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature °C	Salinity	pH value
Comp R,S	31243-101	610	20.2	30	7.62
Comp U,S	31243-102	611	20.2	30	7.57
Comp D,S	31243-103	612	20.2	30	7.64
Comp T,B	31243-104	613	20.4	30	7.60
Comp CAD	31243-105	614	20.2	30	7.75

Date: 11/03/18 pH Meter ID: ML02 Salinity Meter ID: ESI #1

Initial: DG

Study: 31242

Client: AECOM

Project: New Haven

Day 01 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Lab Control	31243-000	700	19.3	31	4.37
CLDS Ref	31242-009	701	11/07 18.4 20.1	31 30	4.61 7.68
Lab Control	31243-000	11/07 702 708	18.4	31	4.61
~~CLDS Ref~~ Lab Control	31242-009	703 709	21.0	~~36~~ 30	4.19
Comp V, W	31243-001	704 702	20.1	30	7.64
Comp R, S	31243-002	705 703	19.7	30	7.55
Comp U, S	31243-003	706 704	19.8	30	7.61
Comp D, S	31243-004	707 705	20.3	30	7.68
Comp T, B	31243-005	708 706	20.6	30	7.76
Comp CAD	31243-006	709 707	20.2	30	7.70

Date: 11/07/18 **pH Meter ID:** ML02 **Salinity Meter ID:** ESI #1

Initial: MS

Day 02 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	710	21.1	30	7.58
Comp R, S	31243-002	711	21.0	30	7.60
Comp U, S	31243-003	712	21.1	30	7.59
Comp D, S	31243-004	713	21.1	30	7.69
Comp T, B	31243-005	714	21.0	30	7.56
Comp CAD	31243-006	715	21.1	30	7.70

Date: 11/08/18 **pH Meter ID:** ML02 **Salinity Meter ID:** ESI#1

Initial: BV

Day 03 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	716	17.6	28	7.38
Comp R, S	31243-002	717	18.0	28	7.53
Comp U, S	31243-003	718	18.4	28	7.51
Comp D, S	31243-004	719	18.5	30	7.57
Comp T, B	31243-005	720	18.7	30	7.37
Comp CAD	31243-006	721	18.3	28	7.68

Date: 11/09/18 **pH Meter ID:** ML02 **Salinity Meter ID:** ESI#1

Initial: BV

Study: 31242

Client: AECOM

Project: New Haven

Day 04 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	722	20.7	30	7.40
Comp R, S	31243-002	723	20.1	32	7.48
Comp U, S	31243-003	724	20.1	30	7.42
Comp D, S	31243-004	725	20.1	30	7.48
Comp T, B	31243-005	726	20.2	32	7.38
Comp CAD	31243-006	727	20.4	30	7.58

Date: 11/10/18 **pH Meter ID:** MLO2 **Salinity Meter ID:** ESI #1

Initial: BG

Day 05 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp V, W	31243-001	728	20.5	30	7.33
Comp R, S	31243-002	729	19.5	30	7.38
Comp U, S	31243-003	730	19.5	30	7.43
Comp D, S	31243-004	731	19.5	30	7.43
Comp T, B	31243-005	732	19.5	30	7.38
Comp CAD	31243-006	733	19.0	31	7.57

Date: 11/11/18 **pH Meter ID:** MLO2 **Salinity Meter ID:** ESI #1

Initial: MS

Study: 31242

Client: AECOM

Project: New Haven

Day 06 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp U,S	31243-102	734	18.4	30	7.36
Comp T, B	31243-104	735	18.4	30	7.35

Date: 11/12/18 **pH Meter ID:** MLOZ **Salinity Meter ID:** ESI#1

Initial: BG

Day 07 Pore Water Quality

Field ID	ESI Code	Sample Number	Temperature	Salinity	pH value
Comp U, S	31243-102	736	17.8	28	7.29

Date: 11/13/18 **pH Meter ID:** MLRC **Salinity Meter ID:** ESI#1

Initial: BG

STUDY: 31243
CLIENT: AECOM
PROJECT: New Haven Harbor Supplemental 2018
ASSAY: Suspended Particulate Phase
TASK: Pore Water Ammonia Summary
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fracti
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solutio
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

Sample ID	Hour	ESI Code	Ammonia Total	Qual	Unionized	QLimit	Units	Sampled	Analyzed	L temp (EC)	M pH (SU)	N salinity (ppt)	O Tot NH3	P Temp (EK)	Q I	R pKa	S FNH3
Lab Day 01	24	31243-700	0.81		6.0E-06	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	19.3	4.37	31	0.81	292.45	0.64	9.319	7.4E-06
Lab Day 01	24	31243-708	0.78		9.4E-06	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	18.4	4.61	31	0.78	291.55	0.64	9.319	1.2E-05
Lab Day 02	48	31243-709	1.3		7.3E-06	0.5	mg/L as N	11/07/18 1100	11/09/18 1300	21.0	4.19	30	1.3	294.15	0.62	9.317	5.6E-06
Ref/CLDS Day 01	24	31243-701	2.3		0.0367	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.1	7.68	30	2.3	293.25	0.62	9.317	0.01594
Comp 001 (V', W')	24	31243-100	38		0.3361	0.2	mg/L as N	10/25/18 1000	10/25/18 1130	18.9	7.46	30	38	292.05	0.62	9.317	0.00885
Comp 001 (V', W')	48	31243-203	14		0.2371	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	20	7.71	30	14	293.15	0.62	9.317	0.01694
Comp 001 (V', W')	72	31243-209	15		0.1406	0.1	mg/L as N	10/27/18 1350	10/28/18	20.3	7.44	30	15	293.45	0.62	9.317	0.00937
Comp 001 (V', W')	96	31243-215	7.8		0.0560	0.1	mg/L as N	10/28/18 1145	10/28/18	17	7.43	30	7.8	290.15	0.62	9.317	0.00718
Comp 001 (V', W')	120	31243-221	5.2		0.0387	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.5	7.37	32	5.2	292.65	0.66	9.321	0.00744
Comp 001 (V', W')	24	31243-702	44		0.6405	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.1	7.64	30	44	293.25	0.62	9.317	0.01456
Comp 001 (V', W')	48	31243-710	25		0.3418	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.58	30	25	294.25	0.62	9.317	0.01367
Comp 001 (V', W')	72	31243-716	11		0.0744	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	17.6	7.38	28	11	290.75	0.57	9.312	0.00677
Comp 001 (V', W')	96	31243-722	6		0.0529	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.7	7.40	30	6	293.85	0.62	9.317	0.00881
Comp 001 (V', W')	120	31243-728	6		0.0444	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	20.5	7.33	30	6	293.65	0.62	9.317	0.0074
Comp 002 (R', S')	24	31243-101	27		0.3095	0.2	mg/L as N	10/25/18 1000	10/25/18 1130	18.4	7.59	30	27	291.55	0.62	9.317	0.01146
Comp 002 (R', S')	48	31243-204	15		0.2168	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	20	7.64	30	15	293.15	0.62	9.317	0.01445
Comp 002 (R', S')	72	31243-210	16		0.1413	0.1	mg/L as N	10/27/18 1350	10/28/18	19.8	7.43	30	16	292.95	0.62	9.317	0.00883
Comp 002 (R', S')	96	31243-216	8.4		0.0520	0.1	mg/L as N	10/28/18 1145	10/28/18	17	7.37	32	8.4	290.15	0.66	9.321	0.00619
Comp 002 (R', S')	120	31243-222	7.3		0.0577	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.7	7.39	32	7.3	292.85	0.66	9.321	0.00791
Comp 002 (R', S')	24	31243-600	33		#VALUE!	0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			33	#VALUE!	0	9.245	#VALUE!
Comp 002 (R', S')	48	31243-605	30		0.3575	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.7	7.56	28	30	292.85	0.57	9.312	0.01192
Comp 002 (R', S')	48	31243-610	34		0.4765	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.62	30	34	293.35	0.62	9.317	0.01401
Comp 002 (R', S')	24	31243-703	40		0.4608	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	19.7	7.55	30	40	292.85	0.62	9.317	0.01152
Comp 002 (R', S')	48	31243-711	25		0.3551	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.0	7.60	30	25	294.15	0.62	9.317	0.0142
Comp 002 (R', S')	72	31243-717	12		0.1178	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.0	7.53	28	12	291.15	0.57	9.312	0.00982
Comp 002 (R', S')	96	31243-723	8.7		0.0870	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.1	7.48	32	8.7	293.25	0.66	9.321	0.01
Comp 002 (R', S')	120	31243-729	8		0.0616	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.38	30	8	292.65	0.62	9.317	0.0077
Comp 003 (US-1, US-2)	24	31243-211	38		0.4108	0.2	mg/L as N	10/27/18 1350	10/28/18	21	7.48	30	38	294.15	0.62	9.317	0.01081
Comp 003 (US-1, US-2)	48	31243-217	22		0.1499	0.2	mg/L as N	10/28/18 1145	10/28/18	18	7.38	32	22	291.15	0.66	9.321	0.00682
Comp 003 (US-1, US-2)	72	31243-223	14		0.1250	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.8	7.44	32	14	292.95	0.66	9.321	0.00893
Comp 003 (US-1, US-2)	96	31243-227	8		0.0409	0.2	mg/L as N	10/30/18 0915	10/30/18 1345	13.8	7.39	32	8	286.95	0.66	9.321	0.00511
Comp 003 (US-1, US-2)	24	31243-601	40		#VALUE!	0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			40	#VALUE!	0	9.245	#VALUE!
Comp 003 (US-1, US-2)	48	31243-606	40		0.3756	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.4	7.47	30	40	292.55	0.62	9.317	0.00939
Comp 003 (US-1, US-2)	48	31243-611	40		0.5004	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.57	30	40	293.35	0.62	9.317	0.01251
Comp 003 (US-1, US-2)	24	31243-704	51		0.6784	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	19.8	7.61	30	51	292.95	0.62	9.317	0.0133
Comp 003 (US-1, US-2)	48	31243-712	32		0.4476	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.59	30	32	294.25	0.62	9.317	0.01399
Comp 003 (US-1, US-2)	72	31243-718	21		0.2029	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.4	7.51	28	21	291.55	0.57	9.312	0.00966
Comp 003 (US-1, US-2)	96	31243-724	11		0.0971	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.1	7.42	30	11	293.25	0.62	9.317	0.00882
Comp 003 (US-1, US-2)	120	31243-730	14		0.1209	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.43	30	14	292.65	0.62	9.317	0.00863
Comp 003 (US-1, US-2)	144	31243-734	10		0.0678	0.2	mg/L as N	11/12/18 1500	11/13/18 1100	18.4	7.36	30	10	291.55	0.62	9.317	0.00678
Comp 003 (US-1, US-2)	168	31243-736	4.6		0.0257	0.2	mg/L as N	11/13/18 1400	11/16/18 1330	17.8	7.29	28	4.6	290.95	0.57	9.312	0.00559
Comp 004 (DS-1, DS-2)	24	31243-212	31.8		0.4293	0.2	mg/L as N	10/27/18 1350	10/28/18	20	7.61	30	31.8	293.15	0.62	9.317	0.0135
Comp 004 (DS-1, DS-2)	48	31243-218	15		0.1542	0.1	mg/L as N	10/28/18 1145	10/28/18	18	7.56	32	15	291.15	0.66	9.321	0.01028
Comp 004 (DS-1, DS-2)	72	31243-224	13		0.1372	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	19.9	7.51	32	13	293.05	0.66	9.321	0.01055
Comp 004 (DS-1, DS-2)	96	31243-228	6.6		0.0465	0.2	mg/L as N	10/30/18 0915	10/30/18 1345	13.5	7.54	32	6.6	286.65	0.66	9.321	0.00704

STUDY: 31243
CLIENT: AECOM
PROJECT: New Haven Harbor Supplemental 2018
ASSAY: Suspended Particulate Phase
TASK: Pore Water Ammonia Summary
METHOD: SM 4500-NH3 G

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fracti
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2
Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solutio
FNH3 = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415
Tot NH3 = total ammonia, or QLimit if ND
pressure in FNH3 assumed to be 1 atm

				Ammonia						L	M	N	O	P	Q	R	S
Sample ID	**Hour**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (EC)	pH (SU)	salinity (ppt)	Tot NH3	Temp (EK)	I	pKa	FNH3
Comp 004 (DS-1, DS-2)	24	31243-602	36		#VALUE!	0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			36	#VALUE!	0	9.245	#VALUE!
Comp 004 (DS-1, DS-2)	48	31243-607	40		0.5262	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.8	7.61	32	40	292.95	0.66	9.321	0.01315
Comp 004 (DS-1, DS-2)	48	31243-612	31		0.4546	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.64	30	31	293.35	0.62	9.317	0.01466
Comp 004 (DS-1, DS-2)	24	31243-705	48		0.7764	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.3	7.68	30	48	293.45	0.62	9.317	0.01618
Comp 004 (DS-1, DS-2)	48	31243-713	32		0.5615	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.69	30	32	294.25	0.62	9.317	0.01755
Comp 004 (DS-1, DS-2)	72	31243-719	16		0.1766	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.5	7.57	30	16	291.65	0.62	9.317	0.01104
Comp 004 (DS-1, DS-2)	96	31243-725	8.4		0.0850	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.1	7.48	30	8.4	293.25	0.62	9.317	0.01012
Comp 004 (DS-1, DS-2)	120	31243-731	10		0.0863	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.43	30	10	292.65	0.62	9.317	0.00863
Comp 005 (TB-1, TB-2)	24	31243-205	31		0.5132	0.5	mg/L as N	10/25/18 1000	10/25/18 1130	20	7.70	30	31	293.15	0.62	9.317	0.01656
Comp 005 (TB-1, TB-2)	48	31243-213	18		0.1439	0.1	mg/L as N	10/27/18 1350	10/28/18	20	7.38	30	18	293.15	0.62	9.317	0.00799
Comp 005 (TB-1, TB-2)	72	31243-219	13		0.0917	0.1	mg/L as N	10/28/18 1145	10/28/18	18	7.39	30	13	291.15	0.62	9.317	0.00705
Comp 005 (TB-1, TB-2)	96	31243-225	13		0.0959	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	20	7.35	32	13	293.15	0.66	9.321	0.00738
Comp 005 (TB-1, TB-2)	24	31243-603	45		#VALUE!	0.2	mg/L as N	11/02/18 1250	11/05/18 1030	No data			45	#VALUE!	0	9.245	#VALUE!
Comp 005 (TB-1, TB-2)	48	31243-608	38		0.4866	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	19.9	7.59	30	38	293.05	0.62	9.317	0.0128
Comp 005 (TB-1, TB-2)	48	31243-613	40		0.5436	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.4	7.60	30	40	293.55	0.62	9.317	0.01359
Comp 005 (TB-1, TB-2)	24	31243-706	50		0.9907	1	mg/L as N	11/07/18 1100	11/08/18 1030	20.6	7.76	30	50	293.75	0.62	9.317	0.01981
Comp 005 (TB-1, TB-2)	48	31243-714	23		0.2983	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.0	7.56	30	23	294.15	0.62	9.317	0.01297
Comp 005 (TB-1, TB-2)	72	31243-720	9.5		0.0674	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.7	7.37	30	9.5	291.85	0.62	9.317	0.0071
Comp 005 (TB-1, TB-2)	96	31243-726	9.5		0.0762	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.2	7.38	32	9.5	293.35	0.66	9.321	0.00802
Comp 005 (TB-1, TB-2)	120	31243-732	12		0.0924	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.5	7.38	30	12	292.65	0.62	9.317	0.0077
Comp 005 (TB-1, TB-2)	144	31243-735	6.1		0.0404	0.2	mg/L as N	11/12/18 1500	11/13/18 1100	18.4	7.35	30	6.1	291.55	0.62	9.317	0.00663
Comp 006 (CAD-1, CAD-2, CAD-3)	24	31243-102	12		0.3011	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	18.9	7.92	30	12	292.05	0.62	9.317	0.02509
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-206	5.5		0.0760	0.5	mg/L as N	10/26/18 1000	10/26/18 1145	20	7.62	30	5.5	293.15	0.62	9.317	0.01381
Comp 006 (CAD-1, CAD-2, CAD-3)	72	31243-214	4.2		0.0590	0.1	mg/L as N	10/27/18 1350	10/28/18	20	7.63	31	4.2	293.15	0.64	9.319	0.01405
Comp 006 (CAD-1, CAD-2, CAD-3)	96	31243-220	3		0.0325	0.1	mg/L as N	10/28/18 1145	10/28/18	19	7.55	32	3	292.15	0.66	9.321	0.01082
Comp 006 (CAD-1, CAD-2, CAD-3)	120	31243-226	3		0.0374	0.2	mg/L as N	10/29/18 1130	10/29/18 1130	20	7.58	32	3	293.15	0.66	9.321	0.01247
Comp 006 (CAD-1, CAD-2, CAD-3)	24	31243-604	13		#VALUE!	0.1	mg/L as N	11/02/18 1250	11/02/18 1000	No data			13	#VALUE!	0	9.245	#VALUE!
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-609	14		0.2567	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20	7.75	32	14	293.15	0.66	9.321	0.01833
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-614	18		0.3386	0.2	mg/L as N	11/03/18 1300	11/05/18 1030	20.2	7.75	30	18	293.35	0.62	9.317	0.01881
Comp 006 (CAD-1, CAD-2, CAD-3)	24	31243-707	16		0.2688	0.5	mg/L as N	11/07/18 1100	11/08/18 1030	20.2	7.70	30	16	293.35	0.62	9.317	0.0168
Comp 006 (CAD-1, CAD-2, CAD-3)	48	31243-715	11		0.1974	0.5	mg/L as N	11/08/18 1000	11/09/18 1300	21.1	7.70	30	11	294.25	0.62	9.317	0.01795
Comp 006 (CAD-1, CAD-2, CAD-3)	72	31243-721	6		0.0847	0.5	mg/L as N	11/09/18 1130	11/09/18 1300	18.3	7.68	28	6	291.45	0.57	9.312	0.01412
Comp 006 (CAD-1, CAD-2, CAD-3)	96	31243-727	4.2		0.0545	0.5	mg/L as N	11/10/18 1330	11/12/18 1100	20.4	7.58	30	4.2	293.55	0.62	9.317	0.01299
Comp 006 (CAD-1, CAD-2, CAD-3)	120	31243-733	3.5		0.0399	0.5	mg/L as N	11/11/18 1300	11/12/18 1100	19.0	7.57	31	3.5	292.15	0.64	9.319	0.01139

Highlighted data are pre-assay results (Day -01 and -02) presented in Table 9

10 DAY SEDIMENT ASSAY

Study #:	31245	**Water Bath ID**	6
Project:	New Haven Harbor	**Client:**	AECOM

Summary of Test Conditions

Exposure	Species Used
Test Mode: In-Life: Static renewal 1 volume replacement daily **Length of Assay:** 10 days	(Check box for all that apply) ☑ Mysid Shrimp (*Americamysis bahia*) ☐ Marine Amphipod *(Leptocheirus plumulosus)*

Water Quality Parameters

Salinity: *A.bahia:* 30 ± 2 ppt *L. plumulosus:* 20 ± 2 ppt **pH:** 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark **Temperature:** 20 ± 1 °C

Test Chamber	Solution & Sediment Volume
(Check box for all that apply) ☑ 1000 mL beaker ☐ other _____	(Check box for all that apply) ☑ 2 cm (~175mL) homogenized sediment ☐ ~800 mL overlying water ☑ other 725mL OW

Replicate Information

A.bahia and L. plumulosus:

- 5 Reps per treatment for survival endpoint
- 1 surrogate replicate for water quality (*Lp* only)
- 20 organisms per chamber
- Continuous aeration from start

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed then rinsed with deionized water (EPA 2002).	Laboratory Control, Reference Site, and Site Sediments

Feeding

A.bahia: Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii*	*L. plumulosus:* NONE

Date: 11/09/18 Initial JTP

034bAR011 0818

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species AMERICAMYSIS bahia

Source: Lab reared ✓ Hatchery reared ____ Field collected ____

Hatch date 11-5-18 Receipt date ____

Lot number 110518MS Strain ____

Brood origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ≈28 ppt D.O. — ppm

pH 7.8 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater ____ Saltwater ✓ Other ____

Recirculating ✓ Flow through ____ Static renewal ____

DIET: Flake food ✓ Phytoplankton ____ Trout chow ____

Artemia ✓ Rotifers ____ YCT ____ Other ENCAP. SHRIMP DIET

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: ESI # of Organisms 1000+

Carrier: ____ Date shipped 11-8-18

Biologist: Mark Rosengren

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

DAY10 Sediment Assay Data Summary

STUDY #: 31245 **WATER BATH ID:** 6

CLIENT: AECOM **PROJECT:** New Haven Harbor

INITIATION RECORD			
Species:	*Americamysis bahia*	Counted by:	BG
Organism Lot ID:	03AbAR0110818	Added by:	BG
Number of Organisms added to each vessel:	20	Temp Data Logger No:	010015860

DAILY LOG				
Day	Daily Water Quality Performed Date / Initials	Renew Daily (One Exchange)	Feeding[1] (A - 5179)	Biological Observations[2] (N= Normal)
0*	11/09/18 BG	✓	✓	N
1	11/10/18 BG	✓	✓	N
2	11/11/18 MS	✓	✓	N
3	11/12/18 MS	✓	✓	N
4	11/13/18 MS	✓	✓	N
5	11/14/18 MS	✓	✓	N
6	11/15/18 MS	✓	✓	N
7	11/16/18 BG	✓	✓	N
8	11/17/18 BG	✓	✓	N
9	11/18/18 MS	✓	✓	N
10*	11/19/18 MS	✓	✓	N

*On Day 0 and Day 10 water quality parameters were performed on all beakers.

[1]Mysid were fed < 24 hour old brine shrimp twice daily.

[2]Organisms were monitored daily. Due to the study design and the nature of each sample matrix it maybe difficult to achieve accurate counts until termination. If organisms appear to be active in the water column they are likely in good health (N=normal) unless otherwise noted.

Overlying water collected for NH_3	Day 0	Initial: BG
	Day 3	Initial: MS
	Day 10	Initial: MS

Comments

STUDY: 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Americamysis bahia* 10 Day Solid Phase Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.18	94.2		43815	28.31
Minimum:	19.7	6.19	85.2	6.69	38619	24.60
Maximum:	21.7	7.68	99.0	8.17	50129	32.89

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	00	11/9/2018 17:39:04	20.3	7.34	94.9	7.71	43410	28.02
Laboratory Control	B	00	11/9/2018 17:39:35	20.1	7.63	98.5	7.75	43932	28.39
Laboratory Control	C	00	11/9/2018 17:40:01	20.2	7.65	98.9	7.75	43878	28.35
Laboratory Control	D	00	11/9/2018 17:40:21	20.2	7.65	98.9	7.76	43855	28.34
Laboratory Control	E	00	11/9/2018 17:40:43	20.2	7.66	99.0	7.76	43806	28.30
CLDS Reference	A	00	11/9/2018 17:41:12	20.0	7.48	96.4	7.82	43972	28.42
CLDS Reference	B	00	11/9/2018 17:41:33	19.8	7.50	96.7	7.85	44642	28.91
CLDS Reference	C	00	11/9/2018 17:41:59	20.0	7.56	97.4	7.85	43892	28.37
CLDS Reference	D	00	11/9/2018 17:42:24	20.1	7.65	98.7	7.86	43920	28.39
CLDS Reference	E	00	11/9/2018 17:43:06	20.4	7.58	98.4	7.86	43888	28.36
Composite 2	A	00	11/9/2018 17:43:35	20.1	7.59	98.1	7.89	43926	28.39
Composite 2	B	00	11/9/2018 17:43:59	19.9	7.68	98.8	7.89	44011	28.45
Composite 2	C	00	11/9/2018 17:44:23	20.0	7.53	97.0	7.90	43851	28.34
Composite 2	D	00	11/9/2018 17:44:50	20.2	7.53	97.3	7.91	43833	28.32
Composite 2	E	00	11/9/2018 17:45:10	20.5	7.49	97.3	7.93	43910	28.37
Composite 3	A	00	11/9/2018 17:45:40	20.0	7.32	94.5	7.92	44387	28.72
Composite 3	B	00	11/9/2018 17:46:08	19.7	7.37	94.9	7.92	45116	29.25
Composite 3	C	00	11/9/2018 17:46:33	20.0	7.49	96.5	7.92	44135	28.54
Composite 3	D	00	11/9/2018 17:46:57	20.1	7.61	98.3	7.92	44166	28.56
Composite 3	E	00	11/9/2018 17:47:21	20.3	7.50	97.3	7.92	44168	28.56
Composite 4	A	00	11/9/2018 17:47:53	20.3	7.44	96.6	7.91	44300	28.66
Composite 4	B	00	11/9/2018 17:48:45	20.2	7.33	95.1	7.90	44301	28.66
Composite 4	C	00	11/9/2018 17:49:16	20.3	7.42	96.2	7.96	44143	28.54
Composite 4	D	00	11/9/2018 17:49:40	20.3	7.52	97.5	7.92	44147	28.55
Composite 4	E	00	11/9/2018 17:50:10	20.3	7.42	96.4	7.91	44228	28.61
Composite 5	A	00	11/9/2018 17:50:35	20.6	7.22	94.1	7.90	44177	28.57
Composite 5	B	00	11/9/2018 17:50:57	20.6	7.48	97.7	7.90	44276	28.64
Composite 5	C	00	11/9/2018 17:51:13	20.6	7.44	97.1	7.90	44391	28.72
Composite 5	D	00	11/9/2018 17:51:47	20.5	7.38	96.3	7.91	44309	28.66
Composite 5	E	00	11/9/2018 17:52:11	20.4	7.53	97.9	7.90	44218	28.60
Composite 6	A	00	11/9/2018 17:52:49	20.7	7.37	96.3	7.89	44288	28.64
Composite 6	B	00	11/9/2018 17:53:13	20.8	7.45	97.7	7.89	44569	28.85
Composite 6	C	00	11/9/2018 17:53:37	20.8	7.40	97.0	7.92	44188	28.57
Composite 6	D	00	11/9/2018 17:53:56	20.6	7.48	97.6	7.90	44290	28.65
Composite 6	E	00	11/9/2018 17:54:20	20.8	7.47	97.7	7.90	44256	28.62
Laboratory Control	A	01	11/10/2018 16:11:00	21.6	7.06	95.7	7.66	45826	29.75
CLDS Reference	A	01	11/10/2018 16:11:33	21.4	7.01	95.1	7.82	46563	30.28
Composite 2	A	01	11/10/2018 16:11:58	21.4	6.92	93.9	7.90	46580	30.30
Composite 3	A	01	11/10/2018 16:12:22	21.5	7.05	95.9	7.92	46880	30.51
Composite 4	A	01	11/10/2018 16:12:41	21.6	6.90	94.0	7.92	46666	30.36
Composite 5	A	01	11/10/2018 16:13:04	21.7	6.68	91.1	7.91	46633	30.33
Composite 6	A	01	11/10/2018 16:13:27	21.7	6.95	94.8	7.92	46794	30.45
Laboratory Control	A	02	11/11/2018 10:56:41	21.1	7.13	94.1	6.69	45092	29.22
CLDS Reference	A	02	11/11/2018 10:57:03	20.9	7.30	96.2	7.31	45469	29.50
Composite 2	A	02	11/11/2018 10:57:26	20.9	7.18	94.7	7.58	45377	29.43
Composite 3	A	02	11/11/2018 10:57:42	21.0	7.12	94.0	7.66	45807	29.74

STUDY: 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Americamysis bahia* 10 Day Solid Phase Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.18	94.2		43815	28.31
Minimum:	19.7	6.19	85.2	6.69	38619	24.60
Maximum:	21.7	7.68	99.0	8.17	50129	32.89

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	A	02	11/11/2018 10:57:59	21.1	7.09	93.9	7.72	45755	29.70
Composite 5	A	02	11/11/2018 10:58:15	21.2	7.03	93.4	7.75	46008	29.88
Composite 6	A	02	11/11/2018 10:58:26	21.2	7.08	94.0	7.76	45757	29.70
Laboratory Control	A	03	11/12/2018 10:33:46	21.2	7.15	93.8	7.54	44620	28.88
CLDS Reference	A	03	11/12/2018 10:34:07	21.0	7.16	93.8	7.67	45054	29.19
Composite 2	A	03	11/12/2018 10:34:25	21.1	7.17	94.3	7.74	45824	29.75
Composite 3	A	03	11/12/2018 10:34:44	21.1	7.04	92.3	7.77	45066	29.20
Composite 4	A	03	11/12/2018 10:35:08	21.2	7.20	94.6	7.79	44908	29.09
Composite 5	A	03	11/12/2018 10:35:36	21.2	7.16	94.3	7.81	45405	29.45
Composite 6	A	03	11/12/2018 10:36:01	21.3	7.08	93.7	7.82	46290	30.09
Laboratory Control	A	04	11/13/2018 09:00:12	21.4	7.04	93.5	7.65	43626	28.16
CLDS Reference	A	04	11/13/2018 09:00:40	21.3	7.19	95.3	7.79	43931	28.38
Composite 2	A	04	11/13/2018 09:01:03	21.3	7.04	93.6	7.85	44354	28.69
Composite 3	A	04	11/13/2018 09:01:21	21.3	7.09	94.1	7.88	44090	28.50
Composite 4	A	04	11/13/2018 09:01:34	21.4	7.01	93.3	7.87	44252	28.61
Composite 5	A	04	11/13/2018 09:01:52	21.4	7.06	94.0	7.87	44041	28.46
Composite 6	A	04	11/13/2018 09:02:19	21.5	6.95	92.7	7.87	44429	28.74
Laboratory Control	A	05	11/14/2018 10:56:50	21.0	6.86	90.6	7.69	45577	29.57
CLDS Reference	A	05	11/14/2018 10:57:08	20.9	6.89	90.8	7.75	45733	29.69
Composite 2	A	05	11/14/2018 10:57:25	20.9	6.80	90.1	7.77	46423	30.19
Composite 3	A	05	11/14/2018 10:57:53	20.9	6.67	88.2	7.81	46251	30.06
Composite 4	A	05	11/14/2018 10:58:16	21.0	6.47	85.8	7.79	46615	30.33
Composite 5	A	05	11/14/2018 10:58:38	21.1	6.61	87.7	7.83	46140	29.98
Composite 6	A	05	11/14/2018 10:58:56	21.1	6.73	89.5	7.81	46436	30.19
Laboratory Control	A	06	11/15/2018 10:02:46	20.8	7.12	92.2	7.68	44577	28.85
CLDS Reference	A	06	11/15/2018 10:03:05	20.7	7.22	93.5	7.74	44997	29.16
Composite 2	A	06	11/15/2018 10:03:32	20.8	7.12	92.5	7.82	45804	29.74
Composite 3	A	06	11/15/2018 10:03:47	20.8	7.15	92.9	7.88	45698	29.66
Composite 4	A	06	11/15/2018 10:04:03	20.9	7.10	93.0	7.86	47043	30.64
Composite 5	A	06	11/15/2018 10:04:24	21.0	6.94	90.5	7.94	45525	29.54
Composite 6	A	06	11/15/2018 10:04:41	21.0	7.12	93.0	7.89	45762	29.71
Laboratory Control	A	07	11/16/2018 11:36:19	21.2	6.63	90.7	7.79	47148	30.71
CLDS Reference	A	07	11/16/2018 11:36:42	21.1	6.36	86.9	7.88	47499	30.97
Composite 2	A	07	11/16/2018 11:36:59	21.1	6.48	89.2	7.94	49062	32.11
Composite 3	A	07	11/16/2018 11:37:22	21.1	6.48	88.9	8.05	48249	31.51
Composite 4	A	07	11/16/2018 11:37:55	21.2	6.22	86.1	8.02	50129	32.89
Composite 5	A	07	11/16/2018 11:38:13	21.2	6.19	85.2	8.12	48270	31.53
Composite 6	A	07	11/16/2018 11:38:39	21.3	6.30	86.8	8.01	48479	31.68
Laboratory Control	A	08	11/17/2018 10:28:24	21.2	6.74	90.6	7.77	47046	30.64
CLDS Reference	A	08	11/17/2018 10:29:05	21.0	7.02	93.7	7.87	46048	29.91
Composite 2	A	08	11/17/2018 10:29:24	21.0	7.12	95.3	7.93	46680	30.37
Composite 3	A	08	11/17/2018 10:29:49	21.1	6.57	88.0	8.01	46543	30.27

STUDY: 31245
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ASSAY: *Americamysis bahia* 10 Day Solid Phase Evaluation
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	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.18	94.2		43815	28.31
Minimum:	19.7	6.19	85.2	6.69	38619	24.60
Maximum:	21.7	7.68	99.0	8.17	50129	32.89

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	A	08	11/17/2018 10:30:11	21.2	6.63	89.2	7.99	47158	30.72
Composite 5	A	08	11/17/2018 10:30:46	21.3	6.37	86.2	8.17	48060	31.37
Composite 6	A	08	11/17/2018 10:31:04	21.3	6.76	91.0	8.05	46915	30.54
Laboratory Control	A	09	11/18/2018 10:48:08	20.9	7.33	94.9	7.43	42271	27.20
CLDS Reference	A	09	11/18/2018 10:48:40	20.7	7.35	95.1	7.68	42897	27.65
Composite 2	A	09	11/18/2018 10:49:01	20.9	7.35	95.9	7.80	44169	28.56
Composite 3	A	09	11/18/2018 10:49:23	20.9	7.28	94.3	7.91	42600	27.43
Composite 4	A	09	11/18/2018 10:49:49	20.9	7.28	94.0	7.92	41616	26.73
Composite 5	A	09	11/18/2018 10:50:06	21.0	7.11	92.6	8.07	43437	28.03
Composite 6	A	09	11/18/2018 10:50:17	21.0	7.18	94.1	7.97	44484	28.78
Laboratory Control	A	10	11/19/2018 14:43:27	21.2	7.49	97.1	7.57	38828	24.75
Laboratory Control	B	10	11/19/2018 14:43:43	21.2	7.46	97.0	7.63	39615	25.30
Laboratory Control	C	10	11/19/2018 14:43:55	21.2	7.46	96.9	7.65	39351	25.12
Laboratory Control	D	10	11/19/2018 14:44:09	21.2	7.49	97.1	7.67	38825	24.75
Laboratory Control	E	10	11/19/2018 14:44:22	21.2	7.43	96.5	7.69	39156	24.98
CLDS Reference	A	10	11/19/2018 14:44:36	20.9	7.43	96.1	7.73	39797	25.44
CLDS Reference	B	10	11/19/2018 14:44:48	20.9	7.38	96.4	7.76	41861	26.90
CLDS Reference	C	10	11/19/2018 14:45:05	21.2	7.29	94.9	7.78	39809	25.44
CLDS Reference	D	10	11/19/2018 14:45:22	21.2	7.35	95.4	7.79	39271	25.06
CLDS Reference	E	10	11/19/2018 14:45:45	21.2	7.34	95.6	7.79	40032	25.60
Composite 2	A	10	11/19/2018 14:46:15	21.2	7.33	95.3	7.90	39763	25.41
Composite 2	B	10	11/19/2018 14:46:32	21.1	7.40	96.0	7.93	39388	25.14
Composite 2	C	10	11/19/2018 14:46:53	21.1	7.38	96.3	7.96	40905	26.22
Composite 2	D	10	11/19/2018 14:47:12	21.2	7.21	93.9	7.97	39911	25.51
Composite 2	E	10	11/19/2018 14:47:27	21.3	7.39	96.4	7.97	39886	25.50
Composite 3	A	10	11/19/2018 14:47:45	21.2	7.29	94.7	7.99	39628	25.31
Composite 3	B	10	11/19/2018 14:48:00	20.4	7.22	95.1	7.99	45975	29.87
Composite 3	C	10	11/19/2018 14:48:14	21.1	7.26	94.7	8.02	40853	26.18
Composite 3	D	10	11/19/2018 14:48:38	21.2	7.25	94.5	8.05	39948	25.54
Composite 3	E	10	11/19/2018 14:49:00	21.2	7.28	94.7	8.07	39663	25.34
Composite 4	A	10	11/19/2018 14:49:23	21.2	7.22	94.1	8.03	40129	25.67
Composite 4	B	10	11/19/2018 14:49:38	21.2	7.29	94.6	8.02	38958	24.84
Composite 4	C	10	11/19/2018 14:50:01	21.1	7.25	94.2	8.02	39780	25.42
Composite 4	D	10	11/19/2018 14:50:22	21.2	7.29	94.5	8.01	38945	24.83
Composite 4	E	10	11/19/2018 14:52:12	21.2	7.25	94.3	8.01	39407	25.16
Composite 5	A	10	11/19/2018 14:52:36	21.3	7.17	93.0	8.12	38619	24.60
Composite 5	B	10	11/19/2018 14:53:05	21.3	7.07	92.2	8.11	39789	25.43
Composite 5	C	10	11/19/2018 14:53:31	21.3	7.15	93.2	8.07	39797	25.43
Composite 5	D	10	11/19/2018 14:53:51	21.2	7.21	93.9	8.09	39770	25.41
Composite 5	E	10	11/19/2018 14:54:09	21.2	7.15	93.2	8.13	40056	25.62
Composite 6	A	10	11/19/2018 14:54:46	21.3	7.08	92.5	7.97	40411	25.87
Composite 6	B	10	11/19/2018 14:55:04	21.3	7.21	94.1	7.93	39896	25.50
Composite 6	C	10	11/19/2018 14:55:22	21.3	7.12	92.9	7.92	40108	25.65
Composite 6	D	10	11/19/2018 14:55:47	21.3	7.26	94.9	7.92	40492	25.93
Composite 6	E	10	11/19/2018 14:56:08	21.3	7.13	93.7	7.90	41502	26.64

STUDY: 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Americamysis bahia* 10 Day Solid Phase Evaluation

TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

Sample ID	Day	ESI Code	Total	Qual	Ammonia Unionized	QLimit	Units	Sampled	Analyzed
Laboratory Control	00	31245-100	0.15		0.0026	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
CLDS Reference Site	00	31245-101	ND		0.0022	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
Composite 2	00	31245-102	1.6		0.0413	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
Composite 3	00	31245-103	1.8		0.0493	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
Composite 4	00	31245-104	2.2		0.0602	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
Composite 5	00	31245-105	2.5		0.0684	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
Composite 6	00	31245-400	0.61		0.0164	0.1	mg/L as N	11/09/18 1200	11/12/18 1100
Laboratory Control	03	31245-200	0.63		0.0080	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
CLDS Reference Site	03	31245-201	0.13		0.0022	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
Composite 2	03	31245-202	3		0.0590	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
Composite 3	03	31245-203	1.6		0.0338	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
Composite 4	03	31245-204	1.8		0.0401	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
Composite 5	03	31245-205	3.4		0.0790	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
Composite 6	03	31245-206	ND		0.0024	0.1	mg/L as N	11/12/18 1000	11/12/18 1100
Laboratory Control	10	31245-300	0.56		0.0078	0.1	mg/L as N	11/19/18 1100	11/20/18 1100
CLDS Reference Site	10	31245-301	0.15		0.0029	0.1	mg/L as N	11/19/18 1100	11/20/18 1100
Composite 2	10	31245-302	0.21		0.0061	0.1	mg/L as N	11/19/18 1100	11/20/18 1100
Composite 3	10	31245-303	0.16		0.0057	0.1	mg/L as N	11/19/18 1100	11/20/18 1100
Composite 4	10	31245-304	0.31		0.0120	0.1	mg/L as N	11/19/18 1100	11/20/18 1100
Composite 5	10	31245-305	0.21		0.0101	0.1	mg/L as N	11/19/18 1100	11/20/18 1100
Composite 6	10	31245-306	ND		0.0034	0.1	mg/L as N	11/19/18 1100	11/20/18 1100

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and USEPA Am

Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) and FLDEP (20

Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)

pKa = ionization constant of ammonium ion in aqueous saline solution (+9.245+0.116*Q

F_{NH3} = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P11)-M11)))

Tot NH3 = total ammonia, or QLimit if ND

pressure in F_{NH3} assumed to be 1 atm

L	M	N	O	P	Q	R	S
temp (°C)	pH (SU)	salinity (ppt)	Tot NH3	Temp (°K)	I	pKa	F_{NH3}
20.3	7.71	28.02	0.15	293.45	0.574544	9.311647	1.75%
20.0	7.82	28.42	0.1	293.15	0.582987	9.312626	2.19%
20.1	7.89	28.39	1.6	293.25	0.582354	9.312553	2.58%
20.0	7.92	28.72	1.8	293.15	0.589324	9.313362	2.74%
20.3	7.91	28.66	2.2	293.45	0.588056	9.313215	2.74%
20.6	7.90	28.57	2.5	293.75	0.586155	9.312994	2.74%
20.7	7.89	28.64	0.61	293.85	0.587634	9.313166	2.69%
21.2	7.54	28.88	0.63	294.35	0.592705	9.313754	1.27%
21.0	7.67	29.19	0.13	294.15	0.59926	9.314514	1.67%
21.1	7.74	29.75	3	294.25	0.611111	9.315889	1.97%
21.1	7.77	29.20	1.6	294.25	0.599471	9.314539	2.11%
21.2	7.79	29.09	1.8	294.35	0.597145	9.314269	2.23%
21.2	7.81	29.45	3.4	294.35	0.60476	9.315152	2.32%
21.3	7.82	30.09	0.1	294.45	0.618313	9.316724	2.39%
21.2	7.57	24.75	0.56	294.35	0.505783	9.303671	1.39%
20.9	7.73	25.44	0.15	294.05	0.520253	9.305349	1.94%
21.2	7.90	25.41	0.21	294.35	0.519624	9.305276	2.91%
21.2	7.99	25.31	0.16	294.35	0.517525	9.305033	3.56%
21.2	8.03	25.67	0.31	294.35	0.525081	9.305909	3.88%
21.3	8.12	24.60	0.21	294.45	0.50264	9.303306	4.79%
21.3	7.97	25.87	0.1	294.45	0.529282	9.306397	3.41%

DAY10 *Americamysis bahia* Sediment Assay Recovery

DATE: 11/19/18 STUDY: 31245

CLIENT: AECOM PROJECT: New Haven Harbor

SAMPLE ID	REP	#LIVE ADULTS	INITIALS
Laboratory Control	A		
	B		
	C		
	D		
	E		
CLDS Reference Site	A		
	B		
	C		
	D		
	E		
Composite 2	A	19	JTP
	B	19	↓
	C	19	↓
	D	18	↓
	E	17	↓
Composite 3	A	17	JTP
	B	19	↓
	C	18	↓
	D	20	↓
	E	17	↓

SAMPLE ID	REP	#LIVE ADULTS	INITIALS
Composite 4	A	19	JTP
	B	18	↓
	C	18	↓
	D	17	↓
	E	19	↓
Composite 5	A	18	JTP
	B	19	↓
	C		
	D		
	E		
Composite 6	A		
	B		
	C		
	D		
	E		

DAY10 *Americamysis bahia* Sediment Assay Recovery

DATE: 11/19/18 **STUDY:** 31245

CLIENT: AECOM **PROJECT:** New Haven Harbor

SAMPLE ID	REP	#LIVE ADULTS	INITIALS	SAMPLE ID	REP	#LIVE ADULTS	INITIALS
Laboratory Control	A	20	AJM	Composite 4	A		
	B	20	AJM		B		
	C	20	AJM		C		
	D	18	AJM		D		
	E	20	AJM		E		
CLDS Reference Site	A	2	AJM	Composite 5	A		
	B	6	AJM		B		
	C	15	AJM		C	20	ku
	D	20	ku		D	18	↓
	E	20	ku		E	20	↓
Composite 2	A			Composite 6	A	18	ku
	B				B	20	↓
	C				C	20	↓
	D				D	20	↓
	E				E	18	↓
Composite 3	A						
	B						
	C						
	D						
	E						

DAY10 *Americamysis bahia* Sediment Assay Recovery

DATE: 11/19/18 STUDY: 31245

CLIENT: AECOM PROJECT: New Haven Harbor

SAMPLE ID	REP	#LIVE ADULTS	INITIALS	SAMPLE ID	REP	#LIVE ADULTS	INITIALS
Laboratory Control	A			Composite 4	A		
	B				B		
	C				C		
	D				D		
	E				E		
CLDS Reference Site	A			Composite 5	A		
	B				B		
	C				C	20	ke
	D	20	ke		D	~~20~~ 18 4/19/19	ke
	E	20	↓		E	20	ke
Composite 2	A	19	JTP	Composite 6	A	18	ke
	B	19			B	20	
	C	19			C	20	
	D	18			D	20	
	E	17	↓		E	18	↓
Composite 3	A	17	JTP				
	B	19					
	C	18					
	D	20					
	E						

CETIS Test Data Worksheet

Report Date: 20 Nov-18 11:03 (p 1 of 1)
Test Code/ID: 03-6453-7833/31245Ab

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Start Date:	09 Nov-18 12:00	**Species:**	Americamysis bahia	**Sample Code:**	31245-000
End Date:	19 Nov-18 12:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	09 Nov-18	**Material:**	Laboratory Control Sediment	**Sample Station:**	Laboratory Control (Ab)

Sample	Rep	Pos	# Exposed	# Survived	Notes
31245-000	1	5	20	20	
31245-000	2	9	20	20	
31245-000	3	21	20	20	
31245-000	4	25	20	18	
31245-000	5	33	20	20	
31242-008	1	4	20	2	
31242-008	2	12	20	6	
31242-008	3	19	20	15	
31242-008	4	28	20	20	
31242-008	5	32	20	20	
31243-101	1	3	20	19	
31243-101	2	8	20	19	
31243-101	3	17	20	19	
31243-101	4	26	20	18	
31243-101	5	31	20	17	
31243-102	1	7	20	17	
31243-102	2	13	20	19	
31243-102	3	15	20	18	
31243-102	4	24	20	20	
31243-102	5	34	20	17	
31243-103	1	2	20	19	
31243-103	2	14	20	18	
31243-103	3	20	20	18	
31243-103	4	23	20	17	
31243-103	5	30	20	19	
31243-104	1	6	20	18	
31243-104	2	11	20	19	
31243-104	3	16	20	20	
31243-104	4	22	20	18	
31243-104	5	29	20	20	
31243-105	1	1	20	18	
31243-105	2	10	20	20	
31243-105	3	18	20	20	
31243-105	4	27	20	20	
31243-105	5	35	20	18	

CETIS Summary Report

Report Date:	20 Nov-18 11:16 (p 1 of 1)
Test Code:	31245Ab | 03-6453-7833

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Batch ID:	15-7241-4783	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	09 Nov-18 12:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Not Applicable
Ending Date:	19 Nov-18 12:00	**Species:**	Americamysis bahia	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31245-000	15-9267-6009	09 Nov-18	09 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h		
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	15d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	14d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	14d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	15d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	16d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31245-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Ab)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
03-8215-3727	Proportion Survived	Unequal Variance t Two-Sample Test	0.0652	31242-008 passed proportion survived
07-5150-4128	Proportion Survived	Unequal Variance t Two-Sample Test	0.8787	31243-101 passed proportion survived
08-5824-7225	Proportion Survived	Equal Variance t Two-Sample Test	0.8848	31243-102 passed proportion survived
10-0056-8620	Proportion Survived	Unequal Variance t Two-Sample Test	0.8665	31243-103 passed proportion survived
07-8869-3920	Proportion Survived	Unequal Variance t Two-Sample Test	0.9093	31243-104 passed proportion survived
00-9012-4393	Proportion Survived	Equal Variance t Two-Sample Test	0.9368	31243-105 passed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31245-000	LC	5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	0.00%
31242-008	RS	5	0.630	0.119	1.000	0.100	1.000	0.184	0.412	65.35%	35.71%
31243-101		5	0.920	0.864	0.976	0.850	0.950	0.020	0.045	4.86%	6.12%
31243-102		5	0.910	0.829	0.991	0.850	1.000	0.029	0.065	7.16%	7.14%
31243-103		5	0.910	0.858	0.962	0.850	0.950	0.019	0.042	4.60%	7.14%
31243-104		5	0.950	0.888	1.000	0.900	1.000	0.022	0.050	5.26%	3.06%
31243-105		5	0.960	0.892	1.000	0.900	1.000	0.025	0.055	5.71%	2.04%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31245-000	LC	1.000	1.000	1.000	0.900	1.000
31242-008	RS	0.100	0.300	0.750	1.000	1.000
31243-101		0.950	0.950	0.950	0.900	0.850
31243-102		0.850	0.950	0.900	1.000	0.850
31243-103		0.950	0.900	0.900	0.850	0.950
31243-104		0.900	0.950	1.000	0.900	1.000
31243-105		0.900	1.000	1.000	1.000	0.900

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-8215-3727	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31245-000	15-9267-6009	09 Nov-18	09 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31245-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Ab)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31242-008 passed proportion survived	35.53%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	1.9	2.13	0.498	4	CDF	0.0652	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.29	0.3890	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.491941	0.491941	1	3.61	0.0941	Non-Significant Effect
Error	1.09147	0.136434	8			
Total	1.58341		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	30	23.2	0.0061	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2425	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31245-000	LC	5	0.980	0.924	1.000	1.000	0.900	1.000	0.020	4.56%	0.00%
31242-008	RS	5	0.630	0.119	1.000	0.750	0.100	1.000	0.184	65.35%	35.71%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31245-000	LC	5	1.42	1.3	1.53	1.46	1.25	1.46	0.0419	6.62%	0.00%
31242-008	RS	5	0.973	0.335	1.61	1.05	0.322	1.46	0.23	52.80%	31.31%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31245-000	LC	1.000	1.000	1.000	0.900	1.000
31242-008	RS	0.100	0.300	0.750	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31245-000	LC	1.46	1.46	1.46	1.25	1.46
31242-008	RS	0.322	0.58	1.05	1.46	1.46

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-5150-4128	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	15d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-101 passed proportion survived	66.46%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-1.37	2.13	0.496	4	CDF	0.8787	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3761	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.25341	0.25341	1	1.88	0.2080	Non-Significant Effect
Error	1.08079	0.135098	8			
Total	1.3342		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	43.1	23.2	0.0030	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3193	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.630	0.119	1.000	0.750	0.100	1.000	0.184	65.35%	0.00%
31243-101		5	0.920	0.864	0.976	0.950	0.850	0.950	0.020	4.86%	-46.03%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.973	0.335	1.61	1.05	0.322	1.46	0.23	52.80%	0.00%
31243-101		5	1.29	1.19	1.39	1.35	1.17	1.35	0.035	6.06%	-32.71%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.100	0.300	0.750	1.000	1.000
31243-101		0.950	0.950	0.950	0.900	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.322	0.58	1.05	1.46	1.46
31243-101		1.35	1.35	1.35	1.25	1.17

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-5824-7225	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	14d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-102 passed proportion survived	58.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.3	1.86	0.439	8	CDF	0.8848	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.85	2.29	0.4192	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.235063	0.235063	1	1.68	0.2305	Non-Significant Effect
Error	1.11632	0.13954	8			
Total	1.35138		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17.6	23.2	0.0167	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6467	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.630	0.119	1.000	0.750	0.100	1.000	0.184	65.35%	0.00%
31243-102		5	0.910	0.829	0.991	0.900	0.850	1.000	0.029	7.16%	-44.44%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.973	0.335	1.61	1.05	0.322	1.46	0.23	52.80%	0.00%
31243-102		5	1.28	1.13	1.43	1.25	1.17	1.46	0.0548	9.57%	-31.51%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.100	0.300	0.750	1.000	1.000
31243-102		0.850	0.950	0.900	1.000	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.322	0.58	1.05	1.46	1.46
31243-102		1.17	1.35	1.25	1.46	1.17

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-0056-8620	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	14d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-103 passed proportion survived	66.37%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-1.29	2.13	0.495	4	CDF	0.8665	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3726	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.223697	0.223697	1	1.66	0.2336	Non-Significant Effect
Error	1.07786	0.134733	8			
Total	1.30156		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	49	23.2	0.0024	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.917	0.741	0.3347	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.630	0.119	1.000	0.750	0.100	1.000	0.184	65.35%	0.00%
31243-103		5	0.910	0.858	0.962	0.900	0.850	0.950	0.019	4.60%	-44.44%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.973	0.335	1.61	1.05	0.322	1.46	0.23	52.80%	0.00%
31243-103		5	1.27	1.18	1.36	1.25	1.17	1.35	0.0328	5.77%	-30.74%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.100	0.300	0.750	1.000	1.000
31243-103		0.950	0.900	0.900	0.850	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.322	0.58	1.05	1.46	1.46
31243-103		1.35	1.25	1.25	1.17	1.35

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-8869-3920	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	15d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-104 passed proportion survived	67.03%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-1.62	2.13	0.5	4	CDF	0.9093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.3997	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.359022	0.359022	1	2.61	0.1448	Non-Significant Effect
Error	1.10033	0.137541	8			
Total	1.45935		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	24	23.2	0.0094	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5218	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.630	0.119	1.000	0.750	0.100	1.000	0.184	65.35%	0.00%
31243-104		5	0.950	0.888	1.000	0.950	0.900	1.000	0.022	5.26%	-50.79%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.973	0.335	1.61	1.05	0.322	1.46	0.23	52.80%	0.00%
31243-104		5	1.35	1.22	1.48	1.35	1.25	1.46	0.0469	7.76%	-38.94%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.100	0.300	0.750	1.000	1.000
31243-104		0.900	0.950	1.000	0.900	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.322	0.58	1.05	1.46	1.46
31243-104		1.25	1.35	1.46	1.25	1.46

Americamysis bahia 10-Day Survival Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-9012-4393	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	16d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-105 passed proportion survived	58.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-1.71	1.86	0.438	8	CDF	0.9368	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.4103	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.403312	0.403312	1	2.91	0.1265	Non-Significant Effect
Error	1.10906	0.138633	8			
Total	1.51237		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	20	23.2	0.0132	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.3966	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.630	0.119	1.000	0.750	0.100	1.000	0.184	65.35%	0.00%
31243-105		5	0.960	0.892	1.000	1.000	0.900	1.000	0.025	5.71%	-52.38%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.973	0.335	1.61	1.05	0.322	1.46	0.23	52.80%	0.00%
31243-105		5	1.37	1.23	1.52	1.46	1.25	1.46	0.0514	8.35%	-41.27%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.100	0.300	0.750	1.000	1.000
31243-105		0.900	1.000	1.000	1.000	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.322	0.58	1.05	1.46	1.46
31243-105		1.25	1.46	1.46	1.46	1.25

10 DAY SEDIMENT ASSAY

Study #:	31244	**Water Bath ID**	6
Project:	New Haven Harbor	**Client:**	AECOM

Summary of Test Conditions

Exposure	Species Used
Test Mode: In-Life: Static renewal 1 volume replacement daily **Length of Assay:** 10 days	(Check box for all that apply) ☐ Mysid Shrimp (*Americamysis bahia*) ☑ Marine Amphipod *(Leptocheirus plumulosus)*

Water Quality Parameters

Salinity: *A.bahia:* 30 ± 2 ppt *L. plumulosus:* 20 ± 2 ppt **pH:** 7.8 ± 0.5	**Photoperiod:** 16 hour light, 8 hour dark **Temperature:** 20 ± 1 °C

Test Chamber	Solution & Sediment Volume
(Check box for all that apply) ☑ 1000 mL beaker ☐ other _____	(Check box for all that apply) ☑ 2 cm (~175mL) homogenized sediment ☐ ~800 mL overlying water ☑ other 725 mL OW

Replicate Information

A.bahia and L. plumulosus:

- 5 Reps per treatment for survival endpoint
- 1 surrogate replicate for water quality (*Lp* only)
- 20 organisms per chamber
- Continuous aeration from start

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed then rinsed with deionized water (EPA 2002).	Laboratory Control, Reference Site, and Site Sediments

Feeding

A.bahia:	*L. plumulosus:*
Daily feedings (2x) of newly hatched, <24 hour old *Artemia nauplii*	NONE

Date: 11/09/18 Initial JTP

(23) LM 11/08
19LpAR011108318

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Leptocheirus plumulosus

Source: Lab reared x Hatchery reared ____ Field collected ____

Hatch date 10/2018 Receipt date ____

Lot number 11 08 18LP Strain A20

Brood origination Chesapeake Bay, VA

II. Water Quality

Temperature 24 °C Salinity ~20 ppt D.O. SAT ppm

pH ~8.0 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater ____ Saltwater x Other ____

Recirculating ____ Flow through ____ Static renewal x

DIET: Flake food x Phytoplankton ____ Trout chow x

Artemia ____ Rotifers ____ YCT ____ Other "GORP"

Prophylactic treatments: ____

Comments: 2-4 mm long

IV. Shipping Information

Client: ESI # of Organisms 11000

Carrier: Pick-up Date shipped 11/8/18

Biologist: [signature]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

DAY10 Sediment Assay Data Summary

STUDY #: 31244 **WATER BATH ID:** 6

CLIENT: AECOM **PROJECT:** New Haven Harbor

INITIATION RECORD

Species:	*Leptocheirus plumulosus*	**Counted by:**	JTP
Organism Lot ID:	19LpAR0110818	**Added by:**	JTP
Number of Organisms added to each vessel:	20	**Temp Data Logger No:**	010015860

DAILY LOG

Day	Daily Water Quality Performed Date / Initials	Renew Daily (One Exchange)	Biological Observations[2] (N= Normal)	Overlying and Pore water collected for NH_3
0*	11/09/18 BG	✓	N	BG
1	11/10/18 BG	✓	N	
2	11/11/18 MS	✓	N	
3	11/12/18 MS	✓	N	MS
4	11/13/18 MS	✓	N	
5	11/14/18 MS	✓	N	
6	11/15/18 MS	✓	N	
7	11/16/18 DF	✓	N	
8	11/17/18 BG	✓	N	
9	11/18/18 MS	✓	N	
10*	11/19/18 MS	✓	N	MS

* On Day 0 and Day 10 water quality parameters were performed on all beakers.

[2]Organisms were monitored daily. Due to the study design and the nature of each sample matrix it maybe difficult to achieve accurate counts until termination. Healthy vessels (N=normal) are characterized by an abundance of burrow-openings on the sediment surface and turbid water from amphipod activity, unless otherwise noted.

Comments

Pore Water Quality Record

Study: 31244

Client: AECOM

Project: New Haven Harbor

Day 0 Pore Water Quality

Sample	Salinity (ppt)	Temperature (C)	pH value
Laboratory Control Sediment	20	20.9	5.82
Reference Site Sediment	22	21.0	7.75
Composite 2	24	21	7.65
Composite 3	20	21.2	7.73
Composite 4	20	21.7	7.79
Composite 5	21	21.2	7.60
Composite 6	20	21.1	7.54

Date: 11/10/18 **pH Meter ID:** ML02
Initial: BG **Salinity Meter ID:** ML02

Day 3 Pore Water Quality

Sample	Salinity (ppt)	Temperature (C)	pH value
Laboratory Control Sediment	19	21.2	6.10
Reference Site Sediment	21	21.1	7.63
Composite 2	22	21.0	7.57
Composite 3	20	20.9	7.44
Composite 4	20	21.0	7.58
Composite 5	20	21.1	7.39
Composite 6	21	21.1	7.74

Date: 11/12/18 **pH Meter ID:** ML01
Initial: MS **Salinity Meter ID:** ~~ESS~~ ML01
ESS 11/12 ESS 11/12

Day 10 Pore Water Quality

Sample	Salinity (ppt)	Temperature (C)	pH value
Laboratory Control Sediment	20	21.2	6.60
Reference Site Sediment	21	21.0	7.41
Composite 2	21	21.2	7.24
Composite 3	21	21.3	7.26
Composite 4	21	21.1	7.31
Composite 5	20	21.1	6.93
Comp 6	20	20.9	7.51

Date: 11/19/18 **pH Meter ID:** ML01
Initial: MS **Salinity Meter ID:** ESI #1

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\31244&31245 Solid Phase 10 Day Exposure Assays\Forms\5. Pore water pH record.wpd

Revised: 11/9/18

STUDY: 31244
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.53	93.6	7.70	31025	19.33
Minimum:	20.0	4.87	62.1	6.30	27874	17.18
Maximum:	21.7	8.13	99.1	8.03	37145	23.57

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	Surrogate	00	11/9/2018 17:19:28	20.2	8.13	99.1	7.78	29803	18.50
Laboratory Control	A	00	11/9/2018 17:20:07	20.2	8.13	99.1	7.76	29687	18.42
Laboratory Control	B	00	11/9/2018 17:20:31	20.3	8.09	98.6	7.74	29543	18.32
Laboratory Control	C	00	11/9/2018 17:20:53	20.3	8.07	98.5	7.74	29548	18.32
Laboratory Control	D	00	11/9/2018 17:21:19	20.4	7.90	96.6	7.74	29629	18.38
Laboratory Control	E	00	11/9/2018 17:21:42	20.4	7.99	97.6	7.74	29582	18.34
CLDS Reference	Surrogate	00	11/9/2018 17:22:04	20.0	7.95	96.8	7.78	30553	19.01
CLDS Reference	A	00	11/9/2018 17:22:22	20.2	8.00	97.7	7.82	30063	18.67
CLDS Reference	B	00	11/9/2018 17:22:44	20.4	7.93	97.1	7.85	29891	18.55
CLDS Reference	C	00	11/9/2018 17:23:21	20.3	7.97	97.6	7.86	30021	18.64
CLDS Reference	D	00	11/9/2018 17:23:55	20.4	7.92	96.9	7.86	29969	18.61
CLDS Reference	E	00	11/9/2018 17:24:33	20.4	8.02	98.4	7.86	30056	18.67
Composite 2	Surrogate	00	11/9/2018 17:25:05	20.3	7.70	94.3	7.93	30223	18.78
Composite 2	A	00	11/9/2018 17:25:31	20.3	7.92	96.8	7.91	29959	18.60
Composite 2	B	00	11/9/2018 17:25:54	20.4	7.94	97.2	7.90	30003	18.63
Composite 2	C	00	11/9/2018 17:26:22	20.4	7.91	97.0	7.91	30000	18.63
Composite 2	D	00	11/9/2018 17:26:36	20.4	7.95	97.5	7.91	30008	18.63
Composite 2	E	00	11/9/2018 17:27:08	20.5	7.90	97.0	7.90	29971	18.61
Composite 3	Surrogate	00	11/9/2018 17:27:36	20.3	7.82	95.7	7.89	29940	18.59
Composite 3	A	00	11/9/2018 17:27:54	20.3	7.93	97.0	7.91	29974	18.61
Composite 3	B	00	11/9/2018 17:28:14	20.3	7.89	96.5	7.92	29950	18.59
Composite 3	C	00	11/9/2018 17:28:32	20.4	7.86	96.2	7.92	29987	18.62
Composite 3	D	00	11/9/2018 17:28:45	20.5	7.89	96.9	7.92	29964	18.60
Composite 3	E	00	11/9/2018 17:29:08	20.5	7.89	96.9	7.92	29971	18.61
Composite 4	Surrogate	00	11/9/2018 17:29:36	20.3	7.65	93.5	7.91	29994	18.62
Composite 4	A	00	11/9/2018 17:30:05	20.4	7.97	97.5	7.93	29856	18.53
Composite 4	B	00	11/9/2018 17:30:23	20.3	7.99	97.7	7.93	29885	18.55
Composite 4	C	00	11/9/2018 17:30:46	20.4	7.95	97.4	7.93	29845	18.52
Composite 4	D	00	11/9/2018 17:31:10	20.5	7.84	96.2	7.95	29884	18.55
Composite 4	E	00	11/9/2018 17:31:30	20.6	7.80	95.8	7.93	29965	18.60
Composite 5	Surrogate	00	11/9/2018 17:31:56	20.3	7.73	94.8	7.90	30716	19.12
Composite 5	A	00	11/9/2018 17:32:17	20.3	7.85	96.2	7.92	30468	18.95
Composite 5	B	00	11/9/2018 17:32:41	20.3	7.99	98.0	7.93	30316	18.84
Composite 5	C	00	11/9/2018 17:33:12	20.3	7.94	97.5	7.91	30657	19.08
Composite 5	D	00	11/9/2018 17:33:36	20.4	7.90	97.2	7.91	30818	19.19
Composite 5	E	00	11/9/2018 17:33:59	20.5	7.90	97.4	7.91	30822	19.19
Composite 6	Surrogate	00	11/9/2018 17:34:32	20.4	7.82	96.3	7.89	31054	19.35
Composite 6	A	00	11/9/2018 17:35:01	20.4	7.91	97.4	7.89	31237	19.47
Composite 6	B	00	11/9/2018 17:35:19	20.4	7.87	96.7	7.91	30548	19.00
Composite 6	C	00	11/9/2018 17:35:41	20.4	8.03	98.7	7.91	30563	19.01
Composite 6	D	00	11/9/2018 17:36:04	20.5	7.93	97.8	7.90	31028	19.33
Composite 6	E	00	11/9/2018 17:36:22	20.5	7.91	97.6	7.90	30990	19.30
Laboratory Control	Surrogate	01	11/10/2018 16:08:07	21.4	4.87	62.1	7.45	31444	19.61
CLDS Reference	Surrogate	01	11/10/2018 16:08:31	21.3	7.30	93.8	7.66	33995	21.37
Composite 2	Surrogate	01	11/10/2018 16:08:52	21.5	7.28	93.4	7.87	32621	20.41
Composite 3	Surrogate	01	11/10/2018 16:09:13	21.6	7.01	89.9	7.85	32092	20.05
Composite 4	Surrogate	01	11/10/2018 16:09:34	21.6	7.22	92.6	7.86	32198	20.12

STUDY: 31244
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.53	93.6	7.70	31025	19.33
Minimum:	20.0	4.87	62.1	6.30	27874	17.18
Maximum:	21.7	8.13	99.1	8.03	37145	23.57

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	Surrogate	01	11/10/2018 16:09:55	21.7	7.06	90.9	7.85	32875	20.59
Composite 6	Surrogate	01	11/10/2018 16:10:15	21.7	7.17	92.5	7.86	33337	20.91
Laboratory Control	Surrogate	02	11/11/2018 10:48:33	21.0	7.44	92.7	6.32	31543	19.68
CLDS Reference	Surrogate	02	11/11/2018 10:49:04	20.8	7.41	92.7	7.05	33603	21.10
Composite 2	Surrogate	02	11/11/2018 10:49:26	21.0	7.47	93.5	7.49	32938	20.64
Composite 3	Surrogate	02	11/11/2018 10:49:49	21.1	7.13	89.2	7.57	32002	19.99
Composite 4	Surrogate	02	11/11/2018 10:50:12	21.1	7.30	91.4	7.62	32172	20.11
Composite 5	Surrogate	02	11/11/2018 10:50:26	21.2	7.37	92.2	7.65	31671	19.76
Composite 6	Surrogate	02	11/11/2018 10:50:52	21.1	7.23	92.2	7.69	36468	23.09
Laboratory Control	Surrogate	03	11/12/2018 10:30:38	21.1	7.00	86.4	6.30	30009	18.63
CLDS Reference	Surrogate	03	11/12/2018 10:31:06	20.8	7.41	91.4	6.52	31525	19.67
Composite 2	Surrogate	03	11/12/2018 10:31:37	21.0	7.20	90.0	7.26	33548	21.06
Composite 3	Surrogate	03	11/12/2018 10:32:04	21.1	7.23	89.3	7.48	30460	18.94
Composite 4	Surrogate	03	11/12/2018 10:32:27	21.1	7.30	90.1	7.54	30451	18.93
Composite 5	Surrogate	03	11/12/2018 10:32:44	21.1	7.35	90.8	7.59	30170	18.74
Composite 6	Surrogate	03	11/12/2018 10:33:07	21.2	7.39	92.0	7.62	31850	19.89
Laboratory Control	Surrogate	04	11/13/2018 08:57:18	21.2	7.30	91.1	6.70	29266	18.12
CLDS Reference	Surrogate	04	11/13/2018 08:57:54	21.1	7.39	92.7	7.36	31077	19.36
Composite 2	Surrogate	04	11/13/2018 08:58:17	21.2	7.30	92.3	7.57	32620	20.42
Composite 3	Surrogate	04	11/13/2018 08:58:38	21.3	7.35	92.0	7.65	29635	18.37
Composite 4	Surrogate	04	11/13/2018 08:59:00	21.3	7.29	91.3	7.67	29740	18.44
Composite 5	Surrogate	04	11/13/2018 08:59:17	21.4	7.20	90.5	7.69	30281	18.81
Composite 6	Surrogate	04	11/13/2018 08:59:41	21.4	7.23	91.2	7.72	30881	19.22
Laboratory Control	Surrogate	05	11/14/2018 10:53:45	21.0	7.30	91.5	6.52	33030	20.70
CLDS Reference	Surrogate	05	11/14/2018 10:54:06	20.7	7.54	94.7	7.16	34867	21.98
Composite 2	Surrogate	05	11/14/2018 10:54:28	20.9	7.27	91.6	7.50	34956	22.04
Composite 3	Surrogate	05	11/14/2018 10:55:11	21.1	7.18	90.2	7.69	33257	20.86
Composite 4	Surrogate	05	11/14/2018 10:55:27	21.0	7.37	92.6	7.71	33515	21.04
Composite 5	Surrogate	05	11/14/2018 10:55:45	21.1	7.14	90.0	7.78	33695	21.16
Composite 6	Surrogate	05	11/14/2018 10:56:01	21.1	7.31	92.2	7.79	33891	21.30
Laboratory Control	Surrogate	06	11/15/2018 09:58:32	20.7	7.63	93.7	6.88	32385	20.26
CLDS Reference	Surrogate	06	11/15/2018 09:58:49	20.5	7.75	95.2	7.21	33334	20.92
Composite 2	Surrogate	06	11/15/2018 09:59:22	20.7	7.54	93.6	7.56	35554	22.46
Composite 3	Surrogate	06	11/15/2018 09:59:41	20.9	7.45	91.9	7.67	32521	20.35
Composite 4	Surrogate	06	11/15/2018 10:00:17	20.8	7.40	91.1	7.70	32455	20.31
Composite 5	Surrogate	06	11/15/2018 10:00:40	20.9	7.40	91.3	7.82	32399	20.27
Composite 6	Surrogate	06	11/15/2018 10:01:09	20.9	7.60	93.8	7.77	32479	20.32
Laboratory Control	Surrogate	07	11/16/2018 11:33:37	20.9	7.11	91.6	7.20	34050	21.41
CLDS Reference	Surrogate	07	11/16/2018 11:33:57	20.8	7.13	92.2	7.45	35366	22.32
Composite 2	Surrogate	07	11/16/2018 11:34:25	21.0	7.01	91.6	7.69	37145	23.57
Composite 3	Surrogate	07	11/16/2018 11:34:43	21.1	6.99	90.5	7.83	34189	21.50
Composite 4	Surrogate	07	11/16/2018 11:35:05	21.1	7.03	90.9	7.86	34197	21.51

STUDY: 31244
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.53	93.6	7.70	31025	19.33
Minimum:	20.0	4.87	62.1	6.30	27874	17.18
Maximum:	21.7	8.13	99.1	8.03	37145	23.57

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	Surrogate	07	11/16/2018 11:35:26	21.1	6.90	89.2	8.02	33807	21.24
Composite 6	Surrogate	07	11/16/2018 11:35:48	21.2	7.07	91.5	7.93	33731	21.19
Laboratory Control	Surrogate	08	11/17/2018 10:25:04	21.1	7.43	93.6	7.59	32061	20.03
CLDS Reference	Surrogate	08	11/17/2018 10:25:24	21.0	7.37	92.9	7.68	32707	20.48
Composite 2	Surrogate	08	11/17/2018 10:25:58	21.1	7.26	92.3	7.81	34186	21.50
Composite 3	Surrogate	08	11/17/2018 10:26:17	21.2	7.09	89.4	7.88	31829	19.87
Composite 4	Surrogate	08	11/17/2018 10:26:37	21.1	7.40	93.2	7.90	31738	19.81
Composite 5	Surrogate	08	11/17/2018 10:26:54	21.2	7.22	91.6	7.99	33327	20.91
Composite 6	Surrogate	08	11/17/2018 10:27:24	21.2	7.28	92.4	7.89	33226	20.84
Laboratory Control	Surrogate	09	11/18/2018 10:44:51	20.7	7.21	88.3	6.71	29811	18.50
CLDS Reference	Surrogate	09	11/18/2018 10:45:07	20.6	7.73	94.9	7.05	30643	19.07
Composite 2	Surrogate	09	11/18/2018 10:45:29	20.8	7.64	94.8	7.46	32592	20.40
Composite 3	Surrogate	09	11/18/2018 10:45:45	20.9	7.59	93.4	7.63	29904	18.56
Composite 4	Surrogate	09	11/18/2018 10:45:58	20.8	7.65	93.9	7.69	29869	18.54
Composite 5	Surrogate	09	11/18/2018 10:46:19	20.9	7.47	92.4	7.85	31120	19.39
Composite 6	Surrogate	09	11/18/2018 10:46:42	21.0	7.60	94.0	7.76	30947	19.27
Laboratory Control	Surrogate	10	11/19/2018 10:42:29	20.8	7.50	92.6	7.00	29464	18.26
Laboratory Control	A	10	No data [a]						
Laboratory Control	B	10	No data [a]						
Laboratory Control	C	10	No data [a]						
Laboratory Control	D	10	No data [a]						
Laboratory Control	E	10	No data [a]						
CLDS Reference	Surrogate	10	11/19/2018 10:42:45	20.8	7.44	92.1	7.17	30186	18.75
CLDS Reference	A	10	No data [a]						
CLDS Reference	B	10	No data [a]						
CLDS Reference	C	10	No data [a]						
CLDS Reference	D	10	No data [a]						
CLDS Reference	E	10	No data [a]						
Composite 2	Surrogate	10	11/19/2018 10:43:07	20.8	7.44	93.1	7.46	32999	20.68
Composite 2	A	10	11/19/2018 13:50:03	21.1	7.00	87.2	7.74	29570	18.33
Composite 2	B	10	11/19/2018 13:50:26	21.1	7.07	88.1	7.79	29302	18.15
Composite 2	C	10	11/19/2018 13:50:43	21.1	7.09	88.4	7.82	29424	18.23
Composite 2	D	10	11/19/2018 13:51:06	21.1	7.09	88.2	7.85	29333	18.17
Composite 2	E	10	11/19/2018 13:51:20	21.2	7.08	88.2	7.85	29386	18.20
Composite 3	Surrogate	10	11/19/2018 10:43:25	21.0	7.39	91.6	7.59	29391	18.21
Composite 3	A	10	11/19/2018 13:51:42	21.0	7.64	95.2	7.89	29864	18.53
Composite 3	B	10	11/19/2018 13:52:05	21.1	7.56	94.1	7.89	29503	18.28
Composite 3	C	10	11/19/2018 13:52:22	21.0	7.68	95.6	7.90	29522	18.30
Composite 3	D	10	11/19/2018 13:52:46	21.2	7.65	95.4	7.89	29303	18.15
Composite 3	E	10	11/19/2018 13:53:09	21.2	7.60	94.9	7.94	29614	18.36
Composite 4	Surrogate	10	11/19/2018 10:43:44	21.0	7.46	92.5	7.66	29432	18.24
Composite 4	A	10	11/19/2018 13:53:29	21.1	7.59	94.3	7.94	29007	17.95
Composite 4	B	10	11/19/2018 13:53:52	21.0	7.69	95.9	7.95	30001	18.62
Composite 4	C	10	11/19/2018 13:54:15	21.1	7.68	95.7	7.94	29691	18.41
Composite 4	D	10	11/19/2018 13:54:37	21.2	7.62	95.5	8.00	30480	18.95

STUDY: 31244
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	20.9	7.53	93.6	7.70	31025	19.33
Minimum:	20.0	4.87	62.1	6.30	27874	17.18
Maximum:	21.7	8.13	99.1	8.03	37145	23.57

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	E	10	11/19/2018 13:55:08	21.2	7.50	94.4	8.02	31502	19.65
Composite 5	Surrogate	10	11/19/2018 10:43:58	21.1	7.34	90.7	7.75	28145	17.36
Composite 5	A	10	11/19/2018 13:55:34	21.1	7.70	95.5	8.03	28398	17.53
Composite 5	B	10	11/19/2018 13:56:01	21.1	7.71	95.9	8.02	29118	18.02
Composite 5	C	10	11/19/2018 13:56:19	21.2	7.50	93.2	8.02	28548	17.63
Composite 5	D	10	11/19/2018 13:56:36	21.2	7.72	95.8	8.01	28119	17.34
Composite 5	E	10	11/19/2018 13:57:04	21.3	7.66	95.2	8.01	28301	17.47
Composite 6	Surrogate	10	11/19/2018 10:44:16	21.1	7.47	92.3	7.72	27874	17.18
Composite 6	A	10	11/19/2018 13:57:33	21.2	7.74	96.1	7.91	28249	17.43
Composite 6	B	10	11/19/2018 13:58:02	21.2	7.75	96.6	7.88	29497	18.28
Composite 6	C	10	11/19/2018 13:58:17	21.2	7.77	96.7	7.88	28644	17.70
Composite 6	D	10	11/19/2018 13:58:39	21.3	7.76	96.4	7.86	28085	17.32
Composite 6	E	10	11/19/2018 13:58:59	21.3	7.77	96.6	7.85	28272	17.45

Notes:
[a] Water quality data are missing for replicates A through E. See Sectionc 3.3 for a discussion of the deviation.

STUDY: 31244
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Evaluation

TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

			Ammonia							L	M	N	O	P	Q	R	S
Sample ID	**Day**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (°C)	pH (SU)	salinity (ppt)	Tot NH3	Temp (°K)	I	pKa	F_{NH3}
Laboratory Control	00	31244-100	ND		0.0021	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.2	7.78	18.50	0.1	293.35	0.37564	9.288574	2.14%
CLDS Reference Site	00	31244-101	ND		0.0021	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.0	7.78	19.01	0.1	293.15	0.386197	9.289799	2.11%
Composite 2	00	31244-102	4.3		0.1298	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.3	7.93	18.78	4.3	293.45	0.381435	9.289246	3.02%
Composite 3	00	31244-103	2.1		0.0580	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.3	7.89	18.59	2.1	293.45	0.377502	9.28879	2.76%
Composite 4	00	31244-104	2.2		0.0636	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.3	7.91	18.62	2.2	293.45	0.378123	9.288862	2.89%
Composite 5	00	31244-105	2		0.0564	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.3	7.90	19.12	2	293.45	0.388476	9.290063	2.82%
Composite 6	00	31244-400	0.68		0.0189	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	20.4	7.89	19.35	0.68	293.55	0.393241	9.290616	2.77%
Laboratory Control	03	31244-200	0.47		0.0004	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	6.30	18.63	0.47	294.25	0.37833	9.288886	0.08%
CLDS Reference Site	03	31244-201	ND		0.0001	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	20.8	6.52	19.67	0.1	293.95	0.399876	9.291386	0.12%
Composite 2	03	31244-202	5.7		0.0392	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.0	7.26	21.06	5.7	294.15	0.428744	9.294734	0.69%
Composite 3	03	31244-203	1.6		0.0185	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	7.48	18.94	1.6	294.25	0.384747	9.289631	1.16%
Composite 4	03	31244-204	1.7		0.0226	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	7.54	18.93	1.7	294.25	0.38454	9.289607	1.33%
Composite 5	03	31244-205	2.6		0.0387	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	7.59	18.74	2.6	294.25	0.380607	9.28915	1.49%
Composite 6	03	31244-214	0.61		0.0097	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.2	7.62	19.89	0.61	294.35	0.404439	9.291915	1.59%
Laboratory Control	10	31244-300	0.27		0.0010	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	20.8	7.00	18.26	0.27	293.95	0.370676	9.287998	0.38%
CLDS Reference Site	10	31244-301	ND		0.0006	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	20.8	7.17	18.75	0.1	293.95	0.380814	9.289174	0.56%
Composite 2	10	31244-302	0.18		0.0019	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	20.8	7.46	20.68	0.18	293.95	0.420844	9.293818	1.07%
Composite 3	10	31244-303	ND		0.0015	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.0	7.59	18.21	0.1	294.15	0.369642	9.287878	1.48%
Composite 4	10	31244-304	ND		0.0017	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.0	7.66	18.24	0.1	294.15	0.370262	9.28795	1.74%
Composite 5	10	31244-305	ND		0.0022	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.1	7.75	17.36	0.1	294.25	0.352081	9.285841	2.15%
Composite 6	10	31244-314	ND		0.0020	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.1	7.72	17.18	0.1	294.25	0.348367	9.285411	2.01%

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and USEPA Amm

Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) and FLDEP (20

Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)

pKa = ionization constant of ammonium ion in aqueous saline solution (+9.245+0.116*Q1

F_{NH3} = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P11)-M11)))

Tot NH3 = total ammonia, or QLimit if ND

pressure in F_{NH3} assumed to be 1 atm

STUDY: 31244
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *Leptocheirus plumulosus* 10 Day Solid Phase Evaluation

TASK: Pore Water Ammonia Summary
METHOD: SM 4500-NH3 G

			Ammonia							L	M	N	O	P	Q	R	S
Sample ID	**Day**	**ESI Code**	**Total**	**Qual**	**Unionized**	**QLimit**	**Units**	**Sampled**	**Analyzed**	temp (°C)	pH (SU)	salinity (ppt)	Tot NH3	Temp (°K)	I	pKa	F_{NH3}
Laboratory Control	00	31244-107	0.69		0.0002	0.5	mg/L as N	11/09/18 1200	11/12/18 1100	20.9	5.82	20	0.69	294.05	0.406722	9.29218	0.03%
CLDS Reference Site	00	31244-108	ND		0.0104	0.5	mg/L as N	11/09/18 1200	11/12/18 1100	21.0	7.75	22	0.5	294.15	0.448314	9.297004	2.08%
Composite 2	00	31244-109	15		0.2467	0.5	mg/L as N	11/09/18 1200	11/12/18 1100	21.0	7.65	24	15	294.15	0.490077	9.301849	1.64%
Composite 3	00	31244-110	6.5		0.1329	0.5	mg/L as N	11/09/18 1200	11/12/18 1100	21.2	7.73	20	6.5	294.35	0.406722	9.29218	2.04%
Composite 4	00	31244-111	6.9		0.1614	0.5	mg/L as N	11/09/18 1200	11/12/18 1100	21.2	7.79	20	6.9	294.35	0.406722	9.29218	2.34%
Composite 5	00	31244-112	16		0.2424	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	21.2	7.60	21	16	294.35	0.427497	9.29459	1.51%
Composite 6	00	31244-401	3.8		0.0987	0.1	mg/L as N	11/09/18 1200	11/12/18 1100	21.1	7.84	20	3.8	294.25	0.406722	9.29218	2.60%
Laboratory Control	03	31244-207	1.8		0.0009	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.2	6.10	19	1.8	294.35	0.38599	9.289775	0.05%
CLDS Reference Site	03	31244-208	0.28		0.0045	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	7.63	21	0.28	294.25	0.427497	9.29459	1.61%
Composite 2	03	31244-209	7.2		0.0999	0.5	mg/L as N	11/12/18 1000	11/12/18 1100	21.0	7.57	22	7.2	294.15	0.448314	9.297004	1.39%
Composite 3	03	31244-210	2		0.0207	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	20.9	7.44	20	2	294.05	0.406722	9.29218	1.04%
Composite 4	03	31244-211	3.2		0.0459	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.0	7.58	20	3.2	294.15	0.406722	9.29218	1.43%
Composite 5	03	31244-212	6.7		0.0628	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	7.39	20	6.7	294.25	0.406722	9.29218	0.94%
Composite 6	03	31244-213	0.91		0.0188	0.1	mg/L as N	11/12/18 1000	11/12/18 1100	21.1	7.74	21	0.91	294.25	0.427497	9.29459	2.06%
Laboratory Control	10	31244-307	1.2		0.0019	0.2	mg/L as N	11/19/18 1100	11/20/18 1100	21.2	6.60	20	1.2	294.35	0.406722	9.29218	0.15%
CLDS Reference Site	10	31244-308	0.26		0.0025	0.2	mg/L as N	11/19/18 1100	11/20/18 1100	21.0	7.41	21	0.26	294.15	0.427497	9.29459	0.97%
Composite 2	10	31244-309	0.8		0.0053	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.2	7.24	21	0.8	294.35	0.427497	9.29459	0.67%
Composite 3	10	31244-310	0.1		0.0007	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.3	7.26	21	0.1	294.45	0.427497	9.29459	0.70%
Composite 4	10	31244-311	0.36		0.0028	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.1	7.31	21	0.36	294.25	0.427497	9.29459	0.78%
Composite 5	10	31244-312	0.5		0.0016	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	21.1	6.93	20	0.5	294.25	0.406722	9.29218	0.33%
Composite 6	10	31244-313	0.2		0.0024	0.1	mg/L as N	11/19/18 1100	11/20/18 1100	20.9	7.51	20	0.2	294.05	0.406722	9.29218	1.21%

Attachment 2 - Formulas Used to Derive Un-Ionized Ammonia (UIA) Fractions and U
Consistent with USEPA AWQC (1989) and Whitfield (1974). Differs from Colt (2004) and F

Where: I = Ionic Strength (19.9273*N11)/(1000-1.005109*N11)
pKa = ionization constant of ammonium ion in aqueous saline solution (+9.245+
F_{NH3} = fraction of UIA (+1/(1+10^(R11+0.0324*(298-P11)+((0.0415*1)/P11)-M1
Tot NH3 = total ammonia, or QLimit if ND
pressure in F_{NH3} assumed to be 1 atm

DAY10 *Leptocheirus plumulosus* Sediment Assay Recovery

DATE: 11/19/18 **STUDY:** 31244

CLIENT: AECOM **PROJECT:** New Haven Harbor

SAMPLE ID	REP	#LIVE ADULTS	INITIALS	SAMPLE ID	REP	#LIVE ADULTS	INITIALS
Laboratory Control	A	19	GRS	Composite 4	A	18	LAG
	B	20	GRS		B	19	LAG
	C	20	GRS		C	17	LAG
	D	19	GRS		D	19	LAG
	E	20	GRS		E	19	LAG
CLDS Reference Site ER LAG 11/19 Polychaete found in in Rep. 3 and E	A	19	GRS	Composite 5	A	20	LAG
	B	20	GRS		B	20	LAG
	C	20	LAG		C	19	LAG
	D	3	LAG		D	20	LAG
	E	17	LAG		E	21	LAG
Composite 2	A	20	LAG	Composite 6	A	18	LAG
	B	18	LAG		B	19	LAG
	C	18	LAG		C	20	LAG
	D	18	LAG		D	18	LAG
	E	20	LAG		E	19	LAG
Composite 3	A	19	LAG				
	B	20	LAG				
	C	18	LAG				
	D	19	LAG				
	E	20	LAG				

CETIS Test Data Worksheet

Report Date: 20 Nov-18 10:57 (p 1 of 1)
Test Code/ID: 00-3053-0358/31244Lp

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Start Date: 09 Nov-18 12:00 **Species:** Leptocheirus plumulosus **Sample Code:** 31244-000
End Date: 19 Nov-18 12:00 **Protocol:** EPA/600/R-94/025 (1994) **Sample Source:** New Haven Harbor 2018
Sample Date: 09 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Lp)

Sample	Rep	Pos	# Exposed	# Survived	# Reburied	Notes
31244-000	1	4	20	19		
31244-000	2	9	20	20		
31244-000	3	19	20	20		
31244-000	4	25	20	19		
31244-000	5	33	20	20		
31242-008	1	3	20	19		
31242-008	2	13	20	20		
31242-008	3	16	20	20		
31242-008	4	28	20	3		
31242-008	5	29	20	17		
31243-101	1	5	20	20		
31243-101	2	14	20	18		
31243-101	3	15	20	18		
31243-101	4	26	20	18		
31243-101	5	32	20	20		
31243-102	1	2	20	19		
31243-102	2	10	20	20		
31243-102	3	18	20	18		
31243-102	4	23	20	19		
31243-102	5	30	20	20		
31243-103	1	7	20	18		
31243-103	2	8	20	19		
31243-103	3	20	20	17		
31243-103	4	22	20	19		
31243-103	5	31	20	19		
31243-104	1	1	20	20		
31243-104	2	12	20	20		
31243-104	3	21	20	19		
31243-104	4	24	20	20		
31243-104	5	34	21	21		
31243-105	1	6	20	18		
31243-105	2	11	20	19		
31243-105	3	17	20	20		
31243-105	4	27	20	18		
31243-105	5	35	20	19		

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Batch ID:	11-4202-1754	**Test Type:**	Survival-Reburial	**Analyst:**	Nancy Roka
Start Date:	09 Nov-18 12:00	**Protocol:**	EPA/600/R-94/025 (1994)	**Diluent:**	Not Applicable
Ending Date:	19 Nov-18 12:00	**Species:**	Leptocheirus plumulosus	**Brine:**	Not Applicable
Duration:	10d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31244-000	08-7981-0638	09 Nov-18	09 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h		
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	15d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	14d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	14d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	15d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	16d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31244-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Lp)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
09-9817-5480	Proportion Survived	Equal Variance t Two-Sample Test	0.2222	31242-008 passed proportion survived
21-1748-0076	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.2222	31242-008 passed proportion survived
15-4805-4366	Proportion Survived	Equal Variance t Two-Sample Test	0.7787	31243-101 passed proportion survived
21-0660-1885	Proportion Survived	Equal Variance t Two-Sample Test	0.3816	31243-101 passed proportion survived
06-3414-4958	Proportion Survived	Equal Variance t Two-Sample Test	0.5640	31243-102 passed proportion survived
01-8970-3237	Proportion Survived	Unequal Variance t Two-Sample Test	0.8147	31243-102 passed proportion survived
13-1444-9439	Proportion Survived	Equal Variance t Two-Sample Test	0.1882	31243-103 passed proportion survived
05-5330-0129	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.4405	31243-103 passed proportion survived
16-0232-5096	Proportion Survived	Equal Variance t Two-Sample Test	0.8654	31243-104 passed proportion survived
07-4359-7899	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-104 passed proportion survived
12-7809-4904	Proportion Survived	Equal Variance t Two-Sample Test	0.3507	31243-105 passed proportion survived
00-8519-4313	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5476	31243-105 passed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31244-000	LC	5	0.980	0.946	1.000	0.950	1.000	0.012	0.027	2.79%	0.00%
31242-008	RS	5	0.790	0.339	1.000	0.150	1.000	0.162	0.363	45.95%	19.39%
31243-101		5	0.940	0.872	1.000	0.900	1.000	0.025	0.055	5.83%	4.08%
31243-102		5	0.960	0.908	1.000	0.900	1.000	0.019	0.042	4.36%	2.04%
31243-103		5	0.920	0.864	0.976	0.850	0.950	0.020	0.045	4.86%	6.12%
31243-104		5	0.990	0.962	1.000	0.950	1.000	0.010	0.022	2.26%	-1.02%
31243-105		5	0.940	0.888	0.992	0.900	1.000	0.019	0.042	4.45%	4.08%

Leptocheirus 10-d Survival and Reburial Sediment Test **EnviroSystems, Inc.**

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31244-000	LC	0.950	1.000	1.000	0.950	1.000
31242-008	RS	0.950	1.000	1.000	0.150	0.850
31243-101		1.000	0.900	0.900	0.900	1.000
31243-102		0.950	1.000	0.900	0.950	1.000
31243-103		0.900	0.950	0.850	0.950	0.950
31243-104		1.000	1.000	0.950	1.000	1.000
31243-105		0.900	0.950	1.000	0.900	0.950

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-1748-0076	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31244-000	08-7981-0638	09 Nov-18	09 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31244-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Lp)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31242-008 passed proportion survived	24.17%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	23	n/a	2	8	Exact	0.2222	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.56	2.29	0.0037	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.152089	0.152089	1	1.5	0.2550	Non-Significant Effect
Error	0.809343	0.101168	8			
Total	0.961433		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	51.4	23.2	0.0022	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.761	0.741	0.0049	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31244-000	LC	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31242-008	RS	5	0.790	0.339	1.000	0.950	0.150	1.000	0.162	45.95%	19.39%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31244-000	LC	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31242-008	RS	5	1.17	0.614	1.72	1.35	0.398	1.46	0.199	38.18%	17.45%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31244-000	LC	0.950	1.000	1.000	0.950	1.000
31242-008	RS	0.950	1.000	1.000	0.150	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31244-000	LC	1.35	1.46	1.46	1.35	1.46
31242-008	RS	1.35	1.46	1.46	0.398	1.17

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-9817-5480	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31244-000	08-7981-0638	09 Nov-18	09 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31244-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Lp)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31242-008 passed proportion survived	6.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	0.81	1.89	0.127	7	CDF	0.2222	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0065749	0.0065749	1	0.657	0.4445	Non-Significant Effect
Error	0.0701038	0.0100148	7			
Total	0.0766787		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.72	24.3	0.1682	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.701	0.2327	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31244-000	LC	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31242-008	RS	4	0.950	0.837	1.000	0.975	0.850	1.000	0.035	7.44%	3.06%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31244-000	LC	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31242-008	RS	4	1.36	1.14	1.57	1.4	1.17	1.46	0.0675	9.93%	3.85%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31244-000	LC	0.950	1.000	1.000	0.950	1.000
31242-008	RS	0.950	1.000	1.000	Outlier	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31244-000	LC	1.35	1.46	1.46	1.35	1.46
31242-008	RS	1.35	1.46	1.46	1.17	

CETIS Analytical Report

Report Date:	20 Nov-18 11:47 (p 1 of 1)
Test Code:	31244Lp | 00-3053-0358

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-4805-4366	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	15d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-101 passed proportion survived	36.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.808	1.86	0.383	8	CDF	0.7787	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.51	2.29	0.0076	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0690657	0.0690657	1	0.653	0.4425	Non-Significant Effect
Error	0.846667	0.105833	8			
Total	0.915732		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15	23.2	0.0223	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.793	0.741	0.0118	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.790	0.339	1.000		0.150	1.000	0.162	45.95%	0.00%
31243-101		5	0.940	0.872	1.000		0.900	1.000	0.025	5.83%	-18.99%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.17	0.614	1.72		0.398	1.46	0.199	38.18%	0.00%
31243-101		5	1.33	1.19	1.48		1.25	1.46	0.0514	8.62%	-14.25%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	0.150	0.850
31243-101		1.000	0.900	0.900	0.900	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS					
31243-101						

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-0660-1885	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	15d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-101 passed proportion survived	8.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0.313	1.89	0.157	7	CDF	0.3816	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0015072	0.0015072	1	0.0982	0.7631	Non-Significant Effect
Error	0.107427	0.0153467	7			
Total	0.108934		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.38	24.3	0.7395	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.868	0.701	0.1170	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.950	0.837	1.000	0.975	0.850	1.000	0.035	7.44%	0.00%
31243-101		5	0.940	0.872	1.000	0.900	0.900	1.000	0.025	5.83%	1.05%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.36	1.14	1.57	1.4	1.17	1.46	0.0675	9.93%	0.00%
31243-101		5	1.33	1.19	1.48	1.25	1.25	1.46	0.0514	8.62%	1.92%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	Outlier	0.850
31243-101		1.000	0.900	0.900	0.900	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.35	1.46	1.46	1.17	
31243-101		1.46	1.25	1.25	1.25	1.46

CETIS Analytical Report

Report Date: 20 Nov-18 11:47 (p 1 of 1)
Test Code: 31244Lp | 00-3053-0358

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-8970-3237	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	14d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-102 passed proportion survived	43.25%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.01	2.13	0.433	4	CDF	0.8147	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.54	2.29	0.0052	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.104762	0.104762	1	1.02	0.3431	Non-Significant Effect
Error	0.825489	0.103186	8			
Total	0.930251		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	25.1	23.2	0.0086	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.787	0.741	0.0101	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.790	0.339	1.000		0.150	1.000	0.162	45.95%	0.00%
31243-102		5	0.960	0.908	1.000		0.900	1.000	0.019	4.36%	-21.52%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.17	0.614	1.72		0.398	1.46	0.199	38.18%	0.00%
31243-102		5	1.37	1.26	1.48		1.25	1.46	0.0397	6.48%	-17.55%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	0.150	0.850
31243-102		0.950	1.000	0.900	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS					
31243-102						

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-3414-4958	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	14d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-102 passed proportion survived	7.31%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.167	1.89	0.141	7	CDF	0.5640	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003445	0.0003445	1	0.028	0.8719	Non-Significant Effect
Error	0.0862495	0.0123214	7			
Total	0.0865941		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.31	24.3	0.4369	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.867	0.701	0.1146	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.950	0.837	1.000	0.975	0.850	1.000	0.035	7.44%	0.00%
31243-102		5	0.960	0.908	1.000	0.950	0.900	1.000	0.019	4.36%	-1.05%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.36	1.14	1.57	1.4	1.17	1.46	0.0675	9.93%	0.00%
31243-102		5	1.37	1.26	1.48	1.35	1.25	1.46	0.0397	6.48%	-0.92%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	Outlier	0.850
31243-102		0.950	1.000	0.900	0.950	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.35	1.46	1.46	1.17	
31243-102		1.35	1.46	1.25	1.35	1.46

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-5330-0129	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	14d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-103 passed proportion survived	36.06%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	26	n/a	2	8	Exact	0.4405	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.55	2.29	0.0045	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0389869	0.0389869	1	0.381	0.5542	Non-Significant Effect
Error	0.818391	0.102299	8			
Total	0.857378		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	32.4	23.2	0.0053	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.776	0.741	0.0074	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.790	0.339	1.000	0.950	0.150	1.000	0.162	45.95%	0.00%
31243-103		5	0.920	0.864	0.976	0.950	0.850	0.950	0.020	4.86%	-16.46%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.17	0.614	1.72	1.35	0.398	1.46	0.199	38.18%	0.00%
31243-103		5	1.29	1.19	1.39	1.35	1.17	1.35	0.035	6.06%	-10.70%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	0.150	0.850
31243-103		0.900	0.950	0.850	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.35	1.46	1.46	0.398	1.17
31243-103		1.25	1.35	1.17	1.35	1.35

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-1444-9439	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	14d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-103 passed proportion survived	6.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0.945	1.89	0.135	7	CDF	0.1882	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0100878	0.0100878	1	0.892	0.3763	Non-Significant Effect
Error	0.0791511	0.0113073	7			
Total	0.089239		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.97	24.3	0.3197	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.701	0.1704	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.950	0.837	1.000	0.975	0.850	1.000	0.035	7.44%	0.00%
31243-103		5	0.920	0.864	0.976	0.950	0.850	0.950	0.020	4.86%	3.16%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.36	1.14	1.57	1.4	1.17	1.46	0.0675	9.93%	0.00%
31243-103		5	1.29	1.19	1.39	1.35	1.17	1.35	0.035	6.06%	4.96%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	Outlier	0.850
31243-103		0.900	0.950	0.850	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.35	1.46	1.46	1.17	
31243-103		1.25	1.35	1.17	1.35	1.35

CETIS Analytical Report

Report Date:	20 Nov-18 11:48 (p 1 of 1)
Test Code:	31244Lp | 00-3053-0358

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-4359-7899	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	15d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-104 passed proportion survived	35.64%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	33.5	n/a	3	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.57	2.29	0.0033	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.182097	0.182097	1	1.81	0.2153	Non-Significant Effect
Error	0.804322	0.10054	8			
Total	0.986418		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	76.1	23.2	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.741	0.741	0.0028	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.790	0.339	1.000		0.150	1.000	0.162	45.95%	0.00%
31243-104		5	0.990	0.962	1.000		0.950	1.000	0.010	2.26%	-25.32%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.17	0.614	1.72		0.398	1.46	0.199	38.18%	0.00%
31243-104		5	1.44	1.37	1.5		1.35	1.46	0.0228	3.55%	-23.13%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	0.150	0.850
31243-104		1.000	1.000	0.950	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS					
31243-104						

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-0232-5096	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	15d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-104 passed proportion survived	6.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-1.2	1.89	0.123	7	CDF	0.8654	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0133925	0.0133925	1	1.44	0.2691	Non-Significant Effect
Error	0.065082	0.0092974	7			
Total	0.0784746		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.99	24.3	0.0910	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.869	0.701	0.1190	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.950	0.837	1.000	0.975	0.850	1.000	0.035	7.44%	0.00%
31243-104		5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	-4.21%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.36	1.14	1.57	1.4	1.17	1.46	0.0675	9.93%	0.00%
31243-104		5	1.44	1.37	1.5	1.46	1.35	1.46	0.0228	3.55%	-5.71%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	Outlier	0.850
31243-104		1.000	1.000	0.950	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.35	1.46	1.46	1.17	
31243-104		1.46	1.46	1.35	1.46	1.46

CETIS Analytical Report

Report Date:	20 Nov-18 11:48 (p 1 of 1)
Test Code:	31244Lp | 00-3053-0358

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-8519-4313	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	16d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-105 passed proportion survived	36.22%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28	n/a	3	8	Exact	0.5476	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.54	2.29	0.0050	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0662302	0.0662302	1	0.643	0.4458	Non-Significant Effect
Error	0.824043	0.103005	8			
Total	0.890273		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	26.3	23.2	0.0078	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.78	0.741	0.0084	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.790	0.339	1.000		0.150	1.000	0.162	45.95%	0.00%
31243-105		5	0.940	0.888	0.992		0.900	1.000	0.019	4.45%	-18.99%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.17	0.614	1.72		0.398	1.46	0.199	38.18%	0.00%
31243-105		5	1.33	1.22	1.44		1.25	1.46	0.0388	6.53%	-13.95%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	0.150	0.850
31243-105		0.900	0.950	1.000	0.900	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS					
31243-105						

Leptocheirus 10-d Survival and Reburial Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-7809-4904	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Nov-18 11:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	17d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	16d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-105 passed proportion survived	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.399	1.89	0.14	7	CDF	0.3507	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0019327	0.0019327	1	0.16	0.7015	Non-Significant Effect
Error	0.0848035	0.0121148	7			
Total	0.0867362		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.42	24.3	0.4135	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.701	0.5918	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.950	0.837	1.000	0.975	0.850	1.000	0.035	7.44%	0.00%
31243-105		5	0.940	0.888	0.992	0.950	0.900	1.000	0.019	4.45%	1.05%

Angular (Corrected) Transformed Summary

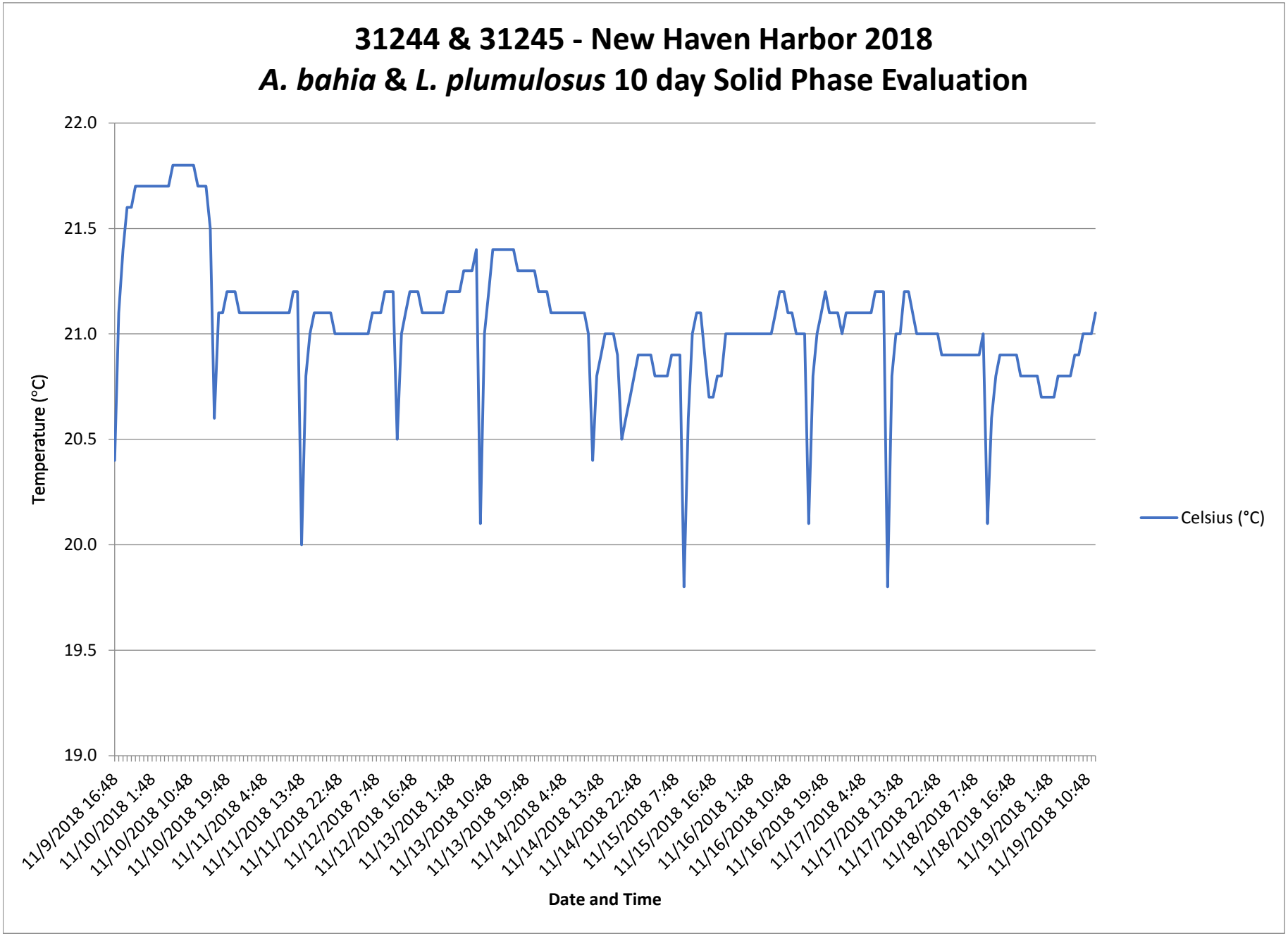
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.36	1.14	1.57	1.4	1.17	1.46	0.0675	9.93%	0.00%
31243-105		5	1.33	1.22	1.44	1.35	1.25	1.46	0.0388	6.53%	2.17%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.950	1.000	1.000	Outlier	0.850
31243-105		0.900	0.950	1.000	0.900	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.35	1.46	1.46	1.17	
31243-105		1.25	1.35	1.46	1.25	1.35


31244 & 31245 - New Haven Harbor 2018
A. bahia & L. plumulosus 10 day Solid Phase Evaluation
Temperature (°C)
22.0
21.5
21.0
20.5
20.0
19.5
19.0
11/9/2018 16:48
11/10/2018 1:48
11/10/2018 10:48
11/10/2018 19:48
11/11/2018 4:48
11/11/2018 13:48
11/11/2018 22:48
11/12/2018 7:48
11/12/2018 16:48
11/13/2018 1:48
11/13/2018 10:48
11/13/2018 19:48
11/14/2018 4:48
11/14/2018 13:48
11/14/2018 22:48
11/15/2018 7:48
11/15/2018 16:48
11/16/2018 1:48
11/16/2018 10:48
11/16/2018 19:48
11/17/2018 4:48
11/17/2018 13:48
11/17/2018 22:48
11/18/2018 7:48
11/18/2018 16:48
11/19/2018 1:48
11/19/2018 10:48
Date and Time
Celsius (°C)

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
1	11/9/2018 16:48	20.4
2	11/9/2018 17:48	21.1
3	11/9/2018 18:48	21.4
4	11/9/2018 19:48	21.6
5	11/9/2018 20:48	21.6
6	11/9/2018 21:48	21.7
7	11/9/2018 22:48	21.7
8	11/9/2018 23:48	21.7
9	11/10/2018 0:48	21.7
10	11/10/2018 1:48	21.7
11	11/10/2018 2:48	21.7
12	11/10/2018 3:48	21.7
13	11/10/2018 4:48	21.7
14	11/10/2018 5:48	21.7
15	11/10/2018 6:48	21.8
16	11/10/2018 7:48	21.8
17	11/10/2018 8:48	21.8
18	11/10/2018 9:48	21.8
19	11/10/2018 10:48	21.8
20	11/10/2018 11:48	21.8
21	11/10/2018 12:48	21.7
22	11/10/2018 13:48	21.7
23	11/10/2018 14:48	21.7
24	11/10/2018 15:48	21.5
25	11/10/2018 16:48	20.6
26	11/10/2018 17:48	21.1
27	11/10/2018 18:48	21.1
28	11/10/2018 19:48	21.2
29	11/10/2018 20:48	21.2
30	11/10/2018 21:48	21.2
31	11/10/2018 22:48	21.1
32	11/10/2018 23:48	21.1
33	11/11/2018 0:48	21.1
34	11/11/2018 1:48	21.1
35	11/11/2018 2:48	21.1

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
36	11/11/2018 3:48	21.1
37	11/11/2018 4:48	21.1
38	11/11/2018 5:48	21.1
39	11/11/2018 6:48	21.1
40	11/11/2018 7:48	21.1
41	11/11/2018 8:48	21.1
42	11/11/2018 9:48	21.1
43	11/11/2018 10:48	21.1
44	11/11/2018 11:48	21.2
45	11/11/2018 12:48	21.2
46	11/11/2018 13:48	20.0
47	11/11/2018 14:48	20.8
48	11/11/2018 15:48	21.0
49	11/11/2018 16:48	21.1
50	11/11/2018 17:48	21.1
51	11/11/2018 18:48	21.1
52	11/11/2018 19:48	21.1
53	11/11/2018 20:48	21.1
54	11/11/2018 21:48	21.0
55	11/11/2018 22:48	21.0
56	11/11/2018 23:48	21.0
57	11/12/2018 0:48	21.0
58	11/12/2018 1:48	21.0
59	11/12/2018 2:48	21.0
60	11/12/2018 3:48	21.0
61	11/12/2018 4:48	21.0
62	11/12/2018 5:48	21.0
63	11/12/2018 6:48	21.1
64	11/12/2018 7:48	21.1
65	11/12/2018 8:48	21.1
66	11/12/2018 9:48	21.2
67	11/12/2018 10:48	21.2
68	11/12/2018 11:48	21.2
69	11/12/2018 12:48	20.5
70	11/12/2018 13:48	21.0

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
71	11/12/2018 14:48	21.1
72	11/12/2018 15:48	21.2
73	11/12/2018 16:48	21.2
74	11/12/2018 17:48	21.2
75	11/12/2018 18:48	21.1
76	11/12/2018 19:48	21.1
77	11/12/2018 20:48	21.1
78	11/12/2018 21:48	21.1
79	11/12/2018 22:48	21.1
80	11/12/2018 23:48	21.1
81	11/13/2018 0:48	21.2
82	11/13/2018 1:48	21.2
83	11/13/2018 2:48	21.2
84	11/13/2018 3:48	21.2
85	11/13/2018 4:48	21.3
86	11/13/2018 5:48	21.3
87	11/13/2018 6:48	21.3
88	11/13/2018 7:48	21.4
89	11/13/2018 8:48	20.1
90	11/13/2018 9:48	21.0
91	11/13/2018 10:48	21.2
92	11/13/2018 11:48	21.4
93	11/13/2018 12:48	21.4
94	11/13/2018 13:48	21.4
95	11/13/2018 14:48	21.4
96	11/13/2018 15:48	21.4
97	11/13/2018 16:48	21.4
98	11/13/2018 17:48	21.3
99	11/13/2018 18:48	21.3
100	11/13/2018 19:48	21.3
101	11/13/2018 20:48	21.3
102	11/13/2018 21:48	21.3
103	11/13/2018 22:48	21.2
104	11/13/2018 23:48	21.2
105	11/14/2018 0:48	21.2

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
106	11/14/2018 1:48	21.1
107	11/14/2018 2:48	21.1
108	11/14/2018 3:48	21.1
109	11/14/2018 4:48	21.1
110	11/14/2018 5:48	21.1
111	11/14/2018 6:48	21.1
112	11/14/2018 7:48	21.1
113	11/14/2018 8:48	21.1
114	11/14/2018 9:48	21.1
115	11/14/2018 10:48	21.0
116	11/14/2018 11:48	20.4
117	11/14/2018 12:48	20.8
118	11/14/2018 13:48	20.9
119	11/14/2018 14:48	21.0
120	11/14/2018 15:48	21.0
121	11/14/2018 16:48	21.0
122	11/14/2018 17:48	20.9
123	11/14/2018 18:48	20.5
124	11/14/2018 19:48	20.6
125	11/14/2018 20:48	20.7
126	11/14/2018 21:48	20.8
127	11/14/2018 22:48	20.9
128	11/14/2018 23:48	20.9
129	11/15/2018 0:48	20.9
130	11/15/2018 1:48	20.9
131	11/15/2018 2:48	20.8
132	11/15/2018 3:48	20.8
133	11/15/2018 4:48	20.8
134	11/15/2018 5:48	20.8
135	11/15/2018 6:48	20.9
136	11/15/2018 7:48	20.9
137	11/15/2018 8:48	20.9
138	11/15/2018 9:48	19.8
139	11/15/2018 10:48	20.6
140	11/15/2018 11:48	21.0

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
141	11/15/2018 12:48	21.1
142	11/15/2018 13:48	21.1
143	11/15/2018 14:48	20.9
144	11/15/2018 15:48	20.7
145	11/15/2018 16:48	20.7
146	11/15/2018 17:48	20.8
147	11/15/2018 18:48	20.8
148	11/15/2018 19:48	21.0
149	11/15/2018 20:48	21.0
150	11/15/2018 21:48	21.0
151	11/15/2018 22:48	21.0
152	11/15/2018 23:48	21.0
153	11/16/2018 0:48	21.0
154	11/16/2018 1:48	21.0
155	11/16/2018 2:48	21.0
156	11/16/2018 3:48	21.0
157	11/16/2018 4:48	21.0
158	11/16/2018 5:48	21.0
159	11/16/2018 6:48	21.0
160	11/16/2018 7:48	21.1
161	11/16/2018 8:48	21.2
162	11/16/2018 9:48	21.2
163	11/16/2018 10:48	21.1
164	11/16/2018 11:48	21.1
165	11/16/2018 12:48	21.0
166	11/16/2018 13:48	21.0
167	11/16/2018 14:48	21.0
168	11/16/2018 15:48	20.1
169	11/16/2018 16:48	20.8
170	11/16/2018 17:48	21.0
171	11/16/2018 18:48	21.1
172	11/16/2018 19:48	21.2
173	11/16/2018 20:48	21.1
174	11/16/2018 21:48	21.1
175	11/16/2018 22:48	21.1

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
176	11/16/2018 23:48	21.0
177	11/17/2018 0:48	21.1
178	11/17/2018 1:48	21.1
179	11/17/2018 2:48	21.1
180	11/17/2018 3:48	21.1
181	11/17/2018 4:48	21.1
182	11/17/2018 5:48	21.1
183	11/17/2018 6:48	21.1
184	11/17/2018 7:48	21.2
185	11/17/2018 8:48	21.2
186	11/17/2018 9:48	21.2
187	11/17/2018 10:48	19.8
188	11/17/2018 11:48	20.8
189	11/17/2018 12:48	21.0
190	11/17/2018 13:48	21.0
191	11/17/2018 14:48	21.2
192	11/17/2018 15:48	21.2
193	11/17/2018 16:48	21.1
194	11/17/2018 17:48	21.0
195	11/17/2018 18:48	21.0
196	11/17/2018 19:48	21.0
197	11/17/2018 20:48	21.0
198	11/17/2018 21:48	21.0
199	11/17/2018 22:48	21.0
200	11/17/2018 23:48	20.9
201	11/18/2018 0:48	20.9
202	11/18/2018 1:48	20.9
203	11/18/2018 2:48	20.9
204	11/18/2018 3:48	20.9
205	11/18/2018 4:48	20.9
206	11/18/2018 5:48	20.9
207	11/18/2018 6:48	20.9
208	11/18/2018 7:48	20.9
209	11/18/2018 8:48	20.9
210	11/18/2018 9:48	21.0

STUDY: 31244 & 31245
CLIENT: AECOM
PROJECT: New Haven Harbor FNP - 2018
ASSAY: *L. plumulosus* and *A. bahia* 10 Day Solid Phase Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015860

Mean: 21.0 °C
Minimum: 19.8 °C
Maximum: 21.8 °C

Reading	Date and Time	Celsius (°C)
211	11/18/2018 10:48	20.1
212	11/18/2018 11:48	20.6
213	11/18/2018 12:48	20.8
214	11/18/2018 13:48	20.9
215	11/18/2018 14:48	20.9
216	11/18/2018 15:48	20.9
217	11/18/2018 16:48	20.9
218	11/18/2018 17:48	20.9
219	11/18/2018 18:48	20.8
220	11/18/2018 19:48	20.8
221	11/18/2018 20:48	20.8
222	11/18/2018 21:48	20.8
223	11/18/2018 22:48	20.8
224	11/18/2018 23:48	20.7
225	11/19/2018 0:48	20.7
226	11/19/2018 1:48	20.7
227	11/19/2018 2:48	20.7
228	11/19/2018 3:48	20.8
229	11/19/2018 4:48	20.8
230	11/19/2018 5:48	20.8
231	11/19/2018 6:48	20.8
232	11/19/2018 7:48	20.9
233	11/19/2018 8:48	20.9
234	11/19/2018 9:48	21.0
235	11/19/2018 10:48	21.0
236	11/19/2018 11:48	21.0
237	11/19/2018 12:48	21.1
238	11/19/2018 13:48	21.0
239	11/19/2018 14:48	20.6
240	11/19/2018 15:48	20.6
241	11/19/2018 16:48	20.5

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for salinity and dissolved oxygen
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	Yes
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	Yes, except as noted for salinity and dissolved oxygen	Salinity outside limits, dissolved oxygen below ESI's SOP limit but with RIM target limit (Section 3.3, Table 4, Appendix A)	Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae	NA		
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	Yes		Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ASSAY REVIEW CHECKLIST

STUDY#: 31244 / 31245

CLIENT: AECOM

PROJECT: New Haven Harbor FNP - 2018

ASSAY: *L. plumulosus* and *A. bahia* 10 day Solid Phase Evaluation

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	11/16/18	JTP	
Sample Receipt Complete	11/16/18	↓	
Organism Culture Sheet(s)	12/06/18	↓	
Bench Sheets Complete (dates, times, initials, etc...)	12/06/18	↓	
Water Quality Data Complete	11/27/18	↓	
Weights Reported	N/A	↓	
Assay Acceptability Review	11/19/18	↓	

Technical Report Review	Date	Initials	Comments
Statistical Analysis	12/06/18	JTP (QC)	
Survival	11/20/18	MR	
Chemical	NA		
Statistical Analysis Reviewed	11/20/18	CJ	
Data Acceptability Review	11/20/18	MR	
Support Documentation			
Temperature Data Logger	12/12/18	MR	
Daily WQ Data	↓	↓	
Overlying and/or Pore Water Chemistry	↓	↓	
Other Chemical Analysis Data	NA		
Draft Report	12/12/18	MR	
Final Report Reviewed	12/13/18	BE/JTP	
QA Audit/Review Complete			
Final Report Printed - PDF	12/13/18	MR	
Report E-mailed / Faxed	12/13/18	MR	
Report Logged Out	↓	↓	

Appendix D.3: 28-Day Sediment Toxicity and Bioaccumulation Evaluation

AECOM Imagine it. Delivered.

Contract: W912WJ-17-D-0003
Delivery Order: W912WJ18F0109

Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project, New Haven, Connecticut

11 April, 2019

28-Day Bioassay and Tissue Analysis Report - Revised Submittal

TOXICOLOGICAL EVALUATION
OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003 TO#5
Delivery Order No.: W912WJ18F0109

28 Day Bioaccumulation Evaluation

Prepared for:

AECOM
250 Apollo Drive
Chelmsford, Massachusetts 01824

Prepared by:

EnviroSystems, an affiliate of Enthalpy Analytical LLC
One Lafayette Road
Hampton, New Hampshire 03842

EnviroSystems, Inc. Master Reference 31242
Specific Studies 31249 & 31250

Report Issue Date: April 10, 2019
Assay Date: November 2018

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LABORATORY STANDARDS STATEMENT

This study was performed by EnviroSystems, an affiliate of Enthalpy Analytical LLC, at its facility in Hampton, New Hampshire. EnviroSystems' laboratory is accredited by the State of New Hampshire under the National Environmental Laboratory Accreditation (NELAC) program. Additionally, ESI is accredited under the Department of Defense (DoD) ELAP program, ISO/IEC 17025:2005, Certificate Number L2340. ESI also has an approved Laboratory Quality Assurance Plan (LQAP) covering all portions of this project. All testing conducted by EnviroSystems as part of this program was compliant with NELAC guidelines and standards. Additionally, this study was conducted in accordance with guidelines presented in the 2004 version of the New England District's Regional Implementation Manual (RIM) for Evaluation of Dredged Material Proposed for Disposal In New England Waters with additional direction provided by the CENAE in an email dated March 30, 2018. Any deviations from specific elements of the RIM are detailed in the Protocol Deviation section of this report.

For EnviroSystems _____ April 10, 2019

Kirk Cram
Laboratory Director

Date

TOXICOLOGICAL EVALUATION OF A PROPOSED DREDGE SEDIMENT:

New Haven Harbor 2018 Federal Navigation Project
Tier III Sediment Evaluation
New Haven, Connecticut

New England District Corps of Engineers
Contract No. W912WJ-17-D-0003 TO#5
Delivery Order No.: W912WJ18F0109

28 Day Bioaccumulation Evaluation

1.0 INTRODUCTION

As part of a comprehensive plan to reduce adverse environmental impacts of ocean dumping, Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 specifies that all sediments to be discharged into ocean waters must be evaluated to define their potential impact on existing benthic communities. The United States Environmental Protection Agency (US EPA) has determined that the most effective means to make such an assessment is through the use of bioassay tests that provide a relatively direct estimate of potential impact.

This project was designed to evaluate the potential toxicity of sediments from the area of dredging proposed for the New Haven Harbor 2018 Federal Navigation Project (FNP) located in New Haven, Connecticut. Placement of dredge materials is proposed at the Central Long Island Sound Disposal Site (CLDS).

Testing involved conduct of 28-day bioaccumulation evaluations using *Macoma nasuta* (bivalve clam) and *Nereis virens* (polychaete worm). Testing followed procedures established by the US EPA, US Army Corps of Engineers and the New England District Army Corps of Engineers (CENAE) for testing of dredged material. Procedures are presented in *Evaluation of Dredged Material Proposed for Ocean Disposal* (US EPA, US ACE 1991), *Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. - Testing Manual* (US EPA, US ACE 1998) and the *Regional Implementation Manual [RIM] for Evaluation of Dredged Material Proposed for Disposal in New England Waters* (US EPA, CENAE, 2004), with additional direction provided by the CENAE in an email dated March 30, 2018 (Appendix A). All biological testing completed in support of the 28 day bioaccumuation evaluation were performed at EnviroSystems (ESI), an affiliate of Enthalpy Analytical LLC, Hampton, New Hampshire. All chemical analyses of surviving tissues were analyzed by Alpha Analytical Laboratory. Subsequent statistical analyses of the body burden data were completed by ESI.

2.0 METHODS AND MATERIALS

2.1 Sample Collection, Preservation and Storage

Sediment cores for toxicological analysis were collected by the US ACE New England District (CENAE) using vibracoring equipment from locations identified in the dredge footprint specified in the project Work Plan (AECOM, 2018). Sediment samples were received from AECOM, Chelmsford, Massachusetts under chain of custody in 3.5 gallon polyethylene buckets, and were composited based on the compositing scheme outlined in the Work Plan. Reference sediment samples were collected by the AECOM field team from the CLDS. Upon arrival at the laboratory, all samples received an internal sample control number and were logged into the project sample control system. Prior to testing, samples were placed in a secure refrigerator and stored at a temperature of $4 \pm 2°C$ until test initiation. Sample identification, collection and receipt information is summarized in Table 1. Sample compositing information is provided in Table 2.

Sediment for the laboratory control treatment was collected from the Hampton-Seabrook Estuary, Hampton, New Hampshire. The area is not known to receive any direct industrial inputs and has been used as laboratory reference sediment in the testing of marine sediments for over 30 years. Overlying seawater is pumped in daily from the estuary and stored in holding tanks. Seawater is obtained through a filter system located on the bottom of the estuary at a point approximately 1 mile from the open ocean. Laboratory water is aerated through the collection system and in individual storage containers and test chambers. Water from the estuary has been used for the culture and maintenance of test organisms at ESI since 1978. The laboratory control was included to verify the health of the test organisms, and as a relative benchmark for reference site toxicity.

2.2 Test Organisms

M. nasuta were obtained from Aquatic Research Organisms (ARO), Hampton, New Hampshire. Organisms were field collected along the Washington coast and shipped to ARO via overnight delivery. At ESI, the clams were placed in clean holding sediment with flowing seawater and monitored for at least 24 hours prior to use. Damaged bivalves and those that would not close when prodded or did not burrow into sediment were not used for testing. Clams used for the assay were approximately 28-45 mm total length.

Adult *N. virens* were also obtained from ARO. Worms were collected in the field from the Damariscotta River in Boothbay Harbor, Maine and delivered to ARO. If not used the same day, worms were refrigerated overnight in seaweed. Damaged and inactive worms were not used in the assay.

2.3 Bioaccumulation Evaluation

The assays were started by placing approximately 6 L of sediment (control, reference or site sediment) into 10 gallon aquaria designed for flow-through testing. Overlying water was then added to each aquarium. The volume of the overlying water in these chambers was 20-30 L. Water flow was adjusted to provide approximately 6 volume additions of water/day to each aquarium. Flow into each aquarium was set so that incoming water mixed throughout the tank and did not stratify as a surface layer.

M. nasuta and *N. virens* were indiscriminately selected from the pool of organisms and randomly added to the aquaria. A total of 20 worms and 20 clams were added by groups of 10 to each of 5 replicates; species were tested in separate test chambers. Animals that did not burrow within the first 24 hours were removed and replaced with new test organisms. Temperature was maintained at 12-16°C with no readings exceeding ±3°C. Salinity was maintained at 30±2‰. The photoperiod was set at 16:8 hours light:dark. Dissolved oxygen levels were maintained at a minimum level of ≥60% saturation by providing aeration to all tanks from the start of the assay. Organisms were not fed during the exposure period.

Dissolved oxygen, pH, temperature, specific conductance and salinity were measured daily in all aquaria using a YSI® multi-parameter probe that captures the data electronically following a pre-determined sample reading order. Data were downloaded using YSI Data Manager® software and formatted into tables.

After 28 days exposure, *M. nasuta* and *N. virens* were recovered from the test sediments and counted. Survival counts were used for statistical analysis. All living organisms were transferred to clean test vessels and maintained in clean seawater for 24 hours to allow for removal of sediment from the animals' digestive tracts. After the depuration period, organisms were transferred to 4 ounce glass jars and frozen. Tissues were subsequently processed (ground up and homogenized) and frozen for delivery to Alpha Analytical for chemical analysis of total metals, PAH, PCB congeners, pesticides and lipids analysis. Tissue chains of custody are provided in Appendix A.

2.4 Tissue Analysis

Methods used by Alpha Analytical in the analyses of tissues generated from the bioaccumulation tests followed protocols recommended in Table 8 of the New England District RIM document with

appropriate updates related to current methods. Tissues were prepared using USEPA Method 3051A for inorganics and USEPA 3570 for organics. Trace metals were evaluated using EPA Method 6020B, Inductively Coupled Plasma - Mass Spectrometry (ICP-MS), and mercury was evaluated using EPA Method 7474, Atomic Fluorescence Spectrometry. PAH compounds and PCB congeners were analyzed by EPA Method SW 846 8082/EPA 680 (modified), and pesticides were analyzed by SW 846 8081B. Reporting Limits and/or Method Detection Limits met RIM requirements with the exception of PCB congeners. The complete tissue chemistry and quality assurance analytical report is provided under separate cover by Alpha Analytical. Summaries of the tissue chemistry results used for the statistical analysis of body burden data are provided in Appendix A.

2.5 Data Analysis

The statistical analyses of survival and body burden data were completed at ESI using CETIS™ ver. 1.9.3.0 (Comprehensive Environmental Toxicity Information System) software to determine significant differences between the reference tissue and the site composite tissues. Data were evaluated to determine homogeneity of sample variances and normality of distribution using appropriate statistics. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Statistical difference was evaluated at $\alpha = 0.05$. Per RIM guidelines and direction provided by the CENAE in an email dated March 30, 2018 (Appendix A), one-half the MDL is used in instances when a compound of concern (COC) is not detected for purposes of calculating a mean tissue concentration and total concentrations for PAHs, PCBs, and pesticides. MDLs used in statistical computations may differ due to differences in tissue mass and final extract volumes used in the analysis for each sample.

All mean body burden concentrations presented in the narrative report tables, CETIS™ reports and the CENAE EDD spreadsheet for each composite are calculated from the same source of tissue chemistry data generated by Alpha Analytical and provided by AECOM on January 30, 2019. Reported concentrations are presented to a precision of 2 significant figures (3 significant figures for metals ≥10.0 µg/g). Slight differences in the mean concentrations are attributable to the ability and limitations of each software package to capture significant figures. The values agree within reason by rounding and represent the magnitude of the average concentration of the COC detected in tissue.

Following CENAE protocol, the statistical analyses were completed for all COCs identified in the Sampling and Analysis Plan and are included in Appendix A, however the findings of significance presented in the report focus only on those COCs detected in the reference sample.

2.6 Reference Toxicant Evaluation

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Summaries of acute exposure reference toxicant assays conducted in support of this study are provided in Table 3.

3.0 RESULTS

Table 4 provides a summary of laboratory control performance and test acceptability criteria. Tables 5 and 6 provide a summary of *M. nasuta* and *N. virens* survival data and statistical analyses, respectively. Tables 7 and 8 provide summaries of body burden data for *M. nasuta* and *N. virens*, respectively. Table 9 provides a supplemental statistical evaluation of PCB congeners in *N. virens* native tissue, and Table 10 summarizes the findings of significant uptake in clam and worm tissue as compared with the CLDS. The number of significant figures for mean concentrations presented in Tables 7 and 8 and those used in the statistical analysis may also vary. Laboratory bench sheets, detailed summaries of survival, body burden data and associated support data are included in Appendix A.

3.1 *Macoma nasuta*

3.1.1 Survival

Mean *M. nasuta* survival in both the laboratory control and CLDS reference samples was 99% with a coefficient of variation (CV) of 2%. Surviving organisms from the control, reference and site composite samples provided sufficient tissue for preparation and analysis of body burdens. The endpoints met and/or exceeded requirements specified in the current version of the RIM.

After 28 days exposure, mean survival of bivalves in the site composite samples ranged from 94% (Composite 5) to 100% (Composite 2). The statistical evaluation of the data showed no significant reductions in survival for bivalves maintained in any of the site composite samples when compared to the CLDS reference sediment.

3.1.2 Water Quality Summary

Daily water quality data collected during the assay documented a mean temperature of 11.6°C with a range of 11.0 to 12.4°C. The target test temperature for the assay was 14±2°C with acceptable limits of 11 to 17°C. Temperature data were also collected on an hourly basis starting on day 9 (11/30/18). The mean hourly temperature value was 12.0°C and ranged from 11.8°C to 12.5°C during the course of the assay. Additional daily water quality data documented salinity levels during the assay varied from 25.7 to 32.0‰ with a mean value of 29.5‰. Dissolved oxygen levels ranged from 58% to 106% with a mean level of 98% while pH ranged from 7.14 to 8.00 SU. Review of the data documented that the salinity fell outside limits specified by ESI's protocol, the New England District's RIM and/or the Inland Testing Manual. See Section 3.3 for a discussion of the deviation and missing hourly temperature data.

3.1.3 Body Burden Analysis

Based on CENAE criteria, there were significant increases in body burdens for clams maintained in the project composite sediments for two metals (cadmium and lead), 6 PAHs and 4,4'-DDE as compared to CLDS reference tissue. Most notably, the PAHs primarily in composites 2, 3, 4 and 6 tissues were detected at concentrations 5 to 16 times higher than in CLDS reference tissue, especially fluoranthene in composites 3, 4 and 6, and chrysene and pyrene in composite 6 tissue, which were also detected at concentrations an order of magnitude or more greater than in reference tissue.

Review of the native clam tissue data indicates that the site composite concentration of cadmium, lead and 4,4'-DDE were only slightly higher than in native tissue, suggesting that a certain percentage of the findings of significance may be attributable to levels occurring in pre-test clam tissue. The same is true for 5 of the 6 PAHs detected in composite 5 tissue. Test organisms were obtained from suppliers routinely used and are indigenous, therefore there is an inherent level of uncertainty and variability in concentrations of COCs present in individual organisms used in respective test treatments.

Review of body burden data also showed that the following COCs were detected in clam tissue following exposure to site composite sediment but were not detected in CLDS reference tissue, therefore these COCs were eliminated from further evaluation: 6 PAHs (acenaphthene, anthracene, benzo(a)pyrene, benzo(k)fluoranthene, benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene), 10 PCB congeners (8, 18, 28, 44, 52, 66, 101, 118, 138 and 153), and 6 pesticides (4,4'-DDD, 4,4'-DDT, alpha-chlordane, gamma-chlordane, dieldrin and oxychlordane).

3.2 *Nereis virens*

3.2.1 Survival

Mean *N. virens* survival in the laboratory control sediment was 96% with a coefficient of variation (CV) of 4%. Mean survival in the CLDS reference sediment was 98% with a CV of 3%. Surviving

organisms from the control, reference and site composite samples provided sufficient tissue for preparation and analysis of body burdens. The endpoints met and/or exceeded requirements specified in the current version of the RIM.

After 28 days exposure, mean survival of polychaetes in the site composite samples ranged from 93% (Composite 5) to 97% (Composites 3 and 4). The statistical evaluation of the data showed a significant reduction in survival for polychaetes maintained in composite 5 sediment when compared to the CLDS reference sediment, however the difference in survival was <10%.

3.2.2 Water Quality Summary

Daily water quality data collected during the assay documented a mean temperature of 11.4°C with a range of 10.8 to 12.2°C. The target test temperature for the assay was 14±2°C with acceptable limits of 11 to 17°C. Temperature data were also collected on an hourly basis starting on day 10 (11/30/18). The mean hourly temperature value was 12.0°C and ranged from 11.8°C to 12.5°C during the course of the assay. Additional daily water quality data documented salinity levels during the assay varied from 13.3 to 32.1‰ with a mean value of 29.5‰. Dissolved oxygen levels ranged from 41% to 105% with a mean level of 96% while pH ranged from 7.32 to 8.02 SU. Review of the data documented that the temperature and salinity fell outside limits specified by ESI's protocol, the New England District's RIM and/or the Inland Testing Manual. See Section 3.3 for a discussion of the deviation and missing hourly temperature data.

3.2.3 Body Burden Analysis

Based on CENAE criteria, there were significant increases in body burdens for worms maintained in the project composite sediments for only 1 metal (copper) and 5 PCB congeners (138, 153, 170, 180 and 187) as compared to CLDS reference tissue.

Review of the native worm tissue data indicates that the site tissue concentration of PCB congeners 138 and 170 were approximately equal to or less than concentrations found in native tissue, and site tissue concentrations of copper and PCB congeners 153, 180 and 187 were only slightly higher than in native tissue, indicating that the findings of significance may be attributable to levels present in pre-test worm tissue. Test organisms were obtained from suppliers routinely used and are indigenous, therefore there is an inherent level of uncertainty and variability in concentrations of COCs present in individual organisms used in respective test treatments.

Following this finding, a supplemental statistical evaluation of PCBs in native worm tissue was completed to identify where the concentrations in native tissue were either significantly *greater than* CLDS reference or composite tissue, and also where concentrations in native worm tissues were significantly *less than* CLDS reference or composite tissue. The findings of this evaluation are presented in Table 9 and Appendix A. There were no instances where PCB concentrations in CLDS reference tissues were significantly higher than native tissue, and only 2 instances for PCB 52 where the composite tissue was significantly higher than native tissue (composites 2 and 4). In the latter scenario, PCB 52 was not detected in CLDS reference tissue, therefore was not evaluated further. Conversely, certain PCBs (e.g., PCBs 138, 153, 170, 180 and 187) in composites 2, 4 and 5 worm tissue that were significantly higher as compared with CLDS reference sediment were also significantly higher in native tissue as compared with the CLDS reference tissue, which is further evidence of the similarity among composites 2, 4 and 5 tissue and native tissue concentrations of PCBs. It was also noted that the concentrations of these congeners in composite tissue were not significantly greater than in native tissue.

Review of body burden data also showed that the following COCs were detected in worm tissue following exposure to site composite sediment but were not detected in CLDS reference tissue, therefore these COCs were eliminated from further evaluation: mercury, 2 PAHs (fluoranthene and pyrene), 7 PCB congeners (8, 18, 52, 101, 105, 128 and 195), and 14 pesticides (4,4'-DDE, 4,4'-DDT, aldrin, cis-nonachlor, alpha-chlordane, gamma-chlordane, dieldrin endosulfan I, endosulfan II, gamma-BHC, heptachlor, heptachlor epoxide, hexachlorobenzene and oxychlordane).

3.3 Protocol Deviations

Review of the assay data revealed the following deviations from the method and/or ESI's protocol:

Data from daily temperature readings suggests that temperatures were generally on the low end of the acceptable range as the mean temperature of 11.4°C for the *N. virens* assay falls below the targeted limit of 14±2°C and the mean temperature of 11.6°C for the *M. nasuta* assay only meets the criterion by rounding to the precision reflected in the protocol. The mean temperature of 12.0°C calculated from the hourly data logger readings is within the acceptable range. Although slightly low, the daily temperature values are still within the normal temperature range tolerated by these species. It is the opinion of ESI's technical manager that this deviation had no adverse impact on the results of the assays.

Data from the daily salinity readings indicates that the minimum measurements fell outside of the acceptable range for both species. The excursions all occurred on November 28, 2018 (day 7 of the *M. nasuta* assay and day 8 of the *N. virens* assay) and were all within the 25-27‰ range, except for one measurement of 13.3‰ in replicate E of composite 5 for *N. virens* that is likely an erroneous reading resulting from technician error. While the exact reason for the excursions is unclear, it is the opinion of ESI technical manager that these deviations had no adverse impact on the outcome of the assay.

The temperature logger for collecting hourly data was not activated at the start of the assays, but instead was activated on November 30, 2018 (day 9 of the *M. nasuta* assay and day 10 of the *N. virens* assay). As a result, approximately one-quarter of the hourly temperature readings were not recorded. In addition, daily water quality readings are missing for replicate A of composite 6 on day 0 of the *N. virens* assay due to a multi-probe malfunction, however water quality readings were obtained from replicates B, C, D and E for that same composite, and all measurements appear to be within reasonable proximity to each other and to the measurements collected for the other composites that day. While these deviations represent a data gap, it is the opinion of ESI's technical manager that this deviation did not adversely affect the outcome of the assay.

3.4 Summary

This program utilized protocols developed by the US EPA and the CENAE to assess the potential impact that the proposed dredge material collected from New Haven Harbor 2018 FNP would have on the marine environment. Results of the 28 day toxicity evaluation indicate that the composite 5 sediment demonstrated significant negative effects on *N. virens* (worm) survival as compared with the CLDS reference site, however the difference in survival was <10%. There were no significant effects on worm survival for any of the other composites, or for *M. nasuta* when compared against the CLDS reference sediment.

Results of body burden data generated from both *M. nasuta* and *N. virens* tissue showed that exposure to the site composite sediment samples resulted in significant uptake of several COCs when compared to organisms maintained in the CLDS reference sediment. Significant uptake was demonstrated for cadmium, lead, 6 PAHs and 4,4'-DDE by *M. nasuta* and for copper and 5 PCB congeners by *N. virens*. Most notable were PAHs that were detected in clam tissues at levels 5 to 16 times higher than in reference tissue, primarily from composites 2 (R',S'), 3 (US 1-2), 4 (DS 1-2) and 6 (CAD 1-3). The concentrations of the metals, PCBs and 4,4'-DDE in site tissues were only slightly higher than in reference tissue and, and in the case of PCBs in composites 2, 4 and 5 worm tissue, were found to be similar to levels in native worm tissue.

4.0 REFERENCES

AECOM. 2018. *Supplemental Sampling and Testing in Support of the New Haven Harbor Navigation Improvement Project: Project Work Plan, New Haven, Connecticut [Work Plan]*. Chelmsford, Massachusetts. October 2018.

US EPA, US ACE. 1991. Evaluation of Dredged Material Proposed for Ocean Disposal - Testing Manual. EPA-503/8-91/001. 204 pages.

US EPA, US ACE. 1998. Evaluation of Dredged Material Proposed for Discharge in Waters of the US - Testing Manual. Appendix E. EPA-823-B-98-004, February 1998.

US EPA Region I, Corps of Engineers, New England District. 2004. Regional Implementation Manual for Evaluation of Dredged Material Proposed for Disposal in New England Waters. September 2004.

Table 1. Sample Collection and Receipt Information. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Field ID	ESI Code	Sample Type	Matrix	Collection Date	Collection Time	Receipt Date	Receipt Time
Comp V',W' Station V'	31242-001	Site	Solid	10/23/18	1125	10/24/18	1015
Comp V',W' Station W'	31242-002	Site	Solid	10/23/18	1125	10/24/18	1015
Comp R',S' Station R'	31242-003	Site	Solid	10/23/18	1215	10/24/18	1015
Comp R',S' Station S'	31242-004	Site	Solid	10/23/18	1215	10/24/18	1015
Comp CAD 1-3 Station CAD-1	31242-005	Site	Solid	10/23/18	1527	10/24/18	1015
Comp CAD 1-3 Station CAD-2	31242-006	Site	Solid	10/23/18	1527	10/24/18	1015
Comp CAD 1-3 Station CAD-3	31242-007	Site	Solid	10/23/18	1527	10/24/18	1015
NHH-CLDS	31242-008	Reference	Solid	10/23/18	1028	10/24/18	1015
Comp TB 1-2, Station TB-1	31242-010	Site	Solid	10/24/18	1146	10/25/18	0835
Comp TB 1-2, Station TB-2	31242-011	Site	Solid	10/24/18	1146	10/25/18	0835
Comp DS 1-2, Station DS-1	31242-012	Site	Solid	10/24/18	1006	10/25/18	0835
Comp DS 1-2, Station DS-2	31242-013	Site	Solid	10/24/18	1006	10/25/18	0835
Comp US 1-2, Station US-1	31242-019	Site	Solid	10/25/18	1023	10/25/18	1820
Comp US 1-2, Station US-2	31242-020	Site	Solid	10/25/18	1023	10/25/18	1820
Comp DS 1-2, Station DS-2	31242-023	Site	Solid	10/25/18	0946	10/25/18	1820

Notes:
[a] The Station IDs listed include detailed information written on individual sample buckets.

Table 2. Summary of Sample Compositing. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Composite ID	ESI Code	Components: Station ID	Components: ESI Code	Final Amount	Composite Date	Composite Time
Composite 1[a]	31243-100	Comp V',W' Station V' Comp V',W' Station W'	31242-001 31242-002	~7 gal	10/24/18	1100
Composite 2	31243-101	Comp R',S' Station R' Comp R',S' Station S'	31242-003 31242-004	~28 gal	10/24/18	1545
Composite 3	31243-102	Comp US 1-2, Station US-1 Comp US 1-2, Station US-2	31242-019 31242-020	~28 gal	10/25/18	2030
Composite 4	31243-103	Comp DS 1-2, Station DS-1 Comp DS 1-2, Station DS-2 Comp DS 1-2, Station DS-2	31242-012 31242-013 31242-023	~28 gal	10/25/18	2000
Composite 5	31243-104	Comp TB 1-2, Station TB-1 Comp TB 1-2, Station TB-2	31242-010 31242-011	~28 gal	10/25/18	1110
Composite 6	31243-105	Comp CAD 1-3 Station CAD-1 Comp CAD 1-3 Station CAD-2 Comp CAD 1-3 Station CAD-3	31242-005 31242-006 31242-007	~31 gal	10/24/18	1115

Note:
[a] This sample was not included in the 28 day bioaccumulation evaluation.

Table 3. Summary of Reference Toxicant Data. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Date	Organism Lot		Value	Historic Mean	Acceptable Range	Reference Toxicant
Macoma nasuta						
11/21/18	99MnARO111318	LC-50	4.1	8.9	0.5 - 17.4	Copper (mg/L)
Nereis virens						
11/20/18	99NvARO112018	LC-50	1.3	3.1	0.5 - 5.7	Copper (mg/L)

Note: Means and Acceptable Ranges based on the past 20 reference toxicant assays. Acceptable range is defined as ± 2 standard deviations of historic mean.

Table 4. Summary of Laboratory Control Performance and Assay Acceptability Criteria. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Endpoint / Measurement		Protocol Criteria	Unit	*M. nasuta*	*N. virens*
Mean Survival		laboratory Control ≥90%	%	99%	96%
			Protocol Met	Yes	Yes
Tissue Mass		Sufficient for analysis	Protocol Met	Yes	Yes
Salinity	Minimum:	28‰	ppt	25.7	13.3
			Protocol Met	No [a]	No [a]
	Maximum:	32‰	ppt	32.0	32.1 [b]
			Protocol Met	Yes	Yes
Temperature		Mean: 14±2°C (target)	Daily / Hourly	11.6 [b] / 12.0	11.4 [a] / 12.0
		Minimum: 11°C	Daily / Hourly	11.0 / 11.8	10.8 [b] / 11.8
		Maximum: 17°C	Daily / Hourly	12.4 / 12.5	12.2 / 12.5
			Protocol Met	Yes / Yes	No [a] / Yes

Notes:
[a] See Section 3.3 for a discussion of the protocol deviation.
[b] The value meets the criterion by rounding to the precision reflected in the protocol.

Table 5. *M. nasuta* Survival Summary and Statistical Analysis. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Survival Summary

Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	31249-000	5	99%	95%	100%	2%
CLDS Reference Site	31242-008	5	99%	95%	100%	2%
Composite 2	31243-101	5	100%	100%	100%	0%
Composite 3	31243-102	5	98%	90%	100%	5%
Composite 4	31243-103	5	96%	90%	100%	4%
Composite 5	31243-104	5	94%	90%	100%	6%
Composite 6	31243-105	5	98%	90%	100%	5%

Survival Statistical Analysis

Sample ID	ESI Code	Mean	Significantly "<" as Compared to: CLDS (31242-008)	Difference in Survival >10% as Compared to: CLDS (31242-008)	
CLDS Reference Site	31242-008	99%	-	-	-
Composite 2	31243-101	100%	No/No	No	-1%
Composite 3	31243-102	98%	No/No	No	1%
Composite 4	31243-103	96%	No	No	3%
Composite 5	31243-104	94%	No	No	5%
Composite 6	31243-105	98%	No/No	No	1%

Notes:
No/No indicates that there was no difference in outcome when an outlier was excluded from the statistical analysis (refer to Appendix A).

Table 6. *N. virens* Survival Summary and Statistical Analysis. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Survival Summary

Sample ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Laboratory Control	31250-000	5	96%	90%	100%	4%
CLDS Reference Site	31242-008	5	98%	95%	100%	3%
Composite 2	31243-101	5	96%	85%	100%	7%
Composite 3	31243-102	5	97%	95%	100%	3%
Composite 4	31243-103	5	97%	95%	100%	3%
Composite 5	31243-104	5	93%	90%	95%	3%
Composite 6	31243-105	5	94%	85%	100%	7%

Survival Statistical Analysis

Sample ID	ESI Code	Mean	Significantly "<" as Compared to: CLDS (31242-008)	Difference in Survival >10% as Compared to: CLDS (31242-008)	
CLDS Reference Site	31242-008	98%	-	-	-
Composite 2	31243-101	96%	No	No	2%
Composite 3	31243-102	97%	No	No	1%
Composite 4	31243-103	97%	No	No	1%
Composite 5	31243-104	93%	Yes	No	5%
Composite 6	31243-105	94%	No	No	4%

Table 7. Statistical Comparisons of *M. nasuta* Body Burdens vs. CLDS Reference Site. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Compound	Units	Native Tissue		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals															
Arsenic, total	mg/kg	1.8		2.3		1.9	NS	2.3	NS	1.8	NS	1.8	NS	1.7	NS
Cadmium, total	mg/kg	0.029	b	0.024	b	0.030	bS	0.027	bNS	0.025	bNS	0.026	bNS	0.028	bNS
Chromium, total	mg/kg	0.46		0.49	b	0.47	NS	0.38	bNS	0.46	NS	0.32	bNS	0.49	NS
Copper, total	mg/kg	1.6		1.9		2.1	NS	2.1	NS	2.2	NS	1.5	NS	2.2	NS
Lead, total	mg/kg	0.28		0.46		0.45	NS	0.40	NS	0.40	NS	0.31	NS	0.61	S
Mercury, total	mg/kg	0.0037	b	0.0064	b	0.0031	abNS	0.0018	abNS	0.0023	abNS	0.0020	abNS	0.0074	bNS
Nickel, total	mg/kg	0.38		0.42		0.34	NS	0.36	NS	0.33	NS	0.32	NS	0.35	NS
Zinc, total	mg/kg	9.7		9.4		9.8	NS	10.7	NS	9.1	NS	8.8	NS	9.6	NS
PAH Compounds															
Acenaphthene	µg/kg	2.4	a	2.3	a	2.3	ac	2.7	abc	2.3	ac	2.3	ac	2.4	ac
Acenaphthylene	µg/kg	2.4	a	2.3	a	2.3	ac	2.2	ac	2.3	ac	2.3	ac	2.4	ac
Anthracene	µg/kg	2.4	a	2.3	a	3.7	abc	7.4	bc	6.6	bc	2.3	ac	4.4	abc
Benzo(a)anthracene	µg/kg	2.4	a	3.6	ab	18	S	24	S	23	S	7.5	bS	28	S
Benzo(a)pyrene	µg/kg	2.4	a	2.3	a	7.7	bc	8.9	bc	9.6	bc	2.7	abc	17	c
Benzo(b)fluoranthene	µg/kg	2.4	a	2.8	ab	16	S	17	S	17	S	7.8	bS	23	S
Benzo(k)fluoranthene	µg/kg	2.4	a	2.3	a	8.2	bc	11	bc	11	bc	4.4	abc	17	c
Benzo(g,h,i)perylene	µg/kg	2.4	a	2.3	a	2.3	ac	3.8	abc	4.2	abc	2.3	ac	7.6	bc
Chrysene	µg/kg	2.4	a	2.8	ab	17	S	23	S	24	S	7.6	bS	30	S
Dibenz(a,h)anthracene	µg/kg	2.4	a	2.3	a	2.3	ac	2.2	ac	2.3	ac	2.3	ac	2.4	ac
Fluoranthene	µg/kg	3.5	ab	6.3	ab	55	S	98	S	83	S	29	S	78	S
Fluorene	µg/kg	2.4	a	2.3	a	2.3	ac	2.2	ac	2.3	ac	2.3	ac	2.4	ac
Indeno(1,2,3-c,d)pyrene	µg/kg	2.4	a	2.3	a	2.3	ac	2.7	abc	2.8	abc	2.3	ac	5.0	abc
Naphthalene	µg/kg	2.4	a	2.3	a	2.3	ac	2.2	ac	2.3	ac	2.3	ac	2.4	ac
Phenanthrene	µg/kg	2.4	a	4.2	ab	12	S	16	S	22	S	6.9	bS	11	bS
Pyrene	µg/kg	3.3	ab	9.1	b	45	S	72	S	64	S	23	S	113	S

New Haven Harbor FNP Tier III Sediment Evaluation. 28 Day Bioaccumulation Evaluation.
US ACE New England District. ESI Studies 31249 & 31250. November 2018.

Compound	Units	Native Tissue		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Total PAHs	µg/kg	40		52		200		297		278		107		345	
PCB Congeners															
PCB 008	µg/kg	0.24	a	0.23	a	0.40	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 018	µg/kg	0.47	ab	0.23	a	0.90	ac	1.8	c	1.5	c	0.62	ac	0.52	ac
PCB 028	µg/kg	0.24	a	0.23	a	2.2	abc	0.61	abc	0.80	bc	0.23	ac	0.24	ac
PCB 044	µg/kg	0.24	a	0.23	a	0.40	abc	0.35	abc	0.60	abc	0.23	ac	0.24	ac
PCB 052	µg/kg	0.24	a	0.23	a	1.2	c	1.4	c	1.8	c	0.23	ac	0.24	ac
PCB 066	µg/kg	0.24	a	0.23	a	0.63	bc	0.56	bc	0.90	bc	0.23	ac	0.24	ac
PCB 101	µg/kg	0.24	a	0.23	a	1.2	c	0.83	bc	1.4	c	0.38	abc	0.30	abc
PCB 105	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 118	µg/kg	0.24	a	0.23	a	0.61	bc	0.42	abc	0.90	bc	0.28	abc	0.29	abc
PCB 128	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 138	µg/kg	0.24	a	0.23	a	0.82	bc	0.72	bc	1.2	bc	0.33	abc	0.31	abc
PCB 153	µg/kg	0.24	a	0.23	a	0.79	bc	0.69	bc	1.0	bc	0.32	abc	0.28	abc
PCB 170	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 180	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.30	abc	0.23	ac	0.24	ac
PCB 187	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 195	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 206	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
PCB 209	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
Total PCBs	µg/kg	9.0		8.3		22		19		24		10		10	
Pesticides															
Aldrin	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
cis-Chlordane	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.30	ac	0.24	ac
trans-Chlordane	µg/kg	0.24	a	0.23	a	0.23	ac	2.1	c	1.5	c	1.0	ac	0.24	ac
cis-Nonachlor	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
trans-Nonachlor	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac

New Haven Harbor FNP Tier III Sediment Evaluation. 28 Day Bioaccumulation Evaluation.
US ACE New England District. ESI Studies 31249 & 31250. November 2018.

Compound	Units	Native Tissue		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Oxychlordane	µg/kg	0.47	a	0.46	a	0.62	ac	0.56	ac	0.45	ac	0.46	ac	0.47	ac
Total Chlordanes	µg/kg	1.4		1.4		1.5		3.3		2.6		2.2		1.4	
4,4'-DDT	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.29	ac	0.24	ac
4,4'-DDD	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.28	ac	0.23	ac	0.24	ac
4,4'-DDE	µg/kg	0.24	a	0.33	a	0.73	S	0.70	S	0.91	S	0.35	aNS	0.24	aNS
Total DDT	µg/kg	0.71		0.79		1.2		1.1		1.4		0.87		0.71	
Dieldrin	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.28	ac	0.23	ac	0.24	ac
alpha-Endosulfan	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
beta-Endosulfan	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
Endosulfans	µg/kg	0.47		0.46		0.46		0.44		0.45		0.46		0.47	
Endrin	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
Heptachlor	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
Heptachlor epoxide	µg/kg	0.47	a	0.46	a	0.46	ac	0.44	ac	0.45	ac	0.46	ac	0.47	ac
Hexachlorobenzene	µg/kg	0.47	a	0.46	a	0.46	ac	0.44	ac	0.45	ac	0.46	ac	0.47	ac
Lindane	µg/kg	0.24	a	0.23	a	0.23	ac	0.22	ac	0.23	ac	0.23	ac	0.24	ac
Methoxychlor	µg/kg	0.95	a	0.93	a	0.92	ac	0.89	ac	0.91	ac	0.91	ac	0.94	ac
Toxaphene	µg/kg	12	a	12	a	12	ac	11	ac	11	ac	11	ac	12	ac

Notes:
a = Analyte not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05.

Table 8. Statistical Comparisons of *N. virens* Body Burdens vs. CLDS Reference Site. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Compound	Units	Native Tissue		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Trace Metals															
Arsenic, total	mg/kg	2.1		1.5		1.3	NS	1.5	NS	1.4	NS	1.4	NS	1.5	NS
Cadmium, total	mg/kg	0.030	b	0.029	b	0.028	bNS	0.029	bNS	0.028	bNS	0.022	bNS	0.024	bNS
Chromium, total	mg/kg	0.29	b	0.073	b	0.061	bNS	0.071	bNS	0.063	bNS	0.077	bNS	0.079	bNS
Copper, total	mg/kg	1.1		1.2		0.92	NS	1.1	NS	1.1	NS	1.1	NS	1.4	S
Lead, total	mg/kg	0.26		0.17		0.17	NS	0.19	NS	0.17	NS	0.13	NS	0.15	NS
Mercury, total	mg/kg	0.0021	ab	0.0016	a	0.0016	ac	0.0048	abc	0.0047	abc	0.0072	bc	0.0090	bc
Nickel, total	mg/kg	0.30		0.12		0.10	bNS	0.11	NS	0.13	NS	0.12	bNS	0.15	NS
Zinc, total	mg/kg	7.7		10.4		10.1	NS	6.7	NS	10.7	NS	13.6	NS	14.1	NS
PAH Compounds															
Acenaphthene	µg/kg	4.9	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Acenaphthylene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Anthracene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Benzo(a)anthracene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Benzo(a)pyrene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Benzo(b)fluoranthene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Benzo(k)fluoranthene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Benzo(g,h,i)perylene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Chrysene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Dibenz(a,h)anthracene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Fluoranthene	µg/kg	3.4	ab	2.3	a	4.4	abc	6.9	abc	6.9	abc	2.4	ac	6.0	bc
Fluorene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Indeno(1,2,3-c,d)pyrene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Naphthalene	µg/kg	2.3	a	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Phenanthrene	µg/kg	3.4	ab	2.3	a	2.3	ac	2.3	ac	2.2	ac	2.4	ac	2.3	ac
Pyrene	µg/kg	3.2	ab	2.3	a	2.9	abc	4.7	abc	5.1	abc	2.4	ac	8.3	bc

New Haven Harbor FNP Tier III Sediment Evaluation. 28 Day Bioaccumulation Evaluation.
US ACE New England District. ESI Studies 31249 & 31250. November 2018.

Compound	Units	Native Tissue		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Total PAHs	µg/kg	43		37		39		44		44		38		47	
PCB Congeners															
PCB 008	µg/kg	0.72	a	0.23	a	0.23	ac	0.23	ac	0.52	ac	0.24	ac	0.23	ac
PCB 018	µg/kg	1.9	a	0.23	a	0.39	ac	0.23	ac	1.1	ac	0.24	ac	0.88	ac
PCB 028	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 044	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 052	µg/kg	0.35	ab	0.23	a	0.63	bc	0.31	abc	0.98	bc	0.24	ac	0.23	ac
PCB 066	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 101	µg/kg	0.42	ab	0.23	a	0.36	abc	0.46	abc	0.78	abc	0.32	abc	0.23	ac
PCB 105	µg/kg	0.23	a	0.23	a	0.28	abc	0.31	abc	0.22	ac	0.24	ac	0.23	ac
PCB 118	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 128	µg/kg	0.23	a	0.23	a	0.28	abc	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 138	µg/kg	2.3		1.1	b	1.9	S	1.8	NS	2.6	S	1.5	bNS	1.1	bNS
PCB 153	µg/kg	3.1		1.7		3.1	NS	3.0	NS	3.8	S	2.5	NS	1.9	NS
PCB 170	µg/kg	1.2	b	0.40	ab	1.1	abNS	0.94	abNS	1.1	aNS	0.91	abS	0.23	aNS
PCB 180	µg/kg	3.0		1.4	b	3.1	S	2.8	NS	3.3	NS	2.2	bNS	1.2	bNS
PCB 187	µg/kg	2.3		1.0	b	1.9	bNS	1.9	NS	2.4	S	1.4	abNS	0.85	abNS
PCB 195	µg/kg	0.23	a	0.23	a	0.23	ac	0.33	abc	0.22	ac	0.24	ac	0.23	ac
PCB 206	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 209	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
Total PCBs	µg/kg	35		17		30		28		37		23		18	
Pesticides															
Aldrin	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.28	ac	0.24	ac	0.23	ac
cis-Chlordane	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.49	ac	0.24	ac	0.23	ac
trans-Chlordane	µg/kg	0.23	a	0.23	a	0.23	ac	0.29	ac	0.40	ac	0.24	ac	0.23	ac
cis-Nonachlor	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.48	ac	0.24	ac	0.23	ac
trans-Nonachlor	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac

Compound	Units	Native Tissue		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
Oxychlordane	µg/kg	0.47	a	0.46	a	0.46	ac	0.47	ac	0.45	ac	0.48	ac	0.47	ac
Total Chlordanes	µg/kg	1.4		1.4		1.4		1.5		2.0		1.4		1.4	
4,4'-DDT	µg/kg	0.23	a	0.23	a	0.43	ac	0.23	ac	0.63	ac	0.24	ac	0.23	ac
4,4'-DDD	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
4,4'-DDE	µg/kg	0.23	a	0.23	a	0.23	ac	0.28	ac	0.22	ac	0.24	ac	0.23	ac
Total DDT	µg/kg	0.70		0.69		0.89		0.75		1.1		0.71		0.70	
Dieldrin	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.66	ac	0.24	ac	0.23	ac
alpha-Endosulfan	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.50	ac	0.24	ac	0.23	ac
beta-Endosulfan	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.45	ac	0.24	ac	0.23	ac
Endosulfans	µg/kg	0.47		0.46		0.46		0.47		0.94		0.48		0.47	
Endrin	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
Heptachlor	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.31	ac	0.24	ac	0.23	ac
Heptachlor epoxide	µg/kg	0.47	a	0.46	a	0.46	ac	0.47	ac	0.45	ac	0.48	ac	0.47	ac
Hexachlorobenzene	µg/kg	0.47	a	0.46	a	0.46	ac	0.47	ac	1.3	ac	0.48	ac	0.47	ac
Lindane	µg/kg	0.23	a	0.23	a	0.23	ac	0.23	ac	0.67	ac	0.24	ac	0.23	ac
Methoxychlor	µg/kg	0.94	a	0.92	a	0.91	ac	0.94	ac	0.90	ac	0.95	ac	0.93	ac
Toxaphene	µg/kg	12	a	12	a	11	ac	12	ac	11	ac	12	ac	12	ac

Notes:
a = Analyte not detected (below MDL) in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = Analyte was detected in the treatment tissue sample replicates at an equal or higher mean concentration than in the associated reference site tissue, however statistical analysis is not required as the analyte was not detected in any of the reference site replicates.

NS = Not Significant - mean tissue body burden was not statistically different from the associated reference site mean body burden. Statistical significance accepted at α=0.05.
S = Significant - mean tissue body burden was statistically different, greater than the associated reference site mean body burden. Statistical significance accepted at α=0.05

Table 9. Statistical Evaluation of PCB Congeners in *N. virens* Native (Pre-Test) Tissue. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

Compound	Units	Native Tissue [d]		CLDS Reference		Comp 2 (R',S')		Comp 3 (US 1-2)		Comp 4 (DS 1-2)		Comp 5 (TB 1-2)		Comp 6 (CAD 1-3)	
		Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual	Mean	Qual
PCB Congeners															
PCB 008	µg/kg	0.72	a	0.23	a	0.23	ac	0.23	ac	0.52	ac	0.24	ac	0.23	ac
PCB 018	µg/kg	1.9	a	0.23	a	0.39	ac	0.23	ac	1.1	ac	0.24	ac	0.88	ac
PCB 028	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 044	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 052	µg/kg	0.35	ab	0.23	a	0.63	bc	0.31	abc	0.98	bc	0.24	ac	0.23	ac
PCB 066	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 101	µg/kg	**0.42**	ab	0.23	a	0.36	abc	0.46	abc	0.78	abc	0.32	abc	0.23	ac
PCB 105	µg/kg	**0.23**	a	0.23	a	0.28	abc	0.31	abc	0.22	ac	0.24	ac	0.23	ac
PCB 118	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 128	µg/kg	**0.23**	a	0.23	a	0.28	abc	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 138	µg/kg	**2.3**		1.1	b	1.9		1.8		2.6		1.5	b	1.1	b
PCB 153	µg/kg	**3.1**		1.7		3.1		3.0		3.8		2.5		1.9	
PCB 170	µg/kg	**1.2**	b	0.40	ab	1.1	ab	0.94	ab	1.1	a	0.91	ab	0.23	a
PCB 180	µg/kg	**3.0**		1.4	b	3.1		2.8		3.3		2.2	b	1.2	b
PCB 187	µg/kg	**2.3**		1.0	b	1.9	b	1.9		2.4		1.4	ab	0.85	ab
PCB 195	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.33	abc	0.22	ac	0.24	ac	0.23	ac
PCB 206	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
PCB 209	µg/kg	**0.23**	a	0.23	a	0.23	ac	0.23	ac	0.22	ac	0.24	ac	0.23	ac
Total PCBs	µg/kg	35		17		30		28		37		23		18	

Notes:

a = Analyte not detected in at least one replicate; mean value was calculated using one-half of the project specific MDL for non-detected values.
b = Analyte estimated (detected below RL but above MDL) in at least one replicate; mean value calculated using estimated value.
c = Statistical analysis is not required as the analyte was not detected in any of the reference site replicates.
[d] Native tissue represents the mean of three replicates, whereas the CLDS and site composites represent a mean of 5 replicates.
Mean composite tissue body burden was significantly greater than the mean CLDS tissue body burden (α=0.05) (C<T).
Mean composite tissue body burden was significantly greater than the mean native tissue body burden (α=0.05) (C<T).
Mean **native tissue** body burden was significantly greater than the mean CLDS (C<T) or composite tissue (C>T) body burdens (α=0.05).

New Haven Harbor FNP Tier III Sediment Evaluation. 28 Day Bioaccumulation Evaluation.
US ACE New England District. ESI Studies 31249 & 31250. November 2018.

Table 10. Summary of Significant Uptake in Tissue. 28 Day Bioaccumulation Evaluation. New Haven Harbor FNP. New Haven, Connecticut. November 2018.

	Macoma nasuta					*Nereis virens*				
Composite	2	3	4	5	6	2	3	4	5	6
Metals (ug/g wet weight)										
Cadmium	S									
Copper										S
Lead					S					
PAHs (ng/g wet weight)										
Benzo(a)anthracene	S	S	S	S	S					
Benzo(b)fluoranthene	S	S	S	S	S					
Chrysene	S	S	S	S	S					
Fluoranthene	S	S	S	S	S					
Phenanthrene	S	S	S	S	S					
Pyrene	S	S	S	S	S					
PCBs (ng/g wet wt.)										
PCB 138						S		S		
PCB 153								S		
PCB 170									S	
PCB 180						S				
PCB 187								S		
Pesticides (ng/g wet weight)										
4,4'-DDE	S	S	S							

Note: "S" Indicates a finding of significance.
" " Indicates there was not a finding of significance.
Green shading indicates concentration in native tissue is greater than concentration in composite tissue.
Orange shading indicates concentration in composite tissue is 5 to 10 times higher than in CLDS reference tissue.
Red shading indicates concentration in composite tissue is ≥10 times higher than in CLDS reference tissue.

APPENDIX A:

RAW DATA & STATISTICAL SUPPORT

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STUDY NUMBER RECORD

Issue and complete this form for studies that will require multiple tasks and directly associated support studies. Issue consecutive study numbers at the start of the project to cover all potential elements of the project.

CLIENT: AECOM

CONTACT(S): Kris Van Naerssen

PROJECT: New Haven Harbor 2018

APP. NUMBER:

	Species / Analysis Parameters:		STUDY:
Sample Receipt:			**31242**
Rinseate Sample Analysis:	**Reference Site Analyzed x 3**		
Grain Size Analysis:			
Composite Prep/NH3 Mit:			**31243**
Bulk Sediment Analysis:			
10 Day Assay:	***Leptocheirus plumulosus***		**31244**
	Americamysis bahia		**31245**
Elutriate Preparation:	**Type:**		**31246**
Elutriate Analysis:	**Pentachlorophenol**	**Yes / No**	**31247**
	Trace Metals	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	
SPP Assays/NH3 Mit:	***Menidia beryllina***		**31248 / 31291**
	Americamysis bahia		
	Arbacia punctulata		
Bioaccumulation Study:	***Macoma nasuta***		**31249**
	Nereis virens		**31250**
Tissue Analysis:	**Trace Metals**	**Yes / No**	
	PAH Compounds	**Yes / No**	
	PCB Congeners	**Yes / No**	
	Pesticides	**Yes / No**	

Tissue analysis completed by Alpha Analytical

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\Study Number Log.wpd

Chain of Custody Records

Sample Receipt Forms

U.S. ARMY C[illegible] OF ENGINEERS

31292

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (*Signature*) RICHARD LOYD [signature]

STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE TESTING	SUSPENDED PHASE TOX.	10-DAY WHOLE SED. TOX.	28-DAY BIOACCUM.			REMARKS
1	10/23	11:25	/		COMP U', W'	2	/	/					STATIONS U', W'
2	10/23	12:15	/		COMP R', S'	8	/	/	/	/			STATIONS R', S'
3	10/23	15:27	/		~~COMP~~ CAD 1-3	9	/	/	/	/			STATIONS CAD-1, CAD-2, CAD-3

Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
[signature]	10/23 1800	[signature]	[signature]	10/24/18 1015	[signature]
Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
Relinquished by: (*Signature*)	Date/Time	Received for Laboratory by: (*Signature*)	Date/Time	REMARKS	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

31242

ENSR

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client/Project Name: USACE / AECOM	Project Location: New Haven Harbor / CONTRAC CT Disposal Sites
Project Number: 60588790	Field Logbook No.:
Sampler (Print Name)/(Affiliation): K. VAN NAORSSON / AECOM	Chain of Custody Tape Nos.: N/A
Signature:	Send Results/Report to: K. VAN NAORSSON
	TAT: As per work plan

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

	Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	Elutriate Prep	SPP Assay	10-Day TOX	28-Day TOX/Tissue							Lab I.D.	Remarks
18	NHH-CLDS	10/23/18	10:28	X	X	3.5 G (6)	SD	7	No	X	X	X	X								For work
19	NHH-CLDS	10/23/18	13:12	X	X	5 G (10)	SW	7	No	X	X										plan / Rim

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date
K. van Naorssow / AECOM Signature:	10/23/18 Time: 17:15	Charles Nixon Signature:	10/23 Time: 17:15
Charles Nixon AECOM Signature:	10/24 Time: 1015	Signature:	10/24/18 Time: 1015
Signature:	Date: Time:	Signature:	Date: Time:

Analytical Laboratory (Destination):

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_AECOM_06_3NCR.doc

White: Original (to Lab) Yellow: Lab Pink: Sampler

Serial No. 02668

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/24/18 1015	Date and TIme Logged into Lab:	10/31/18 1630
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	5	Custody Seals intact?	NA
Number of COC Pages:	2		
COC Serial Number(s):	02668		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp V',W' Station V'	31242-001	S	Elutriate Prep, SPP Assay	1x3.5gal	4 C	Yes
Comp V',W' Station W'	31242-002	S	Elutriate Prep, SPP Assay	1x3.5gal	4 C	Yes
Comp R',S' Station R'	31242-003	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp R',S' Station S'	31242-004	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 1	31242-005	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 2	31242-006	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
Comp CAD 1-3 Station CAD 3	31242-007	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes
NHH-CLDS	31242-008	S	10-Day Solid Phase, 28-Day Bioaccumulation	6x3.5gal	4 C	Yes
NHH-CLDS	31242-009	W	SPP Assay, 10-Day Solid Phase, 28-Day Bioaccumulation	10x3.5gal	4 C	Yes

Notes and qualifications:

See COC

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U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (*Signature*) RICHARD LORD [illegible] B. Lord

	STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE PREP	SUSPENDED PHASE TOX	10-DAY WHOLE SED TOX	28-DAY BIOACCUM			REMARKS
10/011	1	10/24		/		COMP TB 1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
012/013	2	10/24		/		COMP DS 1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
014	3					COMP US 1-2	8	/	/					WATER FROM NEW HAVEN HBR
015	4					COMP DS 1-2	8	/	/					
016	5					COMP TB 1-2	6	/	/					
017	6					COMP CAD 1,2,3	6	/	/					
-018 ~~017~~	7					COMP V' W'	6	/	/					
-022 ~~018~~	8					COMP R' S'	8	/	/					
E3 NR 12/11/18														

Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
[illegible] B. Lord	10/24 1545	Charles Nixon 10/24 1525	[illegible]	10/24 0835	[illegible]
Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)	Relinquished by: (*Signature*)	Date/Time	Received by: (*Signature*)
Relinquished by: (*Signature*)	Date/Time	Received for Laboratory by: (*Signature*)	Date/Time	REMARKS	
				CAD 1,2,3 7 subsamples received DS 1-2 6 subsamples received	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

U.S. ARMY C[illegible]S OF ENGINEERS

CHAIN OF CUST[illegible]DY RECORD

PROJ. NO.

PROJECT NAME: NEW HAVEN HARBOR

SAMPLERS: (Signature) RICHARD LOID [illegible] B. Loid

	STA. NO.	DATE	TIME	COMP	GRAB	STATION LOCATION	NO. OF CONTAINERS	ELUTRIATE PREP	SUSPENDED PHASE PREP	10 DAY WHOLE SED TOX	28 DAY BIOACCUM			REMARKS
0/11	1	10/24	11:46	/		COMP TB1-2	8	/	/	/	/			SED FROM STATIONS TB-1 & TB-2
12/13	2	10/24	10:06	/		COMP DS1-2	5	/	/	/	/			SED FROM STATIONS DS-1 & DS-2
0:14	3	10/24	11:30			COMP US1-2	8	/	/					WATER FROM NEW HAVEN HBR
0:15	4	10/24	11:45			COMP DS1-2	8	/	/					
0:16	5	10/24	12:00			COMP TB1-2	6	/	/					
0:17	6	10/24	12:15			COMP CAD1,2,3	6	/	/					
0:17	7	10/24	12:30			COMP V'W'	6	/	/					
0:18	8	10/24	12:45			COMP R'S'	8	/	/					

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
B. Loid	10/24 1545	Charles N. Zon 10/24 1526	[illegible]	10/25 [illegible]	[illegible]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	REMARKS	
				CAD 1,2,3 7 cubitainers received DS1-2 6 cubitainers received	

Distribution: Original Accompanies Shipment Copy to 1 to Sample Custodian Copy 2 to Coordinator Field Files

B. Loid

Digitally signed by LOID.RICHARD.B.1274669540
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=LOID.RICHARD.B.1274669540
Date: 2018.11.01 11:03:22 -04'00'

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/25/18 0835	Date and TIme Logged into Lab:	11/27/18 1240
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp TB-1-2, Station TB-1	31242-010	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp TB-1-2, Station TB-2	31242-011	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-1	31242-012	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-2	31242-013	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	1x3.5gal	4 C	Yes
Comp US 1-2	31242-014	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes
Comp DS 1-2	31242-015	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes
Comp TB 1-2	31242-016	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp CAD 1,2,3	31242-017	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp V',W'	31242-018	W	Elutriate Prep, SPP Assay	6x5gal	4 C	Yes
Comp R',S'	31242-022	W	Elutriate Prep, SPP Assay	8x5gal	4 C	Yes

Notes and qualifications:

See COC

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CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL World Class Chemistry

8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab:

~~ALPHA Job #:~~

Project Information

Project Name: NEW HAVEN HARBOR
Project Location: NEW HAVEN, CT
Project #:
Project Manager: RICHARD LOYD
ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Client Information

Client: US ARMY CORPS OF ENG.
Address: 696 VIRGINIA RD CONCORD, MA 01742
Phone: 978-318-8048
Email: RICHARD.B.LOYD@USACE.ARMY.MIL

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:

ANALYSIS: ELUTRIATE PREP; SPP TOX.; 10-DAY WHOLE SEDTOX; 28-DAY BIOACCUM

SAMPLE INFO
Filtration: ☐ Field ☐ Lab to do
Preservation: ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	ELUTRIATE PREP	SPP TOX.	10-DAY WHOLE SEDTOX	28-DAY BIOACCUM	Sample Comments	TOTAL # BOTTLES
	COMP DS 1-2	10/25	9:46	SE	RBL	/	/	/	/	STATION DS-23	
	COMP US 1-2	10/25	10:23	SE	RBL	/	/	/	/	STATIONS US 1&2 8	
	Container Type					P	P	P	P		
	Preservative					A	A	A	A		

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	10/25 13:30	[signature]	10/25 1350
[signature]	10/25 1820	[signature]	10/25/18 1820

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	Client		
Date and Time Received:	10/25/18 1820	Date and TIme Logged into Lab:	11/27/18 1245
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
Comp US-1-2, Station US-1	31242-019	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp US-1-2, Station US-2	31242-020	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	4x3.5gal	4 C	Yes
Comp DS-1-2, Station DS-2	31242-023	S	Elutriate Prep, SPP Assay, 10-Day Solid Phase, 28-Day B	3x3.5gal	4 C	Yes

Notes and qualifications:

See COC

EnviroSystems, Inc. One Lafayette Road P.O. Box 778 Hampton, NH 03842-0778 (603) 926-3345 fax (603) 926-3521 www.envirosystems.com

ESI
EnviroSystems, Inc.
1 Lafayette Road
P.O. Box 778
Hampton, N.H. 03843

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No: 31242

CHAIN OF CUSTODY DOCUMENTATION

Client: USACE NAE	Contact: Ben Lloyd	Project Name: New Haven	Page of
Report to:	Address:	Project Number:	
Invoice to:	Address:	Project Manager:	
Voice:	Fax:	email: Richard.B.Lloyd@usace.army.mil	P.O. No: Quote No:

Protocol: RCRA SDWA NPDES USCOE Other

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composit (G/C)	Container Size (ml.)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
21-0TQ (BBL 11/27)	New HAVEN	11/14	2:13	BBL ~~SCST~~	G	5gal Cubitainers	P	4°C	W	N	(7 cubitainers) SPP/Elutriate Prep

Relinquished By: Sarah Turner	Date: 11/14/18 Time: 3:45	Received By: R Smith	Date: 11/14/18 Time: 1545
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

Sample Delivery Group No: Page of

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	31242		
SDG No:			
Project:	New Haven		
Delivered via:	ESI		
Date and Time Received:	11/14/18 1545	Date and TIme Logged into Lab:	11/27/18 1250
Received By:	BG	Logged into Lab by:	BG
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	4	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required	pH Test strip ID number:	NA

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
New Haven	31242-021	W	Elutriate Prep, SPP Assay	7x5gal	4 C	Yes

Notes and qualifications:

See COC

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Composite Preparation

Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 1

Composite Lab ID.: 31243-100 Composite Final Volume: ≈ 7 gal

Composite Matrix: Solid Composite Container(s): 2 × 3.5 gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1100

Initials: CFS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
V	31242-001	S	Na	1 Shell	≈ 3.5 gal	
W	31242-002	S	Na	Na	≈ 3.5 gal	

Subsamples Removed:

Lab Number	Sample Use
~~31244~~	~~*L.p.* 10-Day Solid Phase~~
31245	~~*A.b.* 10-Day Solid Phase~~ BV 02/14
31246	Elutriate Preparation
~~31249~~	~~*M.n.* 28-Day Bioaccumulation~~ BV 02/14
31250	~~*N.v.* 28-Day Bioaccumulation~~

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 2

Composite Lab ID.: 31243-101 Composite Final Volume: ~28g

Composite Matrix: Solid Composite Container(s): 8x3.5gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1545

Initials: MS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
R	31242-003	Solid	None	50mL	~14g	moist dark gray mud, some shells excluded
S	31242-004	Solid	None	50mL	~14g	moist dark gray mud, some shells exclude

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 3

Composite Lab ID.: 31243-102 Composite Final Volume: ≈ 28 gal

Composite Matrix: Solid Composite Container(s): 8x 3.5 gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 2030

Initials: GRS/MS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
US-1	31242-019	S	–	≈ 10 mL	≈ 1/4 gal	Leaves, sticks
US-2	31242-020	S	–	≈ 10 mL	≈ 1/4 gal	Leaves, sticks

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 4

Composite Lab ID.: 31243-103 Composite Final Volume: ≈28gal

Composite Matrix: Solid Composite Container(s): 8x3.5gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 1000

Initials: BG/LAG

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
DS-1	31242-012	S	—	≈ 50mL	≈14gal	
DS-2	31242-013, -023	S	—	≈ 100mL rocks	≈14gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 5

Composite Lab ID.: 31243-104 Composite Final Volume: ≈28 gal

Composite Matrix: Solid Composite Container(s): 8 × 2.5 gal

Composite Prepared Date: 10/25/18

Composite Prepared Time: 1110

Initials: CFS

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
TB-1	31243-104	S	Na	2 Shells	≈ 14gal	
TB-2	31243-104	S	Na	Leaves	≈ 14gal	

Subsamples Removed:

Lab Number	Sample Use
31244	*L.p.* 10-Day Solid Phase
31245	*A.b.* 10-Day Solid Phase
31246	Elutriate Preparation
31249	*M.n.* 28-Day Bioaccumulation
31250	*N.v.* 28-Day Bioaccumulation

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Laboratory Composite Preparation Documentation

Project Number: 31242

Project Name: New Haven Harbor

Composite Identifier: Composite 6

Composite Lab ID.: 31243-105 Composite Final Volume: ≈3 gal

Composite Matrix: Solid Composite Container(s): 9x3.5 gal

Composite Prepared Date: 10/24/18

Composite Prepared Time: 1115

Initials: BG / JTP

Protocol: ESI SOP 1358

This composite was prepared according to protocols cited using the samples and amounts listed below:

Field ID	ESI Lab ID	Matrix	Liquids Excluded	Solids Excluded	Amount Added	Notes
CAD-1	31242-005	S	—	≈1L	≈10 gal	shells and rock excluded
CAD-2	31242-006	S	—	≈500 mL	≈7 gal	↓
CAD-3	31242-007	S	—	≈1L	≈14 gal	↓
						All black sediment with a petroleum smell.

Subsamples Removed:

Lab Number	Sample Use
31246	Elutriate Preparation
31244	L.p. 10 Day Solid Phase
31245	A.b. 10 Day Solid Phase
31249	M.n. 28-Day Bioaccumulation
31250	N.v. 28-Day Bioaccumulation

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\XXXX3 Composite Preparation\Composite and Subsampling Prep Form.wpd

Macoma nasuta
28 day Bioaccumulation Evaluation

Bench Data

28 DAY BIOACCUMULATION ASSAY

Project:	New Haven Harbor 2018	**Client:**	AECOM		
Study #:	31249	**Reference:**	CLDS	**Water Bath:**	TCR
Sample(s):	Comps 2, 3, 4, 5 and 6	**Start:**	11/21/2018	**End:**	12/19/2018

Summary of Test Conditions

Exposure	Species Used
Test Mode: Flow Through (6 volume additions per day) **Length of Assay:** 28 days	(Check box for all that apply) ☐ Polychaete (*Nereis virens*) ☑ Bivalve Clam *(Macoma nasuta)*

Water Quality Parameters

Salinity: 30 ± 2 ppt **Photoperiod:** 16 hour light, 8 hour dark	**Temperature:** 12-16°C with no readings to exceed ±3°C

Test Chamber	Solution & Sediment Volume
(Check box for all that apply) ☑ 38L (10 gallon) Aquaria ☐ other _____	(Check box for all that apply) ☑ ~6L per vessel of homogenized sediment ☑ 20-30L overlying water ☐ other _____

Replicate Information

N. virens and M. nasuta:

- 5 Reps per sample site and reference site
- 5 Reps for Laboratory Control
- 20 organisms per chamber

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed then rinsed with deionized water (EPA 2002).	Laboratory Control, Reference Site, and Site Sediments

Feeding

N. virens:	*M. nasuta:*
NONE	NONE

Date: 2/14/18 Initial NR

(ET) DG 11/13

~~99AR001~~

99MnAR011318

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species Macoma nasuta

Source: Lab reared _____ Hatchery reared _____ Field collected ✓

Hatch date Mixed ages Receipt date 11/13/18

Lot number 11131BMN Strain WILD

Brood origination WA

II. Water Quality

Temperature 14 °C Salinity 30 ppt D.O. Sat ppm

pH 8.3 su Hardness — ppm Alkalinity — ppm

III. Culture Conditions

Freshwater _____ Saltwater ✓ Other _____

Recirculating _____ Flow through ✓ Static renewal _____

DIET: Flake food _____ Phytoplankton ✓ Trout chow _____

Artemia _____ Rotifers _____ YCT _____ Other _____

Prophylactic treatments: _____

Comments: _____

IV. Shipping Information

Client: ESI # of Organisms 1100

Carrier: FEDEX Date shipped 11/13/18

Biologist: Stan Smith

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

Macoma nasuta 28 Day Study

Client: AECOM **Study: 31249**

Day	Date	Water Qualities and Flow	Initial	Day	Date	Water Qualities and Flow	Initial
0	11/21/18	✓	BG	15	12/06/18	✓	BG
1	11/22/18	✓	LAG	16	12/07/18	✓	BG
2	11/22/18	✓	LAG	17	12/08/18	✓	BG
3	11/24/18	✓	BG	18	12/09/18	✓	MS
4	11/25/18	✓	LAG	19	12/10/18	✓	MS
5	11/26/18	✓	MS	20	12/11/18	✓	MS
6	11/27/18	✓	MS	21	12/12/18	✓	MS
7	11/28/18	✓	LAG	22	12/13/18	✓	MS
8	11/29/18	✓	BG	23	12/14/18	✓	BG
9	11/30/18	✓	BG	24	12/15/18	✓	BG
10	12/01/18	✓	BG	25	12/16/18	✓	MS
11	12/02/18	✓	MS	26	12/17/18	✓	MS
12	12/03/18	✓	MS	27	12/18/18	✓	MS
13	12/04/18	✓	MS	28	12/19/18	✓	LAG (DC)
14	12/05/18	✓	MS				

Notes: (EI) BG 12/01/18 Low salinities observed, salinity increased in head tanks.

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Water Quality Check Sheet 06 06 18 rev1.wpd

Daily Observations for *Macoma nasuta*

Client: AECOM **Study: 31249**

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Laboratory Control	A	✓	✓	✓	✓	✓	✓	IS	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	C	✓	✓	✓	✓	✓	✓	IS	✓	✓	✓	✓	✓	✓	IS
Laboratory Control	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	B	4 @ 2:00 1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	E	4 @ 1:00 1R	✓	✓	✓	✓	✓	IS	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	IS	IS	IS	IS	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	4 @ 1:00 1R	✓	✓	✓	✓	✓	✓	IS	IS	IS	IS	IS	IS	IS
Composite 2	D	4 @ 1:00 1R	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	IS	IS	IS	IS	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	IS	IS	IS	IS	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	✓	✓	✓	✓	✓	IS	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	4 @ 1:00 1R	✓	✓	✓	✓	✓	IS	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial	EJ 11/21	~~11/22/18~~ LAG	LAG	BG	LAG	MS	MS	LAG	BG	BG	BG	MS	MS	BG	MS
Date		11/22/18	11/23/18	11/24/18	11/25/18	11/26/18	11/27/18	11/28/18	11/29/18	11/30/18	12/01/18	12/02/18	12/03/18	12/04/18	12/05/18

Observation Codes:

R animals replaced after 1 hour

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Observations for Bioaccumulation Assay 06 06 18 rev1.wpd

Daily Observations for *Macoma nasuta*

Client: AECOM **Study: 31249**

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Composite 4	A	✓ IR	✓	✓	IS	IS	IS	IS	✓	✓	ID	✓	✓	✓	✓
Composite 4	B	✓	✓	IS	IS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓ IR	✓	IS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	✓	✓	IS	IS	IS	IS	IS	IS	IS	IS	✓	✓	IS
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	IS	IS
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	2S	2S	2S	2S	2S	2S	2S	2S	2S	2S	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	IS
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		LAG	LAG	BG	LAG	MS	MS	LAG	BG	BG	BG	MS	MS	BG	MS
Date		11/22/18	11/23/18	11/24/18	11/25/18	11/26/18	11/27/18	11/28/18	11/29/18	11/30/18	12/01/18	12/02/18	12/03/18	12/04/18	12/05/18

Observation Codes:

R animals replaced after 1 hour
D dead animals
S animals observed on the surface
✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Observations for Bioaccumulation Assay 06 06 18 rev1.wpd

Daily Observations for *Macoma nasuta*

Client: AECOM **Study: 31249**

TANK	Rep	DAY 15	16	17	18	19	20	21	22	23	24	25	26	27
Laboratory Control	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	IS	IS	IS	IS	IS	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	IS	IS	IS	IS	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG	BG	BG	MS	MS	MS	MS	MS	BG	BG	MS	MS	MS
Date		12/06/18	12/07/18	12/08/18	12/09/18	12/10/18	12/11/18	12/12/18	12/13/18	12/14/18	12/15/18	12/16/18	12/17/18	12/18/18

Observation Codes:

R animals replaced after 1 hour
D dead animals
S animals observed on the surface
✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Observations for Bioaccumulation Assay 06 06 18 rev1.wpd

Daily Observations for *Macoma nasuta*

Client: AECOM **Study: 31249**

TANK	Rep	DAY 15	16	17	18	19	20	21	22	23	24	25	26	27
Composite 4	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	IS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	IS	IS	IS	IS	IS	✓	✓	✓	IS	IS	IS	IS	✓
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	IS	ID	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG	BG	BG	MS	MS	MS	MS	MS	BG	BG	MS	MS	MS
Date		12/06/18	12/07/18	12/08/18	12/09/18	12/10/18	12/11/18	12/12/18	12/13/18	12/14/18	12/15/18	12/16/18	12/17/18	12/18/18

Observation Codes:

R animals replaced after 1 hour
D dead animals
S animals observed on the surface
✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Observations for Bioaccumulation Assay 06 06 18 rev1.wpd

Macoma nasuta Day 28 Recovery Record

DATE: 12/19/18 **ESI STUDY:** 31249

CLIENT: AECOM **PROJECT:** New Haven Harbor

SAMPLE ID	REP	# LIVE / INITIALS	SAMPLE ID	REP	# LIVE / INITIALS
Laboratory Control Sediment	A	20 MS	Composite 2	A	20 MS
Laboratory Control Sediment	B	19 LAG	Composite 2	B	20 BG
Laboratory Control Sediment	C	20 MS	Composite 2	C	20 LAG
Laboratory Control Sediment	D	E3 LAG 12/19 ~~19~~ 20 LAG	Composite 2	D	20 MS
Laboratory Control Sediment	E	20 MS	Composite 2	E	20 BG
CLDS Reference Sediment	A	20 LAG	Composite 3	A	20 MS
CLDS Reference Sediment	B	20 BG	Composite 3	B	20 LAG
CLDS Reference Sediment	C	R10 MS 12/19 20 MS	Composite 3	C	18 BG
CLDS Reference Sediment	D	20 LAG E10 LAG 12/19	Composite 3	D	20 MS
CLDS Reference Sediment	E	19 BG	Composite 3	E	20 LAG

E10 LAG 12/19 1 native clam found, not included in final count

R10 MS 12/19 1 Native clam found, not part of final count

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\31249&31250 Bioaccumulation Assays\Forms\Bioaccumulation Assay Recovery Record 2015.wpd

Macoma nasuta Day 28 Recovery Record

DATE: 12/19/18 **ESI STUDY:** 31249

CLIENT: AECOM **PROJECT:** New Haven Harbor

SAMPLE ID	REP	# LIVE / INITIALS	SAMPLE ID	REP	# LIVE / INITIALS
Composite 4	A	~~20~~ 19 MS (P3) MS 12/19	Composite 6	A	20 MS
Composite 4	B	18 MS	Composite 6	B	20 LAG
Composite 4	C	19 LAG	Composite 6	C	18 BG
Composite 4	D	20 MS	Composite 6	D	22 MS
Composite 4	E	21 LAG	Composite 6	E	20 BG
Composite 5	A	18 MS			
Composite 5	B	18 BG			
Composite 5	C	18 LAG			
Composite 5	D	20 MS			
Composite 5	E	20 BG			

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\31249&31250 Bioaccumulation Assays\Forms\Bioaccumulation Assay Recovery Record 2015.wpd

Macoma nasuta
28 day Bioaccumulation Evaluation

Daily Water Quality Data

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	00	11/21/2018 02:26:57	11.7	7.59	84.5	7.63	46374	30.02
Laboratory Control	B	00	11/21/2018 02:27:22	11.7	8.68	97.7	7.73	48377	31.46
Laboratory Control	C	00	11/21/2018 02:27:41	11.5	8.79	98.4	7.74	48041	31.21
Laboratory Control	D	00	11/21/2018 02:28:04	11.4	7.91	87.7	7.68	46617	30.18
Laboratory Control	E	00	11/21/2018 02:28:29	11.3	8.08	89.5	7.65	46807	30.31
CLDS Reference	A	00	11/21/2018 02:28:48	11.3	8.53	94.8	7.75	47285	30.65
CLDS Reference	B	00	11/21/2018 02:29:16	11.3	8.93	99.1	7.77	47089	30.51
CLDS Reference	C	00	11/21/2018 02:29:40	11.3	8.27	91.8	7.79	46939	30.40
CLDS Reference	D	00	11/21/2018 02:30:06	11.4	8.63	95.7	7.80	46830	30.33
CLDS Reference	E	00	11/21/2018 02:30:31	11.5	8.78	97.7	7.81	46945	30.42
Composite 2	A	00	11/21/2018 02:30:51	11.6	8.44	94.5	7.77	47940	31.14
Composite 2	B	00	11/21/2018 02:31:19	11.7	8.59	96.0	7.76	46950	30.43
Composite 2	C	00	11/21/2018 02:31:47	11.6	7.97	89.4	7.72	47913	31.12
Composite 2	D	00	11/21/2018 02:32:07	11.4	7.79	85.9	7.70	45231	29.19
Composite 2	E	00	11/21/2018 02:32:28	11.4	8.33	92.6	7.73	47040	30.48
Composite 3	A	00	11/21/2018 02:32:52	11.4	7.85	86.7	7.70	45894	29.66
Composite 3	B	00	11/21/2018 02:33:18	11.3	8.32	90.9	7.69	44012	28.31
Composite 3	C	00	11/21/2018 02:33:43	11.3	8.44	93.3	7.71	46174	29.86
Composite 3	D	00	11/21/2018 02:34:05	11.3	8.90	97.7	7.81	44900	28.94
Composite 3	E	00	11/21/2018 02:34:28	11.3	8.63	94.1	7.78	43464	27.92
Composite 4	A	00	11/21/2018 02:34:52	11.4	8.67	95.9	7.79	45991	29.73
Composite 4	B	00	11/21/2018 02:35:11	11.7	8.71	98.1	7.81	48500	31.55
Composite 4	C	00	11/21/2018 02:35:15	11.7	8.72	98.1	7.81	48500	31.55
Composite 4	D	00	11/21/2018 02:35:41	11.4	8.97	99.1	7.88	45791	29.59
Composite 4	E	00	11/21/2018 02:38:29	11.5	7.97	88.4	7.77	45795	29.59
Composite 5	A	00	11/21/2018 02:38:53	11.5	8.99	99.1	7.90	44654	28.78
Composite 5	B	00	11/21/2018 02:39:12	11.7	8.60	96.6	7.86	47888	31.11
Composite 5	C	00	11/21/2018 02:39:37	11.4	8.94	98.6	7.95	45293	29.23
Composite 5	D	00	11/21/2018 02:40:03	11.3	9.01	99.2	7.93	45198	29.16
Composite 5	E	00	11/21/2018 02:40:26	11.5	8.94	99.7	7.88	47767	31.01
Composite 6	A	00	11/21/2018 02:40:54	11.3	8.79	96.5	7.86	44737	28.83
Composite 6	B	00	11/21/2018 02:41:23	11.4	8.90	98.7	7.91	46758	30.28
Composite 6	C	00	11/21/2018 02:41:54	11.5	8.70	97.0	7.86	47151	30.57
Composite 6	D	00	11/21/2018 02:42:18	11.8	8.62	97.0	7.86	48033	31.21
Composite 6	E	00	11/21/2018 02:42:42	11.9	8.72	98.6	7.87	48718	31.71
Laboratory Control	A	01	11/22/2018 09:48:56	11.8	6.74	74.8	7.27	47418	30.77
Laboratory Control	B	01	11/22/2018 09:49:30	11.8	7.79	87.0	7.32	49139	32.01
Laboratory Control	C	01	11/22/2018 09:49:53	11.6	8.52	94.7	7.31	48955	31.87
Laboratory Control	D	01	11/22/2018 09:50:18	11.5	7.88	86.9	7.38	47677	30.94
Laboratory Control	E	01	11/22/2018 09:50:45	11.5	8.21	90.6	7.44	47949	31.14
CLDS Reference	A	01	11/22/2018 09:51:15	11.5	7.26	80.3	7.52	48189	31.31
CLDS Reference	B	01	11/22/2018 09:51:43	11.4	8.98	98.9	7.63	48086	31.23
CLDS Reference	C	01	11/22/2018 09:52:09	11.4	8.75	96.4	7.66	47919	31.11

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
CLDS Reference	D	01	11/22/2018 09:52:37	11.4	8.75	96.4	7.69	47824	31.05
CLDS Reference	E	01	11/22/2018 09:53:03	11.5	8.74	96.6	7.71	47959	31.15
Composite 2	A	01	11/22/2018 09:53:35	11.6	8.34	92.6	7.69	48769	31.74
Composite 2	B	01	11/22/2018 09:54:03	11.6	8.74	96.7	7.77	47889	31.10
Composite 2	C	01	11/22/2018 09:54:36	11.6	8.39	93.4	7.72	48803	31.76
Composite 2	D	01	11/22/2018 09:55:03	11.5	7.86	86.2	7.68	46307	29.96
Composite 2	E	01	11/22/2018 09:55:29	11.5	7.62	84.1	7.65	48109	31.25
Composite 3	A	01	11/22/2018 09:56:02	11.4	5.26	57.7	7.54	47037	30.48
Composite 3	B	01	11/22/2018 09:56:32	11.2	8.94	96.9	7.77	45050	29.05
Composite 3	C	01	11/22/2018 09:57:08	11.3	8.45	92.7	7.72	47261	30.64
Composite 3	D	01	11/22/2018 09:57:32	11.3	8.68	94.5	7.79	45871	29.64
Composite 3	E	01	11/22/2018 09:58:02	11.3	8.13	88.0	7.77	44431	28.61
Composite 4	A	01	11/22/2018 09:58:23	11.4	8.34	91.5	7.78	47104	30.53
Composite 4	B	01	11/22/2018 09:58:47	11.6	8.72	96.9	7.80	48898	31.83
Composite 4	C	01	11/22/2018 09:59:07	11.4	8.71	95.5	7.84	46757	30.28
Composite 4	D	01	11/22/2018 09:59:33	11.3	9.03	99.0	7.91	46976	30.43
Composite 4	E	01	11/22/2018 10:00:12	11.5	5.49	60.3	7.69	46833	30.34
Composite 5	A	01	11/22/2018 10:00:43	11.5	9.02	98.6	7.91	45651	29.49
Composite 5	B	01	11/22/2018 10:01:09	11.7	8.63	95.9	7.83	48749	31.73
Composite 5	C	01	11/22/2018 10:01:37	11.4	9.15	100.0	7.97	46323	29.96
Composite 5	D	01	11/22/2018 10:02:01	11.3	9.06	98.8	7.95	46260	29.92
Composite 5	E	01	11/22/2018 10:02:29	11.4	9.07	100.3	7.92	48745	31.71
Composite 6	A	01	11/22/2018 10:03:01	11.3	8.45	91.8	7.87	45602	29.44
Composite 6	B	01	11/22/2018 10:03:30	11.2	9.03	99.1	7.91	47998	31.16
Composite 6	C	01	11/22/2018 10:03:55	11.4	8.81	97.2	7.89	48218	31.33
Composite 6	D	01	11/22/2018 10:04:19	11.7	8.54	95.0	7.87	48834	31.79
Composite 6	E	01	11/22/2018 10:04:44	11.7	8.86	98.7	7.88	48815	31.78
Laboratory Control	A	02	11/23/2018 10:02:25	12.3	8.26	91.7	7.68	47440	30.81
Laboratory Control	B	02	11/23/2018 10:02:46	12.1	8.51	94.3	7.67	47737	31.01
Laboratory Control	C	02	11/23/2018 10:03:11	11.7	8.51	93.6	7.57	47880	31.10
Laboratory Control	D	02	11/23/2018 10:03:46	11.6	8.58	93.9	7.66	47081	30.52
Laboratory Control	E	02	11/23/2018 10:04:09	11.6	8.49	92.8	7.67	47171	30.58
CLDS Reference	A	02	11/23/2018 10:04:35	11.5	7.24	79.1	7.64	47191	30.60
CLDS Reference	B	02	11/23/2018 10:04:59	11.5	9.08	99.1	7.73	47203	30.60
CLDS Reference	C	02	11/23/2018 10:05:21	11.5	8.92	97.5	7.74	47085	30.52
CLDS Reference	D	02	11/23/2018 10:05:37	11.6	8.89	97.1	7.75	46878	30.37
CLDS Reference	E	02	11/23/2018 10:05:45	11.6	8.87	96.9	7.75	46880	30.38
Composite 2	A	02	11/23/2018 10:06:08	11.8	8.77	96.2	7.75	47028	30.49
Composite 2	B	02	11/23/2018 10:06:32	11.9	8.53	94.0	7.75	47548	30.87
Composite 2	C	02	11/23/2018 10:07:00	12.0	8.88	97.9	7.83	46918	30.42
Composite 2	D	02	11/23/2018 10:07:26	11.7	8.67	95.3	7.79	47741	31.00
Composite 2	E	02	11/23/2018 10:07:44	11.7	8.23	89.9	7.76	46260	29.93
Composite 3	A	02	11/23/2018 10:08:04	11.6	8.01	87.8	7.72	47338	30.71

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 3	B	02	11/23/2018 10:08:20	11.6	8.10	88.5	7.71	46626	30.19
Composite 3	C	02	11/23/2018 10:08:42	11.4	8.97	96.4	7.86	44202	28.45
Composite 3	D	02	11/23/2018 10:09:07	11.6	8.72	95.3	7.82	46994	30.46
Composite 3	E	02	11/23/2018 10:09:29	11.5	8.68	94.3	7.84	45892	29.66
Composite 4	A	02	11/23/2018 10:09:46	11.5	8.61	92.8	7.84	44283	28.51
Composite 4	B	02	11/23/2018 10:10:08	11.6	8.45	91.3	7.82	44483	28.66
Composite 4	C	02	11/23/2018 10:10:30	11.9	8.86	97.7	7.82	47634	30.93
Composite 4	D	02	11/23/2018 10:10:46	11.7	8.84	96.7	7.85	46541	30.14
Composite 4	E	02	11/23/2018 10:11:05	11.7	8.99	98.2	7.91	46383	30.02
Composite 5	A	02	11/23/2018 10:11:36	11.7	7.44	81.3	7.76	46424	30.05
Composite 5	B	02	11/23/2018 10:11:59	11.6	9.00	97.5	7.94	45146	29.13
Composite 5	C	02	11/23/2018 10:12:14	11.7	8.85	97.3	7.88	47656	30.94
Composite 5	D	02	11/23/2018 10:12:33	11.5	9.12	99.0	7.97	45842	29.63
Composite 5	E	02	11/23/2018 10:12:55	11.5	9.04	97.9	7.96	45737	29.55
Composite 6	A	02	11/23/2018 10:13:12	11.6	9.06	99.3	7.92	47733	30.99
Composite 6	B	02	11/23/2018 10:13:39	11.4	8.65	93.2	7.88	44921	28.96
Composite 6	C	02	11/23/2018 10:14:03	11.4	9.11	99.1	7.90	47158	30.57
Composite 6	D	02	11/23/2018 10:14:16	11.6	9.00	98.4	7.89	47231	30.63
Composite 6	E	02	11/23/2018 10:14:39	12.0	8.89	98.2	7.87	47495	30.84
Laboratory Control	A	03	11/24/2018 12:42:27	12.0	8.64	96.2	7.68	45600	29.48
Laboratory Control	B	03	11/24/2018 12:42:43	11.9	8.77	97.3	7.70	45529	29.42
Laboratory Control	C	03	11/24/2018 12:43:08	11.7	8.78	97.3	7.66	46348	30.00
Laboratory Control	D	03	11/24/2018 12:43:27	11.6	8.83	97.7	7.70	46019	29.76
Laboratory Control	E	03	11/24/2018 12:43:46	11.5	8.77	96.9	7.71	46320	29.97
CLDS Reference	A	03	11/24/2018 12:44:08	11.4	7.67	84.7	7.67	46616	30.18
CLDS Reference	B	03	11/24/2018 12:44:33	11.3	9.03	99.4	7.77	46585	30.15
CLDS Reference	C	03	11/24/2018 12:44:55	11.5	8.96	98.7	7.78	46140	29.84
CLDS Reference	D	03	11/24/2018 12:45:16	11.4	8.91	98.2	7.79	46367	30.00
CLDS Reference	E	03	11/24/2018 12:45:32	11.6	8.88	98.3	7.79	46511	30.11
Composite 2	A	03	11/24/2018 12:45:57	11.7	8.64	96.0	7.82	46802	30.32
Composite 2	B	03	11/24/2018 12:46:22	11.8	8.74	96.8	7.85	45936	29.71
Composite 2	C	03	11/24/2018 12:46:52	11.7	8.66	96.2	7.82	46829	30.34
Composite 2	D	03	11/24/2018 12:47:18	11.7	8.55	94.5	7.81	45584	29.45
Composite 2	E	03	11/24/2018 12:47:32	11.7	8.50	94.2	7.78	46087	29.81
Composite 3	A	03	11/24/2018 12:47:50	11.7	8.67	95.9	7.79	45663	29.51
Composite 3	B	03	11/24/2018 12:48:56	11.2	8.77	95.4	7.93	44456	28.62
Composite 3	C	03	11/24/2018 12:49:21	11.5	8.62	95.0	7.86	46025	29.76
Composite 3	D	03	11/24/2018 12:49:46	11.4	8.80	96.6	7.88	45539	29.41
Composite 3	E	03	11/24/2018 12:50:00	11.5	8.68	95.1	7.86	44667	28.78
Composite 4	A	03	11/24/2018 12:50:19	11.4	8.40	92.4	7.84	45902	29.67
Composite 4	B	03	11/24/2018 12:50:37	11.4	8.75	96.8	7.85	47222	30.61
Composite 4	C	03	11/24/2018 12:50:53	11.7	8.81	97.4	7.87	45721	29.55
Composite 4	D	03	11/24/2018 12:51:14	11.6	8.89	98.1	7.94	45957	29.71

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	E	03	11/24/2018 12:52:06	11.8	8.59	95.1	7.88	45641	29.49
Composite 5	A	03	11/24/2018 12:52:19	11.5	8.80	96.7	7.96	45039	29.05
Composite 5	B	03	11/24/2018 12:52:42	11.9	8.86	98.4	7.90	45695	29.54
Composite 5	C	03	11/24/2018 12:53:05	11.4	9.03	99.2	8.00	45570	29.43
Composite 5	D	03	11/24/2018 12:53:21	11.5	8.96	98.5	7.97	45422	29.32
Composite 5	E	03	11/24/2018 12:53:39	11.5	9.04	99.7	7.94	45855	29.64
Composite 6	A	03	11/24/2018 12:54:05	11.2	8.61	94.0	7.90	44936	28.97
Composite 6	B	03	11/24/2018 12:54:27	11.4	8.88	97.8	7.90	45928	29.68
Composite 6	C	03	11/24/2018 12:54:44	11.7	8.88	98.3	7.90	45931	29.70
Composite 6	D	03	11/24/2018 12:55:06	12.0	8.87	98.4	7.89	45137	29.14
Composite 6	E	03	11/24/2018 12:55:30	11.4	8.86	98.0	7.88	47243	30.63
Laboratory Control	A	04	11/25/2018 12:14:39	12.1	8.31	93.8	7.75	46369	30.03
Laboratory Control	B	04	11/25/2018 12:15:22	11.9	8.36	93.9	7.72	46277	29.96
Laboratory Control	C	04	11/25/2018 12:15:59	11.8	8.88	99.7	7.74	46411	30.05
Laboratory Control	D	04	11/25/2018 12:16:46	11.8	8.77	98.6	7.78	46404	30.04
Laboratory Control	E	04	11/25/2018 12:17:20	11.8	8.67	97.3	7.77	46438	30.07
CLDS Reference	A	04	11/25/2018 12:17:55	11.7	9.05	101.5	7.82	46447	30.07
CLDS Reference	B	04	11/25/2018 12:18:40	11.4	9.12	101.6	7.85	46583	30.15
CLDS Reference	C	04	11/25/2018 12:19:07	11.6	8.97	100.1	7.84	46379	30.01
CLDS Reference	D	04	11/25/2018 12:19:38	11.5	8.95	99.8	7.84	46532	30.12
CLDS Reference	E	04	11/25/2018 12:20:10	11.7	8.92	99.9	7.84	46418	30.05
Composite 2	A	04	11/25/2018 12:20:39	11.8	8.43	94.6	7.84	46486	30.10
Composite 2	B	04	11/25/2018 12:21:15	11.8	8.76	98.3	7.85	46499	30.11
Composite 2	C	04	11/25/2018 12:21:44	11.8	8.92	100.1	7.87	46336	29.99
Composite 2	D	04	11/25/2018 12:22:18	11.8	8.68	97.4	7.84	46418	30.05
Composite 2	E	04	11/25/2018 12:22:38	11.8	8.56	95.9	7.82	46226	29.92
Composite 3	A	04	11/25/2018 12:23:08	11.8	8.50	95.4	7.80	46314	29.98
Composite 3	B	04	11/25/2018 12:23:28	11.9	8.56	96.3	7.79	46388	30.04
Composite 3	C	04	11/25/2018 12:23:59	11.4	8.88	98.3	7.92	45266	29.21
Composite 3	D	04	11/25/2018 12:24:27	11.7	8.68	97.1	7.84	46354	30.00
Composite 3	E	04	11/25/2018 12:25:02	11.6	8.73	97.3	7.85	46194	29.88
Composite 4	A	04	11/25/2018 12:25:47	11.6	8.66	96.7	7.83	45998	29.74
Composite 4	B	04	11/25/2018 12:26:18	11.6	8.50	94.8	7.84	46287	29.95
Composite 4	C	04	11/25/2018 12:26:47	11.6	8.77	98.2	7.86	47023	30.48
Composite 4	D	04	11/25/2018 12:27:06	11.8	8.71	97.8	7.85	46376	30.02
Composite 4	E	04	11/25/2018 12:27:24	11.7	8.88	99.3	7.87	46357	30.00
Composite 5	A	04	11/25/2018 12:28:35	11.9	8.52	95.8	7.83	46345	30.00
Composite 5	B	04	11/25/2018 12:29:05	11.7	8.95	99.7	7.97	45625	29.48
Composite 5	C	04	11/25/2018 12:29:33	12.1	8.62	97.3	7.87	46424	30.07
Composite 5	D	04	11/25/2018 12:29:56	11.7	8.86	98.9	7.94	46059	29.79
Composite 5	E	04	11/25/2018 12:30:29	11.6	8.67	96.6	7.90	46031	29.77
Composite 6	A	04	11/25/2018 12:30:57	11.7	8.92	99.9	7.89	46370	30.01
Composite 6	B	04	11/25/2018 12:31:25	11.4	8.50	94.1	7.87	45569	29.42

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	C	04	11/25/2018 12:32:06	11.6	8.82	98.5	7.89	46247	29.92
Composite 6	D	04	11/25/2018 12:32:29	11.8	8.74	98.1	7.88	46301	29.97
Composite 6	E	04	11/25/2018 12:33:21	11.6	8.68	97.3	7.89	47654	30.93
Laboratory Control	A	05	11/26/2018 12:03:40	12.2	8.38	94.6	7.73	46895	30.41
Laboratory Control	B	05	11/26/2018 12:04:07	11.7	7.44	83.1	7.64	46602	30.18
Laboratory Control	C	05	11/26/2018 12:04:32	11.9	8.73	97.9	7.68	46905	30.41
Laboratory Control	D	05	11/26/2018 12:05:07	11.6	8.72	97.2	7.71	46831	30.34
Laboratory Control	E	05	11/26/2018 12:05:33	11.6	8.68	96.8	7.71	46893	30.39
CLDS Reference	A	05	11/26/2018 12:05:52	11.6	9.03	100.7	7.76	46911	30.40
CLDS Reference	B	05	11/26/2018 12:06:29	11.5	9.06	100.8	7.79	46948	30.42
CLDS Reference	C	05	11/26/2018 12:06:51	11.8	8.99	100.6	7.80	46920	30.41
CLDS Reference	D	05	11/26/2018 12:07:14	11.6	8.95	99.6	7.80	46874	30.37
CLDS Reference	E	05	11/26/2018 12:07:36	11.8	8.92	99.9	7.79	46881	30.39
Composite 2	A	05	11/26/2018 12:08:05	11.8	8.74	97.9	7.79	46892	30.39
Composite 2	B	05	11/26/2018 12:08:29	11.8	8.91	99.8	7.82	46795	30.32
Composite 2	C	05	11/26/2018 12:09:09	11.6	7.38	82.2	7.72	46749	30.28
Composite 2	D	05	11/26/2018 12:09:31	11.5	7.95	88.4	7.71	46547	30.13
Composite 2	E	05	11/26/2018 12:09:54	11.4	7.75	86.0	7.67	46588	30.16
Composite 3	A	05	11/26/2018 12:10:19	11.4	7.65	84.8	7.65	46665	30.21
Composite 3	B	05	11/26/2018 12:10:43	11.4	8.84	97.4	7.85	45593	29.44
Composite 3	C	05	11/26/2018 12:11:11	11.6	8.44	94.1	7.76	46846	30.35
Composite 3	D	05	11/26/2018 12:11:34	11.6	8.58	95.6	7.76	46732	30.27
Composite 3	E	05	11/26/2018 12:11:55	11.7	8.64	96.3	7.76	46657	30.22
Composite 4	A	05	11/26/2018 12:12:19	11.6	8.39	93.4	7.78	46665	30.22
Composite 4	B	05	11/26/2018 12:12:38	11.6	8.55	95.5	7.78	47308	30.68
Composite 4	C	05	11/26/2018 12:13:08	11.6	8.37	93.2	7.75	46743	30.28
Composite 4	D	05	11/26/2018 12:13:28	11.7	8.93	99.7	7.80	46871	30.37
Composite 4	E	05	11/26/2018 12:14:32	11.6	8.06	89.6	7.73	46637	30.20
Composite 5	A	05	11/26/2018 12:14:56	11.5	9.07	100.6	7.89	46122	29.83
Composite 5	B	05	11/26/2018 12:15:22	11.5	8.69	96.5	7.79	46624	30.19
Composite 5	C	05	11/26/2018 12:15:48	11.5	8.95	99.3	7.86	46415	30.04
Composite 5	D	05	11/26/2018 12:16:15	11.4	7.80	86.3	7.76	46312	29.96
Composite 5	E	05	11/26/2018 12:16:39	11.3	9.04	99.9	7.82	46629	30.18
Composite 6	A	05	11/26/2018 12:17:18	11.4	7.75	85.6	7.80	45822	29.61
Composite 6	B	05	11/26/2018 12:17:41	11.6	8.78	97.8	7.81	46776	30.30
Composite 6	C	05	11/26/2018 12:18:10	11.5	8.20	91.0	7.78	46613	30.18
Composite 6	D	05	11/26/2018 12:18:34	11.5	7.94	88.1	7.76	46696	30.24
Composite 6	E	05	11/26/2018 12:18:57	11.5	8.41	93.8	7.78	47735	30.99
Laboratory Control	A	06	11/27/2018 09:40:08	12.1	8.27	95.6	7.65	46643	30.23
Laboratory Control	B	06	11/27/2018 09:40:34	11.7	7.10	81.1	7.54	46019	29.76
Laboratory Control	C	06	11/27/2018 09:41:05	11.8	8.56	98.3	7.64	46624	30.20
Laboratory Control	D	06	11/27/2018 09:41:27	11.6	8.60	98.1	7.69	46427	30.05

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	E	06	11/27/2018 09:41:51	11.5	8.47	96.6	7.70	46506	30.10
CLDS Reference	A	06	11/27/2018 09:42:18	11.5	8.92	101.7	7.78	46545	30.13
CLDS Reference	B	06	11/27/2018 09:42:50	11.4	8.81	100.2	7.83	46502	30.10
CLDS Reference	C	06	11/27/2018 09:43:12	11.4	8.76	99.6	7.82	46454	30.06
CLDS Reference	D	06	11/27/2018 09:43:38	11.5	8.83	100.6	7.84	46420	30.04
CLDS Reference	E	06	11/27/2018 09:43:55	11.7	8.76	100.4	7.83	46601	30.18
Composite 2	A	06	11/27/2018 09:44:12	11.8	8.65	99.1	7.83	46483	30.10
Composite 2	B	06	11/27/2018 09:44:30	11.8	8.75	100.3	7.87	46324	29.99
Composite 2	C	06	11/27/2018 09:45:00	11.8	8.04	92.2	7.78	46454	30.08
Composite 2	D	06	11/27/2018 09:45:25	11.7	8.30	94.9	7.78	46307	29.97
Composite 2	E	06	11/27/2018 09:45:49	11.7	8.37	95.9	7.78	46465	30.08
Composite 3	A	06	11/27/2018 09:46:09	11.5	8.06	91.9	7.75	46252	29.92
Composite 3	B	06	11/27/2018 09:46:33	11.6	8.71	99.2	7.86	46079	29.80
Composite 3	C	06	11/27/2018 09:46:58	11.6	8.27	94.4	7.79	46468	30.08
Composite 3	D	06	11/27/2018 09:47:24	11.6	8.41	96.0	7.79	46398	30.03
Composite 3	E	06	11/27/2018 09:48:02	11.6	8.45	96.5	7.80	46375	30.01
Composite 4	A	06	11/27/2018 09:48:16	11.5	8.33	94.9	7.80	46177	29.87
Composite 4	B	06	11/27/2018 09:48:34	11.6	8.21	93.7	7.80	46564	30.15
Composite 4	C	06	11/27/2018 09:48:50	11.6	8.16	93.1	7.78	46257	29.93
Composite 4	D	06	11/27/2018 09:49:15	11.7	8.76	100.2	7.85	46574	30.16
Composite 4	E	06	11/27/2018 09:50:27	11.5	8.18	93.1	7.80	46076	29.80
Composite 5	A	06	11/27/2018 09:50:51	11.5	8.85	100.5	7.96	45735	29.55
Composite 5	B	06	11/27/2018 09:51:13	11.5	8.47	96.3	7.87	45987	29.73
Composite 5	C	06	11/27/2018 09:51:40	11.5	8.76	99.5	7.93	45950	29.70
Composite 5	D	06	11/27/2018 09:52:12	11.4	7.44	84.3	7.78	45738	29.55
Composite 5	E	06	11/27/2018 09:53:14	11.2	8.92	100.9	7.92	46007	29.73
Composite 6	A	06	11/27/2018 10:01:50	11.4	7.59	85.7	7.82	45200	29.16
Composite 6	B	06	11/27/2018 10:02:19	11.6	8.64	98.6	7.86	46471	30.08
Composite 6	C	06	11/27/2018 10:02:47	11.5	8.02	91.2	7.82	46105	29.81
Composite 6	D	06	11/27/2018 10:03:16	11.4	7.74	88.0	7.79	46097	29.81
Composite 6	E	06	11/27/2018 10:03:45	11.5	8.21	93.7	7.84	47029	30.48
Laboratory Control	A	07	11/28/2018 12:08:47	12.4	8.94	101.2	7.82	41664	26.69
Laboratory Control	B	07	11/28/2018 12:09:47	12.2	8.84	99.7	7.80	41535	26.59
Laboratory Control	C	07	11/28/2018 12:10:24	12.1	8.88	99.9	7.78	41609	26.64
Laboratory Control	D	07	11/28/2018 12:11:47	11.9	8.94	100.1	7.81	41396	26.48
Laboratory Control	E	07	11/28/2018 12:12:35	11.7	8.79	98.1	7.79	41420	26.49
CLDS Reference	A	07	11/28/2018 12:13:26	11.8	9.13	102.2	7.83	41527	26.57
CLDS Reference	B	07	11/28/2018 12:14:38	11.5	9.15	101.6	7.85	41319	26.41
CLDS Reference	C	07	11/28/2018 12:15:08	11.6	9.05	100.7	7.84	41275	26.38
CLDS Reference	D	07	11/28/2018 12:15:31	11.6	9.08	101.0	7.84	41207	26.34
CLDS Reference	E	07	11/28/2018 12:16:12	11.7	8.94	99.7	7.83	41413	26.48
Composite 2	A	07	11/28/2018 12:16:48	11.8	8.88	99.1	7.84	41322	26.42
Composite 2	B	07	11/28/2018 12:17:20	11.8	9.00	100.5	7.86	41206	26.34

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 2	C	07	11/28/2018 12:20:49	11.9	8.47	95.0	7.80	41386	26.47
Composite 2	D	07	11/28/2018 12:21:18	11.9	8.65	96.8	7.80	41212	26.35
Composite 2	E	07	11/28/2018 12:22:03	11.9	8.60	96.4	7.80	41460	26.53
Composite 3	A	07	11/28/2018 12:22:43	11.7	8.42	93.7	7.78	40980	26.18
Composite 3	B	07	11/28/2018 12:23:30	11.7	8.80	97.9	7.85	41121	26.28
Composite 3	C	07	11/28/2018 12:24:06	11.7	8.75	97.6	7.81	41376	26.46
Composite 3	D	07	11/28/2018 12:24:46	11.7	8.78	97.9	7.81	41362	26.45
Composite 3	E	07	11/28/2018 12:25:46	11.6	8.70	96.7	7.81	41278	26.38
Composite 4	A	07	11/28/2018 12:26:41	11.5	8.78	97.3	7.84	40899	26.11
Composite 4	B	07	11/28/2018 12:27:26	11.6	8.76	97.4	7.82	41272	26.38
Composite 4	C	07	11/28/2018 12:27:56	11.7	8.76	97.6	7.82	41204	26.34
Composite 4	D	07	11/28/2018 12:28:37	11.6	9.04	100.7	7.85	41525	26.56
Composite 4	E	07	11/28/2018 12:29:23	11.9	8.80	98.3	7.84	41030	26.22
Composite 5	A	07	11/28/2018 12:30:42	11.6	9.08	100.7	7.97	40663	25.95
Composite 5	B	07	11/28/2018 12:31:38	11.6	8.84	98.1	7.88	40530	25.86
Composite 5	C	07	11/28/2018 12:32:14	11.7	9.02	100.5	7.92	40949	26.16
Composite 5	D	07	11/28/2018 12:33:05	11.6	8.40	93.1	7.83	40483	25.82
Composite 5	E	07	11/28/2018 13:27:21	11.7	9.01	100.2	7.93	40846	26.08
Composite 6	A	07	11/28/2018 13:28:02	11.7	8.63	95.7	7.90	40364	25.74
Composite 6	B	07	11/28/2018 13:28:56	11.8	8.86	99.1	7.89	41469	26.53
Composite 6	C	07	11/28/2018 13:29:38	11.8	8.84	98.8	7.87	41177	26.32
Composite 6	D	07	11/28/2018 13:30:26	11.5	8.39	92.9	7.83	40681	25.96
Composite 6	E	07	11/28/2018 13:31:08	11.7	8.86	98.9	7.87	41452	26.51
Laboratory Control	A	08	11/29/2018 11:11:07	12.0	8.17	92.6	7.61	46901	30.41
Laboratory Control	B	08	11/29/2018 11:11:47	11.8	8.00	90.4	7.61	47174	30.60
Laboratory Control	C	08	11/29/2018 11:12:19	11.9	8.58	97.0	7.66	46736	30.28
Laboratory Control	D	08	11/29/2018 11:12:42	11.6	8.64	97.1	7.70	47011	30.47
Laboratory Control	E	08	11/29/2018 11:13:07	11.6	8.56	96.3	7.71	46825	30.34
CLDS Reference	A	08	11/29/2018 11:13:31	11.4	8.75	98.0	7.75	47070	30.50
CLDS Reference	B	08	11/29/2018 11:13:54	11.5	8.83	99.0	7.78	46879	30.37
CLDS Reference	C	08	11/29/2018 11:14:20	11.5	8.79	98.7	7.79	46883	30.37
CLDS Reference	D	08	11/29/2018 11:14:47	11.5	8.74	98.0	7.80	46990	30.45
CLDS Reference	E	08	11/29/2018 11:15:13	11.6	8.64	97.2	7.80	46914	30.40
Composite 2	A	08	11/29/2018 11:15:40	11.8	8.46	95.4	7.80	46774	30.31
Composite 2	B	08	11/29/2018 11:16:02	11.7	8.71	98.1	7.81	46929	30.42
Composite 2	C	08	11/29/2018 11:16:35	11.8	8.10	91.4	7.80	46819	30.34
Composite 2	D	08	11/29/2018 11:16:57	11.8	8.45	95.5	7.79	46802	30.33
Composite 2	E	08	11/29/2018 11:17:17	11.7	8.02	90.4	7.75	47102	30.54
Composite 3	A	08	11/29/2018 11:17:39	11.8	8.43	95.1	7.77	46815	30.34
Composite 3	B	08	11/29/2018 11:18:01	11.9	8.59	97.2	7.80	46602	30.19
Composite 3	C	08	11/29/2018 11:18:26	11.8	8.51	95.9	7.79	46812	30.33
Composite 3	D	08	11/29/2018 11:18:54	11.7	8.52	95.9	7.79	46787	30.31
Composite 3	E	08	11/29/2018 11:19:15	11.6	8.48	95.3	7.78	46879	30.37

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	A	08	11/29/2018 11:19:31	11.6	8.54	96.0	7.80	46837	30.34
Composite 4	B	08	11/29/2018 11:19:56	11.6	8.62	97.0	7.81	46880	30.38
Composite 4	C	08	11/29/2018 11:20:20	11.6	8.51	95.5	7.80	46900	30.39
Composite 4	D	08	11/29/2018 11:20:34	11.5	8.64	96.9	7.82	47039	30.48
Composite 4	E	08	11/29/2018 11:20:59	11.5	8.19	91.9	7.79	47002	30.46
Composite 5	A	08	11/29/2018 11:21:25	11.5	8.74	97.9	7.89	46634	30.19
Composite 5	B	08	11/29/2018 11:21:48	11.8	8.56	96.5	7.85	46681	30.24
Composite 5	C	08	11/29/2018 11:22:13	11.8	8.55	96.5	7.85	46727	30.28
Composite 5	D	08	11/29/2018 11:22:38	11.7	7.97	89.7	7.81	46663	30.22
Composite 5	E	08	11/29/2018 11:23:03	11.8	8.62	97.1	7.84	46728	30.27
Composite 6	A	08	11/29/2018 11:23:34	11.6	8.24	92.5	7.83	46615	30.19
Composite 6	B	08	11/29/2018 11:23:54	11.6	8.49	95.5	7.83	46976	30.45
Composite 6	C	08	11/29/2018 11:24:12	11.6	8.29	93.1	7.82	46885	30.38
Composite 6	D	08	11/29/2018 11:24:41	11.7	8.48	95.4	7.83	46738	30.28
Composite 6	E	08	11/29/2018 11:25:02	11.7	8.55	96.1	7.84	46893	30.39
Laboratory Control	A	09	11/30/2018 15:07:39	11.8	8.03	90.1	7.36	47978	31.18
Laboratory Control	B	09	11/30/2018 15:08:03	11.6	8.20	91.7	7.40	48560	31.58
Laboratory Control	C	09	11/30/2018 15:08:25	11.7	8.59	96.0	7.47	47716	30.98
Laboratory Control	D	09	11/30/2018 15:08:40	11.3	8.77	97.6	7.51	48218	31.33
Laboratory Control	E	09	11/30/2018 15:09:06	11.4	8.64	95.9	7.55	47869	31.08
CLDS Reference	A	09	11/30/2018 15:09:29	11.1	8.98	99.4	7.61	48207	31.31
CLDS Reference	B	09	11/30/2018 15:09:51	11.1	9.08	100.3	7.66	48064	31.20
CLDS Reference	C	09	11/30/2018 15:10:09	11.1	8.99	99.5	7.67	48105	31.24
CLDS Reference	D	09	11/30/2018 15:10:34	11.2	8.80	97.6	7.68	48204	31.31
CLDS Reference	E	09	11/30/2018 15:10:52	11.3	8.80	97.8	7.68	48321	31.40
Composite 2	A	09	11/30/2018 15:11:16	11.6	8.75	97.6	7.69	47698	30.96
Composite 2	B	09	11/30/2018 15:11:40	11.6	8.78	98.0	7.71	48015	31.19
Composite 2	C	09	11/30/2018 15:12:18	11.5	7.59	84.7	7.63	48159	31.29
Composite 2	D	09	11/30/2018 15:12:42	11.4	8.04	89.5	7.63	48065	31.22
Composite 2	E	09	11/30/2018 15:12:57	11.4	8.02	89.4	7.62	48244	31.35
Composite 3	A	09	11/30/2018 15:13:26	11.6	8.29	92.5	7.66	47779	31.02
Composite 3	B	09	11/30/2018 15:13:44	11.9	8.68	97.3	7.70	47580	30.89
Composite 3	C	09	11/30/2018 15:14:03	11.5	8.69	96.8	7.70	47786	31.02
Composite 3	D	09	11/30/2018 15:14:30	11.5	8.61	95.9	7.70	47732	30.98
Composite 3	E	09	11/30/2018 15:14:54	11.3	8.57	95.1	7.70	47979	31.15
Composite 4	A	09	11/30/2018 15:15:14	11.3	8.50	94.3	7.70	47939	31.12
Composite 4	B	09	11/30/2018 15:15:33	11.3	8.41	93.4	7.70	47999	31.17
Composite 4	C	09	11/30/2018 15:15:55	11.3	8.45	93.8	7.70	47942	31.13
Composite 4	D	09	11/30/2018 15:16:17	11.3	8.87	98.5	7.74	47917	31.11
Composite 4	E	09	11/30/2018 15:16:46	11.4	8.03	89.4	7.72	48343	31.42
Composite 5	A	09	11/30/2018 15:16:59	11.3	8.51	94.5	7.77	47939	31.12
Composite 5	B	09	11/30/2018 15:17:23	11.5	8.65	96.4	7.76	47810	31.04
Composite 5	C	09	11/30/2018 15:17:44	11.6	8.76	97.7	7.77	47707	30.97

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	D	09	11/30/2018 15:18:01	11.5	8.24	91.8	7.73	47847	31.07
Composite 5	E	09	11/30/2018 15:18:23	11.6	8.79	98.1	7.76	47661	30.94
Composite 6	A	09	11/30/2018 15:18:58	11.4	7.85	87.1	7.72	47816	31.04
Composite 6	B	09	11/30/2018 15:19:21	11.5	8.57	95.5	7.75	47857	31.07
Composite 6	C	09	11/30/2018 15:19:40	11.4	8.39	93.4	7.74	48043	31.21
Composite 6	D	09	11/30/2018 15:20:02	11.5	8.58	95.5	7.75	47721	30.98
Composite 6	E	09	11/30/2018 15:20:23	11.5	8.74	97.3	7.76	47734	30.99
Laboratory Control	A	10	12/1/2018 10:49:09	12.1	8.97	98.4	7.73	42981	27.61
Laboratory Control	B	10	12/1/2018 10:49:35	11.9	9.12	99.9	7.73	43338	27.86
Laboratory Control	C	10	12/1/2018 10:49:50	12.1	9.35	102.4	7.75	42419	27.21
Laboratory Control	D	10	12/1/2018 10:50:11	12.0	9.32	101.7	7.76	42612	27.34
Laboratory Control	E	10	12/1/2018 10:50:35	11.8	9.31	101.5	7.76	42707	27.40
CLDS Reference	A	10	12/1/2018 10:50:56	11.7	9.48	103.0	7.78	42788	27.46
CLDS Reference	B	10	12/1/2018 10:51:26	11.4	9.38	101.6	7.80	43579	28.01
CLDS Reference	C	10	12/1/2018 10:51:46	11.6	9.44	102.5	7.81	42944	27.57
CLDS Reference	D	10	12/1/2018 10:52:03	11.5	9.36	101.6	7.80	43787	28.16
CLDS Reference	E	10	12/1/2018 10:52:26	11.6	9.30	101.2	7.80	43504	27.96
Composite 2	A	10	12/1/2018 10:52:48	11.7	9.28	101.1	7.80	43189	27.74
Composite 2	B	10	12/1/2018 10:53:07	11.9	9.34	101.9	7.81	42561	27.30
Composite 2	C	10	12/1/2018 10:53:35	11.9	9.31	101.8	7.80	42911	27.55
Composite 2	D	10	12/1/2018 10:53:53	12.0	9.23	101.0	7.80	42953	27.58
Composite 2	E	10	12/1/2018 10:54:17	11.8	9.34	102.1	7.80	43299	27.83
Composite 3	A	10	12/1/2018 10:54:38	11.8	9.23	100.9	7.80	43436	27.92
Composite 3	B	10	12/1/2018 10:54:55	12.0	9.26	101.3	7.80	42612	27.34
Composite 3	C	10	12/1/2018 10:55:22	11.8	9.14	99.7	7.79	43093	27.68
Composite 3	D	10	12/1/2018 10:55:52	11.6	9.16	99.5	7.79	43345	27.85
Composite 3	E	10	12/1/2018 10:56:16	11.6	9.29	101.1	7.80	43307	27.82
Composite 4	A	10	12/1/2018 10:56:44	11.7	9.12	99.3	7.79	43079	27.66
Composite 4	B	10	12/1/2018 10:57:09	11.5	9.09	98.9	7.79	44069	28.36
Composite 4	C	10	12/1/2018 10:57:32	11.6	9.49	103.1	7.82	43021	27.62
Composite 4	D	10	12/1/2018 10:58:09	11.3	9.20	99.8	7.81	44310	28.52
Composite 4	E	10	12/1/2018 10:58:36	11.9	9.21	100.6	7.82	43037	27.64
Composite 5	A	10	12/1/2018 10:58:55	11.5	9.25	101.2	7.86	45202	29.17
Composite 5	B	10	12/1/2018 10:59:16	11.8	9.15	100.0	7.84	43573	28.02
Composite 5	C	10	12/1/2018 10:59:34	11.9	9.24	100.9	7.83	42794	27.47
Composite 5	D	10	12/1/2018 10:59:57	11.7	8.85	96.9	7.80	44380	28.59
Composite 5	E	10	12/1/2018 11:00:21	11.8	9.27	101.2	7.82	43301	27.82
Composite 6	A	10	12/1/2018 11:00:46	11.8	9.24	100.9	7.82	43110	27.69
Composite 6	B	10	12/1/2018 11:01:09	11.8	9.11	99.6	7.82	43388	27.89
Composite 6	C	10	12/1/2018 11:01:31	11.8	9.26	101.2	7.82	43304	27.83
Composite 6	D	10	12/1/2018 11:01:44	11.9	9.19	100.4	7.82	43000	27.61
Composite 6	E	10	12/1/2018 11:02:05	11.7	9.23	100.6	7.82	43267	27.80

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	11	12/2/2018 12:48:46	12.1	9.12	101.9	7.74	44212	28.48
Laboratory Control	B	11	12/2/2018 12:49:12	12.0	9.15	102.0	7.76	44208	28.48
Laboratory Control	C	11	12/2/2018 12:49:34	12.2	9.32	104.5	7.79	44295	28.55
Laboratory Control	D	11	12/2/2018 12:50:08	12.0	9.32	104.1	7.82	44328	28.56
Laboratory Control	E	11	12/2/2018 12:50:34	11.9	9.22	102.7	7.82	44329	28.56
CLDS Reference	A	11	12/2/2018 12:50:54	11.7	9.49	105.2	7.85	44349	28.57
CLDS Reference	B	11	12/2/2018 12:51:24	11.3	9.49	104.3	7.87	44153	28.41
CLDS Reference	C	11	12/2/2018 12:51:41	11.7	9.40	104.3	7.87	44331	28.55
CLDS Reference	D	11	12/2/2018 12:52:03	11.5	9.42	104.0	7.86	44219	28.47
CLDS Reference	E	11	12/2/2018 12:52:23	11.7	9.30	103.1	7.85	44265	28.51
Composite 2	A	11	12/2/2018 12:52:39	11.7	9.28	102.9	7.86	44224	28.48
Composite 2	B	11	12/2/2018 12:53:01	12.0	9.29	103.7	7.87	44336	28.57
Composite 2	C	11	12/2/2018 12:53:48	12.0	9.18	102.4	7.86	44312	28.55
Composite 2	D	11	12/2/2018 12:54:08	12.0	9.15	102.0	7.86	44273	28.52
Composite 2	E	11	12/2/2018 12:54:30	11.8	8.95	99.4	7.83	44172	28.44
Composite 3	A	11	12/2/2018 12:54:54	11.8	9.02	100.2	7.83	44203	28.47
Composite 3	B	11	12/2/2018 12:55:13	12.0	9.18	102.4	7.85	44301	28.54
Composite 3	C	11	12/2/2018 12:55:33	11.8	9.05	100.6	7.85	44250	28.50
Composite 3	D	11	12/2/2018 12:55:58	11.5	9.13	100.8	7.84	44190	28.45
Composite 3	E	11	12/2/2018 12:56:14	11.6	9.09	100.6	7.83	44205	28.46
Composite 4	A	11	12/2/2018 12:56:29	11.7	9.16	101.7	7.84	44311	28.54
Composite 4	B	11	12/2/2018 12:56:47	11.5	9.10	100.4	7.83	44265	28.50
Composite 4	C	11	12/2/2018 12:57:03	11.6	9.16	101.6	7.84	44499	28.67
Composite 4	D	11	12/2/2018 12:57:22	11.4	9.34	103.0	7.86	44436	28.62
Composite 4	E	11	12/2/2018 12:59:12	11.9	9.08	101.0	7.85	44227	28.49
Composite 5	A	11	12/2/2018 12:59:37	11.5	9.25	102.6	7.91	45228	29.19
Composite 5	B	11	12/2/2018 13:00:02	11.7	9.04	100.2	7.87	44031	28.34
Composite 5	C	11	12/2/2018 13:00:26	11.9	9.19	102.4	7.88	44230	28.49
Composite 5	D	11	12/2/2018 13:00:48	11.7	8.88	98.4	7.84	44284	28.52
Composite 5	E	11	12/2/2018 13:01:15	11.7	9.29	103.1	7.88	44162	28.44
Composite 6	A	11	12/2/2018 13:01:52	11.7	8.92	98.9	7.85	44189	28.45
Composite 6	B	11	12/2/2018 13:02:16	11.8	9.15	101.7	7.86	44180	28.45
Composite 6	C	11	12/2/2018 13:02:42	11.8	9.12	101.3	7.86	44131	28.42
Composite 6	D	11	12/2/2018 13:03:07	11.8	9.16	101.9	7.86	44255	28.51
Composite 6	E	11	12/2/2018 13:03:32	11.7	9.19	101.9	7.86	44164	28.44
Laboratory Control	A	12	12/3/2018 11:57:59	12.0	8.08	92.2	7.69	46822	30.35
Laboratory Control	B	12	12/3/2018 11:58:20	11.6	8.45	95.7	7.67	47004	30.47
Laboratory Control	C	12	12/3/2018 11:58:43	11.4	8.94	100.9	7.73	47016	30.47
Laboratory Control	D	12	12/3/2018 11:58:48	11.4	8.97	101.2	7.73	47023	30.47
Laboratory Control	E	12	12/3/2018 11:59:09	11.3	8.66	97.5	7.71	47034	30.47
CLDS Reference	A	12	12/3/2018 11:59:35	11.3	9.16	103.0	7.79	47023	30.46
CLDS Reference	B	12	12/3/2018 11:59:55	11.3	9.22	103.6	7.81	46946	30.41
CLDS Reference	C	12	12/3/2018 12:00:32	11.6	8.87	100.3	7.83	46876	30.37

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
CLDS Reference	D	12	12/3/2018 12:01:00	11.5	9.07	102.5	7.83	46972	30.44
CLDS Reference	E	12	12/3/2018 12:01:24	11.7	8.89	100.8	7.82	46912	30.40
Composite 2	A	12	12/3/2018 12:02:05	11.7	9.02	102.4	7.84	47038	30.50
Composite 2	B	12	12/3/2018 12:02:50	12.1	7.94	90.8	7.82	46868	30.39
Composite 2	C	12	12/3/2018 12:03:08	12.1	8.18	93.6	7.83	46820	30.36
Composite 2	D	12	12/3/2018 12:03:23	11.8	8.18	93.0	7.80	46859	30.37
Composite 2	E	12	12/3/2018 12:04:38	11.8	8.15	92.6	7.80	46859	30.37
Composite 3	A	12	12/3/2018 12:05:01	11.5	8.88	100.4	7.81	46966	30.43
Composite 3	B	12	12/3/2018 12:05:26	11.7	8.58	97.2	7.82	46855	30.36
Composite 3	C	12	12/3/2018 12:05:51	11.5	8.44	95.2	7.80	46887	30.37
Composite 3	D	12	12/3/2018 12:06:06	11.6	8.45	95.6	7.80	46875	30.37
Composite 3	E	12	12/3/2018 12:06:21	11.8	8.55	96.5	7.82	45112	29.12
Composite 4	A	12	12/3/2018 12:06:32	11.8	8.46	96.2	7.83	46832	30.35
Composite 4	B	12	12/3/2018 12:06:55	11.6	8.30	94.0	7.80	47004	30.47
Composite 4	C	12	12/3/2018 12:07:10	11.7	8.18	92.8	7.80	47053	30.50
Composite 4	D	12	12/3/2018 12:07:34	11.5	8.99	101.5	7.83	47206	30.60
Composite 4	E	12	12/3/2018 12:08:42	12.1	8.26	94.4	7.83	46813	30.35
Composite 5	A	12	12/3/2018 12:09:07	11.7	8.92	101.7	7.91	47932	31.14
Composite 5	B	12	12/3/2018 12:09:35	11.8	8.63	97.9	7.85	46727	30.27
Composite 5	C	12	12/3/2018 12:09:59	12.0	8.74	99.6	7.86	46782	30.32
Composite 5	D	12	12/3/2018 12:10:24	11.8	8.11	92.1	7.83	46912	30.41
Composite 5	E	12	12/3/2018 12:10:47	11.8	8.92	101.3	7.86	46797	30.33
Composite 6	A	12	12/3/2018 12:11:14	11.7	8.21	93.1	7.83	46807	30.33
Composite 6	B	12	12/3/2018 12:11:39	11.9	8.58	97.6	7.85	46788	30.32
Composite 6	C	12	12/3/2018 12:11:54	11.9	8.57	97.6	7.85	46770	30.31
Composite 6	D	12	12/3/2018 12:12:19	12.0	8.44	96.2	7.85	46803	30.34
Composite 6	E	12	12/3/2018 12:12:40	11.8	8.61	97.7	7.85	46773	30.31
Laboratory Control	A	13	12/4/2018 09:45:54	11.9	7.81	87.6	7.62	46400	30.04
Laboratory Control	B	13	12/4/2018 09:46:16	11.6	8.17	91.0	7.63	46293	29.96
Laboratory Control	C	13	12/4/2018 09:46:32	11.4	8.31	92.1	7.62	46268	29.93
Laboratory Control	D	13	12/4/2018 09:46:54	11.2	8.87	98.0	7.70	46276	29.92
Laboratory Control	E	13	12/4/2018 09:47:17	11.1	8.64	95.3	7.69	46297	29.93
CLDS Reference	A	13	12/4/2018 09:47:38	11.1	9.01	99.3	7.75	46342	29.97
CLDS Reference	B	13	12/4/2018 09:48:12	11.1	9.02	99.3	7.79	46295	29.93
CLDS Reference	C	13	12/4/2018 09:48:35	11.4	8.89	98.7	7.79	46678	30.22
CLDS Reference	D	13	12/4/2018 09:48:59	11.3	8.95	99.0	7.80	46325	29.96
CLDS Reference	E	13	12/4/2018 09:49:22	11.4	8.84	98.1	7.79	46419	30.04
Composite 2	A	13	12/4/2018 09:49:42	11.6	8.79	98.0	7.81	46639	30.20
Composite 2	B	13	12/4/2018 09:49:59	11.6	8.86	98.6	7.82	46200	29.89
Composite 2	C	13	12/4/2018 09:50:58	11.6	7.26	80.8	7.75	46289	29.95
Composite 2	D	13	12/4/2018 09:51:23	11.5	8.42	93.5	7.78	46178	29.87
Composite 2	E	13	12/4/2018 09:51:57	11.4	7.58	84.0	7.74	46157	29.85
Composite 3	A	13	12/4/2018 09:52:15	11.3	7.64	84.4	7.73	46081	29.79

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 3	B	13	12/4/2018 09:52:48	11.1	8.81	97.2	7.80	46183	29.85
Composite 3	C	13	12/4/2018 09:53:13	11.1	8.45	93.1	7.78	46090	29.79
Composite 3	D	13	12/4/2018 09:53:38	11.1	7.88	86.8	7.75	46161	29.83
Composite 3	E	13	12/4/2018 09:53:58	11.1	8.10	89.2	7.74	46129	29.81
Composite 4	A	13	12/4/2018 09:54:23	11.1	8.25	90.9	7.76	46102	29.79
Composite 4	B	13	12/4/2018 09:54:48	11.2	7.78	85.9	7.73	46244	29.90
Composite 4	C	13	12/4/2018 09:55:12	11.2	7.10	78.5	7.70	46188	29.86
Composite 4	D	13	12/4/2018 09:55:40	11.2	8.88	98.3	7.78	46586	30.15
Composite 4	E	13	12/4/2018 09:56:20	11.5	8.13	90.2	7.76	46065	29.78
Composite 5	A	13	12/4/2018 09:56:45	11.4	8.82	98.2	7.90	47087	30.52
Composite 5	B	13	12/4/2018 09:57:14	11.4	8.62	95.6	7.84	45913	29.67
Composite 5	C	13	12/4/2018 09:57:36	11.5	8.78	97.6	7.87	46257	29.92
Composite 5	D	13	12/4/2018 09:58:05	11.4	7.74	85.9	7.81	46162	29.85
Composite 5	E	13	12/4/2018 09:58:30	11.4	8.88	98.4	7.86	46228	29.90
Composite 6	A	13	12/4/2018 09:59:01	11.3	7.75	85.7	7.78	46072	29.78
Composite 6	B	13	12/4/2018 09:59:30	11.4	8.58	95.2	7.80	46288	29.94
Composite 6	C	13	12/4/2018 09:59:54	11.4	8.33	92.4	7.79	46116	29.82
Composite 6	D	13	12/4/2018 10:00:19	11.5	8.34	92.8	7.79	46483	30.09
Composite 6	E	13	12/4/2018 10:00:41	11.4	8.64	95.9	7.80	46300	29.95
Laboratory Control	A	14	12/5/2018 09:57:01	12.1	8.22	91.8	7.68	46619	30.21
Laboratory Control	B	14	12/5/2018 09:57:29	11.9	8.48	94.4	7.69	46501	30.12
Laboratory Control	C	14	12/5/2018 09:57:42	11.5	8.58	94.2	7.68	45842	29.63
Laboratory Control	D	14	12/5/2018 09:58:02	11.2	8.97	97.8	7.71	45562	29.41
Laboratory Control	E	14	12/5/2018 09:58:22	11.1	8.75	95.2	7.70	45473	29.34
CLDS Reference	A	14	12/5/2018 09:59:02	11.1	9.11	99.3	7.76	45858	29.62
CLDS Reference	B	14	12/5/2018 09:59:40	11.2	9.09	99.4	7.78	46061	29.77
CLDS Reference	C	14	12/5/2018 10:00:05	11.8	8.86	98.5	7.79	46783	30.31
CLDS Reference	D	14	12/5/2018 10:00:29	11.4	8.91	97.9	7.79	46182	29.87
CLDS Reference	E	14	12/5/2018 10:00:55	11.7	8.77	97.1	7.78	46644	30.21
Composite 2	A	14	12/5/2018 10:01:18	11.9	8.73	97.1	7.80	46766	30.30
Composite 2	B	14	12/5/2018 10:01:42	11.6	8.88	98.1	7.80	46476	30.08
Composite 2	C	14	12/5/2018 10:02:45	11.7	7.83	86.6	7.76	46293	29.96
Composite 2	D	14	12/5/2018 10:03:09	11.7	8.52	94.3	7.79	46383	30.02
Composite 2	E	14	12/5/2018 10:03:31	11.4	7.94	87.0	7.76	45797	29.59
Composite 3	A	14	12/5/2018 10:03:50	11.3	8.02	87.8	7.76	45810	29.59
Composite 3	B	14	12/5/2018 10:04:14	11.1	8.85	96.1	7.79	45389	29.28
Composite 3	C	14	12/5/2018 10:04:40	11.1	8.39	91.0	7.77	45188	29.14
Composite 3	D	14	12/5/2018 10:05:04	11.2	8.57	93.7	7.78	46131	29.82
Composite 3	E	14	12/5/2018 10:05:28	11.1	8.60	93.6	7.79	45450	29.33
Composite 4	A	14	12/5/2018 10:05:54	11.1	8.60	93.4	7.77	45259	29.19
Composite 4	B	14	12/5/2018 10:06:15	11.1	8.27	90.2	7.75	45755	29.55
Composite 4	C	14	12/5/2018 10:06:35	11.2	8.07	88.0	7.73	45768	29.56
Composite 4	D	14	12/5/2018 10:06:59	11.2	8.94	97.7	7.78	46059	29.77

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	E	14	12/5/2018 10:07:35	11.3	8.19	89.4	7.75	45176	29.14
Composite 5	A	14	12/5/2018 10:08:00	11.3	8.87	97.1	7.88	46124	29.82
Composite 5	B	14	12/5/2018 10:08:19	11.4	8.73	95.3	7.85	44987	29.01
Composite 5	C	14	12/5/2018 10:08:44	11.7	8.72	96.5	7.85	46453	30.07
Composite 5	D	14	12/5/2018 10:09:06	11.5	8.08	88.7	7.82	45687	29.51
Composite 5	E	14	12/5/2018 10:09:31	11.5	8.86	97.7	7.84	46297	29.95
Composite 6	A	14	12/5/2018 10:10:11	11.6	8.25	91.1	7.78	46310	29.97
Composite 6	B	14	12/5/2018 10:10:38	11.8	8.62	95.6	7.80	46519	30.12
Composite 6	C	14	12/5/2018 10:11:03	11.7	8.60	95.2	7.80	46340	29.99
Composite 6	D	14	12/5/2018 10:11:26	11.8	8.64	96.0	7.81	46664	30.23
Composite 6	E	14	12/5/2018 10:11:52	11.6	8.66	95.7	7.80	46515	30.11
Laboratory Control	A	15	12/6/2018 09:59:23	11.9	7.99	89.5	7.66	47599	30.91
Laboratory Control	B	15	12/6/2018 09:59:50	11.8	8.34	93.2	7.69	47493	30.83
Laboratory Control	C	15	12/6/2018 10:00:22	11.4	8.42	93.0	7.66	47148	30.56
Laboratory Control	D	15	12/6/2018 10:00:45	11.1	8.98	98.5	7.69	46801	30.30
Laboratory Control	E	15	12/6/2018 10:01:06	11.4	8.55	94.6	7.70	47317	30.68
CLDS Reference	A	15	12/6/2018 10:01:31	11.1	8.99	98.7	7.73	47216	30.59
CLDS Reference	B	15	12/6/2018 10:02:06	11.1	9.06	99.6	7.76	47414	30.74
CLDS Reference	C	15	12/6/2018 10:02:29	11.7	8.84	98.3	7.78	47368	30.73
CLDS Reference	D	15	12/6/2018 10:02:49	11.3	8.87	97.9	7.77	47490	30.80
CLDS Reference	E	15	12/6/2018 10:03:16	11.5	8.74	97.0	7.77	47552	30.86
Composite 2	A	15	12/6/2018 10:03:40	11.7	8.75	97.5	7.79	47392	30.75
Composite 2	B	15	12/6/2018 10:03:57	11.5	8.88	98.6	7.78	47713	30.97
Composite 2	C	15	12/6/2018 10:04:24	11.6	8.57	95.2	7.78	47520	30.83
Composite 2	D	15	12/6/2018 10:04:58	11.6	8.53	94.7	7.79	47487	30.81
Composite 2	E	15	12/6/2018 10:05:20	11.4	8.25	91.1	7.78	47052	30.49
Composite 3	A	15	12/6/2018 10:05:38	11.2	8.11	89.2	7.76	47075	30.50
Composite 3	B	15	12/6/2018 10:05:58	11.0	8.80	96.2	7.78	46612	30.15
Composite 3	C	15	12/6/2018 10:06:21	11.0	8.34	91.1	7.77	46355	29.97
Composite 3	D	15	12/6/2018 10:06:44	11.2	8.51	93.7	7.78	47388	30.72
Composite 3	E	15	12/6/2018 10:07:05	11.1	8.52	93.5	7.79	46997	30.44
Composite 4	A	15	12/6/2018 10:07:26	11.0	8.59	93.9	7.77	46554	30.11
Composite 4	B	15	12/6/2018 10:07:38	11.0	8.51	93.3	7.76	47051	30.47
Composite 4	C	15	12/6/2018 10:08:00	11.1	8.17	89.7	7.74	47134	30.53
Composite 4	D	15	12/6/2018 10:08:26	11.1	8.95	98.3	7.76	47438	30.75
Composite 4	E	15	12/6/2018 10:08:57	11.3	8.12	89.2	7.74	46360	29.99
Composite 5	A	15	12/6/2018 10:09:25	11.2	8.87	97.7	7.87	47274	30.64
Composite 5	B	15	12/6/2018 10:09:46	11.3	8.57	94.1	7.85	46138	29.83
Composite 5	C	15	12/6/2018 10:10:11	11.4	8.76	97.0	7.85	47509	30.82
Composite 5	D	15	12/6/2018 10:10:30	11.4	8.15	90.0	7.83	46859	30.35
Composite 5	E	15	12/6/2018 10:10:54	11.4	8.83	97.7	7.83	47431	30.76
Composite 6	A	15	12/6/2018 10:11:18	11.2	8.05	88.7	7.78	47486	30.79
Composite 6	B	15	12/6/2018 10:11:34	11.6	8.33	92.6	7.79	47442	30.78

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	C	15	12/6/2018 10:11:52	11.5	8.50	94.2	7.79	47469	30.79
Composite 6	D	15	12/6/2018 10:12:15	11.6	8.59	95.4	7.80	47452	30.79
Composite 6	E	15	12/6/2018 10:12:36	11.3	8.48	93.7	7.78	47630	30.90
Laboratory Control	A	16	12/7/2018 09:55:19	11.9	8.86	97.7	7.14	44889	28.96
Laboratory Control	B	16	12/7/2018 09:55:40	11.8	9.12	100.4	7.30	44753	28.86
Laboratory Control	C	16	12/7/2018 09:55:57	11.7	9.12	100.0	7.36	44772	28.87
Laboratory Control	D	16	12/7/2018 09:56:13	11.8	9.31	102.2	7.45	44541	28.71
Laboratory Control	E	16	12/7/2018 09:56:36	11.4	9.18	100.1	7.49	44887	28.94
CLDS Reference	A	16	12/7/2018 09:56:58	11.3	9.45	102.8	7.57	44813	28.88
CLDS Reference	B	16	12/7/2018 09:57:16	11.4	9.45	103.0	7.61	44724	28.82
CLDS Reference	C	16	12/7/2018 09:57:33	11.6	9.38	102.6	7.63	44562	28.72
CLDS Reference	D	16	12/7/2018 09:57:51	11.5	9.33	102.0	7.65	44859	28.92
CLDS Reference	E	16	12/7/2018 09:58:07	11.5	9.29	101.6	7.65	45026	29.04
Composite 2	A	16	12/7/2018 09:58:28	11.7	9.21	101.0	7.68	44704	28.82
Composite 2	B	16	12/7/2018 09:58:39	11.8	9.25	101.6	7.69	44513	28.69
Composite 2	C	16	12/7/2018 09:59:00	12.0	9.21	101.5	7.70	44474	28.67
Composite 2	D	16	12/7/2018 09:59:13	11.9	9.09	100.0	7.71	44733	28.85
Composite 2	E	16	12/7/2018 09:59:33	12.0	9.16	101.0	7.72	44487	28.68
Composite 3	A	16	12/7/2018 09:59:47	12.0	9.19	101.3	7.73	44505	28.69
Composite 3	B	16	12/7/2018 10:00:08	11.9	9.18	101.0	7.74	44512	28.69
Composite 3	C	16	12/7/2018 10:00:24	11.8	9.14	100.4	7.74	44523	28.70
Composite 3	D	16	12/7/2018 10:00:50	11.8	9.13	100.3	7.75	44561	28.72
Composite 3	E	16	12/7/2018 10:01:10	11.6	9.00	98.5	7.75	44794	28.88
Composite 4	A	16	12/7/2018 10:01:26	11.7	9.15	100.2	7.76	44606	28.75
Composite 4	B	16	12/7/2018 10:01:43	11.5	9.09	99.4	7.75	44842	28.91
Composite 4	C	16	12/7/2018 10:02:05	11.5	8.97	98.0	7.74	44855	28.92
Composite 4	D	16	12/7/2018 10:02:30	11.3	9.26	101.0	7.76	45532	29.39
Composite 4	E	16	12/7/2018 10:03:03	11.9	9.04	99.5	7.77	44549	28.72
Composite 5	A	16	12/7/2018 10:03:17	11.7	9.13	100.3	7.83	45150	29.14
Composite 5	B	16	12/7/2018 10:03:30	12.1	9.09	100.3	7.82	44438	28.65
Composite 5	C	16	12/7/2018 10:03:48	11.9	9.11	100.3	7.82	44589	28.75
Composite 5	D	16	12/7/2018 10:04:08	11.7	8.41	92.4	7.80	45051	29.07
Composite 5	E	16	12/7/2018 10:04:28	11.8	9.16	100.7	7.82	44597	28.75
Composite 6	A	16	12/7/2018 10:04:57	11.9	9.18	101.0	7.80	44501	28.68
Composite 6	B	16	12/7/2018 10:05:11	11.7	9.09	99.9	7.79	44858	28.93
Composite 6	C	16	12/7/2018 10:05:32	11.7	9.09	99.8	7.79	44890	28.95
Composite 6	D	16	12/7/2018 10:05:45	11.7	9.01	98.9	7.79	45023	29.05
Composite 6	E	16	12/7/2018 10:06:05	11.7	9.04	99.1	7.79	44852	28.93
Laboratory Control	A	17	12/8/2018 09:52:16	12.0	8.62	94.1	7.72	44165	28.45
Laboratory Control	B	17	12/8/2018 09:52:34	11.9	8.91	97.1	7.74	44116	28.41
Laboratory Control	C	17	12/8/2018 09:53:05	11.8	8.89	96.6	7.73	44185	28.45
Laboratory Control	D	17	12/8/2018 09:53:29	11.9	9.19	100.0	7.77	44049	28.36

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	E	17	12/8/2018 09:53:50	11.6	9.04	97.9	7.76	44235	28.48
CLDS Reference	A	17	12/8/2018 09:54:13	11.5	9.21	99.5	7.79	44277	28.51
CLDS Reference	B	17	12/8/2018 09:54:31	11.6	9.31	100.7	7.80	44163	28.43
CLDS Reference	C	17	12/8/2018 09:54:53	11.8	9.19	99.9	7.81	44049	28.36
CLDS Reference	D	17	12/8/2018 09:55:07	11.7	9.23	100.0	7.81	44209	28.47
CLDS Reference	E	17	12/8/2018 09:55:29	11.7	9.15	99.3	7.81	44324	28.55
Composite 2	A	17	12/8/2018 09:55:49	11.8	9.13	99.2	7.82	44135	28.42
Composite 2	B	17	12/8/2018 09:56:10	12.0	9.22	100.6	7.82	44036	28.35
Composite 2	C	17	12/8/2018 09:56:47	12.0	9.15	99.8	7.82	44026	28.35
Composite 2	D	17	12/8/2018 09:57:03	11.9	9.07	98.8	7.83	44125	28.42
Composite 2	E	17	12/8/2018 09:57:25	12.0	9.14	99.8	7.83	44017	28.34
Composite 3	A	17	12/8/2018 09:57:39	12.0	9.19	100.3	7.83	44009	28.34
Composite 3	B	17	12/8/2018 09:58:01	11.9	9.15	99.7	7.83	44044	28.36
Composite 3	C	17	12/8/2018 09:58:20	11.9	9.09	99.0	7.83	44018	28.34
Composite 3	D	17	12/8/2018 09:58:43	11.9	9.09	98.8	7.84	44044	28.36
Composite 3	E	17	12/8/2018 09:59:06	11.6	8.94	96.9	7.83	44210	28.46
Composite 4	A	17	12/8/2018 09:59:19	11.7	9.08	98.5	7.83	44079	28.38
Composite 4	B	17	12/8/2018 09:59:33	11.5	8.97	96.9	7.82	44339	28.55
Composite 4	C	17	12/8/2018 09:59:54	11.6	8.85	95.7	7.81	44209	28.46
Composite 4	D	17	12/8/2018 10:00:07	11.5	9.13	98.7	7.82	44458	28.64
Composite 4	E	17	12/8/2018 10:00:58	11.9	9.07	98.8	7.83	44053	28.36
Composite 5	A	17	12/8/2018 10:01:17	11.7	8.92	97.1	7.88	44756	28.86
Composite 5	B	17	12/8/2018 10:01:34	12.1	9.04	98.8	7.87	43993	28.33
Composite 5	C	17	12/8/2018 10:01:55	11.9	9.10	99.1	7.88	44083	28.39
Composite 5	D	17	12/8/2018 10:02:14	11.7	8.39	91.1	7.86	44675	28.80
Composite 5	E	17	12/8/2018 10:02:35	11.8	9.11	98.9	7.87	44108	28.40
Composite 6	A	17	12/8/2018 10:03:00	12.0	9.12	99.4	7.85	44014	28.34
Composite 6	B	17	12/8/2018 10:03:18	11.7	8.55	92.8	7.81	44419	28.62
Composite 6	C	17	12/8/2018 10:03:39	11.8	8.95	97.2	7.83	44249	28.50
Composite 6	D	17	12/8/2018 10:04:00	11.9	9.18	99.9	7.83	44070	28.38
Composite 6	E	17	12/8/2018 10:04:14	11.7	9.04	98.2	7.83	44201	28.46
Laboratory Control	A	18	12/9/2018 12:36:47	12.1	8.71	95.6	7.63	43489	27.97
Laboratory Control	B	18	12/9/2018 12:37:02	12.0	8.74	95.5	7.63	43444	27.93
Laboratory Control	C	18	12/9/2018 12:37:24	11.8	9.00	98.1	7.64	43460	27.94
Laboratory Control	D	18	12/9/2018 12:37:45	11.9	9.37	102.4	7.70	43654	28.08
Laboratory Control	E	18	12/9/2018 12:38:03	11.7	9.26	100.6	7.70	43581	28.02
CLDS Reference	A	18	12/9/2018 12:38:19	11.5	9.42	102.1	7.73	43563	28.00
CLDS Reference	B	18	12/9/2018 12:38:50	11.6	9.31	101.0	7.76	43599	28.03
CLDS Reference	C	18	12/9/2018 12:39:11	11.8	9.44	103.1	7.77	43676	28.09
CLDS Reference	D	18	12/9/2018 12:39:27	11.7	9.34	101.5	7.76	43524	27.98
CLDS Reference	E	18	12/9/2018 12:39:49	11.8	9.34	101.8	7.76	43572	28.02
Composite 2	A	18	12/9/2018 12:40:09	11.9	9.20	100.6	7.77	43615	28.05
Composite 2	B	18	12/9/2018 12:40:27	12.0	9.33	102.2	7.78	43700	28.12

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 2	C	18	12/9/2018 12:42:15	12.1	9.34	102.5	7.80	43694	28.12
Composite 2	D	18	12/9/2018 12:42:37	12.0	9.15	100.2	7.80	43613	28.06
Composite 2	E	18	12/9/2018 12:42:58	12.1	9.26	101.7	7.80	43657	28.09
Composite 3	A	18	12/9/2018 12:43:19	12.1	9.34	102.6	7.81	43671	28.10
Composite 3	B	18	12/9/2018 12:43:35	12.0	9.26	101.4	7.81	43649	28.08
Composite 3	C	18	12/9/2018 12:44:03	12.0	9.22	100.9	7.82	43646	28.08
Composite 3	D	18	12/9/2018 12:44:23	11.9	9.27	101.4	7.82	43663	28.09
Composite 3	E	18	12/9/2018 12:44:42	11.7	8.96	97.3	7.81	43481	27.95
Composite 4	A	18	12/9/2018 12:45:47	11.8	9.13	99.5	7.81	43596	28.03
Composite 4	B	18	12/9/2018 12:46:08	11.6	8.95	97.2	7.79	43527	27.98
Composite 4	C	18	12/9/2018 12:46:21	11.7	8.89	96.7	7.78	43543	27.99
Composite 4	D	18	12/9/2018 12:46:38	11.6	9.27	100.7	7.80	43696	28.10
Composite 4	E	18	12/9/2018 12:47:31	12.0	9.05	98.9	7.80	43585	28.03
Composite 5	A	18	12/9/2018 12:48:12	11.8	8.59	93.8	7.87	43815	28.19
Composite 5	B	18	12/9/2018 12:48:35	12.2	9.25	101.6	7.85	43660	28.10
Composite 5	C	18	12/9/2018 12:48:56	12.0	9.11	99.7	7.86	43498	27.97
Composite 5	D	18	12/9/2018 12:49:19	11.8	8.39	91.5	7.84	43736	28.14
Composite 5	E	18	12/9/2018 12:49:40	11.9	9.22	100.8	7.85	43558	28.01
Composite 6	A	18	12/9/2018 12:50:05	12.0	9.21	100.9	7.83	43623	28.06
Composite 6	B	18	12/9/2018 12:50:28	11.7	8.82	95.9	7.80	43493	27.96
Composite 6	C	18	12/9/2018 12:50:47	11.8	9.09	99.1	7.81	43437	27.92
Composite 6	D	18	12/9/2018 12:51:04	12.0	9.20	100.8	7.82	43792	28.18
Composite 6	E	18	12/9/2018 12:51:25	11.8	9.04	98.4	7.80	43432	27.92
Laboratory Control	A	19	12/10/2018 11:05:29	12.0	8.78	96.5	7.73	42893	27.54
Laboratory Control	B	19	12/10/2018 11:05:49	11.7	8.73	95.3	7.71	42770	27.45
Laboratory Control	C	19	12/10/2018 11:06:04	11.6	9.00	98.0	7.71	42793	27.46
Laboratory Control	D	19	12/10/2018 11:06:21	11.8	9.32	101.8	7.75	42790	27.46
Laboratory Control	E	19	12/10/2018 11:06:43	11.5	9.18	99.7	7.75	42932	27.55
CLDS Reference	A	19	12/10/2018 11:06:59	11.3	9.40	101.6	7.78	42921	27.54
CLDS Reference	B	19	12/10/2018 11:07:30	11.3	9.34	101.1	7.80	42971	27.57
CLDS Reference	C	19	12/10/2018 11:07:53	11.7	9.36	102.2	7.81	42986	27.60
CLDS Reference	D	19	12/10/2018 11:08:15	11.4	9.36	101.4	7.81	42886	27.52
CLDS Reference	E	19	12/10/2018 11:08:32	11.5	9.31	101.1	7.81	42934	27.55
Composite 2	A	19	12/10/2018 11:08:48	11.7	9.20	100.4	7.82	42873	27.52
Composite 2	B	19	12/10/2018 11:09:13	11.9	9.25	101.4	7.82	42989	27.61
Composite 2	C	19	12/10/2018 11:09:54	12.1	9.07	99.8	7.82	42962	27.60
Composite 2	D	19	12/10/2018 11:10:06	11.9	9.15	100.2	7.82	42929	27.56
Composite 2	E	19	12/10/2018 11:10:16	12.0	9.13	100.2	7.82	42934	27.57
Composite 3	A	19	12/10/2018 11:10:30	12.1	9.24	101.7	7.82	42941	27.58
Composite 3	B	19	12/10/2018 11:10:49	11.9	9.20	100.8	7.83	42946	27.58
Composite 3	C	19	12/10/2018 11:11:04	11.9	9.21	100.9	7.83	42945	27.58
Composite 3	D	19	12/10/2018 11:11:28	11.8	9.26	101.4	7.83	42971	27.59
Composite 3	E	19	12/10/2018 11:11:52	11.4	8.98	97.4	7.83	42823	27.47

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	A	19	12/10/2018 11:12:13	11.5	9.13	99.1	7.83	42931	27.55
Composite 4	B	19	12/10/2018 11:12:30	11.4	9.03	97.9	7.82	42880	27.51
Composite 4	C	19	12/10/2018 11:12:46	11.4	8.88	96.3	7.80	42907	27.53
Composite 4	D	19	12/10/2018 11:13:03	11.4	9.29	100.8	7.82	43045	27.63
Composite 4	E	19	12/10/2018 11:13:47	11.8	9.04	98.8	7.82	42970	27.59
Composite 5	A	19	12/10/2018 11:14:02	11.6	8.92	97.2	7.87	42919	27.55
Composite 5	B	19	12/10/2018 11:14:22	12.2	9.16	101.0	7.85	42924	27.57
Composite 5	C	19	12/10/2018 11:14:39	11.9	9.10	99.6	7.86	42873	27.52
Composite 5	D	19	12/10/2018 11:14:55	11.7	8.46	92.2	7.84	42815	27.47
Composite 5	E	19	12/10/2018 11:15:16	11.8	9.22	100.9	7.84	42915	27.55
Composite 6	A	19	12/10/2018 11:15:37	11.9	9.11	99.7	7.83	42929	27.56
Composite 6	B	19	12/10/2018 11:15:59	11.5	8.82	95.7	7.81	42591	27.31
Composite 6	C	19	12/10/2018 11:16:27	11.6	8.85	96.2	7.81	42657	27.36
Composite 6	D	19	12/10/2018 11:16:44	11.8	9.13	99.9	7.82	42994	27.61
Composite 6	E	19	12/10/2018 11:17:07	11.6	9.03	98.2	7.81	42757	27.43
Laboratory Control	A	20	12/11/2018 09:14:01	12.1	8.89	99.1	7.75	46219	29.92
Laboratory Control	B	20	12/11/2018 09:14:13	11.8	8.83	97.7	7.73	46332	29.99
Laboratory Control	C	20	12/11/2018 09:14:35	11.6	8.98	98.9	7.73	46383	30.02
Laboratory Control	D	20	12/11/2018 09:14:49	11.4	9.28	102.0	7.75	46547	30.13
Laboratory Control	E	20	12/11/2018 09:15:03	11.5	9.20	101.1	7.75	46400	30.02
CLDS Reference	A	20	12/11/2018 09:15:24	11.3	9.38	102.8	7.78	46476	30.07
CLDS Reference	B	20	12/11/2018 09:15:58	11.4	9.35	102.6	7.79	46450	30.06
CLDS Reference	C	20	12/11/2018 09:16:19	11.8	9.34	103.2	7.81	46131	29.85
CLDS Reference	D	20	12/11/2018 09:16:40	11.5	9.31	102.4	7.80	46554	30.14
CLDS Reference	E	20	12/11/2018 09:17:02	11.5	9.27	102.0	7.80	46582	30.15
Composite 2	A	20	12/11/2018 09:17:24	11.7	9.15	101.2	7.81	46345	30.00
Composite 2	B	20	12/11/2018 09:17:39	11.9	9.18	101.7	7.81	46191	29.89
Composite 2	C	20	12/11/2018 09:22:40	12.2	9.23	103.0	7.83	46026	29.79
Composite 2	D	20	12/11/2018 09:22:48	12.0	9.24	102.7	7.83	46187	29.90
Composite 2	E	20	12/11/2018 09:23:03	12.1	9.15	101.8	7.83	46103	29.84
Composite 3	A	20	12/11/2018 09:23:15	12.2	9.21	102.7	7.83	46032	29.79
Composite 3	B	20	12/11/2018 09:23:36	12.0	9.18	101.9	7.83	46128	29.85
Composite 3	C	20	12/11/2018 09:24:01	11.9	9.13	101.3	7.84	46155	29.87
Composite 3	D	20	12/11/2018 09:24:23	11.9	9.20	102.0	7.84	46116	29.84
Composite 3	E	20	12/11/2018 09:24:44	11.4	8.93	98.0	7.84	46414	30.03
Composite 4	A	20	12/11/2018 09:25:04	11.5	9.06	99.6	7.84	46372	30.00
Composite 4	B	20	12/11/2018 09:25:19	11.4	8.97	98.5	7.83	46546	30.12
Composite 4	C	20	12/11/2018 09:25:36	11.4	8.90	97.7	7.82	46447	30.05
Composite 4	D	20	12/11/2018 09:25:55	11.4	9.27	101.9	7.82	46464	30.07
Composite 4	E	20	12/11/2018 09:27:36	11.8	8.96	99.2	7.82	46372	30.02
Composite 5	A	20	12/11/2018 09:27:55	11.6	8.85	97.8	7.89	46623	30.19
Composite 5	B	20	12/11/2018 09:28:15	12.3	9.10	101.6	7.87	46008	29.78
Composite 5	C	20	12/11/2018 09:28:35	11.9	9.08	100.7	7.87	46263	29.95

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	D	20	12/11/2018 09:28:57	11.6	8.36	92.3	7.85	46391	30.03
Composite 5	E	20	12/11/2018 09:29:16	11.8	9.13	101.1	7.84	46229	29.92
Composite 6	A	20	12/11/2018 09:29:38	11.8	9.12	101.0	7.84	46183	29.89
Composite 6	B	20	12/11/2018 09:29:58	11.4	8.73	95.8	7.82	46180	29.86
Composite 6	C	20	12/11/2018 09:30:20	11.4	8.60	94.4	7.80	46241	29.91
Composite 6	D	20	12/11/2018 09:30:39	11.7	9.05	99.9	7.82	46292	29.96
Composite 6	E	20	12/11/2018 09:30:59	11.5	8.97	98.6	7.81	46353	29.99
Laboratory Control	A	21	12/12/2018 10:09:39	11.9	9.07	101.2	7.69	46305	29.98
Laboratory Control	B	21	12/12/2018 10:10:01	11.7	9.22	102.5	7.71	46449	30.07
Laboratory Control	C	21	12/12/2018 10:10:19	11.5	9.25	102.4	7.71	46587	30.16
Laboratory Control	D	21	12/12/2018 10:10:37	11.3	9.49	104.7	7.73	46844	30.33
Laboratory Control	E	21	12/12/2018 10:10:57	11.4	9.36	103.2	7.74	46428	30.04
CLDS Reference	A	21	12/12/2018 10:11:14	11.2	9.58	105.5	7.76	46607	30.16
CLDS Reference	B	21	12/12/2018 10:11:49	11.3	9.55	105.3	7.78	46425	30.04
CLDS Reference	C	21	12/12/2018 10:12:02	11.7	9.46	104.8	7.80	46062	29.79
CLDS Reference	D	21	12/12/2018 10:12:24	11.3	9.50	104.9	7.79	46641	30.19
CLDS Reference	E	21	12/12/2018 10:12:44	11.4	9.35	103.5	7.79	47152	30.56
Composite 2	A	21	12/12/2018 10:13:06	11.7	9.30	103.2	7.81	46277	29.95
Composite 2	B	21	12/12/2018 10:13:16	11.8	9.33	103.7	7.81	46101	29.82
Composite 2	C	21	12/12/2018 10:13:57	12.1	9.32	104.2	7.82	45986	29.75
Composite 2	D	21	12/12/2018 10:14:12	11.9	9.23	102.9	7.81	46170	29.88
Composite 2	E	21	12/12/2018 10:14:32	12.0	9.20	102.7	7.82	46021	29.78
Composite 3	A	21	12/12/2018 10:14:53	12.1	9.31	104.1	7.82	45991	29.76
Composite 3	B	21	12/12/2018 10:15:09	11.9	9.30	103.6	7.82	46052	29.79
Composite 3	C	21	12/12/2018 10:15:35	11.9	9.12	101.6	7.83	46018	29.77
Composite 3	D	21	12/12/2018 10:15:57	11.8	9.28	103.2	7.83	46078	29.81
Composite 3	E	21	12/12/2018 10:16:14	11.3	9.04	99.7	7.82	46709	30.24
Composite 4	A	21	12/12/2018 10:16:35	11.5	9.26	102.4	7.83	46278	29.94
Composite 4	B	21	12/12/2018 10:16:54	11.4	9.18	101.3	7.82	46583	30.15
Composite 4	C	21	12/12/2018 10:17:16	11.3	9.21	101.6	7.82	46621	30.18
Composite 4	D	21	12/12/2018 10:17:39	11.3	9.40	103.6	7.82	46562	30.13
Composite 4	E	21	12/12/2018 10:18:27	11.7	9.01	100.1	7.82	46333	29.99
Composite 5	A	21	12/12/2018 10:18:48	11.6	8.93	99.3	7.90	47144	30.57
Composite 5	B	21	12/12/2018 10:19:07	12.2	9.23	103.2	7.87	45607	29.49
Composite 5	C	21	12/12/2018 10:19:28	11.9	9.13	101.7	7.86	46217	29.91
Composite 5	D	21	12/12/2018 10:19:50	11.6	8.34	92.6	7.82	46890	30.38
Composite 5	E	21	12/12/2018 10:20:12	11.6	9.26	102.7	7.84	46274	29.94
Composite 6	A	21	12/12/2018 10:20:34	11.7	9.18	102.0	7.83	46101	29.82
Composite 6	B	21	12/12/2018 10:20:56	11.4	8.74	96.6	7.81	46738	30.26
Composite 6	C	21	12/12/2018 10:21:13	11.4	8.46	93.4	7.79	46784	30.29
Composite 6	D	21	12/12/2018 10:21:32	11.5	9.17	101.5	7.81	46379	30.01
Composite 6	E	21	12/12/2018 10:21:53	11.4	9.01	99.6	7.80	46699	30.23

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	22	12/13/2018 08:45:59	12.1	8.72	95.9	7.55	46081	29.82
Laboratory Control	B	22	12/13/2018 08:46:22	11.9	9.03	99.0	7.59	46053	29.80
Laboratory Control	C	22	12/13/2018 08:46:37	11.7	9.06	99.0	7.60	46262	29.94
Laboratory Control	D	22	12/13/2018 08:46:51	11.6	9.25	100.8	7.61	46629	30.19
Laboratory Control	E	22	12/13/2018 08:47:15	11.7	9.19	100.2	7.64	46027	29.77
CLDS Reference	A	22	12/13/2018 08:47:29	11.6	9.33	101.7	7.65	46239	29.92
CLDS Reference	B	22	12/13/2018 08:48:00	11.6	9.34	101.7	7.68	46019	29.76
CLDS Reference	C	22	12/13/2018 08:48:20	12.0	9.35	102.3	7.70	45609	29.48
CLDS Reference	D	22	12/13/2018 08:48:34	11.6	9.33	101.7	7.69	46480	30.09
CLDS Reference	E	22	12/13/2018 08:48:53	11.6	9.22	100.9	7.69	47335	30.70
Composite 2	A	22	12/13/2018 08:49:06	11.9	9.20	100.6	7.71	45888	29.68
Composite 2	B	22	12/13/2018 08:49:29	12.1	9.20	101.1	7.71	45684	29.54
Composite 2	C	22	12/13/2018 08:50:05	12.2	9.23	101.5	7.71	45538	29.44
Composite 2	D	22	12/13/2018 08:50:17	11.9	9.06	99.1	7.70	45899	29.68
Composite 2	E	22	12/13/2018 08:50:28	12.2	9.07	99.7	7.71	45567	29.46
Composite 3	A	22	12/13/2018 08:50:50	12.2	9.26	101.9	7.72	45545	29.44
Composite 3	B	22	12/13/2018 08:51:09	12.1	9.17	100.6	7.72	45594	29.47
Composite 3	C	22	12/13/2018 08:51:24	12.0	9.18	100.6	7.73	45585	29.47
Composite 3	D	22	12/13/2018 08:51:46	12.0	9.21	100.8	7.73	45559	29.44
Composite 3	E	22	12/13/2018 08:52:07	11.5	8.87	96.4	7.73	46410	30.03
Composite 4	A	22	12/13/2018 08:52:29	11.7	9.18	100.0	7.74	45765	29.58
Composite 4	B	22	12/13/2018 08:52:44	11.5	9.13	99.1	7.73	46154	29.85
Composite 4	C	22	12/13/2018 08:53:02	11.4	9.39	101.9	7.74	46257	29.92
Composite 4	D	22	12/13/2018 08:53:16	11.7	9.22	100.5	7.74	46087	29.81
Composite 4	E	22	12/13/2018 08:54:05	11.8	8.95	97.8	7.74	45912	29.69
Composite 5	A	22	12/13/2018 08:54:27	11.7	8.86	97.0	7.83	47239	30.64
Composite 5	B	22	12/13/2018 08:54:53	12.3	9.18	101.1	7.78	45485	29.40
Composite 5	C	22	12/13/2018 08:55:15	11.9	9.11	99.7	7.78	45805	29.62
Composite 5	D	22	12/13/2018 08:55:39	11.6	7.91	86.4	7.72	46941	30.42
Composite 5	E	22	12/13/2018 08:56:02	11.6	9.17	99.7	7.75	46054	29.78
Composite 6	A	22	12/13/2018 08:56:24	11.7	9.09	99.0	7.75	45798	29.60
Composite 6	B	22	12/13/2018 08:56:45	11.4	8.65	94.0	7.73	46804	30.31
Composite 6	C	22	12/13/2018 08:57:08	11.4	8.28	90.0	7.70	46847	30.34
Composite 6	D	22	12/13/2018 08:57:30	11.6	9.15	99.5	7.74	45824	29.62
Composite 6	E	22	12/13/2018 08:57:51	11.4	8.92	97.0	7.72	46633	30.19
Laboratory Control	A	23	12/14/2018 11:47:02	12.0	8.83	97.2	7.57	46117	29.85
Laboratory Control	B	23	12/14/2018 11:47:23	11.7	9.02	98.8	7.59	46421	30.05
Laboratory Control	C	23	12/14/2018 11:47:44	11.5	9.05	98.8	7.58	46696	30.24
Laboratory Control	D	23	12/14/2018 11:48:05	11.3	9.31	101.4	7.61	47160	30.56
Laboratory Control	E	23	12/14/2018 11:48:25	11.3	9.25	100.4	7.63	46445	30.05
CLDS Reference	A	23	12/14/2018 11:48:45	11.2	9.42	102.1	7.66	46619	30.17
CLDS Reference	B	23	12/14/2018 11:49:07	11.3	9.43	102.3	7.69	46380	30.00
CLDS Reference	C	23	12/14/2018 11:49:19	11.6	9.38	102.2	7.69	46052	29.78

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
CLDS Reference	D	23	12/14/2018 11:49:40	11.3	9.29	101.1	7.69	47254	30.63
CLDS Reference	E	23	12/14/2018 11:49:57	11.4	9.24	101.2	7.68	48180	31.30
Composite 2	A	23	12/14/2018 11:50:20	11.6	9.22	100.7	7.71	46250	29.92
Composite 2	B	23	12/14/2018 11:50:41	11.8	9.26	101.3	7.71	46045	29.78
Composite 2	C	23	12/14/2018 11:51:27	12.0	9.20	101.1	7.71	45972	29.74
Composite 2	D	23	12/14/2018 11:51:51	11.8	8.99	98.6	7.70	46319	29.98
Composite 2	E	23	12/14/2018 11:52:04	12.0	9.06	99.6	7.70	45980	29.75
Composite 3	A	23	12/14/2018 11:52:19	12.0	9.24	101.6	7.71	45954	29.73
Composite 3	B	23	12/14/2018 11:52:40	11.8	9.20	100.8	7.72	46020	29.77
Composite 3	C	23	12/14/2018 11:53:01	11.8	9.18	100.7	7.73	45985	29.74
Composite 3	D	23	12/14/2018 11:53:23	11.7	9.18	100.3	7.73	46018	29.76
Composite 3	E	23	12/14/2018 11:53:46	11.3	8.88	96.6	7.72	46890	30.37
Composite 4	A	23	12/14/2018 11:54:10	11.5	9.20	100.2	7.73	46125	29.83
Composite 4	B	23	12/14/2018 11:54:28	11.4	9.07	98.6	7.72	46512	30.10
Composite 4	C	23	12/14/2018 11:54:48	11.3	7.93	86.3	7.67	46764	30.28
Composite 4	D	23	12/14/2018 11:55:01	11.4	8.86	96.3	7.70	46389	30.01
Composite 4	E	23	12/14/2018 11:55:27	11.7	8.93	97.6	7.71	46303	29.96
Composite 5	A	23	12/14/2018 11:55:49	11.6	8.87	97.7	7.82	47997	31.18
Composite 5	B	23	12/14/2018 11:56:04	12.1	9.03	99.4	7.80	45940	29.72
Composite 5	C	23	12/14/2018 11:56:21	11.8	9.10	99.6	7.79	46177	29.88
Composite 5	D	23	12/14/2018 11:56:40	11.6	8.48	93.2	7.72	47375	30.73
Composite 5	E	23	12/14/2018 11:56:56	11.5	9.13	99.6	7.74	46439	30.06
Composite 6	A	23	12/14/2018 11:57:23	11.6	9.15	99.9	7.75	46127	29.83
Composite 6	B	23	12/14/2018 11:57:45	11.4	8.71	95.2	7.72	47575	30.87
Composite 6	C	23	12/14/2018 11:57:54	11.4	8.71	95.2	7.71	47516	30.82
Composite 6	D	23	12/14/2018 11:58:10	11.5	9.10	99.2	7.73	46179	29.87
Composite 6	E	23	12/14/2018 11:58:31	11.4	8.98	98.1	7.71	47247	30.63
Laboratory Control	A	24	12/15/2018 11:43:08	11.8	8.99	98.9	7.67	44630	28.77
Laboratory Control	B	24	12/15/2018 11:44:07	11.7	9.06	99.5	7.71	44637	28.77
Laboratory Control	C	24	12/15/2018 11:44:23	11.6	9.24	101.3	7.71	44666	28.79
Laboratory Control	D	24	12/15/2018 11:44:40	11.5	9.36	102.4	7.73	44740	28.84
Laboratory Control	E	24	12/15/2018 11:45:02	11.4	9.22	100.6	7.73	44736	28.83
CLDS Reference	A	24	12/15/2018 11:45:20	11.4	9.22	100.5	7.75	44748	28.84
CLDS Reference	B	24	12/15/2018 11:45:34	11.4	9.40	102.5	7.76	44675	28.79
CLDS Reference	C	24	12/15/2018 11:45:55	11.5	9.44	103.1	7.77	44652	28.77
CLDS Reference	D	24	12/15/2018 11:46:17	11.4	9.40	102.7	7.78	44980	29.01
CLDS Reference	E	24	12/15/2018 11:46:31	11.5	9.40	102.9	7.78	44925	28.97
Composite 2	A	24	12/15/2018 11:46:47	11.6	9.17	100.5	7.78	44869	28.93
Composite 2	B	24	12/15/2018 11:47:06	11.7	9.27	101.7	7.78	44630	28.77
Composite 2	C	24	12/15/2018 11:47:30	11.7	9.22	101.2	7.77	44592	28.74
Composite 2	D	24	12/15/2018 11:47:46	11.6	9.11	99.9	7.77	44782	28.87
Composite 2	E	24	12/15/2018 11:48:07	11.6	9.11	99.9	7.76	44642	28.77
Composite 3	A	24	12/15/2018 11:48:22	11.7	9.18	100.8	7.77	44588	28.74

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 3	B	24	12/15/2018 11:48:47	11.5	9.21	100.8	7.78	44694	28.81
Composite 3	C	24	12/15/2018 11:49:01	11.6	9.14	100.0	7.78	44645	28.77
Composite 3	D	24	12/15/2018 11:49:23	11.5	9.08	99.2	7.77	44654	28.78
Composite 3	E	24	12/15/2018 11:49:40	11.4	8.99	98.1	7.77	44971	29.00
Composite 4	A	24	12/15/2018 11:49:57	11.4	9.14	99.9	7.77	44735	28.83
Composite 4	B	24	12/15/2018 11:50:10	11.4	9.15	100.0	7.77	44894	28.95
Composite 4	C	24	12/15/2018 11:50:22	11.5	9.14	99.9	7.77	44701	28.81
Composite 4	D	24	12/15/2018 11:50:39	11.4	9.22	100.7	7.78	44980	29.00
Composite 4	E	24	12/15/2018 11:51:05	11.6	9.03	99.0	7.77	44772	28.87
Composite 5	A	24	12/15/2018 11:51:26	11.7	9.04	99.2	7.80	44856	28.93
Composite 5	B	24	12/15/2018 11:51:40	11.7	9.18	100.9	7.80	44578	28.73
Composite 5	C	24	12/15/2018 11:51:56	11.8	9.09	99.8	7.80	44589	28.74
Composite 5	D	24	12/15/2018 11:52:19	11.9	9.35	103.1	7.79	44445	28.65
Composite 5	E	24	12/15/2018 11:52:40	11.6	9.19	100.7	7.79	44710	28.82
Composite 6	A	24	12/15/2018 11:53:07	11.6	9.10	99.6	7.79	44679	28.80
Composite 6	B	24	12/15/2018 11:53:21	11.6	9.16	100.4	7.79	44823	28.90
Composite 6	C	24	12/15/2018 11:53:36	11.6	9.21	101.0	7.79	44750	28.85
Composite 6	D	24	12/15/2018 11:53:53	11.7	9.20	100.9	7.79	44622	28.76
Composite 6	E	24	12/15/2018 11:54:15	11.7	9.27	101.8	7.79	44567	28.72
Laboratory Control	A	25	12/16/2018 12:15:48	11.9	8.78	96.8	7.66	44077	28.38
Laboratory Control	B	25	12/16/2018 12:16:17	11.8	9.13	100.6	7.69	44332	28.56
Laboratory Control	C	25	12/16/2018 12:16:38	11.7	9.13	100.2	7.69	44351	28.57
Laboratory Control	D	25	12/16/2018 12:17:00	11.5	9.35	102.3	7.72	44390	28.59
Laboratory Control	E	25	12/16/2018 12:17:29	11.4	9.34	101.7	7.72	43600	28.02
CLDS Reference	A	25	12/16/2018 12:17:49	11.4	9.44	103.0	7.75	44423	28.61
CLDS Reference	B	25	12/16/2018 12:18:12	11.3	9.46	103.1	7.77	44391	28.58
CLDS Reference	C	25	12/16/2018 12:18:49	11.5	9.44	103.2	7.78	44356	28.56
CLDS Reference	D	25	12/16/2018 12:19:10	11.5	9.42	103.1	7.78	44502	28.67
CLDS Reference	E	25	12/16/2018 12:19:26	11.6	9.33	102.3	7.77	44505	28.67
Composite 2	A	25	12/16/2018 12:19:47	11.6	9.20	101.0	7.77	44727	28.83
Composite 2	B	25	12/16/2018 12:20:12	11.7	9.25	101.7	7.78	44333	28.56
Composite 2	C	25	12/16/2018 12:21:07	11.8	9.15	100.6	7.78	44329	28.56
Composite 2	D	25	12/16/2018 12:21:28	11.7	9.01	99.1	7.75	44488	28.67
Composite 2	E	25	12/16/2018 12:21:50	11.7	9.05	99.5	7.76	44327	28.55
Composite 3	A	25	12/16/2018 12:22:11	11.8	9.05	99.5	7.76	44319	28.55
Composite 3	B	25	12/16/2018 12:22:33	11.6	9.21	101.1	7.78	44364	28.58
Composite 3	C	25	12/16/2018 12:22:54	11.6	9.12	100.0	7.78	44322	28.55
Composite 3	D	25	12/16/2018 12:23:15	11.5	9.06	99.1	7.77	44393	28.59
Composite 3	E	25	12/16/2018 12:23:30	11.4	9.00	98.5	7.76	44671	28.78
Composite 4	A	25	12/16/2018 12:23:48	11.5	9.10	99.5	7.77	44429	28.62
Composite 4	B	25	12/16/2018 12:24:09	11.5	9.12	99.8	7.76	44468	28.64
Composite 4	C	25	12/16/2018 12:24:31	11.5	9.17	100.4	7.77	44421	28.61
Composite 4	D	25	12/16/2018 12:24:50	11.4	9.25	101.1	7.77	44701	28.81

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	E	25	12/16/2018 12:25:48	11.7	8.93	98.1	7.76	44487	28.67
Composite 5	A	25	12/16/2018 12:26:14	11.7	9.08	100.0	7.80	44451	28.64
Composite 5	B	25	12/16/2018 12:26:35	11.8	9.16	100.8	7.80	44307	28.54
Composite 5	C	25	12/16/2018 12:27:01	11.8	9.11	100.4	7.81	44394	28.61
Composite 5	D	25	12/16/2018 12:27:21	11.8	9.25	102.0	7.80	44423	28.63
Composite 5	E	25	12/16/2018 12:27:45	11.7	9.19	101.0	7.80	44373	28.59
Composite 6	A	25	12/16/2018 12:28:12	11.7	9.09	99.9	7.79	44339	28.56
Composite 6	B	25	12/16/2018 12:28:41	11.7	9.15	100.7	7.79	44400	28.60
Composite 6	C	25	12/16/2018 12:29:03	11.7	9.13	100.3	7.78	44452	28.64
Composite 6	D	25	12/16/2018 12:29:26	11.7	9.13	100.3	7.78	44337	28.56
Composite 6	E	25	12/16/2018 12:29:57	11.7	9.16	100.7	7.79	44283	28.52
Laboratory Control	A	26	12/17/2018 11:55:09	11.8	8.25	93.4	7.64	46557	30.15
Laboratory Control	B	26	12/17/2018 11:55:30	11.7	8.79	99.3	7.68	46656	30.22
Laboratory Control	C	26	12/17/2018 11:55:45	11.6	8.84	99.7	7.70	46712	30.25
Laboratory Control	D	26	12/17/2018 11:56:06	11.4	9.10	102.2	7.73	46716	30.25
Laboratory Control	E	26	12/17/2018 11:56:26	11.3	9.01	101.1	7.73	46703	30.24
CLDS Reference	A	26	12/17/2018 11:56:48	11.3	9.16	102.6	7.77	46798	30.30
CLDS Reference	B	26	12/17/2018 11:57:27	11.1	9.15	102.1	7.78	46688	30.22
CLDS Reference	C	26	12/17/2018 11:57:47	11.4	9.15	102.9	7.80	46858	30.35
CLDS Reference	D	26	12/17/2018 11:58:03	11.4	9.11	102.5	7.80	46852	30.35
CLDS Reference	E	26	12/17/2018 11:58:16	11.4	9.06	101.8	7.80	46720	30.25
Composite 2	A	26	12/17/2018 11:58:38	11.5	8.87	99.7	7.80	46779	30.30
Composite 2	B	26	12/17/2018 11:58:59	11.6	8.94	100.8	7.79	46749	30.28
Composite 2	C	26	12/17/2018 11:59:40	11.8	8.84	100.3	7.79	46980	30.46
Composite 2	D	26	12/17/2018 11:59:55	11.5	8.72	98.0	7.77	46497	30.10
Composite 2	E	26	12/17/2018 12:00:11	11.6	8.62	97.4	7.77	46809	30.33
Composite 3	A	26	12/17/2018 12:00:26	11.7	8.77	99.4	7.78	46945	30.43
Composite 3	B	26	12/17/2018 12:00:47	11.6	8.86	99.9	7.79	46837	30.34
Composite 3	C	26	12/17/2018 12:01:09	11.5	8.79	99.0	7.79	46808	30.32
Composite 3	D	26	12/17/2018 12:01:28	11.4	8.71	97.8	7.78	46913	30.39
Composite 3	E	26	12/17/2018 12:01:51	11.2	8.71	97.4	7.78	46716	30.24
Composite 4	A	26	12/17/2018 12:02:13	11.3	8.80	98.6	7.78	46726	30.25
Composite 4	B	26	12/17/2018 12:02:28	11.3	8.72	97.7	7.78	46695	30.23
Composite 4	C	26	12/17/2018 12:02:44	11.4	8.85	99.4	7.78	46876	30.36
Composite 4	D	26	12/17/2018 12:03:06	11.3	8.98	100.8	7.79	46899	30.38
Composite 4	E	26	12/17/2018 12:03:43	11.5	8.57	96.4	7.77	46573	30.15
Composite 5	A	26	12/17/2018 12:04:09	11.5	8.79	98.8	7.80	46550	30.13
Composite 5	B	26	12/17/2018 12:04:31	11.8	8.83	100.1	7.79	46926	30.42
Composite 5	C	26	12/17/2018 12:04:53	11.8	8.77	99.3	7.81	46923	30.41
Composite 5	D	26	12/17/2018 12:05:14	12.1	8.95	102.3	7.81	47088	30.55
Composite 5	E	26	12/17/2018 12:05:29	11.6	8.94	100.8	7.80	46665	30.22
Composite 6	A	26	12/17/2018 12:05:51	11.6	8.76	98.9	7.80	46805	30.32
Composite 6	B	26	12/17/2018 12:06:16	11.5	8.83	99.4	7.80	46662	30.22

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	C	26	12/17/2018 12:06:42	11.5	8.78	98.7	7.80	46594	30.16
Composite 6	D	26	12/17/2018 12:07:00	11.6	8.82	99.4	7.80	46785	30.31
Composite 6	E	26	12/17/2018 12:07:16	11.4	8.75	98.2	7.79	46512	30.10
Laboratory Control	A	27	12/18/2018 08:22:53	11.8	8.22	92.0	7.46	45694	29.53
Laboratory Control	B	27	12/18/2018 08:23:12	11.7	8.93	99.8	7.53	45852	29.64
Laboratory Control	C	27	12/18/2018 08:23:34	11.6	8.87	99.0	7.55	45932	29.69
Laboratory Control	D	27	12/18/2018 08:23:52	11.3	9.19	102.0	7.60	45944	29.69
Laboratory Control	E	27	12/18/2018 08:24:09	11.2	9.17	101.5	7.61	45927	29.67
CLDS Reference	A	27	12/18/2018 08:25:54	11.8	8.26	92.4	7.62	45690	29.53
CLDS Reference	B	27	12/18/2018 08:26:20	11.7	8.91	99.6	7.65	45843	29.63
CLDS Reference	C	27	12/18/2018 08:26:33	11.6	8.89	99.2	7.65	45932	29.69
CLDS Reference	D	27	12/18/2018 08:26:51	11.3	9.19	101.9	7.69	45937	29.69
CLDS Reference	E	27	12/18/2018 08:27:12	11.2	9.15	101.3	7.69	45929	29.68
Composite 2	A	27	12/18/2018 08:27:35	11.2	9.33	103.2	7.73	46038	29.75
Composite 2	B	27	12/18/2018 08:28:11	11.1	9.30	102.6	7.76	45946	29.68
Composite 2	C	27	12/18/2018 08:28:32	11.3	9.34	103.7	7.77	46077	29.79
Composite 2	D	27	12/18/2018 08:28:48	11.3	9.30	103.3	7.77	46084	29.79
Composite 2	E	27	12/18/2018 08:29:02	11.3	9.26	102.8	7.77	45931	29.68
Composite 3	A	27	12/18/2018 08:29:17	11.4	9.07	100.8	7.76	45941	29.69
Composite 3	B	27	12/18/2018 08:29:38	11.5	9.10	101.3	7.76	46016	29.75
Composite 3	C	27	12/18/2018 08:33:36	11.8	8.84	99.1	7.75	46132	29.85
Composite 3	D	27	12/18/2018 08:33:55	11.6	8.76	97.5	7.74	45637	29.48
Composite 3	E	27	12/18/2018 08:34:11	11.7	8.60	96.3	7.73	45996	29.75
Composite 4	A	27	12/18/2018 08:34:25	11.9	8.71	97.8	7.74	46083	29.82
Composite 4	B	27	12/18/2018 08:34:37	11.6	8.92	99.6	7.75	46044	29.78
Composite 4	C	27	12/18/2018 08:34:58	11.6	8.84	98.6	7.76	46020	29.76
Composite 4	D	27	12/18/2018 08:35:20	11.4	8.71	96.9	7.75	46074	29.79
Composite 4	E	27	12/18/2018 08:35:37	11.2	8.75	96.7	7.75	45844	29.61
Composite 5	A	27	12/18/2018 08:35:52	11.3	8.83	97.9	7.75	45945	29.69
Composite 5	B	27	12/18/2018 08:36:07	11.3	8.74	97.0	7.75	45927	29.68
Composite 5	C	27	12/18/2018 08:36:24	11.3	9.00	99.8	7.76	46122	29.82
Composite 5	D	27	12/18/2018 08:36:38	11.1	9.14	101.0	7.77	46088	29.79
Composite 5	E	27	12/18/2018 08:44:06	11.5	8.54	95.1	7.74	45767	29.57
Composite 6	A	27	12/18/2018 08:44:28	11.6	8.88	98.9	7.79	45681	29.51
Composite 6	B	27	12/18/2018 08:44:40	12.0	8.87	99.8	7.79	46064	29.81
Composite 6	C	27	12/18/2018 08:44:54	12.0	8.86	99.7	7.80	46025	29.78
Composite 6	D	27	12/18/2018 08:45:16	12.4	8.97	101.8	7.79	46087	29.84
Composite 6	E	27	12/18/2018 08:45:38	11.7	9.02	100.8	7.80	45887	29.67
Laboratory Control	A	28	12/19/2018 09:17:47	12.1	8.49	94.4	7.55	45192	29.19
Laboratory Control	B	28	12/19/2018 09:18:25	12.0	8.97	99.6	7.62	45279	29.25
Laboratory Control	C	28	12/19/2018 09:18:58	11.8	8.99	99.4	7.63	45312	29.26
Laboratory Control	D	28	12/19/2018 09:20:12	11.4	9.19	100.8	7.69	45292	29.23

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.6	8.83	97.6		45650	29.50
Minimum:	11.0	5.26	57.7	7.14	40364	25.74
Maximum:	12.4	9.58	105.5	8.00	49139	32.01

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	E	28	12/19/2018 09:20:42	11.4	9.07	99.3	7.68	45286	29.22
CLDS Reference	A	28	12/19/2018 09:21:10	11.3	9.31	101.9	7.73	45406	29.31
CLDS Reference	B	28	12/19/2018 09:21:46	11.2	9.30	101.4	7.75	45331	29.25
CLDS Reference	C	28	12/19/2018 09:22:19	11.4	9.30	101.9	7.78	45429	29.32
CLDS Reference	D	28	12/19/2018 09:22:51	11.5	9.26	101.8	7.78	45448	29.35
CLDS Reference	E	28	12/19/2018 09:23:23	11.6	9.16	100.8	7.78	45300	29.24
Composite 2	A	28	12/19/2018 09:24:07	11.7	8.97	98.9	7.77	45353	29.28
Composite 2	B	28	12/19/2018 09:24:39	11.8	9.03	99.8	7.77	45448	29.35
Composite 2	C	28	12/19/2018 09:25:50	11.9	8.85	98.0	7.76	45410	29.33
Composite 2	D	28	12/19/2018 09:26:21	11.8	8.86	97.9	7.75	45196	29.18
Composite 2	E	28	12/19/2018 09:26:52	11.6	8.42	92.6	7.72	45326	29.26
Composite 3	A	28	12/19/2018 09:27:37	11.6	8.61	94.7	7.73	45375	29.30
Composite 3	B	28	12/19/2018 09:28:16	11.4	8.99	98.6	7.75	45365	29.28
Composite 3	C	28	12/19/2018 09:28:49	11.6	8.84	97.3	7.75	45348	29.28
Composite 3	D	28	12/19/2018 09:29:16	11.3	8.70	95.2	7.73	45371	29.28
Composite 3	E	28	12/19/2018 09:29:36	11.3	8.73	95.4	7.74	45199	29.15
Composite 4	A	28	12/19/2018 09:30:04	11.3	8.76	95.7	7.73	45277	29.21
Composite 4	B	28	12/19/2018 09:30:39	11.3	8.23	89.9	7.70	45247	29.19
Composite 4	C	28	12/19/2018 09:31:19	11.4	8.98	98.4	7.75	45429	29.33
Composite 4	D	28	12/19/2018 09:32:00	11.5	9.08	99.8	7.77	45478	29.37
Composite 4	E	28	12/19/2018 09:33:33	11.9	8.78	97.1	7.76	45203	29.18
Composite 5	A	28	12/19/2018 09:34:14	11.7	8.91	98.4	7.79	45160	29.15
Composite 5	B	28	12/19/2018 09:34:44	11.9	8.89	98.5	7.79	45335	29.28
Composite 5	C	28	12/19/2018 09:35:19	11.8	8.93	98.8	7.82	45317	29.26
Composite 5	D	28	12/19/2018 09:36:13	11.9	8.78	97.3	7.79	45326	29.27
Composite 5	E	28	12/19/2018 09:36:53	11.6	9.02	99.2	7.79	45203	29.17
Composite 6	A	28	12/19/2018 09:37:37	11.6	8.73	96.1	7.77	45324	29.26
Composite 6	B	28	12/19/2018 09:38:52	11.5	8.73	95.7	7.77	45219	29.18
Composite 6	C	28	12/19/2018 09:39:32	11.5	8.69	95.3	7.76	45017	29.03
Composite 6	D	28	12/19/2018 09:40:13	11.6	8.70	95.8	7.77	45278	29.23
Composite 6	E	28	12/19/2018 09:40:58	11.7	8.81	97.1	7.79	45241	29.20

Macoma nasuta
28 day Bioaccumulation Evaluation

Statistical Analysis Reports

Survival

CETIS Test Data Worksheet

Report Date: 27 Dec-18 10:47 (p 1 of 1)
Test Code/ID: 01-9939-1409/31249Mn-Surv

Bioaccumulation Evaluation - Survival Endpoint **EnviroSystems, Inc.**

Start Date:	21 Nov-18 12:00	**Species:**	Macoma nasuta	**Sample Code:**	31249-000
End Date:	19 Dec-18 12:00	**Protocol:**	US ACE NED RIM (2004)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	21 Nov-18	**Material:**	Laboratory Control Sediment	**Sample Station:**	Laboratory Control (Mn)

Sample	Rep	Pos	# Exposed	# Survived	Notes
31249-000	1	7	20	20	
31249-000	2	10	20	19	
31249-000	3	16	20	20	
31249-000	4	25	20	20	
31249-000	5	34	20	20	
31242-008	1	3	20	20	
31242-008	2	11	20	20	
31242-008	3	19	20	20	
31242-008	4	23	20	20	
31242-008	5	33	20	19	
31243-101	1	1	20	20	
31243-101	2	8	20	20	
31243-101	3	18	20	20	
31243-101	4	22	20	20	
31243-101	5	35	20	20	
31243-102	1	5	20	20	
31243-102	2	9	20	20	
31243-102	3	15	20	18	
31243-102	4	26	20	20	
31243-102	5	31	20	20	
31243-103	1	4	20	19	
31243-103	2	12	20	18	
31243-103	3	20	20	19	
31243-103	4	27	20	20	
31243-103	5	29	21	21	
31243-104	1	6	20	18	
31243-104	2	14	20	18	
31243-104	3	17	20	18	
31243-104	4	28	20	20	
31243-104	5	30	20	20	
31243-105	1	2	20	20	
31243-105	2	13	20	20	
31243-105	3	21	20	18	
31243-105	4	24	22	22	
31243-105	5	32	20	20	

CETIS Summary Report

Report Date: 28 Dec-18 10:35 (p 1 of 1)
Test Code: 31249Mn-Surv | 01-9939-1409

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Batch ID:	09-8484-4680	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 12:00	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	19 Dec-18 12:00	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31249-000	16-6162-6890	21 Nov-18	21 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h		
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31249-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Mn)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
06-7090-7592	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.7778	31242-008 passed proportion survived
06-7315-4018	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	1.0000	31243-101 passed proportion survived
13-6711-0421	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	1.0000	31243-101 passed proportion survived
04-1462-7524	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5000	31243-102 passed proportion survived
21-3547-0895	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5556	31243-102 passed proportion survived
21-1783-4608	Proportion Survived	Equal Variance t Two-Sample Test	0.1006	31243-103 passed proportion survived
10-7841-9910	Proportion Survived	Equal Variance t Two-Sample Test	0.0518	31243-104 passed proportion survived
06-2798-0718	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5000	31243-105 passed proportion survived
12-8678-4349	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.5556	31243-105 passed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31249-000	LC	5	0.990	0.962	1.000	0.950	1.000	0.010	0.022	2.26%	0.00%
31242-008	RS	5	0.990	0.962	1.000	0.950	1.000	0.010	0.022	2.26%	0.00%
31243-101		5	1.000	1.000	1.000	1.000	1.000	0.000	0.000	0.00%	-1.01%
31243-102		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	1.01%
31243-103		5	0.960	0.908	1.000	0.900	1.000	0.019	0.042	4.36%	3.03%
31243-104		5	0.940	0.872	1.000	0.900	1.000	0.025	0.055	5.83%	5.05%
31243-105		5	0.980	0.924	1.000	0.900	1.000	0.020	0.045	4.56%	1.01%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31249-000	LC	1.000	0.950	1.000	1.000	1.000
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-101		1.000	1.000	1.000	1.000	1.000
31243-102		1.000	1.000	0.900	1.000	1.000
31243-103		0.950	0.900	0.950	1.000	1.000
31243-104		0.900	0.900	0.900	1.000	1.000
31243-105		1.000	1.000	0.900	1.000	1.000

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	06-7090-7592	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31249-000	16-6162-6890	21 Nov-18	21 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31249-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Mn)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31242-008 passed proportion survived	2.76%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	27.5	n/a	2	8	Exact	0.7778	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0206028	0.0025754	8			
Total	0.0206028		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.509	0.741	4.7E-06	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31249-000	LC	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31249-000	LC	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31249-000	LC	1.000	0.950	1.000	1.000	1.000
31242-008	RS	1.000	1.000	1.000	1.000	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31249-000	LC	1.46	1.35	1.46	1.46	1.46
31242-008	RS	1.46	1.46	1.46	1.46	1.35

CETIS Analytical Report

Report Date: 09 Jan-19 12:34 (p 1 of 1)
Test Code: 31249Mn-Surv | 01-9939-1409

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID: 06-7315-4018 **Endpoint:** Proportion Survived **CETIS Version:** CETISv1.9.3
Analyzed: 28 Dec-18 10:34 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-101 passed proportion survived	2.12%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	30	n/a	1	8	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	1	0.3466	Non-Significant Effect
Error	0.0103014	0.0012877	8			
Total	0.0115891		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.11	11.3	0.0285	Equal Variances
Variances	Mod Levene Equality of Variance Test	1	13.7	0.3559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.625	0.741	1.1E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31243-101		5	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	-1.01%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31243-101		5	1.46	1.46	1.46	1.46	1.46	1.46	0	0.00%	-1.58%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-101		1.000	1.000	1.000	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	1.35
31243-101		1.46	1.46	1.46	1.46	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	13-6711-0421	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	25	n/a	1	7	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65500	<1.0E-37	Significant Effect
Error	0	0	7			
Total	0		8			

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%
31243-101		5	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	1.46	1.46	1.46	1.46	1.46	1.46	0	0.00%	0.00%
31243-101		5	1.46	1.46	1.46	1.46	1.46	1.46	0	0.00%	0.00%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	Outlier
31243-101		1.000	1.000	1.000	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	
31243-101		1.46	1.46	1.46	1.46	1.46

CETIS Analytical Report

Report Date: 09 Jan-19 12:34 (p 1 of 1)
Test Code: 31249Mn-Surv | 01-9939-1409

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	04-1462-7524	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-102 passed proportion survived	3.95%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	27	n/a	1	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.36	2.29	0.0301	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009262	0.0009262	1	0.163	0.6971	Non-Significant Effect
Error	0.045485	0.0056856	8			
Total	0.0464112		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.42	23.2	0.2613	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.639	0.741	1.6E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000		0.950	1.000	0.010	2.26%	0.00%
31243-102		5	0.980	0.924	1.000		0.900	1.000	0.020	4.56%	1.01%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5		1.35	1.46	0.0227	3.53%	0.00%
31243-102		5	1.42	1.3	1.53		1.25	1.46	0.0419	6.62%	1.34%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-102		1.000	1.000	0.900	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS					
31243-102						

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	21-3547-0895	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-102 passed proportion survived	2.35%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	22	n/a	1	7	Exact	0.5556	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011446	0.0011446	1	0.778	0.4071	Non-Significant Effect
Error	0.0103014	0.0014716	7			
Total	0.011446		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	5.53	12.2	0.0510	Equal Variances
Variances	Mod Levene Equality of Variance Test	1	13.7	0.3559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.701	2.4E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31243-102		4	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	-1.01%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31243-102		4	1.46	1.46	1.46	1.46	1.46	1.46	0	0.00%	-1.58%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-102		1.000	1.000	Outlier	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	1.35
31243-102		1.46	1.46	1.46	1.46	

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	21-1783-4608	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-103 passed proportion survived	3.81%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	1.39	1.86	0.086	8	CDF	0.1006	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5119	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0102706	0.0102706	1	1.94	0.2013	Non-Significant Effect
Error	0.0423786	0.0052973	8			
Total	0.0526492		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.11	23.2	0.2971	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3183	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31243-103		5	0.960	0.908	1.000	0.950	0.900	1.000	0.019	4.36%	3.03%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31243-103		5	1.37	1.26	1.48	1.35	1.25	1.46	0.04	6.53%	4.46%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-103		0.950	0.900	0.950	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	1.35
31243-103		1.35	1.25	1.35	1.46	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	10-7841-9910	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-104 passed proportion survived	4.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.84	1.86	0.104	8	CDF	0.0518	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0265908	0.0265908	1	3.37	0.1036	Non-Significant Effect
Error	0.0630768	0.0078846	8			
Total	0.0896676		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.12	23.2	0.1426	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.833	0.741	0.0361	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31243-104		5	0.940	0.872	1.000	0.900	0.900	1.000	0.025	5.83%	5.05%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31243-104		5	1.33	1.19	1.48	1.25	1.25	1.46	0.0514	8.62%	7.18%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-104		0.900	0.900	0.900	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	1.35
31243-104		1.25	1.25	1.25	1.46	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	06-2798-0718	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-105 passed proportion survived	3.97%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	27	n/a	1	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.36	2.29	0.0295	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008282	0.0008282	1	0.144	0.7140	Non-Significant Effect
Error	0.045946	0.0057433	8			
Total	0.0467742		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.46	23.2	0.2565	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.65	0.741	2.2E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31243-105		5	0.980	0.924	1.000	1.000	0.900	1.000	0.020	4.56%	1.01%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31243-105		5	1.42	1.3	1.54	1.46	1.25	1.46	0.0422	6.66%	1.27%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-105		1.000	1.000	0.900	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	1.35
31243-105		1.46	1.46	1.25	1.46	1.46

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	12-8678-4349	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-105 passed proportion survived	2.35%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	22	n/a	1	7	Exact	0.5556	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012804	0.0012804	1	0.868	0.3824	Non-Significant Effect
Error	0.0103219	0.0014746	7			
Total	0.0116023		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	376	46.2	4.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.645	0.701	3.3E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.990	0.962	1.000	1.000	0.950	1.000	0.010	2.26%	0.00%
31243-105		4	1.000	1.000	1.000	1.000	1.000	1.000	0.000	0.00%	-1.01%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	1.37	1.5	1.46	1.35	1.46	0.0227	3.53%	0.00%
31243-105		4	1.46	1.46	1.46	1.46	1.46	1.46	0.0013	0.18%	-1.67%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	1.000	1.000	0.950
31243-105		1.000	1.000	Outlier	1.000	1.000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.46	1.46	1.35
31243-105		1.46	1.46	1.46	1.46	

Nereis virens
28 day Bioaccumulation Evaluation

Bench Data

28 DAY BIOACCUMULATION ASSAY

Project:	New Haven Harbor 2018	**Client:**	AECOM		
Study #:	31250	**Reference:**	CLDS	**Water Bath:**	TCR
Sample(s):	Comps 2, 3, 4, 5 and 6	**Start:**	11/20/2018	**End:**	12/18/2018

Summary of Test Conditions

Exposure	Species Used
Test Mode: Flow Through (6 volume additions per day) **Length of Assay:** 28 days	(Check box for all that apply) ☑ Polychaete (*Nereis virens*) ☐ Bivalve Clam *(Macoma nasuta)*

Water Quality Parameters

Salinity: 30 ± 2 ppt **Photoperiod:** 16 hour light, 8 hour dark	**Temperature:** 12-16°C with no readings to exceed ±3°C

Test Chamber	Solution & Sediment Volume
(Check box for all that apply) ☑ 38L (10 gallon) Aquaria ☐ other _____	(Check box for all that apply) ☑ ~6L per vessel of homogenized sediment ☑ 20-30L overlying water ☐ other _____

Replicate Information

N. virens and M. nasuta:

- 5 Reps per sample site and reference site
- 5 Reps for Laboratory Control
- 20 organisms per chamber

Cleaning	Treatments
Prior to test initiation, all test vessels were washed using lab safe detergent, acid washed then rinsed with deionized water (EPA 2002).	Laboratory Control, Reference Site, and Site Sediments

Feeding

N. virens:	*M. nasuta:*
NONE	NONE

Date: 2/14/18 Initial NR

99NvAR011 2018

Aquatic Research Organisms

DATA SHEET/ CUSTODY CHAIN

I. Organism History

Species Neanthes (Neries) virens

Source: Lab reared____ Hatchery reared____ Field collected X

Hatch date Mixed aged adults Receipt date 11/20/18

Lot number 11201 8NV Strain Wild

Brood origination: Damariscotta River, Boothbay Harbor, Maine

II. Water Quality

Temperature 12 °C Salinity 28-32 ppt D.O. Saturated ppm

pH 8.0-8.4 su Hardness N.A. ppm Alkalinity N.A. ppm

III. Culture Conditions

Freshwater____ Saltwater X Other____

Recirculating____ Flow through____ Static____

DIET: Flake food____ Phytoplankton____ Trout chow____

Artemia____ Rotifers____ YCT____ Other Not fed

Prophylactic treatments:____

Comments: Held at 4C on moist seaweed. Shipped with gel ice packs to keep cool

IV. Shipping Information

Client: EST # of Organisms 1100+

Carrier: ~~FEDEX~~ PICK UP Date shipped 11/20/18

Tracking # N/A # of boxes 10

Released by: [signature] Date: 11/20/18 Time:____

Received by:____ Date:____ Time:____

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

Nereis virens 28 Day Study

Client: AECOM **Study: 31250**

Day	Date	Water Qualities and Flow	Initial	Day	Date	Water Qualities and Flow	Initial
0	11/20/18	✓	BG	15	12/05/18	✓	MS
1	11/28/18	✓	BG	16	12/06/18	✓	BG
2	11/22/18	✓	LAG	17	12/07/18	✓	BG
3	11/23/18	✓	LAG	18	12/08/18	✓	BG
4	11/24/18	✓	~~LAG~~ BG	19	12/09/18	✓	MS
5	11/25/18	✓	LAG	20	12/10/18	✓	MS
6	11/26/18	✓	MS	21	12/11/18	✓	MS
7	11/27/18	✓	MS	22	12/12/18	✓	MS
8	11/28/18	✓	LAG	23	12/13/18	✓	MS
9	11/29/18	✓	BG	24	12/14/18	✓	BG
10	11/30/18	✓	BG	25	12/15/18	✓	BG
11	12/01/18	✓	BG	26	12/16/18	✓	MS
12	12/02/18	✓	MS	27	12/17/18	✓	MS
13	12/03/18	✓	MS	28	12/18/18	✓	MS
14	12/04/18	✓	MS				

Notes: 21d MS 11/26/18 Comp 3 E air was increased due to low flow

21d BG 12/01/18 Low salinities observed; salinity increased in head tanks

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Daily Observations for *Nereis virens*

Client: AECOM **Study: 31250**

TANK	Rep	DAY 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Laboratory Control	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	D	✓	✓	✓	✓	IS	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG	LAG	BG LAG	BG	LAG	MS	MS	LAG	BG	BG	BG	MS	MS	BG
Date		11/21/18	11/22/18	11/23/18	11/24/18	11/25/18	11/26/18	11/27/18	11/28/18	11/29/18	11/30/18	12/01/18	12/02/18	12/03/18	12/04/18

Observation Codes:

R animals replaced after 1 hour

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

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Daily Observations for *Nereis virens*

Client: AECOM **Study: 31250**

TANK		DAY													
	Rep	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Composite 4	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		BG	LAG	LAG	BG	LAG	MS	MS	LAG	BG	BG	BG	MS	MS	BG
Date		11/21/18	11/22/18	11/23/18	11/24/18	11/25/18	11/26/18	11/27/18	11/28/18	11/29/18	11/30/18	12/01/18	12/02/18	12/03/18	12/04/18

Observation Codes:

R animals replaced after 1 hour

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Observations for Bioaccumulation Assay 06 06 18 rev1.wpd

Daily Observations for *Nereis virens*

Client: AECOM **Study: 31250**

TANK		DAY												
	Rep	15	16	17	18	19	20	21	22	23	24	25	26	27
Laboratory Control	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratory Control	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CLDS Ref Site	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 2	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 3	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		MS	BG	BG	BG	MS	MS	MS	MS	MS	BG	BG	MS	MS
Date		12/05/18	12/06/18	12/07/18	12/08/18	12/09/18	12/10/18	12/11/18	12/12/18	12/13/18	12/14/18	12/15/18	12/16/18	12/17/18

Observation Codes:

R animals replaced after 1 hour

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

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Daily Observations for *Nereis virens*

Client: AECOM **Study: 31250**

TANK	Rep	DAY 15	16	17	18	19	20	21	22	23	24	25	26	27
Composite 4	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 4	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 5	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Composite 6	E	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Initial		MS	BG	BG	BG	MS	MS	MS	MS	MS	BG	BG	MS	MS
Date		12/05/18	12/06/18	12/07/18	12/08/18	12/09/18	12/10/18	12/11/18	12/12/18	12/13/18	12/14/18	12/15/18	12/16/18	12/17/18

Observation Codes:

R animals replaced after 1 hour

D dead animals

S animals observed on the surface

✓ tank checked and no animals were on the surface or dead

P:\General Projects\RPT-Active\DSE 00000 Template\XXXX9 Bioaccumulation Assays\Forms\Daily Observations for Bioaccumulation Assay 06 06 18 rev1.wpd

Nereis virens Day 28 Recovery Record

DATE: 12/18/18 **ESI STUDY:** 31250

CLIENT: AECOM **PROJECT:** New Haven Harbor

SAMPLE ID	REP	# LIVE / INITIALS	SAMPLE ID	REP	# LIVE / INITIALS
Laboratory Control Sediment	A	19 JTP	Composite 2	A	20 JTP
Laboratory Control Sediment	B	21 MS	Composite 2	B	20 JTP
Laboratory Control Sediment	C	20 JTP	Composite 2	C	19 MS
Laboratory Control Sediment	D	19 MS	Composite 2	D	20 JTP
Laboratory Control Sediment	E	18 JTP	Composite 2	E	17 MS
CLDS Reference Sediment	A	20 MS	Composite 3	A	22 LAG
CLDS Reference Sediment	B	20 JTP	Composite 3	B	19 JTP
CLDS Reference Sediment	C	19 MS	Composite 3	C	20 MS
CLDS Reference Sediment	D	20 JTP	Composite 3	D	19 JTP
CLDS Reference Sediment	E	19 MS	Composite 3	E	19 MS

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\31249&31250 Bioaccumulation Assays\Forms\Bioaccumulation Assay Recovery Record 2015.wpd

Nereis virens Day 28 Recovery Record

DATE: 12/18/18 **ESI STUDY:** 31250

CLIENT: AECOM **PROJECT:** New Haven Harbor

SAMPLE ID	REP	# LIVE / INITIALS	SAMPLE ID	REP	# LIVE / INITIALS
Composite 4	A	20 JTP	Composite 6	A	20 MT MS 12/18
Composite 4	B	20 LAG	Composite 6	B	19 MW
Composite 4	C	19 JTP	Composite 6	C	17 MS
Composite 4	D	19 JTP	Composite 6	D	20 MS
Composite 4	E	19 LAG	Composite 6	E	18 LAG
Composite 5	A	19 MS			
Composite 5	B	19 LAG			
Composite 5	C	19 MS			
Composite 5	D	18 LAG			
Composite 5	E	18 MS			

P:\General Projects\RPT-Active\DSE 31242 AECOM - New Haven Harbor 2018\31249&31250 Bioaccumulation Assays\Forms\Bioaccumulation Assay Recovery Record 2015.wpd

Nereis virens
28 day Bioaccumulation Evaluation

Daily Water Quality Data

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	00	11/20/2018 15:52:14	11.6	8.73	97.9	7.85	47355	30.72
Laboratory Control	B	00	11/20/2018 15:52:41	11.3	8.26	91.0	7.81	45062	29.06
Laboratory Control	C	00	11/20/2018 15:53:04	11.3	8.03	88.6	7.79	45474	29.35
Laboratory Control	D	00	11/20/2018 15:53:25	11.2	7.70	84.6	7.77	44896	28.93
Laboratory Control	E	00	11/20/2018 15:53:46	11.2	7.59	83.6	7.73	45509	29.37
CLDS Reference	A	00	11/20/2018 15:54:10	11.1	8.17	89.4	7.80	44552	28.68
CLDS Reference	B	00	11/20/2018 15:54:32	11.3	8.50	94.5	7.83	46862	30.35
CLDS Reference	C	00	11/20/2018 15:55:05	11.5	8.67	97.0	7.86	47397	30.74
CLDS Reference	D	00	11/20/2018 15:55:31	11.3	7.94	87.8	7.86	45785	29.58
CLDS Reference	E	00	11/20/2018 15:55:53	11.3	8.59	95.2	7.86	46318	29.96
Composite 2	A	00	11/20/2018 15:56:17	11.4	7.73	86.1	7.78	46849	30.35
Composite 2	B	00	11/20/2018 15:56:45	11.3	7.74	85.6	7.75	45988	29.72
Composite 2	C	00	11/20/2018 15:57:10	11.2	7.84	86.1	7.74	44652	28.76
Composite 2	D	00	11/20/2018 15:57:56	11.3	7.25	79.6	7.71	44481	28.64
Composite 2	E	00	11/20/2018 15:58:20	11.1	7.80	85.6	7.72	44892	28.93
Composite 3	A	00	11/20/2018 15:58:41	11.2	8.61	95.1	7.75	46225	29.88
Composite 3	B	00	11/20/2018 15:59:05	11.2	7.97	88.1	7.73	46169	29.85
Composite 3	C	00	11/20/2018 15:59:38	11.1	8.82	97.0	7.80	45407	29.30
Composite 3	D	00	11/20/2018 15:59:58	11.4	8.41	93.7	7.78	47083	30.51
Composite 3	E	00	11/20/2018 16:00:21	11.0	9.21	98.9	7.85	41022	26.18
Composite 4	A	00	11/20/2018 16:00:45	11.1	7.34	80.5	7.75	45110	29.08
Composite 4	B	00	11/20/2018 16:01:06	11.1	7.81	85.4	7.77	44612	28.73
Composite 4	C	00	11/20/2018 16:01:25	11.1	7.36	80.7	7.74	45111	29.08
Composite 4	D	00	11/20/2018 16:01:52	11.1	7.76	84.9	7.77	44612	28.73
Composite 4	E	00	11/20/2018 16:02:17	11.2	7.69	84.8	7.72	45262	29.20
Composite 5	A	00	11/20/2018 16:02:48	11.2	6.49	71.2	7.64	44313	28.52
Composite 5	B	00	11/20/2018 16:03:44	11.1	8.03	88.1	7.66	45071	29.06
Composite 5	C	00	11/20/2018 16:04:05	11.1	7.83	85.7	7.64	44456	28.62
Composite 5	D	00	11/20/2018 16:04:27	11.4	8.45	94.1	7.71	47278	30.65
Composite 5	E	00	11/20/2018 16:04:51	11.6	7.65	85.2	7.69	45887	29.67
Composite 6	A	00	Multiprobe malfunction						
Composite 6	B	00	11/20/2018 16:40:34	11.1	8.31	91.4	7.32	45661	29.48
Composite 6	C	00	11/20/2018 16:40:55	11.1	7.85	85.8	7.42	44425	28.59
Composite 6	D	00	11/20/2018 16:41:14	11.1	7.15	78.2	7.47	44508	28.65
Composite 6	E	00	11/20/2018 16:41:30	11.3	8.19	90.6	7.51	46036	29.76
Laboratory Control	A	01	11/21/2018 02:43:11	11.5	7.47	83.7	7.75	48419	31.48
Laboratory Control	B	01	11/21/2018 02:43:46	11.4	8.79	97.6	7.80	46927	30.40
Laboratory Control	C	01	11/21/2018 02:44:10	11.5	8.43	94.2	7.78	47870	31.08
Laboratory Control	D	01	11/21/2018 02:44:35	11.6	8.52	95.7	7.79	48560	31.59
Laboratory Control	E	01	11/21/2018 02:45:05	11.2	8.52	93.8	7.77	46105	29.80
CLDS Reference	A	01	11/21/2018 02:45:30	11.4	8.45	94.2	7.79	47923	31.11
CLDS Reference	B	01	11/21/2018 02:45:56	11.2	8.62	95.7	7.80	47824	31.03
CLDS Reference	C	01	11/21/2018 02:46:20	11.3	8.46	94.4	7.80	48299	31.38
CLDS Reference	D	01	11/21/2018 02:46:46	11.1	8.61	94.9	7.80	46536	30.10
CLDS Reference	E	01	11/21/2018 02:47:10	11.1	8.64	95.7	7.80	47271	30.63

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 2	A	01	11/21/2018 02:47:38	11.1	8.68	96.1	7.83	47602	30.87
Composite 2	B	01	11/21/2018 02:48:02	11.2	8.50	93.8	7.84	46773	30.28
Composite 2	C	01	11/21/2018 02:48:25	11.4	8.64	96.2	7.86	47451	30.77
Composite 2	D	01	11/21/2018 02:48:57	11.3	5.68	62.4	7.71	45211	29.16
Composite 2	E	01	11/21/2018 02:49:23	11.1	8.48	93.1	7.85	45609	29.44
Composite 3	A	01	11/21/2018 02:49:49	11.1	7.80	86.2	7.76	47180	30.57
Composite 3	B	01	11/21/2018 02:50:11	11.1	8.69	96.1	7.84	47452	30.76
Composite 3	C	01	11/21/2018 02:50:39	11.1	8.24	90.9	7.80	46570	30.13
Composite 3	D	01	11/21/2018 02:50:57	11.3	8.12	90.3	7.78	47888	31.08
Composite 3	E	01	11/21/2018 02:51:28	11.3	7.85	86.8	7.77	46277	29.93
Composite 4	A	01	11/21/2018 02:51:50	11.0	8.81	96.8	7.87	46086	29.78
Composite 4	B	01	11/21/2018 02:52:13	11.0	8.69	95.1	7.87	45329	29.24
Composite 4	C	01	11/21/2018 02:52:36	11.3	8.42	94.0	7.85	48293	31.38
Composite 4	D	01	11/21/2018 02:53:04	11.2	8.74	97.3	7.90	48215	31.32
Composite 4	E	01	11/21/2018 02:53:41	11.1	8.49	93.2	7.88	45670	29.49
Composite 5	A	01	11/21/2018 02:54:14	11.6	8.47	95.3	7.82	48928	31.85
Composite 5	B	01	11/21/2018 02:54:40	11.1	8.66	95.2	7.87	45807	29.58
Composite 5	C	01	11/21/2018 02:55:04	11.1	8.68	95.1	7.89	45165	29.12
Composite 5	D	01	11/21/2018 02:55:27	11.4	8.43	94.2	7.83	48290	31.38
Composite 5	E	01	11/21/2018 02:55:51	12.0	8.35	95.0	7.84	49101	32.00
Composite 6	A	01	11/21/2018 02:56:25	11.0	8.96	98.6	7.87	46422	30.02
Composite 6	B	01	11/21/2018 02:56:44	11.0	8.90	97.0	7.92	44837	28.88
Composite 6	C	01	11/21/2018 02:57:05	11.0	8.79	95.9	7.90	44677	28.77
Composite 6	D	01	11/21/2018 02:57:31	11.2	8.13	89.9	7.86	46718	30.24
Composite 6	E	01	11/21/2018 02:57:48	11.2	8.43	92.6	7.87	45583	29.42
Laboratory Control	A	02	11/22/2018 10:06:10	11.4	7.99	88.6	7.72	49093	31.96
Laboratory Control	B	02	11/22/2018 10:06:37	11.4	9.06	100.1	7.81	48276	31.37
Laboratory Control	C	02	11/22/2018 10:07:05	11.6	8.71	96.7	7.81	48901	31.83
Laboratory Control	D	02	11/22/2018 10:07:37	11.5	8.89	98.7	7.82	49305	32.12
Laboratory Control	E	02	11/22/2018 10:08:05	11.5	8.78	96.8	7.83	47793	31.03
CLDS Reference	A	02	11/22/2018 10:08:37	11.5	8.72	96.5	7.84	48766	31.73
CLDS Reference	B	02	11/22/2018 10:09:08	11.5	8.79	97.4	7.84	48735	31.71
CLDS Reference	C	02	11/22/2018 10:10:06	11.4	8.64	95.7	7.84	48992	31.89
CLDS Reference	D	02	11/22/2018 10:10:30	11.3	8.76	96.2	7.84	47564	30.85
CLDS Reference	E	02	11/22/2018 10:10:56	11.4	8.69	95.8	7.84	48262	31.36
Composite 2	A	02	11/22/2018 10:11:22	11.3	8.76	96.7	7.89	48500	31.53
Composite 2	B	02	11/22/2018 10:11:49	11.4	8.61	94.8	7.91	47771	31.01
Composite 2	C	02	11/22/2018 10:12:20	11.6	8.74	96.9	7.93	48535	31.57
Composite 2	D	02	11/22/2018 10:12:58	11.4	5.91	64.6	7.76	46364	29.99
Composite 2	E	02	11/22/2018 10:13:53	11.2	8.72	95.2	7.96	46681	30.21
Composite 3	A	02	11/22/2018 10:14:39	11.2	8.06	88.6	7.84	48265	31.36
Composite 3	B	02	11/22/2018 10:15:16	11.1	8.90	97.8	7.95	48492	31.51
Composite 3	C	02	11/22/2018 10:15:46	11.3	8.28	90.9	7.89	47810	31.03
Composite 3	D	02	11/22/2018 10:16:26	11.5	8.01	88.7	7.85	48758	31.72
Composite 3	E	02	11/22/2018 10:16:55	11.5	7.99	88.2	7.83	48049	31.21

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	A	02	11/22/2018 10:17:27	11.2	8.87	97.1	7.96	47348	30.69
Composite 4	B	02	11/22/2018 10:18:21	11.3	8.68	94.6	7.97	46368	29.99
Composite 4	C	02	11/22/2018 10:18:53	11.5	8.56	94.9	7.91	48895	31.82
Composite 4	D	02	11/22/2018 10:19:21	11.3	8.86	97.9	7.97	48962	31.86
Composite 4	E	02	11/22/2018 10:19:49	11.4	8.52	93.3	7.97	46625	30.18
Composite 5	A	02	11/22/2018 10:20:16	11.5	8.81	97.7	7.91	48892	31.82
Composite 5	B	02	11/22/2018 10:20:44	11.2	8.86	96.7	7.97	46918	30.38
Composite 5	C	02	11/22/2018 10:21:10	11.2	8.95	97.5	8.01	46276	29.92
Composite 5	D	02	11/22/2018 10:21:39	11.5	8.68	96.2	7.93	48915	31.84
Composite 5	E	02	11/22/2018 10:22:02	12.1	8.66	97.1	7.92	48297	31.42
Composite 6	A	02	11/22/2018 10:22:31	11.2	9.11	99.8	7.96	47549	30.84
Composite 6	B	02	11/22/2018 10:23:01	11.1	9.13	98.9	8.02	45663	29.48
Composite 6	C	02	11/22/2018 10:23:32	11.2	9.00	97.7	8.00	45467	29.35
Composite 6	D	02	11/22/2018 10:24:04	11.4	8.39	92.4	7.93	47757	31.00
Composite 6	E	02	11/22/2018 10:24:37	11.4	8.77	96.1	7.95	46530	30.12
Laboratory Control	A	03	11/23/2018 10:15:40	11.8	8.24	90.7	7.82	47781	31.03
Laboratory Control	B	03	11/23/2018 10:16:08	11.7	8.96	98.5	7.84	47739	31.00
Laboratory Control	C	03	11/23/2018 10:16:31	12.0	8.80	97.3	7.85	47423	30.79
Laboratory Control	D	03	11/23/2018 10:16:46	11.8	8.89	98.0	7.85	47855	31.09
Laboratory Control	E	03	11/23/2018 10:17:09	11.9	8.81	97.1	7.85	47549	30.87
CLDS Reference	A	03	11/23/2018 10:17:31	11.7	8.87	97.5	7.85	47714	30.98
CLDS Reference	B	03	11/23/2018 10:17:48	11.7	8.90	97.8	7.85	47615	30.91
CLDS Reference	C	03	11/23/2018 10:18:16	11.7	8.84	97.2	7.85	47629	30.92
CLDS Reference	D	03	11/23/2018 10:18:35	11.6	8.92	97.8	7.85	47515	30.83
CLDS Reference	E	03	11/23/2018 10:18:53	11.5	8.91	97.6	7.85	47662	30.94
Composite 2	A	03	11/23/2018 10:19:15	11.6	8.79	96.3	7.85	47675	30.95
Composite 2	B	03	11/23/2018 10:19:38	11.7	8.78	96.4	7.86	47520	30.84
Composite 2	C	03	11/23/2018 10:20:02	11.5	8.92	97.7	7.88	47807	31.04
Composite 2	D	03	11/23/2018 10:20:36	11.7	7.53	82.5	7.80	46848	30.36
Composite 2	E	03	11/23/2018 10:21:01	11.6	8.76	95.5	7.93	46479	30.09
Composite 3	A	03	11/23/2018 10:21:26	11.7	8.20	90.2	7.84	47585	30.89
Composite 3	B	03	11/23/2018 10:21:47	11.5	8.82	96.5	7.89	47610	30.90
Composite 3	C	03	11/23/2018 10:22:12	11.5	8.54	93.4	7.86	47352	30.71
Composite 3	D	03	11/23/2018 10:22:36	11.6	8.46	92.8	7.83	47745	31.00
Composite 3	E	03	11/23/2018 10:23:00	11.7	8.43	92.7	7.82	47528	30.85
Composite 4	A	03	11/23/2018 10:23:20	11.4	8.92	97.1	7.90	47112	30.53
Composite 4	B	03	11/23/2018 10:23:40	11.3	8.87	95.9	7.93	45957	29.70
Composite 4	C	03	11/23/2018 10:24:00	11.6	8.75	95.9	7.88	47681	30.95
Composite 4	D	03	11/23/2018 10:24:23	11.3	8.99	98.1	7.92	47885	31.09
Composite 4	E	03	11/23/2018 10:24:45	11.4	8.82	95.6	7.96	46062	29.78
Composite 5	A	03	11/23/2018 10:25:12	11.9	8.79	96.8	7.88	47442	30.79
Composite 5	B	03	11/23/2018 10:25:26	11.5	8.89	96.8	7.93	46599	30.17
Composite 5	C	03	11/23/2018 10:25:44	11.5	8.99	97.6	7.99	45725	29.54
Composite 5	D	03	11/23/2018 10:26:08	12.2	8.69	96.1	7.92	46942	30.45
Composite 5	E	03	11/23/2018 10:26:31	12.2	8.67	96.0	7.89	46968	30.46

STUDY: 31250
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ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	A	03	11/23/2018 10:27:02	11.3	9.10	98.9	7.92	47166	30.57
Composite 6	B	03	11/23/2018 10:27:25	11.2	9.16	98.5	7.99	45096	29.08
Composite 6	C	03	11/23/2018 10:27:41	11.3	9.05	97.5	7.97	45129	29.11
Composite 6	D	03	11/23/2018 10:28:04	11.4	8.61	93.8	7.92	47052	30.49
Composite 6	E	03	11/23/2018 10:28:23	11.4	8.83	95.8	7.93	46233	29.90
Laboratory Control	A	04	11/24/2018 12:55:48	11.4	8.00	88.3	7.83	46855	30.35
Laboratory Control	B	04	11/24/2018 12:56:14	11.6	8.92	98.8	7.86	46439	30.06
Laboratory Control	C	04	11/24/2018 12:56:38	11.5	8.72	96.3	7.84	46465	30.07
Laboratory Control	D	04	11/24/2018 12:56:55	11.8	8.82	97.7	7.86	45777	29.59
Laboratory Control	E	04	11/24/2018 12:57:26	11.3	8.76	96.4	7.84	46692	30.22
CLDS Reference	A	04	11/24/2018 12:57:51	11.6	8.84	97.6	7.86	45725	29.55
CLDS Reference	B	04	11/24/2018 12:58:08	11.6	8.89	98.0	7.87	45279	29.23
CLDS Reference	C	04	11/24/2018 12:58:31	11.5	8.76	96.4	7.87	45360	29.28
CLDS Reference	D	04	11/24/2018 12:58:45	11.6	8.85	97.7	7.86	45527	29.41
CLDS Reference	E	04	11/24/2018 12:59:00	11.3	8.90	97.7	7.86	45917	29.67
Composite 2	A	04	11/24/2018 12:59:24	11.1	8.78	96.5	7.88	46907	30.37
Composite 2	B	04	11/24/2018 12:59:40	11.1	8.73	96.0	7.88	46998	30.44
Composite 2	C	04	11/24/2018 13:00:04	11.4	8.80	97.2	7.90	46685	30.23
Composite 2	D	04	11/24/2018 13:00:31	11.6	7.74	85.4	7.82	45582	29.44
Composite 2	E	04	11/24/2018 13:00:53	11.4	8.73	96.0	7.91	45654	29.49
Composite 3	A	04	11/24/2018 13:01:11	11.4	8.45	93.0	7.85	46055	29.77
Composite 3	B	04	11/24/2018 13:01:35	11.5	8.70	95.9	7.86	45560	29.43
Composite 3	C	04	11/24/2018 13:01:56	11.3	8.52	93.5	7.83	45804	29.59
Composite 3	D	04	11/24/2018 13:02:11	11.6	8.49	93.7	7.83	45702	29.53
Composite 3	E	04	11/24/2018 13:02:37	11.5	8.53	94.0	7.82	45748	29.56
Composite 4	A	04	11/24/2018 13:02:52	11.3	8.79	96.5	7.87	45863	29.63
Composite 4	B	04	11/24/2018 13:03:12	11.2	8.76	95.8	7.90	45596	29.44
Composite 4	C	04	11/24/2018 13:03:33	11.7	8.75	96.7	7.88	45444	29.35
Composite 4	D	04	11/24/2018 13:03:52	11.3	8.87	97.7	7.90	46371	30.00
Composite 4	E	04	11/24/2018 13:04:13	11.4	8.72	95.8	7.93	45603	29.45
Composite 5	A	04	11/24/2018 13:04:44	11.3	8.81	97.0	7.89	46663	30.20
Composite 5	B	04	11/24/2018 13:05:00	11.3	8.79	96.3	7.91	45762	29.56
Composite 5	C	04	11/24/2018 13:05:20	11.3	8.79	96.4	7.96	45378	29.29
Composite 5	D	04	11/24/2018 13:05:33	11.3	8.84	97.2	7.93	45902	29.66
Composite 5	E	04	11/24/2018 13:05:47	11.1	8.85	97.0	7.88	46625	30.17
Composite 6	A	04	11/24/2018 13:06:10	10.9	8.97	97.9	7.91	46487	30.06
Composite 6	B	04	11/24/2018 13:06:33	11.1	9.01	98.0	7.97	45052	29.04
Composite 6	C	04	11/24/2018 13:06:57	11.1	8.87	96.4	7.96	44976	28.99
Composite 6	D	04	11/24/2018 13:07:17	11.4	8.63	95.1	7.92	45993	29.73
Composite 6	E	04	11/24/2018 13:07:39	11.2	8.71	95.3	7.93	45852	29.62
Laboratory Control	A	05	11/25/2018 12:35:45	11.4	7.85	87.7	7.75	47164	30.57
Laboratory Control	B	05	11/25/2018 12:36:40	11.7	8.68	97.2	7.83	46365	30.01
Laboratory Control	C	05	11/25/2018 12:37:10	11.6	8.64	96.5	7.83	46422	30.05
Laboratory Control	D	05	11/25/2018 12:37:35	11.8	8.69	97.5	7.84	46477	30.10

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	E	05	11/25/2018 12:38:06	11.4	8.72	97.2	7.84	46815	30.32
CLDS Reference	A	05	11/25/2018 12:38:53	11.7	8.52	95.3	7.85	46469	30.08
CLDS Reference	B	05	11/25/2018 12:39:21	11.6	8.61	96.2	7.85	46464	30.08
CLDS Reference	C	05	11/25/2018 12:39:50	11.5	8.67	96.6	7.85	46311	29.96
CLDS Reference	D	05	11/25/2018 12:40:17	11.6	8.47	94.7	7.85	46453	30.07
CLDS Reference	E	05	11/25/2018 12:40:54	11.3	8.66	96.1	7.85	46370	30.00
Composite 2	A	05	11/25/2018 12:41:26	11.3	8.50	94.4	7.86	46612	30.17
Composite 2	B	05	11/25/2018 12:41:52	11.2	8.14	90.3	7.87	47053	30.48
Composite 2	C	05	11/25/2018 12:42:36	11.4	8.59	95.6	7.86	46471	30.07
Composite 2	D	05	11/25/2018 12:43:11	11.7	7.74	86.6	7.79	46387	30.02
Composite 2	E	05	11/25/2018 12:43:36	11.5	8.43	94.0	7.83	46323	29.97
Composite 3	A	05	11/25/2018 12:44:07	11.5	7.93	88.4	7.79	46384	30.02
Composite 3	B	05	11/25/2018 12:44:34	11.6	8.38	93.7	7.80	46459	30.08
Composite 3	C	05	11/25/2018 12:45:08	11.5	7.94	88.4	7.79	46331	29.97
Composite 3	D	05	11/25/2018 12:46:31	11.6	8.09	90.3	7.79	46413	30.04
Composite 3	E	05	11/25/2018 12:46:59	11.4	8.34	92.6	7.79	46280	29.93
Composite 4	A	05	11/25/2018 12:47:26	11.4	8.51	94.6	7.83	46355	29.99
Composite 4	B	05	11/25/2018 12:47:59	11.4	8.41	93.5	7.84	46245	29.91
Composite 4	C	05	11/25/2018 12:48:24	11.7	8.49	95.0	7.83	46497	30.10
Composite 4	D	05	11/25/2018 12:48:50	11.5	8.53	95.0	7.84	46434	30.05
Composite 4	E	05	11/25/2018 12:49:28	11.4	8.22	91.2	7.84	46234	29.90
Composite 5	A	05	11/25/2018 12:50:45	11.3	8.66	96.2	7.86	46719	30.25
Composite 5	B	05	11/25/2018 12:51:09	11.4	8.32	92.4	7.85	46225	29.89
Composite 5	C	05	11/25/2018 12:51:43	11.4	8.45	93.9	7.86	46166	29.85
Composite 5	D	05	11/25/2018 12:52:08	11.4	8.52	94.7	7.84	46347	29.98
Composite 5	E	05	11/25/2018 12:52:49	11.1	8.27	91.7	7.83	46924	30.39
Composite 6	A	05	11/25/2018 12:53:20	11.0	9.12	100.9	7.90	47074	30.49
Composite 6	B	05	11/25/2018 12:54:12	11.0	9.14	100.6	7.95	45839	29.60
Composite 6	C	05	11/25/2018 12:54:38	11.2	8.69	96.0	7.93	45846	29.62
Composite 6	D	05	11/25/2018 12:55:11	11.5	8.36	93.1	7.88	46361	30.00
Composite 6	E	05	11/25/2018 12:55:37	11.3	8.60	95.4	7.91	46340	29.97
Laboratory Control	A	06	11/26/2018 12:19:25	11.4	7.82	87.0	7.72	47438	30.77
Laboratory Control	B	06	11/26/2018 12:19:53	11.6	8.29	92.1	7.72	46635	30.20
Laboratory Control	C	06	11/26/2018 12:25:07	11.5	8.27	91.8	7.71	46747	30.27
Laboratory Control	D	06	11/26/2018 12:25:34	11.4	6.27	69.5	7.65	46749	30.27
Laboratory Control	E	06	11/26/2018 12:26:03	11.3	8.57	94.9	7.71	47058	30.49
CLDS Reference	A	06	11/26/2018 12:26:27	11.2	8.45	93.2	7.72	46765	30.27
CLDS Reference	B	06	11/26/2018 12:27:01	11.1	8.59	94.7	7.74	46821	30.31
CLDS Reference	C	06	11/26/2018 12:27:24	11.1	8.76	96.5	7.76	46775	30.28
CLDS Reference	D	06	11/26/2018 12:27:52	11.1	7.63	84.1	7.71	46749	30.26
CLDS Reference	E	06	11/26/2018 12:28:15	11.1	8.23	90.6	7.72	46714	30.23
Composite 2	A	06	11/26/2018 12:28:40	11.2	8.14	89.9	7.72	46936	30.40
Composite 2	B	06	11/26/2018 12:29:07	11.1	6.88	76.0	7.70	47333	30.68
Composite 2	C	06	11/26/2018 12:29:31	11.2	8.21	90.6	7.72	46814	30.31
Composite 2	D	06	11/26/2018 12:30:00	11.4	7.55	83.7	7.67	46683	30.22

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 2	E	06	11/26/2018 12:30:22	11.3	7.55	83.6	7.69	46763	30.28
Composite 3	A	06	11/26/2018 12:30:46	11.3	7.20	79.7	7.66	46809	30.31
Composite 3	B	06	11/26/2018 12:31:11	11.2	8.04	88.8	7.67	46798	30.30
Composite 3	C	06	11/26/2018 12:31:40	11.2	6.35	70.1	7.62	46726	30.24
Composite 3	D	06	11/26/2018 12:32:05	11.1	6.47	71.3	7.61	46730	30.24
Composite 3	E	06	11/26/2018 12:32:58	11.0	3.74	41.1	7.52	46563	30.12
Composite 4	A	06	11/26/2018 12:33:27	11.1	7.96	87.8	7.64	46778	30.28
Composite 4	B	06	11/26/2018 12:33:52	11.1	7.50	82.6	7.65	46627	30.17
Composite 4	C	06	11/26/2018 12:34:15	11.1	7.97	87.8	7.66	46823	30.31
Composite 4	D	06	11/26/2018 12:34:38	11.2	7.70	85.1	7.67	46824	30.32
Composite 4	E	06	11/26/2018 12:35:00	11.2	7.96	87.9	7.69	46642	30.19
Composite 5	A	06	11/26/2018 12:35:33	11.3	8.91	98.8	7.76	47006	30.45
Composite 5	B	06	11/26/2018 12:36:07	11.2	8.17	90.3	7.71	46723	30.25
Composite 5	C	06	11/26/2018 12:36:31	11.2	7.79	85.9	7.71	46488	30.07
Composite 5	D	06	11/26/2018 12:36:51	11.1	8.02	88.5	7.69	46751	30.26
Composite 5	E	06	11/26/2018 12:37:20	11.1	6.32	69.7	7.62	47178	30.56
Composite 6	A	06	11/26/2018 12:38:00	10.9	9.19	101.1	7.78	47325	30.66
Composite 6	B	06	11/26/2018 12:38:22	10.9	9.27	101.4	7.86	46085	29.77
Composite 6	C	06	11/26/2018 12:38:49	11.1	8.07	88.9	7.79	46425	30.03
Composite 6	D	06	11/26/2018 12:39:23	11.2	8.35	92.2	7.77	46731	30.25
Composite 6	E	06	11/26/2018 12:39:47	11.2	8.44	93.1	7.80	46670	30.20
Laboratory Control	A	07	11/27/2018 10:04:12	11.4	7.69	87.7	7.78	46861	30.35
Laboratory Control	B	07	11/27/2018 10:04:39	11.6	8.35	95.3	7.81	46303	29.96
Laboratory Control	C	07	11/27/2018 10:05:02	11.4	8.27	94.0	7.80	46287	29.94
Laboratory Control	D	07	11/27/2018 10:05:39	11.4	5.16	58.5	7.64	46148	29.84
Laboratory Control	E	07	11/27/2018 10:06:07	11.3	8.32	94.3	7.76	46448	30.05
CLDS Reference	A	07	11/27/2018 10:06:26	11.1	8.28	93.5	7.78	46163	29.84
CLDS Reference	B	07	11/27/2018 10:06:48	11.1	8.42	95.1	7.80	46300	29.94
CLDS Reference	C	07	11/27/2018 10:07:12	11.1	8.44	95.4	7.82	46306	29.94
CLDS Reference	D	07	11/27/2018 10:07:38	11.1	8.02	90.6	7.80	46341	29.97
CLDS Reference	E	07	11/27/2018 10:07:59	11.1	8.00	90.3	7.79	46156	29.83
Composite 2	A	07	11/27/2018 10:08:23	11.2	7.97	90.2	7.78	46472	30.06
Composite 2	B	07	11/27/2018 10:08:50	11.1	6.43	72.7	7.73	46729	30.24
Composite 2	C	07	11/27/2018 10:09:41	11.2	8.06	91.2	7.80	46245	29.90
Composite 2	D	07	11/27/2018 10:10:10	11.4	7.34	83.3	7.75	46090	29.80
Composite 2	E	07	11/27/2018 10:10:45	11.3	8.02	90.9	7.79	46385	30.01
Composite 3	A	07	11/27/2018 10:11:10	11.2	6.52	73.8	7.72	46363	29.99
Composite 3	B	07	11/27/2018 10:11:36	11.1	7.83	88.4	7.74	46252	29.90
Composite 3	C	07	11/27/2018 10:12:18	11.1	5.84	65.9	7.66	46251	29.90
Composite 3	D	07	11/27/2018 10:12:45	11.1	5.76	64.9	7.61	46111	29.80
Composite 3	E	07	11/27/2018 10:13:13	11.0	7.05	79.3	7.64	45954	29.68
Composite 4	A	07	11/27/2018 10:13:37	11.1	7.99	90.3	7.72	46373	29.99
Composite 4	B	07	11/27/2018 10:14:01	11.1	7.38	83.2	7.72	46110	29.80
Composite 4	C	07	11/27/2018 10:14:26	11.0	7.76	87.4	7.72	46204	29.86
Composite 4	D	07	11/27/2018 10:14:51	11.1	7.59	85.7	7.72	46340	29.97

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	E	07	11/27/2018 10:15:08	11.2	7.83	88.5	7.75	46127	29.82
Composite 5	A	07	11/27/2018 10:15:40	11.3	8.66	98.3	7.83	46483	30.08
Composite 5	B	07	11/27/2018 10:16:03	11.2	7.96	90.0	7.78	46255	29.91
Composite 5	C	07	11/27/2018 10:16:28	11.1	7.80	88.0	7.78	45895	29.65
Composite 5	D	07	11/27/2018 10:16:47	11.1	8.19	92.5	7.77	46223	29.88
Composite 5	E	07	11/27/2018 10:17:13	11.1	5.82	65.8	7.66	46560	30.12
Composite 6	A	07	11/27/2018 10:17:55	10.9	8.99	101.3	7.92	46737	30.24
Composite 6	B	07	11/27/2018 10:18:25	10.9	9.04	101.2	8.00	45483	29.34
Composite 6	C	07	11/27/2018 10:18:51	11.1	8.02	90.5	7.88	46087	29.78
Composite 6	D	07	11/27/2018 10:19:18	11.2	8.23	92.9	7.86	46214	29.88
Composite 6	E	07	11/27/2018 10:19:43	11.1	8.09	91.3	7.86	46052	29.76
Laboratory Control	A	08	11/28/2018 13:33:30	11.5	8.14	90.3	7.78	41313	26.41
Laboratory Control	B	08	11/28/2018 13:34:14	11.9	8.91	99.8	7.83	41455	26.52
Laboratory Control	C	08	11/28/2018 13:34:49	11.7	8.82	98.4	7.84	41523	26.56
Laboratory Control	D	08	11/28/2018 13:35:16	11.8	9.02	100.8	7.85	41493	26.55
Laboratory Control	E	08	11/28/2018 13:36:01	11.6	8.91	99.1	7.86	41471	26.52
CLDS Reference	A	08	11/28/2018 13:36:39	11.7	8.79	97.8	7.85	41330	26.42
CLDS Reference	B	08	11/28/2018 13:37:19	11.6	8.69	96.6	7.85	41334	26.42
CLDS Reference	C	08	11/28/2018 13:37:57	11.5	8.79	97.5	7.85	41218	26.34
CLDS Reference	D	08	11/28/2018 13:38:53	11.7	8.53	94.9	7.83	41278	26.39
CLDS Reference	E	08	11/28/2018 13:39:21	11.8	8.71	97.2	7.83	41265	26.38
Composite 2	A	08	11/28/2018 13:40:14	11.6	8.44	93.9	7.82	41370	26.45
Composite 2	B	08	11/28/2018 13:40:44	11.4	7.90	87.4	7.80	41205	26.33
Composite 2	C	08	11/28/2018 13:41:24	11.7	8.72	97.1	7.84	41219	26.35
Composite 2	D	08	11/28/2018 13:42:06	11.8	8.47	94.5	7.83	41239	26.36
Composite 2	E	08	11/28/2018 13:42:40	11.6	8.46	94.2	7.82	41408	26.48
Composite 3	A	08	11/28/2018 13:43:36	11.7	7.56	84.2	7.75	41355	26.44
Composite 3	B	08	11/28/2018 13:44:41	11.5	8.57	95.1	7.80	41171	26.31
Composite 3	C	08	11/28/2018 13:45:32	11.3	7.71	85.0	7.73	40972	26.16
Composite 3	D	08	11/28/2018 13:46:35	11.6	8.01	88.9	7.73	41099	26.26
Composite 3	E	08	11/28/2018 13:47:16	11.1	7.61	83.3	7.70	40345	25.71
Composite 4	A	08	11/28/2018 13:47:54	11.2	8.40	92.6	7.76	41148	26.28
Composite 4	B	08	11/28/2018 13:48:17	11.1	8.17	89.7	7.76	40556	25.86
Composite 4	C	08	11/28/2018 13:48:50	11.1	7.90	86.7	7.74	40572	25.87
Composite 4	D	08	11/28/2018 13:49:23	11.2	8.32	91.7	7.76	40978	26.16
Composite 4	E	08	11/28/2018 13:49:48	11.2	8.18	89.9	7.78	40546	25.86
Composite 5	A	08	11/28/2018 13:50:43	11.7	8.88	99.1	7.83	41459	26.52
Composite 5	B	08	11/28/2018 13:51:21	11.7	8.47	94.4	7.80	41355	26.44
Composite 5	C	08	11/28/2018 13:51:54	11.6	8.58	95.4	7.81	41034	26.21
Composite 5	D	08	11/28/2018 13:52:29	11.6	8.56	95.2	7.80	41259	26.37
Composite 5	E	08	11/28/2018 13:52:37	11.6	9.31	95.2	7.80	22060	13.29
Composite 6	A	08	11/28/2018 13:53:28	11.4	9.10	100.6	7.88	41301	26.39
Composite 6	B	08	11/28/2018 13:54:46	11.7	9.06	100.7	7.93	41081	26.25
Composite 6	C	08	11/28/2018 13:55:29	11.4	8.44	93.3	7.85	40898	26.11
Composite 6	D	08	11/28/2018 13:55:59	11.5	8.59	95.3	7.85	41074	26.24

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	E	08	11/28/2018 13:56:27	11.6	8.65	96.1	7.86	41017	26.20
Laboratory Control	A	09	11/29/2018 11:25:31	11.4	7.87	88.0	7.79	47125	30.54
Laboratory Control	B	09	11/29/2018 11:25:58	11.7	8.45	95.1	7.81	46778	30.31
Laboratory Control	C	09	11/29/2018 11:26:19	11.5	8.44	94.6	7.82	46921	30.40
Laboratory Control	D	09	11/29/2018 11:26:36	11.3	8.65	96.6	7.83	47066	30.50
Laboratory Control	E	09	11/29/2018 11:26:58	11.3	8.68	97.0	7.84	46940	30.40
CLDS Reference	A	09	11/29/2018 11:27:14	11.1	8.64	96.2	7.83	47164	30.55
CLDS Reference	B	09	11/29/2018 11:27:33	11.2	8.46	94.2	7.83	46778	30.29
CLDS Reference	C	09	11/29/2018 11:28:00	11.5	8.45	94.7	7.83	46792	30.31
CLDS Reference	D	09	11/29/2018 11:28:55	11.6	8.37	94.0	7.83	46745	30.28
CLDS Reference	E	09	11/29/2018 11:29:37	11.5	8.29	93.0	7.82	46839	30.34
Composite 2	A	09	11/29/2018 11:29:55	11.6	8.33	93.6	7.82	46773	30.30
Composite 2	B	09	11/29/2018 11:30:23	11.4	8.00	89.6	7.80	46917	30.39
Composite 2	C	09	11/29/2018 11:30:51	11.6	8.53	95.8	7.82	46728	30.27
Composite 2	D	09	11/29/2018 11:31:19	11.4	8.38	93.8	7.81	46874	30.36
Composite 2	E	09	11/29/2018 11:31:41	11.2	7.98	89.0	7.79	47102	30.52
Composite 3	A	09	11/29/2018 11:32:06	11.3	7.73	86.4	7.74	46947	30.41
Composite 3	B	09	11/29/2018 11:32:32	11.4	7.91	88.4	7.76	46848	30.34
Composite 3	C	09	11/29/2018 11:32:54	11.4	8.13	90.9	7.77	46754	30.28
Composite 3	D	09	11/29/2018 11:33:15	11.1	7.57	84.2	7.74	46970	30.42
Composite 3	E	09	11/29/2018 11:33:42	11.4	8.26	92.4	7.77	46701	30.24
Composite 4	A	09	11/29/2018 11:34:00	11.5	8.37	93.7	7.78	46557	30.14
Composite 4	B	09	11/29/2018 11:34:32	11.2	8.14	90.7	7.77	46640	30.19
Composite 4	C	09	11/29/2018 11:34:52	11.5	8.42	94.4	7.79	46717	30.25
Composite 4	D	09	11/29/2018 11:35:13	11.2	8.18	91.2	7.78	46953	30.41
Composite 4	E	09	11/29/2018 11:35:42	11.5	8.38	93.8	7.80	46741	30.27
Composite 5	A	09	11/29/2018 11:36:13	11.6	8.58	96.2	7.82	46675	30.23
Composite 5	B	09	11/29/2018 11:36:37	11.5	8.01	89.7	7.80	46766	30.29
Composite 5	C	09	11/29/2018 11:36:56	11.4	8.12	90.8	7.79	46917	30.39
Composite 5	D	09	11/29/2018 11:37:19	11.6	8.35	93.7	7.80	46698	30.24
Composite 5	E	09	11/29/2018 11:37:44	11.2	7.39	82.5	7.74	47017	30.46
Composite 6	A	09	11/29/2018 11:38:12	11.0	8.82	98.0	7.84	47125	30.52
Composite 6	B	09	11/29/2018 11:38:37	11.0	8.93	99.1	7.89	46867	30.34
Composite 6	C	09	11/29/2018 11:38:51	11.2	8.59	95.7	7.86	46870	30.35
Composite 6	D	09	11/29/2018 11:39:05	11.5	8.31	93.1	7.84	46843	30.34
Composite 6	E	09	11/29/2018 11:39:27	11.6	8.40	94.4	7.84	46713	30.26
Laboratory Control	A	10	11/30/2018 15:20:48	11.2	8.08	89.7	7.72	48360	31.42
Laboratory Control	B	10	11/30/2018 15:21:37	11.5	8.74	97.2	7.75	47683	30.95
Laboratory Control	C	10	11/30/2018 15:21:56	11.3	8.75	96.9	7.75	47902	31.10
Laboratory Control	D	10	11/30/2018 15:22:11	11.1	8.88	98.1	7.76	48209	31.31
Laboratory Control	E	10	11/30/2018 15:22:28	11.0	8.96	98.8	7.77	48050	31.19
CLDS Reference	A	10	11/30/2018 15:22:54	10.9	8.61	95.0	7.74	48531	31.53
CLDS Reference	B	10	11/30/2018 15:23:12	11.2	8.62	95.3	7.75	47742	30.97
CLDS Reference	C	10	11/30/2018 15:23:50	11.4	8.60	95.5	7.77	47727	30.98

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
CLDS Reference	D	10	11/30/2018 15:24:13	11.5	8.54	95.0	7.77	47682	30.95
CLDS Reference	E	10	11/30/2018 15:24:39	11.4	8.67	96.3	7.76	47770	31.01
Composite 2	A	10	11/30/2018 15:25:03	11.5	8.36	93.0	7.75	47696	30.96
Composite 2	B	10	11/30/2018 15:25:21	11.3	8.15	90.4	7.73	47943	31.12
Composite 2	C	10	11/30/2018 15:25:44	11.3	8.72	96.8	7.75	47757	30.99
Composite 2	D	10	11/30/2018 15:26:13	11.2	8.54	94.5	7.74	47956	31.13
Composite 2	E	10	11/30/2018 15:26:33	11.1	8.36	92.4	7.73	48153	31.27
Composite 3	A	10	11/30/2018 15:26:53	11.1	5.24	58.0	7.62	47891	31.08
Composite 3	B	10	11/30/2018 15:27:21	11.1	8.20	90.6	7.67	47857	31.06
Composite 3	C	10	11/30/2018 15:27:47	11.2	8.04	89.0	7.69	47719	30.96
Composite 3	D	10	11/30/2018 15:28:10	11.0	6.43	70.9	7.62	48351	31.40
Composite 3	E	10	11/30/2018 15:28:37	11.2	8.43	93.4	7.68	47764	30.99
Composite 4	A	10	11/30/2018 15:29:01	11.5	8.55	95.1	7.72	47654	30.93
Composite 4	B	10	11/30/2018 15:29:37	11.1	8.14	89.9	7.70	48001	31.16
Composite 4	C	10	11/30/2018 15:29:58	11.4	8.49	94.3	7.72	47713	30.96
Composite 4	D	10	11/30/2018 15:30:22	11.1	8.04	89.0	7.69	48326	31.39
Composite 4	E	10	11/30/2018 15:30:50	11.4	8.54	94.9	7.73	47748	30.99
Composite 5	A	10	11/30/2018 15:31:16	11.3	8.81	97.7	7.75	47689	30.95
Composite 5	B	10	11/30/2018 15:31:38	11.2	8.38	92.8	7.73	47730	30.97
Composite 5	C	10	11/30/2018 15:32:01	11.1	8.37	92.6	7.73	48073	31.21
Composite 5	D	10	11/30/2018 15:32:25	11.4	8.49	94.2	7.74	47662	30.93
Composite 5	E	10	11/30/2018 15:32:48	11.1	6.38	70.5	7.63	48404	31.45
Composite 6	A	10	11/30/2018 15:33:27	10.9	9.01	99.2	7.75	48455	31.47
Composite 6	B	10	11/30/2018 15:33:45	10.9	9.07	99.9	7.80	48258	31.33
Composite 6	C	10	11/30/2018 15:34:05	11.1	8.52	94.1	7.77	48163	31.27
Composite 6	D	10	11/30/2018 15:34:27	11.4	8.51	94.5	7.76	47787	31.02
Composite 6	E	10	11/30/2018 15:34:51	11.5	8.56	95.3	7.77	47654	30.93
Laboratory Control	A	11	12/1/2018 11:02:29	11.4	8.74	94.9	7.79	44219	28.46
Laboratory Control	B	11	12/1/2018 11:02:57	11.6	9.10	98.9	7.80	43367	27.86
Laboratory Control	C	11	12/1/2018 11:03:21	11.5	9.27	100.7	7.80	43411	27.89
Laboratory Control	D	11	12/1/2018 11:03:44	11.7	9.37	101.8	7.81	42656	27.36
Laboratory Control	E	11	12/1/2018 11:05:54	11.5	9.26	100.3	7.82	43205	27.74
CLDS Reference	A	11	12/1/2018 11:06:21	11.7	9.29	100.9	7.82	42618	27.34
CLDS Reference	B	11	12/1/2018 11:06:41	11.3	9.24	99.8	7.81	43223	27.75
CLDS Reference	C	11	12/1/2018 11:07:08	11.5	9.20	99.7	7.82	43218	27.75
CLDS Reference	D	11	12/1/2018 11:07:36	11.6	9.00	97.7	7.81	43064	27.65
CLDS Reference	E	11	12/1/2018 11:07:53	11.6	9.11	98.9	7.81	42972	27.58
Composite 2	A	11	12/1/2018 11:08:06	11.6	9.14	99.3	7.81	43062	27.65
Composite 2	B	11	12/1/2018 11:08:57	11.4	8.58	92.9	7.77	43525	27.97
Composite 2	C	11	12/1/2018 11:09:23	11.5	9.17	99.5	7.80	43160	27.71
Composite 2	D	11	12/1/2018 11:09:59	11.6	9.04	98.1	7.80	42879	27.52
Composite 2	E	11	12/1/2018 11:10:32	11.5	9.56	103.6	7.83	42854	27.50
Composite 3	A	11	12/1/2018 11:11:04	11.5	8.81	95.6	7.79	43237	27.77
Composite 3	B	11	12/1/2018 11:11:33	11.4	8.87	96.1	7.78	43368	27.86
Composite 3	C	11	12/1/2018 11:11:59	11.3	8.94	96.6	7.79	43458	27.92

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 3	D	11	12/1/2018 11:12:19	11.2	9.38	101.4	7.81	44080	28.35
Composite 3	E	11	12/1/2018 11:12:56	11.3	8.92	96.6	7.79	43965	28.28
Composite 4	A	11	12/1/2018 11:13:21	11.5	9.10	98.7	7.79	43128	27.69
Composite 4	B	11	12/1/2018 11:13:48	11.5	8.87	96.3	7.79	43491	27.95
Composite 4	C	11	12/1/2018 11:14:24	11.5	8.84	95.9	7.79	43304	27.82
Composite 4	D	11	12/1/2018 11:14:55	11.3	8.86	96.2	7.78	43979	28.29
Composite 4	E	11	12/1/2018 11:15:22	11.6	9.09	98.7	7.80	42784	27.45
Composite 5	A	11	12/1/2018 11:15:49	11.5	9.24	100.2	7.80	43064	27.65
Composite 5	B	11	12/1/2018 11:16:14	11.5	8.77	95.2	7.78	43343	27.84
Composite 5	C	11	12/1/2018 11:16:44	11.7	9.01	97.9	7.80	42800	27.47
Composite 5	D	11	12/1/2018 11:17:08	11.6	8.97	97.4	7.79	43136	27.70
Composite 5	E	11	12/1/2018 11:17:26	11.5	8.87	96.2	7.78	43238	27.77
Composite 6	A	11	12/1/2018 11:18:00	11.2	9.38	101.5	7.81	44063	28.34
Composite 6	B	11	12/1/2018 11:18:25	11.3	9.40	101.7	7.83	43468	27.92
Composite 6	C	11	12/1/2018 11:18:50	11.2	8.79	95.5	7.78	45265	29.20
Composite 6	D	11	12/1/2018 11:19:11	11.7	8.98	97.7	7.81	42980	27.59
Composite 6	E	11	12/1/2018 11:19:32	11.7	9.16	99.7	7.81	42764	27.44
Laboratory Control	A	12	12/2/2018 13:05:06	11.4	8.56	94.3	7.78	44319	28.53
Laboratory Control	B	12	12/2/2018 13:05:38	11.5	9.18	101.5	7.82	44071	28.36
Laboratory Control	C	12	12/2/2018 13:05:59	11.5	9.27	102.5	7.83	44172	28.43
Laboratory Control	D	12	12/2/2018 13:06:17	11.7	9.27	102.9	7.85	44309	28.54
Laboratory Control	E	12	12/2/2018 13:06:43	11.4	9.41	103.7	7.86	44202	28.45
CLDS Reference	A	12	12/2/2018 13:07:13	11.7	9.24	102.5	7.87	44321	28.55
CLDS Reference	B	12	12/2/2018 13:07:38	11.3	9.21	101.4	7.86	44300	28.52
CLDS Reference	C	12	12/2/2018 13:07:59	11.4	9.25	101.9	7.86	44187	28.44
CLDS Reference	D	12	12/2/2018 13:08:25	11.5	9.01	99.5	7.85	44238	28.48
CLDS Reference	E	12	12/2/2018 13:08:49	11.6	9.10	100.8	7.85	44285	28.52
Composite 2	A	12	12/2/2018 13:09:14	11.5	8.95	99.0	7.85	44286	28.52
Composite 2	B	12	12/2/2018 13:09:38	11.2	8.45	92.5	7.80	43879	28.21
Composite 2	C	12	12/2/2018 13:10:01	11.5	9.07	100.2	7.84	44280	28.51
Composite 2	D	12	12/2/2018 13:10:27	11.5	9.07	100.4	7.84	44304	28.53
Composite 2	E	12	12/2/2018 13:10:47	11.4	8.86	97.7	7.83	44333	28.54
Composite 3	A	12	12/2/2018 13:11:13	11.4	8.96	98.9	7.83	44240	28.48
Composite 3	B	12	12/2/2018 13:11:36	11.3	8.96	98.7	7.83	44207	28.45
Composite 3	C	12	12/2/2018 13:11:54	11.3	9.12	100.4	7.83	44375	28.57
Composite 3	D	12	12/2/2018 13:12:20	11.2	8.10	88.9	7.77	44395	28.58
Composite 3	E	12	12/2/2018 13:12:47	11.2	8.85	97.2	7.79	44211	28.45
Composite 4	A	12	12/2/2018 13:13:12	11.6	8.95	99.0	7.82	44274	28.51
Composite 4	B	12	12/2/2018 13:13:36	11.5	8.99	99.4	7.82	44231	28.48
Composite 4	C	12	12/2/2018 13:13:59	11.4	8.99	99.2	7.83	44247	28.48
Composite 4	D	12	12/2/2018 13:14:24	11.2	8.82	96.8	7.80	44175	28.42
Composite 4	E	12	12/2/2018 13:14:48	11.6	9.01	99.9	7.83	44327	28.55
Composite 5	A	12	12/2/2018 13:15:20	11.3	9.07	99.9	7.84	44286	28.51
Composite 5	B	12	12/2/2018 13:15:48	11.4	8.83	97.4	7.82	44162	28.42
Composite 5	C	12	12/2/2018 13:16:14	11.6	8.98	99.4	7.84	44252	28.49

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	D	12	12/2/2018 13:16:39	11.4	8.91	98.3	7.83	44186	28.44
Composite 5	E	12	12/2/2018 13:16:57	11.4	8.69	95.9	7.82	44204	28.45
Composite 6	A	12	12/2/2018 13:17:23	11.2	9.39	103.2	7.87	44311	28.52
Composite 6	B	12	12/2/2018 13:17:50	11.2	9.45	103.7	7.90	44117	28.38
Composite 6	C	12	12/2/2018 13:18:18	11.2	8.81	97.1	7.83	45320	29.24
Composite 6	D	12	12/2/2018 13:18:42	11.6	8.98	99.6	7.85	44252	28.50
Composite 6	E	12	12/2/2018 13:19:08	11.7	9.05	100.5	7.86	44294	28.53
Laboratory Control	A	13	12/3/2018 12:13:04	11.5	8.17	92.2	7.80	47024	30.47
Laboratory Control	B	13	12/3/2018 12:13:34	11.5	8.85	99.9	7.82	46801	30.31
Laboratory Control	C	13	12/3/2018 12:13:58	11.4	8.89	100.2	7.83	46845	30.34
Laboratory Control	D	13	12/3/2018 12:14:13	11.2	8.95	100.6	7.83	47043	30.48
Laboratory Control	E	13	12/3/2018 12:14:31	11.2	9.07	101.6	7.85	46881	30.36
CLDS Reference	A	13	12/3/2018 12:14:48	11.1	8.77	98.1	7.82	47079	30.49
CLDS Reference	B	13	12/3/2018 12:15:04	11.0	8.65	96.7	7.82	46967	30.41
CLDS Reference	C	13	12/3/2018 12:15:27	11.3	8.77	98.6	7.84	46876	30.36
CLDS Reference	D	13	12/3/2018 12:15:51	11.4	8.39	94.7	7.83	46861	30.36
CLDS Reference	E	13	12/3/2018 12:16:11	11.5	8.54	96.4	7.84	46817	30.33
Composite 2	A	13	12/3/2018 12:16:34	11.5	8.19	92.5	7.84	46880	30.37
Composite 2	B	13	12/3/2018 12:17:11	11.3	7.37	82.8	7.77	46706	30.24
Composite 2	C	13	12/3/2018 12:17:36	11.4	8.68	97.8	7.83	46935	30.40
Composite 2	D	13	12/3/2018 12:18:03	11.5	8.36	94.3	7.81	46895	30.38
Composite 2	E	13	12/3/2018 12:18:22	11.4	8.17	92.1	7.82	46887	30.37
Composite 3	A	13	12/3/2018 12:18:41	11.3	8.27	93.0	7.80	46868	30.35
Composite 3	B	13	12/3/2018 12:19:07	11.3	8.50	95.5	7.81	46879	30.36
Composite 3	C	13	12/3/2018 12:19:27	11.2	8.62	96.8	7.81	47003	30.45
Composite 3	D	13	12/3/2018 12:19:56	11.2	6.41	71.9	7.71	47060	30.48
Composite 3	E	13	12/3/2018 12:20:35	11.2	8.48	95.2	7.76	46915	30.38
Composite 4	A	13	12/3/2018 12:21:04	11.5	8.37	94.5	7.80	46854	30.35
Composite 4	B	13	12/3/2018 12:21:29	11.5	8.38	94.5	7.81	46796	30.31
Composite 4	C	13	12/3/2018 12:21:58	11.4	8.50	95.8	7.81	46878	30.37
Composite 4	D	13	12/3/2018 12:22:14	11.3	8.35	93.8	7.78	46902	30.38
Composite 4	E	13	12/3/2018 12:22:39	11.5	8.56	96.7	7.82	46879	30.37
Composite 5	A	13	12/3/2018 12:23:12	11.4	8.69	97.8	7.82	46982	30.44
Composite 5	B	13	12/3/2018 12:23:38	11.4	8.13	91.6	7.82	46822	30.33
Composite 5	C	13	12/3/2018 12:24:04	11.5	8.33	93.9	7.84	46826	30.33
Composite 5	D	13	12/3/2018 12:24:29	11.4	8.42	94.8	7.84	46830	30.33
Composite 5	E	13	12/3/2018 12:24:54	11.3	7.97	89.7	7.82	46852	30.34
Composite 6	A	13	12/3/2018 12:25:21	11.2	9.15	102.7	7.85	46994	30.44
Composite 6	B	13	12/3/2018 12:25:44	11.2	9.21	103.2	7.87	46872	30.35
Composite 6	C	13	12/3/2018 12:26:10	11.3	8.59	97.0	7.82	48083	31.23
Composite 6	D	13	12/3/2018 12:26:34	11.6	8.36	94.6	7.84	46824	30.34
Composite 6	E	13	12/3/2018 12:26:59	11.6	8.40	94.9	7.85	46849	30.35
Laboratory Control	A	14	12/4/2018 10:01:07	11.3	8.05	89.1	7.75	46429	30.04
Laboratory Control	B	14	12/4/2018 10:01:37	11.3	8.70	96.3	7.77	46043	29.76

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	C	14	12/4/2018 10:02:01	11.2	8.62	95.4	7.78	46262	29.92
Laboratory Control	D	14	12/4/2018 10:02:26	11.1	8.77	96.7	7.80	46243	29.89
Laboratory Control	E	14	12/4/2018 10:02:52	11.1	8.94	98.4	7.82	46247	29.90
CLDS Reference	A	14	12/4/2018 10:03:12	11.0	8.64	94.9	7.80	46284	29.92
CLDS Reference	B	14	12/4/2018 10:03:39	10.9	8.45	92.8	7.78	46303	29.93
CLDS Reference	C	14	12/4/2018 10:04:04	11.1	8.76	96.5	7.80	46410	30.01
CLDS Reference	D	14	12/4/2018 10:04:30	11.1	8.18	90.2	7.77	46262	29.91
CLDS Reference	E	14	12/4/2018 10:04:55	11.2	8.49	93.8	7.78	46487	30.07
Composite 2	A	14	12/4/2018 10:05:19	11.1	8.21	90.5	7.79	46338	29.96
Composite 2	B	14	12/4/2018 10:05:43	11.1	6.72	73.9	7.72	45972	29.70
Composite 2	C	14	12/4/2018 10:06:11	11.3	8.60	95.4	7.79	46567	30.14
Composite 2	D	14	12/4/2018 10:06:46	11.2	8.29	91.6	7.77	46327	29.96
Composite 2	E	14	12/4/2018 10:07:13	11.2	7.79	86.1	7.75	46506	30.09
Composite 3	A	14	12/4/2018 10:07:41	11.1	8.08	89.2	7.72	46349	29.97
Composite 3	B	14	12/4/2018 10:08:13	11.0	8.25	90.6	7.75	46085	29.77
Composite 3	C	14	12/4/2018 10:08:42	11.1	6.52	71.9	7.67	46501	30.08
Composite 3	D	14	12/4/2018 10:09:14	11.0	4.86	53.4	7.58	46284	29.92
Composite 3	E	14	12/4/2018 10:09:50	11.0	8.42	92.7	7.70	46281	29.92
Composite 4	A	14	12/4/2018 10:10:12	11.0	8.35	91.9	7.72	46195	29.86
Composite 4	B	14	12/4/2018 10:10:35	11.1	8.07	88.9	7.72	46204	29.87
Composite 4	C	14	12/4/2018 10:10:53	11.0	8.34	91.8	7.73	46166	29.84
Composite 4	D	14	12/4/2018 10:11:15	11.1	8.09	89.2	7.71	46201	29.86
Composite 4	E	14	12/4/2018 10:11:37	11.3	8.55	94.7	7.75	46507	30.09
Composite 5	A	14	12/4/2018 10:12:11	11.1	8.61	95.0	7.78	46198	29.86
Composite 5	B	14	12/4/2018 10:12:37	11.1	7.48	82.4	7.74	46099	29.79
Composite 5	C	14	12/4/2018 10:13:01	11.1	8.09	89.3	7.77	46315	29.95
Composite 5	D	14	12/4/2018 10:13:27	11.1	8.28	91.1	7.79	46122	29.81
Composite 5	E	14	12/4/2018 10:13:54	11.1	7.08	78.0	7.74	46229	29.88
Composite 6	A	14	12/4/2018 10:14:23	10.9	9.07	99.7	7.81	46323	29.94
Composite 6	B	14	12/4/2018 10:14:46	10.9	9.11	100.0	7.83	46194	29.85
Composite 6	C	14	12/4/2018 10:15:11	11.1	8.53	94.4	7.80	47254	30.62
Composite 6	D	14	12/4/2018 10:15:36	11.2	7.95	87.8	7.78	46258	29.91
Composite 6	E	14	12/4/2018 10:16:00	11.2	8.21	90.6	7.78	46204	29.87
Laboratory Control	A	15	12/5/2018 10:12:21	11.3	8.18	89.8	7.76	46342	29.98
Laboratory Control	B	15	12/5/2018 10:12:53	11.4	8.85	97.1	7.79	45789	29.58
Laboratory Control	C	15	12/5/2018 10:13:18	11.4	8.82	97.1	7.80	46519	30.11
Laboratory Control	D	15	12/5/2018 10:13:33	11.1	8.90	96.9	7.80	45336	29.25
Laboratory Control	E	15	12/5/2018 10:13:59	11.3	8.87	97.3	7.81	46467	30.06
CLDS Reference	A	15	12/5/2018 10:14:26	11.0	8.54	92.7	7.78	45417	29.30
CLDS Reference	B	15	12/5/2018 10:14:54	10.9	8.65	93.9	7.78	45870	29.62
CLDS Reference	C	15	12/5/2018 10:15:23	11.4	8.70	95.8	7.80	46596	30.16
CLDS Reference	D	15	12/5/2018 10:15:50	11.4	8.18	90.0	7.77	46351	29.99
CLDS Reference	E	15	12/5/2018 10:16:12	11.5	8.52	94.2	7.78	46651	30.21
Composite 2	A	15	12/5/2018 10:16:34	11.4	8.16	89.6	7.79	46396	30.02
Composite 2	B	15	12/5/2018 10:17:02	11.1	6.87	74.6	7.72	45127	29.10

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 2	C	15	12/5/2018 10:17:30	11.5	8.55	94.4	7.78	46663	30.21
Composite 2	D	15	12/5/2018 10:17:58	11.4	8.52	93.8	7.78	46680	30.22
Composite 2	E	15	12/5/2018 10:18:23	11.2	8.21	90.1	7.77	46608	30.16
Composite 3	A	15	12/5/2018 10:18:47	11.1	8.41	91.9	7.76	46331	29.96
Composite 3	B	15	12/5/2018 10:19:11	11.1	8.50	92.6	7.77	45612	29.44
Composite 3	C	15	12/5/2018 10:19:35	11.2	7.96	87.3	7.74	46490	30.08
Composite 3	D	15	12/5/2018 10:19:58	11.0	8.65	94.1	7.76	45624	29.45
Composite 3	E	15	12/5/2018 10:20:32	11.1	8.44	92.0	7.76	46023	29.74
Composite 4	A	15	12/5/2018 10:20:56	11.0	8.15	88.4	7.74	45293	29.21
Composite 4	B	15	12/5/2018 10:21:20	11.1	8.42	91.9	7.75	46029	29.74
Composite 4	C	15	12/5/2018 10:21:41	11.1	8.47	92.1	7.76	45596	29.43
Composite 4	D	15	12/5/2018 10:22:03	11.3	8.44	92.4	7.75	45987	29.72
Composite 4	E	15	12/5/2018 10:22:19	11.3	8.50	93.2	7.76	46496	30.08
Composite 5	A	15	12/5/2018 10:22:46	11.1	8.56	93.1	7.78	45327	29.24
Composite 5	B	15	12/5/2018 10:23:10	11.1	8.08	88.1	7.76	45939	29.67
Composite 5	C	15	12/5/2018 10:23:35	11.0	8.17	88.9	7.79	45813	29.58
Composite 5	D	15	12/5/2018 10:23:59	11.1	8.45	92.0	7.80	45898	29.65
Composite 5	E	15	12/5/2018 10:24:24	11.2	7.61	83.1	7.77	46060	29.77
Composite 6	A	15	12/5/2018 10:24:55	10.9	9.05	98.0	7.79	45691	29.49
Composite 6	B	15	12/5/2018 10:25:11	11.0	9.07	98.7	7.80	45939	29.67
Composite 6	C	15	12/5/2018 10:25:33	11.1	8.57	93.5	7.77	46316	29.94
Composite 6	D	15	12/5/2018 10:25:56	11.4	8.40	92.2	7.78	46194	29.87
Composite 6	E	15	12/5/2018 10:26:18	11.3	8.44	92.5	7.78	45998	29.73
Laboratory Control	A	16	12/6/2018 10:12:59	11.1	8.20	90.3	7.75	47618	30.88
Laboratory Control	B	16	12/6/2018 10:13:28	11.2	8.86	97.6	7.78	47199	30.59
Laboratory Control	C	16	12/6/2018 10:13:58	11.1	8.87	97.7	7.79	47657	30.91
Laboratory Control	D	16	12/6/2018 10:14:24	11.1	8.88	97.5	7.80	47126	30.53
Laboratory Control	E	16	12/6/2018 10:15:03	11.1	8.91	98.1	7.82	47554	30.84
CLDS Reference	A	16	12/6/2018 10:15:26	11.0	8.77	96.1	7.80	47090	30.50
CLDS Reference	B	16	12/6/2018 10:15:50	10.8	8.70	95.0	7.78	47167	30.54
CLDS Reference	C	16	12/6/2018 10:16:28	11.3	8.75	96.7	7.80	47495	30.81
CLDS Reference	D	16	12/6/2018 10:16:54	11.4	8.29	91.9	7.78	47426	30.76
CLDS Reference	E	16	12/6/2018 10:17:19	11.5	8.54	94.8	7.80	47439	30.77
Composite 2	A	16	12/6/2018 10:17:39	11.4	8.19	90.6	7.80	47496	30.81
Composite 2	B	16	12/6/2018 10:18:55	11.7	7.96	88.6	7.81	47285	30.67
Composite 2	C	16	12/6/2018 10:19:19	11.4	8.61	95.4	7.82	47523	30.83
Composite 2	D	16	12/6/2018 10:19:46	11.1	8.55	94.1	7.80	47679	30.92
Composite 2	E	16	12/6/2018 10:20:12	11.0	8.15	89.4	7.78	47677	30.92
Composite 3	A	16	12/6/2018 10:20:35	11.0	8.52	93.6	7.77	47470	30.77
Composite 3	B	16	12/6/2018 10:20:59	11.0	8.54	93.6	7.78	47083	30.49
Composite 3	C	16	12/6/2018 10:21:30	11.1	7.93	87.3	7.76	47506	30.80
Composite 3	D	16	12/6/2018 10:21:49	10.9	8.72	95.4	7.77	46968	30.41
Composite 3	E	16	12/6/2018 10:22:13	11.0	8.51	93.3	7.77	47272	30.63
Composite 4	A	16	12/6/2018 10:22:37	10.9	8.03	87.5	7.74	46456	30.04
Composite 4	B	16	12/6/2018 10:23:02	11.1	8.50	93.3	7.75	47287	30.64

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	C	16	12/6/2018 10:23:28	11.0	8.53	93.4	7.76	46932	30.38
Composite 4	D	16	12/6/2018 10:23:47	11.2	8.43	92.8	7.75	47319	30.67
Composite 4	E	16	12/6/2018 10:24:06	11.2	8.58	94.6	7.77	47623	30.89
Composite 5	A	16	12/6/2018 10:24:33	11.0	8.84	96.6	7.79	46611	30.15
Composite 5	B	16	12/6/2018 10:24:56	11.0	7.94	87.0	7.77	47228	30.59
Composite 5	C	16	12/6/2018 10:25:19	10.9	8.41	91.9	7.80	47056	30.47
Composite 5	D	16	12/6/2018 10:25:36	10.9	8.50	93.0	7.80	47109	30.50
Composite 5	E	16	12/6/2018 10:25:56	11.0	8.21	90.1	7.79	47324	30.67
Composite 6	A	16	12/6/2018 10:26:50	10.8	9.10	99.2	7.79	46982	30.41
Composite 6	B	16	12/6/2018 10:27:13	10.9	9.05	98.9	7.79	47269	30.62
Composite 6	C	16	12/6/2018 10:27:31	11.0	8.56	94.0	7.76	47500	30.79
Composite 6	D	16	12/6/2018 10:27:53	11.3	8.32	91.8	7.77	47349	30.70
Composite 6	E	16	12/6/2018 10:28:17	11.2	8.04	88.6	7.78	47293	30.65
Laboratory Control	A	17	12/7/2018 10:06:26	11.6	8.90	97.3	7.79	44634	28.77
Laboratory Control	B	17	12/7/2018 10:06:48	11.6	9.25	101.2	7.80	44621	28.76
Laboratory Control	C	17	12/7/2018 10:07:05	11.6	9.21	100.9	7.80	44615	28.76
Laboratory Control	D	17	12/7/2018 10:07:27	11.7	9.29	101.7	7.81	44538	28.70
Laboratory Control	E	17	12/7/2018 10:07:48	11.6	9.30	101.6	7.82	44584	28.73
CLDS Reference	A	17	12/7/2018 10:08:04	11.0	9.19	99.5	7.80	45271	29.19
CLDS Reference	B	17	12/7/2018 10:08:23	11.3	9.06	98.4	7.81	44720	28.81
CLDS Reference	C	17	12/7/2018 10:08:44	11.7	9.21	100.9	7.82	44500	28.67
CLDS Reference	D	17	12/7/2018 10:09:00	11.7	9.15	100.3	7.82	44504	28.68
CLDS Reference	E	17	12/7/2018 10:09:16	11.6	9.03	98.8	7.81	44613	28.75
Composite 2	A	17	12/7/2018 10:09:34	11.6	8.98	98.3	7.83	44559	28.72
Composite 2	B	17	12/7/2018 10:09:48	11.6	8.79	96.2	7.82	44579	28.73
Composite 2	C	17	12/7/2018 10:10:06	11.6	9.05	99.1	7.83	44536	28.70
Composite 2	D	17	12/7/2018 10:10:30	11.4	8.97	97.8	7.82	44727	28.83
Composite 2	E	17	12/7/2018 10:10:50	11.6	8.88	97.1	7.82	44581	28.73
Composite 3	A	17	12/7/2018 10:11:11	11.7	8.95	98.0	7.82	44516	28.69
Composite 3	B	17	12/7/2018 10:11:24	11.7	8.98	98.5	7.82	44492	28.67
Composite 3	C	17	12/7/2018 10:11:48	11.4	7.76	84.5	7.80	44859	28.92
Composite 3	D	17	12/7/2018 10:12:08	11.6	8.98	98.2	7.82	44518	28.69
Composite 3	E	17	12/7/2018 10:12:29	11.5	8.89	97.1	7.82	44646	28.77
Composite 4	A	17	12/7/2018 10:12:44	11.7	8.94	98.0	7.83	44519	28.69
Composite 4	B	17	12/7/2018 10:12:55	11.5	8.96	97.9	7.82	44709	28.82
Composite 4	C	17	12/7/2018 10:13:14	11.6	8.94	97.7	7.82	44592	28.74
Composite 4	D	17	12/7/2018 10:13:32	11.7	8.96	98.1	7.82	44542	28.70
Composite 4	E	17	12/7/2018 10:13:48	11.6	9.11	99.8	7.83	44531	28.69
Composite 5	A	17	12/7/2018 10:14:12	11.7	9.03	98.9	7.84	44514	28.68
Composite 5	B	17	12/7/2018 10:14:30	11.7	8.75	95.9	7.83	44500	28.68
Composite 5	C	17	12/7/2018 10:14:42	11.7	8.83	96.9	7.84	44535	28.70
Composite 5	D	17	12/7/2018 10:14:55	11.8	8.93	98.0	7.85	44479	28.66
Composite 5	E	17	12/7/2018 10:15:17	11.6	8.82	96.4	7.84	44596	28.74
Composite 6	A	17	12/7/2018 10:15:41	11.2	9.38	101.8	7.85	44975	28.99
Composite 6	B	17	12/7/2018 10:16:00	11.5	9.35	102.1	7.85	44597	28.74

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	C	17	12/7/2018 10:16:16	11.4	8.92	97.4	7.82	44985	29.01
Composite 6	D	17	12/7/2018 10:16:32	11.8	8.92	97.9	7.83	44523	28.69
Composite 6	E	17	12/7/2018 10:16:59	11.6	9.04	98.9	7.84	44569	28.72
Laboratory Control	A	18	12/8/2018 10:04:37	11.7	8.92	96.7	7.82	44123	28.40
Laboratory Control	B	18	12/8/2018 10:05:05	11.7	9.22	100.0	7.83	44113	28.40
Laboratory Control	C	18	12/8/2018 10:05:32	11.7	8.99	97.6	7.83	44081	28.38
Laboratory Control	D	18	12/8/2018 10:05:50	11.8	9.24	100.4	7.84	44043	28.35
Laboratory Control	E	18	12/8/2018 10:06:11	11.7	9.33	101.3	7.85	44044	28.35
CLDS Reference	A	18	12/8/2018 10:06:25	11.5	9.04	97.7	7.84	44222	28.47
CLDS Reference	B	18	12/8/2018 10:06:42	11.5	9.14	98.8	7.84	44117	28.39
CLDS Reference	C	18	12/8/2018 10:07:07	11.9	9.23	100.4	7.84	44028	28.35
CLDS Reference	D	18	12/8/2018 10:07:29	11.9	9.11	99.1	7.84	44025	28.34
CLDS Reference	E	18	12/8/2018 10:07:39	11.8	9.12	99.0	7.84	44069	28.37
Composite 2	A	18	12/8/2018 10:07:52	11.8	9.04	98.2	7.85	44052	28.36
Composite 2	B	18	12/8/2018 10:08:11	11.7	8.70	94.3	7.84	44079	28.38
Composite 2	C	18	12/8/2018 10:08:54	11.8	8.80	95.6	7.85	44050	28.36
Composite 2	D	18	12/8/2018 10:09:19	11.6	8.86	95.9	7.84	44182	28.44
Composite 2	E	18	12/8/2018 10:09:43	11.7	8.97	97.3	7.85	44064	28.37
Composite 3	A	18	12/8/2018 10:09:58	11.8	8.94	97.2	7.84	44039	28.35
Composite 3	B	18	12/8/2018 10:10:14	11.9	8.95	97.3	7.84	44026	28.34
Composite 3	C	18	12/8/2018 10:10:36	11.6	8.11	87.8	7.82	44206	28.46
Composite 3	D	18	12/8/2018 10:10:56	11.8	9.04	98.2	7.84	44036	28.35
Composite 3	E	18	12/8/2018 10:11:25	11.7	8.91	96.5	7.84	44109	28.39
Composite 4	A	18	12/8/2018 10:11:45	11.8	8.94	97.2	7.84	44035	28.35
Composite 4	B	18	12/8/2018 10:12:04	11.7	8.95	97.1	7.83	44111	28.40
Composite 4	C	18	12/8/2018 10:12:19	11.7	8.97	97.4	7.84	44068	28.37
Composite 4	D	18	12/8/2018 10:12:40	11.8	8.94	97.1	7.83	44056	28.36
Composite 4	E	18	12/8/2018 10:12:59	11.8	9.14	99.3	7.84	44039	28.35
Composite 5	A	18	12/8/2018 10:13:20	11.8	9.09	98.8	7.85	44028	28.34
Composite 5	B	18	12/8/2018 10:13:44	11.8	8.67	94.2	7.85	44032	28.35
Composite 5	C	18	12/8/2018 10:14:05	11.8	8.84	96.0	7.86	44068	28.37
Composite 5	D	18	12/8/2018 10:14:25	11.9	9.06	98.6	7.86	44021	28.34
Composite 5	E	18	12/8/2018 10:14:45	11.7	8.71	94.5	7.85	44085	28.38
Composite 6	A	18	12/8/2018 10:15:08	11.3	9.35	100.7	7.85	44418	28.60
Composite 6	B	18	12/8/2018 10:15:22	11.5	9.30	100.5	7.85	44107	28.39
Composite 6	C	18	12/8/2018 10:15:43	11.5	8.73	94.4	7.82	44424	28.61
Composite 6	D	18	12/8/2018 10:16:04	11.9	8.97	97.6	7.84	44028	28.35
Composite 6	E	18	12/8/2018 10:16:22	11.7	8.98	97.4	7.84	44071	28.37
Laboratory Control	A	19	12/9/2018 12:51:47	11.7	9.00	98.0	7.79	43608	28.04
Laboratory Control	B	19	12/9/2018 12:52:11	11.8	9.27	100.9	7.80	43449	27.93
Laboratory Control	C	19	12/9/2018 12:52:23	11.8	9.34	101.7	7.81	43547	28.00
Laboratory Control	D	19	12/9/2018 12:52:43	11.8	9.44	103.0	7.82	43632	28.06
Laboratory Control	E	19	12/9/2018 12:53:04	11.8	9.46	103.1	7.83	43626	28.06
CLDS Reference	A	19	12/9/2018 12:53:24	11.5	9.21	99.7	7.82	43502	27.96

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
CLDS Reference	B	19	12/9/2018 12:53:43	11.5	9.22	99.9	7.82	43606	28.03
CLDS Reference	C	19	12/9/2018 12:54:05	11.9	9.41	102.7	7.83	43680	28.10
CLDS Reference	D	19	12/9/2018 12:54:24	11.9	9.33	101.9	7.83	43670	28.09
CLDS Reference	E	19	12/9/2018 12:54:43	11.8	9.21	100.3	7.82	43619	28.05
Composite 2	A	19	12/9/2018 12:55:03	11.8	9.12	99.5	7.84	43653	28.08
Composite 2	B	19	12/9/2018 12:55:23	11.6	8.68	94.2	7.83	43543	27.99
Composite 2	C	19	12/9/2018 12:55:42	11.8	9.15	99.8	7.84	43680	28.09
Composite 2	D	19	12/9/2018 12:56:04	11.7	8.96	97.4	7.82	43529	27.98
Composite 2	E	19	12/9/2018 12:56:24	11.8	9.10	99.3	7.83	43741	28.14
Composite 3	A	19	12/9/2018 12:56:46	11.8	9.05	98.7	7.83	43625	28.06
Composite 3	B	19	12/9/2018 12:57:06	11.9	9.15	100.0	7.84	43672	28.09
Composite 3	C	19	12/9/2018 12:57:27	11.7	8.61	93.5	7.80	43568	28.01
Composite 3	D	19	12/9/2018 12:57:48	11.8	9.17	99.9	7.83	43656	28.08
Composite 3	E	19	12/9/2018 12:58:10	11.7	9.04	98.2	7.83	43568	28.01
Composite 4	A	19	12/9/2018 12:58:31	11.9	9.17	100.1	7.83	43656	28.08
Composite 4	B	19	12/9/2018 12:58:45	11.7	9.12	99.2	7.82	43566	28.01
Composite 4	C	19	12/9/2018 12:59:07	11.8	8.98	97.8	7.83	43623	28.05
Composite 4	D	19	12/9/2018 12:59:27	11.7	9.08	98.8	7.82	43598	28.03
Composite 4	E	19	12/9/2018 12:59:41	11.8	9.25	101.0	7.83	43704	28.11
Composite 5	A	19	12/9/2018 13:00:03	11.9	9.12	99.6	7.84	43661	28.08
Composite 5	B	19	12/9/2018 13:00:24	11.9	8.96	97.9	7.84	43639	28.07
Composite 5	C	19	12/9/2018 13:00:45	11.8	8.96	97.5	7.86	43539	27.99
Composite 5	D	19	12/9/2018 13:01:09	11.9	9.12	99.7	7.85	43668	28.09
Composite 5	E	19	12/9/2018 13:01:32	11.7	8.78	95.4	7.84	43536	27.99
Composite 6	A	19	12/9/2018 13:01:58	11.3	9.45	102.0	7.85	43599	28.02
Composite 6	B	19	12/9/2018 13:02:20	11.6	9.37	101.7	7.85	43640	28.06
Composite 6	C	19	12/9/2018 13:02:42	11.5	8.74	94.7	7.80	43542	27.99
Composite 6	D	19	12/9/2018 13:03:06	11.9	9.07	99.1	7.82	43640	28.07
Composite 6	E	19	12/9/2018 13:03:28	11.7	9.09	99.0	7.82	43589	28.03
Laboratory Control	A	20	12/10/2018 11:17:27	11.4	8.78	95.1	7.78	42924	27.54
Laboratory Control	B	20	12/10/2018 11:17:49	11.5	9.31	101.1	7.81	42803	27.46
Laboratory Control	C	20	12/10/2018 11:18:09	11.5	9.36	101.8	7.82	42932	27.55
Laboratory Control	D	20	12/10/2018 11:18:30	11.7	9.38	102.4	7.83	42974	27.59
Laboratory Control	E	20	12/10/2018 11:18:44	11.6	9.46	103.1	7.84	42958	27.58
CLDS Reference	A	20	12/10/2018 11:18:57	11.2	9.39	101.3	7.83	42806	27.45
CLDS Reference	B	20	12/10/2018 11:19:14	11.3	9.25	100.1	7.83	42963	27.56
CLDS Reference	C	20	12/10/2018 11:19:38	11.8	9.39	102.7	7.83	42977	27.60
CLDS Reference	D	20	12/10/2018 11:19:58	11.9	9.26	101.3	7.83	42949	27.58
CLDS Reference	E	20	12/10/2018 11:20:19	11.6	9.19	100.1	7.83	42949	27.57
Composite 2	A	20	12/10/2018 11:20:44	11.7	9.07	99.0	7.84	42970	27.59
Composite 2	B	20	12/10/2018 11:21:06	11.4	8.54	92.5	7.83	42875	27.51
Composite 2	C	20	12/10/2018 11:21:26	11.7	9.15	99.9	7.84	42967	27.59
Composite 2	D	20	12/10/2018 11:21:49	11.4	9.00	97.6	7.83	42869	27.50
Composite 2	E	20	12/10/2018 11:22:10	11.7	9.07	98.9	7.84	42959	27.58
Composite 3	A	20	12/10/2018 11:22:29	11.7	9.03	98.6	7.83	42942	27.57

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 3	B	20	12/10/2018 11:22:52	11.8	9.09	99.3	7.84	42957	27.58
Composite 3	C	20	12/10/2018 11:23:09	11.4	8.75	94.9	7.82	42900	27.53
Composite 3	D	20	12/10/2018 11:23:29	11.6	9.17	100.0	7.84	42962	27.58
Composite 3	E	20	12/10/2018 11:23:52	11.4	9.06	98.3	7.84	42907	27.53
Composite 4	A	20	12/10/2018 11:24:12	11.8	9.07	99.2	7.84	42961	27.58
Composite 4	B	20	12/10/2018 11:24:33	11.6	9.04	98.3	7.83	42908	27.54
Composite 4	C	20	12/10/2018 11:24:55	11.6	9.01	98.2	7.83	42954	27.57
Composite 4	D	20	12/10/2018 11:25:17	11.5	9.01	98.0	7.83	42930	27.55
Composite 4	E	20	12/10/2018 11:25:31	11.8	9.15	100.0	7.84	42976	27.59
Composite 5	A	20	12/10/2018 11:26:03	11.7	9.17	100.1	7.85	42955	27.58
Composite 5	B	20	12/10/2018 11:26:18	11.8	8.94	97.7	7.84	42949	27.57
Composite 5	C	20	12/10/2018 11:26:33	11.5	9.00	97.8	7.86	42882	27.52
Composite 5	D	20	12/10/2018 11:26:54	11.8	9.15	100.0	7.86	42955	27.58
Composite 5	E	20	12/10/2018 11:27:12	11.5	8.87	96.3	7.86	42893	27.52
Composite 6	A	20	12/10/2018 11:27:43	11.1	9.47	102.0	7.85	42870	27.49
Composite 6	B	20	12/10/2018 11:28:01	11.4	9.40	102.0	7.84	42928	27.55
Composite 6	C	20	12/10/2018 11:28:23	11.3	8.84	95.4	7.81	42681	27.36
Composite 6	D	20	12/10/2018 11:28:43	11.7	9.03	98.5	7.82	42933	27.56
Composite 6	E	20	12/10/2018 11:29:07	11.6	9.09	99.0	7.83	42937	27.56
Laboratory Control	A	21	12/11/2018 09:31:23	11.3	8.62	94.5	7.77	46609	30.17
Laboratory Control	B	21	12/11/2018 09:31:50	11.5	9.28	102.1	7.81	46421	30.04
Laboratory Control	C	21	12/11/2018 09:32:12	11.6	9.31	102.7	7.82	46234	29.91
Laboratory Control	D	21	12/11/2018 09:32:33	11.6	9.33	102.9	7.83	46238	29.92
Laboratory Control	E	21	12/11/2018 09:32:52	11.7	9.35	103.2	7.84	46159	29.86
CLDS Reference	A	21	12/11/2018 09:33:14	11.2	9.23	100.9	7.83	46409	30.02
CLDS Reference	B	21	12/11/2018 09:33:40	11.4	9.18	100.7	7.83	46292	29.94
CLDS Reference	C	21	12/11/2018 09:34:02	11.9	9.26	102.6	7.84	46052	29.79
CLDS Reference	D	21	12/11/2018 09:34:16	11.9	9.24	102.4	7.84	46065	29.80
CLDS Reference	E	21	12/11/2018 09:34:32	11.7	9.13	100.8	7.83	46193	29.89
Composite 2	A	21	12/11/2018 09:34:44	11.8	9.02	99.7	7.84	46118	29.84
Composite 2	B	21	12/11/2018 09:34:56	11.4	8.82	96.8	7.83	46418	30.03
Composite 2	C	21	12/11/2018 09:35:11	11.8	9.09	100.5	7.84	46112	29.83
Composite 2	D	21	12/11/2018 09:35:34	11.5	8.98	98.8	7.84	46323	29.97
Composite 2	E	21	12/11/2018 09:35:54	11.8	9.14	101.1	7.85	46093	29.82
Composite 3	A	21	12/11/2018 09:36:16	11.8	8.92	98.7	7.84	46151	29.86
Composite 3	B	21	12/11/2018 09:36:33	11.9	9.02	99.9	7.84	46079	29.81
Composite 3	C	21	12/11/2018 09:36:49	11.5	8.92	98.2	7.84	46306	29.96
Composite 3	D	21	12/11/2018 09:37:13	11.6	9.11	100.5	7.84	46182	29.88
Composite 3	E	21	12/11/2018 09:37:33	11.4	8.99	98.6	7.84	46415	30.03
Composite 4	A	21	12/11/2018 09:37:55	11.8	9.06	100.2	7.84	46098	29.82
Composite 4	B	21	12/11/2018 09:38:10	11.6	9.03	99.4	7.84	46304	29.96
Composite 4	C	21	12/11/2018 09:38:32	11.7	8.98	99.1	7.84	46190	29.88
Composite 4	D	21	12/11/2018 09:38:48	11.5	8.99	99.0	7.83	46320	29.97
Composite 4	E	21	12/11/2018 09:39:08	11.8	9.13	101.0	7.84	46062	29.80
Composite 5	A	21	12/11/2018 09:39:35	11.8	9.03	99.9	7.84	46125	29.84

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 5	B	21	12/11/2018 09:39:56	11.8	9.00	99.6	7.85	46114	29.84
Composite 5	C	21	12/11/2018 09:40:23	11.6	8.92	98.3	7.87	46333	29.98
Composite 5	D	21	12/11/2018 09:40:46	11.8	9.01	99.8	7.86	46092	29.82
Composite 5	E	21	12/11/2018 09:41:08	11.5	8.83	97.2	7.86	46301	29.96
Composite 6	A	21	12/11/2018 09:41:29	11.1	9.38	102.4	7.83	46523	30.09
Composite 6	B	21	12/11/2018 09:41:51	11.5	9.30	102.2	7.82	46236	29.91
Composite 6	C	21	12/11/2018 09:42:12	11.2	8.83	96.7	7.80	46312	29.95
Composite 6	D	21	12/11/2018 09:42:28	11.7	8.97	99.2	7.82	46169	29.87
Composite 6	E	21	12/11/2018 09:42:48	11.7	9.04	99.8	7.83	46221	29.91
Laboratory Control	A	22	12/12/2018 10:22:14	11.2	8.61	94.9	7.75	46922	30.39
Laboratory Control	B	22	12/12/2018 10:22:37	11.4	9.33	103.2	7.80	46782	30.30
Laboratory Control	C	22	12/12/2018 10:22:56	11.4	9.38	103.5	7.82	46276	29.93
Laboratory Control	D	22	12/12/2018 10:23:17	11.5	9.42	104.1	7.83	46166	29.86
Laboratory Control	E	22	12/12/2018 10:23:38	11.6	9.47	104.8	7.84	46055	29.78
CLDS Reference	A	22	12/12/2018 10:23:56	11.1	9.29	102.0	7.82	46724	30.24
CLDS Reference	B	22	12/12/2018 10:24:17	11.3	9.21	101.3	7.82	46227	29.89
CLDS Reference	C	22	12/12/2018 10:24:39	11.8	9.32	103.5	7.83	46001	29.75
CLDS Reference	D	22	12/12/2018 10:25:00	11.8	9.23	102.6	7.83	46000	29.75
CLDS Reference	E	22	12/12/2018 10:25:15	11.6	9.20	101.9	7.83	46112	29.83
Composite 2	A	22	12/12/2018 10:25:28	11.7	9.09	100.9	7.84	46048	29.78
Composite 2	B	22	12/12/2018 10:25:46	11.3	8.74	96.4	7.83	46489	30.08
Composite 2	C	22	12/12/2018 10:26:05	11.7	9.22	102.4	7.84	46033	29.77
Composite 2	D	22	12/12/2018 10:26:29	11.3	9.03	99.5	7.83	46560	30.13
Composite 2	E	22	12/12/2018 10:26:50	11.7	9.18	101.8	7.85	46031	29.77
Composite 3	A	22	12/12/2018 10:27:09	11.7	9.03	100.1	7.84	46078	29.80
Composite 3	B	22	12/12/2018 10:27:23	11.8	9.10	101.1	7.84	46004	29.75
Composite 3	C	22	12/12/2018 10:27:48	11.4	8.90	98.2	7.82	46308	29.96
Composite 3	D	22	12/12/2018 10:28:09	11.5	9.21	101.7	7.84	46117	29.82
Composite 3	E	22	12/12/2018 10:28:30	11.3	9.02	99.4	7.84	46512	30.10
Composite 4	A	22	12/12/2018 10:28:46	11.8	9.14	101.5	7.84	46013	29.76
Composite 4	B	22	12/12/2018 10:29:12	11.5	9.01	99.6	7.83	46287	29.94
Composite 4	C	22	12/12/2018 10:29:35	11.6	9.10	100.8	7.84	46113	29.82
Composite 4	D	22	12/12/2018 10:29:52	11.5	8.98	99.3	7.83	46293	29.95
Composite 4	E	22	12/12/2018 10:30:12	11.7	9.17	101.7	7.84	46038	29.78
Composite 5	A	22	12/12/2018 10:30:39	11.7	9.12	101.2	7.85	46056	29.79
Composite 5	B	22	12/12/2018 10:31:02	11.7	9.00	99.9	7.84	46037	29.78
Composite 5	C	22	12/12/2018 10:31:23	11.5	8.98	99.3	7.86	46370	30.00
Composite 5	D	22	12/12/2018 10:31:44	11.8	9.10	101.1	7.86	46035	29.78
Composite 5	E	22	12/12/2018 10:32:06	11.5	8.87	98.1	7.86	46266	29.93
Composite 6	A	22	12/12/2018 10:32:29	11.0	9.50	104.3	7.85	46914	30.37
Composite 6	B	22	12/12/2018 10:32:51	11.4	9.44	104.1	7.85	46147	29.84
Composite 6	C	22	12/12/2018 10:33:12	11.2	8.79	96.9	7.80	46912	30.38
Composite 6	D	22	12/12/2018 10:33:33	11.7	8.92	98.8	7.83	46098	29.82
Composite 6	E	22	12/12/2018 10:33:55	11.6	9.09	100.6	7.83	46165	29.86

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	A	23	12/13/2018 08:58:12	11.5	8.51	92.6	7.67	46860	30.35
Laboratory Control	B	23	12/13/2018 08:58:35	11.7	9.23	100.8	7.73	46573	30.16
Laboratory Control	C	23	12/13/2018 08:58:57	11.7	9.31	101.5	7.75	45890	29.67
Laboratory Control	D	23	12/13/2018 08:59:19	11.8	9.34	101.9	7.76	45731	29.56
Laboratory Control	E	23	12/13/2018 08:59:40	11.9	9.38	102.5	7.76	45612	29.48
CLDS Reference	A	23	12/13/2018 09:00:01	11.5	9.12	99.1	7.75	46600	30.17
CLDS Reference	B	23	12/13/2018 09:00:21	11.7	9.11	99.2	7.75	45792	29.60
CLDS Reference	C	23	12/13/2018 09:00:43	12.1	9.32	102.2	7.76	45546	29.44
CLDS Reference	D	23	12/13/2018 09:01:04	12.1	9.21	101.1	7.76	45552	29.45
CLDS Reference	E	23	12/13/2018 09:01:27	11.9	9.16	100.2	7.76	45661	29.52
Composite 2	A	23	12/13/2018 09:01:49	12.0	9.07	99.3	7.77	45611	29.48
Composite 2	B	23	12/13/2018 09:02:10	11.6	8.44	91.9	7.75	46379	30.01
Composite 2	C	23	12/13/2018 09:02:30	12.1	9.16	100.6	7.77	45571	29.46
Composite 2	D	23	12/13/2018 09:02:55	11.7	8.94	97.5	7.77	46100	29.82
Composite 2	E	23	12/13/2018 09:04:01	11.9	9.03	98.7	7.78	45608	29.48
Composite 3	A	23	12/13/2018 09:04:22	11.9	8.96	97.9	7.78	45661	29.51
Composite 3	B	23	12/13/2018 09:04:44	12.0	9.07	99.3	7.78	45574	29.45
Composite 3	C	23	12/13/2018 09:05:00	11.7	9.22	100.5	7.78	45830	29.63
Composite 3	D	23	12/13/2018 09:05:21	11.8	9.18	100.2	7.78	45688	29.53
Composite 3	E	23	12/13/2018 09:05:43	11.6	8.94	97.2	7.78	46169	29.86
Composite 4	A	23	12/13/2018 09:05:59	12.0	9.12	100.0	7.78	45562	29.45
Composite 4	B	23	12/13/2018 09:06:20	11.8	8.93	97.4	7.77	45848	29.64
Composite 4	C	23	12/13/2018 09:06:41	11.9	8.95	97.8	7.78	45666	29.52
Composite 4	D	23	12/13/2018 09:06:55	11.8	8.90	97.1	7.77	45871	29.66
Composite 4	E	23	12/13/2018 09:07:17	12.1	9.12	100.0	7.78	45589	29.47
Composite 5	A	23	12/13/2018 09:07:49	11.8	9.10	99.2	7.79	45744	29.57
Composite 5	B	23	12/13/2018 09:08:04	12.0	9.00	98.4	7.78	45584	29.46
Composite 5	C	23	12/13/2018 09:08:26	11.7	8.83	96.2	7.80	46009	29.75
Composite 5	D	23	12/13/2018 09:08:45	11.9	9.03	98.7	7.80	45616	29.48
Composite 5	E	23	12/13/2018 09:09:08	11.8	8.75	95.6	7.79	45741	29.57
Composite 6	A	23	12/13/2018 09:09:34	11.3	9.34	101.2	7.77	46758	30.27
Composite 6	B	23	12/13/2018 09:09:56	11.5	9.37	101.7	7.77	45788	29.59
Composite 6	C	23	12/13/2018 09:10:19	11.4	8.65	94.2	7.73	47011	30.46
Composite 6	D	23	12/13/2018 09:10:42	11.9	9.01	98.6	7.76	45657	29.51
Composite 6	E	23	12/13/2018 09:11:07	11.9	8.97	98.0	7.77	45780	29.60
Laboratory Control	A	24	12/14/2018 11:58:50	11.3	8.49	92.5	7.67	47585	30.87
Laboratory Control	B	24	12/14/2018 11:59:14	11.4	9.30	101.4	7.72	47041	30.48
Laboratory Control	C	24	12/14/2018 11:59:33	11.4	9.38	102.0	7.74	46353	29.99
Laboratory Control	D	24	12/14/2018 11:59:48	11.4	9.32	101.3	7.74	46115	29.82
Laboratory Control	E	24	12/14/2018 12:00:08	11.5	9.43	102.7	7.75	46020	29.75
CLDS Reference	A	24	12/14/2018 12:00:34	11.1	9.29	100.7	7.75	46889	30.36
CLDS Reference	B	24	12/14/2018 12:00:54	11.2	9.30	100.6	7.75	46166	29.84
CLDS Reference	C	24	12/14/2018 12:01:16	11.6	9.30	101.5	7.76	45980	29.73
CLDS Reference	D	24	12/14/2018 12:01:28	11.7	9.25	101.1	7.76	45984	29.74
CLDS Reference	E	24	12/14/2018 12:01:49	11.6	9.20	100.4	7.76	46053	29.78

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 2	A	24	12/14/2018 12:02:06	11.6	9.04	98.6	7.76	45922	29.69
Composite 2	B	24	12/14/2018 12:02:30	11.3	8.74	95.1	7.74	46684	30.22
Composite 2	C	24	12/14/2018 12:02:50	11.6	9.11	99.4	7.77	46007	29.75
Composite 2	D	24	12/14/2018 12:03:13	11.4	9.01	98.0	7.76	46356	29.99
Composite 2	E	24	12/14/2018 12:03:30	11.5	9.13	99.4	7.77	46077	29.80
Composite 3	A	24	12/14/2018 12:03:51	11.5	9.10	99.1	7.77	46063	29.79
Composite 3	B	24	12/14/2018 12:04:15	11.6	9.08	99.0	7.77	46013	29.75
Composite 3	C	24	12/14/2018 12:04:35	11.3	8.34	90.7	7.75	46376	30.00
Composite 3	D	24	12/14/2018 12:04:56	11.4	9.10	98.8	7.77	46117	29.82
Composite 3	E	24	12/14/2018 12:05:20	11.3	9.03	98.1	7.78	46565	30.13
Composite 4	A	24	12/14/2018 12:05:41	11.7	9.06	98.9	7.78	45986	29.74
Composite 4	B	24	12/14/2018 12:06:02	11.4	8.95	97.3	7.76	46237	29.91
Composite 4	C	24	12/14/2018 12:06:22	11.5	9.12	99.4	7.77	46058	29.78
Composite 4	D	24	12/14/2018 12:06:40	11.5	9.03	98.3	7.76	46196	29.88
Composite 4	E	24	12/14/2018 12:06:55	11.6	9.16	100.0	7.77	46007	29.75
Composite 5	A	24	12/14/2018 12:07:19	11.5	9.17	99.9	7.79	46154	29.85
Composite 5	B	24	12/14/2018 12:07:42	11.6	8.96	97.9	7.77	45995	29.74
Composite 5	C	24	12/14/2018 12:07:56	11.4	9.04	98.5	7.78	46345	29.98
Composite 5	D	24	12/14/2018 12:08:15	11.6	9.11	99.4	7.78	46012	29.75
Composite 5	E	24	12/14/2018 12:08:40	11.6	8.98	97.9	7.78	46081	29.80
Composite 6	A	24	12/14/2018 12:09:06	11.0	9.34	101.2	7.78	47401	30.72
Composite 6	B	24	12/14/2018 12:09:25	11.3	9.35	101.5	7.79	46157	29.84
Composite 6	C	24	12/14/2018 12:09:38	11.2	8.89	96.9	7.75	47895	31.09
Composite 6	D	24	12/14/2018 12:09:55	11.6	9.04	98.7	7.77	46032	29.77
Composite 6	E	24	12/14/2018 12:10:09	11.5	9.15	99.7	7.77	46158	29.85
Laboratory Control	A	25	12/15/2018 11:54:38	11.5	9.11	99.7	7.77	44716	28.82
Laboratory Control	B	25	12/15/2018 11:55:03	11.5	9.37	102.6	7.79	44720	28.83
Laboratory Control	C	25	12/15/2018 11:55:18	11.6	9.36	102.4	7.80	44559	28.71
Laboratory Control	D	25	12/15/2018 11:55:34	11.4	9.34	102.0	7.79	44661	28.78
Laboratory Control	E	25	12/15/2018 11:55:55	11.4	9.33	101.7	7.80	44669	28.78
CLDS Reference	A	25	12/15/2018 11:56:17	11.4	9.35	102.0	7.80	44620	28.75
CLDS Reference	B	25	12/15/2018 11:56:36	11.1	9.27	100.5	7.80	44793	28.86
CLDS Reference	C	25	12/15/2018 11:57:01	11.4	9.30	101.5	7.80	44618	28.75
CLDS Reference	D	25	12/15/2018 11:57:22	11.5	9.24	100.9	7.80	44616	28.75
CLDS Reference	E	25	12/15/2018 11:57:55	11.5	8.89	97.2	7.80	44601	28.74
Composite 2	A	25	12/15/2018 11:58:10	11.4	9.07	99.0	7.80	44674	28.79
Composite 2	B	25	12/15/2018 11:58:34	11.5	9.06	99.0	7.80	44576	28.72
Composite 2	C	25	12/15/2018 11:59:02	11.4	9.18	100.3	7.81	44650	28.77
Composite 2	D	25	12/15/2018 11:59:25	11.5	9.16	100.2	7.81	44608	28.74
Composite 2	E	25	12/15/2018 11:59:45	11.6	9.20	100.8	7.81	44532	28.69
Composite 3	A	25	12/15/2018 12:00:00	11.5	9.09	99.3	7.81	44608	28.74
Composite 3	B	25	12/15/2018 12:00:19	11.4	9.07	98.9	7.81	44662	28.78
Composite 3	C	25	12/15/2018 12:00:37	11.3	8.79	95.7	7.79	44772	28.85
Composite 3	D	25	12/15/2018 12:00:56	11.3	9.16	99.7	7.81	44730	28.82
Composite 3	E	25	12/15/2018 12:01:21	11.5	9.16	100.1	7.81	44578	28.72

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 4	A	25	12/15/2018 12:01:47	11.5	9.06	99.0	7.81	44623	28.75
Composite 4	B	25	12/15/2018 12:02:07	11.4	9.05	98.8	7.80	44680	28.79
Composite 4	C	25	12/15/2018 12:02:28	11.5	9.11	99.6	7.81	44585	28.73
Composite 4	D	25	12/15/2018 12:02:41	11.5	9.09	99.4	7.81	44583	28.73
Composite 4	E	25	12/15/2018 12:03:01	11.5	9.16	100.0	7.81	44612	28.75
Composite 5	A	25	12/15/2018 12:03:31	11.6	9.15	100.1	7.82	44587	28.73
Composite 5	B	25	12/15/2018 12:03:48	11.6	9.03	98.9	7.81	44571	28.72
Composite 5	C	25	12/15/2018 12:04:06	11.5	9.12	99.7	7.82	44612	28.75
Composite 5	D	25	12/15/2018 12:04:27	11.5	9.11	99.6	7.82	44624	28.76
Composite 5	E	25	12/15/2018 12:04:43	11.6	9.08	99.5	7.82	44543	28.70
Composite 6	A	25	12/15/2018 12:05:10	11.1	9.34	101.8	7.82	46027	29.74
Composite 6	B	25	12/15/2018 12:05:30	11.3	9.34	101.7	7.83	44743	28.83
Composite 6	C	25	12/15/2018 12:05:49	11.2	8.93	97.7	7.79	46104	29.80
Composite 6	D	25	12/15/2018 12:06:13	11.7	9.15	100.3	7.80	44529	28.69
Composite 6	E	25	12/15/2018 12:06:34	11.5	9.16	100.1	7.81	44630	28.76
Laboratory Control	A	26	12/16/2018 12:30:28	11.4	8.63	94.3	7.72	44658	28.77
Laboratory Control	B	26	12/16/2018 12:31:02	11.6	9.39	102.9	7.78	44408	28.60
Laboratory Control	C	26	12/16/2018 12:31:24	11.5	9.40	103.0	7.79	44310	28.53
Laboratory Control	D	26	12/16/2018 12:31:51	11.5	9.29	101.5	7.80	44360	28.57
Laboratory Control	E	26	12/16/2018 12:32:16	11.4	9.40	102.6	7.80	44367	28.57
CLDS Reference	A	26	12/16/2018 12:32:38	11.4	9.29	101.4	7.80	44358	28.56
CLDS Reference	B	26	12/16/2018 12:32:59	11.1	9.27	100.7	7.80	44498	28.65
CLDS Reference	C	26	12/16/2018 12:33:24	11.4	9.32	101.8	7.81	44352	28.56
CLDS Reference	D	26	12/16/2018 12:33:47	11.5	9.25	101.2	7.81	44352	28.56
CLDS Reference	E	26	12/16/2018 12:34:09	11.5	9.23	100.9	7.81	44350	28.56
Composite 2	A	26	12/16/2018 12:34:27	11.4	9.01	98.4	7.80	44395	28.59
Composite 2	B	26	12/16/2018 12:34:42	11.5	8.97	98.0	7.80	44350	28.56
Composite 2	C	26	12/16/2018 12:35:07	11.4	9.18	100.3	7.82	44389	28.58
Composite 2	D	26	12/16/2018 12:35:45	11.5	9.13	99.9	7.82	44346	28.56
Composite 2	E	26	12/16/2018 12:36:07	11.5	9.24	101.2	7.82	44395	28.59
Composite 3	A	26	12/16/2018 12:36:30	11.5	9.06	99.2	7.81	44344	28.56
Composite 3	B	26	12/16/2018 12:36:52	11.4	9.03	98.6	7.81	44383	28.58
Composite 3	C	26	12/16/2018 12:37:09	11.3	8.95	97.7	7.80	44458	28.63
Composite 3	D	26	12/16/2018 12:37:26	11.3	9.13	99.5	7.81	44436	28.61
Composite 3	E	26	12/16/2018 12:37:51	11.5	9.05	99.0	7.82	44356	28.56
Composite 4	A	26	12/16/2018 12:38:15	11.5	9.12	99.7	7.82	44364	28.57
Composite 4	B	26	12/16/2018 12:38:39	11.4	8.90	97.2	7.80	44443	28.62
Composite 4	C	26	12/16/2018 12:39:05	11.5	9.07	99.2	7.81	44364	28.57
Composite 4	D	26	12/16/2018 12:39:27	11.5	9.15	100.1	7.81	44355	28.56
Composite 4	E	26	12/16/2018 12:39:49	11.4	9.16	100.1	7.82	44385	28.58
Composite 5	A	26	12/16/2018 12:40:30	11.5	9.18	100.5	7.83	44369	28.57
Composite 5	B	26	12/16/2018 12:40:52	11.5	8.85	97.0	7.81	44349	28.56
Composite 5	C	26	12/16/2018 12:42:41	11.5	9.00	98.6	7.83	44359	28.57
Composite 5	D	26	12/16/2018 12:43:01	11.5	9.06	99.2	7.83	44364	28.57
Composite 5	E	26	12/16/2018 12:43:24	11.5	8.94	97.9	7.83	44353	28.56

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Composite 6	A	26	12/16/2018 12:44:02	11.0	9.36	102.2	7.83	46183	29.85
Composite 6	B	26	12/16/2018 12:44:27	11.2	9.40	102.4	7.85	44482	28.64
Composite 6	C	26	12/16/2018 12:44:49	11.3	8.80	96.5	7.79	46001	29.73
Composite 6	D	26	12/16/2018 12:45:12	11.6	9.11	99.9	7.82	44369	28.58
Composite 6	E	26	12/16/2018 12:45:37	11.5	9.12	99.7	7.81	44371	28.57
Laboratory Control	A	27	12/17/2018 12:07:39	11.2	8.20	91.7	7.72	46579	30.14
Laboratory Control	B	27	12/17/2018 12:08:04	11.4	9.13	102.5	7.79	46555	30.13
Laboratory Control	C	27	12/17/2018 12:08:24	11.5	9.11	102.5	7.81	46838	30.34
Laboratory Control	D	27	12/17/2018 12:08:46	11.4	9.05	101.6	7.81	46763	30.28
Laboratory Control	E	27	12/17/2018 12:09:07	11.4	9.15	102.7	7.82	46813	30.32
CLDS Reference	A	27	12/17/2018 12:09:28	11.4	9.00	101.2	7.82	46930	30.40
CLDS Reference	B	27	12/17/2018 12:09:50	11.1	8.97	100.0	7.82	46757	30.26
CLDS Reference	C	27	12/17/2018 12:10:09	11.4	9.02	101.5	7.82	46917	30.39
CLDS Reference	D	27	12/17/2018 12:10:26	11.5	8.89	100.1	7.82	46901	30.39
CLDS Reference	E	27	12/17/2018 12:10:39	11.5	8.91	100.5	7.82	46937	30.41
Composite 2	A	27	12/17/2018 12:11:05	11.4	8.68	97.5	7.82	46847	30.34
Composite 2	B	27	12/17/2018 12:11:37	11.5	8.59	96.8	7.82	46932	30.41
Composite 2	C	27	12/17/2018 12:11:56	11.4	8.87	99.9	7.83	46917	30.40
Composite 2	D	27	12/17/2018 12:12:28	11.4	8.79	98.8	7.82	46960	30.42
Composite 2	E	27	12/17/2018 12:12:56	11.6	8.79	99.3	7.83	47068	30.51
Composite 3	A	27	12/17/2018 12:13:16	11.4	8.74	98.3	7.83	46871	30.36
Composite 3	B	27	12/17/2018 12:13:37	11.4	8.74	98.3	7.83	46875	30.36
Composite 3	C	27	12/17/2018 12:13:59	11.3	8.24	92.3	7.80	46791	30.30
Composite 3	D	27	12/17/2018 12:14:21	11.2	8.86	99.0	7.82	46694	30.22
Composite 3	E	27	12/17/2018 12:14:43	11.5	8.78	99.0	7.83	46971	30.44
Composite 4	A	27	12/17/2018 12:15:04	11.5	8.76	98.8	7.83	46952	30.42
Composite 4	B	27	12/17/2018 12:15:26	11.3	8.66	97.1	7.81	46687	30.22
Composite 4	C	27	12/17/2018 12:15:41	11.5	8.76	98.9	7.82	46970	30.44
Composite 4	D	27	12/17/2018 12:16:00	11.5	8.78	99.0	7.82	46960	30.43
Composite 4	E	27	12/17/2018 12:16:16	11.5	8.83	99.6	7.83	46988	30.45
Composite 5	A	27	12/17/2018 12:16:52	11.4	8.84	99.4	7.84	46849	30.34
Composite 5	B	27	12/17/2018 12:17:14	11.5	8.64	97.3	7.82	46914	30.39
Composite 5	C	27	12/17/2018 12:17:33	11.5	8.73	98.2	7.84	46890	30.38
Composite 5	D	27	12/17/2018 12:17:52	11.4	8.81	99.2	7.84	46856	30.35
Composite 5	E	27	12/17/2018 12:18:06	11.6	8.73	98.5	7.84	46976	30.44
Composite 6	A	27	12/17/2018 12:18:30	11.0	9.04	101.2	7.82	48093	31.22
Composite 6	B	27	12/17/2018 12:18:52	11.2	9.06	101.4	7.83	46819	30.31
Composite 6	C	27	12/17/2018 12:19:09	11.2	8.62	96.8	7.79	47855	31.06
Composite 6	D	27	12/17/2018 12:19:28	11.8	8.79	99.6	7.82	47010	30.48
Composite 6	E	27	12/17/2018 12:19:50	11.6	8.82	99.5	7.82	46906	30.39
Laboratory Control	A	28	12/18/2018 08:48:04	11.1	8.35	92.0	7.70	45631	29.46
Laboratory Control	B	28	12/18/2018 08:48:32	11.3	9.29	102.9	7.78	45708	29.52
Laboratory Control	C	28	12/18/2018 08:49:24	11.3	9.26	102.6	7.83	46022	29.74
Laboratory Control	D	28	12/18/2018 08:49:37	11.2	9.25	102.2	7.83	45956	29.69

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor
ASSAY: *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Daily Water Qualities

	Temp	DO	DO%	pH	SpCond	Salinity
Mean:	11.4	8.68	95.6		45674	29.51
Minimum:	10.8	3.74	41.1	7.32	22060	13.29
Maximum:	12.2	9.56	104.8	8.02	49305	32.12

Field ID	Replicate	Day	DateTime M/D/Y	Temp C	DO mg/L	DO % Sat	pH SU	SpCond uS/cm	Salinity ppt
Laboratory Control	E	28	12/18/2018 08:49:58	11.1	9.30	102.8	7.83	45993	29.72
CLDS Reference	A	28	12/18/2018 08:50:17	11.1	9.17	101.3	7.82	46063	29.77
CLDS Reference	B	28	12/18/2018 08:50:37	10.9	9.13	100.3	7.82	45941	29.67
CLDS Reference	C	28	12/18/2018 08:51:41	11.2	9.05	100.0	7.83	46068	29.77
CLDS Reference	D	28	12/18/2018 08:52:05	11.2	8.89	98.4	7.82	46049	29.76
CLDS Reference	E	28	12/18/2018 08:52:27	11.2	9.00	99.7	7.83	46080	29.78
Composite 2	A	28	12/18/2018 08:52:49	11.2	8.65	95.6	7.82	46021	29.74
Composite 2	B	28	12/18/2018 08:53:11	11.1	8.48	93.7	7.82	46085	29.78
Composite 2	C	28	12/18/2018 08:53:33	11.2	8.92	98.7	7.83	46109	29.80
Composite 2	D	28	12/18/2018 08:54:43	11.4	8.85	98.2	7.83	46107	29.81
Composite 2	E	28	12/18/2018 08:55:03	11.4	8.76	97.4	7.84	46118	29.82
Composite 3	A	28	12/18/2018 08:55:25	11.3	8.84	97.9	7.83	46035	29.75
Composite 3	B	28	12/18/2018 08:55:42	11.3	8.84	97.9	7.83	46038	29.76
Composite 3	C	28	12/18/2018 08:56:03	11.2	8.10	89.5	7.79	45957	29.69
Composite 3	D	28	12/18/2018 08:56:25	11.0	9.06	99.8	7.83	45836	29.60
Composite 3	E	28	12/18/2018 08:56:45	11.4	8.90	98.8	7.84	46089	29.80
Composite 4	A	28	12/18/2018 08:57:07	11.4	8.92	99.1	7.84	46089	29.80
Composite 4	B	28	12/18/2018 08:57:27	11.2	8.73	96.5	7.81	45855	29.62
Composite 4	C	28	12/18/2018 08:57:49	11.4	8.87	98.6	7.83	46105	29.81
Composite 4	D	28	12/18/2018 08:58:10	11.3	8.85	98.2	7.82	46077	29.79
Composite 4	E	28	12/18/2018 08:58:32	11.4	8.88	98.7	7.83	46143	29.84
Composite 5	A	28	12/18/2018 08:59:54	11.3	9.01	99.7	7.85	46049	29.76
Composite 5	B	28	12/18/2018 09:00:14	11.3	8.57	95.0	7.82	46069	29.78
Composite 5	C	28	12/18/2018 09:00:36	11.3	8.86	98.3	7.85	46052	29.77
Composite 5	D	28	12/18/2018 09:00:57	11.4	8.84	98.1	7.85	46035	29.76
Composite 5	E	28	12/18/2018 09:01:19	11.5	8.73	97.1	7.85	46097	29.81
Composite 6	A	28	12/18/2018 09:02:37	10.8	9.25	102.0	7.84	47122	30.51
Composite 6	B	28	12/18/2018 09:02:59	10.9	9.24	101.6	7.85	46037	29.74
Composite 6	C	28	12/18/2018 09:03:16	11.1	8.86	98.1	7.82	46796	30.29
Composite 6	D	28	12/18/2018 09:03:41	11.7	8.81	98.5	7.83	46095	29.82
Composite 6	E	28	12/18/2018 09:04:03	11.5	8.87	98.8	7.83	46071	29.79

Nereis virens
28 day Bioaccumulation Evaluation

Statistical Analysis Reports

Survival

CETIS Test Data Worksheet

Report Date: 27 Dec-18 10:45 (p 1 of 1)
Test Code/ID: 01-9484-6514/31250Nv-Surv

Bioaccumulation Evaluation - Survival Endpoint **EnviroSystems, Inc.**

Start Date:	20 Nov-18 12:00	**Species:**	Nereis virens	**Sample Code:**	31250-000
End Date:	18 Dec-18 12:00	**Protocol:**	US ACE NED RIM (2004)	**Sample Source:**	New Haven Harbor 2018
Sample Date:	20 Nov-18	**Material:**	Laboratory Control Sediment	**Sample Station:**	Laboratory Control (Nv)

Sample	Rep	Pos	# Exposed	# Survived	Notes
31250-000	1	4	20	19	
31250-000	2	10	21	21	
31250-000	3	20	20	20	
31250-000	4	28	20	19	
31250-000	5	31	20	18	
31242-008	1	7	20	20	
31242-008	2	9	20	20	
31242-008	3	19	20	19	
31242-008	4	23	20	20	
31242-008	5	29	20	19	
31243-101	1	3	20	20	
31243-101	2	14	20	20	
31243-101	3	15	20	19	
31243-101	4	26	20	20	
31243-101	5	33	20	17	
31243-102	1	2	22	22	
31243-102	2	13	20	19	
31243-102	3	17	20	20	
31243-102	4	24	20	19	
31243-102	5	30	20	19	
31243-103	1	6	20	20	
31243-103	2	8	20	20	
31243-103	3	18	20	19	
31243-103	4	22	20	19	
31243-103	5	32	20	19	
31243-104	1	1	20	19	
31243-104	2	12	20	19	
31243-104	3	21	20	19	
31243-104	4	27	20	18	
31243-104	5	34	20	18	
31243-105	1	5	20	20	
31243-105	2	11	20	19	
31243-105	3	16	20	17	
31243-105	4	25	20	20	
31243-105	5	35	20	18	

CETIS Summary Report

Report Date: 28 Dec-18 10:37 (p 1 of 1)
Test Code: 31250Nv-Surv | 01-9484-6514

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Batch ID:	21-3034-5200	**Test Type:**	Survival	**Analyst:**	Nancy Roka
Start Date:	20 Nov-18 12:00	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	18 Dec-18 12:00	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-000	17-4527-5443	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Nv)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-1554-3400	Proportion Survived	Equal Variance t Two-Sample Test	0.7898	31242-008 passed proportion survived
19-4330-8774	Proportion Survived	Equal Variance t Two-Sample Test	0.2983	31243-101 passed proportion survived
16-6263-9919	Proportion Survived	Equal Variance t Two-Sample Test	0.3005	31243-102 passed proportion survived
03-7312-9950	Proportion Survived	Equal Variance t Two-Sample Test	0.2898	31243-103 passed proportion survived
01-0555-6310	Proportion Survived	Wilcoxon Rank Sum Two-Sample Test	0.0397	31243-104 failed proportion survived
02-6908-1986	Proportion Survived	Equal Variance t Two-Sample Test	0.1305	31243-105 passed proportion survived

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-000	LC	5	0.960	0.908	1.000	0.900	1.000	0.019	0.042	4.36%	0.00%
31242-008	RS	5	0.980	0.946	1.000	0.950	1.000	0.012	0.027	2.79%	-2.08%
31243-101		5	0.960	0.879	1.000	0.850	1.000	0.029	0.065	6.79%	0.00%
31243-102		5	0.970	0.936	1.000	0.950	1.000	0.012	0.027	2.82%	-1.04%
31243-103		5	0.970	0.936	1.000	0.950	1.000	0.012	0.027	2.82%	-1.04%
31243-104		5	0.930	0.896	0.964	0.900	0.950	0.012	0.027	2.94%	3.12%
31243-105		5	0.940	0.859	1.000	0.850	1.000	0.029	0.065	6.94%	2.08%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-000	LC	0.950	1.000	1.000	0.950	0.900
31242-008	RS	1.000	1.000	0.950	1.000	0.950
31243-101		1.000	1.000	0.950	1.000	0.850
31243-102		1.000	0.950	1.000	0.950	0.950
31243-103		1.000	1.000	0.950	0.950	0.950
31243-104		0.950	0.950	0.950	0.900	0.900
31243-105		1.000	0.950	0.850	1.000	0.900

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	02-1554-3400	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-000	17-4527-5443	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-000	Laboratory Control Sediment	New Haven Harbor 2018	Laboratory Control (Nv)	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31242-008 passed proportion survived	4.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control Sedime		Reference Sed	-0.849	1.86	0.091	8	CDF	0.7898	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.6999	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004285	0.004285	1	0.721	0.4204	Non-Significant Effect
Error	0.0475293	0.0059412	8			
Total	0.0518143		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.08	23.2	0.4967	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3406	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-000	LC	5	0.960	0.908	1.000	0.950	0.900	1.000	0.019	4.36%	0.00%
31242-008	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	-2.08%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-000	LC	5	1.37	1.26	1.48	1.35	1.25	1.46	0.04	6.53%	0.00%
31242-008	RS	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	-3.02%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-000	LC	0.950	1.000	1.000	0.950	0.900
31242-008	RS	1.000	1.000	0.950	1.000	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-000	LC	1.35	1.46	1.46	1.35	1.25
31242-008	RS	1.46	1.46	1.35	1.46	1.35

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	19-4330-8774	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-101 passed proportion survived	5.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0.551	1.86	0.116	8	CDF	0.2983	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.29	0.0825	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0029648	0.0029648	1	0.304	0.5966	Non-Significant Effect
Error	0.0780693	0.0097587	8			
Total	0.0810341		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.05	23.2	0.2040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0300	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31243-101		5	0.960	0.879	1.000	1.000	0.850	1.000	0.029	6.79%	2.04%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31243-101		5	1.38	1.22	1.53	1.46	1.17	1.46	0.056	9.07%	2.44%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	0.950	1.000	0.950
31243-101		1.000	1.000	0.950	1.000	0.850

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.35	1.46	1.35
31243-101		1.46	1.46	1.35	1.46	1.17

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	16-6263-9919	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-102 passed proportion survived	3.33%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.544	1.86	0.074	8	CDF	0.3005	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.22	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0011716	0.0011716	1	0.296	0.6011	Non-Significant Effect
Error	0.0316389	0.0039549	8			
Total	0.0328105		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.05	23.2	0.9652	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.805	0.741	0.0168	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31243-102		5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	1.02%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31243-102		5	1.39	1.31	1.47	1.35	1.35	1.46	0.0284	4.57%	1.53%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	0.950	1.000	0.950
31243-102		1.000	0.950	1.000	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.35	1.46	1.35
31243-102		1.46	1.35	1.46	1.35	1.35

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	03-7312-9950	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-103 passed proportion survived	3.29%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0.577	1.86	0.073	8	CDF	0.2898	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0012877	0.0012877	1	0.333	0.5796	Non-Significant Effect
Error	0.0309042	0.0038630	8			
Total	0.0321919		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31243-103		5	0.970	0.936	1.000	0.950	0.950	1.000	0.012	2.82%	1.02%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31243-103		5	1.39	1.31	1.47	1.35	1.35	1.46	0.0278	4.47%	1.61%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	0.950	1.000	0.950
31243-103		1.000	1.000	0.950	0.950	0.950

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.35	1.46	1.35
31243-103		1.46	1.46	1.35	1.35	1.35

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	01-0555-6310	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:37	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-104 failed proportion survived	3.05%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	18	n/a	1	8	Exact	0.0397	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.25	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0283984	0.0283984	1	8.55	0.0192	Significant Effect
Error	0.026566	0.0033208	8			
Total	0.0549644		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.39	23.2	0.7572	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7	0.741	8.8E-04	Non-Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31243-104		5	0.930	0.896	0.964	0.950	0.900	0.950	0.012	2.94%	5.10%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31243-104		5	1.31	1.24	1.37	1.35	1.25	1.35	0.0236	4.03%	7.54%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	0.950	1.000	0.950
31243-104		0.950	0.950	0.950	0.900	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.35	1.46	1.35
31243-104		1.35	1.35	1.35	1.25	1.25

Bioaccumulation Evaluation - Survival Endpoint — **EnviroSystems, Inc.**

Analysis ID:	02-6908-1986	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.9.3
Analyzed:	28 Dec-18 10:37	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	31243-105 passed proportion survived	5.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	1.21	1.86	0.117	8	CDF	0.1305	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6022	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0145847	0.0145847	1	1.46	0.2610	Non-Significant Effect
Error	0.0797712	0.0099714	8			
Total	0.0943559		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.16	23.2	0.1961	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.932	0.741	0.4648	Normal Distribution

Proportion Survived Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.980	0.946	1.000	1.000	0.950	1.000	0.012	2.79%	0.00%
31243-105		5	0.940	0.859	1.000	0.950	0.850	1.000	0.029	6.94%	4.08%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.41	1.34	1.49	1.46	1.35	1.46	0.0278	4.40%	0.00%
31243-105		5	1.34	1.18	1.49	1.35	1.17	1.46	0.0567	9.48%	5.40%

Proportion Survived Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.000	1.000	0.950	1.000	0.950
31243-105		1.000	0.950	0.850	1.000	0.900

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.46	1.46	1.35	1.46	1.35
31243-105		1.46	1.35	1.17	1.46	1.25

Macoma nasuta and *Nereis virens* 28 day Bioaccumulation Evaluation

Tissue Chemistry Chains of Custody

ESI EnviroSystems, Inc.
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Hampton, NH 03842

Voice: 603-926-3345
FAX: 603-926-3521

ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018 31249 (Mn)	
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalp	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	B567PreMnA	12/21/18	1015	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
002	B567PreMnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
003	B567PreMnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
004	B567PreMnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
005	B567PreMnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
006	B567LabMnA	12/21/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
007	B567LabMnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
008	B567LabMnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
009	B567LabMnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
010	B567LabMnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
011	B567R01MnA	12/21/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
012	B567R01MnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/26/18 Time: 1100	Received By: T. Hawk	Date: 12/26/18 Time: 1100
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

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ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018 31249 (MA)	
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
013	B567R01MnC	12/21/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
014	B567R01MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
015	B567R01MnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
016	B567S01MnA	12/21/18	1030	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
017	B567S01MnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
018	B567S01MnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
019	B567S01MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
020	B567S01MnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
021	B567S02MnA	12/21/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
022	B567S02MnB	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
023	B567S02MnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
024	B567S02MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/26/18 Time: 1100	Received By: T. Hamilton	Date: 12/26/18 Time: 1100
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

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ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31249 (Ma)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
025	B567S02MnE	12/21/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
026	B567S03MnA	12/21/18	1115	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
027	B567S03MnB	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
028	B567S03MnC	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
029	B567S03MnD	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
030	B567S03MnE	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
031	B567S04MnA	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
032	B567S04MnB	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
033	B567S04MnC	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
034	B567S04MnD	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
035	B567S04MnE	12/21/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
036	B567S05MnA	12/21/18	1230	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/26/18 Time: 1100	Received By: T. Hurlbut	Date: 12/26/18 Time: 1102
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

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ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31249 (Mn)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
037	B567S05MnB	12/21/18	1230	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
038	B567S05MnC	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
039	B567S05MnD	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
040	B567S05MnE	12/21/18	↓	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By: [signature]	Date: 12/26/18 Time: 1100	Received By: T. Hall	Date: 12/26/18 Time: 1100
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

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COC Number: A1017071

Sample Delivery Group No: December 2018	Page of	

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ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31250 (NV)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or com-posite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preser-vation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
001	B567PreNvA	12/20/18	0900	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
002	B567PreNvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
003	B567PreNvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
004	B567PreNvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
005	B567PreNvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
006	B567LabNvA	12/20/18	0915	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
007	B567LabNvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
008	B567LabNvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
009	B567LabNvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
010	B567LabNvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
011	B567R01NvA	12/20/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
012	B567R01NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/26/18 Time: 1100	Received By: T. Hubbell	Date: 12/26/18 Time: 1600
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

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ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31250 (Nv)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
013	B567R01NvC	12/20/18	0930	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
014	B567R01NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
015	B567R01NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
016	B567S01NvA	12/20/18	0945	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
017	B567S01NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
018	B567S01NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
019	B567S01NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
020	B567S01NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
021	B567S02NvA	12/20/18	1000	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
022	B567S02NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
023	B567S02NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
024	B567S02NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/20/18 Time: 1100	Received By: T. Hewlett	Date: 12/20/18 Time: 1100
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

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ESI Job No:

CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31250(NV)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

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026	B567S03NvA	12/20/18	1015	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
027	B567S03NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
028	B567S03NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
029	B567S03NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
030	B567S03NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
031	B567S04NvA	12/20/18	1030	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
032	B567S04NvB	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
033	B567S04NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
034	B567S04NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
035	B567S04NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
036	B567S05NvA	12/20/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C

Relinquished By:	Date: 12/20/18 Time: 1100	Received By: T. Hudd	Date: 12/20/18 Time: 1100
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

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CHAIN OF CUSTODY DOCUMENTATION

Client: EnviroSystems, Inc.	Contact: Alexandra MacKinnon	Project Name: AECOM - New Haven Harbor 2018	31250 (N.)
Report to: Alexandra MacKinnon	Address: P.O. Box 778	Project Number: P0816	Task: 0001
Invoice to: Alexandra MacKinnon	Address: Hampton, NH 03843	Project Manager: Alexandra MacKinnon	
Voice: 0	Fax: 0	email: alexandra.mackinnon@enthalpy	ERR

Protocol: NPDES

Lab Number (assigned by lab)	Your Field ID: (must agree with container)	Date Sampled	Time Sampled	Sampled By	Grab or composite (G/C)	Container No	Container Size (mL)	Container Type (P/G/T)	Field Preservation	Matrix S=Solid W=Water	Filter N=Not needed F=Done in field L=Lab to do	Analyses Requested\ Special Instructions:
037	B567S05NvB	12/20/18	1045	ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
038	B567S05NvC	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
039	B567S05NvD	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
040	B567S05NvE	12/20/18		ESI	C	1	9 oz	G	Frozen	Tissue	N	%Lipids,TS%,PAH680,Pest8081,CGR680,Total Metals As,C
				ESI	C							
				ESI	C							
				ESI	C							
				ESI	C							
				ESI	C							
				ESI	C							
				ESI	C							
				ESI	C							

Relinquished By:	Date: 12/26/18 Time: 1100	Received By: T. Hudell	Date: 12/26/18 Time: 1100
Relinquished By:	Date: Time:	Received at Lab By:	Date: Time:

Comments:

ERR

COC Number: A1017071

Sample Delivery Group No: December 2018	Page of

MONTROSE ENVIRONMENTAL

Nancy Roka <nancy.roka@enthalpy.com>

/Tissue Reporting

Fri, Mar 30, 2018 at 10:17 AM

To: Nancy Roka <nroka@envirosystems.com>, "Kirk Cram (kirk.cram@enthalpy.com)" <kirk.cram@enthalpy.com>, "nancy.roka@enthalpy.com" <nancy.roka@enthalpy.com>

Good morning Nancy -

Please see the below confirmation just received from NAE regarding the handling of statistics under their recently requested "totals" calculation protocol. Please proceed using the below guidance and let us know if any questions etc

Best

Kris

-----Original Message-----
From: Loyd, Richard B CIV USARMY CENAE (US) [mailto:Richard.B.Loyd@usace.army.mil]
Sent: Friday, March 30, 2018 10:12 AM
To:
Cc
Subject: RE: /Tissue Reporting

Hey there Maura,
I agree with ESI's recommendation to use 1/2 MDL for non-detects for both the computation of totals and for statistical analysis. It took a little while to get you an answer because I was waiting on a call back from our regulatory office to make sure they were ok with that methodology as well. In future ESI should follow the proposed protocol for both federal and private projects.

Thanks,
Ben

Richard B. Loyd
US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742
Office: (978) 318-8048
Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil

-----Original Message-----
From:
Sent: Wednesday, March 28, 2018 4:56 PM
To: Loyd, Richard B CIV USARMY CENAE (US) <Richard.B.Loyd@usace.army.mil>

Subject: [Non-DoD Source] /Tissue Reporting

Ben,

Based on the recent directive regarding reporting on non-detects and summation of totals, we have some further questions regarding statistical evaluation. The issue, paraphrased from ESI is as follows:

"Historically the Bioaccumulation EDD, where totals for PCBs etc are provided, uses the MDL when a value is a non-detect "ND" and the statistical analysis on the individual compounds are run using the MDL in place of the ND. Going forward, as per direction from USACE, we will use 1/2 of the MDL to compute the "Total" concentration for specified compounds. Under this scenario what number should be incorporated into the statistical analysis program, the 1/2 MDL or the MDL? As indicated, the "Total" numbers have not been included in the statistical analysis historically. However, a potential issue arises if the stats were run using the MDL then a review of the full data package differs shows different numbers which could potentially lead to some level of confusion. ESI's suggestion would be to use the 1/2 MDL for the computation of totals and for the statistical analysis, for those groups where total are generated, PCBs, Pesticides and PAHs.

Do you concur with ESI's recommendation?

Thanks Ben,

Maura

-----Original Message-----
From: Loyd, Richard B CIV USARMY CENAE (US) [mailto:Richard.B.Loyd@usace.army.mil <mailto:Richard.B.Loyd@usace.army.mil>]
Sent: Monday, March 26, 2018 2:28 PM
To:
Cc:
Subject: RE: Draft Report

Hello Kris,
I realize that the reporting methods we requested are in conflict with the guidance of the RIM and the 2009 errata. The 2009 errata is the most recent RIM update. Please stick to the guidance we gave you in our last conference call, which is summarized below:

- Please continue to report NDs as the full RL. We are in the process of changing our methods to report NDs as the full MDL, but this change might not take place in the near future.

- For totals calculations (PCBs, DDT, PAHs) please use 1/2 the MDL for NDs. Please remember that PCB totals are calculated using only the NOAA 18 congeners. Also, despite what the errata guidance, please continue to calculate PCB totals for sediment chemistry.

Thanks,
Ben

Richard B. Loyd
US Army Corps of Engineers
696 Virginia Road
Concord, MA 01742
Office: (978) 318-8048
Cell: (978) 763-5438
Richard.B.Loyd@usace.army.mil <mailto:Richard.B.Loyd@usace.army.mil>

Macoma nasuta
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

Trace Metals

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Pre-Tissue					
CONTAMINANT	REP1	*	REP2	*	REP3	*
Metals (ug/g wet weight)						
Arsenic	1.8		2.0		1.7	
Cadmium	0.030	J	0.031	J	0.025	J
Chromium	0.46		0.50		0.43	
Copper	1.5		1.8		1.5	
Lead	0.27		0.30		0.26	
Mercury	0.0030	J	0.0040	J	0.0040	J
Nickel	0.38		0.41		0.35	
Zinc	11.1		9.9		8.3	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.8		2.1		1.9		2.6		2.3	
Cadmium	0.030	J	0.023	J	0.023	J	0.026	J	0.020	J
Chromium	0.39		0.44		0.31	J	0.68		0.61	
Copper	2.0		1.8		2.0		1.9		2.1	
Lead	0.41		0.42		0.37		0.54		0.56	
Mercury	0.0080	J	0.0050	J	0.0050	J	0.0070	J	0.0070	J
Nickel	0.42		0.44		0.32		0.48		0.44	
Zinc	10.5		8.3		10.2		10.1		8.1	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.9		1.9		1.9		1.2		2.5	
Cadmium	0.024	J	0.028	J	0.031	J	0.033	J	0.032	J
Chromium	0.45		0.40		0.55		0.45		0.51	
Copper	2.0		2.2		2.0		2.2		2.0	
Lead	0.43		0.42		0.62		0.33		0.45	
Mercury	0.0040	J	0.0030	J	0.0040	J	0.0015	U	0.0030	J
Nickel	0.29		0.32		0.37		0.28		0.42	
Zinc	7.6		11.2		10.2		9.4		10.7	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	2.3		2.0		2.4		2.7		2.2	
Cadmium	0.025	J	0.022	J	0.038		0.028	J	0.023	J
Chromium	0.36	J	0.36		0.51		0.42		0.27	J
Copper	2.0		2.1		2.3		2.0		1.9	
Lead	0.40		0.38		0.47		0.44		0.29	
Mercury	0.0015	U	0.0015	U	0.0030	J	0.0015	U	0.0015	U
Nickel	0.33		0.35		0.44		0.35		0.32	
Zinc	10.5		8.7		13.6		10.6		10.3	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.8		2.3		1.9		1.4		1.9	
Cadmium	0.023	J	0.024	J	0.028	J	0.022	J	0.030	J
Chromium	0.39		0.41		0.59		0.42		0.51	
Copper	2.2		1.9		2.6		2.0		2.2	
Lead	0.35		0.37		0.45		0.37		0.44	
Mercury	0.0030	J	0.0015	U	0.0015	U	0.0015	U	0.0040	J
Nickel	0.26		0.35		0.41		0.29		0.36	
Zinc	8.0		10.4		8.9		7.7		10.4	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.9		2.1		2.0		1.8		1.5	
Cadmium	0.023	J	0.029	J	0.033	J	0.027	J	0.019	J
Chromium	0.31	J	0.38		0.30	J	0.27	J	0.35	J
Copper	1.8		1.5		1.5		1.5		1.4	
Lead	0.28		0.38		0.28		0.25		0.36	
Mercury	0.0015	U	0.0015	U	0.0015	U	0.0040	J	0.0015	U
Nickel	0.30		0.34		0.33		0.30		0.31	
Zinc	8.7		9.5		9.3		9.0		7.6	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.9		1.7		1.8		1.6		1.6	
Cadmium	0.022	J	0.031	J	0.031	J	0.028	J	0.028	J
Chromium	0.36		0.93		0.43		0.36		0.36	
Copper	2.3		2.7		2.3		1.9		1.8	
Lead	0.58		0.79		0.56		0.52		0.57	
Mercury	0.0080	J	0.0090	J	0.0060	J	0.0070	J	0.0070	J
Nickel	0.34		0.45		0.37		0.30		0.31	
Zinc	8.5		10.0		11.5		9.8		8.4	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 01 Feb-19 13:42 (p 1 of 1)
Test Code/ID: 12-9274-1446/31249Mn-Met

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Start Date: 21 Nov-18 12:01 **Species:** Macoma nasuta **Sample Code:** 31249-000
End Date: 19 Dec-18 12:01 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 21 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Mn)

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Silver
31242-008	1	4		2.8	0.03	0.39	2	0.41	0.008	0.42	10.5	
31242-008	2	11		2.1	0.023	0.44	1.8	0.42	0.005	0.44	8.3	
31242-008	3	18		1.9	0.023	0.31	2	0.37	0.005	0.32	10.2	
31242-008	4	24		2.6	0.026	0.68	1.9	0.54	0.007	0.48	10.1	
31242-008	5	29		2.3	0.02	0.61	2.1	0.56	0.007	0.44	8.1	
31243-101	1	6		1.9	0.024	0.45	2	0.43	0.004	0.29	7.6	
31243-101	2	12		1.9	0.028	0.4	2.2	0.42	0.003	0.32	11.2	
31243-101	3	13		1.9	0.031	0.55	2	0.62	0.004	0.37	10.2	
31243-101	4	21		1.2	0.033	0.45	2.2	0.33	0.0015	0.28	9.4	
31243-101	5	25		2.5	0.032	0.51	2	0.45	0.003	0.42	10.7	
31243-102	1	2		2.3	0.025	0.36	2	0.4	0.0015	0.33	10.5	
31243-102	2	8		2	0.022	0.36	2.1	0.38	0.0015	0.35	8.7	
31243-102	3	17		2.4	0.038	0.51	2.3	0.47	0.003	0.44	13.6	
31243-102	4	19		2.7	0.028	0.42	2	0.44	0.0015	0.35	10.6	
31243-102	5	27		2.2	0.023	0.27	1.9	0.29	0.0015	0.32	10.3	
31243-103	1	5		1.8	0.023	0.39	2.2	0.35	0.003	0.26	8	
31243-103	2	7		2.3	0.024	0.41	1.9	0.37	0.0015	0.35	10.4	
31243-103	3	16		1.9	0.028	0.59	2.6	0.45	0.0015	0.41	8.9	
31243-103	4	22		1.4	0.022	0.42	2	0.37	0.0015	0.29	7.7	
31243-103	5	28		1.9	0.03	0.51	2.2	0.44	0.004	0.36	10.4	
31243-104	1	1		1.9	0.023	0.31	1.8	0.28	0.0015	0.3	8.7	
31243-104	2	9		2.1	0.029	0.38	1.5	0.38	0.0015	0.34	9.5	
31243-104	3	14		2	0.033	0.3	1.5	0.28	0.0015	0.33	9.3	
31243-104	4	23		1.8	0.027	0.27	1.5	0.25	0.004	0.3	9	
31243-104	5	26		1.5	0.019	0.35	1.4	0.36	0.0015	0.31	7.6	
31243-105	1	3		1.9	0.022	0.36	2.3	0.58	0.008	0.34	8.5	
31243-105	2	10		1.7	0.031	0.93	2.7	0.79	0.009	0.45	10	
31243-105	3	15		1.8	0.031	0.43	2.3	0.56	0.006	0.37	11.5	
31243-105	4	20		1.6	0.028	0.36	1.9	0.52	0.007	0.3	9.8	
31243-105	5	30		1.6	0.028	0.36	1.8	0.57	0.007	0.31	8.4	

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Batch ID:	20-2290-9068	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 12:01	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	19 Dec-18 12:01	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-2967-2273	Arsenic	Equal Variance t Two-Sample Test	0.9410	31243-101 passed arsenic
17-8457-1708	Arsenic	Equal Variance t Two-Sample Test	0.5386	31243-102 passed arsenic
06-7985-6353	Arsenic	Equal Variance t Two-Sample Test	0.9709	31243-103 passed arsenic
16-6681-9544	Arsenic	Equal Variance t Two-Sample Test	0.9812	31243-104 passed arsenic
09-7957-0265	Arsenic	Equal Variance t Two-Sample Test	0.9964	31243-105 passed arsenic
02-5097-2061	Cadmium	Equal Variance t Two-Sample Test	0.0289	31243-101 failed cadmium
03-0676-1861	Cadmium	Equal Variance t Two-Sample Test	0.2135	31243-102 passed cadmium
08-6268-0444	Cadmium	Equal Variance t Two-Sample Test	0.3366	31243-103 passed cadmium
20-4359-9124	Cadmium	Equal Variance t Two-Sample Test	0.2793	31243-104 passed cadmium
20-6343-1957	Cadmium	Equal Variance t Two-Sample Test	0.0827	31243-105 passed cadmium
04-2238-2526	Chromium	Equal Variance t Two-Sample Test	0.5728	31243-101 passed chromium
10-6598-3043	Chromium	Equal Variance t Two-Sample Test	0.8821	31243-102 passed chromium
17-8905-2944	Chromium	Equal Variance t Two-Sample Test	0.6066	31243-103 passed chromium
01-6324-5319	Chromium	Equal Variance t Two-Sample Test	0.9743	31243-104 passed chromium
11-5807-8577	Chromium	Equal Variance t Two-Sample Test	0.4941	31243-105 passed chromium
05-2085-3074	Copper	Equal Variance t Two-Sample Test	0.0641	31243-101 passed copper
01-8795-3351	Copper	Equal Variance t Two-Sample Test	0.1362	31243-102 passed copper
14-0357-0546	Copper	Equal Variance t Two-Sample Test	0.0650	31243-103 passed copper
00-5105-5445	Copper	Equal Variance t Two-Sample Test	0.9994	31243-104 passed copper
00-4258-3067	Copper	Equal Variance t Two-Sample Test	0.0968	31243-105 passed copper
13-2639-2316	Lead	Equal Variance t Two-Sample Test	0.5636	31243-101 passed lead
07-6922-1056	Lead	Equal Variance t Two-Sample Test	0.8872	31243-102 passed lead
06-9033-2205	Lead	Equal Variance t Two-Sample Test	0.9127	31243-103 passed lead
06-1939-2709	Lead	Equal Variance t Two-Sample Test	0.9945	31243-104 passed lead
17-2190-3102	Lead	Equal Variance t Two-Sample Test	0.0227	31243-105 failed lead
02-1030-4500	Mercury	Equal Variance t Two-Sample Test	0.9988	31243-101 passed mercury
16-6589-9510	Mercury	Equal Variance t Two-Sample Test	0.9999	31243-102 passed mercury
09-5296-1956	Mercury	Equal Variance t Two-Sample Test	0.9996	31243-103 passed mercury
07-6362-6041	Mercury	Equal Variance t Two-Sample Test	0.9998	31243-104 passed mercury
01-0104-8346	Mercury	Equal Variance t Two-Sample Test	0.1199	31243-105 passed mercury
01-7750-2713	Nickel	Equal Variance t Two-Sample Test	0.9723	31243-101 passed nickel
12-1132-2508	Nickel	Equal Variance t Two-Sample Test	0.9460	31243-102 passed nickel
08-4991-0214	Nickel	Equal Variance t Two-Sample Test	0.9739	31243-103 passed nickel

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
01-2571-5451	Nickel	Equal Variance t Two-Sample Test	1.0000	31243-104 passed nickel
20-3513-9465	Nickel	Equal Variance t Two-Sample Test	0.9970	31243-104 passed nickel
14-0352-2568	Nickel	Equal Variance t Two-Sample Test	0.9396	31243-105 passed nickel
18-4384-6194	Zinc	Equal Variance t Two-Sample Test	0.3260	31243-101 passed zinc
15-7056-8033	Zinc	Equal Variance t Two-Sample Test	0.1030	31243-102 passed zinc
06-0169-8430	Zinc	Equal Variance t Two-Sample Test	0.6740	31243-103 passed zinc
15-4472-5498	Zinc	Equal Variance t Two-Sample Test	0.8301	31243-104 passed zinc
07-0176-2888	Zinc	Equal Variance t Two-Sample Test	0.4001	31243-105 passed zinc

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	1.89	2.79	1.9	2.8	0.163	0.365	15.59%	0.00%
31243-101		5	1.88	1.31	2.45	1.2	2.5	0.206	0.46	24.49%	19.66%
31243-102		5	2.32	2	2.64	2	2.7	0.116	0.259	11.16%	0.85%
31243-103		5	1.86	1.46	2.26	1.4	2.3	0.144	0.321	17.25%	20.51%
31243-104		5	1.86	1.57	2.15	1.5	2.1	0.103	0.23	12.38%	20.51%
31243-105		5	1.72	1.56	1.88	1.6	1.9	0.0583	0.13	7.58%	26.50%

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.0244	0.0197	0.0291	0.02	0.03	0.00169	0.00378	15.50%	0.00%
31243-101		5	0.0296	0.0251	0.0341	0.024	0.033	0.00163	0.00365	12.32%	-21.31%
31243-102		5	0.0272	0.0192	0.0352	0.022	0.038	0.00289	0.00646	23.74%	-11.48%
31243-103		5	0.0254	0.0211	0.0297	0.022	0.03	0.00154	0.00344	13.52%	-4.10%
31243-104		5	0.0262	0.0195	0.0329	0.019	0.033	0.00242	0.0054	20.62%	-7.38%
31243-105		5	0.028	0.0234	0.0326	0.022	0.031	0.00164	0.00367	13.12%	-14.75%

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.486	0.294	0.678	0.31	0.68	0.069	0.154	31.76%	0.00%
31243-101		5	0.472	0.399	0.545	0.4	0.55	0.0262	0.0585	12.39%	2.88%
31243-102		5	0.384	0.274	0.494	0.27	0.51	0.0396	0.0885	23.04%	20.99%
31243-103		5	0.464	0.36	0.568	0.39	0.59	0.0376	0.0841	18.13%	4.53%
31243-104		5	0.322	0.268	0.376	0.27	0.38	0.0193	0.0432	13.43%	33.74%
31243-105		5	0.488	0.179	0.797	0.36	0.93	0.111	0.249	51.01%	-0.41%

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.96	1.82	2.1	1.8	2.1	0.051	0.114	5.82%	0.00%
31243-101		5	2.08	1.94	2.22	2	2.2	0.049	0.11	5.27%	-6.12%
31243-102		5	2.06	1.87	2.25	1.9	2.3	0.0678	0.152	7.36%	-5.10%
31243-103		5	2.18	1.85	2.51	1.9	2.6	0.12	0.268	12.31%	-11.22%
31243-104		5	1.54	1.35	1.73	1.4	1.8	0.0678	0.152	9.85%	21.43%
31243-105		5	2.2	1.75	2.65	1.8	2.7	0.161	0.361	16.39%	-12.24%

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.46	0.355	0.565	0.37	0.56	0.0378	0.0846	18.38%	0.00%
31243-101		5	0.45	0.319	0.581	0.33	0.62	0.0472	0.106	23.47%	2.17%
31243-102		5	0.396	0.311	0.481	0.29	0.47	0.0308	0.0688	17.37%	13.91%
31243-103		5	0.396	0.339	0.453	0.35	0.45	0.0204	0.0456	11.52%	13.91%
31243-104		5	0.31	0.24	0.38	0.25	0.38	0.0253	0.0566	18.25%	32.61%
31243-105		5	0.604	0.472	0.736	0.52	0.79	0.0476	0.106	17.62%	-31.30%

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.0064	0.00473	0.00807	0.005	0.008	0.0006	0.00134	20.96%	0.00%
31243-101		5	0.0031	0.00183	0.00437	0.0015	0.004	0.000458	0.00102	33.05%	51.56%
31243-102		5	0.0018	0.000967	0.00263	0.0015	0.003	0.0003	0.000671	37.27%	71.88%
31243-103		5	0.0023	0.000871	0.00373	0.0015	0.004	0.000515	0.00115	50.05%	64.06%
31243-104		5	0.002	0.000612	0.00339	0.0015	0.004	0.0005	0.00112	55.90%	68.75%
31243-105		5	0.0074	0.00598	0.00882	0.006	0.009	0.00051	0.00114	15.41%	-15.62%

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.42	0.346	0.494	0.32	0.48	0.0268	0.06	14.29%	0.00%
31243-101		5	0.336	0.263	0.409	0.28	0.42	0.0262	0.0586	17.43%	20.00%
31243-102		5	0.358	0.299	0.417	0.32	0.44	0.0213	0.0476	13.31%	14.76%
31243-103		5	0.334	0.26	0.408	0.26	0.41	0.0266	0.0594	17.79%	20.48%
31243-104		5	0.316	0.293	0.339	0.3	0.34	0.00812	0.0182	5.75%	24.76%
31243-105		5	0.354	0.279	0.429	0.3	0.45	0.0269	0.0602	17.02%	15.71%

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	9.44	8.02	10.9	8.1	10.5	0.511	1.14	12.12%	0.00%
31243-101		5	9.82	8.07	11.6	7.6	11.2	0.63	1.41	14.34%	-4.03%
31243-102		5	10.7	8.54	12.9	8.7	13.6	0.794	1.78	16.53%	-13.77%
31243-103		5	9.08	7.49	10.7	7.7	10.4	0.574	1.28	14.13%	3.81%
31243-104		5	8.82	7.89	9.75	7.6	9.5	0.334	0.746	8.46%	6.57%
31243-105		5	9.64	8.06	11.2	8.4	11.5	0.568	1.27	13.17%	-2.12%

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.8	2.1	1.9	2.6	2.3
31243-101		1.9	1.9	1.9	1.2	2.5
31243-102		2.3	2	2.4	2.7	2.2
31243-103		1.8	2.3	1.9	1.4	1.9
31243-104		1.9	2.1	2	1.8	1.5
31243-105		1.9	1.7	1.8	1.6	1.6

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.023	0.023	0.026	0.02
31243-101		0.024	0.028	0.031	0.033	0.032
31243-102		0.025	0.022	0.038	0.028	0.023
31243-103		0.023	0.024	0.028	0.022	0.03
31243-104		0.023	0.029	0.033	0.027	0.019
31243-105		0.022	0.031	0.031	0.028	0.028

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.39	0.44	0.31	0.68	0.61
31243-101		0.45	0.4	0.55	0.45	0.51
31243-102		0.36	0.36	0.51	0.42	0.27
31243-103		0.39	0.41	0.59	0.42	0.51
31243-104		0.31	0.38	0.3	0.27	0.35
31243-105		0.36	0.93	0.43	0.36	0.36

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2	1.8	2	1.9	2.1
31243-101		2	2.2	2	2.2	2
31243-102		2	2.1	2.3	2	1.9
31243-103		2.2	1.9	2.6	2	2.2
31243-104		1.8	1.5	1.5	1.5	1.4
31243-105		2.3	2.7	2.3	1.9	1.8

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.41	0.42	0.37	0.54	0.56
31243-101		0.43	0.42	0.62	0.33	0.45
31243-102		0.4	0.38	0.47	0.44	0.29
31243-103		0.35	0.37	0.45	0.37	0.44
31243-104		0.28	0.38	0.28	0.25	0.36
31243-105		0.58	0.79	0.56	0.52	0.57

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.008	0.005	0.005	0.007	0.007
31243-101		0.004	0.003	0.004	0.0015	0.003
31243-102		0.0015	0.0015	0.003	0.0015	0.0015
31243-103		0.003	0.0015	0.0015	0.0015	0.004
31243-104		0.0015	0.0015	0.0015	0.004	0.0015
31243-105		0.008	0.009	0.006	0.007	0.007

Bioaccumulation Evaluation - Metals - Macoma **EnviroSystems, Inc.**

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.42	0.44	0.32	0.48	0.44
31243-101		0.29	0.32	0.37	0.28	0.42
31243-102		0.33	0.35	0.44	0.35	0.32
31243-103		0.26	0.35	0.41	0.29	0.36
31243-104		0.3	0.34	0.33	0.3	0.31
31243-105		0.34	0.45	0.37	0.3	0.31

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	10.5	8.3	10.2	10.1	8.1
31243-101		7.6	11.2	10.2	9.4	10.7
31243-102		10.5	8.7	13.6	10.6	10.3
31243-103		8	10.4	8.9	7.7	10.4
31243-104		8.7	9.5	9.3	9	7.6
31243-105		8.5	10	11.5	9.8	8.4

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Metals

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-1.75119	1.85955	0.9409905	0.05	FALSE	0.4884633	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	2.213267	1.85955	0.0288929	0.05	TRUE	0.00436895	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.18964	1.85955	0.5728427	0.05	FALSE	0.1372795	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	1.697057	1.85955	0.0640611	0.05	FALSE	0.1314899	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.1652949	1.85955	0.5635937	0.05	FALSE	0.1124988	8		C
Mercury	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-4.370956	1.85955	0.9988113	0.05	FALSE	0.00140393	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-2.240199	1.85955	0.9722959	0.05	FALSE	0.06972685	8		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0.4684576	1.85955	0.3259782	0.05	FALSE	1.508413	8		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.0999996	1.85955	0.5385973	0.05	FALSE	0.3719096	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.8366601	1.85955	0.2135335	0.05	FALSE	0.00622324	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.281828	1.85955	0.8820992	0.05	FALSE	0.1479714	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.178511	1.85955	0.1362278	0.05	FALSE	0.1577879	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.312976	1.85955	0.8871998	0.05	FALSE	0.09064224	8		C
Mercury	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-6.857275	1.85955	0.999935	0.05	FALSE	0.00124742	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.809496	1.85955	0.9460131	0.05	FALSE	0.06371497	8		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.376297	1.85955	0.1030104	0.05	FALSE	1.756461	8		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-2.209379	1.85955	0.9709314	0.05	FALSE	0.4039972	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	0.4376882	1.85955	0.3365943	0.05	FALSE	0.00424857	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.2798069	1.85955	0.606638	0.05	FALSE	0.1462083	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	1.687323	1.85955	0.065011	0.05	FALSE	0.2424554	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-1.489581	1.85955	0.9126685	0.05	FALSE	0.07989568	8		C
Mercury	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-5.186135	1.85955	0.9995818	0.05	FALSE	0.0014701	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-2.277396	1.85955	0.9738583	0.05	FALSE	0.07022103	8		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.468284	1.85955	0.6739624	0.05	FALSE	1.429556	8		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-2.488684	1.85955	0.9812003	0.05	FALSE	0.3586566	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.6102571	1.85955	0.2793122	0.05	FALSE	0.00548488	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-2.287506	1.85955	0.9742676	0.05	FALSE	0.1333181	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-4.949748	1.85955	0.9994394	0.05	FALSE	0.1577879	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-3.296902	1.85955	0.9945455	0.05	FALSE	0.08460433	8		C
Mercury	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-5.633622	1.85955	0.9997547	0.05	FALSE	0.00145235	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-3.709557	1.85955	0.9970199	0.05	FALSE	0.05213371	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-8.966119	1.89458	0.9999781	0.05	FALSE	0.02725824	7		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-1.015167	1.85955	0.8301292	0.05	FALSE	1.135695	8		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	-3.579571	1.85955	0.9964036	0.05	FALSE	0.3220831	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	1.52674	1.85955	0.082671	0.05	FALSE	0.00438475	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.0152677	1.85955	0.4940962	0.05	FALSE	0.2435937	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	1.41915	1.85955	0.0968107	0.05	FALSE	0.3144781	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	2.368626	1.85955	0.0226718	0.05	TRUE	0.1130507	8		C
Mercury	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	1.270001	1.85955	0.1198881	0.05	FALSE	0.00146421	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	-1.73564	1.85955	0.9395789	0.05	FALSE	0.07071174	8		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.2616669	1.85955	0.4000946	0.05	FALSE	1.421308	8		C

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-2967-2273 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed arsenic	20.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-1.75	1.86	0.488	8	CDF	0.9410	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6102	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.529	0.529	1	3.07	0.1180	Non-Significant Effect
Error	1.38	0.1725	8			
Total	1.909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.59	23.2	0.6625	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.969	0.741	0.8824	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	1.89	2.79	2.3	1.9	2.8	0.163	15.59%	0.00%
31243-101		5	1.88	1.31	2.45	1.9	1.2	2.5	0.206	24.49%	19.66%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.8	2.1	1.9	2.6	2.3
31243-101		1.9	1.9	1.9	1.2	2.5

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-8457-1708	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed arsenic	15.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.1	1.86	0.372	8	CDF	0.5386	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.01	0.9228	Non-Significant Effect
Error	0.8	0.1	8			
Total	0.801		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.99	23.2	0.5230	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8530	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	1.89	2.79	2.3	1.9	2.8	0.163	15.59%	0.00%
31243-102		5	2.32	2	2.64	2.3	2	2.7	0.116	11.16%	0.85%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.8	2.1	1.9	2.6	2.3
31243-102		2.3	2	2.4	2.7	2.2

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-7985-6353 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed arsenic	17.26%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-2.21	1.86	0.404	8	CDF	0.9709	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.42	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.576	0.576	1	4.88	0.0581	Non-Significant Effect
Error	0.944	0.118	8			
Total	1.52		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	23.2	0.8103	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5090	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	1.89	2.79	2.3	1.9	2.8	0.163	15.59%	0.00%
31243-103		5	1.86	1.46	2.26	1.9	1.4	2.3	0.144	17.25%	20.51%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.8	2.1	1.9	2.6	2.3
31243-103		1.8	2.3	1.9	1.4	1.9

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 16-6681-9544 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed arsenic	15.33%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-2.49	1.86	0.359	8	CDF	0.9812	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9076	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.576	0.576	1	6.19	0.0376	Significant Effect
Error	0.744	0.093	8			
Total	1.32		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.51	23.2	0.3946	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9196	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	1.89	2.79	2.3	1.9	2.8	0.163	15.59%	0.00%
31243-104		5	1.86	1.57	2.15	1.9	1.5	2.1	0.103	12.38%	20.51%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.8	2.1	1.9	2.6	2.3
31243-104		1.9	2.1	2	1.8	1.5

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7957-0265 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed arsenic	13.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-3.58	1.86	0.322	8	CDF	0.9964	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5286	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.961	0.961	1	12.8	0.0072	Significant Effect
Error	0.6	0.075	8			
Total	1.561		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.82	23.2	0.0712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.989	0.741	0.9961	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	1.89	2.79	2.3	1.9	2.8	0.163	15.59%	0.00%
31243-105		5	1.72	1.56	1.88	1.7	1.6	1.9	0.0583	7.58%	26.50%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.8	2.1	1.9	2.6	2.3
31243-105		1.9	1.7	1.8	1.6	1.6

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5097-2061 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed cadmium	17.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	2.21	1.86	0.004	8	CDF	0.0289	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9101	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000676	0.0000676	1	4.9	0.0578	Non-Significant Effect
Error	0.0001104	0.0000138	8			
Total	0.000178		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.08	23.2	0.9457	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8565	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0244	0.0197	0.0291	0.023	0.02	0.03	0.00169	15.50%	0.00%
31243-101		5	0.0296	0.0251	0.0341	0.031	0.024	0.033	0.00163	12.32%	-21.31%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.023	0.023	0.026	0.02
31243-101		0.024	0.028	0.031	0.033	0.032

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-0676-1861 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed cadmium	25.51%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.837	1.86	0.006	8	CDF	0.2135	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1063	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000196	0.0000196	1	0.7	0.4271	Non-Significant Effect
Error	0.000224	0.000028	8			
Total	0.0002436		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.92	23.2	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.885	0.741	0.1493	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0244	0.0197	0.0291	0.023	0.02	0.03	0.00169	15.50%	0.00%
31243-102		5	0.0272	0.0192	0.0352	0.025	0.022	0.038	0.00289	23.74%	-11.48%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.023	0.023	0.026	0.02
31243-102		0.025	0.022	0.038	0.028	0.023

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-6268-0444 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed cadmium	17.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0.438	1.86	0.004	8	CDF	0.3366	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8028	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000025	0.0000025	1	0.192	0.6732	Non-Significant Effect
Error	0.0001044	1.305E-05	8			
Total	0.0001069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.21	23.2	0.8568	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3707	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0244	0.0197	0.0291	0.023	0.02	0.03	0.00169	15.50%	0.00%
31243-103		5	0.0254	0.0211	0.0297	0.024	0.022	0.03	0.00154	13.52%	-4.10%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.023	0.023	0.026	0.02
31243-103		0.023	0.024	0.028	0.022	0.03

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-4359-9124 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed cadmium	22.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.61	1.86	0.005	8	CDF	0.2793	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8182	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000081	0.0000081	1	0.372	0.5586	Non-Significant Effect
Error	0.000174	2.175E-05	8			
Total	0.0001821		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.04	23.2	0.5063	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.981	0.741	0.9698	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0244	0.0197	0.0291	0.023	0.02	0.03	0.00169	15.50%	0.00%
31243-104		5	0.0262	0.0195	0.0329	0.027	0.019	0.033	0.00242	20.62%	-7.38%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.023	0.023	0.026	0.02
31243-104		0.023	0.029	0.033	0.027	0.019

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-6343-1957 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed cadmium	17.97%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	1.53	1.86	0.004	8	CDF	0.0827	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.29	0.6683	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000324	0.0000324	1	2.33	0.1653	Non-Significant Effect
Error	0.0001112	0.0000139	8			
Total	0.0001436		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.06	23.2	0.9568	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.973	0.741	0.9159	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0244	0.0197	0.0291	0.023	0.02	0.03	0.00169	15.50%	0.00%
31243-105		5	0.028	0.0234	0.0326	0.028	0.022	0.031	0.00164	13.12%	-14.75%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.023	0.023	0.026	0.02
31243-105		0.022	0.031	0.031	0.028	0.028

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-2238-2526 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed chromium	28.25%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.19	1.86	0.137	8	CDF	0.5728	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5616	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00049	0.00049	1	0.036	0.8543	Non-Significant Effect
Error	0.109	0.013625	8			
Total	0.10949		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.97	23.2	0.0866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.741	0.9736	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.486	0.294	0.678	0.44	0.31	0.68	0.069	31.76%	0.00%
31243-101		5	0.472	0.399	0.545	0.45	0.4	0.55	0.0262	12.39%	2.88%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.39	0.44	0.31	0.68	0.61
31243-101		0.45	0.4	0.55	0.45	0.51

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-6598-3043 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed chromium	30.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.28	1.86	0.148	8	CDF	0.8821	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8229	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02601	0.02601	1	1.64	0.2358	Non-Significant Effect
Error	0.12664	0.01583	8			
Total	0.15265		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.04	23.2	0.3065	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.959	0.741	0.7718	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.486	0.294	0.678	0.44	0.31	0.68	0.069	31.76%	0.00%
31243-102		5	0.384	0.274	0.494	0.36	0.27	0.51	0.0396	23.04%	20.99%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.39	0.44	0.31	0.68	0.61
31243-102		0.36	0.36	0.51	0.42	0.27

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-8905-2944 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed chromium	30.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.28	1.86	0.146	8	CDF	0.6066	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7781	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00121	0.00121	1	0.0783	0.7867	Non-Significant Effect
Error	0.12364	0.015455	8			
Total	0.12485		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.37	23.2	0.2667	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5047	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.486	0.294	0.678	0.44	0.31	0.68	0.069	31.76%	0.00%
31243-103		5	0.464	0.36	0.568	0.42	0.39	0.59	0.0376	18.13%	4.53%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.39	0.44	0.31	0.68	0.61
31243-103		0.39	0.41	0.59	0.42	0.51

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-6324-5319 **Endpoint:** Chromium **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed chromium	27.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-2.29	1.86	0.133	8	CDF	0.9743	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.82	2.29	0.4725	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06724	0.06724	1	5.23	0.0515	Non-Significant Effect
Error	0.1028	0.01285	8			
Total	0.17004		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	12.7	23.2	0.0302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.741	0.9746	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.486	0.294	0.678	0.44	0.31	0.68	0.069	31.76%	0.00%
31243-104		5	0.322	0.268	0.376	0.31	0.27	0.38	0.0193	13.43%	33.74%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.39	0.44	0.31	0.68	0.61
31243-104		0.31	0.38	0.3	0.27	0.35

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-5807-8577	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed chromium	50.12%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.0153	1.86	0.244	8	CDF	0.4941	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.26	2.29	0.0595	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.000E-05	1.000E-05	1	0.000233	0.9882	Non-Significant Effect
Error	0.3432	0.0429	8			
Total	0.34321		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.6	23.2	0.3771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.806	0.741	0.0174	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.486	0.294	0.678	0.44	0.31	0.68	0.069	31.76%	0.00%
31243-105		5	0.488	0.179	0.797	0.36	0.36	0.93	0.111	51.01%	-0.41%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.39	0.44	0.31	0.68	0.61
31243-105		0.36	0.93	0.43	0.36	0.36

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-2085-3074 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed copper	6.71%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	1.7	1.86	0.131	8	CDF	0.0641	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.52	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.036	0.036	1	2.88	0.1281	Non-Significant Effect
Error	0.1	0.0125	8			
Total	0.136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.08	23.2	0.9400	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.741	0.2037	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.96	1.82	2.1	2	1.8	2.1	0.051	5.82%	0.00%
31243-101		5	2.08	1.94	2.22	2	2	2.2	0.049	5.27%	-6.12%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2	1.8	2	1.9	2.1
31243-101		2	2.2	2	2.2	2

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-8795-3351 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed copper	8.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.18	1.86	0.158	8	CDF	0.1362	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	1.39	0.2725	Non-Significant Effect
Error	0.144	0.018	8			
Total	0.169		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.77	23.2	0.5941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4453	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.96	1.82	2.1	2	1.8	2.1	0.051	5.82%	0.00%
31243-102		5	2.06	1.87	2.25	2	1.9	2.3	0.0678	7.36%	-5.10%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2	1.8	2	1.9	2.1
31243-102		2	2.1	2.3	2	1.9

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-0357-0546	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed copper	12.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	1.69	1.86	0.242	8	CDF	0.0650	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1086	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.121	0.121	1	2.85	0.1300	Non-Significant Effect
Error	0.34	0.0425	8			
Total	0.461		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.54	23.2	0.1260	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4383	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.96	1.82	2.1	2	1.8	2.1	0.051	5.82%	0.00%
31243-103		5	2.18	1.85	2.51	2.2	1.9	2.6	0.12	12.31%	-11.22%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2	1.8	2	1.9	2.1
31243-103		2.2	1.9	2.6	2	2.2

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-5105-5445 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed copper	8.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-4.95	1.86	0.158	8	CDF	0.9994	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1833	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.441	0.441	1	24.5	0.0011	Significant Effect
Error	0.144	0.018	8			
Total	0.585		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.77	23.2	0.5941	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3720	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.96	1.82	2.1	2	1.8	2.1	0.051	5.82%	0.00%
31243-104		5	1.54	1.35	1.73	1.5	1.4	1.8	0.0678	9.85%	21.43%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2	1.8	2	1.9	2.1
31243-104		1.8	1.5	1.5	1.5	1.4

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-4258-3067 **Endpoint:** Copper **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed copper	16.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	1.42	1.86	0.314	8	CDF	0.0968	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2513	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.144	0.144	1	2.01	0.1936	Non-Significant Effect
Error	0.572	0.0715	8			
Total	0.716		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10	23.2	0.0466	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.948	0.741	0.6475	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.96	1.82	2.1	2	1.8	2.1	0.051	5.82%	0.00%
31243-105		5	2.2	1.75	2.65	2.3	1.8	2.7	0.161	16.39%	-12.24%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2	1.8	2	1.9	2.1
31243-105		2.3	2.7	2.3	1.9	1.8

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-2639-2316 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed lead	24.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.165	1.86	0.112	8	CDF	0.5636	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.29	0.3692	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	0.0273	0.8728	Non-Significant Effect
Error	0.0732	0.00915	8			
Total	0.07345		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.56	23.2	0.6774	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.741	0.5330	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.355	0.565	0.42	0.37	0.56	0.0378	18.38%	0.00%
31243-101		5	0.45	0.319	0.581	0.43	0.33	0.62	0.0472	23.47%	2.17%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.41	0.42	0.37	0.54	0.56
31243-101		0.43	0.42	0.62	0.33	0.45

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-6922-1056 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed lead	19.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.31	1.86	0.091	8	CDF	0.8872	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.46	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01024	0.01024	1	1.72	0.2256	Non-Significant Effect
Error	0.04752	0.00594	8			
Total	0.05776		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6987	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.741	0.5990	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.355	0.565	0.42	0.37	0.56	0.0378	18.38%	0.00%
31243-102		5	0.396	0.311	0.481	0.4	0.29	0.47	0.0308	17.37%	13.91%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.41	0.42	0.37	0.54	0.56
31243-102		0.4	0.38	0.47	0.44	0.29

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-9033-2205 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed lead	17.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-1.49	1.86	0.08	8	CDF	0.9127	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01024	0.01024	1	2.22	0.1747	Non-Significant Effect
Error	0.03692	0.004615	8			
Total	0.04716		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.44	23.2	0.2589	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2968	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.355	0.565	0.42	0.37	0.56	0.0378	18.38%	0.00%
31243-103		5	0.396	0.339	0.453	0.37	0.35	0.45	0.0204	11.52%	13.91%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.41	0.42	0.37	0.54	0.56
31243-103		0.35	0.37	0.45	0.37	0.44

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-1939-2709 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed lead	18.39%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-3.3	1.86	0.085	8	CDF	0.9945	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.47	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05625	0.05625	1	10.9	0.0109	Significant Effect
Error	0.0414	0.005175	8			
Total	0.09765		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.23	23.2	0.4553	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.741	0.1648	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.355	0.565	0.42	0.37	0.56	0.0378	18.38%	0.00%
31243-104		5	0.31	0.24	0.38	0.28	0.25	0.38	0.0253	18.25%	32.61%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.41	0.42	0.37	0.54	0.56
31243-104		0.28	0.38	0.28	0.25	0.36

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-2190-3102 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed lead	24.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	2.37	1.86	0.113	8	CDF	0.0227	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1859	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05184	0.05184	1	5.61	0.0453	Significant Effect
Error	0.07392	0.00924	8			
Total	0.12576		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.58	23.2	0.6665	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.842	0.741	0.0463	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.355	0.565	0.42	0.37	0.56	0.0378	18.38%	0.00%
31243-105		5	0.604	0.472	0.736	0.57	0.52	0.79	0.0476	17.62%	-31.30%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.41	0.42	0.37	0.54	0.56
31243-105		0.58	0.79	0.56	0.52	0.57

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-1030-4500 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed mercury	21.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-4.37	1.86	0.001	8	CDF	0.9988	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.42	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.723E-05	2.723E-05	1	19.1	0.0024	Significant Effect
Error	0.0000114	1.425E-06	8			
Total	3.863E-05		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.71	23.2	0.6144	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.898	0.741	0.2082	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0064	0.00473	0.00807	0.007	0.005	0.008	0.0006	20.96%	0.00%
31243-101		5	0.0031	0.00183	0.00437	0.003	0.0015	0.004	0.000458	33.05%	51.56%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.008	0.005	0.005	0.007	0.007
31243-101		0.004	0.003	0.004	0.0015	0.003

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-6589-9510	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed mercury	19.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-6.86	1.86	0.001	8	CDF	0.9999	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9074	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	47	1.3E-04	Significant Effect
Error	0.000009	1.125E-06	8			
Total	0.0000619		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.922	0.741	0.3699	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0064	0.00473	0.00807	0.007	0.005	0.008	0.0006	20.96%	0.00%
31243-102		5	0.0018	0.000967	0.00263	0.0015	0.0015	0.003	0.0003	37.27%	71.88%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.008	0.005	0.005	0.007	0.007
31243-102		0.0015	0.0015	0.003	0.0015	0.0015

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-5296-1956 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed mercury	22.97%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-5.19	1.86	0.001	8	CDF	0.9996	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.44	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.203E-05	4.203E-05	1	26.9	8.4E-04	Significant Effect
Error	0.0000125	1.563E-06	8			
Total	5.453E-05		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.36	23.2	0.7738	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1275	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0064	0.00473	0.00807	0.007	0.005	0.008	0.0006	20.96%	0.00%
31243-103		5	0.0023	0.000871	0.00373	0.0015	0.0015	0.004	0.000515	50.05%	64.06%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.008	0.005	0.005	0.007	0.007
31243-103		0.003	0.0015	0.0015	0.0015	0.004

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-6362-6041 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed mercury	22.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-5.63	1.86	0.001	8	CDF	0.9998	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6466	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000484	0.0000484	1	31.7	4.9E-04	Significant Effect
Error	0.0000122	1.525E-06	8			
Total	0.0000606		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.44	23.2	0.7324	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.741	0.2039	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0064	0.00473	0.00807	0.007	0.005	0.008	0.0006	20.96%	0.00%
31243-104		5	0.002	0.000612	0.00339	0.0015	0.0015	0.004	0.0005	55.90%	68.75%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.008	0.005	0.005	0.007	0.007
31243-104		0.0015	0.0015	0.0015	0.004	0.0015

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-0104-8346 **Endpoint:** Mercury **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed mercury	22.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	1.27	1.86	0.001	8	CDF	0.1199	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000025	0.0000025	1	1.61	0.2398	Non-Significant Effect
Error	0.0000124	1.55E-06	8			
Total	0.0000149		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.38	23.2	0.7602	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.741	0.1239	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0064	0.00473	0.00807	0.007	0.005	0.008	0.0006	20.96%	0.00%
31243-105		5	0.0074	0.00598	0.00882	0.007	0.006	0.009	0.00051	15.41%	-15.62%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.008	0.005	0.005	0.007	0.007
31243-105		0.008	0.009	0.006	0.007	0.007

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-7750-2713 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed nickel	16.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-2.24	1.86	0.07	8	CDF	0.9723	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5158	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01764	0.01764	1	5.02	0.0554	Non-Significant Effect
Error	0.02812	0.003515	8			
Total	0.04576		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.05	23.2	0.9637	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.981	0.741	0.9706	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.42	0.346	0.494	0.44	0.32	0.48	0.0268	14.29%	0.00%
31243-101		5	0.336	0.263	0.409	0.32	0.28	0.42	0.0262	17.43%	20.00%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.42	0.44	0.32	0.48	0.44
31243-101		0.29	0.32	0.37	0.28	0.42

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-1132-2508 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed nickel	15.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.81	1.86	0.064	8	CDF	0.9460	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.96	2.29	0.2789	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00961	0.00961	1	3.27	0.1080	Non-Significant Effect
Error	0.02348	0.002935	8			
Total	0.03309		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.59	23.2	0.6660	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8644	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.42	0.346	0.494	0.44	0.32	0.48	0.0268	14.29%	0.00%
31243-102		5	0.358	0.299	0.417	0.35	0.32	0.44	0.0213	13.31%	14.76%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.42	0.44	0.32	0.48	0.44
31243-102		0.33	0.35	0.44	0.35	0.32

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-4991-0214 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed nickel	16.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-2.28	1.86	0.070	8	CDF	0.9739	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5375	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01849	0.01849	1	5.19	0.0523	Non-Significant Effect
Error	0.02852	0.003565	8			
Total	0.04701		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.02	23.2	0.9853	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4275	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.42	0.346	0.494	0.44	0.32	0.48	0.0268	14.29%	0.00%
31243-103		5	0.334	0.26	0.408	0.35	0.26	0.41	0.0266	17.79%	20.48%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.42	0.44	0.32	0.48	0.44
31243-103		0.26	0.35	0.41	0.29	0.36

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-3513-9465 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed nickel	12.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-3.71	1.86	0.052	8	CDF	0.9970	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.39	2.29	0.0231	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02704	0.02704	1	13.8	0.0060	Significant Effect
Error	0.01572	0.001965	8			
Total	0.04276		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10.9	23.2	0.0399	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.741	0.0811	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.42	0.346	0.494	0.44	0.32	0.48	0.0268	14.29%	0.00%
31243-104		5	0.316	0.293	0.339	0.31	0.3	0.34	0.00812	5.75%	24.76%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.42	0.44	0.32	0.48	0.44
31243-104		0.3	0.34	0.33	0.3	0.31

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-0352-2568 **Endpoint:** Nickel **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed nickel	16.84%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-1.74	1.86	0.071	8	CDF	0.9396	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5594	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01089	0.01089	1	3.01	0.1208	Non-Significant Effect
Error	0.02892	0.003615	8			
Total	0.03981		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.01	23.2	0.9938	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.741	0.9731	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.42	0.346	0.494	0.44	0.32	0.48	0.0268	14.29%	0.00%
31243-105		5	0.354	0.279	0.429	0.34	0.3	0.45	0.0269	17.02%	15.71%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.42	0.44	0.32	0.48	0.44
31243-105		0.34	0.45	0.37	0.3	0.31

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-4384-6194 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed zinc	15.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0.468	1.86	1.51	8	CDF	0.3260	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.84	2.29	0.4401	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.360999	0.360999	1	0.219	0.6520	Non-Significant Effect
Error	13.16	1.645	8			
Total	13.521		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6970	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.901	0.741	0.2264	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.44	8.02	10.9	10.1	8.1	10.5	0.511	12.12%	0.00%
31243-101		5	9.82	8.07	11.6	10.2	7.6	11.2	0.63	14.34%	-4.03%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	10.5	8.3	10.2	10.1	8.1
31243-101		7.6	11.2	10.2	9.4	10.7

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-7056-8033 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed zinc	18.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.38	1.86	1.76	8	CDF	0.1030	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.03	2.29	0.2046	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.225	4.225	1	1.89	0.2060	Non-Significant Effect
Error	17.844	2.2305	8			
Total	22.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.41	23.2	0.4150	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8283	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.44	8.02	10.9	10.1	8.1	10.5	0.511	12.12%	0.00%
31243-102		5	10.7	8.54	12.9	10.5	8.7	13.6	0.794	16.53%	-13.77%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	10.5	8.3	10.2	10.1	8.1
31243-102		10.5	8.7	13.6	10.6	10.3

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-0169-8430 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed zinc	15.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.468	1.86	1.43	8	CDF	0.6740	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.2	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.324001	0.324001	1	0.219	0.6521	Non-Significant Effect
Error	11.82	1.4775	8			
Total	12.144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.26	23.2	0.8287	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.842	0.741	0.0470	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.44	8.02	10.9	10.1	8.1	10.5	0.511	12.12%	0.00%
31243-103		5	9.08	7.49	10.7	8.9	7.7	10.4	0.574	14.13%	3.81%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	10.5	8.3	10.2	10.1	8.1
31243-103		8	10.4	8.9	7.7	10.4

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-4472-5498 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed zinc	12.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-1.02	1.86	1.14	8	CDF	0.8301	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.47	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.961001	0.961001	1	1.03	0.3397	Non-Significant Effect
Error	7.46	0.9325	8			
Total	8.421		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.35	23.2	0.4286	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.855	0.741	0.0674	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.44	8.02	10.9	10.1	8.1	10.5	0.511	12.12%	0.00%
31243-104		5	8.82	7.89	9.75	9	7.6	9.5	0.334	8.46%	6.57%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	10.5	8.3	10.2	10.1	8.1
31243-104		8.7	9.5	9.3	9	7.6

Bioaccumulation Evaluation - Metals - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-0176-2888 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:34 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed zinc	15.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.262	1.86	1.42	8	CDF	0.4001	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8298	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0999998	0.0999998	1	0.0685	0.8002	Non-Significant Effect
Error	11.684	1.4605	8			
Total	11.784		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.23	23.2	0.8439	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1798	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.44	8.02	10.9	10.1	8.1	10.5	0.511	12.12%	0.00%
31243-105		5	9.64	8.06	11.2	9.8	8.4	11.5	0.568	13.17%	-2.12%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	10.5	8.3	10.2	10.1	8.1
31243-105		8.5	10	11.5	9.8	8.4

Macoma nasuta
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

PAHs

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

					Pre-Tissue	
CONTAMINANT	REP1	*	REP2	*	REP3	*
PAHs (ng/g wet weight)						
Acenaphthene	2.5	U	2.3	U	2.3	U
Acenaphthylene	2.5	U	2.3	U	2.3	U
Anthracene	2.5	U	2.3	U	2.3	U
Benzo(a)anthracene	2.5	U	2.3	U	2.3	U
Benzo(a)pyrene	2.5	U	2.3	U	2.3	U
Benzo(b)fluoranthene	2.5	U	2.3	U	2.3	U
Benzo(k)fluoranthene	2.5	U	2.3	U	2.3	U
Benzo(g,h,i)perylene	2.5	U	2.3	U	2.3	U
Chrysene	2.5	U	2.3	U	2.3	U
Dibenzo(a,h)anthracene	2.5	U	2.3	U	2.3	U
Fluoranthene	2.5	U	5.7	J	2.3	U
Fluorene	2.5	U	2.3	U	2.3	U
Indeno(1,2,3-c,d)pyrene	2.5	U	2.3	U	2.3	U
Naphthalene	2.5	U	2.3	U	2.3	U
Phenanthrene	2.5	U	2.3	U	2.3	U
Pyrene	2.5	U	5.0	J	2.3	U
PAH Total	40		44		36	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Acenaphthylene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Anthracene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Benzo(a)anthracene	5.2	J	2.4	U	2.1	U	5.9	J	2.4	U
Benzo(a)pyrene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Benzo(b)fluoranthene	5.0	J	2.4	U	2.1	U	2.2	U	2.4	U
Benzo(k)fluoranthene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Benzo(g,h,i)perylene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Chrysene	2.4	U	2.4	U	2.1	U	4.8	J	2.4	U
Dibenzo(a,h)anthracene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Fluoranthene	8.4	J	7.3	J	2.1	U	8.3	J	5.3	J
Fluorene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Indeno(1,2,3-c,d)pyrene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Naphthalene	2.4	U	2.4	U	2.1	U	2.2	U	2.4	U
Phenanthrene	5.3	J	5.4	J	2.1	U	5.7	J	2.4	U
Pyrene	11		9.5	J	5.9	J	12		8.1	J
PAH Total	61		53		38		60		48	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Acenaphthylene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Anthracene	4.5	J	2.2	U	4.9	J	4.5	J	2.4	U
Benzo(a)anthracene	19		17		20		17		17	
Benzo(a)pyrene	7.5	J	7.4	J	8.6	J	7.1	J	7.8	J
Benzo(b)fluoranthene	17		16		19		15		15	
Benzo(k)fluoranthene	8.0	J	7.5	J	8.9	J	7.1	J	9.7	
Benzo(g,h,i)perylene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Chrysene	19		16		20		16		17	
Dibenzo(a,h)anthracene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Fluoranthene	61		48		58		53		53	
Fluorene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Indeno(1,2,3-c,d)pyrene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Naphthalene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Phenanthrene	14		9.6		13		13		12	
Pyrene	50		42		46		44		45	
PAH Total	215		182		214		192		195	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	4.4	J	2.4	U	2.2	U	2.2	U	2.2	U
Acenaphthylene	2.1	U	2.4	U	2.2	U	2.2	U	2.2	U
Anthracene	7.0	J	6.0	J	9.0		8.2	J	7.0	J
Benzo(a)anthracene	23		21		29		28		20	
Benzo(a)pyrene	8.0	J	7.8	J	11		10		7.1	J
Benzo(b)fluoranthene	16		16		20		19		14	
Benzo(k)fluoranthene	11		8.9	J	15		13		9.8	
Benzo(g,h,i)perylene	4.3	J	2.4	U	5.8	J	4.5	J	2.2	U
Chrysene	23		19		29		25		20	
Dibenzo(a,h)anthracene	2.1	U	2.4	U	2.2	U	2.2	U	2.2	U
Fluoranthene	96		89		113		102		90	
Fluorene	2.1	U	2.4	U	2.2	U	2.2	U	2.2	U
Indeno(1,2,3-c,d)pyrene	2.1	U	2.4	U	4.5	J	2.2	U	2.2	U
Naphthalene	2.1	U	2.4	U	2.2	U	2.2	U	2.2	U
Phenanthrene	17		14		18		17		16	
Pyrene	71		70		82		77		63	
PAH Total	290		269		347		317		262	

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NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.4	U	2.1	U	2.3	U	2.3	U	2.2	U
Acenaphthylene	2.4	U	2.1	U	2.3	U	2.3	U	2.2	U
Anthracene	6.5	J	6.8	J	6.8	J	5.8	J	7.3	J
Benzo(a)anthracene	21		24		21		22		25	
Benzo(a)pyrene	8.4	J	10		8.6	J	10		11	
Benzo(b)fluoranthene	16		20		16		16		17	
Benzo(k)fluoranthene	9.2	J	9.6		9.5		12		14	
Benzo(g,h,i)perylene	2.4	U	5.3	J	2.3	U	5.5	J	5.5	J
Chrysene	20		26		23		23		26	
Dibenzo(a,h)anthracene	2.4	U	2.1	U	2.3	U	2.3	U	2.2	U
Fluoranthene	76		90		82		75		93	
Fluorene	2.4	U	2.1	U	2.3	U	2.3	U	2.2	U
Indeno(1,2,3-c,d)pyrene	2.4	U	2.1	U	2.3	U	2.3	U	4.7	J
Naphthalene	2.4	U	2.1	U	2.3	U	2.3	U	2.2	U
Phenanthrene	21		25		23		18		23	
Pyrene	55		71		64		59		73	
PAH Total	250		299		271		260		311	

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NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Acenaphthylene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Anthracene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Benzo(a)anthracene	6.6	J	9.3		7.7	J	6.1	J	7.6	J
Benzo(a)pyrene	2.4	U	4.5	J	2.2	U	2.4	U	2.2	U
Benzo(b)fluoranthene	7.1	J	9.0		9.1		6.7	J	7.2	J
Benzo(k)fluoranthene	2.4	U	6.3	J	4.7	J	2.4	U	6.3	J
Benzo(g,h,i)perylene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Chrysene	6.8	J	8.9	J	7.9	J	6.4	J	8.1	J
Dibenzo(a,h)anthracene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Fluoranthene	27		32		30		24		30	
Fluorene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Indeno(1,2,3-c,d)pyrene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Naphthalene	2.4	U	2.2	U	2.2	U	2.4	U	2.2	U
Phenanthrene	7.8	J	7.3	J	6.6	J	6.1	J	6.8	J
Pyrene	22		27		25		18		25	
PAH Total	102		122		110		91		110	

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J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.4	U	2.4	U	2.2	U	2.4	U	2.3	U
Acenaphthylene	2.4	U	2.4	U	2.2	U	2.4	U	2.3	U
Anthracene	2.4	U	6.2	J	6.1	J	5.1	J	2.3	U
Benzo(a)anthracene	24		38		32		26		17	
Benzo(a)pyrene	14		25		18		19		11	
Benzo(b)fluoranthene	21		30		25		22		16	
Benzo(k)fluoranthene	16		24		18		17		12	
Benzo(g,h,i)perylene	6.0	J	11		7.9	J	7.9	J	5.6	J
Chrysene	25		43		35		27		19	
Dibenzo(a,h)anthracene	2.4	U	2.4	U	2.2	U	2.4	U	2.3	U
Fluoranthene	68		111		95		67		48	
Fluorene	2.4	U	2.4	U	2.2	U	2.4	U	2.3	U
Indeno(1,2,3-c,d)pyrene	5.3	J	8.4	J	2.2	U	6.8	J	2.3	U
Naphthalene	2.4	U	2.4	U	2.2	U	2.4	U	2.3	U
Phenanthrene	8.8	J	15		13		9.6	J	6.7	J
Pyrene	102		156		127		99		81	
PAH Total	304		480		391		319		232	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Start Date: 21 Nov-18 12:02 **Species:** Macoma nasuta **Sample Code:** 31249-000
End Date: 19 Dec-18 12:02 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 21 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Mn)

Sample	Rep	Pos	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	1,4-Dichlorobenze	Total PAHs
31242-008	1	6	2.4	2.4	2.4	5.2	2.4	5	2.4	2.4	2.4	2.4	8.4	2.4	2.4	2.4	5.3	11		
31242-008	2	9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	7.3	2.4	2.4	2.4	5.4	9.5		
31242-008	3	16	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	5.9		
31242-008	4	23	2.2	2.2	2.2	5.9	2.2	2.2	2.2	2.2	4.8	2.2	8.3	2.2	2.2	2.2	5.7	12		
31242-008	5	29	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	5.3	2.4	2.4	2.4	2.4	8.1		
31243-101	1	5	2.2	2.2	4.5	19	7.5	17	2.2	8	19	2.2	61	2.2	2.2	2.2	14	50		
31243-101	2	7	2.2	2.2	2.2	17	7.4	16	2.2	7.5	16	2.2	48	2.2	2.2	2.2	9.6	42		
31243-101	3	13	2.5	2.5	4.9	20	8.6	19	2.5	8.9	20	2.5	58	2.5	2.5	2.5	13	46		
31243-101	4	24	2.2	2.2	4.5	17	7.1	15	2.2	7.1	16	2.2	53	2.2	2.2	2.2	13	44		
31243-101	5	30	2.4	2.4	2.4	17	7.8	15	2.4	9.7	17	2.4	53	2.4	2.4	2.4	12	45		
31243-102	1	2	4.4	2.1	7	23	8	16	4.3	11	23	2.1	96	2.1	2.1	2.1	17	71		
31243-102	2	11	2.4	2.4	6	21	7.8	16	2.4	8.9	19	2.4	89	2.4	2.4	2.4	14	70		
31243-102	3	17	2.2	2.2	9	29	11	20	5.8	15	29	2.2	113	2.2	4.5	2.2	18	82		
31243-102	4	22	2.2	2.2	8.2	28	10	19	4.5	13	25	2.2	102	2.2	2.2	2.2	17	77		
31243-102	5	27	2.2	2.2	7	20	7.1	14	2.2	9.8	20	2.2	90	2.2	2.2	2.2	16	63		
31243-103	1	4	2.4	2.4	6.5	21	8.4	16	2.4	9.2	20	2.4	76	2.4	2.4	2.4	21	55		
31243-103	2	10	2.1	2.1	6.8	24	10	20	5.3	9.6	26	2.1	90	2.1	2.1	2.1	25	71		
31243-103	3	14	2.3	2.3	6.8	21	8.6	16	2.3	9.5	23	2.3	82	2.3	2.3	2.3	23	64		
31243-103	4	21	2.3	2.3	5.8	22	10	16	5.5	12	23	2.3	75	2.3	2.3	2.3	18	59		
31243-103	5	28	2.2	2.2	7.3	25	11	17	5.5	14	26	2.2	93	2.2	4.7	2.2	23	73		
31243-104	1	3	2.4	2.4	2.4	6.6	2.4	7.1	2.4	2.4	6.8	2.4	27	2.4	2.4	2.4	7.8	22		
31243-104	2	8	2.2	2.2	2.2	9.3	4.5	9	2.2	6.3	8.9	2.2	32	2.2	2.2	2.2	7.3	27		
31243-104	3	18	2.2	2.2	2.2	7.7	2.2	9.1	2.2	4.7	7.9	2.2	30	2.2	2.2	2.2	6.6	25		
31243-104	4	19	2.4	2.4	2.4	6.1	2.4	6.7	2.4	2.4	6.4	2.4	24	2.4	2.4	2.4	6.1	18		
31243-104	5	26	2.2	2.2	2.2	7.6	2.2	7.2	2.2	6.3	8.1	2.2	30	2.2	2.2	2.2	6.8	25		
31243-105	1	1	2.4	2.4	2.4	24	14	21	6	16	25	2.4	68	2.4	5.3	2.4	8.8	102		
31243-105	2	12	2.4	2.4	6.2	38	25	30	11	24	43	2.4	111	2.4	8.4	2.4	15	156		

Sample	Rep	Pos	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,I)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	1,4-Dichlorobenze	Total PAHs
31243-105	3	15	2.2	2.2	6.1	32	18	25	7.9	18	35	2.2	95	2.2	2.2	2.2	13	127		
31243-105	4	20	2.4	2.4	5.1	26	19	22	7.9	17	27	2.4	67	2.4	6.8	2.4	9.6	99		
31243-105	5	25	2.3	2.3	2.3	17	11	16	5.6	12	19	2.3	48	2.3	2.3	2.3	6.7	81		

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Batch ID:	17-2745-8862	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 12:02	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	19 Dec-18 12:02	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
13-3474-0254	Acenaphthene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed acenaphthene
08-2109-9841	Acenaphthene	Equal Variance t Two-Sample Test	0.7146	31243-102 passed acenaphthene
17-2674-6774	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.5000	31243-102 passed acenaphthene
05-7754-4263	Acenaphthene	Equal Variance t Two-Sample Test	0.6822	31243-103 passed acenaphthene
12-1401-2826	Acenaphthene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed acenaphthene
03-2265-8633	Acenaphthene	Equal Variance t Two-Sample Test	0.3038	31243-105 passed acenaphthene
21-4446-2897	Acenaphthylene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed acenaphthylene
06-1618-2847	Acenaphthylene	Equal Variance t Two-Sample Test	0.8267	31243-102 passed acenaphthylene
06-7040-3520	Acenaphthylene	Equal Variance t Two-Sample Test	0.6822	31243-103 passed acenaphthylene
15-9162-7409	Acenaphthylene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed acenaphthylene
08-2056-1266	Acenaphthylene	Equal Variance t Two-Sample Test	0.3038	31243-105 passed acenaphthylene
20-0054-6748	Anthracene	Unequal Variance t Two-Sample Test	0.0367	31243-101 failed anthracene
21-3614-6359	Anthracene	Unequal Variance t Two-Sample Test	3.1E-04	31243-102 failed anthracene
09-6317-6537	Anthracene	Equal Variance t Two-Sample Test	<1.0E-37	31243-103 failed anthracene
11-5271-0134	Anthracene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed anthracene
01-1420-2848	Anthracene	Unequal Variance t Two-Sample Test	0.0356	31243-105 failed anthracene
14-5427-9659	Benzo(a)anthracene	Equal Variance t Two-Sample Test	3.2E-07	31243-101 failed benzo(a)anthracene
06-0050-8200	Benzo(a)anthracene	Equal Variance t Two-Sample Test	3.4E-06	31243-102 failed benzo(a)anthracene
06-5528-0338	Benzo(a)anthracene	Equal Variance t Two-Sample Test	<1.0E-37	31243-103 failed benzo(a)anthracene
16-4843-7693	Benzo(a)anthracene	Equal Variance t Two-Sample Test	0.0021	31243-104 failed benzo(a)anthracene
19-0780-3343	Benzo(a)anthracene	Equal Variance t Two-Sample Test	9.4E-05	31243-105 failed benzo(a)anthracene
04-8615-2596	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	31243-101 failed benzo(a)pyrene
08-8965-1364	Benzo(a)pyrene	Equal Variance t Two-Sample Test	<1.0E-37	31243-101 failed benzo(a)pyrene
16-8936-6240	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	4.6E-04	31243-102 failed benzo(a)pyrene
14-7533-7838	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	5.9E-05	31243-103 failed benzo(a)pyrene
09-2300-5068	Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.5952	31243-104 passed benzo(a)pyrene
14-1130-0618	Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.3611	31243-104 passed benzo(a)pyrene
11-7985-4163	Benzo(a)pyrene	Unequal Variance t Two-Sample Test	0.0016	31243-105 failed benzo(a)pyrene
07-6489-4164	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	2.3E-07	31243-101 failed benzo(b)fluoranthene
14-4061-3883	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	1.4E-06	31243-102 failed benzo(b)fluoranthene
18-4980-6077	Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-103 failed benzo(b)fluoranthene
14-4861-1123	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	7.8E-05	31243-104 failed benzo(b)fluoranthene
17-1720-4897	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	1.5E-05	31243-105 failed benzo(b)fluoranthene

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
12-9317-9093	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed benzo(g,h,i)perylene
17-9788-9194	Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	0.0436	31243-102 failed benzo(g,h,i)perylene
14-9722-6069	Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	0.0333	31243-103 failed benzo(g,h,i)perylene
09-3958-2128	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed benzo(g,h,i)perylene
11-1507-2317	Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	0.0026	31243-105 failed benzo(g,h,i)perylene
14-7540-6812	Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	0.0025	31243-105 failed benzo(g,h,i)perylene
06-1872-5668	Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	1.2E-04	31243-101 failed benzo(k)fluoranthene
15-8422-8458	Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	5.6E-04	31243-102 failed benzo(k)fluoranthene
10-5991-9650	Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	3.9E-04	31243-103 failed benzo(k)fluoranthene
20-3657-1078	Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	0.0365	31243-104 failed benzo(k)fluoranthene
19-1009-2096	Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-105 failed benzo(k)fluoranthene
12-3480-7525	Chrysene	Equal Variance t Two-Sample Test	1.5E-07	31243-101 failed chrysene
08-2627-2171	Chrysene	Equal Variance t Two-Sample Test	2.2E-06	31243-102 failed chrysene
08-3604-7899	Chrysene	Equal Variance t Two-Sample Test	<1.0E-37	31243-103 failed chrysene
11-1862-7354	Chrysene	Equal Variance t Two-Sample Test	5.0E-05	31243-104 failed chrysene
16-6515-4273	Chrysene	Unequal Variance t Two-Sample Test	0.0015	31243-105 failed chrysene
09-3212-1340	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed dibenz(a,h)anthracene
12-0345-4823	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.8267	31243-102 passed dibenz(a,h)anthracene
06-7104-7666	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.6822	31243-103 passed dibenz(a,h)anthracene
06-0301-0803	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed dibenz(a,h)anthracene
20-9385-5757	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.3038	31243-105 passed dibenz(a,h)anthracene
03-5038-5377	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	31243-101 failed fluoranthene
18-4480-0285	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	31243-102 failed fluoranthene
18-6902-0736	Fluoranthene	Equal Variance t Two-Sample Test	<1.0E-37	31243-103 failed fluoranthene
05-8319-3164	Fluoranthene	Equal Variance t Two-Sample Test	9.6E-07	31243-104 failed fluoranthene
17-7922-2524	Fluoranthene	Unequal Variance t Two-Sample Test	0.0016	31243-105 failed fluoranthene
06-7099-1216	Fluorene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed fluorene
20-2090-0971	Fluorene	Equal Variance t Two-Sample Test	0.8267	31243-102 passed fluorene
20-7696-8294	Fluorene	Equal Variance t Two-Sample Test	0.6822	31243-103 passed fluorene
16-7066-5749	Fluorene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed fluorene
03-7059-9297	Fluorene	Equal Variance t Two-Sample Test	0.3038	31243-105 passed fluorene
17-4319-2402	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed indeno(1,2,3-cd)pyrene
03-0452-1480	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.7826	31243-102 passed indeno(1,2,3-cd)pyrene
18-8934-3513	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.6190	31243-102 passed indeno(1,2,3-cd)pyrene
14-7665-3709	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.6048	31243-103 passed indeno(1,2,3-cd)pyrene
05-4800-8548	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.5000	31243-103 passed indeno(1,2,3-cd)pyrene
16-3695-5345	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed indeno(1,2,3-cd)pyrene
14-1034-4719	Indeno(1,2,3-cd)pyrene	Unequal Variance t Two-Sample Test	0.0463	31243-105 failed indeno(1,2,3-cd)pyrene
01-9452-0586	Naphthalene	Equal Variance t Two-Sample Test	0.5000	31243-101 passed naphthalene
16-0779-7137	Naphthalene	Equal Variance t Two-Sample Test	0.8267	31243-102 passed naphthalene
21-2797-1984	Naphthalene	Equal Variance t Two-Sample Test	0.6822	31243-103 passed naphthalene
03-0879-8652	Naphthalene	Equal Variance t Two-Sample Test	0.5956	31243-104 passed naphthalene
21-0306-2091	Naphthalene	Equal Variance t Two-Sample Test	0.3038	31243-105 passed naphthalene
00-6451-6280	Phenanthrene	Equal Variance t Two-Sample Test	3.6E-05	31243-101 failed phenanthrene
20-7517-1226	Phenanthrene	Equal Variance t Two-Sample Test	1.3E-06	31243-102 failed phenanthrene
15-3299-6093	Phenanthrene	Equal Variance t Two-Sample Test	7.8E-07	31243-103 failed phenanthrene
03-7683-9029	Phenanthrene	Equal Variance t Two-Sample Test	0.0059	31243-104 failed phenanthrene
12-6278-9935	Phenanthrene	Equal Variance t Two-Sample Test	0.0026	31243-105 failed phenanthrene
21-2343-7091	Pyrene	Equal Variance t Two-Sample Test	<1.0E-37	31243-101 failed pyrene
19-9755-8167	Pyrene	Equal Variance t Two-Sample Test	<1.0E-37	31243-102 failed pyrene
12-7641-4731	Pyrene	Equal Variance t Two-Sample Test	1.6E-07	31243-103 failed pyrene
15-3225-3392	Pyrene	Equal Variance t Two-Sample Test	3.8E-05	31243-104 failed pyrene
20-1010-3075	Pyrene	Unequal Variance t Two-Sample Test	6.8E-04	31243-105 failed pyrene

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Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	2.68	1.48	3.88	2.2	4.4	0.432	0.965	36.02%	-16.52%
31243-103		5	2.26	2.12	2.4	2.1	2.4	0.051	0.114	5.05%	1.74%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	-1.74%

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.1	2.4	0.049	0.11	4.93%	3.48%
31243-103		5	2.26	2.12	2.4	2.1	2.4	0.051	0.114	5.05%	1.74%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	-1.74%

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	3.7	2.1	5.3	2.2	4.9	0.577	1.29	34.87%	-60.87%
31243-102		5	7.44	5.99	8.89	6	9	0.523	1.17	15.72%	-223.48%
31243-103		5	6.64	5.96	7.32	5.8	7.3	0.246	0.55	8.29%	-188.70%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	4.42	2.01	6.83	2.3	6.2	0.867	1.94	43.85%	-92.17%

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	3.6	1.36	5.84	2.1	5.9	0.806	1.8	50.04%	0.00%
31243-101		5	18	16.2	19.8	17	20	0.632	1.41	7.86%	-400.00%
31243-102		5	24.2	19.1	29.3	20	29	1.83	4.09	16.89%	-572.22%
31243-103		5	22.6	20.3	24.9	21	25	0.812	1.82	8.04%	-527.78%
31243-104		5	7.46	5.93	8.99	6.1	9.3	0.55	1.23	16.49%	-107.22%
31243-105		5	27.4	17.5	37.3	17	38	3.57	7.99	29.15%	-661.11%

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	7.68	6.97	8.39	7.1	8.6	0.256	0.572	7.45%	-233.91%
31243-102		5	8.78	6.74	10.8	7.1	11	0.735	1.64	18.72%	-281.74%
31243-103		5	9.6	8.25	10.9	8.4	11	0.486	1.09	11.32%	-317.39%
31243-104		5	2.74	1.51	3.97	2.2	4.5	0.442	0.989	36.09%	-19.13%
31243-105		5	17.4	10.8	24	11	25	2.38	5.32	30.57%	-656.52%

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.82	1.3	4.34	2.1	5	0.548	1.23	43.46%	0.00%
31243-101		5	16.4	14.3	18.5	15	19	0.748	1.67	10.20%	-481.56%
31243-102		5	17	14	20	14	20	1.1	2.45	14.41%	-502.84%
31243-103		5	17	14.8	19.2	16	20	0.775	1.73	10.19%	-502.84%
31243-104		5	7.82	6.41	9.23	6.7	9.1	0.509	1.14	14.56%	-177.30%
31243-105		5	22.8	16.4	29.2	16	30	2.31	5.17	22.66%	-708.51%

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Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	3.84	1.95	5.73	2.2	5.8	0.68	1.52	39.61%	-66.96%
31243-103		5	4.2	2.1	6.3	2.3	5.5	0.756	1.69	40.27%	-82.61%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	7.68	5.03	10.3	5.6	11	0.956	2.14	27.83%	-233.91%

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	8.24	6.93	9.55	7.1	9.7	0.473	1.06	12.83%	-258.26%
31243-102		5	11.5	8.47	14.6	8.9	15	1.1	2.47	21.40%	-401.74%
31243-103		5	10.9	8.27	13.4	9.2	14	0.931	2.08	19.18%	-372.17%
31243-104		5	4.42	1.99	6.85	2.4	6.3	0.875	1.96	44.26%	-92.17%
31243-105		5	17.4	12	22.8	12	24	1.94	4.34	24.92%	-656.52%

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.82	1.44	4.2	2.1	4.8	0.498	1.11	39.52%	0.00%
31243-101		5	17.6	15.3	19.9	16	20	0.812	1.82	10.32%	-524.11%
31243-102		5	23.2	18.2	28.2	19	29	1.8	4.02	17.35%	-722.70%
31243-103		5	23.6	20.5	26.7	20	26	1.12	2.51	10.64%	-736.88%
31243-104		5	7.62	6.36	8.88	6.4	8.9	0.453	1.01	13.30%	-170.21%
31243-105		5	29.8	18.2	41.4	19	43	4.18	9.34	31.34%	-956.74%

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.1	2.4	0.049	0.11	4.93%	3.48%
31243-103		5	2.26	2.12	2.4	2.1	2.4	0.051	0.114	5.05%	1.74%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	-1.74%

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	6.28	2.99	9.57	2.1	8.4	1.18	2.65	42.17%	0.00%
31243-101		5	54.6	48.4	60.8	48	61	2.25	5.03	9.21%	-769.43%
31243-102		5	98	85.7	110	89	113	4.42	9.87	10.08%	-1460.51
31243-103		5	83.2	73.1	93.3	75	93	3.62	8.11	9.74%	-1224.84
31243-104		5	28.6	24.7	32.5	24	32	1.4	3.13	10.95%	-355.41%
31243-105		5	77.8	46.8	109	48	111	11.2	25	32.13%	-1138.85

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.1	2.4	0.049	0.11	4.93%	3.48%
31243-103		5	2.26	2.12	2.4	2.1	2.4	0.051	0.114	5.05%	1.74%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	-1.74%

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Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	2.68	1.41	3.95	2.1	4.5	0.458	1.02	38.18%	-16.52%
31243-103		5	2.76	1.41	4.11	2.1	4.7	0.487	1.09	39.49%	-20.00%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	5	1.6	8.4	2.2	8.4	1.23	2.74	54.79%	-117.39%

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.1	2.4	0.0632	0.141	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.1	2.4	0.049	0.11	4.93%	3.48%
31243-103		5	2.26	2.12	2.4	2.1	2.4	0.051	0.114	5.05%	1.74%
31243-104		5	2.28	2.14	2.42	2.2	2.4	0.049	0.11	4.80%	0.87%
31243-105		5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	-1.74%

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	4.18	1.98	6.38	2.1	5.7	0.792	1.77	42.37%	0.00%
31243-101		5	12.3	10.2	14.4	9.6	14	0.75	1.68	13.61%	-194.74%
31243-102		5	16.4	14.5	18.3	14	18	0.678	1.52	9.25%	-292.34%
31243-103		5	22	18.7	25.3	18	25	1.18	2.65	12.03%	-426.32%
31243-104		5	6.92	6.11	7.73	6.1	7.8	0.292	0.653	9.44%	-65.55%
31243-105		5	10.6	6.48	14.8	6.7	15	1.49	3.34	31.43%	-154.07%

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	9.3	6.31	12.3	5.9	12	1.08	2.41	25.91%	0.00%
31243-101		5	45.4	41.7	49.1	42	50	1.33	2.97	6.53%	-388.17%
31243-102		5	72.6	63.6	81.6	63	82	3.23	7.23	9.96%	-680.65%
31243-103		5	64.4	54.9	73.9	55	73	3.43	7.67	11.91%	-592.47%
31243-104		5	23.4	19	27.8	18	27	1.57	3.51	14.99%	-151.61%
31243-105		5	113	76.9	149	81	156	13	29.1	25.75%	-1115.05

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Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		4.4	2.4	2.2	2.2	2.2
31243-103		2.4	2.1	2.3	2.3	2.2
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		2.4	2.4	2.2	2.4	2.3

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2
31243-103		2.4	2.1	2.3	2.3	2.2
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		2.4	2.4	2.2	2.4	2.3

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		4.5	2.2	4.9	4.5	2.4
31243-102		7	6	9	8.2	7
31243-103		6.5	6.8	6.8	5.8	7.3
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		2.4	6.2	6.1	5.1	2.3

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.2	2.4	2.1	5.9	2.4
31243-101		19	17	20	17	17
31243-102		23	21	29	28	20
31243-103		21	24	21	22	25
31243-104		6.6	9.3	7.7	6.1	7.6
31243-105		24	38	32	26	17

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		7.5	7.4	8.6	7.1	7.8
31243-102		8	7.8	11	10	7.1
31243-103		8.4	10	8.6	10	11
31243-104		2.4	4.5	2.2	2.4	2.2
31243-105		14	25	18	19	11

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5	2.4	2.1	2.2	2.4
31243-101		17	16	19	15	15
31243-102		16	16	20	19	14
31243-103		16	20	16	16	17
31243-104		7.1	9	9.1	6.7	7.2
31243-105		21	30	25	22	16

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		4.3	2.4	5.8	4.5	2.2
31243-103		2.4	5.3	2.3	5.5	5.5
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		6	11	7.9	7.9	5.6

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		8	7.5	8.9	7.1	9.7
31243-102		11	8.9	15	13	9.8
31243-103		9.2	9.6	9.5	12	14
31243-104		2.4	6.3	4.7	2.4	6.3
31243-105		16	24	18	17	12

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	4.8	2.4
31243-101		19	16	20	16	17
31243-102		23	19	29	25	20
31243-103		20	26	23	23	26
31243-104		6.8	8.9	7.9	6.4	8.1
31243-105		25	43	35	27	19

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2
31243-103		2.4	2.1	2.3	2.3	2.2
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		2.4	2.4	2.2	2.4	2.3

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	8.4	7.3	2.1	8.3	5.3
31243-101		61	48	58	53	53
31243-102		96	89	113	102	90
31243-103		76	90	82	75	93
31243-104		27	32	30	24	30
31243-105		68	111	95	67	48

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2
31243-103		2.4	2.1	2.3	2.3	2.2
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		2.4	2.4	2.2	2.4	2.3

Bioaccumulation Evaluation - PAHs - Macoma **EnviroSystems, Inc.**

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.1	2.4	4.5	2.2	2.2
31243-103		2.4	2.1	2.3	2.3	4.7
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		5.3	8.4	2.2	6.8	2.3

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2
31243-103		2.4	2.1	2.3	2.3	2.2
31243-104		2.4	2.2	2.2	2.4	2.2
31243-105		2.4	2.4	2.2	2.4	2.3

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.3	5.4	2.1	5.7	2.4
31243-101		14	9.6	13	13	12
31243-102		17	14	18	17	16
31243-103		21	25	23	18	23
31243-104		7.8	7.3	6.6	6.1	6.8
31243-105		8.8	15	13	9.6	6.7

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	9.5	5.9	12	8.1
31243-101		50	42	46	44	45
31243-102		71	70	82	77	63
31243-103		55	71	64	59	73
31243-104		22	27	25	18	25
31243-105		102	156	127	99	81

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Anthracene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	2.411643	2.13185	0.036712	0.05	TRUE	1.237573	4		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	14.05966	1.85955	3.179E-07	0.05	TRUE	1.904562	8		C
Benzo(a)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	20.42219	1.85955	0	0.05	TRUE	0.4898773	8		C
Benzo(a)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	35.35842	1.89458	0	0.05	TRUE	0.2759479	7		C
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	14.64029	1.85955	2.325E-07	0.05	TRUE	1.724875	8		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	12.45089	2.13185	0.0001196	0.05	TRUE	1.017049	4		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	15.50729	1.85955	1.488E-07	0.05	TRUE	1.772336	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	19.00772	1.85955	0	0.05	TRUE	4.727204	8		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0	1.85955	0.5	0.05	FALSE	0.1663231	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	7.462553	1.85955	3.589E-05	0.05	TRUE	2.028357	8		C
Pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	21.12231	1.85955	0	0.05	TRUE	3.178141	8		C
Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	27		0.5	0.05	FALSE		8	2	E
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.594588	1.89458	0.7145854	0.05	FALSE	0.1593186	7		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999997	1.85955	0.8267032	0.05	FALSE	0.1487639	8		C
Anthracene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	9.755587	2.13185	0.0003092	0.05	TRUE	1.123222	4		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	10.31419	1.85955	3.367E-06	0.05	TRUE	3.713979	8		C
Benzo(a)pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	8.782455	2.13185	0.0004635	0.05	TRUE	1.57295	4		C
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	11.57638	1.85955	1.409E-06	0.05	TRUE	2.277776	8		C
Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	2.25449	2.13185	0.0436053	0.05	TRUE	1.456225	4		C
Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	8.353188	2.13185	0.0005615	0.05	TRUE	2.358173	4		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	10.91166	1.85955	2.205E-06	0.05	TRUE	3.473126	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999997	1.85955	0.8267032	0.05	FALSE	0.1487639	8		C
Fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	20.06162	1.85955	0	0.05	TRUE	8.501694	8		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999997	1.85955	0.8267032	0.05	FALSE	0.1487639	8		C
Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	28		0.6190476	0.05	FALSE		8	3	E
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.8284167	1.89458	0.7826166	0.05	FALSE	0.1715241	7		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999997	1.85955	0.8267032	0.05	FALSE	0.1487639	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	11.71862	1.85955	1.284E-06	0.05	TRUE	1.939108	8		C
Pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	18.56872	1.85955	0	0.05	TRUE	6.339123	8		C
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923664	1.85955	0.6821564	0.05	FALSE	0.1510705	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923664	1.85955	0.6821564	0.05	FALSE	0.1510705	8		C
Anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	17.0755	1.85955	0	0.05	TRUE	0.4726326	8		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	16.60672	1.85955	0	0.05	TRUE	2.127537	8		C
Benzo(a)pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	14.90106	2.13185	5.906E-05	0.05	TRUE	1.044387	4		C
Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	15		0.0039683	0.05	TRUE		8	0	E
Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.50347	2.13185	0.0332598	0.05	TRUE	1.617958	4		C

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	9.168856	2.13185	0.0003928	0.05	TRUE	1.990282	4		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	16.91949	1.85955	0	0.05	TRUE	2.28384	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923664	1.85955	0.6821564	0.05	FALSE	0.1510705	8		C
Fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	20.17071	1.85955	0	0.05	TRUE	7.091293	8		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923664	1.85955	0.6821564	0.05	FALSE	0.1510705	8		C
Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	27		0.5	0.05	FALSE		8	2	E
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.2761396	1.89458	0.6047921	0.05	FALSE	0.1715241	7		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923664	1.85955	0.6821564	0.05	FALSE	0.1510705	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	12.51521	1.85955	7.776E-07	0.05	TRUE	2.647751	8		C
Pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	15.32864	1.85955	1.629E-07	0.05	TRUE	6.684293	8		C
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	3.956946	1.85955	0.0020975	0.05	TRUE	1.813989	8		C
Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	25		0.3611111	0.05	FALSE		8	2	E
Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	20		0.5952381	0.05	FALSE		7	2	E
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	6.682724	1.85955	7.773E-05	0.05	TRUE	1.39131	8		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Benzo(k)fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	2.416906	2.13185	0.0365035	0.05	TRUE	1.869959	4		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	7.125396	1.85955	4.974E-05	0.05	TRUE	1.252679	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	12.17221	1.85955	9.616E-07	0.05	TRUE	3.409825	8		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499997	1.85955	0.5955561	0.05	FALSE	0.1487639	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	3.245389	1.85955	0.0058911	0.05	TRUE	1.56997	8		C
Pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	7.409772	1.85955	3.774E-05	0.05	TRUE	3.53852	8		C
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345224	1.85955	0.3037556	0.05	FALSE	0.1391559	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345224	1.85955	0.3037556	0.05	FALSE	0.1391559	8		C
Anthracene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	2.4392	2.13185	0.035635	0.05	TRUE	1.852868	4		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	6.499482	1.85955	9.41E-05	0.05	TRUE	6.809349	8		C
Benzo(a)pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	6.344762	2.13185	0.0015804	0.05	TRUE	5.073616	4		C
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	8.4128	1.85955	1.517E-05	0.05	TRUE	4.416338	8		C
Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	5.61698	2.13185	0.0024688	0.05	TRUE	2.041904	4		C
Benzo(g,h,i)perylene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	7.398944	2.35336	0.0025532	0.05	TRUE	1.447207	3		C
Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	15		0.0039683	0.05	TRUE		8	0	E
Chrysene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	6.415015	2.13185	0.0015173	0.05	TRUE	8.966032	4		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345224	1.85955	0.3037556	0.05	FALSE	0.1391559	8		C
Fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	6.362868	2.13185	0.0015638	0.05	TRUE	23.96241	4		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345224	1.85955	0.3037556	0.05	FALSE	0.1391559	8		C
Indeno(1,2,3-cd)pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	2.200876	2.13185	0.0462811	0.05	TRUE	2.615316	4		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345224	1.85955	0.3037556	0.05	FALSE	0.1391559	8		C

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	3.810851	1.85955	0.0025782	0.05	TRUE	3.142471	8		C
Pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	7.942665	2.13185	0.0006803	0.05	TRUE	27.83354	4		C

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-3474-0254	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed acenaphthene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-2109-9841	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed acenaphthene	6.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.595	1.89	0.159	7	CDF	0.7146	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0055556	0.0055556	1	0.354	0.5708	Non-Significant Effect
Error	0.11	0.0157143	7			
Total	0.115556		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2	46.2	0.5956	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.901	0.701	0.2600	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		4	2.25	2.09	2.41	2.2	2.2	2.4	0.05	4.44%	2.17%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		Outlier	2.4	2.2	2.2	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-7754-4263 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed acenaphthene	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.151	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0040000	0.0040000	1	0.242	0.6357	Non-Significant Effect
Error	0.132	0.0165	8			
Total	0.136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	2.26	2.12	2.4	2.3	2.1	2.4	0.051	5.05%	1.74%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	2.1	2.3	2.3	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-1401-2826	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed acenaphthene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-2265-8633 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed acenaphthene	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.139	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	-1.74%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		2.4	2.4	2.2	2.4	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-4446-2897	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed acenaphthylene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-1618-2847	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed acenaphthylene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.149	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	1	0.3466	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.2	2.1	2.4	0.049	4.93%	3.48%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-7040-3520 **Endpoint:** Acenaphthylene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed acenaphthylene	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.151	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0040000	0.0040000	1	0.242	0.6357	Non-Significant Effect
Error	0.132	0.0165	8			
Total	0.136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	2.26	2.12	2.4	2.3	2.1	2.4	0.051	5.05%	1.74%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	2.1	2.3	2.3	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-9162-7409	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed acenaphthylene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-2056-1266 **Endpoint:** Acenaphthylene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed acenaphthylene	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.139	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	-1.74%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		2.4	2.4	2.2	2.4	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-0054-6748	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed anthracene	53.81%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	2.41	2.13	1.24	4	CDF	0.0367	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6164	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.9	4.9	1	5.82	0.0424	Significant Effect
Error	6.74	0.8425	8			
Total	11.64		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	83.2	23.2	8.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.741	0.2923	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	3.7	2.1	5.3	4.5	2.2	4.9	0.577	34.87%	-60.87%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		4.5	2.2	4.9	4.5	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-3614-6359	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed anthracene	48.84%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	9.76	2.13	1.12	4	CDF	3.1E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2483	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	66.049	66.049	1	95.2	1.0E-05	Significant Effect
Error	5.552	0.694	8			
Total	71.601		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	68.4	23.2	0.0012	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4827	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	7.44	5.99	8.89	7	6	9	0.523	15.72%	-223.48%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		7	6	9	8.2	7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-6317-6537	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed anthracene	20.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	17.1	1.86	0.473	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.29	0.0792	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	47.089	47.089	1	292	1.4E-07	Significant Effect
Error	1.292	0.1615	8			
Total	48.381		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15.1	23.2	0.0221	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1398	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	6.64	5.96	7.32	6.8	5.8	7.3	0.246	8.29%	-188.70%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		6.5	6.8	6.8	5.8	7.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-5271-0134	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed anthracene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-1420-2848	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed anthracene	80.56%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	2.44	2.13	1.85	4	CDF	0.0356	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8210	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11.236	11.236	1	5.95	0.0406	Significant Effect
Error	15.108	1.8885	8			
Total	26.344		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	188	23.2	1.7E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1717	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	4.42	2.01	6.83	5.1	2.3	6.2	0.867	43.85%	-92.17%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		2.4	6.2	6.1	5.1	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-5427-9659	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed benzo(a)anthracene	52.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	14.1	1.86	1.9	8	CDF	3.2E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	518.4	518.4	1	198	6.4E-07	Significant Effect
Error	20.98	2.6225	8			
Total	539.38		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.62	23.2	0.6506	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.793	0.741	0.0119	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	3.6	1.36	5.84	2.4	2.1	5.9	0.806	50.04%	0.00%
31243-101		5	18	16.2	19.8	17	17	20	0.632	7.86%	-400.00%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.2	2.4	2.1	5.9	2.4
31243-101		19	17	20	17	17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-0050-8200	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed benzo(a)anthracene	103.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	10.3	1.86	3.71	8	CDF	3.4E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8777	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1060.9	1060.9	1	106	6.7E-06	Significant Effect
Error	79.78	9.9725	8			
Total	1140.68		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.15	23.2	0.1416	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.932	0.741	0.4714	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	3.6	1.36	5.84	2.4	2.1	5.9	0.806	50.04%	0.00%
31243-102		5	24.2	19.1	29.3	23	20	29	1.83	16.89%	-572.22%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.2	2.4	2.1	5.9	2.4
31243-102		23	21	29	28	20

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-5528-0338	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed benzo(a)anthracene	59.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	16.6	1.86	2.13	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.41	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	902.5	902.5	1	276	1.7E-07	Significant Effect
Error	26.18	3.2725	8			
Total	928.68		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.02	23.2	0.9874	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.803	0.741	0.0159	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	3.6	1.36	5.84	2.4	2.1	5.9	0.806	50.04%	0.00%
31243-103		5	22.6	20.3	24.9	22	21	25	0.812	8.04%	-527.78%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.2	2.4	2.1	5.9	2.4
31243-103		21	24	21	22	25

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-4843-7693	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed benzo(a)anthracene	50.39%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	3.96	1.86	1.81	8	CDF	0.0021	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.29	0.9533	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	37.249	37.249	1	15.7	0.0042	Significant Effect
Error	19.032	2.379	8			
Total	56.281		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.14	23.2	0.4781	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.741	0.0801	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	3.6	1.36	5.84	2.4	2.1	5.9	0.806	50.04%	0.00%
31243-104		5	7.46	5.93	8.99	7.6	6.1	9.3	0.55	16.49%	-107.22%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.2	2.4	2.1	5.9	2.4
31243-104		6.6	9.3	7.7	6.1	7.6

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-0780-3343	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed benzo(a)anthracene	189.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	6.5	1.86	6.81	8	CDF	9.4E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.2973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1416.1	1416.1	1	42.2	1.9E-04	Significant Effect
Error	268.18	33.5225	8			
Total	1684.28		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19.7	23.2	0.0136	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.741	0.5339	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	3.6	1.36	5.84	2.4	2.1	5.9	0.806	50.04%	0.00%
31243-105		5	27.4	17.5	37.3	26	17	38	3.57	29.15%	-661.11%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.2	2.4	2.1	5.9	2.4
31243-105		24	38	32	26	17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-8965-1364	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed benzo(a)pyrene	21.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	20.4	1.86	0.49	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.34	2.29	0.0344	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	72.361	72.361	1	417	<1.0E-37	Significant Effect
Error	1.388	0.1735	8			
Total	73.749		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.3	23.2	0.0192	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.87	0.741	0.0999	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	7.68	6.97	8.39	7.5	7.1	8.6	0.256	7.45%	-233.91%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		7.5	7.4	8.6	7.1	7.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-8936-6240	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed benzo(a)pyrene	68.39%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	8.78	2.13	1.57	4	CDF	4.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2164	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	104.976	104.976	1	77.1	2.2E-05	Significant Effect
Error	10.888	1.361	8			
Total	115.864		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	135	23.2	3.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5242	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	8.78	6.74	10.8	8	7.1	11	0.735	18.72%	-281.74%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		8	7.8	11	10	7.1

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-7533-7838	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed benzo(a)pyrene	45.41%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	14.9	2.13	1.04	4	CDF	5.9E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3274	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	133.225	133.225	1	222	4.1E-07	Significant Effect
Error	4.8	0.6	8			
Total	138.025		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	59	23.2	0.0016	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.741	0.3868	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	9.6	8.25	10.9	10	8.4	11	0.486	11.32%	-317.39%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		8.4	10	8.6	10	11

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-1130-0618	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(a)pyrene	36.12%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	25	n/a	2	8	Exact	0.3611	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.64	2.29	0.0010	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.484	0.484	1	0.97	0.3535	Non-Significant Effect
Error	3.992	0.499	8			
Total	4.476		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	48.9	23.2	0.0024	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.709	0.741	0.0011	Non-Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.74	1.51	3.97	2.4	2.2	4.5	0.442	36.09%	-19.13%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	4.5	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-7985-4163	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed benzo(a)pyrene	220.59%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	6.34	2.13	5.07	4	CDF	0.0016	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.29	0.1199	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	570.025	570.025	1	40.3	2.2E-04	Significant Effect
Error	113.28	14.16	8			
Total	683.305		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1410	23.2	3.0E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0773	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	17.4	10.8	24	18	11	25	2.38	30.57%	-656.52%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		14	25	18	19	11

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-6489-4164	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed benzo(b)fluoranthene	61.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	14.6	1.86	1.72	8	CDF	2.3E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3756	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	461.041	461.041	1	214	4.7E-07	Significant Effect
Error	17.208	2.151	8			
Total	478.249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.86	23.2	0.5612	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.831	0.741	0.0348	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.3	4.34	2.4	2.1	5	0.548	43.46%	0.00%
31243-101		5	16.4	14.3	18.5	16	15	19	0.748	10.20%	-481.56%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5	2.4	2.1	2.2	2.4
31243-101		17	16	19	15	15

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-4061-3883	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed benzo(b)fluoranthene	80.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	11.6	1.86	2.28	8	CDF	1.4E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8057	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	502.681	502.681	1	134	2.8E-06	Significant Effect
Error	30.008	3.751	8			
Total	532.689		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.99	23.2	0.2084	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1828	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.3	4.34	2.4	2.1	5	0.548	43.46%	0.00%
31243-102		5	17	14	20	16	14	20	1.1	14.41%	-502.84%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5	2.4	2.1	2.2	2.4
31243-102		16	16	20	19	14

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-4980-6077	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed benzo(b)fluoranthene	62.57%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1338	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	502.681	502.681	1	223	4.0E-07	Significant Effect
Error	18.008	2.251	8			
Total	520.689		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2	23.2	0.5193	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.72	0.741	0.0015	Non-Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.3	4.34	2.4	2.1	5	0.548	43.46%	0.00%
31243-103		5	17	14.8	19.2	16	16	20	0.775	10.19%	-502.84%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5	2.4	2.1	2.2	2.4
31243-103		16	20	16	16	17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-4861-1123	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed benzo(b)fluoranthene	49.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	6.68	1.86	1.39	8	CDF	7.8E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.95	2.29	0.2826	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	62.5	62.5	1	44.7	1.6E-04	Significant Effect
Error	11.196	1.3995	8			
Total	73.696		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.16	23.2	0.8903	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0141	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.3	4.34	2.4	2.1	5	0.548	43.46%	0.00%
31243-104		5	7.82	6.41	9.23	7.2	6.7	9.1	0.509	14.56%	-177.30%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5	2.4	2.1	2.2	2.4
31243-104		7.1	9	9.1	6.7	7.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-1720-4897	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed benzo(b)fluoranthene	156.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	8.41	1.86	4.42	8	CDF	1.5E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.03	2.29	0.2023	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	998.001	998.001	1	70.8	3.0E-05	Significant Effect
Error	112.808	14.101	8			
Total	1110.81		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	17.8	23.2	0.0164	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1788	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.3	4.34	2.4	2.1	5	0.548	43.46%	0.00%
31243-105		5	22.8	16.4	29.2	22	16	30	2.31	22.66%	-708.51%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5	2.4	2.1	2.2	2.4
31243-105		21	30	25	22	16

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-9317-9093	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed benzo(g,h,i)perylene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-9788-9194	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed benzo(g,h,i)perylene	63.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	2.25	2.13	1.46	4	CDF	0.0436	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3177	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.929	5.929	1	5.08	0.0542	Non-Significant Effect
Error	9.332	1.1665	8			
Total	15.261		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	116	23.2	4.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3177	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	3.84	1.95	5.73	4.3	2.2	5.8	0.68	39.61%	-66.96%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		4.3	2.4	5.8	4.5	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-9722-6069	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed benzo(g,h,i)perylene	70.35%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.5	2.13	1.62	4	CDF	0.0333	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7254	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.025	9.025	1	6.27	0.0367	Significant Effect
Error	11.52	1.44	8			
Total	20.545		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	143	23.2	2.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.741	0.0903	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	4.2	2.1	6.3	5.3	2.3	5.5	0.756	40.27%	-82.61%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	5.3	2.3	5.5	5.5

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-3958-2128	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(g,h,i)perylene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-1507-2317	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed benzo(g,h,i)perylene	62.92%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	7.4	2.35	1.45	3	CDF	0.0026	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	46.0056	46.0056	1	70.5	6.7E-05	Significant Effect
Error	4.57	0.652857	7			
Total	50.5756		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	74.8	24.3	0.0011	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.701	0.3782	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		4	6.85	4.9	8.8	6.95	5.6	7.9	0.612	17.86%	-197.83%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		6	Outlier	7.9	7.9	5.6

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-1872-5668	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed benzo(k)fluoranthene	44.22%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	12.5	2.13	1.02	4	CDF	1.2E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.05	2.29	0.1855	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	88.209	88.209	1	155	1.6E-06	Significant Effect
Error	4.552	0.569	8			
Total	92.761		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	55.9	23.2	0.0018	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5673	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	8.24	6.93	9.55	8	7.1	9.7	0.473	12.83%	-258.26%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		8	7.5	8.9	7.1	9.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-8422-8458	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed benzo(k)fluoranthene	102.53%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	8.35	2.13	2.36	4	CDF	5.6E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1497	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	213.444	213.444	1	69.8	3.2E-05	Significant Effect
Error	24.472	3.059	8			
Total	237.916		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	305	23.2	6.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.916	0.741	0.3242	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	11.5	8.47	14.6	11	8.9	15	1.1	21.40%	-401.74%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		11	8.9	15	13	9.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-5991-9650	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed benzo(k)fluoranthene	86.53%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	9.17	2.13	1.99	4	CDF	3.9E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.26	2.29	0.0623	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	183.184	183.184	1	84.1	1.6E-05	Significant Effect
Error	17.432	2.179	8			
Total	200.616		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	217	23.2	1.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.741	0.1244	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	10.9	8.27	13.4	9.6	9.2	14	0.931	19.18%	-372.17%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		9.2	9.6	9.5	12	14

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-3657-1078	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed benzo(k)fluoranthene	81.30%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	2.42	2.13	1.87	4	CDF	0.0365	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11.236	11.236	1	5.84	0.0421	Significant Effect
Error	15.388	1.9235	8			
Total	26.624		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	191	23.2	1.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.741	0.0869	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	4.42	1.99	6.85	4.7	2.4	6.3	0.875	44.26%	-92.17%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	6.3	4.7	2.4	6.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-1009-2096	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed benzo(k)fluoranthene	156.86%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.28	2.29	0.0527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	570.025	570.025	1	60.6	5.3E-05	Significant Effect
Error	75.28	9.41	8			
Total	645.305		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	940	23.2	6.8E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.786	0.741	0.0099	Non-Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	17.4	12	22.8	17	12	24	1.94	24.92%	-656.52%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		16	24	18	17	12

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-3480-7525	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed chrysene	62.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	15.5	1.86	1.77	8	CDF	1.5E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.7047	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	546.121	546.121	1	240	3.0E-07	Significant Effect
Error	18.168	2.271	8			
Total	564.289		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.66	23.2	0.3669	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.858	0.741	0.0731	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.44	4.2	2.4	2.1	4.8	0.498	39.52%	0.00%
31243-101		5	17.6	15.3	19.9	17	16	20	0.812	10.32%	-524.11%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	4.8	2.4
31243-101		19	16	20	16	17

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-2627-2171	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed chrysene	123.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	10.9	1.86	3.47	8	CDF	2.2E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.29	0.1610	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1038.36	1038.36	1	119	4.4E-06	Significant Effect
Error	69.768	8.721	8			
Total	1108.13		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	13	23.2	0.0290	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.741	0.3507	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.44	4.2	2.4	2.1	4.8	0.498	39.52%	0.00%
31243-102		5	23.2	18.2	28.2	23	19	29	1.8	17.35%	-722.70%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	4.8	2.4
31243-102		23	19	29	25	20

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-3604-7899	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed chrysene	80.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	16.9	1.86	2.28	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2695	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1079.52	1079.52	1	286	1.5E-07	Significant Effect
Error	30.168	3.771	8			
Total	1109.69		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.07	23.2	0.1448	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.843	0.741	0.0483	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.44	4.2	2.4	2.1	4.8	0.498	39.52%	0.00%
31243-103		5	23.6	20.5	26.7	23	20	26	1.12	10.64%	-736.88%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	4.8	2.4
31243-103		20	26	23	23	26

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-1862-7354	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed chrysene	44.42%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	7.13	1.86	1.25	8	CDF	5.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2636	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57.6	57.6	1	50.8	9.9E-05	Significant Effect
Error	9.076	1.1345	8			
Total	66.676		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.21	23.2	0.8583	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2641	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.44	4.2	2.4	2.1	4.8	0.498	39.52%	0.00%
31243-104		5	7.62	6.36	8.88	7.9	6.4	8.9	0.453	13.30%	-170.21%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	4.8	2.4
31243-104		6.8	8.9	7.9	6.4	8.1

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-6515-4273	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed chrysene	317.94%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	6.42	2.13	8.97	4	CDF	0.0015	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.11	2.29	0.1445	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1819.8	1819.8	1	41.2	2.1E-04	Significant Effect
Error	353.768	44.221	8			
Total	2173.57		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	70.2	23.2	0.0012	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4298	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.82	1.44	4.2	2.4	2.1	4.8	0.498	39.52%	0.00%
31243-105		5	29.8	18.2	41.4	27	19	43	4.18	31.34%	-956.74%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	4.8	2.4
31243-105		25	43	35	27	19

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-3212-1340	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed dibenz(a,h)anthracene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-0345-4823	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed dibenz(a,h)anthracene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.149	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	1	0.3466	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.2	2.1	2.4	0.049	4.93%	3.48%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-7104-7666 **Endpoint:** Dibenz(a,h)anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed dibenz(a,h)anthracene	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.151	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0040000	0.0040000	1	0.242	0.6357	Non-Significant Effect
Error	0.132	0.0165	8			
Total	0.136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	2.26	2.12	2.4	2.3	2.1	2.4	0.051	5.05%	1.74%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	2.1	2.3	2.3	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-0301-0803	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed dibenz(a,h)anthracene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-9385-5757	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed dibenz(a,h)anthracene	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.139	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	-1.74%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		2.4	2.4	2.2	2.4	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-5038-5377 **Endpoint:** Fluoranthene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed fluoranthene	75.27%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	19	1.86	4.73	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6007	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5837.06	5837.06	1	361	<1.0E-37	Significant Effect
Error	129.248	16.156	8			
Total	5966.3		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.61	23.2	0.2417	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.983	0.741	0.9807	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	6.28	2.99	9.57	7.3	2.1	8.4	1.18	42.17%	0.00%
31243-101		5	54.6	48.4	60.8	53	48	61	2.25	9.21%	-769.43%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	8.4	7.3	2.1	8.3	5.3
31243-101		61	48	58	53	53

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-4480-0285	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed fluoranthene	135.38%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	20.1	1.86	8.5	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.29	0.0870	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	21031.4	21031.4	1	402	<1.0E-37	Significant Effect
Error	418.048	52.256	8			
Total	21449.4		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	13.9	23.2	0.0258	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.741	0.3808	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	6.28	2.99	9.57	7.3	2.1	8.4	1.18	42.17%	0.00%
31243-102		5	98	85.7	110	96	89	113	4.42	10.08%	-1460.51%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	8.4	7.3	2.1	8.3	5.3
31243-102		96	89	113	102	90

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-6902-0736	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed fluoranthene	112.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	20.2	1.86	7.09	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6346	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	14791.7	14791.7	1	407	<1.0E-37	Significant Effect
Error	290.848	36.356	8			
Total	15082.6		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.37	23.2	0.0522	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.966	0.741	0.8474	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	6.28	2.99	9.57	7.3	2.1	8.4	1.18	42.17%	0.00%
31243-103		5	83.2	73.1	93.3	82	75	93	3.62	9.74%	-1224.84%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	8.4	7.3	2.1	8.3	5.3
31243-103		76	90	82	75	93

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-8319-3164	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed fluoranthene	54.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	12.2	1.86	3.41	8	CDF	9.6E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7181	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1245.46	1245.46	1	148	1.9E-06	Significant Effect
Error	67.248	8.406	8			
Total	1312.7		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.4	23.2	0.7535	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1793	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	6.28	2.99	9.57	7.3	2.1	8.4	1.18	42.17%	0.00%
31243-104		5	28.6	24.7	32.5	30	24	32	1.4	10.95%	-355.41%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	8.4	7.3	2.1	8.3	5.3
31243-104		27	32	30	24	30

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-7922-2524	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed fluoranthene	381.57%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	6.36	2.13	24	4	CDF	0.0016	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2533	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12787.8	12787.8	1	40.5	2.2E-04	Significant Effect
Error	2526.85	315.856	8			
Total	15314.6		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	89.1	23.2	7.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.941	0.741	0.5596	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	6.28	2.99	9.57	7.3	2.1	8.4	1.18	42.17%	0.00%
31243-105		5	77.8	46.8	109	68	48	111	11.2	32.13%	-1138.85%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	8.4	7.3	2.1	8.3	5.3
31243-105		68	111	95	67	48

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-7099-1216	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed fluorene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-2090-0971	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed fluorene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.149	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	1	0.3466	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.2	2.1	2.4	0.049	4.93%	3.48%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-7696-8294	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed fluorene	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.151	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0040000	0.0040000	1	0.242	0.6357	Non-Significant Effect
Error	0.132	0.0165	8			
Total	0.136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	2.26	2.12	2.4	2.3	2.1	2.4	0.051	5.05%	1.74%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	2.1	2.3	2.3	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-7066-5749	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed fluorene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-7059-9297 **Endpoint:** Fluorene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:39 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed fluorene	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.139	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	-1.74%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		2.4	2.4	2.2	2.4	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-4319-2402	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed indeno(1,2,3-cd)pyrene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-0452-1480	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed indeno(1,2,3-cd)pyrene	7.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.828	1.89	0.172	7	CDF	0.7826	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0125	0.0125	1	0.686	0.4348	Non-Significant Effect
Error	0.1275	0.0182143	7			
Total	0.14		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.26	46.2	0.8828	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.701	0.5283	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		4	2.23	2.02	2.43	2.2	2.1	2.4	0.0629	5.66%	3.26%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		2.1	2.4	Outlier	2.2	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-4800-8548	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed indeno(1,2,3-cd)pyrene	39.74%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	27	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	9.5E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.529	0.529	1	0.876	0.3767	Non-Significant Effect
Error	4.832	0.604	8			
Total	5.361		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	59.4	23.2	0.0016	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.713	0.741	0.0013	Non-Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	2.76	1.41	4.11	2.3	2.1	4.7	0.487	39.49%	-20.00%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	2.1	2.3	2.3	4.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-3695-5345	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed indeno(1,2,3-cd)pyrene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-1034-4719	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed indeno(1,2,3-cd)pyrene	113.71%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	2.2	2.13	2.62	4	CDF	0.0463	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.86	2.29	0.4055	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.225	18.225	1	4.84	0.0589	Non-Significant Effect
Error	30.1	3.7625	8			
Total	48.325		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	375	23.2	4.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1598	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	5	1.6	8.4	5.3	2.2	8.4	1.23	54.79%	-117.39%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		5.3	8.4	2.2	6.8	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-9452-0586 **Endpoint:** Naphthalene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:38 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed naphthalene	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0	1.86	0.166	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.16	0.02	8			
Total	0.16		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	0.00%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-0779-7137	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed naphthalene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.149	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	1	0.3466	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-102		5	2.22	2.08	2.36	2.2	2.1	2.4	0.049	4.93%	3.48%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-102		2.1	2.4	2.2	2.2	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-2797-1984	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed naphthalene	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.151	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0040000	0.0040000	1	0.242	0.6357	Non-Significant Effect
Error	0.132	0.0165	8			
Total	0.136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-103		5	2.26	2.12	2.4	2.3	2.1	2.4	0.051	5.05%	1.74%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-103		2.4	2.1	2.3	2.3	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-0879-8652	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed naphthalene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.149	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0625	0.8089	Non-Significant Effect
Error	0.128	0.016	8			
Total	0.129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-104		5	2.28	2.14	2.42	2.2	2.2	2.4	0.049	4.80%	0.87%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-104		2.4	2.2	2.2	2.4	2.2

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-0306-2091	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed naphthalene	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.139	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.3	2.12	2.48	2.4	2.1	2.4	0.0632	6.15%	0.00%
31243-105		5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	-1.74%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.4	2.4	2.1	2.2	2.4
31243-105		2.4	2.4	2.2	2.4	2.3

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-6451-6280	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed phenanthrene	48.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	7.46	1.86	2.03	8	CDF	3.6E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.67	2.29	0.7395	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	165.649	165.649	1	55.7	7.2E-05	Significant Effect
Error	23.796	2.9745	8			
Total	189.445		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.12	23.2	0.9181	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.741	0.0801	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	4.18	1.98	6.38	5.3	2.1	5.7	0.792	42.37%	0.00%
31243-101		5	12.3	10.2	14.4	13	9.6	14	0.75	13.61%	-194.74%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.3	5.4	2.1	5.7	2.4
31243-101		14	9.6	13	13	12

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-7517-1226	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed phenanthrene	46.39%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	11.7	1.86	1.94	8	CDF	1.3E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	373.321	373.321	1	137	2.6E-06	Significant Effect
Error	21.748	2.7185	8			
Total	395.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.36	23.2	0.7709	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.854	0.741	0.0643	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	4.18	1.98	6.38	5.3	2.1	5.7	0.792	42.37%	0.00%
31243-102		5	16.4	14.5	18.3	17	14	18	0.678	9.25%	-292.34%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.3	5.4	2.1	5.7	2.4
31243-102		17	14	18	17	16

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-3299-6093	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed phenanthrene	63.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	12.5	1.86	2.65	8	CDF	7.8E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.29	0.3699	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	793.881	793.881	1	157	1.6E-06	Significant Effect
Error	40.548	5.0685	8			
Total	834.429		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.23	23.2	0.4561	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.741	0.3469	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	4.18	1.98	6.38	5.3	2.1	5.7	0.792	42.37%	0.00%
31243-103		5	22	18.7	25.3	23	18	25	1.18	12.03%	-426.32%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.3	5.4	2.1	5.7	2.4
31243-103		21	25	23	18	23

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-7683-9029	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed phenanthrene	37.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	3.25	1.86	1.57	8	CDF	0.0059	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7837	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.769	18.769	1	10.5	0.0118	Significant Effect
Error	14.256	1.782	8			
Total	33.025		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.35	23.2	0.0792	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.927	0.741	0.4201	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	4.18	1.98	6.38	5.3	2.1	5.7	0.792	42.37%	0.00%
31243-104		5	6.92	6.11	7.73	6.8	6.1	7.8	0.292	9.44%	-65.55%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.3	5.4	2.1	5.7	2.4
31243-104		7.8	7.3	6.6	6.1	6.8

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-6278-9935	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed phenanthrene	75.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	3.81	1.86	3.14	8	CDF	0.0026	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6062	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	103.684	103.684	1	14.5	0.0052	Significant Effect
Error	57.116	7.1395	8			
Total	160.8		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.55	23.2	0.2472	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.959	0.741	0.7689	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	4.18	1.98	6.38	5.3	2.1	5.7	0.792	42.37%	0.00%
31243-105		5	10.6	6.48	14.8	9.6	6.7	15	1.49	31.43%	-154.07%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	5.3	5.4	2.1	5.7	2.4
31243-105		8.8	15	13	9.6	6.7

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	21-2343-7091	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pyrene	34.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	21.1	1.86	3.18	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.81	2.29	0.4883	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3258.02	3258.02	1	446	<1.0E-37	Significant Effect
Error	58.42	7.3025	8			
Total	3316.44		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.52	23.2	0.6967	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.964	0.741	0.8346	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.3	6.31	12.3	9.5	5.9	12	1.08	25.91%	0.00%
31243-101		5	45.4	41.7	49.1	45	42	50	1.33	6.53%	-388.17%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	9.5	5.9	12	8.1
31243-101		50	42	46	44	45

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-9755-8167	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pyrene	68.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	18.6	1.86	6.34	8	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.89	2.29	0.3637	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10017.2	10017.2	1	345	<1.0E-37	Significant Effect
Error	232.42	29.0525	8			
Total	10249.6		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.01	23.2	0.0559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9427	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.3	6.31	12.3	9.5	5.9	12	1.08	25.91%	0.00%
31243-102		5	72.6	63.6	81.6	71	63	82	3.23	9.96%	-680.65%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	9.5	5.9	12	8.1
31243-102		71	70	82	77	63

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-7641-4731	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pyrene	71.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	15.3	1.86	6.68	8	CDF	1.6E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.29	0.5773	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7590.02	7590.02	1	235	3.3E-07	Significant Effect
Error	258.42	32.3025	8			
Total	7848.44		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10.1	23.2	0.0455	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.986	0.741	0.9891	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.3	6.31	12.3	9.5	5.9	12	1.08	25.91%	0.00%
31243-103		5	64.4	54.9	73.9	64	55	73	3.43	11.91%	-592.47%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	9.5	5.9	12	8.1
31243-103		55	71	64	59	73

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-3225-3392	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed pyrene	38.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	7.41	1.86	3.54	8	CDF	3.8E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.9	2.29	0.3444	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	497.025	497.025	1	54.9	7.5E-05	Significant Effect
Error	72.42	9.0525	8			
Total	569.445		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.12	23.2	0.4850	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5128	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.3	6.31	12.3	9.5	5.9	12	1.08	25.91%	0.00%
31243-104		5	23.4	19	27.8	25	18	27	1.57	14.99%	-151.61%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	9.5	5.9	12	8.1
31243-104		22	27	25	18	25

Bioaccumulation Evaluation - PAHs - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-1010-3075	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed pyrene	299.29%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	7.94	2.13	27.8	4	CDF	6.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.29	0.0828	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	26884.2	26884.2	1	63.1	4.6E-05	Significant Effect
Error	3409.22	426.152	8			
Total	30293.4		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	146	23.2	2.8E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3188	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	9.3	6.31	12.3	9.5	5.9	12	1.08	25.91%	0.00%
31243-105		5	113	76.9	149	102	81	156	13	25.75%	-1115.05%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	9.5	5.9	12	8.1
31243-105		102	156	127	99	81

Macoma nasuta
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

PCB Congeners

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

					Pre-Tissue	
CONTAMINANT	REP1	*	REP2	*	REP3	*
PCB Congeners (ng/g wet wt.)						
PCB 8	0.25	U	0.23	U	0.23	U
PCB 18	0.25	U	0.93	J	0.23	U
PCB 28	0.25	U	0.23	U	0.23	U
PCB 44	0.25	U	0.23	U	0.23	U
PCB 52	0.25	U	0.23	U	0.23	U
PCB 66	0.25	U	0.23	U	0.23	U
PCB 101	0.25	U	0.23	U	0.23	U
PCB 105	0.25	U	0.23	U	0.23	U
PCB 118	0.25	U	0.23	U	0.23	U
PCB 128	0.25	U	0.23	U	0.23	U
PCB 138	0.25	U	0.23	U	0.23	U
PCB 153	0.25	U	0.23	U	0.23	U
PCB 170	0.25	U	0.23	U	0.23	U
PCB 180	0.25	U	0.23	U	0.23	U
PCB 187	0.25	U	0.23	U	0.23	U
PCB 195	0.25	U	0.23	U	0.23	U
PCB 206	0.25	U	0.23	U	0.23	U
PCB 209	0.25	U	0.23	U	0.23	U
Total PCBs	8.9		9.8		8.2	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 18	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 28	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 44	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 52	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 66	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 101	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 105	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 118	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 128	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 138	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 153	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 170	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 180	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 187	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 195	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 206	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
PCB 209	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
Total PCBs	8.8		8.6		7.7		7.8		8.8	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.22	U	0.22	U	0.25	U	1.1		0.24	U
PCB 18	0.22	U	0.22	U	0.25	U	3.6		0.24	U
PCB 28	0.22	U	0.70	J	0.25	U	9.5		0.24	U
PCB 44	0.58	J	0.46	J	0.50	J	0.22	U	0.24	U
PCB 52	1.4		1.3		1.3		0.92		1.4	
PCB 66	0.67	J	0.75	J	0.58	J	0.54	J	0.62	J
PCB 101	1.3		1.1		1.2		1.1		1.1	
PCB 105	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 118	0.71	J	0.63	J	0.65	J	0.49	J	0.57	J
PCB 128	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 138	0.90		0.69	J	1.0		0.79	J	0.74	J
PCB 153	0.90		0.76	J	0.89	J	0.65	J	0.76	J
PCB 170	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 180	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 187	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 195	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 206	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 209	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Total PCBs	18		17		18		41		16	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 18	1.7		1.2		1.8		2.6		1.8	
PCB 28	1.1		1.0		0.45	J	0.22	U	0.22	U
PCB 44	0.47	J	0.24	U	0.62	J	0.22	U	0.22	U
PCB 52	1.6		1.4		1.6		1.4		1.0	
PCB 66	0.49	J	0.60	J	0.77	J	0.51	J	0.46	J
PCB 101	0.78	J	0.86	J	1.0		0.86	J	0.62	J
PCB 105	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 118	0.57	J	0.24	U	0.63	J	0.45	J	0.22	U
PCB 128	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 138	0.91		0.58	J	0.91		0.66	J	0.56	J
PCB 153	0.78	J	0.53	J	0.79	J	0.70	J	0.63	J
PCB 170	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 180	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 187	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 195	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 206	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
PCB 209	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
Total PCBs	21		17		21		19		15	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 18	1.8		0.94		1.8		1.6		1.2	
PCB 28	0.86	J	0.73	J	0.74	J	0.81	J	0.88	J
PCB 44	0.68	J	0.67	J	0.23	U	0.52	J	0.90	
PCB 52	1.6		1.7		1.6		1.7		2.3	
PCB 66	0.79	J	0.99		0.82	J	0.87	J	1.0	
PCB 101	1.1		1.6		1.4		1.3		1.5	
PCB 105	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 118	0.77	J	1.0		0.89	J	0.81	J	1.0	
PCB 128	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 138	0.96	J	1.3		1.3		1.1		1.4	
PCB 153	0.88	J	1.2		0.95		0.96		1.1	
PCB 170	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 180	0.24	U	0.21	U	0.23	U	0.61	J	0.22	U
PCB 187	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 195	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 206	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
PCB 209	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
Total PCBs	23		24		24		24		27	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 18	1.2		1.3		0.22	U	0.24	U	0.22	U
PCB 28	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 44	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 52	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 66	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 101	0.24	U	0.51	J	0.22	U	0.24	U	0.68	J
PCB 105	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 118	0.24	U	0.22	U	0.45	J	0.24	U	0.22	U
PCB 128	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 138	0.24	U	0.47	J	0.22	U	0.24	U	0.46	J
PCB 153	0.24	U	0.45	J	0.22	U	0.24	U	0.46	J
PCB 170	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 180	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 187	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 195	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 206	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
PCB 209	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
Total PCBs	11		12		8.3		8.7		9.8	

* = Qualifiers
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J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 18	0.24	U	1.7		0.22	U	0.24	U	0.23	U
PCB 28	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 44	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 52	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 66	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 101	0.24	U	0.57	J	0.22	U	0.24	U	0.23	U
PCB 105	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 118	0.24	U	0.53	J	0.22	U	0.24	U	0.23	U
PCB 128	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 138	0.24	U	0.62	J	0.22	U	0.24	U	0.23	U
PCB 153	0.24	U	0.49	J	0.22	U	0.24	U	0.23	U
PCB 170	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 180	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 187	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 195	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 206	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
PCB 209	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Total PCBs	8.7		14		8.0		8.7		8.1	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 01 Feb-19 14:05 (p 1 of 1)
Test Code/ID: 17-7443-8782/31249Mn-PCB

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Start Date: 21 Nov-18 12:03 **Species:** Macoma nasuta **Sample Code:** 31249-000
End Date: 19 Dec-18 12:03 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 21 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Mn)

Sample	Rep	Pos	PBC 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087	PCB 049	PCB 183	PCB 184	Total PCBs
31242-008	1	1	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31242-008	2	12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	
31242-008	3	13	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	
31242-008	4	19	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31242-008	5	30	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-101	1	2	0.22	0.22	0.22	0.58	1.4	0.67	1.3	0.22	0.71	0.22	0.9	0.9	0.22	0.22	0.22	0.22	0.22	0.22	0.22	1	0.22	0.22	
31243-101	2	10	0.22	0.22	0.7	0.46	1.3	0.75	1.1	0.22	0.63	0.22	0.69	0.76	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.83	0.22	0.22	
31243-101	3	17	0.25	0.25	0.25	0.5	1.3	0.58	1.2	0.25	0.65	0.25	1	0.89	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.94	0.25	0.25	
31243-101	4	21	1.1	3.6	9.5	0.22	0.92	0.54	1.1	0.22	0.49	0.22	0.79	0.65	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.72	0.22	0.22	
31243-101	5	26	0.24	0.24	0.24	0.24	1.4	0.62	1.1	0.24	0.57	0.24	0.74	0.76	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	0.24	0.24	
31243-102	1	6	0.21	1.7	1.1	0.47	1.6	0.49	0.78	0.21	0.57	0.21	0.91	0.78	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.92	0.21	0.21	
31243-102	2	11	0.24	1.2	1	0.24	1.4	0.6	0.86	0.24	0.24	0.24	0.58	0.53	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.77	0.24	0.24	
31243-102	3	18	0.22	1.8	0.45	0.62	1.6	0.77	1	0.22	0.63	0.22	0.91	0.79	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.82	0.22	0.22	
31243-102	4	23	0.22	2.6	0.22	0.22	1.4	0.51	0.86	0.22	0.45	0.22	0.66	0.7	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.86	0.22	0.22	
31243-102	5	25	0.22	1.8	0.22	0.22	1	0.46	0.62	0.22	0.22	0.22	0.56	0.63	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.68	0.22	0.22	
31243-103	1	4	0.24	1.8	0.86	0.68	1.6	0.79	1.1	0.24	0.77	0.24	0.96	0.88	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.94	0.24	0.24	
31243-103	2	8	0.21	0.94	0.73	0.67	1.7	0.99	1.6	0.21	1	0.21	1.3	1.2	0.21	0.21	0.21	0.21	0.21	0.21	0.21	1.3	0.21	0.21	
31243-103	3	14	0.23	1.8	0.74	0.23	1.6	0.82	1.4	0.23	0.89	0.23	1.3	0.95	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.2	0.23	0.23	
31243-103	4	22	0.23	1.6	0.81	0.52	1.7	0.87	1.3	0.23	0.81	0.23	1.1	0.96	0.23	0.61	0.23	0.23	0.23	0.23	0.23	0.98	0.23	0.23	
31243-103	5	27	0.22	1.2	0.88	0.9	2.3	1	1.5	0.22	1	0.22	1.4	1.1	0.22	0.22	0.22	0.22	0.22	0.22	0.22	1.3	0.22	0.22	
31243-104	1	3	0.24	1.2	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-104	2	9	0.22	1.3	0.22	0.22	0.22	0.22	0.51	0.22	0.22	0.22	0.47	0.45	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31243-104	3	15	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.45	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31243-104	4	24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-104	5	28	0.22	0.22	0.22	0.22	0.22	0.22	0.68	0.22	0.22	0.22	0.46	0.46	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31243-105	1	5	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	2	7	0.24	1.7	0.24	0.24	0.24	0.24	0.57	0.24	0.53	0.24	0.62	0.49	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	3	16	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31243-105	4	20	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	5	29	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Batch ID:	00-9494-6438	**Test Type:**	Bioaccumulation - PCBs - Mn	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 12:03	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	19 Dec-18 12:03	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-1119-3513	PCB 008	Equal Variance t Two-Sample Test	0.4024	31243-101 passed pcb 008
15-5115-7714	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.2619	31243-101 passed pcb 008
10-2806-4013	PCB 008	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 008
11-0482-8785	PCB 008	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 008
08-6856-6673	PCB 008	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 008
11-7003-1131	PCB 008	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 008
01-9432-5804	PCB 018	Equal Variance t Two-Sample Test	0.4024	31243-101 passed pcb 018
18-5237-1556	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.2619	31243-101 passed pcb 018
11-2199-9586	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-102 failed pcb 018
15-5030-1590	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.0079	31243-102 failed pcb 018
05-5946-4600	PCB 018	Unequal Variance t Two-Sample Test	9.8E-04	31243-103 failed pcb 018
19-6143-1880	PCB 018	Unequal Variance t Two-Sample Test	0.0907	31243-104 passed pcb 018
15-5643-4290	PCB 018	Equal Variance t Two-Sample Test	0.3862	31243-105 passed pcb 018
04-8276-7602	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-105 passed pcb 018
07-1289-3142	PCB 028	Wilcoxon Rank Sum Two-Sample Test	0.1429	31243-101 passed pcb 028
13-9341-1369	PCB 028	Wilcoxon Rank Sum Two-Sample Test	0.0714	31243-101 passed pcb 028
04-8990-0680	PCB 028	Unequal Variance t Two-Sample Test	0.0624	31243-102 passed pcb 028
08-8455-6280	PCB 028	Unequal Variance t Two-Sample Test	2.5E-05	31243-103 failed pcb 028
10-4966-7768	PCB 028	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 028
09-7187-1647	PCB 028	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 028
07-1820-1441	PCB 044	Unequal Variance t Two-Sample Test	0.0393	31243-101 failed pcb 044
13-9068-6664	PCB 044	Unequal Variance t Two-Sample Test	0.1021	31243-102 passed pcb 044
13-3427-6458	PCB 044	Unequal Variance t Two-Sample Test	0.0144	31243-103 failed pcb 044
00-8103-6882	PCB 044	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 044
03-1794-3809	PCB 044	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 044
00-9874-4482	PCB 049	Unequal Variance t Two-Sample Test	1.3E-04	31243-101 failed pcb 049
00-6901-6953	PCB 049	Unequal Variance t Two-Sample Test	7.4E-05	31243-102 failed pcb 049
12-9965-1139	PCB 049	Unequal Variance t Two-Sample Test	1.5E-04	31243-103 failed pcb 049
10-6328-7617	PCB 049	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 049
09-1545-6113	PCB 049	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 049
02-9556-5625	PCB 052	Equal Variance t Two-Sample Test	<1.0E-37	31243-101 failed pcb 052
14-0417-2866	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-101 failed pcb 052
14-4851-5873	PCB 052	Unequal Variance t Two-Sample Test	1.0E-04	31243-102 failed pcb 052

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
14-1386-8034	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-102 failed pcb 052
11-0925-7890	PCB 052	Equal Variance t Two-Sample Test	<1.0E-37	31243-103 failed pcb 052
16-1968-7828	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-103 failed pcb 052
02-0173-6432	PCB 052	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 052
20-8794-7343	PCB 052	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 052
05-3771-6910	PCB 066	Unequal Variance t Two-Sample Test	2.1E-04	31243-101 failed pcb 066
18-3186-9614	PCB 066	Equal Variance t Two-Sample Test	8.3E-06	31243-102 failed pcb 066
17-1514-2181	PCB 066	Unequal Variance t Two-Sample Test	0.0020	31243-102 failed pcb 066
15-4770-3524	PCB 066	Unequal Variance t Two-Sample Test	5.4E-05	31243-103 failed pcb 066
10-9958-0807	PCB 066	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 066
09-3938-8251	PCB 066	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 066
16-6724-2778	PCB 087	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 087
15-6833-2720	PCB 087	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 087
19-1248-2477	PCB 087	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 087
16-1703-1319	PCB 087	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 087
11-1818-5802	PCB 087	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 087
01-8778-6376	PCB 101	Unequal Variance t Two-Sample Test	1.1E-05	31243-101 failed pcb 101
15-7670-8102	PCB 101	Wilcoxon Rank Sum Two-Sample Test	0.0079	31243-101 failed pcb 101
16-8112-4591	PCB 101	Unequal Variance t Two-Sample Test	3.4E-04	31243-102 failed pcb 101
14-0467-3815	PCB 101	Unequal Variance t Two-Sample Test	9.1E-05	31243-103 failed pcb 101
15-7169-1637	PCB 101	Unequal Variance t Two-Sample Test	0.0931	31243-104 passed pcb 101
08-5164-9285	PCB 101	Equal Variance t Two-Sample Test	0.3862	31243-105 passed pcb 101
10-6177-4696	PCB 101	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-105 passed pcb 101
02-0801-0401	PCB 105	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 105
01-8325-3721	PCB 105	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 105
12-3788-7330	PCB 105	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 105
16-9547-6975	PCB 105	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 105
02-5793-9599	PCB 105	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 105
02-5081-1861	PCB 118	Unequal Variance t Two-Sample Test	2.8E-04	31243-101 failed pcb 118
00-6586-5248	PCB 118	Unequal Variance t Two-Sample Test	0.0420	31243-102 failed pcb 118
02-0970-2531	PCB 118	Unequal Variance t Two-Sample Test	7.8E-05	31243-103 failed pcb 118
01-2619-4768	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.5952	31243-104 passed pcb 118
01-8969-7758	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.3611	31243-104 passed pcb 118
12-7819-7114	PCB 118	Equal Variance t Two-Sample Test	0.3862	31243-105 passed pcb 118
01-0911-3673	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-105 passed pcb 118
07-2961-3022	PCB 128	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 128
18-5327-5959	PCB 128	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 128
04-9019-9025	PCB 128	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 128
07-8543-9491	PCB 128	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 128
12-4991-4209	PCB 128	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 128
06-9363-1134	PCB 138	Unequal Variance t Two-Sample Test	2.3E-04	31243-101 failed pcb 138
01-7735-9706	PCB 138	Unequal Variance t Two-Sample Test	0.0016	31243-102 failed pcb 138
14-5268-4866	PCB 138	Unequal Variance t Two-Sample Test	1.3E-04	31243-103 failed pcb 138
00-2151-5839	PCB 138	Unequal Variance t Two-Sample Test	0.0844	31243-104 passed pcb 138
06-0056-0249	PCB 138	Equal Variance t Two-Sample Test	0.3862	31243-105 passed pcb 138
18-5212-3470	PCB 138	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-105 passed pcb 138
09-7680-8230	PCB 153	Unequal Variance t Two-Sample Test	1.4E-04	31243-101 failed pcb 153
14-4344-3612	PCB 153	Unequal Variance t Two-Sample Test	3.7E-04	31243-102 failed pcb 153
17-7508-5716	PCB 153	Unequal Variance t Two-Sample Test	8.6E-05	31243-103 failed pcb 153
06-0738-4697	PCB 153	Unequal Variance t Two-Sample Test	0.0843	31243-104 passed pcb 153
01-8485-0840	PCB 153	Equal Variance t Two-Sample Test	0.3862	31243-105 passed pcb 153
01-7068-7934	PCB 153	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-105 passed pcb 153
10-1161-9596	PCB 170	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 170

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
16-3627-8230	PCB 170	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 170
20-1276-8387	PCB 170	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 170
07-9453-6606	PCB 170	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 170
10-3634-8794	PCB 170	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 170
10-0239-0617	PCB 180	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 180
20-1860-0580	PCB 180	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 180
13-6240-7515	PCB 180	Equal Variance t Two-Sample Test	0.6993	31243-103 passed pcb 180
14-8709-4302	PCB 180	Wilcoxon Rank Sum Two-Sample Test	0.5635	31243-103 passed pcb 180
15-1649-9218	PCB 180	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 180
02-6417-2610	PCB 180	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 180
11-9230-7239	PCB 183	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 183
01-4022-3639	PCB 183	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 183
09-1241-7529	PCB 183	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 183
07-8933-5706	PCB 183	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 183
05-1050-5638	PCB 183	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 183
03-6134-3183	PCB 184	Equal Variance t Two-Sample Test	0.4024	31243-101 passed pcb 184
13-3555-5187	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.6190	31243-101 passed pcb 184
01-3515-6926	PCB 184	Equal Variance t Two-Sample Test	0.7282	31243-102 passed pcb 184
13-3748-5018	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.8810	31243-102 passed pcb 184
10-2570-8369	PCB 184	Equal Variance t Two-Sample Test	0.5655	31243-103 passed pcb 184
04-3694-3199	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.8135	31243-103 passed pcb 184
04-9455-5724	PCB 184	Equal Variance t Two-Sample Test	0.4777	31243-104 passed pcb 184
08-4112-5558	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.7540	31243-104 passed pcb 184
01-5957-8988	PCB 184	Equal Variance t Two-Sample Test	0.2216	31243-105 passed pcb 184
08-3852-6539	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.5794	31243-105 passed pcb 184
10-5290-1600	PCB 187	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 187
20-4069-1199	PCB 187	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 187
10-3211-5403	PCB 187	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 187
13-9446-4047	PCB 187	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 187
20-8778-0616	PCB 187	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 187
06-1281-6677	PCB 195	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 195
02-6842-0056	PCB 195	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 195
16-0166-1825	PCB 195	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 195
18-4067-9679	PCB 195	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 195
07-1087-0723	PCB 195	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 195
02-5269-2630	PCB 206	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 206
19-5456-5449	PCB 206	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 206
01-8283-7491	PCB 206	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 206
13-6313-4325	PCB 206	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 206
09-5247-7608	PCB 206	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 206
04-8798-3621	PCB 209	Equal Variance t Two-Sample Test	0.5000	31243-101 passed pcb 209
09-5524-8741	PCB 209	Equal Variance t Two-Sample Test	0.8267	31243-102 passed pcb 209
00-7238-8844	PCB 209	Equal Variance t Two-Sample Test	0.6822	31243-103 passed pcb 209
20-8636-9116	PCB 209	Equal Variance t Two-Sample Test	0.5956	31243-104 passed pcb 209
07-2103-6241	PCB 209	Equal Variance t Two-Sample Test	0.3038	31243-105 passed pcb 209

Bioaccumulation Evaluation - PCB Congeners - Macoma **EnviroSystems, Inc.**

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.406	-0.076	0.888	0.22	1.1	0.174	0.388	95.61%	-76.52%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.906	-0.964	2.78	0.22	3.6	0.674	1.51	166.23%	-293.91%
31243-102		5	1.82	1.2	2.44	1.2	2.6	0.224	0.502	27.58%	-691.30%
31243-103		5	1.47	0.992	1.94	0.94	1.8	0.172	0.384	26.13%	-538.26%
31243-104		5	0.636	-0.0614	1.33	0.22	1.3	0.251	0.562	88.31%	-176.52%
31243-105		5	0.526	-0.289	1.34	0.22	1.7	0.294	0.656	124.78%	-128.70%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	2.18	-2.9	7.27	0.22	9.5	1.83	4.1	187.71%	-848.70%
31243-102		5	0.598	0.0707	1.13	0.22	1.1	0.19	0.425	71.01%	-160.00%
31243-103		5	0.804	0.72	0.888	0.73	0.88	0.0304	0.068	8.46%	-249.57%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.4	0.2	0.6	0.22	0.58	0.0721	0.161	40.31%	-73.91%
31243-102		5	0.354	0.127	0.581	0.22	0.62	0.0816	0.182	51.53%	-53.91%
31243-103		5	0.6	0.293	0.907	0.23	0.9	0.111	0.247	41.21%	-160.87%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.898	0.747	1.05	0.72	1	0.0543	0.121	13.51%	-290.43%
31243-102		5	0.81	0.697	0.923	0.68	0.92	0.0407	0.0911	11.25%	-252.17%
31243-103		5	1.14	0.929	1.36	0.94	1.3	0.0776	0.173	15.16%	-397.39%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	1.26	1.02	1.51	0.92	1.4	0.0889	0.199	15.72%	-449.57%
31243-102		5	1.4	1.1	1.7	1	1.6	0.11	0.245	17.50%	-508.70%
31243-103		5	1.78	1.41	2.15	1.6	2.3	0.132	0.295	16.57%	-673.91%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

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PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.632	0.531	0.733	0.54	0.75	0.0365	0.0817	12.92%	-174.78%
31243-102		5	0.566	0.41	0.722	0.46	0.77	0.0561	0.125	22.16%	-146.09%
31243-103		5	0.894	0.774	1.01	0.79	1	0.0432	0.0966	10.80%	-288.70%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	1.16	1.05	1.27	1.1	1.3	0.04	0.0894	7.71%	-404.35%
31243-102		5	0.824	0.652	0.996	0.62	1	0.0621	0.139	16.85%	-258.26%
31243-103		5	1.38	1.14	1.62	1.1	1.6	0.086	0.192	13.94%	-500.00%
31243-104		5	0.378	0.121	0.635	0.22	0.68	0.0926	0.207	54.81%	-64.35%
31243-105		5	0.3	0.112	0.488	0.22	0.57	0.0676	0.151	50.39%	-30.43%

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.61	0.506	0.714	0.49	0.71	0.0374	0.0837	13.72%	-165.22%
31243-102		5	0.422	0.19	0.654	0.22	0.63	0.0836	0.187	44.31%	-83.48%
31243-103		5	0.894	0.762	1.03	0.77	1	0.0474	0.106	11.85%	-288.70%
31243-104		5	0.274	0.151	0.397	0.22	0.45	0.0442	0.0989	36.09%	-19.13%
31243-105		5	0.292	0.126	0.458	0.22	0.53	0.0596	0.133	45.65%	-26.96%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

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PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.824	0.668	0.98	0.69	1	0.0561	0.125	15.22%	-258.26%
31243-102		5	0.724	0.508	0.94	0.56	0.91	0.0778	0.174	24.01%	-214.78%
31243-103		5	1.21	0.991	1.43	0.96	1.4	0.0796	0.178	14.69%	-426.96%
31243-104		5	0.326	0.168	0.484	0.22	0.47	0.0569	0.127	39.02%	-41.74%
31243-105		5	0.31	0.0946	0.525	0.22	0.62	0.0776	0.173	55.97%	-34.78%

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.792	0.663	0.921	0.65	0.9	0.0466	0.104	13.16%	-244.35%
31243-102		5	0.686	0.551	0.821	0.53	0.79	0.0486	0.109	15.86%	-198.26%
31243-103		5	1.02	0.857	1.18	0.88	1.2	0.0578	0.129	12.70%	-342.61%
31243-104		5	0.322	0.171	0.473	0.22	0.46	0.0544	0.122	37.81%	-40.00%
31243-105		5	0.284	0.141	0.427	0.22	0.49	0.0516	0.115	40.65%	-23.48%

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.302	0.0878	0.516	0.21	0.61	0.0772	0.173	57.13%	-31.30%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.278	0.137	0.419	0.21	0.48	0.0508	0.114	40.89%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	17.27%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	20.14%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	18.71%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	17.99%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	15.83%

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PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

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PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	1.1	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	3.6	0.24
31243-102		1.7	1.2	1.8	2.6	1.8
31243-103		1.8	0.94	1.8	1.6	1.2
31243-104		1.2	1.3	0.22	0.24	0.22
31243-105		0.24	1.7	0.22	0.24	0.23

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.7	0.25	9.5	0.24
31243-102		1.1	1	0.45	0.22	0.22
31243-103		0.86	0.73	0.74	0.81	0.88
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.58	0.46	0.5	0.22	0.24
31243-102		0.47	0.24	0.62	0.22	0.22
31243-103		0.68	0.67	0.23	0.52	0.9
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		1	0.83	0.94	0.72	1
31243-102		0.92	0.77	0.82	0.86	0.68
31243-103		0.94	1.3	1.2	0.98	1.3
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		1.4	1.3	1.3	0.92	1.4
31243-102		1.6	1.4	1.6	1.4	1
31243-103		1.6	1.7	1.6	1.7	2.3
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

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PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.67	0.75	0.58	0.54	0.62
31243-102		0.49	0.6	0.77	0.51	0.46
31243-103		0.79	0.99	0.82	0.87	1
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		1.3	1.1	1.2	1.1	1.1
31243-102		0.78	0.86	1	0.86	0.62
31243-103		1.1	1.6	1.4	1.3	1.5
31243-104		0.24	0.51	0.22	0.24	0.68
31243-105		0.24	0.57	0.22	0.24	0.23

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.71	0.63	0.65	0.49	0.57
31243-102		0.57	0.24	0.63	0.45	0.22
31243-103		0.77	1	0.89	0.81	1
31243-104		0.24	0.22	0.45	0.24	0.22
31243-105		0.24	0.53	0.22	0.24	0.23

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

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PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.9	0.69	1	0.79	0.74
31243-102		0.91	0.58	0.91	0.66	0.56
31243-103		0.96	1.3	1.3	1.1	1.4
31243-104		0.24	0.47	0.22	0.24	0.46
31243-105		0.24	0.62	0.22	0.24	0.23

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.9	0.76	0.89	0.65	0.76
31243-102		0.78	0.53	0.79	0.7	0.63
31243-103		0.88	1.2	0.95	0.96	1.1
31243-104		0.24	0.45	0.22	0.24	0.46
31243-105		0.24	0.49	0.22	0.24	0.23

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.61	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.48	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

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PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	23.5		0.2619048	0.05	FALSE		8	2	E
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0.2567363	1.89458	0.4023824	0.05	FALSE	0.0184487	7		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	23.5		0.2619048	0.05	FALSE		8	2	E
PCB 018	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0.2567363	1.89458	0.4023824	0.05	FALSE	0.0184487	7		C
PCB 028	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	20		0.0714286	0.05	FALSE		8	2	E
PCB 028	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	15		0.1428571	0.05	FALSE		7	2	E
PCB 044	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	2.348461	2.13185	0.0393238	0.05	TRUE	0.1543198	4		C
PCB 049	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	12.22861	2.13185	0.0001284	0.05	TRUE	0.1164543	4		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	15		0.0039683	0.05	TRUE		8	0	E
PCB 052	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	42.50586	1.89458	0	0.05	TRUE	0.04992083	7		C
PCB 066	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	10.84508	2.13185	0.0002051	0.05	TRUE	0.07902224	4		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	22.96472	2.13185	1.065E-05	0.05	TRUE	0.08633319	4		C
PCB 101	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	10		0.0079365	0.05	TRUE		7	0	E
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 118	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	10.01388	2.13185	0.0002795	0.05	TRUE	0.08089788	4		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 138	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	10.52358	2.13185	0.0002306	0.05	TRUE	0.1203314	4		C
PCB 153	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	11.94394	2.13185	0.0001408	0.05	TRUE	0.1003101	4		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	28.5		0.6190476	0.05	FALSE		8	2	E
PCB 184	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	0.2567363	1.89458	0.4023824	0.05	FALSE	0.0184487	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	15		0.0039683	0.05	TRUE		8	0	E
PCB 018	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	10		0.0079365	0.05	TRUE		7	0	E
PCB 028	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.936735	2.13185	0.0624225	0.05	FALSE	0.4050733	4		C
PCB 044	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.515354	2.13185	0.1021306	0.05	FALSE	0.1744471	4		C
PCB 049	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	14.06707	2.13185	7.41E-05	0.05	TRUE	0.0878983	4		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	15		0.0039683	0.05	TRUE		8	0	E
PCB 052	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	21.86623	2.35336	0.0001047	0.05	TRUE	0.1366843	3		C
PCB 066	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	5.952734	2.13185	0.0019983	0.05	TRUE	0.1203314	4		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	10.39189	1.89458	8.3E-06	0.05	TRUE	0.05195925	7		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	9.516494	2.13185	0.0003403	0.05	TRUE	0.1330655	4		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 118	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	2.289286	2.13185	0.0419615	0.05	TRUE	0.1787957	4		C

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CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 138	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	6.332292	2.13185	0.0015919	0.05	TRUE	0.1663114	4		C
PCB 153	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	9.296447	2.13185	0.0003725	0.05	TRUE	0.1045692	4		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	32		0.8809524	0.05	FALSE		8	3	E
PCB 184	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.6382846	1.89458	0.7282013	0.05	FALSE	0.01632529	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 018	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	7.212317	2.13185	0.0009797	0.05	TRUE	0.3659332	4		C
PCB 028	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	18.46815	2.13185	2.529E-05	0.05	TRUE	0.06625894	4		C
PCB 044	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	3.340254	2.13185	0.0144145	0.05	TRUE	0.2361447	4		C
PCB 049	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	11.74501	2.13185	0.0001503	0.05	TRUE	0.1659009	4		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	15		0.0039683	0.05	TRUE		8	0	E
PCB 052	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	53.89136	1.89458	0	0.05	TRUE	0.04992083	7		C
PCB 066	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	15.20921	2.13185	5.449E-05	0.05	TRUE	0.09307165	4		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	13.33249	2.13185	9.149E-05	0.05	TRUE	0.1838834	4		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 118	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	13.88769	2.13185	7.794E-05	0.05	TRUE	0.1019281	4		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 138	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	12.29037	2.13185	0.0001259	0.05	TRUE	0.1703344	4		C
PCB 153	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	13.546	2.13185	8.595E-05	0.05	TRUE	0.1240142	4		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 180	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	27.5		0.5634921	0.05	FALSE		8	3	E
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.5469415	1.89458	0.6992944	0.05	FALSE	0.01731975	7		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	31		0.8134921	0.05	FALSE		8	3	E
PCB 184	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.171139	1.89458	0.5655218	0.05	FALSE	0.01660557	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 018	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.6158	2.13185	0.0907209	0.05	FALSE	0.5356665	4		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 044	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 049	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C

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ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
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Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 052	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.593703	2.13185	0.0931128	0.05	FALSE	0.197975	4		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 118	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	25		0.3611111	0.05	FALSE		8	2	E
PCB 118	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	20		0.5952381	0.05	FALSE		7	2	E
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 138	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.677256	2.13185	0.0843988	0.05	FALSE	0.1220191	4		C
PCB 153	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.678564	2.13185	0.0842693	0.05	FALSE	0.1168439	4		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	29.5		0.7539682	0.05	FALSE		8	2	E
PCB 184	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.05802609	1.89458	0.4776748	0.05	FALSE	0.01632529	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	24.5		0.3214286	0.05	FALSE		8	2	E
PCB 018	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.3007316	1.89458	0.3861774	0.05	FALSE	0.01574976	7		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 044	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 049	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 052	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 101	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	24.5		0.3214286	0.05	FALSE		8	2	E
PCB 101	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.3007316	1.89458	0.3861774	0.05	FALSE	0.01574976	7		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 118	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	24.5		0.3214286	0.05	FALSE		8	2	E
PCB 118	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.3007316	1.89458	0.3861774	0.05	FALSE	0.01574976	7		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 138	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	24.5		0.3214286	0.05	FALSE		8	2	E
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.3007316	1.89458	0.3861774	0.05	FALSE	0.01574976	7		C
PCB 153	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	24.5		0.3214286	0.05	FALSE		8	2	E
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.3007316	1.89458	0.3861774	0.05	FALSE	0.01574976	7		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	27.5		0.5793651	0.05	FALSE		8	2	E

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 184	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.8127272	1.89458	0.2215667	0.05	FALSE	0.0151524	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-5115-7714	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 008	140.45%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	23.5	n/a	2	8	Exact	0.2619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.7E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07744	0.07744	1	1.03	0.3406	Non-Significant Effect
Error	0.60352	0.07544	8			
Total	0.68096		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	753	23.2	1.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.653	0.741	2.4E-04	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.406	-0.076	0.888	0.24	0.22	1.1	0.174	95.61%	-76.52%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	1.1	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-1119-3513	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 008	8.02%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0.257	1.89	0.018	7	CDF	0.4024	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.389E-05	1.389E-05	1	0.0659	0.8048	Non-Significant Effect
Error	0.001475	0.0002107	7			
Total	0.0014889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.12	24.3	0.8771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.701	0.1103	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	-1.09%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	Outlier	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-2806-4013	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 008	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-0482-8785	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 008	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-6856-6673 **Endpoint:** PCB 008 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 008	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-7003-1131	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 008	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-9432-5804	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 018	8.02%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0.257	1.89	0.018	7	CDF	0.4024	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.389E-05	1.389E-05	1	0.0659	0.8048	Non-Significant Effect
Error	0.001475	0.0002107	7			
Total	0.0014889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.12	24.3	0.8771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.701	0.1103	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	-1.09%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	Outlier	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-5030-1590	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 018	104.07%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	10	n/a	0	7	Exact	0.0079	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.3245	4.3245	1	122	1.1E-05	Significant Effect
Error	0.2483	0.0354714	7			
Total	4.5728		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	412	24.3	3.9E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.756	0.701	0.0064	Non-Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		4	1.62	1.17	2.08	1.75	1.2	1.8	0.144	17.68%	-606.52%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		1.7	1.2	1.8	Outlier	1.8

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-5946-4600	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 018	159.10%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	7.21	2.13	0.366	4	CDF	9.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.29	0.1767	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.83161	3.83161	1	52	9.1E-05	Significant Effect
Error	0.58928	0.07366	8			
Total	4.42089		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	736	23.2	1.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.894	0.741	0.1879	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	1.47	0.992	1.94	1.6	0.94	1.8	0.172	26.13%	-538.26%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		1.8	0.94	1.8	1.6	1.2

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-6143-1880	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 018	232.90%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.62	2.13	0.536	4	CDF	0.0907	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5441	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.41209	0.41209	1	2.61	0.1448	Non-Significant Effect
Error	1.26272	0.15784	8			
Total	1.67481		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1580	23.2	2.4E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.846	0.741	0.0519	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.636	-0.0614	1.33	0.24	0.22	1.3	0.251	88.31%	-176.52%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		1.2	1.3	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-5643-4290	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 018	6.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.301	1.89	0.016	7	CDF	0.3862	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.389E-05	1.389E-05	1	0.0904	0.7724	Non-Significant Effect
Error	0.001075	0.0001536	7			
Total	0.0010889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.18	46.2	0.5476	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.701	0.0447	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		4	0.232	0.217	0.248	0.235	0.22	0.24	0.00479	4.12%	-1.09%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	Outlier	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-9341-1369	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 028	1480.94%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	20	n/a	2	8	Exact	0.0714	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.7E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.52576	9.52576	1	1.14	0.3177	Non-Significant Effect
Error	67.1037	8.38796	8			
Total	76.6294		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	83900	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.642	0.741	1.8E-04	Non-Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	2.18	-2.9	7.27	0.25	0.22	9.5	1.83	187.71%	-848.70%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.7	0.25	9.5	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-1289-3142	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 028	84.13%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	15	n/a	2	7	Exact	0.1429	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0333472	0.0333472	1	1.44	0.2694	Non-Significant Effect
Error	0.162275	0.0231821	7			
Total	0.195622		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	269	24.3	9.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.744	0.701	0.0046	Non-Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		4	0.352	-0.0167	0.722	0.245	0.22	0.7	0.116	65.82%	-53.26%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.7	0.25	Outlier	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-8990-0680 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 028	176.12%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.94	2.13	0.405	4	CDF	0.0624	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.29	0.5448	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.33856	0.33856	1	3.75	0.0888	Non-Significant Effect
Error	0.72208	0.09026	8			
Total	1.06064		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	902	23.2	7.4E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.886	0.741	0.1525	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.598	0.0707	1.13	0.45	0.22	1.1	0.19	71.01%	-160.00%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		1.1	1	0.45	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-8455-6280	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 028	28.81%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	18.5	2.13	0.066	4	CDF	2.5E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8116	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.82369	0.82369	1	341	<1.0E-37	Significant Effect
Error	0.01932	0.002415	8			
Total	0.84301		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	23.1	23.2	0.0100	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5252	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.804	0.72	0.888	0.81	0.73	0.88	0.0304	8.46%	-249.57%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.86	0.73	0.74	0.81	0.88

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-4966-7768	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 028	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-7187-1647 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:44 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 028	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-1820-1441	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 044	67.10%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	2.35	2.13	0.154	4	CDF	0.0393	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.67	2.29	0.7497	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07225	0.07225	1	5.52	0.0468	Significant Effect
Error	0.1048	0.0131	8			
Total	0.17705		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	130	23.2	3.5E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.927	0.741	0.4182	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.4	0.2	0.6	0.46	0.22	0.58	0.0721	40.31%	-73.91%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.58	0.46	0.5	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-9068-6664	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 044	75.85%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.52	2.13	0.174	4	CDF	0.1021	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.29	0.0975	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03844	0.03844	1	2.3	0.1681	Non-Significant Effect
Error	0.13392	0.01674	8			
Total	0.17236		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	166	23.2	2.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1219	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.354	0.127	0.581	0.24	0.22	0.62	0.0816	51.53%	-53.91%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.47	0.24	0.62	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-3427-6458	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 044	102.67%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	3.34	2.13	0.236	4	CDF	0.0144	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.24	2.29	0.0686	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.34225	0.34225	1	11.2	0.0102	Significant Effect
Error	0.2454	0.030675	8			
Total	0.58765		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	306	23.2	6.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.858	0.741	0.0716	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.6	0.293	0.907	0.67	0.23	0.9	0.111	41.21%	-160.87%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.68	0.67	0.23	0.52	0.9

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-8103-6882	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 044	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-1794-3809 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:44 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 044	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-9874-4482 **Endpoint:** PCB 049 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:42 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 049	50.63%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	12.2	2.13	0.116	4	CDF	1.3E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.19	2.29	0.0947	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.11556	1.11556	1	150	1.9E-06	Significant Effect
Error	0.05968	0.00746	8			
Total	1.17524		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	73.6	23.2	0.0011	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2440	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.898	0.747	1.05	0.94	0.72	1	0.0543	13.51%	-290.43%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		1	0.83	0.94	0.72	1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-6901-6953	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 049	38.22%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	14.1	2.13	0.088	4	CDF	7.4E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1378	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.841	0.841	1	198	6.3E-07	Significant Effect
Error	0.034	0.00425	8			
Total	0.875		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	41.5	23.2	0.0033	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.913	0.741	0.3021	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.81	0.697	0.923	0.82	0.68	0.92	0.0407	11.25%	-252.17%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.92	0.77	0.82	0.86	0.68

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-9965-1139	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 049	72.13%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	11.7	2.13	0.166	4	CDF	1.5E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5695	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.08849	2.08849	1	138	2.5E-06	Significant Effect
Error	0.12112	0.01514	8			
Total	2.20961		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	150	23.2	2.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.902	0.741	0.2312	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	1.14	0.929	1.36	1.2	0.94	1.3	0.0776	15.16%	-397.39%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.94	1.3	1.2	0.98	1.3

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-6328-7617	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 049	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-1545-6113	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 049	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-9556-5625	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 052	21.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	42.5	1.89	0.05	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.78756	2.78756	1	1810	<1.0E-37	Significant Effect
Error	0.0108	0.0015429	7			
Total	2.79836		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.7	24.3	0.0201	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.701	0.3166	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		4	1.35	1.26	1.44	1.35	1.3	1.4	0.0289	4.28%	-486.96%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		1.4	1.3	1.3	Outlier	1.4

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-1386-8034	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 052	88.71%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	15	n/a	0	8	Exact	0.0040	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.45	2.29	0.0144	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.42225	3.42225	1	114	5.2E-06	Significant Effect
Error	0.2408	0.0301	8			
Total	3.66305		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	300	23.2	6.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.741	0.741	0.0028	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	1.4	1.1	1.7	1.4	1	1.6	0.11	17.50%	-508.70%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		1.6	1.4	1.6	1.4	1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-4851-5873	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 052	59.43%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	21.9	2.35	0.137	3	CDF	1.0E-04	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.58422	3.58422	1	615	<1.0E-37	Significant Effect
Error	0.0408	0.0058286	7			
Total	3.62502		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	66.7	24.3	0.0014	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.701	0.1943	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		4	1.5	1.32	1.68	1.5	1.4	1.6	0.0577	7.70%	-552.17%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		1.6	1.4	1.6	1.4	Outlier

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-0925-7890	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 052	21.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	53.9	1.89	0.05	7	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.48089	4.48089	1	2900	<1.0E-37	Significant Effect
Error	0.0108	0.0015429	7			
Total	4.49169		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.7	24.3	0.0201	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.701	0.3166	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		4	1.65	1.56	1.74	1.65	1.6	1.7	0.0289	3.50%	-617.39%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		1.6	1.7	1.6	1.7	Outlier

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-0173-6432	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 052	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-8794-7343	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 052	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-3771-6910	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 066	34.36%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	10.8	2.13	0.079	4	CDF	2.1E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.29	0.1242	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.40401	0.40401	1	118	4.6E-06	Significant Effect
Error	0.02748	0.003435	8			
Total	0.43149		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	33.3	23.2	0.0050	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.932	0.741	0.4661	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.632	0.531	0.733	0.62	0.54	0.75	0.0365	12.92%	-174.78%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.67	0.75	0.58	0.54	0.62

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-1514-2181	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 066	52.32%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	5.95	2.13	0.12	4	CDF	0.0020	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.42	2.29	0.0175	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.28224	0.28224	1	35.4	3.4E-04	Significant Effect
Error	0.06372	0.007965	8			
Total	0.34596		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	78.6	23.2	9.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.85	0.741	0.0574	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.566	0.41	0.722	0.51	0.46	0.77	0.0561	22.16%	-146.09%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.49	0.6	0.77	0.51	0.46

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-4770-3524	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 066	40.47%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	15.2	2.13	0.093	4	CDF	5.4E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8385	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.10224	1.10224	1	231	3.5E-07	Significant Effect
Error	0.03812	0.004765	8			
Total	1.14036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	46.7	23.2	0.0026	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4375	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.894	0.774	1.01	0.87	0.79	1	0.0432	10.80%	-288.70%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.79	0.99	0.82	0.87	1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-9958-0807	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 066	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-3938-8251 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:44 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 066	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-6724-2778	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 087	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-6833-2720	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 087	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-1248-2477	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 087	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-1703-1319	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 087	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-1818-5802	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 087	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-7670-8102	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 101	19.03%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	10	n/a	0	7	Exact	0.0079	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.78006	1.78006	1	1500	<1.0E-37	Significant Effect
Error	0.0083	0.0011857	7			
Total	1.78836		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	12.5	24.3	0.0337	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.771	0.701	0.0095	Non-Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		4	1.13	1.05	1.2	1.1	1.1	1.2	0.025	4.44%	-389.13%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		Outlier	1.1	1.2	1.1	1.1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-8112-4591	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 101	57.85%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	9.52	2.13	0.133	4	CDF	3.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.19	2.29	0.0913	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.88209	0.88209	1	90.6	1.2E-05	Significant Effect
Error	0.07792	0.00974	8			
Total	0.96001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	96.4	23.2	6.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0753	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.824	0.652	0.996	0.86	0.62	1	0.0621	16.85%	-258.26%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.78	0.86	1	0.86	0.62

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-0467-3815	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 101	79.95%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	13.3	2.13	0.184	4	CDF	9.1E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.29	0.0992	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.30625	3.30625	1	178	9.6E-07	Significant Effect
Error	0.1488	0.0186	8			
Total	3.45505		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	185	23.2	1.7E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.741	0.1647	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	1.38	1.14	1.62	1.4	1.1	1.6	0.086	13.94%	-500.00%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		1.1	1.6	1.4	1.3	1.5

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-7169-1637	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 101	86.08%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.59	2.13	0.198	4	CDF	0.0931	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.29	0.0970	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05476	0.05476	1	2.54	0.1497	Non-Significant Effect
Error	0.17248	0.02156	8			
Total	0.22724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	215	23.2	1.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.877	0.741	0.1207	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.378	0.121	0.635	0.24	0.22	0.68	0.0926	54.81%	-64.35%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.51	0.22	0.24	0.68

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-5164-9285	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 101	6.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.301	1.89	0.016	7	CDF	0.3862	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.389E-05	1.389E-05	1	0.0904	0.7724	Non-Significant Effect
Error	0.001075	0.0001536	7			
Total	0.0010889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.18	46.2	0.5476	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.701	0.0447	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		4	0.232	0.217	0.248	0.235	0.22	0.24	0.00479	4.12%	-1.09%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	Outlier	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-0801-0401	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 105	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-8325-3721 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 105	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-3788-7330	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 105	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-9547-6975	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 105	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-5793-9599	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 105	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-5081-1861 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:42 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 118	35.17%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	10	2.13	0.081	4	CDF	2.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1335	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.361	0.361	1	100	8.4E-06	Significant Effect
Error	0.0288	0.0036	8			
Total	0.3898		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	35	23.2	0.0045	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.929	0.741	0.4375	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.61	0.506	0.714	0.63	0.49	0.71	0.0374	13.72%	-165.22%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.71	0.63	0.65	0.49	0.57

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-6586-5248	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 118	77.74%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	2.29	2.13	0.179	4	CDF	0.0420	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7593	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09216	0.09216	1	5.24	0.0513	Non-Significant Effect
Error	0.14068	0.017585	8			
Total	0.23284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	175	23.2	1.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2396	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.422	0.19	0.654	0.45	0.22	0.63	0.0836	44.31%	-83.48%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.57	0.24	0.63	0.45	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-0970-2531	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 118	44.32%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	13.9	2.13	0.102	4	CDF	7.8E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.6042	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.10224	1.10224	1	193	7.0E-07	Significant Effect
Error	0.04572	0.005715	8			
Total	1.14796		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	56.2	23.2	0.0018	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.909	0.741	0.2769	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.894	0.762	1.03	0.89	0.77	1	0.0474	11.85%	-288.70%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.77	1	0.89	0.81	1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-2619-4768	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 118	7.23%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	20	n/a	2	7	Exact	0.5952	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0012	0.0001714	7			
Total	0.0012		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	46.2	0.7698	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.751	0.701	0.0055	Non-Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		4	0.23	0.212	0.248	0.23	0.22	0.24	0.00577	5.02%	0.00%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	Outlier	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-0911-3673	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 118	48.47%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	24.5	n/a	2	8	Exact	0.3214	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	6.9E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00961	0.00961	1	1.07	0.3313	Non-Significant Effect
Error	0.07188	0.008985	8			
Total	0.08149		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	88.8	23.2	7.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.691	0.741	6.8E-04	Non-Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.292	0.126	0.458	0.24	0.22	0.53	0.0596	45.65%	-26.96%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.53	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-2961-3022	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 128	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-5327-5959	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 128	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-9019-9025	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 128	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-8543-9491 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 128	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-4991-4209	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 128	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-9363-1134	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 138	52.32%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	10.5	2.13	0.12	4	CDF	2.3E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1546	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.88209	0.88209	1	111	5.8E-06	Significant Effect
Error	0.06372	0.007965	8			
Total	0.94581		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	78.6	23.2	9.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5248	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.824	0.668	0.98	0.79	0.69	1	0.0561	15.22%	-258.26%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.9	0.69	1	0.79	0.74

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-7735-9706	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 138	72.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	6.33	2.13	0.166	4	CDF	0.0016	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9089	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.61009	0.61009	1	40.1	2.2E-04	Significant Effect
Error	0.12172	0.015215	8			
Total	0.73181		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	151	23.2	2.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1837	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.724	0.508	0.94	0.66	0.56	0.91	0.0778	24.01%	-214.78%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.91	0.58	0.91	0.66	0.56

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-5268-4866	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 138	74.06%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	12.3	2.13	0.17	4	CDF	1.3E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1373	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.41081	2.41081	1	151	1.8E-06	Significant Effect
Error	0.12768	0.01596	8			
Total	2.53849		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	159	23.2	2.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.926	0.741	0.4090	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	1.21	0.991	1.43	1.3	0.96	1.4	0.0796	14.69%	-426.96%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.96	1.3	1.3	1.1	1.4

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-2151-5839	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 138	53.05%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.68	2.13	0.122	4	CDF	0.0844	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.7078	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02304	0.02304	1	2.81	0.1320	Non-Significant Effect
Error	0.06552	0.00819	8			
Total	0.08856		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	80.9	23.2	8.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.885	0.741	0.1507	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.326	0.168	0.484	0.24	0.22	0.47	0.0569	39.02%	-41.74%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.47	0.22	0.24	0.46

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-5212-3470	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 138	62.94%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	24.5	n/a	2	8	Exact	0.3214	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	5.8E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	1.06	0.3342	Non-Significant Effect
Error	0.1212	0.01515	8			
Total	0.1372		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	151	23.2	2.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.677	0.741	4.7E-04	Non-Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.31	0.0946	0.525	0.24	0.22	0.62	0.0776	55.97%	-34.78%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.62	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-0056-0249	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 138	6.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.301	1.89	0.016	7	CDF	0.3862	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.389E-05	1.389E-05	1	0.0904	0.7724	Non-Significant Effect
Error	0.001075	0.0001536	7			
Total	0.0010889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.18	46.2	0.5476	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.701	0.0447	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		4	0.232	0.217	0.248	0.235	0.22	0.24	0.00479	4.12%	-1.09%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	Outlier	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-7680-8230	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 153	43.61%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	11.9	2.13	0.1	4	CDF	1.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2107	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.78961	0.78961	1	143	2.2E-06	Significant Effect
Error	0.04428	0.005535	8			
Total	0.83389		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	54.4	23.2	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9	0.741	0.2218	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.792	0.663	0.921	0.76	0.65	0.9	0.0466	13.16%	-244.35%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.9	0.76	0.89	0.65	0.76

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-4344-3612	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 153	45.46%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	9.3	2.13	0.105	4	CDF	3.7E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1255	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.51984	0.51984	1	86.4	1.5E-05	Significant Effect
Error	0.04812	0.006015	8			
Total	0.56796		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	59.2	23.2	0.0016	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.901	0.741	0.2264	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.686	0.551	0.821	0.7	0.53	0.79	0.0486	15.86%	-198.26%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.78	0.53	0.79	0.7	0.63

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-7508-5716	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 153	53.92%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	13.5	2.13	0.124	4	CDF	8.6E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1493	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.55236	1.55236	1	183	8.5E-07	Significant Effect
Error	0.06768	0.00846	8			
Total	1.62004		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	83.6	23.2	8.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.938	0.741	0.5339	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	1.02	0.857	1.18	0.96	0.88	1.2	0.0578	12.70%	-342.61%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.88	1.2	0.95	0.96	1.1

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	06-0738-4697	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 153	50.80%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.68	2.13	0.117	4	CDF	0.0843	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.69	2.29	0.7051	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02116	0.02116	1	2.82	0.1318	Non-Significant Effect
Error	0.06008	0.00751	8			
Total	0.08124		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	74.1	23.2	0.0011	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1611	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.322	0.171	0.473	0.24	0.22	0.46	0.0544	37.81%	-40.00%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.45	0.22	0.24	0.46

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-7068-7934 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:44 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 153	42.06%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	24.5	n/a	2	8	Exact	0.3214	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.9E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00729	0.00729	1	1.08	0.3296	Non-Significant Effect
Error	0.05412	0.006765	8			
Total	0.06141		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	66.7	23.2	0.0013	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.699	0.741	8.7E-04	Non-Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.284	0.141	0.427	0.24	0.22	0.49	0.0516	40.65%	-23.48%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.49	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-1161-9596	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 170	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-3627-8230	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 170	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-1276-8387	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 170	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-9453-6606 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 170	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-3634-8794	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 170	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-0239-0617	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 180	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-1860-0580	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 180	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-8709-4302	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 180	62.59%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	27.5	n/a	3	8	Exact	0.5635	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	6.1E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01296	0.01296	1	0.865	0.3796	Non-Significant Effect
Error	0.11988	0.014985	8			
Total	0.13284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	149	23.2	2.7E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.741	5.8E-04	Non-Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.302	0.0878	0.516	0.23	0.21	0.61	0.0772	57.13%	-31.30%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.61	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-1649-9218	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 180	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-6417-2610 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:44 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 180	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-9230-7239	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 183	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-4022-3639	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 183	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-1241-7529 **Endpoint:** PCB 183 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 183	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-8933-5706 **Endpoint:** PCB 183 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 183	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-1050-5638 **Endpoint:** PCB 183 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:44 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 183	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	03-6134-3183	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 184	8.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	0.257	1.89	0.018	7	CDF	0.4024	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.389E-05	1.389E-05	1	0.0659	0.8048	Non-Significant Effect
Error	0.001475	0.0002107	7			
Total	0.0014889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.12	24.3	0.8771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.701	0.1103	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.227	0.204	0.251	0.23	0.21	0.24	0.0075	6.59%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	-1.10%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	Outlier	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-3515-6926	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 184	7.18%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.638	1.89	0.016	7	CDF	0.7282	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.722E-05	6.722E-05	1	0.407	0.5436	Non-Significant Effect
Error	0.001155	0.000165	7			
Total	0.0012222		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.88	24.3	0.5495	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.932	0.701	0.4985	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.227	0.204	0.251	0.23	0.21	0.24	0.0075	6.59%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	2.42%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	Outlier	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	04-3694-3199	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 184	34.17%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	31	n/a	3	8	Exact	0.8135	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	8.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00676	0.00676	1	1.04	0.3385	Non-Significant Effect
Error	0.0522	0.006525	8			
Total	0.05896		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	99.4	23.2	5.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.715	0.741	0.0013	Non-Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.278	0.137	0.419	0.24	0.21	0.48	0.0508	40.89%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	18.71%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.48	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-2570-8369	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 184	7.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.171	1.89	0.017	7	CDF	0.5655	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5E-06	5E-06	1	0.0293	0.8690	Non-Significant Effect
Error	0.001195	0.0001707	7			
Total	0.0012		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	24.3	0.5968	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.895	0.701	0.2232	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.227	0.204	0.251	0.23	0.21	0.24	0.0075	6.59%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	0.66%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	Outlier	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	08-4112-5558	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 184	34.16%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	29.5	n/a	2	8	Exact	0.7540	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	8.5E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00625	0.00625	1	0.959	0.3562	Non-Significant Effect
Error	0.05216	0.00652	8			
Total	0.05841		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	108	23.2	5.0E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.709	0.741	0.0011	Non-Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.278	0.137	0.419	0.24	0.21	0.48	0.0508	40.89%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	17.99%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.48	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-5957-8988	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 184	6.66%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.813	1.89	0.015	7	CDF	0.2216	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.389E-05	9.389E-05	1	0.661	0.4431	Non-Significant Effect
Error	0.000995	0.0001421	7			
Total	0.0010889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.81	24.3	0.3434	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.701	0.2367	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.227	0.204	0.251	0.23	0.21	0.24	0.0075	6.59%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-2.86%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	Outlier	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-5290-1600	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 187	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-4069-1199	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 187	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-3211-5403	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 187	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-9446-4047	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 187	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-8778-0616	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 187	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-1281-6677 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 195	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-6842-0056	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 195	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-0166-1825	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 195	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-4067-9679	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 195	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-1087-0723	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 195	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	02-5269-2630	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 206	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-5456-5449	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 206	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	01-8283-7491	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 206	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-6313-4325	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 206	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-5247-7608	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 206	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-8798-3621 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 209	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	09-5524-8741	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 209	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-7238-8844	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 209	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-8636-9116	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 209	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - PCB Congeners - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-2103-6241	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 209	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Macoma nasuta
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

Pesticides

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

					Pre-Tissue	
CONTAMINANT	REP1	*	REP2	*	REP3	*
Pesticides (ng/g wet weight)						
Aldrin	0.25	U	0.23	U	0.23	U
cis-Chlordane	0.25	U	0.23	U	0.23	U
trans-Chlordane	0.25	U	0.23	U	0.23	U
cis-Nonachlor	0.25	U	0.23	U	0.23	U
trans-Nonachlor	0.25	U	0.23	U	0.23	U
Oxychlordane	0.50	U	0.47	U	0.45	U
Total Chlordanes	1.5		1.4		1.4	
4,4'-DDT	0.25	U	0.23	U	0.23	U
4,4'-DDD	0.25	U	0.23	U	0.23	U
4,4'-DDE	0.25	U	0.23	U	0.23	U
Total DDT	0.74		0.70		0.68	
Dieldrin	0.25	U	0.23	U	0.23	U
alpha-Endosulfan	0.25	U	0.23	U	0.23	U
beta-Endosulfan	0.25	U	0.23	U	0.23	U
Endosulfans	0.50		0.47		0.45	
Endrin	0.25	U	0.23	U	0.23	U
Heptachlor	0.25	U	0.23	U	0.23	U
Heptachlor epoxide	0.50	U	0.47	U	0.45	U
Hexachlorobenzene	0.50	U	0.47	U	0.45	U
Lindane	0.25	U	0.23	U	0.23	U
Methoxychlor	0.99	U	0.94	U	0.91	U
Toxaphene	12	U	12	U	11	U

* = Qualifiers
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J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
cis-Chlordane	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
trans-Chlordane	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
cis-Nonachlor	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
trans-Nonachlor	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
Oxychlordane	0.49	U	0.48	U	0.43	U	0.44	U	0.49	U
Total Chlordanes	1.5		1.4		1.3		1.3		1.5	
4,4'-DDT	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
4,4'-DDD	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
4,4'-DDE	0.50		0.24	U	0.21	U	0.44		0.24	U
Total DDT	0.98		0.72		0.64		0.87		0.73	
Dieldrin	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
alpha-Endosulfan	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
beta-Endosulfan	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
Endosulfans	0.49		0.48		0.43		0.44		0.49	
Endrin	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
Heptachlor	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
Heptachlor epoxide	0.49	U	0.48	U	0.43	U	0.44	U	0.49	U
Hexachlorobenzene	0.49	U	0.48	U	0.43	U	0.44	U	0.49	U
Lindane	0.24	U	0.24	U	0.21	U	0.22	U	0.24	U
Methoxychlor	0.98	U	0.96	U	0.86	U	0.87	U	0.98	U
Toxaphene	12	U	12	U	11	U	11	U	12	U

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NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
cis-Chlordane	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
trans-Chlordane	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
cis-Nonachlor	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
trans-Nonachlor	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Oxychlordane	0.44	U	0.45	U	0.49	U	1.2		0.48	U
Total Chlordanes	1.3		1.3		1.5		2.1		1.4	
4,4'-DDT	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
4,4'-DDD	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
4,4'-DDE	0.67		0.81		0.78		0.64		0.74	
Total DDT	1.1		1.3		1.3		1.1		1.2	
Dieldrin	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
alpha-Endosulfan	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
beta-Endosulfan	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Endosulfans	0.44		0.45		0.49		0.44		0.48	
Endrin	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Heptachlor	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Heptachlor epoxide	0.44	U	0.45	U	0.49	U	0.44	U	0.48	U
Hexachlorobenzene	0.44	U	0.45	U	0.49	U	0.44	U	0.48	U
Lindane	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Methoxychlor	0.89	U	0.90	U	0.98	U	0.88	U	0.97	U
Toxaphene	11	U	11	U	12	U	11	U	12	U

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APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
cis-Chlordane	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
trans-Chlordane	1.8		2.3		2.2		2.1		2.0	
cis-Nonachlor	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
trans-Nonachlor	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
Oxychlordane	0.43	U	0.47	U	0.44	U	1.0		0.44	U
Total Chlordanes	2.9		3.4		3.3		3.8		3.1	
4,4'-DDT	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
4,4'-DDD	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
4,4'-DDE	0.61		0.60		0.80		0.83		0.64	
Total DDT	1.0		1.1		1.2		1.3		1.1	
Dieldrin	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
alpha-Endosulfan	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
beta-Endosulfan	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
Endosulfans	0.43		0.47		0.44		0.45		0.44	
Endrin	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
Heptachlor	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
Heptachlor epoxide	0.43	U	0.47	U	0.44	U	0.45	U	0.44	U
Hexachlorobenzene	0.43	U	0.47	U	0.44	U	0.45	U	0.44	U
Lindane	0.21	U	0.24	U	0.22	U	0.22	U	0.22	U
Methoxychlor	0.85	U	0.94	U	0.88	U	0.89	U	0.89	U
Toxaphene	11	U	12	U	11	U	11	U	11	U

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APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
cis-Chlordane	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
trans-Chlordane	1.3		1.5		1.5		1.4		1.6	
cis-Nonachlor	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
trans-Nonachlor	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
Oxychlordane	0.48	U	0.42	U	0.46	U	0.46	U	0.44	U
Total Chlordanes	2.5		2.6		2.6		2.5		2.7	
4,4'-DDT	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
4,4'-DDD	0.24	U	0.47		0.23	U	0.23	U	0.22	U
4,4'-DDE	0.81		1.0		0.82		0.91		0.97	
Total DDT	1.3		1.7		1.3		1.4		1.4	
Dieldrin	0.24	U	0.47		0.23	U	0.23	U	0.22	U
alpha-Endosulfan	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
beta-Endosulfan	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
Endosulfans	0.48		0.42		0.47		0.46		0.44	
Endrin	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
Heptachlor	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
Heptachlor epoxide	0.48	U	0.42	U	0.46	U	0.46	U	0.44	U
Hexachlorobenzene	0.48	U	0.42	U	0.46	U	0.46	U	0.44	U
Lindane	0.24	U	0.21	U	0.23	U	0.23	U	0.22	U
Methoxychlor	0.96	U	0.85	U	0.93	U	0.93	U	0.89	U
Toxaphene	12	U	11	U	12	U	12	U	11	U

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APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
cis-Chlordane	0.24	U	0.58		0.22	U	0.24	U	0.22	U
trans-Chlordane	0.59		2.1		1.0		0.24	U	1.2	
cis-Nonachlor	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
trans-Nonachlor	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
Oxychlordane	0.49	U	0.45	U	0.43	U	0.48	U	0.44	U
Total Chlordanes	1.8		3.5		2.1		1.4		2.3	
4,4'-DDT	0.24	U	0.53		0.22	U	0.24	U	0.22	U
4,4'-DDD	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
4,4'-DDE	0.24	U	0.53		0.51		0.24	U	0.22	U
Total DDT	0.73		1.3		0.94		0.72		0.66	
Dieldrin	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
alpha-Endosulfan	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
beta-Endosulfan	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
Endosulfans	0.49		0.45		0.43		0.48		0.44	
Endrin	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
Heptachlor	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
Heptachlor epoxide	0.49	U	0.45	U	0.43	U	0.48	U	0.44	U
Hexachlorobenzene	0.49	U	0.45	U	0.43	U	0.48	U	0.44	U
Lindane	0.24	U	0.22	U	0.22	U	0.24	U	0.22	U
Methoxychlor	0.97	U	0.89	U	0.87	U	0.97	U	0.89	U
Toxaphene	12	U	11	U	11	U	12	U	11	U

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APPENDIX A. CONCENTRATIONS OF COCs IN THE CLAM (*M. nasuta*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
cis-Chlordane	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
trans-Chlordane	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
cis-Nonachlor	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
trans-Nonachlor	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Oxychlordane	0.49	U	0.49	U	0.44	U	0.48	U	0.45	U
Total Chlordanes	1.5		1.5		1.3		1.4		1.4	
4,4'-DDT	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
4,4'-DDD	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
4,4'-DDE	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Total DDT	0.73		0.73		0.67		0.72		0.68	
Dieldrin	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
alpha-Endosulfan	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
beta-Endosulfan	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Endosulfans	0.49		0.49		0.44		0.48		0.45	
Endrin	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Heptachlor	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Heptachlor epoxide	0.49	U	0.49	U	0.44	U	0.48	U	0.45	U
Hexachlorobenzene	0.49	U	0.49	U	0.44	U	0.48	U	0.45	U
Lindane	0.24	U	0.24	U	0.22	U	0.24	U	0.23	U
Methoxychlor	0.97	U	0.98	U	0.89	U	0.96	U	0.91	U
Toxaphene	12	U	12	U	11	U	12	U	11	U

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NA Not Analyzed

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Start Date: 21 Nov-18 12:04 **Species:** Macoma nasuta **Sample Code:** 31249-000
End Date: 19 Dec-18 12:04 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 21 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Mn)

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor	2-4'-DDD	2-4'-DDE	2-4'-DDT	endosulfan sulfate	Total DDTs
31242-008	1	2	0.24	0.5	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.49	0.49	0.98	0.49	12	0.24					
31242-008	2	7	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.96	0.48	12	0.24					
31242-008	3	13	0.21	0.21	0.21	0.21	0.21			0.21		0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.43	0.43	0.86	0.43	11	0.21					
31242-008	4	20	0.22	0.44	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.44	0.44	0.87	0.44	11	0.22					
31242-008	5	28	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.49	0.49	0.98	0.49	12	0.24					
31243-101	1	4	0.22	0.67	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-101	2	12	0.22	0.81	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.45	0.45	0.9	0.45	11	0.22					
31243-101	3	15	0.25	0.78	0.25	0.25	0.25			0.25		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.49	0.49	0.98	0.49	12	0.25					
31243-101	4	24	0.22	0.64	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.44	0.44	0.88	1.2	11	0.22					
31243-101	5	29	0.24	0.74	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.97	0.48	12	0.24					
31243-102	1	1	0.21	0.61	0.21	0.21	0.21			0.21		0.21	0.21	0.21	0.21	0.21	1.8	0.21	0.43	0.43	0.85	0.43	11	0.21					
31243-102	2	10	0.24	0.6	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	2.3	0.24	0.47	0.47	0.94	0.47	12	0.24					
31243-102	3	18	0.22	0.8	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	2.2	0.22	0.44	0.44	0.88	0.44	11	0.22					
31243-102	4	23	0.22	0.83	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	2.1	0.22	0.45	0.45	0.89	1	11	0.22					
31243-102	5	30	0.22	0.64	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	2	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-103	1	6	0.24	0.81	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	1.3	0.24	0.48	0.48	0.96	0.48	12	0.24					
31243-103	2	11	0.47	1.03	0.21	0.21	0.21			0.21		0.47	0.21	0.21	0.21	0.21	1.5	0.21	0.42	0.42	0.85	0.42	11	0.21					
31243-103	3	14	0.23	0.82	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	1.5	0.23	0.46	0.46	0.93	0.46	12	0.23					
31243-103	4	22	0.23	0.91	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	1.4	0.23	0.46	0.46	0.93	0.46	12	0.23					
31243-103	5	27	0.22	0.97	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	1.6	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-104	1	5	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.59	0.24	0.49	0.49	0.97	0.49	12	0.24					
31243-104	2	9	0.22	0.53	0.53	0.22	0.58			0.22		0.22	0.22	0.22	0.22	0.22	2.1	0.22	0.45	0.45	0.89	0.45	11	0.22					
31243-104	3	16	0.22	0.51	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	1	0.22	0.43	0.43	0.87	0.43	11	0.22					
31243-104	4	21	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.97	0.48	12	0.24					
31243-104	5	26	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	1.2	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-105	1	3	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.49	0.49	0.97	0.49	12	0.24					
31243-105	2	8	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.49	0.49	0.98	0.49	12	0.24					
31243-105	3	17	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-105	4	19	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.96	0.48	12	0.24					

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor	2-4'-DDD	2-4'-DDE	2-4'-DDT	endosulfan sulfate	Total DDTs
31243-105	5	25	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.45	0.45	0.91	0.45	11	0.23					

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Batch ID:	19-3262-0177	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	21 Nov-18 12:04	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	19 Dec-18 12:04	**Species:**	Macoma nasuta	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
10-7918-4970	4-4'-DDD	Equal Variance t Two-Sample Test	0.5000	31243-101 passed 4-4'-ddd
12-5676-4839	4-4'-DDD	Equal Variance t Two-Sample Test	0.8267	31243-102 passed 4-4'-ddd
15-9233-1535	4-4'-DDD	Equal Variance t Two-Sample Test	0.5000	31243-103 passed 4-4'-ddd
11-3902-4308	4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	0.4048	31243-103 passed 4-4'-ddd
04-0339-0697	4-4'-DDD	Equal Variance t Two-Sample Test	0.5956	31243-104 passed 4-4'-ddd
18-1725-8052	4-4'-DDD	Equal Variance t Two-Sample Test	0.3038	31243-105 passed 4-4'-ddd
18-7626-3223	4-4'-DDE	Equal Variance t Two-Sample Test	1.8E-04	31243-101 failed 4-4'-dde
03-2845-4360	4-4'-DDE	Equal Variance t Two-Sample Test	7.0E-04	31243-102 failed 4-4'-dde
10-4310-6027	4-4'-DDE	Equal Variance t Two-Sample Test	2.3E-05	31243-103 failed 4-4'-dde
15-9191-3395	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-104 passed 4-4'-dde
09-6038-0996	4-4'-DDE	Unequal Variance t Two-Sample Test	0.9002	31243-105 passed 4-4'-dde
09-2679-5973	4-4'-DDT	Equal Variance t Two-Sample Test	0.5000	31243-101 passed 4-4'-ddt
15-0027-9913	4-4'-DDT	Equal Variance t Two-Sample Test	0.8267	31243-102 passed 4-4'-ddt
09-4568-9081	4-4'-DDT	Equal Variance t Two-Sample Test	0.6822	31243-103 passed 4-4'-ddt
09-9430-2453	4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	0.3611	31243-104 passed 4-4'-ddt
14-3079-8205	4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	0.5952	31243-104 passed 4-4'-ddt
13-5563-3973	4-4'-DDT	Equal Variance t Two-Sample Test	0.3038	31243-105 passed 4-4'-ddt
10-5890-1541	aldrin	Equal Variance t Two-Sample Test	0.5000	31243-101 passed aldrin
15-2346-9392	aldrin	Equal Variance t Two-Sample Test	0.8267	31243-102 passed aldrin
18-8883-4371	aldrin	Equal Variance t Two-Sample Test	0.6822	31243-103 passed aldrin
20-0260-6456	aldrin	Equal Variance t Two-Sample Test	0.5956	31243-104 passed aldrin
09-1069-6462	aldrin	Equal Variance t Two-Sample Test	0.3038	31243-105 passed aldrin
12-6563-3317	alpha chlordane	Equal Variance t Two-Sample Test	0.5000	31243-101 passed alpha chlordane
12-2677-4331	alpha chlordane	Equal Variance t Two-Sample Test	0.8267	31243-102 passed alpha chlordane
13-8929-1900	alpha chlordane	Equal Variance t Two-Sample Test	0.6822	31243-103 passed alpha chlordane
09-9634-4136	alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	0.5952	31243-104 passed alpha chlordane
20-4027-5678	alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	0.3611	31243-104 passed alpha chlordane
04-5534-0272	alpha chlordane	Equal Variance t Two-Sample Test	0.3038	31243-105 passed alpha chlordane
13-6008-2815	cis-Nonachlor	Equal Variance t Two-Sample Test	0.5000	31243-101 passed cis-nonachlor
19-7473-6332	cis-Nonachlor	Equal Variance t Two-Sample Test	0.8267	31243-102 passed cis-nonachlor
20-9424-6754	cis-Nonachlor	Equal Variance t Two-Sample Test	0.6822	31243-103 passed cis-nonachlor
08-2697-3040	cis-Nonachlor	Equal Variance t Two-Sample Test	0.5956	31243-104 passed cis-nonachlor
19-4586-0893	cis-Nonachlor	Equal Variance t Two-Sample Test	0.3038	31243-105 passed cis-nonachlor

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
14-6611-2758	Dieldrin	Equal Variance t Two-Sample Test	0.5000	31243-101 passed dieldrin
09-4399-5028	Dieldrin	Equal Variance t Two-Sample Test	0.8267	31243-102 passed dieldrin
07-1472-0407	Dieldrin	Equal Variance t Two-Sample Test	0.5000	31243-103 passed dieldrin
18-0185-2594	Dieldrin	Wilcoxon Rank Sum Two-Sample Test	0.4048	31243-103 passed dieldrin
09-4172-8521	Dieldrin	Equal Variance t Two-Sample Test	0.5956	31243-104 passed dieldrin
19-5697-6840	Dieldrin	Equal Variance t Two-Sample Test	0.3038	31243-105 passed dieldrin
21-1064-8156	endosulfan I	Equal Variance t Two-Sample Test	0.5000	31243-101 passed endosulfan i
00-0781-2533	endosulfan I	Equal Variance t Two-Sample Test	0.8267	31243-102 passed endosulfan i
09-9770-4534	endosulfan I	Equal Variance t Two-Sample Test	0.6822	31243-103 passed endosulfan i
06-2801-9638	endosulfan I	Equal Variance t Two-Sample Test	0.5956	31243-104 passed endosulfan i
04-5916-7807	endosulfan I	Equal Variance t Two-Sample Test	0.3038	31243-105 passed endosulfan i
17-4316-6277	endosulfan II	Equal Variance t Two-Sample Test	0.5000	31243-101 passed endosulfan ii
07-9022-4840	endosulfan II	Equal Variance t Two-Sample Test	0.8267	31243-102 passed endosulfan ii
14-9154-8130	endosulfan II	Equal Variance t Two-Sample Test	0.6822	31243-103 passed endosulfan ii
10-3282-9056	endosulfan II	Equal Variance t Two-Sample Test	0.5956	31243-104 passed endosulfan ii
20-9731-1311	endosulfan II	Equal Variance t Two-Sample Test	0.3038	31243-105 passed endosulfan ii
11-9026-3117	endrin	Equal Variance t Two-Sample Test	0.5000	31243-101 passed endrin
05-4221-9451	endrin	Equal Variance t Two-Sample Test	0.8267	31243-102 passed endrin
19-5460-0053	endrin	Equal Variance t Two-Sample Test	0.6822	31243-103 passed endrin
21-1859-3737	endrin	Equal Variance t Two-Sample Test	0.5956	31243-104 passed endrin
01-4555-4935	endrin	Equal Variance t Two-Sample Test	0.3038	31243-105 passed endrin
03-0725-1606	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.5000	31243-101 passed gamma-bhc (lindane)
15-4372-8732	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.8267	31243-102 passed gamma-bhc (lindane)
07-1343-1487	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.6822	31243-103 passed gamma-bhc (lindane)
12-3950-2973	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.5956	31243-104 passed gamma-bhc (lindane)
10-1207-7613	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.3038	31243-105 passed gamma-bhc (lindane)
13-2080-0006	gamma-chlordane	Equal Variance t Two-Sample Test	0.5000	31243-101 passed gamma-chlordane
05-7624-2648	gamma-chlordane	Unequal Variance t Two-Sample Test	1.4E-05	31243-102 failed gamma-chlordane
02-6843-2915	gamma-chlordane	Unequal Variance t Two-Sample Test	9.0E-06	31243-103 failed gamma-chlordane
07-5584-2949	gamma-chlordane	Unequal Variance t Two-Sample Test	0.0326	31243-104 failed gamma-chlordane
16-3389-7020	gamma-chlordane	Equal Variance t Two-Sample Test	0.3038	31243-105 passed gamma-chlordane
21-1171-5849	heptachlor	Equal Variance t Two-Sample Test	0.5000	31243-101 passed heptachlor
17-1415-0550	heptachlor	Equal Variance t Two-Sample Test	0.8267	31243-102 passed heptachlor
19-4755-2897	heptachlor	Equal Variance t Two-Sample Test	0.6822	31243-103 passed heptachlor
11-2526-2340	heptachlor	Equal Variance t Two-Sample Test	0.5956	31243-104 passed heptachlor
18-2225-4717	heptachlor	Equal Variance t Two-Sample Test	0.3038	31243-105 passed heptachlor
18-9387-0911	heptachlor epoxide	Equal Variance t Two-Sample Test	0.6363	31243-101 passed heptachlor epoxide
13-5196-9210	heptachlor epoxide	Equal Variance t Two-Sample Test	0.8966	31243-102 passed heptachlor epoxide
18-7463-8797	heptachlor epoxide	Equal Variance t Two-Sample Test	0.7905	31243-103 passed heptachlor epoxide
20-0177-5320	heptachlor epoxide	Equal Variance t Two-Sample Test	0.6718	31243-104 passed heptachlor epoxide
13-9494-3720	heptachlor epoxide	Equal Variance t Two-Sample Test	0.4079	31243-105 passed heptachlor epoxide
21-1978-5423	hexachlorobenzene	Equal Variance t Two-Sample Test	0.6363	31243-101 passed hexachlorobenzene
18-3082-0549	hexachlorobenzene	Equal Variance t Two-Sample Test	0.8966	31243-102 passed hexachlorobenzene
01-7834-5061	hexachlorobenzene	Equal Variance t Two-Sample Test	0.7905	31243-103 passed hexachlorobenzene
10-0999-1594	hexachlorobenzene	Equal Variance t Two-Sample Test	0.6718	31243-104 passed hexachlorobenzene
20-1001-3399	hexachlorobenzene	Equal Variance t Two-Sample Test	0.4079	31243-105 passed hexachlorobenzene
04-9035-9936	Methoxychlor	Equal Variance t Two-Sample Test	0.5676	31243-101 passed methoxychlor
17-7413-4406	Methoxychlor	Equal Variance t Two-Sample Test	0.8870	31243-102 passed methoxychlor
07-2085-5391	Methoxychlor	Equal Variance t Two-Sample Test	0.7003	31243-103 passed methoxychlor
17-0283-6331	Methoxychlor	Equal Variance t Two-Sample Test	0.6319	31243-104 passed methoxychlor
06-6016-5571	Methoxychlor	Equal Variance t Two-Sample Test	0.3594	31243-105 passed methoxychlor
00-8542-5518	oxychlordane	Equal Variance t Two-Sample Test	0.5214	31243-101 passed oxychlordane
16-5309-1950	oxychlordane	Wilcoxon Rank Sum Two-Sample Test	0.3294	31243-101 passed oxychlordane

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
20-6177-0348	oxychlordane	Equal Variance t Two-Sample Test	0.8785	31243-102 passed oxychlordane
20-1695-8795	oxychlordane	Wilcoxon Rank Sum Two-Sample Test	0.6706	31243-102 passed oxychlordane
15-7678-9530	oxychlordane	Equal Variance t Two-Sample Test	0.7905	31243-103 passed oxychlordane
17-2081-6672	oxychlordane	Equal Variance t Two-Sample Test	0.6718	31243-104 passed oxychlordane
11-7788-5162	oxychlordane	Equal Variance t Two-Sample Test	0.4079	31243-105 passed oxychlordane
12-2441-4271	toxaphene	Equal Variance t Two-Sample Test	0.7102	31243-101 passed toxaphene
05-7163-2231	toxaphene	Equal Variance t Two-Sample Test	0.8792	31243-102 passed toxaphene
07-6884-9096	toxaphene	Wilcoxon Rank Sum Two-Sample Test	0.7381	31243-103 passed toxaphene
11-1161-8841	toxaphene	Equal Variance t Two-Sample Test	0.7102	31243-104 passed toxaphene
14-8164-0987	toxaphene	Wilcoxon Rank Sum Two-Sample Test	0.7381	31243-105 passed toxaphene
17-3809-4452	trans-nonachlor	Equal Variance t Two-Sample Test	0.5000	31243-101 passed trans-nonachlor
14-5550-0612	trans-nonachlor	Equal Variance t Two-Sample Test	0.8267	31243-102 passed trans-nonachlor
09-1382-8135	trans-nonachlor	Equal Variance t Two-Sample Test	0.6822	31243-103 passed trans-nonachlor
19-6979-3914	trans-nonachlor	Equal Variance t Two-Sample Test	0.5956	31243-104 passed trans-nonachlor
17-5794-1762	trans-nonachlor	Equal Variance t Two-Sample Test	0.3038	31243-105 passed trans-nonachlor

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.278	0.144	0.412	0.22	0.47	0.0481	0.108	38.69%	-20.87%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.326	0.16	0.492	0.21	0.5	0.0598	0.134	41.02%	0.00%
31243-101		5	0.728	0.639	0.817	0.64	0.81	0.0322	0.0719	9.88%	-123.31%
31243-102		5	0.696	0.559	0.833	0.6	0.83	0.0493	0.11	15.82%	-113.50%
31243-103		5	0.908	0.79	1.03	0.81	1.03	0.0425	0.095	10.46%	-178.53%
31243-104		5	0.348	0.153	0.543	0.22	0.53	0.0704	0.157	45.23%	-6.75%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	28.22%

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.29	0.123	0.457	0.22	0.53	0.0602	0.135	46.39%	-26.09%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.3	0.105	0.495	0.22	0.58	0.0701	0.157	52.28%	-30.43%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.278	0.144	0.412	0.22	0.47	0.0481	0.108	38.69%	-20.87%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	2.08	1.84	2.32	1.8	2.3	0.086	0.192	9.25%	-804.35%
31243-103		5	1.46	1.32	1.6	1.3	1.6	0.051	0.114	7.81%	-534.78%
31243-104		5	1.03	0.15	1.9	0.24	2.1	0.316	0.706	68.79%	-346.09%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.43	0.49	0.0129	0.0288	6.18%	0.00%
31243-101		5	0.46	0.431	0.489	0.44	0.49	0.0105	0.0235	5.10%	1.29%
31243-102		5	0.446	0.427	0.465	0.43	0.47	0.00678	0.0152	3.40%	4.29%
31243-103		5	0.452	0.424	0.48	0.42	0.48	0.0102	0.0228	5.05%	3.00%
31243-104		5	0.458	0.426	0.49	0.43	0.49	0.0116	0.0259	5.65%	1.72%
31243-105		5	0.47	0.441	0.499	0.44	0.49	0.0105	0.0235	4.99%	-0.86%

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.43	0.49	0.0129	0.0288	6.18%	0.00%
31243-101		5	0.46	0.431	0.489	0.44	0.49	0.0105	0.0235	5.10%	1.29%
31243-102		5	0.446	0.427	0.465	0.43	0.47	0.00678	0.0152	3.40%	4.29%
31243-103		5	0.452	0.424	0.48	0.42	0.48	0.0102	0.0228	5.05%	3.00%
31243-104		5	0.458	0.426	0.49	0.43	0.49	0.0116	0.0259	5.65%	1.72%
31243-105		5	0.47	0.441	0.499	0.44	0.49	0.0105	0.0235	4.99%	-0.86%

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.93	0.856	1	0.86	0.98	0.0268	0.06	6.45%	0.00%
31243-101		5	0.924	0.865	0.983	0.88	0.98	0.0211	0.0472	5.11%	0.65%
31243-102		5	0.89	0.85	0.93	0.85	0.94	0.0145	0.0324	3.64%	4.30%
31243-103		5	0.912	0.859	0.965	0.85	0.96	0.0191	0.0427	4.68%	1.94%
31243-104		5	0.918	0.858	0.978	0.87	0.97	0.0215	0.0482	5.25%	1.29%
31243-105		5	0.942	0.893	0.991	0.89	0.98	0.0177	0.0396	4.21%	-1.29%

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.43	0.49	0.0129	0.0288	6.18%	0.00%
31243-101		5	0.612	0.203	1.02	0.44	1.2	0.147	0.329	53.82%	-31.33%
31243-102		5	0.556	0.247	0.865	0.43	1	0.111	0.249	44.72%	-19.31%
31243-103		5	0.452	0.424	0.48	0.42	0.48	0.0102	0.0228	5.05%	3.00%
31243-104		5	0.458	0.426	0.49	0.43	0.49	0.0116	0.0259	5.65%	1.72%
31243-105		5	0.47	0.441	0.499	0.44	0.49	0.0105	0.0235	4.99%	-0.86%

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	11	12	0.245	0.548	4.72%	0.00%
31243-101		5	11.4	10.7	12.1	11	12	0.245	0.548	4.80%	1.72%
31243-102		5	11.2	10.6	11.8	11	12	0.2	0.447	3.99%	3.45%
31243-103		5	11.6	10.9	12.3	11	12	0.245	0.548	4.72%	0.00%
31243-104		5	11.4	10.7	12.1	11	12	0.245	0.548	4.80%	1.72%
31243-105		5	11.6	10.9	12.3	11	12	0.245	0.548	4.72%	0.00%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.21	0.24	0.00632	0.0141	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.21	0.24	0.0049	0.011	4.93%	3.48%
31243-103		5	0.226	0.212	0.24	0.21	0.24	0.0051	0.0114	5.05%	1.74%
31243-104		5	0.228	0.214	0.242	0.22	0.24	0.0049	0.011	4.80%	0.87%
31243-105		5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	-1.74%

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.47	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.5	0.24	0.21	0.44	0.24
31243-101		0.67	0.81	0.78	0.64	0.74
31243-102		0.61	0.6	0.8	0.83	0.64
31243-103		0.81	1.03	0.82	0.91	0.97
31243-104		0.24	0.53	0.51	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.53	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.58	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.47	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		1.8	2.3	2.2	2.1	2
31243-103		1.3	1.5	1.5	1.4	1.6
31243-104		0.59	2.1	1	0.24	1.2
31243-105		0.24	0.24	0.22	0.24	0.23

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heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-101		0.44	0.45	0.49	0.44	0.48
31243-102		0.43	0.47	0.44	0.45	0.44
31243-103		0.48	0.42	0.46	0.46	0.44
31243-104		0.49	0.45	0.43	0.48	0.44
31243-105		0.49	0.49	0.44	0.48	0.45

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-101		0.44	0.45	0.49	0.44	0.48
31243-102		0.43	0.47	0.44	0.45	0.44
31243-103		0.48	0.42	0.46	0.46	0.44
31243-104		0.49	0.45	0.43	0.48	0.44
31243-105		0.49	0.49	0.44	0.48	0.45

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.98	0.96	0.86	0.87	0.98
31243-101		0.89	0.9	0.98	0.88	0.97
31243-102		0.85	0.94	0.88	0.89	0.89
31243-103		0.96	0.85	0.93	0.93	0.89
31243-104		0.97	0.89	0.87	0.97	0.89
31243-105		0.97	0.98	0.89	0.96	0.91

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-101		0.44	0.45	0.49	1.2	0.48
31243-102		0.43	0.47	0.44	1	0.44
31243-103		0.48	0.42	0.46	0.46	0.44
31243-104		0.49	0.45	0.43	0.48	0.44
31243-105		0.49	0.49	0.44	0.48	0.45

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	12	12	11	11	12
31243-101		11	11	12	11	12
31243-102		11	12	11	11	11
31243-103		12	11	12	12	11
31243-104		12	11	11	12	11
31243-105		12	12	11	12	11

Bioaccumulation Evaluation - Pesticides - Macoma **EnviroSystems, Inc.**

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22
31243-103		0.24	0.21	0.23	0.23	0.22
31243-104		0.24	0.22	0.22	0.24	0.22
31243-105		0.24	0.24	0.22	0.24	0.23

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
4-4'-DDE	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	5.920734	1.85955	0.0001767	0.05	TRUE	0.1262577	8		C
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
gamma-chlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.3611579	1.85955	0.6363335	0.05	FALSE	0.03089313	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.3611579	1.85955	0.6363335	0.05	FALSE	0.03089313	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.1757124	1.85955	0.5675569	0.05	FALSE	0.06349751	8		C
oxychlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	25		0.3293651	0.05	FALSE		8	4	E
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.0556665	1.89458	0.5214185	0.05	FALSE	0.03403469	7		C
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5773503	1.85955	0.710208	0.05	FALSE	0.6441664	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.332E-07	1.85955	0.4999999	0.05	FALSE	0.0166323	8		C
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
4-4'-DDE	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	4.775884	1.85955	0.000699	0.05	TRUE	0.144064	8		C
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
gamma-chlordane	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	21.44792	2.13185	1.397E-05	0.05	TRUE	0.1838834	4		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.373606	1.85955	0.896589	0.05	FALSE	0.02707543	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.373606	1.85955	0.896589	0.05	FALSE	0.02707543	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.311652	1.85955	0.8869869	0.05	FALSE	0.05670859	8		C
oxychlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	29.5		0.6706349	0.05	FALSE		8	2	E
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.274987	1.89458	0.8785006	0.05	FALSE	0.03120514	7		C
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.264911	1.85955	0.879248	0.05	FALSE	0.5880407	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.9999998	1.85955	0.8267032	0.05	FALSE	0.01487638	8		C
4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	26		0.4047619	0.05	FALSE		8	2	E
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	6.5048E-07	1.89458	0.4999998	0.05	FALSE	0.01519042	7		C

STUDY: 31249
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDE	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	7.934724	1.85955	2.316E-05	0.05	TRUE	0.136395	8		C
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
Dieldrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	26		0.4047619	0.05	FALSE		8	2	E
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	6.5048E-07	1.89458	0.4999998	0.05	FALSE	0.01519042	7		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
gamma-chlordane	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	23.93884	2.13185	9.03E-06	0.05	TRUE	0.1095363	4		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.8520131	1.85955	0.7905098	0.05	FALSE	0.03055549	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.8520131	1.85955	0.7905098	0.05	FALSE	0.03055549	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.5467113	1.85955	0.700255	0.05	FALSE	0.06122404	8		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.8520131	1.85955	0.7905098	0.05	FALSE	0.03055549	8		C
toxaphene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	27.5		0.7380952	0.05	FALSE		8	2	E
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4923655	1.85955	0.6821561	0.05	FALSE	0.01510704	8		C
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	25		0.3214286	0.05	FALSE		8	1	E
4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	25		0.3611111	0.05	FALSE		8	2	E
4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	20		0.5952381	0.05	FALSE		7	2	E
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	25		0.3611111	0.05	FALSE		8	2	E
alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	20		0.5952381	0.05	FALSE		7	2	E
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
gamma-chlordane	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	2.521514	2.13185	0.0326257	0.05	TRUE	0.6729886	4		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.4618804	1.85955	0.6717662	0.05	FALSE	0.03220832	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.4618804	1.85955	0.6717662	0.05	FALSE	0.03220832	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.3487429	1.85955	0.6318586	0.05	FALSE	0.06398576	8		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.4618804	1.85955	0.6717662	0.05	FALSE	0.03220832	8		C
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.5773503	1.85955	0.710208	0.05	FALSE	0.6441664	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.01487638	8		C
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
4-4'-DDE	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	-1.53504	2.13185	0.9002162	0.05	FALSE	0.1277686	4		C

STUDY: 31249
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ASSAY: *M. nasuta* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
gamma-chlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.2407714	1.85955	0.407894	0.05	FALSE	0.03089314	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.2407714	1.85955	0.407894	0.05	FALSE	0.03089314	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.3731822	1.85955	0.3593536	0.05	FALSE	0.05979539	8		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.2407714	1.85955	0.407894	0.05	FALSE	0.03089314	8		C
toxaphene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	27.5		0.7380952	0.05	FALSE		8	2	E
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5345228	1.85955	0.3037555	0.05	FALSE	0.01391558	8		C

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-7918-4970 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed 4-4'-ddd	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-5676-4839	**Endpoint:**	4-4'-DDD	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed 4-4'-ddd	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-9233-1535	**Endpoint:**	4-4'-DDD	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed 4-4'-ddd	6.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	6.5E-07	1.89	0.015	7	CDF	0.5000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.551E-17	5.551E-17	1	3.89E-13	1.0000	Non-Significant Effect
Error	0.001	0.0001429	7			
Total	0.001		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3	46.2	0.3935	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.844	0.701	0.0648	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		4	0.23	0.217	0.243	0.23	0.22	0.24	0.00408	3.55%	0.00%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	Outlier	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-0339-0697 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-ddd	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-1725-8052 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed 4-4'-ddd	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-7626-3223	**Endpoint:**	4-4'-DDE	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed 4-4'-dde	38.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	5.92	1.86	0.126	8	CDF	1.8E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6440	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.40401	0.40401	1	35.1	3.5E-04	Significant Effect
Error	0.0922	0.011525	8			
Total	0.49621		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.46	23.2	0.2567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2381	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.326	0.16	0.492	0.24	0.21	0.5	0.0598	41.02%	0.00%
31243-101		5	0.728	0.639	0.817	0.74	0.64	0.81	0.0322	9.88%	-123.31%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.5	0.24	0.21	0.44	0.24
31243-101		0.67	0.81	0.78	0.64	0.74

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-2845-4360 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed 4-4'-dde	44.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	4.78	1.86	0.144	8	CDF	7.0E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.34225	0.34225	1	22.8	0.0014	Significant Effect
Error	0.12004	0.015005	8			
Total	0.46229		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.47	23.2	0.7161	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.798	0.741	0.0136	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.326	0.16	0.492	0.24	0.21	0.5	0.0598	41.02%	0.00%
31243-102		5	0.696	0.559	0.833	0.64	0.6	0.83	0.0493	15.82%	-113.50%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.5	0.24	0.21	0.44	0.24
31243-102		0.61	0.6	0.8	0.83	0.64

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-4310-6027 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed 4-4'-dde	41.84%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	7.93	1.86	0.136	8	CDF	2.3E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9288	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.84681	0.84681	1	63	4.6E-05	Significant Effect
Error	0.1076	0.01345	8			
Total	0.95441		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.98	23.2	0.5238	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.857	0.741	0.0712	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.326	0.16	0.492	0.24	0.21	0.5	0.0598	41.02%	0.00%
31243-103		5	0.908	0.79	1.03	0.91	0.81	1.03	0.0425	10.46%	-178.53%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.5	0.24	0.21	0.44	0.24
31243-103		0.81	1.03	0.82	0.91	0.97

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-9191-3395 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-dde	52.68%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	25	n/a	1	8	Exact	0.3214	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.32	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00121	0.00121	1	0.0567	0.8177	Non-Significant Effect
Error	0.1706	0.021325	8			
Total	0.17181		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.39	23.2	0.7598	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.753	0.741	0.0039	Non-Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.326	0.16	0.492	0.24	0.21	0.5	0.0598	41.02%	0.00%
31243-104		5	0.348	0.153	0.543	0.24	0.22	0.53	0.0704	45.23%	-6.75%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.5	0.24	0.21	0.44	0.24
31243-104		0.24	0.53	0.51	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-6038-0996 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed 4-4'-dde	39.19%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-1.54	2.13	0.128	4	CDF	0.9002	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.95	2.29	0.2906	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02116	0.02116	1	2.36	0.1633	Non-Significant Effect
Error	0.07184	0.00898	8			
Total	0.093		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	224	23.2	1.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2384	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.326	0.16	0.492	0.24	0.21	0.5	0.0598	41.02%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	28.22%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.5	0.24	0.21	0.44	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-2679-5973 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed 4-4'-ddt	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-0027-9913 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed 4-4'-ddt	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-4568-9081 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed 4-4'-ddt	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-9430-2453 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-ddt	48.91%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	25	n/a	2	8	Exact	0.3611	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.2E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009	0.009	1	0.984	0.3504	Non-Significant Effect
Error	0.0732	0.00915	8			
Total	0.0822		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	90.5	23.2	7.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.69	0.741	6.7E-04	Non-Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.29	0.123	0.457	0.24	0.22	0.53	0.0602	46.39%	-26.09%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.53	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-3079-8205	**Endpoint:**	4-4'-DDT	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-ddt	7.23%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	20	n/a	2	7	Exact	0.5952	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0012	0.0001714	7			
Total	0.0012		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	46.2	0.7698	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.751	0.701	0.0055	Non-Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		4	0.23	0.212	0.248	0.23	0.22	0.24	0.00577	5.02%	0.00%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	Outlier	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-5563-3973 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed 4-4'-ddt	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 10-5890-1541 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed aldrin	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-2346-9392 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed aldrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-8883-4371 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed aldrin	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-0260-6456 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed aldrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-1069-6462 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed aldrin	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-6563-3317	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed alpha chlordane	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-2677-4331	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed alpha chlordane	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-8929-1900	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed alpha chlordane	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-4027-5678 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed alpha chlordane	56.94%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	25	n/a	2	8	Exact	0.3611	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	6.3E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01225	0.01225	1	0.988	0.3494	Non-Significant Effect
Error	0.0992	0.0124	8			
Total	0.11145		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	123	23.2	3.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.682	0.741	5.4E-04	Non-Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.3	0.105	0.495	0.24	0.22	0.58	0.0701	52.28%	-30.43%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.58	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-5534-0272 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed alpha chlordane	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 13-6008-2815 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed cis-nonachlor	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-7473-6332	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed cis-nonachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-9424-6754 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed cis-nonachlor	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 08-2697-3040 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed cis-nonachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-4586-0893	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed cis-nonachlor	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-6611-2758 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed dieldrin	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-4399-5028 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed dieldrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 18-0185-2594 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed dieldrin	39.23%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	26	n/a	2	8	Exact	0.4048	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	8.2E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.979	0.3515	Non-Significant Effect
Error	0.04708	0.005885	8			
Total	0.05284		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	57.9	23.2	0.0017	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.698	0.741	8.3E-04	Non-Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.278	0.144	0.412	0.23	0.22	0.47	0.0481	38.69%	-20.87%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.47	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-1472-0407	**Endpoint:**	Dieldrin	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed dieldrin	6.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	6.5E-07	1.89	0.015	7	CDF	0.5000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.551E-17	5.551E-17	1	3.89E-13	1.0000	Non-Significant Effect
Error	0.001	0.0001429	7			
Total	0.001		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3	46.2	0.3935	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.844	0.701	0.0648	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		4	0.23	0.217	0.243	0.23	0.22	0.24	0.00408	3.55%	0.00%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	Outlier	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-4172-8521 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed dieldrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-5697-6840 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed dieldrin	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-1064-8156 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed endosulfan i	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 00-0781-2533 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed endosulfan i	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-9770-4534 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed endosulfan i	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-2801-9638 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed endosulfan i	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-5916-7807 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed endosulfan i	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-4316-6277	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed endosulfan ii	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	07-9022-4840	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed endosulfan ii	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 14-9154-8130 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed endosulfan ii	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-3282-9056	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed endosulfan ii	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 20-9731-1311 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed endosulfan ii	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-9026-3117 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed endrin	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-4221-9451 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed endrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-5460-0053 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed endrin	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-1859-3737 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed endrin	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-4555-4935 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed endrin	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 03-0725-1606 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed gamma-bhc (lindane)	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	15-4372-8732	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed gamma-bhc (lindane)	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-1343-1487 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed gamma-bhc (lindane)	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	12-3950-2973	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed gamma-bhc (lindane)	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-1207-7613	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed gamma-bhc (lindane)	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-2080-0006	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed gamma-chlordane	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	05-7624-2648	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed gamma-chlordane	79.95%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	21.4	2.13	0.184	4	CDF	1.4E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.29	0.0992	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.55625	8.55625	1	460	<1.0E-37	Significant Effect
Error	0.1488	0.0186	8			
Total	8.70505		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	185	23.2	1.7E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.741	0.1647	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	2.08	1.84	2.32	2.1	1.8	2.3	0.086	9.25%	-804.35%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		1.8	2.3	2.2	2.1	2

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 02-6843-2915 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed gamma-chlordane	47.62%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	23.9	2.13	0.11	4	CDF	9.0E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1566	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.78225	3.78225	1	573	<1.0E-37	Significant Effect
Error	0.0528	0.0066	8			
Total	3.83505		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	65	23.2	0.0014	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.741	0.3520	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	1.46	1.32	1.6	1.5	1.3	1.6	0.051	7.81%	-534.78%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		1.3	1.5	1.5	1.4	1.6

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-5584-2949 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed gamma-chlordane	292.60%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	2.52	2.13	0.673	4	CDF	0.0326	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.28	2.29	0.0527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.58404	1.58404	1	6.36	0.0357	Significant Effect
Error	1.99312	0.24914	8			
Total	3.57716		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2490	23.2	9.7E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.822	0.741	0.0268	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	1.03	0.15	1.9	1	0.24	2.1	0.316	68.79%	-346.09%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.59	2.1	1	0.24	1.2

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	16-3389-7020	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed gamma-chlordane	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-9387-0911	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed heptachlor epoxide	6.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.361	1.86	0.031	8	CDF	0.6363	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.13	0.7273	Non-Significant Effect
Error	0.00552	0.00069	8			
Total	0.00561		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6998	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.741	0.1239	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-101		5	0.46	0.431	0.489	0.45	0.44	0.49	0.0105	5.10%	1.29%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-101		0.44	0.45	0.49	0.44	0.48

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-5196-9210	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed heptachlor epoxide	5.81%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.37	1.86	0.027	8	CDF	0.8966	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7705	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	1.89	0.2068	Non-Significant Effect
Error	0.00424	0.00053	8			
Total	0.00524		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.61	23.2	0.2416	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3206	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-102		5	0.446	0.427	0.465	0.44	0.43	0.47	0.00678	3.40%	4.29%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-102		0.43	0.47	0.44	0.45	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-7463-8797	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed heptachlor epoxide	6.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.852	1.86	0.031	8	CDF	0.7905	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.47	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00049	0.00049	1	0.726	0.4190	Non-Significant Effect
Error	0.0054	0.000675	8			
Total	0.00589		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6616	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1410	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-103		5	0.452	0.424	0.48	0.46	0.42	0.48	0.0102	5.05%	3.00%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-103		0.48	0.42	0.46	0.46	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-0177-5320	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed heptachlor epoxide	6.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.462	1.86	0.032	8	CDF	0.6718	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.39	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.213	0.6565	Non-Significant Effect
Error	0.006	0.00075	8			
Total	0.00616		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8406	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1277	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-104		5	0.458	0.426	0.49	0.45	0.43	0.49	0.0116	5.65%	1.72%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-104		0.49	0.45	0.43	0.48	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	13-9494-3720	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed heptachlor epoxide	6.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.241	1.86	0.031	8	CDF	0.4079	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.058	0.8158	Non-Significant Effect
Error	0.00552	0.00069	8			
Total	0.00556		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6998	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.816	0.741	0.0227	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-105		5	0.47	0.441	0.499	0.48	0.44	0.49	0.0105	4.99%	-0.86%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-105		0.49	0.49	0.44	0.48	0.45

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-1171-5849 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed heptachlor	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-1415-0550	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed heptachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 19-4755-2897 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed heptachlor	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	11-2526-2340	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed heptachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-2225-4717	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed heptachlor	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 21-1978-5423 **Endpoint:** hexachlorobenzene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed hexachlorobenzene	6.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.361	1.86	0.031	8	CDF	0.6363	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.13	0.7273	Non-Significant Effect
Error	0.00552	0.00069	8			
Total	0.00561		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6998	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.741	0.1239	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-101		5	0.46	0.431	0.489	0.45	0.44	0.49	0.0105	5.10%	1.29%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-101		0.44	0.45	0.49	0.44	0.48

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	18-3082-0549	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed hexachlorobenzene	5.81%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.37	1.86	0.027	8	CDF	0.8966	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.29	0.7705	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	1.89	0.2068	Non-Significant Effect
Error	0.00424	0.00053	8			
Total	0.00524		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.61	23.2	0.2416	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3206	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-102		5	0.446	0.427	0.465	0.44	0.43	0.47	0.00678	3.40%	4.29%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-102		0.43	0.47	0.44	0.45	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 01-7834-5061 **Endpoint:** hexachlorobenzene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed hexachlorobenzene	6.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.852	1.86	0.031	8	CDF	0.7905	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.47	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00049	0.00049	1	0.726	0.4190	Non-Significant Effect
Error	0.0054	0.000675	8			
Total	0.00589		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6616	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1410	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-103		5	0.452	0.424	0.48	0.46	0.42	0.48	0.0102	5.05%	3.00%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-103		0.48	0.42	0.46	0.46	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	10-0999-1594	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed hexachlorobenzene	6.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.462	1.86	0.032	8	CDF	0.6718	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.39	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.213	0.6565	Non-Significant Effect
Error	0.006	0.00075	8			
Total	0.00616		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8406	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1277	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-104		5	0.458	0.426	0.49	0.45	0.43	0.49	0.0116	5.65%	1.72%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-104		0.49	0.45	0.43	0.48	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-1001-3399	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed hexachlorobenzene	6.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.241	1.86	0.031	8	CDF	0.4079	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.058	0.8158	Non-Significant Effect
Error	0.00552	0.00069	8			
Total	0.00556		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6998	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.816	0.741	0.0227	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-105		5	0.47	0.441	0.499	0.48	0.44	0.49	0.0105	4.99%	-0.86%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-105		0.49	0.49	0.44	0.48	0.45

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 04-9035-9936 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed methoxychlor	6.83%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.176	1.86	0.064	8	CDF	0.5676	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.38	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.000E-05	9.000E-05	1	0.0309	0.8649	Non-Significant Effect
Error	0.02332	0.002915	8			
Total	0.02341		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.61	23.2	0.6540	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.848	0.741	0.0547	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.93	0.856	1	0.96	0.86	0.98	0.0268	6.45%	0.00%
31243-101		5	0.924	0.865	0.983	0.9	0.88	0.98	0.0211	5.11%	0.65%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.98	0.96	0.86	0.87	0.98
31243-101		0.89	0.9	0.98	0.88	0.97

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-7413-4406	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed methoxychlor	6.10%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.31	1.86	0.057	8	CDF	0.8870	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	1.72	0.2260	Non-Significant Effect
Error	0.0186	0.002325	8			
Total	0.0226		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.43	23.2	0.2599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.898	0.741	0.2080	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.93	0.856	1	0.96	0.86	0.98	0.0268	6.45%	0.00%
31243-102		5	0.89	0.85	0.93	0.89	0.85	0.94	0.0145	3.64%	4.30%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.98	0.96	0.86	0.87	0.98
31243-102		0.85	0.94	0.88	0.89	0.89

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-2085-5391 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed methoxychlor	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.547	1.86	0.061	8	CDF	0.7003	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.43	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008100	0.0008100	1	0.299	0.5995	Non-Significant Effect
Error	0.02168	0.00271	8			
Total	0.02249		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.98	23.2	0.5251	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.843	0.741	0.0485	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.93	0.856	1	0.96	0.86	0.98	0.0268	6.45%	0.00%
31243-103		5	0.912	0.859	0.965	0.93	0.85	0.96	0.0191	4.68%	1.94%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.98	0.96	0.86	0.87	0.98
31243-103		0.96	0.85	0.93	0.93	0.89

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-0283-6331 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed methoxychlor	6.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.349	1.86	0.064	8	CDF	0.6319	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.36	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00036	0.00036	1	0.122	0.7363	Non-Significant Effect
Error	0.02368	0.00296	8			
Total	0.02404		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.55	23.2	0.6807	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.741	0.0289	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.93	0.856	1	0.96	0.86	0.98	0.0268	6.45%	0.00%
31243-104		5	0.918	0.858	0.978	0.89	0.87	0.97	0.0215	5.25%	1.29%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.98	0.96	0.86	0.87	0.98
31243-104		0.97	0.89	0.87	0.97	0.89

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 06-6016-5571 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed methoxychlor	6.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.373	1.86	0.06	8	CDF	0.3594	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.46	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00036	0.00036	1	0.139	0.7187	Non-Significant Effect
Error	0.02068	0.002585	8			
Total	0.02104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.29	23.2	0.4413	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.847	0.741	0.0533	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.93	0.856	1	0.96	0.86	0.98	0.0268	6.45%	0.00%
31243-105		5	0.942	0.893	0.991	0.96	0.89	0.98	0.0177	4.21%	-1.29%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.98	0.96	0.86	0.87	0.98
31243-105		0.97	0.98	0.89	0.96	0.91

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	00-8542-5518	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed oxychlordane	7.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.0557	1.89	0.034	7	CDF	0.5214	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.222E-06	2.222E-06	1	0.0031	0.9572	Non-Significant Effect
Error	0.00502	0.0007171	7			
Total	0.0050222		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.46	46.2	0.7851	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.701	0.0489	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-101		4	0.465	0.427	0.503	0.465	0.44	0.49	0.0119	5.12%	0.21%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-101		0.44	0.45	0.49	Outlier	0.48

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	20-6177-0348	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed oxychlordane	6.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.27	1.89	0.031	7	CDF	0.8785	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00098	0.00098	1	1.63	0.2430	Non-Significant Effect
Error	0.00422	0.0006029	7			
Total	0.0052		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.77	46.2	0.4294	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.901	0.701	0.2572	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-102		4	0.445	0.417	0.473	0.44	0.43	0.47	0.00866	3.89%	4.51%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-102		0.43	0.47	0.44	Outlier	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 15-7678-9530 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed oxychlordane	6.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.852	1.86	0.031	8	CDF	0.7905	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.47	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00049	0.00049	1	0.726	0.4190	Non-Significant Effect
Error	0.0054	0.000675	8			
Total	0.00589		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	23.2	0.6616	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1410	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-103		5	0.452	0.424	0.48	0.46	0.42	0.48	0.0102	5.05%	3.00%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-103		0.48	0.42	0.46	0.46	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 17-2081-6672 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed oxychlordane	6.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.462	1.86	0.032	8	CDF	0.6718	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.39	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.213	0.6565	Non-Significant Effect
Error	0.006	0.00075	8			
Total	0.00616		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.24	23.2	0.8406	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1277	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-104		5	0.458	0.426	0.49	0.45	0.43	0.49	0.0116	5.65%	1.72%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-104		0.49	0.45	0.43	0.48	0.44

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-7788-5162 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:49 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed oxychlordane	6.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.241	1.86	0.031	8	CDF	0.4079	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.058	0.8158	Non-Significant Effect
Error	0.00552	0.00069	8			
Total	0.00556		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.51	23.2	0.6998	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.816	0.741	0.0227	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.466	0.43	0.502	0.48	0.43	0.49	0.0129	6.18%	0.00%
31243-105		5	0.47	0.441	0.499	0.48	0.44	0.49	0.0105	4.99%	-0.86%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.49	0.48	0.43	0.44	0.49
31243-105		0.49	0.49	0.44	0.48	0.45

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 12-2441-4271 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed toxaphene	5.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.577	1.86	0.644	8	CDF	0.7102	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1	0.1	1	0.333	0.5796	Non-Significant Effect
Error	2.4	0.3	8			
Total	2.5		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-101		5	11.4	10.7	12.1	11	11	12	0.245	4.80%	1.72%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	12	12	11	11	12
31243-101		11	11	12	11	12

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 05-7163-2231 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed toxaphene	5.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.26	1.86	0.588	8	CDF	0.8792	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4	0.4	1	1.6	0.2415	Non-Significant Effect
Error	2	0.25	8			
Total	2.4		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1713	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-102		5	11.2	10.6	11.8	11	11	12	0.2	3.99%	3.45%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	12	12	11	11	12
31243-102		11	12	11	11	11

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 07-6884-9096 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed toxaphene	5.55%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	27.5	n/a	2	8	Exact	0.7381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	2.4	0.3	8			
Total	2.4		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.64	0.741	1.7E-04	Non-Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-103		5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	12	12	11	11	12
31243-103		12	11	12	12	11

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 11-1161-8841 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed toxaphene	5.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.577	1.86	0.644	8	CDF	0.7102	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1	0.1	1	0.333	0.5796	Non-Significant Effect
Error	2.4	0.3	8			
Total	2.5		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-104		5	11.4	10.7	12.1	11	11	12	0.245	4.80%	1.72%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	12	12	11	11	12
31243-104		12	11	11	12	11

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-8164-0987	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed toxaphene	5.55%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	27.5	n/a	2	8	Exact	0.7381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	2.4	0.3	8			
Total	2.4		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.64	0.741	1.7E-04	Non-Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-105		5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	12	12	11	11	12
31243-105		12	12	11	12	11

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-3809-4452	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	27d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed trans-nonachlor	7.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.33E-07	1.86	0.017	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0016	0.0002	8			
Total	0.0016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.859	0.741	0.0742	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	0.00%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	14-5550-0612	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed trans-nonachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1	1.86	0.015	8	CDF	0.8267	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	1	0.3466	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6223	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-102		5	0.222	0.208	0.236	0.22	0.21	0.24	0.0049	4.93%	3.48%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-102		0.21	0.24	0.22	0.22	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID: 09-1382-8135 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 05 Feb-19 15:48 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	26d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed trans-nonachlor	6.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.492	1.86	0.015	8	CDF	0.6822	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7865	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.242	0.6357	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00136		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	23.2	0.6866	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1779	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-103		5	0.226	0.212	0.24	0.23	0.21	0.24	0.0051	5.05%	1.74%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-103		0.24	0.21	0.23	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	19-6979-3914	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed trans-nonachlor	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.25	1.86	0.015	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.68	2.29	0.7304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1E-05	1E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00128	0.00016	8			
Total	0.00129		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	23.2	0.6328	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.741	0.0249	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-104		5	0.228	0.214	0.242	0.22	0.22	0.24	0.0049	4.80%	0.87%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-104		0.24	0.22	0.22	0.24	0.22

Bioaccumulation Evaluation - Pesticides - Macoma — **EnviroSystems, Inc.**

Analysis ID:	17-5794-1762	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	05 Feb-19 15:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	29d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	28d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed trans-nonachlor	6.05%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.535	1.86	0.014	8	CDF	0.3038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.837	0.741	0.0409	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.23	0.212	0.248	0.24	0.21	0.24	0.00632	6.15%	0.00%
31243-105		5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	-1.74%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.24	0.24	0.21	0.22	0.24
31243-105		0.24	0.24	0.22	0.24	0.23

Nereis virens
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

Trace Metals

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

				Pre-Tissue		
CONTAMINANT	REP1	*	REP2	*	REP3	*
Metals (ug/g wet weight)						
Arsenic	2.1		2.1		2.0	
Cadmium	0.030	J	0.030	J	0.030	J
Chromium	0.30	J	0.29	J	0.29	J
Copper	1.1		1.2		1.1	
Lead	0.25		0.26		0.25	
Mercury	0.0030	J	0.0017	U	0.0017	U
Nickel	0.29		0.31		0.31	
Zinc	7.7		7.8		7.6	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.6		1.5		1.3		1.5		1.7	
Cadmium	0.030	J	0.033	J	0.026	J	0.027	J	0.028	J
Chromium	0.081	J	0.065	J	0.056	J	0.11	J	0.052	J
Copper	1.3		1.1		1.2		1.1		1.2	
Lead	0.16		0.17		0.18		0.16		0.18	
Mercury	0.0016	U	0.0016	U	0.0018	U	0.0015	U	0.0016	U
Nickel	0.14		0.12		0.11		0.14		0.096	
Zinc	14.0		20.2		5.6		5.7		6.8	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.2		1.4		1.6		1.0		1.2	
Cadmium	0.023	J	0.032	J	0.029	J	0.027	J	0.029	J
Chromium	0.039	J	0.087	J	0.083	J	0.037	J	0.058	J
Copper	0.79		1.1		1.1		0.74		0.92	
Lead	0.10		0.20		0.16		0.16		0.21	
Mercury	0.0017	U	0.0016	U	0.0015	U	0.0018	U	0.0015	U
Nickel	0.074	J	0.10		0.14		0.088	J	0.11	
Zinc	4.9		6.3		29.4		4.5		5.4	

* = Qualifiers
U Analyte not detected; below Mthe Method Detection Limit
J Analyte estimated; detection beDetection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.6		1.4		1.5		1.5		1.5	
Cadmium	0.041		0.037		0.019	J	0.027	J	0.023	J
Chromium	0.047	J	0.074	J	0.075	J	0.067	J	0.094	J
Copper	1.1		0.93		0.98		1.3		1.1	
Lead	0.30		0.20		0.11		0.19		0.16	
Mercury	0.0016	U	0.0016	U	0.0080	J	0.0060	J	0.0070	J
Nickel	0.10		0.13		0.11		0.11		0.12	
Zinc	7.1		5.9		6.1		7.5		6.8	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.1		1.6		1.6		1.5		1.5	
Cadmium	0.024	J	0.032	J	0.028	J	0.026	J	0.031	J
Chromium	0.042	J	0.063	J	0.075	J	0.080	J	0.057	J
Copper	0.79		1.3		1.2		1.3		1.1	
Lead	0.12		0.19		0.14		0.20		0.20	
Mercury	0.0016	U	0.0060	J	0.0040	J	0.0080	J	0.0040	J
Nickel	0.096		0.14		0.16		0.15		0.11	
Zinc	4.7		22.3		7.2		7.0		12.3	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.6		1.5		1.1		1.5		1.5	
Cadmium	0.023	J	0.022	J	0.019	J	0.020	J	0.025	J
Chromium	0.083	J	0.097	J	0.050	J	0.076	J	0.081	J
Copper	1.1		1.2		0.93		1.1		1.2	
Lead	0.13		0.13		0.14		0.12		0.15	
Mercury	0.0080	J	0.0080	J	0.0040	J	0.0060	J	0.010	J
Nickel	0.14		0.13		0.076	J	0.12		0.12	
Zinc	7.2		6.7		26.9		6.5		20.7	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Metals (ug/g wet weight)										
Arsenic	1.7		1.6		1.4		1.6		1.5	
Cadmium	0.030	J	0.026	J	0.021	J	0.025	J	0.020	J
Chromium	0.072	J	0.073	J	0.075	J	0.090	J	0.087	J
Copper	1.7		1.5		1.2		1.3		1.3	
Lead	0.19		0.16		0.099		0.15		0.14	
Mercury	0.010	J	0.0080	J	0.0090	J	0.010	J	0.0080	J
Nickel	0.25		0.15		0.12		0.13		0.13	
Zinc	8.1		8.0		32.6		6.9		15.0	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 07 Feb-19 08:40 (p 1 of 1)
Test Code/ID: 20-6215-6556/31250Nv-Met

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Start Date: 20 Nov-18 12:01 **Species:** Nereis virens **Sample Code:** 31250-000
End Date: 18 Dec-18 12:01 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 20 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Nv)

Sample	Rep	Pos	Body Burden	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Silver
31242-008	1	6		1.6	0.03	0.081	1.3	0.16	0.0016	0.14	14	
31242-008	2	8		1.5	0.033	0.065	1.1	0.17	0.0016	0.12	20.2	
31242-008	3	18		1.3	0.026	0.056	1.2	0.18	0.0018	0.11	5.6	
31242-008	4	23		1.5	0.027	0.11	1.1	0.16	0.0015	0.14	5.7	
31242-008	5	28		1.7	0.028	0.052	1.2	0.18	0.0016	0.1	6.8	
31243-101	1	1		1.2	0.023	0.039	0.79	0.1	0.0017	0.074	4.9	
31243-101	2	11		1.4	0.032	0.087	1.1	0.2	0.0016	0.1	6.3	
31243-101	3	17		1.6	0.029	0.083	1.1	0.16	0.0015	0.14	29.4	
31243-101	4	19		1	0.027	0.037	0.74	0.16	0.0018	0.088	4.5	
31243-101	5	30		1.2	0.029	0.058	0.92	0.21	0.0015	0.11	5.4	
31243-102	1	4		1.6	0.041	0.047	1.1	0.3	0.0016	0.1	7.1	
31243-102	2	9		1.4	0.037	0.074	0.93	0.2	0.0016	0.13	5.9	
31243-102	3	15		1.5	0.019	0.075	0.98	0.11	0.008	0.11	6.1	
31243-102	4	20		1.5	0.027	0.067	1.3	0.19	0.006	0.11	7.5	
31243-102	5	26		1.5	0.023	0.094	1.1	0.16	0.007	0.12	6.8	
31243-103	1	2		1.1	0.024	0.042	0.79	0.12	0.0016	0.1	4.7	
31243-103	2	7		1.6	0.032	0.063	1.3	0.19	0.006	0.14	22.3	
31243-103	3	16		1.6	0.028	0.075	1.2	0.14	0.004	0.16	7.2	
31243-103	4	22		1.5	0.026	0.08	1.3	0.2	0.008	0.15	7	
31243-103	5	27		1.5	0.031	0.057	1.1	0.2	0.004	0.11	12.3	
31243-104	1	3		1.6	0.023	0.083	1.1	0.13	0.008	0.14	7.2	
31243-104	2	10		1.5	0.022	0.097	1.2	0.13	0.008	0.13	6.7	
31243-104	3	14		1.1	0.019	0.05	0.93	0.14	0.004	0.076	26.9	
31243-104	4	24		1.5	0.02	0.076	1.1	0.12	0.006	0.12	6.5	
31243-104	5	25		1.5	0.025	0.081	1.2	0.15	0.01	0.12	20.7	
31243-105	1	5		1.7	0.03	0.072	1.7	0.19	0.01	0.25	8.1	
31243-105	2	12		1.6	0.026	0.073	1.5	0.16	0.008	0.15	8	
31243-105	3	13		1.4	0.021	0.075	1.2	0.1	0.009	0.12	32.6	
31243-105	4	21		1.6	0.025	0.09	1.3	0.15	0.01	0.13	6.9	
31243-105	5	29		1.5	0.02	0.087	1.3	0.14	0.008	0.13	15	

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Batch ID:	14-7242-1237	**Test Type:**	Bioaccumulation - Metals	**Analyst:**	Nancy Roka
Start Date:	20 Nov-18 12:01	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	18 Dec-18 12:01	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
13-3255-9262	Arsenic	Equal Variance t Two-Sample Test	0.9580	31243-101 passed arsenic
13-1020-6345	Arsenic	Equal Variance t Two-Sample Test	0.6038	31243-102 passed arsenic
10-6798-3795	Arsenic	Equal Variance t Two-Sample Test	0.6935	31243-103 passed arsenic
01-1522-6896	Arsenic	Equal Variance t Two-Sample Test	0.7570	31243-104 passed arsenic
16-2920-1927	Arsenic	Equal Variance t Two-Sample Test	0.3227	31243-105 passed arsenic
18-6989-4905	Cadmium	Equal Variance t Two-Sample Test	0.6550	31243-101 passed cadmium
16-8345-2970	Cadmium	Equal Variance t Two-Sample Test	0.4468	31243-102 passed cadmium
19-7281-6676	Cadmium	Equal Variance t Two-Sample Test	0.6172	31243-103 passed cadmium
00-1822-0066	Cadmium	Equal Variance t Two-Sample Test	0.9986	31243-104 passed cadmium
13-3527-0827	Cadmium	Equal Variance t Two-Sample Test	0.9603	31243-105 passed cadmium
16-3707-1616	Chromium	Equal Variance t Two-Sample Test	0.7777	31243-101 passed chromium
13-1652-7153	Chromium	Equal Variance t Two-Sample Test	0.5416	31243-102 passed chromium
14-3376-6970	Chromium	Equal Variance t Two-Sample Test	0.7628	31243-103 passed chromium
18-5452-5382	Chromium	Equal Variance t Two-Sample Test	0.3668	31243-104 passed chromium
05-6138-4604	Chromium	Equal Variance t Two-Sample Test	0.2861	31243-105 passed chromium
05-9115-2817	Copper	Equal Variance t Two-Sample Test	0.9911	31243-101 passed copper
18-3116-3252	Copper	Equal Variance t Two-Sample Test	0.8889	31243-102 passed copper
05-2101-4778	Copper	Equal Variance t Two-Sample Test	0.2379	31243-103 passed copper
21-3021-9774	Copper	Equal Variance t Two-Sample Test	0.6548	31243-103 passed copper
20-5630-3518	Copper	Equal Variance t Two-Sample Test	0.8668	31243-104 passed copper
05-6651-2107	Copper	Equal Variance t Two-Sample Test	0.0265	31243-105 failed copper
15-6875-4498	Lead	Equal Variance t Two-Sample Test	0.5771	31243-101 passed lead
08-6320-2064	Lead	Equal Variance t Two-Sample Test	0.6029	31243-102 passed lead
00-1686-6927	Lead	Unequal Variance t Two-Sample Test	0.2619	31243-102 passed lead
05-0575-9466	Lead	Equal Variance t Two-Sample Test	0.5000	31243-103 passed lead
07-0519-8133	Lead	Equal Variance t Two-Sample Test	0.9996	31243-104 passed lead
21-0298-5795	Lead	Equal Variance t Two-Sample Test	0.9058	31243-105 passed lead
16-4273-9343	Mercury	Equal Variance t Two-Sample Test	0.5000	31243-101 passed mercury
07-8095-7860	Mercury	Unequal Variance t Two-Sample Test	0.0386	31243-102 failed mercury
02-0648-0266	Mercury	Unequal Variance t Two-Sample Test	0.0226	31243-103 failed mercury
07-7178-6438	Mercury	Unequal Variance t Two-Sample Test	0.0027	31243-104 failed mercury
18-1980-9582	Mercury	Unequal Variance t Two-Sample Test	4.0E-05	31243-105 failed mercury
06-2406-3040	Nickel	Equal Variance t Two-Sample Test	0.9043	31243-101 passed nickel

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
05-6440-5864	Nickel	Equal Variance t Two-Sample Test	0.7882	31243-102 passed nickel
12-4844-1242	Nickel	Equal Variance t Two-Sample Test	0.2487	31243-103 passed nickel
08-6608-9382	Nickel	Equal Variance t Two-Sample Test	0.6338	31243-104 passed nickel
02-8426-6158	Nickel	Equal Variance t Two-Sample Test	0.1079	31243-105 passed nickel
08-2362-8082	Nickel	Equal Variance t Two-Sample Test	0.1779	31243-105 passed nickel
13-3467-8356	Zinc	Unequal Variance t Two-Sample Test	0.9250	31243-101 passed zinc
17-2350-8699	Zinc	Wilcoxon Rank Sum Two-Sample Test	0.8889	31243-101 passed zinc
08-8093-1435	Zinc	Unequal Variance t Two-Sample Test	0.8684	31243-102 passed zinc
05-1603-5130	Zinc	Equal Variance t Two-Sample Test	0.4783	31243-103 passed zinc
16-8581-7927	Zinc	Equal Variance t Two-Sample Test	0.2800	31243-104 passed zinc
18-0355-3687	Zinc	Equal Variance t Two-Sample Test	0.2671	31243-105 passed zinc

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.52	1.34	1.7	1.3	1.7	0.0663	0.148	9.76%	0.00%
31243-101		5	1.28	0.997	1.56	1	1.6	0.102	0.228	17.82%	15.79%
31243-102		5	1.5	1.41	1.59	1.4	1.6	0.0316	0.0707	4.71%	1.32%
31243-103		5	1.46	1.2	1.72	1.1	1.6	0.0927	0.207	14.20%	3.95%
31243-104		5	1.44	1.2	1.68	1.1	1.6	0.0872	0.195	13.54%	5.26%
31243-105		5	1.56	1.42	1.7	1.4	1.7	0.051	0.114	7.31%	-2.63%

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.0288	0.0254	0.0322	0.026	0.033	0.00124	0.00277	9.64%	0.00%
31243-101		5	0.028	0.0239	0.0321	0.023	0.032	0.00148	0.00332	11.85%	2.78%
31243-102		5	0.0294	0.0178	0.041	0.019	0.041	0.00417	0.00932	31.69%	-2.08%
31243-103		5	0.0282	0.024	0.0324	0.024	0.032	0.0015	0.00335	11.87%	2.08%
31243-104		5	0.0218	0.0188	0.0248	0.019	0.025	0.00107	0.00239	10.95%	24.31%
31243-105		5	0.0244	0.0194	0.0294	0.02	0.03	0.00181	0.00404	16.55%	15.28%

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.0728	0.0435	0.102	0.052	0.11	0.0106	0.0236	32.41%	0.00%
31243-101		5	0.0608	0.0315	0.0901	0.037	0.087	0.0106	0.0236	38.82%	16.48%
31243-102		5	0.0714	0.0504	0.0924	0.047	0.094	0.00757	0.0169	23.70%	1.92%
31243-103		5	0.0634	0.0447	0.0821	0.042	0.08	0.00674	0.0151	23.78%	12.91%
31243-104		5	0.0774	0.0561	0.0987	0.05	0.097	0.00769	0.0172	22.20%	-6.32%
31243-105		5	0.0794	0.0689	0.0899	0.072	0.09	0.00378	0.00844	10.63%	-9.07%

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.18	1.08	1.28	1.1	1.3	0.0374	0.0837	7.09%	0.00%
31243-101		5	0.93	0.721	1.14	0.74	1.1	0.0754	0.169	18.12%	21.19%
31243-102		5	1.08	0.905	1.26	0.93	1.3	0.0639	0.143	13.21%	8.31%
31243-103		5	1.14	0.875	1.4	0.79	1.3	0.0946	0.211	18.58%	3.56%
31243-104		5	1.11	0.969	1.24	0.93	1.2	0.0494	0.11	9.98%	6.27%
31243-105		5	1.4	1.15	1.65	1.2	1.7	0.0894	0.2	14.29%	-18.64%

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.16	0.18	0.00447	0.01	5.88%	0.00%
31243-101		5	0.166	0.112	0.22	0.1	0.21	0.0194	0.0434	26.12%	2.35%
31243-102		5	0.192	0.105	0.279	0.11	0.3	0.0312	0.0698	36.35%	-12.94%
31243-103		5	0.17	0.124	0.216	0.12	0.2	0.0167	0.0374	22.01%	0.00%
31243-104		5	0.134	0.12	0.148	0.12	0.15	0.0051	0.0114	8.51%	21.18%
31243-105		5	0.148	0.107	0.189	0.1	0.19	0.0146	0.0327	22.10%	12.94%

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.00162	0.00148	0.00176	0.0015	0.0018	0.000049	0.00011	6.76%	0.00%
31243-101		5	0.00162	0.00146	0.00178	0.0015	0.0018	5.83E-05	0.00013	8.05%	0.00%
31243-102		5	0.00484	0.00106	0.00862	0.0016	0.008	0.00136	0.00304	62.83%	-198.77%
31243-103		5	0.00472	0.00173	0.00771	0.0016	0.008	0.00108	0.00241	50.99%	-191.36%
31243-104		5	0.0072	0.00437	0.01	0.004	0.01	0.00102	0.00228	31.67%	-344.44%
31243-105		5	0.009	0.00776	0.0102	0.008	0.01	0.000447	0.001	11.11%	-455.56%

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.122	0.0998	0.144	0.1	0.14	0.008	0.0179	14.66%	0.00%
31243-101		5	0.102	0.0714	0.133	0.074	0.14	0.0112	0.025	24.37%	16.07%
31243-102		5	0.114	0.0998	0.128	0.1	0.13	0.0051	0.0114	10.00%	6.56%
31243-103		5	0.132	0.0999	0.164	0.1	0.16	0.0116	0.0259	19.61%	-8.20%
31243-104		5	0.117	0.0868	0.148	0.076	0.14	0.0109	0.0245	20.89%	3.93%
31243-105		5	0.156	0.0894	0.223	0.12	0.25	0.024	0.0537	34.40%	-27.87%

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	5.6	20.2	2.89	6.46	61.79%	0.00%
31243-101		5	10.1	-3.32	23.5	4.5	29.4	4.83	10.8	107.03%	3.44%
31243-102		5	6.68	5.85	7.51	5.9	7.5	0.301	0.672	10.06%	36.14%
31243-103		5	10.7	1.94	19.5	4.7	22.3	3.15	7.05	65.93%	-2.29%
31243-104		5	13.6	1.72	25.5	6.5	26.9	4.28	9.57	70.36%	-30.02%
31243-105		5	14.1	0.688	27.6	6.9	32.6	4.84	10.8	76.61%	-34.99%

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.6	1.5	1.3	1.5	1.7
31243-101		1.2	1.4	1.6	1	1.2
31243-102		1.6	1.4	1.5	1.5	1.5
31243-103		1.1	1.6	1.6	1.5	1.5
31243-104		1.6	1.5	1.1	1.5	1.5
31243-105		1.7	1.6	1.4	1.6	1.5

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.033	0.026	0.027	0.028
31243-101		0.023	0.032	0.029	0.027	0.029
31243-102		0.041	0.037	0.019	0.027	0.023
31243-103		0.024	0.032	0.028	0.026	0.031
31243-104		0.023	0.022	0.019	0.02	0.025
31243-105		0.03	0.026	0.021	0.025	0.02

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.081	0.065	0.056	0.11	0.052
31243-101		0.039	0.087	0.083	0.037	0.058
31243-102		0.047	0.074	0.075	0.067	0.094
31243-103		0.042	0.063	0.075	0.08	0.057
31243-104		0.083	0.097	0.05	0.076	0.081
31243-105		0.072	0.073	0.075	0.09	0.087

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.3	1.1	1.2	1.1	1.2
31243-101		0.79	1.1	1.1	0.74	0.92
31243-102		1.1	0.93	0.98	1.3	1.1
31243-103		0.79	1.3	1.2	1.3	1.1
31243-104		1.1	1.2	0.93	1.1	1.2
31243-105		1.7	1.5	1.2	1.3	1.3

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-101		0.1	0.2	0.16	0.16	0.21
31243-102		0.3	0.2	0.11	0.19	0.16
31243-103		0.12	0.19	0.14	0.2	0.2
31243-104		0.13	0.13	0.14	0.12	0.15
31243-105		0.19	0.16	0.1	0.15	0.14

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.0016	0.0016	0.0018	0.0015	0.0016
31243-101		0.0017	0.0016	0.0015	0.0018	0.0015
31243-102		0.0016	0.0016	0.008	0.006	0.007
31243-103		0.0016	0.006	0.004	0.008	0.004
31243-104		0.008	0.008	0.004	0.006	0.01
31243-105		0.01	0.008	0.009	0.01	0.008

Bioaccumulation Evaluation - Metals - Nereis virens **EnviroSystems, Inc.**

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.14	0.12	0.11	0.14	0.1
31243-101		0.074	0.1	0.14	0.088	0.11
31243-102		0.1	0.13	0.11	0.11	0.12
31243-103		0.1	0.14	0.16	0.15	0.11
31243-104		0.14	0.13	0.076	0.12	0.12
31243-105		0.25	0.15	0.12	0.13	0.13

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-101		4.9	6.3	29.4	4.5	5.4
31243-102		7.1	5.9	6.1	7.5	6.8
31243-103		4.7	22.3	7.2	7	12.3
31243-104		7.2	6.7	26.9	6.5	20.7
31243-105		8.1	8	32.6	6.9	15

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Metals

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-1.972788	1.85955	0.9580097	0.05	FALSE	0.2262238	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.4136702	1.85955	0.6550086	0.05	FALSE	0.0035962	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.8039762	1.85955	0.777679	0.05	FALSE	0.02775527	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-2.971142	1.85955	0.99108	0.05	FALSE	0.1564675	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.2010078	1.85955	0.5771455	0.05	FALSE	0.03700454	8		C
Mercury	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	3.0572E-07	1.85955	0.4999999	0.05	FALSE	0.00014162	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-1.427353	1.85955	0.9043381	0.05	FALSE	0.02553478	8		C
Zinc	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	33		0.8888889	0.05	FALSE		8	0	E
Zinc	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	-1.777998	2.13185	0.9249831	0.05	FALSE	6.216893	4		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.2721655	1.85955	0.6038064	0.05	FALSE	0.1366483	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.1380131	1.85955	0.4468203	0.05	FALSE	0.00808422	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.10782	1.85955	0.5416032	0.05	FALSE	0.0241455	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.323358	1.85955	0.8888577	0.05	FALSE	0.137707	8		C
Lead	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.6977975	2.13185	0.2618693	0.05	FALSE	0.06721237	4		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.2708788	1.89458	0.6028511	0.05	FALSE	0.03497098	7		C
Mercury	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	2.366112	2.13185	0.0385735	0.05	TRUE	0.00290119	4		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	-0.8432742	1.85955	0.788215	0.05	FALSE	0.01764122	8		C
Zinc	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	-1.300821	2.13185	0.8684018	0.05	FALSE	6.19484	4		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.5262347	1.85955	0.6935011	0.05	FALSE	0.2120211	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.3086066	1.85955	0.6172479	0.05	FALSE	0.00361537	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.75068	1.85955	0.762828	0.05	FALSE	0.02328523	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-0.4129574	1.85955	0.654758	0.05	FALSE	0.1891261	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	0.7533706	1.89458	0.2378987	0.05	FALSE	0.1131661	7		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	0	1.85955	0.5000001	0.05	FALSE	0.03220832	8		C
Mercury	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.877286	2.13185	0.0225681	0.05	TRUE	0.00229686	4		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	0.7106691	1.85955	0.2487407	0.05	FALSE	0.02616616	8		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	0.05609276	1.85955	0.4783218	0.05	FALSE	7.956302	8		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.7302967	1.85955	0.756979	0.05	FALSE	0.2037033	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-4.275931	1.85955	0.9986488	0.05	FALSE	0.00304421	8		C
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.3523895	1.85955	0.3668248	0.05	FALSE	0.02427405	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-1.194792	1.85955	0.8668073	0.05	FALSE	0.1151719	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-5.307909	1.85955	0.9996393	0.05	FALSE	0.01261207	8		C
Mercury	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 5	5.465338	2.13185	0.0027255	0.05	TRUE	0.00217657	4		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	-0.3540148	1.85955	0.6337615	0.05	FALSE	0.02521317	8		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.6080477	1.85955	0.2800089	0.05	FALSE	9.602833	8		C
Arsenic	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.4780914	1.85955	0.3226882	0.05	FALSE	0.155581	8		C
Cadmium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	-2.008316	1.85955	0.9602574	0.05	FALSE	0.00407407	8		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Metals

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Chromium	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5889103	1.85955	0.2860854	0.05	FALSE	0.02084022	8		C
Copper	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	2.269126	1.85955	0.0264813	0.05	TRUE	0.1802899	8		C
Lead	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	-1.438185	1.85955	0.9058368	0.05	FALSE	0.02844561	8		C
Mercury	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	16.40406	2.13185	4.042E-05	0.05	TRUE	0.00095909	4		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	1.343968	1.85955	0.1079131	0.05	FALSE	0.04704326	8		C
Nickel	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.9885381	1.89458	0.1779098	0.05	FALSE	0.02012373	7		C
Zinc	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.6494529	1.85955	0.267122	0.05	FALSE	10.47951	8		C

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	13-3255-9262	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed arsenic	14.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-1.97	1.86	0.226	8	CDF	0.9580	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5586	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.144	0.144	1	3.89	0.0840	Non-Significant Effect
Error	0.296	0.037	8			
Total	0.44		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.36	23.2	0.4252	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.979	0.741	0.9600	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.52	1.34	1.7	1.5	1.3	1.7	0.0663	9.76%	0.00%
31243-101		5	1.28	0.997	1.56	1.2	1	1.6	0.102	17.82%	15.79%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.6	1.5	1.3	1.5	1.7
31243-101		1.2	1.4	1.6	1	1.2

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	13-1020-6345	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed arsenic	8.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.272	1.86	0.137	8	CDF	0.6038	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.29	0.2260	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001	0.001	1	0.0741	0.7924	Non-Significant Effect
Error	0.108	0.0135	8			
Total	0.109		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.4	23.2	0.1804	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.943	0.741	0.5896	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.52	1.34	1.7	1.5	1.3	1.7	0.0663	9.76%	0.00%
31243-102		5	1.5	1.41	1.59	1.5	1.4	1.6	0.0316	4.71%	1.32%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.6	1.5	1.3	1.5	1.7
31243-102		1.6	1.4	1.5	1.5	1.5

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	10-6798-3795	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed arsenic	13.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.526	1.86	0.212	8	CDF	0.6935	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.12	2.29	0.1357	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009	0.009	1	0.277	0.6130	Non-Significant Effect
Error	0.26	0.0325	8			
Total	0.269		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5322	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.867	0.741	0.0925	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.52	1.34	1.7	1.5	1.3	1.7	0.0663	9.76%	0.00%
31243-103		5	1.46	1.2	1.72	1.5	1.1	1.6	0.0927	14.20%	3.95%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.6	1.5	1.3	1.5	1.7
31243-103		1.1	1.6	1.6	1.5	1.5

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 01-1522-6896 **Endpoint:** Arsenic **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed arsenic	13.40%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.73	1.86	0.204	8	CDF	0.7570	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.29	0.1619	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.016	0.016	1	0.533	0.4860	Non-Significant Effect
Error	0.24	0.03	8			
Total	0.256		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.73	23.2	0.6095	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.861	0.741	0.0786	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.52	1.34	1.7	1.5	1.3	1.7	0.0663	9.76%	0.00%
31243-104		5	1.44	1.2	1.68	1.5	1.1	1.6	0.0872	13.54%	5.26%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.6	1.5	1.3	1.5	1.7
31243-104		1.6	1.5	1.1	1.5	1.5

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	16-2920-1927	**Endpoint:**	Arsenic	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed arsenic	10.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.478	1.86	0.156	8	CDF	0.3227	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5597	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.229	0.6454	Non-Significant Effect
Error	0.14	0.0175	8			
Total	0.144		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.69	23.2	0.6228	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8627	Normal Distribution

Arsenic Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.52	1.34	1.7	1.5	1.3	1.7	0.0663	9.76%	0.00%
31243-105		5	1.56	1.42	1.7	1.6	1.4	1.7	0.051	7.31%	-2.63%

Arsenic Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.6	1.5	1.3	1.5	1.7
31243-105		1.7	1.6	1.4	1.6	1.5

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-6989-4905	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed cadmium	12.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.414	1.86	0.004	8	CDF	0.6550	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6144	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000016	0.0000016	1	0.171	0.6900	Non-Significant Effect
Error	0.0000748	9.35E-06	8			
Total	0.0000764		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.43	23.2	0.7380	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.96	0.741	0.7910	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0288	0.0254	0.0322	0.028	0.026	0.033	0.00124	9.64%	0.00%
31243-101		5	0.028	0.0239	0.0321	0.029	0.023	0.032	0.00148	11.85%	2.78%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.033	0.026	0.027	0.028
31243-101		0.023	0.032	0.029	0.027	0.029

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	16-8345-2970	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed cadmium	28.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.138	1.86	0.008	8	CDF	0.4468	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5143	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000009	0.0000009	1	0.019	0.8936	Non-Significant Effect
Error	0.000378	4.725E-05	8			
Total	0.0003789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.3	23.2	0.0377	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.976	0.741	0.9419	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0288	0.0254	0.0322	0.028	0.026	0.033	0.00124	9.64%	0.00%
31243-102		5	0.0294	0.0178	0.041	0.027	0.019	0.041	0.00417	31.69%	-2.08%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.033	0.026	0.027	0.028
31243-102		0.041	0.037	0.019	0.027	0.023

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	19-7281-6676	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed cadmium	12.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.309	1.86	0.004	8	CDF	0.6172	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9E-07	9E-07	1	0.0952	0.7655	Non-Significant Effect
Error	0.0000756	9.45E-06	8			
Total	0.0000765		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.45	23.2	0.7254	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.946	0.741	0.6157	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0288	0.0254	0.0322	0.028	0.026	0.033	0.00124	9.64%	0.00%
31243-103		5	0.0282	0.024	0.0324	0.028	0.024	0.032	0.0015	11.87%	2.08%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.033	0.026	0.027	0.028
31243-103		0.024	0.032	0.028	0.026	0.031

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 00-1822-0066 **Endpoint:** Cadmium **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed cadmium	10.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-4.28	1.86	0.003	8	CDF	0.9986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.72	2.29	0.6402	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001225	0.0001225	1	18.3	0.0027	Significant Effect
Error	0.0000536	0.0000067	8			
Total	0.0001761		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7778	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.925	0.741	0.4006	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0288	0.0254	0.0322	0.028	0.026	0.033	0.00124	9.64%	0.00%
31243-104		5	0.0218	0.0188	0.0248	0.022	0.019	0.025	0.00107	10.95%	24.31%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.033	0.026	0.027	0.028
31243-104		0.023	0.022	0.019	0.02	0.025

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	13-3527-0827	**Endpoint:**	Cadmium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed cadmium	14.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-2.01	1.86	0.004	8	CDF	0.9603	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.29	0.6528	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000484	0.0000484	1	4.03	0.0795	Non-Significant Effect
Error	0.000096	0.000012	8			
Total	0.0001444		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.12	23.2	0.4855	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.961	0.741	0.7971	Normal Distribution

Cadmium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0288	0.0254	0.0322	0.028	0.026	0.033	0.00124	9.64%	0.00%
31243-105		5	0.0244	0.0194	0.0294	0.025	0.02	0.03	0.00181	16.55%	15.28%

Cadmium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.03	0.033	0.026	0.027	0.028
31243-105		0.03	0.026	0.021	0.025	0.02

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	16-3707-1616	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed chromium	38.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.804	1.86	0.028	8	CDF	0.7777	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.67	2.29	0.7414	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00036	0.00036	1	0.646	0.4446	Non-Significant Effect
Error	0.0044556	0.000557	8			
Total	0.0048156		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	0.9993	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.899	0.741	0.2113	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0728	0.0435	0.102	0.065	0.052	0.11	0.0106	32.41%	0.00%
31243-101		5	0.0608	0.0315	0.0901	0.058	0.037	0.087	0.0106	38.82%	16.48%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.081	0.065	0.056	0.11	0.052
31243-101		0.039	0.087	0.083	0.037	0.058

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	13-1652-7153	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed chromium	33.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.108	1.86	0.024	8	CDF	0.5416	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.92	2.29	0.3214	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000049	0.0000049	1	0.0116	0.9168	Non-Significant Effect
Error	0.003372	0.0004215	8			
Total	0.0033769		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.94	23.2	0.5354	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.741	0.6919	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0728	0.0435	0.102	0.065	0.052	0.11	0.0106	32.41%	0.00%
31243-102		5	0.0714	0.0504	0.0924	0.074	0.047	0.094	0.00757	23.70%	1.92%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.081	0.065	0.056	0.11	0.052
31243-102		0.047	0.074	0.075	0.067	0.094

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	14-3376-6970	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed chromium	31.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-0.751	1.86	0.023	8	CDF	0.7628	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.99	2.29	0.2414	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002209	0.0002209	1	0.564	0.4743	Non-Significant Effect
Error	0.003136	0.000392	8			
Total	0.0033569		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.45	23.2	0.4069	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.741	0.5233	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0728	0.0435	0.102	0.065	0.052	0.11	0.0106	32.41%	0.00%
31243-103		5	0.0634	0.0447	0.0821	0.063	0.042	0.08	0.00674	23.78%	12.91%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.081	0.065	0.056	0.11	0.052
31243-103		0.042	0.063	0.075	0.08	0.057

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-5452-5382	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed chromium	33.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.352	1.86	0.024	8	CDF	0.3668	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3341	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0000529	0.0000529	1	0.124	0.7336	Non-Significant Effect
Error	0.003408	0.000426	8			
Total	0.0034609		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.89	23.2	0.5542	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.972	0.741	0.9093	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0728	0.0435	0.102	0.065	0.052	0.11	0.0106	32.41%	0.00%
31243-104		5	0.0774	0.0561	0.0987	0.081	0.05	0.097	0.00769	22.20%	-6.32%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.081	0.065	0.056	0.11	0.052
31243-104		0.083	0.097	0.05	0.076	0.081

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-6138-4604	**Endpoint:**	Chromium	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed chromium	28.63%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.589	1.86	0.021	8	CDF	0.2861	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.23	2.29	0.0748	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001089	0.0001089	1	0.347	0.5722	Non-Significant Effect
Error	0.002512	0.000314	8			
Total	0.0026209		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.81	23.2	0.0715	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.904	0.741	0.2394	Normal Distribution

Chromium Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.0728	0.0435	0.102	0.065	0.052	0.11	0.0106	32.41%	0.00%
31243-105		5	0.0794	0.0689	0.0899	0.075	0.072	0.09	0.00378	10.63%	-9.07%

Chromium Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.081	0.065	0.056	0.11	0.052
31243-105		0.072	0.073	0.075	0.09	0.087

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-9115-2817	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed copper	13.26%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-2.97	1.86	0.156	8	CDF	0.9911	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.15625	0.15625	1	8.83	0.0178	Significant Effect
Error	0.1416	0.0177	8			
Total	0.29785		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.06	23.2	0.2037	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5550	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.18	1.08	1.28	1.2	1.1	1.3	0.0374	7.09%	0.00%
31243-101		5	0.93	0.721	1.14	0.92	0.74	1.1	0.0754	18.12%	21.19%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.3	1.1	1.2	1.1	1.2
31243-101		0.79	1.1	1.1	0.74	0.92

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-3116-3252	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed copper	11.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.32	1.86	0.138	8	CDF	0.8889	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.29	0.2603	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02401	0.02401	1	1.75	0.2223	Non-Significant Effect
Error	0.10968	0.01371	8			
Total	0.13369		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.92	23.2	0.3245	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.741	0.4277	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.18	1.08	1.28	1.2	1.1	1.3	0.0374	7.09%	0.00%
31243-102		5	1.08	0.905	1.26	1.1	0.93	1.3	0.0639	13.21%	8.31%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.3	1.1	1.2	1.1	1.2
31243-102		1.1	0.93	0.98	1.3	1.1

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-2101-4778	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed copper	9.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0.753	1.89	0.113	7	CDF	0.2379	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0045	0.0045	1	0.568	0.4758	Non-Significant Effect
Error	0.0555	0.0079286	7			
Total	0.06		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.31	24.3	0.7745	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.949	0.701	0.6775	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.18	1.08	1.28	1.2	1.1	1.3	0.0374	7.09%	0.00%
31243-103		4	1.22	1.07	1.38	1.25	1.1	1.3	0.0479	7.82%	-3.81%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.3	1.1	1.2	1.1	1.2
31243-103		Outlier	1.3	1.2	1.3	1.1

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	20-5630-3518	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed copper	9.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-1.19	1.86	0.115	8	CDF	0.8668	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.91	2.29	0.3411	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01369	0.01369	1	1.43	0.2664	Non-Significant Effect
Error	0.07672	0.00959	8			
Total	0.09041		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.74	23.2	0.6047	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.741	0.5566	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.18	1.08	1.28	1.2	1.1	1.3	0.0374	7.09%	0.00%
31243-104		5	1.11	0.969	1.24	1.1	0.93	1.2	0.0494	9.98%	6.27%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.3	1.1	1.2	1.1	1.2
31243-104		1.1	1.2	0.93	1.1	1.2

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-6651-2107	**Endpoint:**	Copper	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed copper	15.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	2.27	1.86	0.18	8	CDF	0.0265	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.29	0.1668	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.121	0.121	1	5.15	0.0530	Non-Significant Effect
Error	0.188	0.0235	8			
Total	0.309		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.71	23.2	0.1199	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.931	0.741	0.4589	Normal Distribution

Copper Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.18	1.08	1.28	1.2	1.1	1.3	0.0374	7.09%	0.00%
31243-105		5	1.4	1.15	1.65	1.3	1.2	1.7	0.0894	14.29%	-18.64%

Copper Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.3	1.1	1.2	1.1	1.2
31243-105		1.7	1.5	1.2	1.3	1.3

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	15-6875-4498	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed lead	21.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.201	1.86	0.037	8	CDF	0.5771	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.29	0.0756	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.000E-05	4.000E-05	1	0.0404	0.8457	Non-Significant Effect
Error	0.00792	0.00099	8			
Total	0.00796		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	18.8	23.2	0.0148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.893	0.741	0.1810	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.17	0.16	0.18	0.00447	5.88%	0.00%
31243-101		5	0.166	0.112	0.22	0.16	0.1	0.21	0.0194	26.12%	2.35%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-101		0.1	0.2	0.16	0.16	0.21

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	00-1686-6927	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed lead	39.54%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.698	2.13	0.067	4	CDF	0.2619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0474	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00121	0.00121	1	0.487	0.5051	Non-Significant Effect
Error	0.01988	0.002485	8			
Total	0.02109		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	48.7	23.2	0.0024	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.842	0.741	0.0470	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.17	0.16	0.18	0.00447	5.88%	0.00%
31243-102		5	0.192	0.105	0.279	0.19	0.11	0.3	0.0312	36.35%	-12.94%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-102		0.3	0.2	0.11	0.19	0.16

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	08-6320-2064	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed lead	20.57%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.271	1.89	0.035	7	CDF	0.6029	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.556E-05	5.556E-05	1	0.0734	0.7943	Non-Significant Effect
Error	0.0053	0.0007571	7			
Total	0.0053556		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.3	24.3	0.0208	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.917	0.701	0.3691	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.17	0.16	0.18	0.00447	5.88%	0.00%
31243-102		4	0.165	0.101	0.229	0.175	0.11	0.2	0.0202	24.49%	2.94%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-102		Outlier	0.2	0.11	0.19	0.16

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 05-0575-9466 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed lead	18.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0	1.86	0.032	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3036	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.006	0.00075	8			
Total	0.006		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	14	23.2	0.0255	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.936	0.741	0.5048	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.17	0.16	0.18	0.00447	5.88%	0.00%
31243-103		5	0.17	0.124	0.216	0.19	0.12	0.2	0.0167	22.01%	0.00%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-103		0.12	0.19	0.14	0.2	0.2

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 07-0519-8133 **Endpoint:** Lead **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed lead	7.42%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-5.31	1.86	0.013	8	CDF	0.9996	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.29	0.9510	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00324	0.00324	1	28.2	7.2E-04	Significant Effect
Error	0.0009200	0.000115	8			
Total	0.00416		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.3	23.2	0.8055	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.944	0.741	0.5954	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.17	0.16	0.18	0.00447	5.88%	0.00%
31243-104		5	0.134	0.12	0.148	0.13	0.12	0.15	0.0051	8.51%	21.18%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-104		0.13	0.13	0.14	0.12	0.15

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	21-0298-5795	**Endpoint:**	Lead	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed lead	16.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-1.44	1.86	0.028	8	CDF	0.9058	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1449	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00121	0.00121	1	2.07	0.1883	Non-Significant Effect
Error	0.00468	0.000585	8			
Total	0.00589		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10.7	23.2	0.0413	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.741	0.3194	Normal Distribution

Lead Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.17	0.158	0.182	0.17	0.16	0.18	0.00447	5.88%	0.00%
31243-105		5	0.148	0.107	0.189	0.15	0.1	0.19	0.0146	22.10%	12.94%

Lead Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.16	0.17	0.18	0.16	0.18
31243-105		0.19	0.16	0.1	0.15	0.14

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	16-4273-9343	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed mercury	8.74%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	3.06E-07	1.86	0.0001	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9435	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.388E-21	3.388E-21	1	2.34E-13	1.0000	Non-Significant Effect
Error	1.16E-07	1.45E-08	8			
Total	1.16E-07		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.42	23.2	0.7439	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.848	0.741	0.0553	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.00162	0.00148	0.00176	0.0016	0.0015	0.0018	0.000049	6.76%	0.00%
31243-101		5	0.00162	0.00146	0.00178	0.0016	0.0015	0.0018	5.83E-05	8.05%	0.00%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.0016	0.0016	0.0018	0.0015	0.0016
31243-101		0.0017	0.0016	0.0015	0.0018	0.0015

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	07-8095-7860	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed mercury	179.09%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	2.37	2.13	0.003	4	CDF	0.0386	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.6	2.29	0.9145	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.592E-05	2.592E-05	1	5.6	0.0455	Significant Effect
Error	3.704E-05	4.63E-06	8			
Total	6.296E-05		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	771	23.2	1.0E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.741	0.1773	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.00162	0.00148	0.00176	0.0016	0.0015	0.0018	0.000049	6.76%	0.00%
31243-102		5	0.00484	0.00106	0.00862	0.006	0.0016	0.008	0.00136	62.83%	-198.77%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.0016	0.0016	0.0018	0.0015	0.0016
31243-102		0.0016	0.0016	0.008	0.006	0.007

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	02-0648-0266	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed mercury	141.78%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.88	2.13	0.002	4	CDF	0.0226	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1947	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.403E-05	2.403E-05	1	8.28	0.0206	Significant Effect
Error	2.322E-05	2.902E-06	8			
Total	4.724E-05		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	483	23.2	2.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.886	0.741	0.1521	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.00162	0.00148	0.00176	0.0016	0.0015	0.0018	0.000049	6.76%	0.00%
31243-103		5	0.00472	0.00173	0.00771	0.004	0.0016	0.008	0.00108	50.99%	-191.36%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.0016	0.0016	0.0018	0.0015	0.0016
31243-103		0.0016	0.006	0.004	0.008	0.004

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	07-7178-6438	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed mercury	134.36%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	5.47	2.13	0.002	4	CDF	0.0027	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1466	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.784E-05	7.784E-05	1	29.9	6.0E-04	Significant Effect
Error	2.085E-05	2.606E-06	8			
Total	9.869E-05		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	433	23.2	3.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.896	0.741	0.1979	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.00162	0.00148	0.00176	0.0016	0.0015	0.0018	0.000049	6.76%	0.00%
31243-104		5	0.0072	0.00437	0.01	0.008	0.004	0.01	0.00102	31.67%	-344.44%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.0016	0.0016	0.0018	0.0015	0.0016
31243-104		0.008	0.008	0.004	0.006	0.01

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-1980-9582	**Endpoint:**	Mercury	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed mercury	59.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	16.4	2.13	0.001	4	CDF	4.0E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001362	0.0001362	1	269	1.9E-07	Significant Effect
Error	4.048E-06	5.06E-07	8			
Total	0.0001402		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	83.3	23.2	8.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.866	0.741	0.0893	Normal Distribution

Mercury Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.00162	0.00148	0.00176	0.0016	0.0015	0.0018	0.000049	6.76%	0.00%
31243-105		5	0.009	0.00776	0.0102	0.009	0.008	0.01	0.000447	11.11%	-455.56%

Mercury Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.0016	0.0016	0.0018	0.0015	0.0016
31243-105		0.01	0.008	0.009	0.01	0.008

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	06-2406-3040	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed nickel	20.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-1.43	1.86	0.026	8	CDF	0.9043	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.84	2.29	0.4387	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009604	0.0009604	1	2.04	0.1913	Non-Significant Effect
Error	0.0037712	0.0004714	8			
Total	0.0047316		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.95	23.2	0.5348	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.967	0.741	0.8628	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.122	0.0998	0.144	0.12	0.1	0.14	0.008	14.66%	0.00%
31243-101		5	0.102	0.0714	0.133	0.1	0.074	0.14	0.0112	24.37%	16.07%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.14	0.12	0.11	0.14	0.1
31243-101		0.074	0.1	0.14	0.088	0.11

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	05-6440-5864	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed nickel	14.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.843	1.86	0.018	8	CDF	0.7882	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.56	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.711	0.4236	Non-Significant Effect
Error	0.0018	0.000225	8			
Total	0.00196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.46	23.2	0.4043	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3928	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.122	0.0998	0.144	0.12	0.1	0.14	0.008	14.66%	0.00%
31243-102		5	0.114	0.0998	0.128	0.11	0.1	0.13	0.0051	10.00%	6.56%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.14	0.12	0.11	0.14	0.1
31243-102		0.1	0.13	0.11	0.11	0.12

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	12-4844-1242	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed nickel	21.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0.711	1.86	0.026	8	CDF	0.2487	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.53	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	0.505	0.4975	Non-Significant Effect
Error	0.00396	0.000495	8			
Total	0.00421		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.09	23.2	0.4918	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.916	0.741	0.3278	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.122	0.0998	0.144	0.12	0.1	0.14	0.008	14.66%	0.00%
31243-103		5	0.132	0.0999	0.164	0.14	0.1	0.16	0.0116	19.61%	-8.20%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.14	0.12	0.11	0.14	0.1
31243-103		0.1	0.14	0.16	0.15	0.11

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	08-6608-9382	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed nickel	20.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	-0.354	1.86	0.025	8	CDF	0.6338	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.04	2.29	0.1981	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.760E-05	5.760E-05	1	0.125	0.7325	Non-Significant Effect
Error	0.0036768	0.0004596	8			
Total	0.0037344		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.87	23.2	0.5584	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.919	0.741	0.3475	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.122	0.0998	0.144	0.12	0.1	0.14	0.008	14.66%	0.00%
31243-104		5	0.117	0.0868	0.148	0.12	0.076	0.14	0.0109	20.89%	3.93%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.14	0.12	0.11	0.14	0.1
31243-104		0.14	0.13	0.076	0.12	0.12

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	02-8426-6158	**Endpoint:**	Nickel	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed nickel	38.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	1.34	1.86	0.047	8	CDF	0.1079	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.49	2.29	0.0089	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00289	0.00289	1	1.81	0.2158	Non-Significant Effect
Error	0.0128	0.0016	8			
Total	0.01569		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9	23.2	0.0560	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8	0.741	0.0144	Normal Distribution

Nickel Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.122	0.0998	0.144	0.12	0.1	0.14	0.008	14.66%	0.00%
31243-105		5	0.156	0.0894	0.223	0.13	0.12	0.25	0.024	34.40%	-27.87%

Nickel Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.14	0.12	0.11	0.14	0.1
31243-105		0.25	0.15	0.12	0.13	0.13

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	17-2350-8699	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed zinc	100.13%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	33	n/a	0	8	Exact	0.8889	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.3	2.29	0.0471	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.324	0.324	1	0.00409	0.9506	Non-Significant Effect
Error	634.492	79.3115	8			
Total	634.816		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.8	23.2	0.3430	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.706	0.741	0.0011	Non-Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	6.8	5.6	20.2	2.89	61.79%	0.00%
31243-101		5	10.1	-3.32	23.5	5.4	4.5	29.4	4.83	107.03%	3.44%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-101		4.9	6.3	29.4	4.5	5.4

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	13-3467-8356	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed zinc	59.43%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-1.78	2.13	6.22	4	CDF	0.9250	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59.7427	59.7427	1	2.48	0.1596	Non-Significant Effect
Error	168.88	24.1256	7			
Total	228.622		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	69.3	46.2	0.0055	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.896	0.701	0.2289	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	6.8	5.6	20.2	2.89	61.79%	0.00%
31243-101		4	5.28	4.04	6.51	5.15	4.5	6.3	0.388	14.71%	49.57%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-101		4.9	6.3	Outlier	4.5	5.4

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	08-8093-1435	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed zinc	59.22%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-1.3	2.13	6.19	4	CDF	0.8684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.25	2.29	0.0654	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	35.721	35.721	1	1.69	0.2295	Non-Significant Effect
Error	168.88	21.11	8			
Total	204.601		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	92.4	23.2	6.8E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.887	0.741	0.1588	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	6.8	5.6	20.2	2.89	61.79%	0.00%
31243-102		5	6.68	5.85	7.51	6.8	5.9	7.5	0.301	10.06%	36.14%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-102		7.1	5.9	6.1	7.5	6.8

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 05-1603-5130 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed zinc	76.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	0.0561	1.86	7.96	8	CDF	0.4783	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.82	2.29	0.4670	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.144	0.144	1	0.00315	0.9566	Non-Significant Effect
Error	366.132	45.7665	8			
Total	366.276		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.19	23.2	0.8693	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.821	0.741	0.0260	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	6.8	5.6	20.2	2.89	61.79%	0.00%
31243-103		5	10.7	1.94	19.5	7.2	4.7	22.3	3.15	65.93%	-2.29%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-103		4.7	22.3	7.2	7	12.3

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID: 16-8581-7927 **Endpoint:** Zinc **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed zinc	91.81%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.608	1.86	9.6	8	CDF	0.2800	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6273	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	24.649	24.649	1	0.37	0.5600	Non-Significant Effect
Error	533.352	66.669	8			
Total	558.001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.19	23.2	0.4658	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.838	0.741	0.0423	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	6.8	5.6	20.2	2.89	61.79%	0.00%
31243-104		5	13.6	1.72	25.5	7.2	6.5	26.9	4.28	70.36%	-30.02%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-104		7.2	6.7	26.9	6.5	20.7

Bioaccumulation Evaluation - Metals - Nereis virens — **EnviroSystems, Inc.**

Analysis ID:	18-0355-3687	**Endpoint:**	Zinc	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed zinc	100.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.649	1.86	10.5	8	CDF	0.2671	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.29	0.0875	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	33.489	33.489	1	0.422	0.5342	Non-Significant Effect
Error	635.18	79.3975	8			
Total	668.669		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.8	23.2	0.3423	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.816	0.741	0.0224	Normal Distribution

Zinc Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	10.5	2.44	18.5	6.8	5.6	20.2	2.89	61.79%	0.00%
31243-105		5	14.1	0.688	27.6	8.1	6.9	32.6	4.84	76.61%	-34.99%

Zinc Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	14	20.2	5.6	5.7	6.8
31243-105		8.1	8	32.6	6.9	15

Nereis virens
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

PAHs

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

				Pre-Tissue		
CONTAMINANT	REP1	*	REP2	*	REP3	*
PAHs (ng/g wet weight)						
Acenaphthene	2.4	U	2.4	U	9.9	
Acenaphthylene	2.4	U	2.4	U	2.3	U
Anthracene	2.4	U	2.4	U	2.3	U
Benzo(a)anthracene	2.4	U	2.4	U	2.3	U
Benzo(a)pyrene	2.4	U	2.4	U	2.3	U
Benzo(b)fluoranthene	2.4	U	2.4	U	2.3	U
Benzo(k)fluoranthene	2.4	U	2.4	U	2.3	U
Benzo(g,h,i)perylene	2.4	U	2.4	U	2.3	U
Chrysene	2.4	U	2.4	U	2.3	U
Dibenzo(a,h)anthracene	2.4	U	2.4	U	2.3	U
Fluoranthene	5.5	J	2.4	U	2.3	U
Fluorene	2.4	U	2.4	U	2.3	U
Indeno(1,2,3-c,d)pyrene	2.4	U	2.4	U	2.3	U
Naphthalene	2.4	U	2.4	U	2.3	U
Phenanthrene	5.5	J	2.4	U	2.3	U
Pyrene	4.9	J	2.4	U	2.3	U
PAH Total	47		38		45	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Acenaphthylene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Anthracene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Benzo(a)anthracene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Benzo(a)pyrene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Benzo(b)fluoranthene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Benzo(k)fluoranthene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Benzo(g,h,i)perylene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Chrysene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Dibenzo(a,h)anthracene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Fluoranthene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Fluorene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Indeno(1,2,3-c,d)pyrene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Naphthalene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Phenanthrene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
Pyrene	2.3	U	2.2	U	2.4	U	2.4	U	2.4	U
PAH Total	36		34		38		38		38	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Acenaphthylene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Anthracene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Benzo(a)anthracene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Benzo(a)pyrene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Benzo(b)fluoranthene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Benzo(k)fluoranthene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Benzo(g,h,i)perylene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Chrysene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Dibenzo(a,h)anthracene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Fluoranthene	4.5	J	6.6	J	6.1	J	2.2	U	2.4	U
Fluorene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Indeno(1,2,3-c,d)pyrene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Naphthalene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Phenanthrene	2.2	U	2.2	U	2.5	U	2.2	U	2.4	U
Pyrene	2.2	U	5.1	J	2.5	U	2.2	U	2.4	U
PAH Total	37		42		43		35		39	

* = Qualifiers
U Analyte not detected; below Mthe Method Detection Limit
J Analyte estimated; detection beDetection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Acenaphthylene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Anthracene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Benzo(a)anthracene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Benzo(a)pyrene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Benzo(b)fluoranthene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Benzo(k)fluoranthene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Benzo(g,h,i)perylene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Chrysene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Dibenzo(a,h)anthracene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Fluoranthene	10		8.8	J	6.6	J	6.5	J	2.4	U
Fluorene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Indeno(1,2,3-c,d)pyrene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Naphthalene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Phenanthrene	2.2	U	2.4	U	2.2	U	2.5	U	2.4	U
Pyrene	7.2	J	6.2	J	5.0	J	2.5	U	2.4	U
PAH Total	49		49		42		44		38	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Acenaphthylene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Anthracene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Benzo(a)anthracene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Benzo(a)pyrene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Benzo(b)fluoranthene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Benzo(k)fluoranthene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Benzo(g,h,i)perylene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Chrysene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Dibenzo(a,h)anthracene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Fluoranthene	7.3	J	5.2	J	9.9		2.3	U	10	
Fluorene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Indeno(1,2,3-c,d)pyrene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Naphthalene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Phenanthrene	2.2	U	2.3	U	2.2	U	2.3	U	2.2	U
Pyrene	6.4	J	2.3	U	7.1	J	2.3	U	7.6	J
PAH Total	45		39		48		37		49	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Acenaphthylene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Anthracene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Benzo(a)anthracene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Benzo(a)pyrene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Benzo(b)fluoranthene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Benzo(k)fluoranthene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Benzo(g,h,i)perylene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Chrysene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Dibenzo(a,h)anthracene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Fluoranthene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Fluorene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Indeno(1,2,3-c,d)pyrene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Naphthalene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Phenanthrene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
Pyrene	2.4	U	2.3	U	2.4	U	2.4	U	2.4	U
PAH Total	39		37		38		39		38	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PAHs (ng/g wet weight)										
Acenaphthene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Acenaphthylene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Anthracene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Benzo(a)anthracene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Benzo(a)pyrene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Benzo(b)fluoranthene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Benzo(k)fluoranthene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Benzo(g,h,i)perylene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Chrysene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Dibenzo(a,h)anthracene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Fluoranthene	5.0	J	6.9	J	4.6	J	8.0	J	5.7	J
Fluorene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Indeno(1,2,3-c,d)pyrene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Naphthalene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Phenanthrene	2.4	U	2.4	U	2.3	U	2.3	U	2.3	U
Pyrene	7.6	J	9.7		6.6	J	10		7.5	J
PAH Total	46		50		43		50		46	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Start Date: 20 Nov-18 12:02 **Species:** Nereis virens **Sample Code:** 31250-000
End Date: 18 Dec-18 12:02 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 20 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Nv)

Sample	Rep	Pos	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	1,4-Dichlorobenze	Total PAHs
31242-008	1	2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
31242-008	2	11	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
31242-008	3	13	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31242-008	4	21	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31242-008	5	30	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-101	1	1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	4.5	2.2	2.2	2.2	2.2	2.2		
31243-101	2	7	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	6.6	2.2	2.2	2.2	2.2	5.1		
31243-101	3	18	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	6.1	2.5	2.5	2.5	2.5	2.5		
31243-101	4	20	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
31243-101	5	26	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-102	1	5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	10	2.2	2.2	2.2	2.2	7.2		
31243-102	2	8	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	8.8	2.4	2.4	2.4	2.4	6.2		
31243-102	3	17	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	6.6	2.2	2.2	2.2	2.2	5		
31243-102	4	23	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	6.5	2.5	2.5	2.5	2.5	2.5		
31243-102	5	25	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-103	1	4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	7.3	2.2	2.2	2.2	2.2	6.4		
31243-103	2	10	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	5.2	2.3	2.3	2.3	2.3	2.3		
31243-103	3	16	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	9.9	2.2	2.2	2.2	2.2	7.1		
31243-103	4	22	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
31243-103	5	28	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	10	2.2	2.2	2.2	2.2	7.6		
31243-104	1	3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-104	2	9	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3		
31243-104	3	14	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-104	4	19	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-104	5	27	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4		
31243-105	1	6	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	5	2.4	2.4	2.4	2.4	7.6		
31243-105	2	12	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	6.9	2.4	2.4	2.4	2.4	9.7		

Sample	Rep	Pos	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,I)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	1,4-Dichlorobenze	Total PAHs
31243-105	3	15	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	4.6	2.3	2.3	2.3	2.3	6.6		
31243-105	4	24	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	8	2.3	2.3	2.3	2.3	10		
31243-105	5	29	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	5.7	2.3	2.3	2.3	2.3	7.5		

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Batch ID:	09-2412-6295	**Test Type:**	Bioaccumulation - PAHs	**Analyst:**	Nancy Roka
Start Date:	20 Nov-18 12:02	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	18 Dec-18 12:02	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-9665-6021	Acenaphthene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed acenaphthene
07-6192-8737	Acenaphthene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed acenaphthene
07-0836-8009	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed acenaphthene
12-1788-0916	Acenaphthene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed acenaphthene
07-4413-2322	Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed acenaphthene
17-2159-2510	Acenaphthylene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed acenaphthylene
03-2529-9915	Acenaphthylene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed acenaphthylene
14-4723-1047	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed acenaphthylene
04-2526-6563	Acenaphthylene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed acenaphthylene
10-0121-1132	Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed acenaphthylene
00-5132-6343	Anthracene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed anthracene
02-7320-2909	Anthracene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed anthracene
17-2962-3544	Anthracene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed anthracene
00-0555-5440	Anthracene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed anthracene
15-8732-4772	Anthracene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed anthracene
06-8344-3433	Benzo(a)anthracene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed benzo(a)anthracene
13-9538-2528	Benzo(a)anthracene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed benzo(a)anthracene
03-4041-8400	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed benzo(a)anthracene
04-6928-9272	Benzo(a)anthracene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed benzo(a)anthracene
06-7392-5123	Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed benzo(a)anthracene
11-3036-3519	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed benzo(a)pyrene
09-3219-3319	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed benzo(a)pyrene
16-0004-4814	Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed benzo(a)pyrene
17-1353-1657	Benzo(a)pyrene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed benzo(a)pyrene
06-6171-5377	Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed benzo(a)pyrene
00-1429-0677	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed benzo(b)fluoranthene
12-8372-5694	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed benzo(b)fluoranthene
05-8437-3471	Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed benzo(b)fluoranthene
08-0060-6203	Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed benzo(b)fluoranthene
20-8336-4888	Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed benzo(b)fluoranthene
16-2647-8037	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed benzo(g,h,i)perylene
20-7389-5897	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed benzo(g,h,i)perylene
18-9826-8440	Benzo(g,h,i)perylene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed benzo(g,h,i)perylene

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
21-1612-2308	Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed benzo(g,h,i)perylene
10-5125-4621	Benzo(g,h,i)perylene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed benzo(g,h,i)perylene
02-2173-7057	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed benzo(k)fluoranthene
05-7914-6075	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed benzo(k)fluoranthene
10-3779-5250	Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed benzo(k)fluoranthene
04-4336-0151	Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed benzo(k)fluoranthene
14-5794-5255	Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed benzo(k)fluoranthene
20-5645-4137	Chrysene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed chrysene
15-3895-8292	Chrysene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed chrysene
04-9154-8922	Chrysene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed chrysene
01-4970-8907	Chrysene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed chrysene
07-8515-4298	Chrysene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed chrysene
19-9708-7928	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed dibenz(a,h)anthracene
05-8815-2917	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed dibenz(a,h)anthracene
06-4240-9278	Dibenz(a,h)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed dibenz(a,h)anthracene
17-4231-5375	Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed dibenz(a,h)anthracene
00-2515-8859	Dibenz(a,h)anthracene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed dibenz(a,h)anthracene
20-8939-5577	Fluoranthene	Unequal Variance t Two-Sample Test	0.0455	31243-101 failed fluoranthene
09-1889-8287	Fluoranthene	Unequal Variance t Two-Sample Test	0.0036	31243-102 failed fluoranthene
18-2243-8727	Fluoranthene	Unequal Variance t Two-Sample Test	0.0127	31243-102 failed fluoranthene
19-3869-2219	Fluoranthene	Unequal Variance t Two-Sample Test	0.0174	31243-103 failed fluoranthene
00-8566-4975	Fluoranthene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed fluoranthene
01-6906-3541	Fluoranthene	Unequal Variance t Two-Sample Test	0.0021	31243-105 failed fluoranthene
15-1459-0497	Fluorene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed fluorene
02-9241-4733	Fluorene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed fluorene
09-3100-2282	Fluorene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed fluorene
17-3552-4991	Fluorene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed fluorene
12-4123-0949	Fluorene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed fluorene
00-5437-0629	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed indeno(1,2,3-cd)pyrene
09-7419-7339	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed indeno(1,2,3-cd)pyrene
16-5762-8097	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed indeno(1,2,3-cd)pyrene
11-5754-1449	Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed indeno(1,2,3-cd)pyrene
15-0022-9335	Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed indeno(1,2,3-cd)pyrene
16-1692-6850	Naphthalene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed naphthalene
04-2995-2727	Naphthalene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed naphthalene
12-0962-8112	Naphthalene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed naphthalene
14-7513-6801	Naphthalene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed naphthalene
05-2247-2850	Naphthalene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed naphthalene
08-3186-5631	Phenanthrene	Equal Variance t Two-Sample Test	0.6962	31243-101 passed phenanthrene
12-3981-9690	Phenanthrene	Equal Variance t Two-Sample Test	0.5000	31243-102 passed phenanthrene
14-4179-7054	Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed phenanthrene
13-2865-5228	Phenanthrene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed phenanthrene
01-7720-5808	Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed phenanthrene
01-4289-3386	Pyrene	Equal Variance t Two-Sample Test	0.5717	31243-101 passed pyrene
18-7891-2478	Pyrene	Wilcoxon Rank Sum Two-Sample Test	0.3452	31243-101 passed pyrene
10-4209-7979	Pyrene	Unequal Variance t Two-Sample Test	0.0373	31243-102 failed pyrene
01-5318-6439	Pyrene	Unequal Variance t Two-Sample Test	0.0379	31243-103 failed pyrene
09-1966-4873	Pyrene	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pyrene
10-4299-4260	Pyrene	Unequal Variance t Two-Sample Test	4.4E-04	31243-105 failed pyrene

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Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

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Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	4.36	1.83	6.89	2.2	6.6	0.91	2.04	46.68%	-86.32%
31243-102		5	6.86	3.26	10.5	2.4	10	1.3	2.9	42.32%	-193.16%
31243-103		5	6.94	2.88	11	2.3	10	1.46	3.27	47.14%	-196.58%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	6.04	4.3	7.78	4.6	8	0.627	1.4	23.20%	-158.12%

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.5	0.0632	0.141	6.15%	1.71%
31243-102		5	2.34	2.17	2.51	2.2	2.5	0.06	0.134	5.73%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.3	0.0245	0.0548	2.45%	4.27%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	2.34	2.27	2.41	2.3	2.4	0.0245	0.0548	2.34%	0.00%

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.2	2.4	0.04	0.0894	3.82%	0.00%
31243-101		5	2.88	1.33	4.43	2.2	5.1	0.558	1.25	43.33%	-23.08%
31243-102		5	4.66	1.97	7.35	2.4	7.2	0.967	2.16	46.41%	-99.15%
31243-103		5	5.14	1.88	8.4	2.3	7.6	1.17	2.63	51.12%	-119.66%
31243-104		5	2.38	2.32	2.44	2.3	2.4	0.02	0.0447	1.88%	-1.71%
31243-105		5	8.28	6.43	10.1	6.6	10	0.666	1.49	17.98%	-253.85%

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Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

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Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		4.5	6.6	6.1	2.2	2.4
31243-102		10	8.8	6.6	6.5	2.4
31243-103		7.3	5.2	9.9	2.3	10
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		5	6.9	4.6	8	5.7

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis **EnviroSystems, Inc.**

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4
31243-102		2.2	2.4	2.2	2.5	2.4
31243-103		2.2	2.3	2.2	2.3	2.2
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	5.1	2.5	2.2	2.4
31243-102		7.2	6.2	5	2.5	2.4
31243-103		6.4	2.3	7.1	2.3	7.6
31243-104		2.4	2.3	2.4	2.4	2.4
31243-105		7.6	9.7	6.6	10	7.5

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Benzo(a)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	2.216971	2.13185	0.045459	0.05	TRUE	1.942439	4		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345226	1.85955	0.6962444	0.05	FALSE	0.1391558	8		C
Pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	25.5		0.3452381	0.05	FALSE		8	2	E
Pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.1875524	1.89458	0.5717259	0.05	FALSE	0.151524	7		C
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Benzo(a)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	3.479807	2.13185	0.0126782	0.05	TRUE	2.769104	4		C
Fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	6.555465	2.35336	0.0036091	0.05	TRUE	2.022923	3		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.1340939	8		C
Pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	2.396469	2.13185	0.0373209	0.05	TRUE	2.063821	4		C
Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Anthracene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Benzo(g,h,i)perylene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Chrysene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Dibenz(a,h)anthracene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	3.14288	2.13185	0.0173756	0.05	TRUE	3.120226	4		C
Fluorene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Naphthalene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
Pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.381621	2.13185	0.0379277	0.05	TRUE	2.506348	4		C
Acenaphthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Acenaphthylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Benzo(a)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Benzo(a)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Benzo(b)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Benzo(g,h,i)perylene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Benzo(k)fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Chrysene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Dibenz(a,h)anthracene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Fluoranthene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Fluorene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Indeno(1,2,3-cd)pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Naphthalene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Phenanthrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Pyrene	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944269	1.85955	0.198602	0.05	FALSE	0.08316156	8		C
Acenaphthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Acenaphthylene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Anthracene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Benzo(a)anthracene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Benzo(a)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Benzo(b)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Benzo(g,h,i)perylene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Benzo(k)fluoranthene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PAHs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Chrysene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Dibenz(a,h)anthracene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Fluoranthene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	5.893094	2.13185	0.0020733	0.05	TRUE	1.338488	4		C
Fluorene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Indeno(1,2,3-cd)pyrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Naphthalene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Phenanthrene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
Pyrene	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	8.904436	2.13185	0.0004396	0.05	TRUE	1.422119	4		C

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9665-6021	**Endpoint:**	Acenaphthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed acenaphthene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-6192-8737 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed acenaphthene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-0836-8009 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed acenaphthene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-1788-0916 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed acenaphthene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-4413-2322 **Endpoint:** Acenaphthene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed acenaphthene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Acenaphthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Acenaphthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2159-2510	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed acenaphthylene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-2529-9915	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed acenaphthylene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4723-1047	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed acenaphthylene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-2526-6563 **Endpoint:** Acenaphthylene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed acenaphthylene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-0121-1132	**Endpoint:**	Acenaphthylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed acenaphthylene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Acenaphthylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Acenaphthylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-5132-6343	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed anthracene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-7320-2909	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed anthracene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2962-3544	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed anthracene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-0555-5440 **Endpoint:** Anthracene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed anthracene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-8732-4772	**Endpoint:**	Anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed anthracene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-8344-3433	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed benzo(a)anthracene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-9538-2528	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed benzo(a)anthracene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-4041-8400	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed benzo(a)anthracene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-6928-9272	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(a)anthracene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-7392-5123	**Endpoint:**	Benzo(a)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed benzo(a)anthracene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(a)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Benzo(a)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-3036-3519	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed benzo(a)pyrene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-3219-3319	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed benzo(a)pyrene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-0004-4814	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed benzo(a)pyrene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-1353-1657	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(a)pyrene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-6171-5377	**Endpoint:**	Benzo(a)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed benzo(a)pyrene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(a)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Benzo(a)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-1429-0677	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed benzo(b)fluoranthene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-8372-5694	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed benzo(b)fluoranthene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-8437-3471	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed benzo(b)fluoranthene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-0060-6203	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(b)fluoranthene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-8336-4888	**Endpoint:**	Benzo(b)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed benzo(b)fluoranthene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(b)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Benzo(b)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2647-8037	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed benzo(g,h,i)perylene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-7389-5897	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed benzo(g,h,i)perylene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-9826-8440	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed benzo(g,h,i)perylene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1612-2308	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(g,h,i)perylene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-5125-4621	**Endpoint:**	Benzo(g,h,i)perylene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed benzo(g,h,i)perylene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(g,h,i)perylene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Benzo(g,h,i)perylene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-2173-7057 **Endpoint:** Benzo(k)fluoranthene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed benzo(k)fluoranthene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-7914-6075	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed benzo(k)fluoranthene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3779-5250	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed benzo(k)fluoranthene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-4336-0151	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed benzo(k)fluoranthene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-5794-5255	**Endpoint:**	Benzo(k)fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed benzo(k)fluoranthene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Benzo(k)fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Benzo(k)fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-5645-4137	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed chrysene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-3895-8292	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed chrysene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-9154-8922	**Endpoint:**	Chrysene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed chrysene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-4970-8907 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed chrysene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-8515-4298 **Endpoint:** Chrysene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed chrysene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Chrysene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Chrysene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-9708-7928	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed dibenz(a,h)anthracene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-8815-2917	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed dibenz(a,h)anthracene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4240-9278	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed dibenz(a,h)anthracene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-4231-5375	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed dibenz(a,h)anthracene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2515-8859	**Endpoint:**	Dibenz(a,h)anthracene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed dibenz(a,h)anthracene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Dibenz(a,h)anthracene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Dibenz(a,h)anthracene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-8939-5577	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed fluoranthene	83.01%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	2.22	2.13	1.94	4	CDF	0.0455	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7916	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.201	10.201	1	4.91	0.0575	Non-Significant Effect
Error	16.604	2.0755	8			
Total	26.805		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	518	23.2	2.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.876	0.741	0.1174	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	4.36	1.83	6.89	4.5	2.2	6.6	0.91	46.68%	-86.32%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		4.5	6.6	6.1	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1889-8287	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed fluoranthene	86.45%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	6.56	2.35	2.02	3	CDF	0.0036	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	70.5627	70.5627	1	55.6	1.4E-04	Significant Effect
Error	8.8795	1.2685	7			
Total	79.4422		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	369	24.3	4.9E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.701	0.2375	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		4	7.98	5.24	10.7	7.7	6.5	10	0.859	21.53%	-240.81%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		10	8.8	6.6	6.5	Outlier

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-3869-2219	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed fluoranthene	133.34%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	3.14	2.13	3.12	4	CDF	0.0174	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.29	0.1299	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.9	52.9	1	9.88	0.0137	Significant Effect
Error	42.844	5.3555	8			
Total	95.744		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1340	23.2	3.3E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.864	0.741	0.0844	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	6.94	2.88	11	7.3	2.3	10	1.46	47.14%	-196.58%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		7.3	5.2	9.9	2.3	10

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8566-4975	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed fluoranthene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-6906-3541	**Endpoint:**	Fluoranthene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed fluoranthene	57.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	5.89	2.13	1.34	4	CDF	0.0021	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1527	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	34.225	34.225	1	34.7	3.6E-04	Significant Effect
Error	7.884	0.9855	8			
Total	42.109		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	245	23.2	9.9E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.741	0.3390	Normal Distribution

Fluoranthene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	6.04	4.3	7.78	5.7	4.6	8	0.627	23.20%	-158.12%

Fluoranthene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		5	6.9	4.6	8	5.7

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-1459-0497	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed fluorene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-9241-4733	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed fluorene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-3100-2282 **Endpoint:** Fluorene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed fluorene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-3552-4991	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed fluorene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-4123-0949	**Endpoint:**	Fluorene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed fluorene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Fluorene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Fluorene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-5437-0629	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed indeno(1,2,3-cd)pyrene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-7419-7339	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed indeno(1,2,3-cd)pyrene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-5762-8097	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed indeno(1,2,3-cd)pyrene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-5754-1449	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed indeno(1,2,3-cd)pyrene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-0022-9335	**Endpoint:**	Indeno(1,2,3-cd)pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed indeno(1,2,3-cd)pyrene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Indeno(1,2,3-cd)pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Indeno(1,2,3-cd)pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-1692-6850	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed naphthalene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-2995-2727	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed naphthalene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-0962-8112	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed naphthalene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-7513-6801	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed naphthalene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-2247-2850	**Endpoint:**	Naphthalene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed naphthalene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Naphthalene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Naphthalene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3186-5631	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed phenanthrene	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.139	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.286	0.6075	Non-Significant Effect
Error	0.112	0.014	8			
Total	0.116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.3	2.12	2.48	2.2	2.2	2.5	0.0632	6.15%	1.71%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	2.2	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-3981-9690	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed phenanthrene	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.134	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.104	0.013	8			
Total	0.104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	2.34	2.17	2.51	2.4	2.2	2.5	0.06	5.73%	0.00%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		2.2	2.4	2.2	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4179-7054	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed phenanthrene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.025	0.025	1	4.55	0.0656	Non-Significant Effect
Error	0.044	0.0055	8			
Total	0.069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	2.24	2.17	2.31	2.2	2.2	2.3	0.0245	2.45%	4.27%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		2.2	2.3	2.2	2.3	2.2

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-2865-5228	**Endpoint:**	Phenanthrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed phenanthrene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-7720-5808 **Endpoint:** Phenanthrene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed phenanthrene	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.421E-14	1.421E-14	1	2.58E-12	1.0000	Non-Significant Effect
Error	0.0440001	0.0055000	8			
Total	0.0440001		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Phenanthrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	2.34	2.27	2.41	2.3	2.3	2.4	0.0245	2.34%	0.00%

Phenanthrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		2.4	2.4	2.3	2.3	2.3

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-7891-2478	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pyrene	44.46%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	25.5	n/a	2	8	Exact	0.3452	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.1E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.729	0.729	1	0.932	0.3627	Non-Significant Effect
Error	6.26	0.7825	8			
Total	6.989		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	195	23.2	1.6E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.692	0.741	7.0E-04	Non-Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-101		5	2.88	1.33	4.43	2.4	2.2	5.1	0.558	43.33%	-23.08%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-101		2.2	5.1	2.5	2.2	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-4209-7979	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pyrene	88.20%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	2.4	2.13	2.06	4	CDF	0.0373	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.29	0.5667	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	13.456	13.456	1	5.74	0.0434	Significant Effect
Error	18.744	2.343	8			
Total	32.2		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	585	23.2	1.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.891	0.741	0.1731	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-102		5	4.66	1.97	7.35	5	2.4	7.2	0.967	46.41%	-99.15%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-102		7.2	6.2	5	2.5	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-5318-6439	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pyrene	107.11%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.38	2.13	2.51	4	CDF	0.0379	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.62	2.29	0.8579	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19.6	19.6	1	5.67	0.0444	Significant Effect
Error	27.644	3.4555	8			
Total	47.244		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	863	23.2	8.0E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.88	0.741	0.1304	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-103		5	5.14	1.88	8.4	6.4	2.3	7.6	1.17	51.12%	-119.66%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-103		6.4	2.3	7.1	2.3	7.6

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-1966-4873 **Endpoint:** Pyrene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:47 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pyrene	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.083	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004	0.004	1	0.8	0.3972	Non-Significant Effect
Error	0.04	0.0050000	8			
Total	0.044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-104		5	2.38	2.32	2.44	2.4	2.3	2.4	0.02	1.88%	-1.71%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-104		2.4	2.3	2.4	2.4	2.4

Bioaccumulation Evaluation - PAHs - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-4299-4260	**Endpoint:**	Pyrene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:47	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 failed pyrene	60.77%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105*	8.9	2.13	1.42	4	CDF	4.4E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6235	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	88.209	88.209	1	79.3	2.0E-05	Significant Effect
Error	8.9	1.1125	8			
Total	97.109		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	277	23.2	7.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.92	0.741	0.3574	Normal Distribution

Pyrene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	2.34	2.23	2.45	2.4	2.2	2.4	0.04	3.82%	0.00%
31243-105		5	8.28	6.43	10.1	7.6	6.6	10	0.666	17.98%	-253.85%

Pyrene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	2.2	2.4	2.4	2.4
31243-105		7.6	9.7	6.6	10	7.5

Nereis virens
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

PCB Congeners

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Pre-Tissue					
CONTAMINANT	REP1	*	REP2	*	REP3	*
PCB Congeners (ng/g wet wt.)						
PCB 8	0.24	U	0.24	U	1.7	
PCB 18	0.24	U	0.24	U	5.3	
PCB 28	0.24	U	0.24	U	0.23	U
PCB 44	0.24	U	0.24	U	0.23	U
PCB 52	0.24	U	0.24	U	0.58	J
PCB 66	0.24	U	0.24	U	0.23	U
PCB 101	0.50	J	0.24	U	0.53	J
PCB 105	0.24	U	0.24	U	0.23	U
PCB 118	0.24	U	0.24	U	0.23	U
PCB 128	0.24	U	0.24	U	0.23	U
PCB 138	1.8		2.3		2.8	
PCB 153	2.6		2.6		4.2	
PCB 170	0.88	J	1.0		1.7	
PCB 180	2.5		2.7		3.8	
PCB 187	2.1		1.8		2.9	
PCB 195	0.24	U	0.24	U	0.23	U
PCB 206	0.24	U	0.24	U	0.23	U
PCB 209	0.24	U	0.24	U	0.23	U
Total PCBs	26		27		51	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 18	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 28	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 44	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 52	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 66	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 101	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 105	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 118	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 128	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 138	1.4		0.9		0.8	J	1.4		0.9	J
PCB 153	2.1		1.4		1.3		2.1		1.6	
PCB 170	0.76	J	0.22	U	0.24	U	0.54	J	0.24	U
PCB 180	2.3		0.82	J	1.2		1.8		1.1	
PCB 187	1.8		0.58	J	0.61	J	1.5		0.66	J
PCB 195	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 206	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
PCB 209	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Total PCBs	23		14		14		21		15	

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 18	0.22	U	1.0		0.25	U	0.22	U	0.24	U
PCB 28	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 44	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 52	0.50	J	0.69	J	0.82	J	0.53	J	0.64	J
PCB 66	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 101	0.22	U	0.51	J	0.25	U	0.22	U	0.60	J
PCB 105	0.22	U	0.48	J	0.25	U	0.22	U	0.24	U
PCB 118	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 128	0.22	U	0.46	J	0.25	U	0.22	U	0.24	U
PCB 138	1.2		3.3		1.4		1.9		1.9	
PCB 153	1.4		5.5		1.8		3.3		3.3	
PCB 170	0.22	U	2.6		0.25	U	0.83	J	1.4	
PCB 180	1.2		5.9		1.6		3.5		3.2	
PCB 187	0.77	J	3.7		0.79	J	2.4		1.7	
PCB 195	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 206	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
PCB 209	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Total PCBs	16		52		19		30		31	

* = Qualifiers
U Analyte not detected; below Mthe Method Detection Limit
J Analyte estimated; detection beDetection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 18	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 28	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 44	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 52	0.59	J	0.24	U	0.22	U	0.25	U	0.24	U
PCB 66	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 101	0.63	J	0.57	J	0.60	J	0.25	U	0.24	U
PCB 105	0.59	J	0.24	U	0.22	U	0.25	U	0.24	U
PCB 118	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 128	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 138	3.4		1.9		1.1		1.6		1.2	
PCB 153	5.8		3.2		1.7		2.5		1.9	
PCB 170	2.3		1.1		0.22	U	0.86	J	0.24	U
PCB 180	5.6		2.8		1.3		2.6		1.6	
PCB 187	3.8		2.0		0.88		1.9		1.1	
PCB 195	0.69	J	0.24	U	0.22	U	0.25	U	0.24	U
PCB 206	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
PCB 209	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
Total PCBs	51		29		17		25		18	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.22	U	0.23	U	1.7		0.23	U	0.22	U
PCB 18	1.7		1.3		2.1		0.23	U	0.22	U
PCB 28	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 44	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 52	0.82	J	1.1		1.1		0.61	J	1.3	
PCB 66	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 101	0.71	J	0.69	J	0.99		0.23	U	1.3	
PCB 105	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 118	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 128	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 138	2.4		2.1		1.9		1.4		5.0	
PCB 153	3.8		2.6		2.4		2.4		7.5	
PCB 170	1.3		0.23	U	0.22	U	0.23	U	3.5	
PCB 180	3.6		2.1		1.6		1.7		7.4	
PCB 187	2.4		1.7		1.6		1.6		4.8	
PCB 195	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 206	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
PCB 209	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
Total PCBs	38		28		31		21		66	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 18	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 28	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 44	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 52	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 66	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 101	0.64	J	0.23	U	0.24	U	0.24	U	0.24	U
PCB 105	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 118	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 128	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 138	2.5		1.5		0.61	J	1.1		1.8	
PCB 153	3.7		2.5		1.1		1.7		3.2	
PCB 170	1.5		0.72	J	0.24	U	0.76	J	1.4	
PCB 180	3.7		2.2		0.98		0.85	J	3.1	
PCB 187	2.4		1.6		0.24	U	0.69	J	2.2	
PCB 195	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 206	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
PCB 209	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Total PCBs	34		23		13		16		29	

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U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
PCB Congeners (ng/g wet wt.)										
PCB 8	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 18	0.24	U	0.24	U	3.5		0.23	U	0.23	U
PCB 28	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 44	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 52	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 66	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 101	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 105	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 118	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 128	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 138	0.69	J	0.86	J	1.3		1.3		1.5	
PCB 153	1.3		1.3		2.0		2.0		2.7	
PCB 170	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 180	0.64	J	0.64	J	1.4		1.6		1.9	
PCB 187	0.24	U	0.56	J	1.3		1.1		1.1	
PCB 195	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 206	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
PCB 209	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Total PCBs	12		13		25		18		21	

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

CETIS Test Data Worksheet

Report Date: 01 Feb-19 14:15 (p 1 of 1)
Test Code/ID: 12-5299-7080/31250Nv-PCB

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

Start Date: 20 Nov-18 12:03 **Species:** Nereis virens **Sample Code:** 31250-000
End Date: 18 Dec-18 12:03 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 20 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Nv)

Sample	Rep	Pos	PCB 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087	PCB 049	PCB 183	PCB 184	Total PCBs
31242-008	1	5	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.4	2.1	0.76	2.3	1.8	0.23	0.23	0.23	0.23	0.23	0.63	0.23	
31242-008	2	11	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.92	1.4	0.22	0.82	0.58	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31242-008	3	17	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.82	1.3	0.24	1.2	0.61	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31242-008	4	19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.4	2.1	0.54	1.8	1.5	0.24	0.24	0.24	0.24	0.24	0.52	0.24	
31242-008	5	25	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.87	1.6	0.24	1.1	0.66	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-101	1	3	0.22	0.22	0.22	0.22	0.5	0.22	0.22	0.22	0.22	0.22	1.2	1.4	0.22	1.2	0.77	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31243-101	2	9	0.22	1	0.22	0.22	0.69	0.22	0.51	0.48	0.22	0.46	3.3	5.5	2.6	5.9	3.7	0.22	0.22	0.22	0.22	0.22	1.4	0.22	
31243-101	3	13	0.25	0.25	0.25	0.25	0.82	0.25	0.25	0.25	0.25	0.25	1.4	1.8	0.25	1.6	0.79	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
31243-101	4	24	0.22	0.22	0.22	0.22	0.53	0.22	0.22	0.22	0.22	0.22	1.9	3.3	0.83	3.5	2.4	0.22	0.22	0.22	0.22	0.22	1	0.22	
31243-101	5	29	0.24	0.24	0.24	0.24	0.64	0.24	0.6	0.24	0.24	0.24	1.9	3.3	1.4	3.2	1.7	0.24	0.24	0.24	0.24	0.24	0.99	0.24	
31243-102	1	4	0.22	0.22	0.22	0.22	0.59	0.22	0.63	0.59	0.22	0.22	3.4	5.8	2.3	5.6	3.8	0.69	0.22	0.22	0.22	0.22	1.7	0.22	
31243-102	2	10	0.24	0.24	0.24	0.24	0.24	0.24	0.57	0.24	0.24	0.24	1.9	3.2	1.1	2.8	2	0.24	0.24	0.24	0.24	0.24	0.76	0.24	
31243-102	3	15	0.22	0.22	0.22	0.22	0.22	0.22	0.6	0.22	0.22	0.22	1.1	1.7	0.22	1.3	0.88	0.22	0.22	0.22	0.22	0.22	0.44	0.22	
31243-102	4	21	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.6	2.5	0.86	2.6	1.9	0.25	0.25	0.25	0.25	0.25	0.87	0.25	
31243-102	5	30	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.2	1.9	0.24	1.6	1.1	0.24	0.24	0.24	0.24	0.24	0.56	0.24	
31243-103	1	2	0.22	1.7	0.22	0.22	0.82	0.22	0.71	0.22	0.22	0.22	2.4	3.8	1.3	3.6	2.4	0.22	0.22	0.22	0.22	0.22	0.96	0.22	
31243-103	2	8	0.23	1.3	0.23	0.23	1.1	0.23	0.69	0.23	0.23	0.23	2.1	2.6	0.23	2.1	1.7	0.23	0.23	0.23	0.23	0.23	0.76	0.23	
31243-103	3	14	1.7	2.1	0.22	0.22	1.1	0.22	0.99	0.22	0.22	0.22	1.9	2.4	0.22	1.6	1.6	0.22	0.22	0.22	0.22	1.3	0.6	0.22	
31243-103	4	20	0.23	0.23	0.23	0.23	0.61	0.23	0.23	0.23	0.23	0.23	1.4	2.4	0.23	1.7	1.6	0.23	0.23	0.23	0.23	0.23	0.58	0.23	
31243-103	5	27	0.22	0.22	0.22	0.22	1.3	0.22	1.3	0.22	0.22	0.22	5	7.5	3.5	7.4	4.8	0.22	0.22	0.22	0.22	0.22	2.1	0.22	
31243-104	1	1	0.24	0.24	0.24	0.24	0.24	0.24	0.64	0.24	0.24	0.24	2.5	3.7	1.5	3.7	2.4	0.24	0.24	0.24	0.24	0.24	1.1	0.24	
31243-104	2	12	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.5	2.5	0.72	2.2	1.6	0.23	0.23	0.23	0.23	0.23	0.67	0.23	
31243-104	3	18	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.61	1.1	0.24	0.98	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-104	4	23	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.1	1.7	0.76	0.85	0.69	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-104	5	26	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.8	3.2	1.4	3.1	2.2	0.24	0.24	0.24	0.24	0.24	0.86	0.24	
31243-105	1	6	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.69	1.3	0.24	0.64	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	2	7	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.86	1.3	0.24	0.64	0.56	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	3	16	0.23	3.5	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.3	2	0.23	1.4	1.3	0.23	0.23	0.23	0.23	0.23	0.55	0.23	
31243-105	4	22	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.3	2	0.23	1.6	1.1	0.23	0.23	0.23	0.23	0.23	0.51	0.23	
31243-105	5	28	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.5	2.7	0.23	1.9	1.1	0.23	0.23	0.23	0.23	0.23	0.53	0.23	

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Batch ID:	14-8521-9393	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	Nancy Roka
Start Date:	20 Nov-18 12:03	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	18 Dec-18 12:03	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-6293-6609	PCB 008	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 008
12-5370-7000	PCB 008	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 008
10-0958-2585	PCB 008	Equal Variance t Two-Sample Test	0.9366	31243-103 passed pcb 008
05-6882-3060	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.8095	31243-103 passed pcb 008
02-8737-0229	PCB 008	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 008
08-4865-7985	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 008
13-4097-2498	PCB 018	Equal Variance t Two-Sample Test	0.5717	31243-101 passed pcb 018
17-9884-6839	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.3452	31243-101 passed pcb 018
05-1476-9782	PCB 018	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 018
07-6364-2943	PCB 018	Unequal Variance t Two-Sample Test	0.0420	31243-103 failed pcb 018
08-7948-8948	PCB 018	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 018
02-5681-1115	PCB 018	Equal Variance t Two-Sample Test	0.4264	31243-105 passed pcb 018
12-7235-1533	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.3611	31243-105 passed pcb 018
18-2811-4275	PCB 028	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 028
18-0214-6474	PCB 028	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 028
10-9104-5152	PCB 028	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 028
14-4675-9807	PCB 028	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 028
04-0286-9394	PCB 028	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 028
00-8780-5410	PCB 044	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 044
21-3624-3681	PCB 044	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 044
09-0793-0409	PCB 044	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 044
04-0033-2893	PCB 044	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 044
15-9645-9929	PCB 044	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 044
14-2637-8904	PCB 052	Unequal Variance t Two-Sample Test	0.0011	31243-101 failed pcb 052
04-9017-1224	PCB 052	Equal Variance t Two-Sample Test	0.3197	31243-102 passed pcb 052
20-0746-4815	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.1984	31243-102 passed pcb 052
01-0589-9465	PCB 052	Unequal Variance t Two-Sample Test	0.0017	31243-103 failed pcb 052
01-8133-5322	PCB 052	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 052
10-5911-0054	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 052
18-8030-3763	PCB 066	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 066
15-1029-0270	PCB 066	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 066
10-3592-3211	PCB 066	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 066
00-3896-4606	PCB 066	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 066

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-2800-6482	PCB 066	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 066
03-8378-1432	PCB 101	Unequal Variance t Two-Sample Test	0.0977	31243-101 passed pcb 101
00-8072-0948	PCB 101	Unequal Variance t Two-Sample Test	0.0314	31243-102 failed pcb 101
09-4659-8210	PCB 101	Unequal Variance t Two-Sample Test	0.0181	31243-103 failed pcb 101
21-1684-6051	PCB 101	Equal Variance t Two-Sample Test	0.2549	31243-104 passed pcb 101
07-5194-7433	PCB 101	Wilcoxon Rank Sum Two-Sample Test	0.2421	31243-104 passed pcb 101
20-6924-6284	PCB 101	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 101
16-8554-5999	PCB 105	Equal Variance t Two-Sample Test	0.5717	31243-101 passed pcb 105
18-0181-7950	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.3452	31243-101 passed pcb 105
07-8785-0667	PCB 105	Equal Variance t Two-Sample Test	0.3197	31243-102 passed pcb 105
09-9401-1134	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.1984	31243-102 passed pcb 105
16-7369-1441	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 105
20-3929-1236	PCB 105	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 105
08-6494-7432	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 105
11-8392-1723	PCB 118	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 118
15-4876-6864	PCB 118	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 118
09-0700-1259	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 118
01-9603-4432	PCB 118	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 118
04-8519-2812	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 118
04-4961-7501	PCB 128	Equal Variance t Two-Sample Test	0.5717	31243-101 passed pcb 128
08-0160-3503	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.3452	31243-101 passed pcb 128
14-5158-7822	PCB 128	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 128
13-1775-8631	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 128
20-2981-3996	PCB 128	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 128
05-4360-1100	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 128
07-3923-4895	PCB 138	Equal Variance t Two-Sample Test	0.0294	31243-101 failed pcb 138
10-1604-8179	PCB 138	Equal Variance t Two-Sample Test	0.0236	31243-101 failed pcb 138
02-3288-6218	PCB 138	Equal Variance t Two-Sample Test	0.0600	31243-102 passed pcb 138
09-1276-9526	PCB 138	Equal Variance t Two-Sample Test	0.0691	31243-102 passed pcb 138
18-3519-7354	PCB 138	Equal Variance t Two-Sample Test	0.0040	31243-103 failed pcb 138
06-6096-8619	PCB 138	Unequal Variance t Two-Sample Test	0.0418	31243-103 failed pcb 138
20-7568-6026	PCB 138	Equal Variance t Two-Sample Test	0.1292	31243-104 passed pcb 138
21-4637-3684	PCB 138	Equal Variance t Two-Sample Test	0.4084	31243-105 passed pcb 138
17-7555-1871	PCB 153	Equal Variance t Two-Sample Test	0.0520	31243-101 passed pcb 153
01-2130-8938	PCB 153	Equal Variance t Two-Sample Test	0.0603	31243-102 passed pcb 153
19-3243-2511	PCB 153	Equal Variance t Two-Sample Test	0.0607	31243-102 passed pcb 153
01-9546-8026	PCB 153	Equal Variance t Two-Sample Test	0.0085	31243-103 failed pcb 153
06-2136-4120	PCB 153	Wilcoxon Rank Sum Two-Sample Test	0.0040	31243-103 failed pcb 153
02-4585-5256	PCB 153	Equal Variance t Two-Sample Test	0.0903	31243-104 passed pcb 153
12-4375-4832	PCB 153	Equal Variance t Two-Sample Test	0.3112	31243-105 passed pcb 153
16-6184-0001	PCB 170	Equal Variance t Two-Sample Test	0.0923	31243-101 passed pcb 170
01-2200-8170	PCB 170	Equal Variance t Two-Sample Test	0.2014	31243-102 passed pcb 170
05-3176-7922	PCB 170	Equal Variance t Two-Sample Test	0.1029	31243-102 passed pcb 170
08-1611-4290	PCB 170	Wilcoxon Rank Sum Two-Sample Test	0.5476	31243-103 passed pcb 170
21-4204-6097	PCB 170	Wilcoxon Rank Sum Two-Sample Test	0.7778	31243-103 passed pcb 170
19-8791-1887	PCB 170	Equal Variance t Two-Sample Test	0.0382	31243-104 failed pcb 170
17-4336-0101	PCB 170	Unequal Variance t Two-Sample Test	0.9006	31243-105 passed pcb 170
03-8751-1837	PCB 180	Equal Variance t Two-Sample Test	0.0491	31243-101 failed pcb 180
07-8247-7583	PCB 180	Equal Variance t Two-Sample Test	0.0680	31243-102 passed pcb 180
12-9222-0795	PCB 180	Equal Variance t Two-Sample Test	0.0987	31243-102 passed pcb 180
03-2279-5629	PCB 180	Equal Variance t Two-Sample Test	0.0779	31243-103 passed pcb 180
05-4390-3167	PCB 180	Equal Variance t Two-Sample Test	0.0703	31243-103 passed pcb 180
12-8631-2364	PCB 180	Equal Variance t Two-Sample Test	0.1404	31243-104 passed pcb 180

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
06-3650-8296	PCB 180	Equal Variance t Two-Sample Test	0.7053	31243-105 passed pcb 180
06-5261-0709	PCB 187	Equal Variance t Two-Sample Test	0.1013	31243-101 passed pcb 187
11-2776-6571	PCB 187	Equal Variance t Two-Sample Test	0.0770	31243-102 passed pcb 187
00-7104-7720	PCB 187	Equal Variance t Two-Sample Test	0.0255	31243-103 failed pcb 187
16-5635-1341	PCB 187	Equal Variance t Two-Sample Test	0.0351	31243-103 failed pcb 187
04-7675-9424	PCB 187	Equal Variance t Two-Sample Test	0.2224	31243-104 passed pcb 187
02-4504-9367	PCB 187	Equal Variance t Two-Sample Test	0.6924	31243-105 passed pcb 187
21-1876-5519	PCB 195	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 195
20-5792-3653	PCB 195	Equal Variance t Two-Sample Test	0.3197	31243-102 passed pcb 195
20-3233-0170	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.1984	31243-102 passed pcb 195
03-8811-2549	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 195
08-5378-2959	PCB 195	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 195
06-5933-6910	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 195
08-9335-9036	PCB 206	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 206
12-1341-6090	PCB 206	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 206
17-6517-0670	PCB 206	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 206
00-3419-5473	PCB 206	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 206
16-9254-8177	PCB 206	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 206
16-7537-8356	PCB 209	Equal Variance t Two-Sample Test	0.6962	31243-101 passed pcb 209
03-4203-2272	PCB 209	Equal Variance t Two-Sample Test	0.5000	31243-102 passed pcb 209
03-1203-7495	PCB 209	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed pcb 209
09-5588-2269	PCB 209	Equal Variance t Two-Sample Test	0.1986	31243-104 passed pcb 209
06-6086-0310	PCB 209	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed pcb 209

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.52	-0.299	1.34	0.22	1.7	0.295	0.66	126.86%	-122.22%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.386	-0.0405	0.812	0.22	1	0.154	0.343	88.99%	-64.96%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	1.11	0.0472	2.17	0.22	2.1	0.383	0.856	77.12%	-374.36%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.888	-0.925	2.7	0.23	3.5	0.653	1.46	164.43%	-279.49%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.636	0.476	0.796	0.5	0.82	0.0577	0.129	20.28%	-171.79%
31243-102		5	0.308	0.112	0.504	0.22	0.59	0.0707	0.158	51.30%	-31.62%
31243-103		5	0.986	0.65	1.32	0.61	1.3	0.121	0.271	27.47%	-321.37%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.36	0.135	0.585	0.22	0.6	0.0811	0.181	50.35%	-53.85%
31243-102		5	0.458	0.215	0.701	0.24	0.63	0.0875	0.196	42.71%	-95.73%
31243-103		5	0.784	0.291	1.28	0.23	1.3	0.177	0.397	50.62%	-235.04%
31243-104		5	0.318	0.0944	0.542	0.23	0.64	0.0805	0.18	56.62%	-35.90%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.282	0.144	0.42	0.22	0.48	0.0498	0.111	39.52%	-20.51%
31243-102		5	0.308	0.112	0.504	0.22	0.59	0.0707	0.158	51.30%	-31.62%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.278	0.151	0.405	0.22	0.46	0.0459	0.103	36.89%	-18.80%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.82	1.4	0.131	0.292	27.03%	0.00%
31243-101		5	1.94	0.921	2.96	1.2	3.3	0.367	0.82	42.29%	-79.30%
31243-102		5	1.84	0.687	2.99	1.1	3.4	0.415	0.929	50.49%	-70.06%
31243-103		5	2.56	0.807	4.31	1.4	5	0.631	1.41	55.15%	-136.60%
31243-104		5	1.5	0.615	2.39	0.61	2.5	0.32	0.715	47.57%	-38.82%
31243-105		5	1.13	0.708	1.55	0.69	1.5	0.152	0.34	30.05%	-4.44%

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.7	1.23	2.17	1.3	2.1	0.17	0.381	22.40%	0.00%
31243-101		5	3.06	1.06	5.06	1.4	5.5	0.722	1.61	52.72%	-80.00%
31243-102		5	3.02	0.958	5.08	1.7	5.8	0.743	1.66	54.98%	-77.65%
31243-103		5	3.74	1.03	6.45	2.4	7.5	0.975	2.18	58.32%	-120.00%
31243-104		5	2.44	1.12	3.76	1.1	3.7	0.475	1.06	43.53%	-43.53%
31243-105		5	1.86	1.13	2.59	1.3	2.7	0.262	0.586	31.49%	-9.41%

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.4	0.1	0.7	0.22	0.76	0.108	0.241	60.31%	0.00%
31243-101		5	1.06	-0.166	2.29	0.22	2.6	0.442	0.988	93.17%	-165.00%
31243-102		5	0.944	-0.111	2	0.22	2.3	0.38	0.85	90.04%	-136.00%
31243-103		5	1.1	-0.67	2.86	0.22	3.5	0.636	1.42	129.74%	-174.00%
31243-104		5	0.924	0.274	1.57	0.24	1.5	0.234	0.523	56.62%	-131.00%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	41.50%

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.44	0.702	2.19	0.82	2.3	0.267	0.597	41.36%	0.00%
31243-101		5	3.08	0.768	5.39	1.2	5.9	0.833	1.86	60.45%	-113.30%
31243-102		5	2.78	0.668	4.89	1.3	5.6	0.761	1.7	61.17%	-92.52%
31243-103		5	3.28	0.252	6.31	1.6	7.4	1.09	2.44	74.35%	-127.15%
31243-104		5	2.17	0.6	3.73	0.85	3.7	0.564	1.26	58.24%	-50.00%
31243-105		5	1.24	0.525	1.95	0.64	1.9	0.256	0.572	46.31%	14.40%

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	1.03	0.314	1.75	0.58	1.8	0.258	0.577	55.97%	0.00%
31243-101		5	1.87	0.347	3.4	0.77	3.7	0.549	1.23	65.62%	-81.75%
31243-102		5	1.94	0.508	3.36	0.88	3.8	0.514	1.15	59.42%	-87.96%
31243-103		5	2.42	0.717	4.12	1.6	4.8	0.614	1.37	56.69%	-134.95%
31243-104		5	1.43	0.26	2.59	0.24	2.4	0.42	0.939	65.84%	-38.45%
31243-105		5	0.86	0.311	1.41	0.24	1.3	0.198	0.442	51.45%	16.50%

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.328	0.0764	0.58	0.22	0.69	0.0906	0.203	61.79%	-40.17%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	1.7	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	1	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		1.7	1.3	2.1	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	3.5	0.23	0.23

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.5	0.69	0.82	0.53	0.64
31243-102		0.59	0.24	0.22	0.25	0.24
31243-103		0.82	1.1	1.1	0.61	1.3
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.51	0.25	0.22	0.6
31243-102		0.63	0.57	0.6	0.25	0.24
31243-103		0.71	0.69	0.99	0.23	1.3
31243-104		0.64	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.48	0.25	0.22	0.24
31243-102		0.59	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.46	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-101		1.2	3.3	1.4	1.9	1.9
31243-102		3.4	1.9	1.1	1.6	1.2
31243-103		2.4	2.1	1.9	1.4	5
31243-104		2.5	1.5	0.61	1.1	1.8
31243-105		0.69	0.86	1.3	1.3	1.5

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-101		1.4	5.5	1.8	3.3	3.3
31243-102		5.8	3.2	1.7	2.5	1.9
31243-103		3.8	2.6	2.4	2.4	7.5
31243-104		3.7	2.5	1.1	1.7	3.2
31243-105		1.3	1.3	2	2	2.7

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-101		0.22	2.6	0.25	0.83	1.4
31243-102		2.3	1.1	0.22	0.86	0.24
31243-103		1.3	0.23	0.22	0.23	3.5
31243-104		1.5	0.72	0.24	0.76	1.4
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-101		1.2	5.9	1.6	3.5	3.2
31243-102		5.6	2.8	1.3	2.6	1.6
31243-103		3.6	2.1	1.6	1.7	7.4
31243-104		3.7	2.2	0.98	0.85	3.1
31243-105		0.64	0.64	1.4	1.6	1.9

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-101		0.77	3.7	0.79	2.4	1.7
31243-102		3.8	2	0.88	1.9	1.1
31243-103		2.4	1.7	1.6	1.6	4.8
31243-104		2.4	1.6	0.24	0.69	2.2
31243-105		0.24	0.56	1.3	1.1	1.1

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.69	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	25.5		0.3452381	0.05	FALSE		8	2	E
PCB 018	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.1875523	1.89458	0.5717258	0.05	FALSE	0.0151524	7		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 044	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 052	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	6.95381	2.13185	0.0011236	0.05	TRUE	0.1232421	4		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 2	1.5526	2.13185	0.0977369	0.05	FALSE	0.1730083	4		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	25.5		0.3452381	0.05	FALSE		8	2	E
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.1875523	1.89458	0.5717258	0.05	FALSE	0.0151524	7		C
PCB 118	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 128	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 2	25.5		0.3452381	0.05	FALSE		8	2	E
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.1875523	1.89458	0.5717258	0.05	FALSE	0.0151524	7		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	2.20287	1.85955	0.0293653	0.05	TRUE	0.724279	8		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	2.404252	1.89458	0.0235853	0.05	TRUE	0.4081901	7		C
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	1.834491	1.85955	0.0519597	0.05	FALSE	1.378576	8		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	1.451584	1.85955	0.0923381	0.05	FALSE	0.8454913	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	1.870801	1.85955	0.049143	0.05	TRUE	1.62616	8		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	1.387555	1.85955	0.1013491	0.05	FALSE	1.128416	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 2	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 018	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 044	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	22.5		0.1984127	0.05	FALSE		8	2	E
PCB 052	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.489584	1.89458	0.3196984	0.05	FALSE	0.0135442	7		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 3	2.557704	2.13185	0.0313953	0.05	TRUE	0.186704	4		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	22.5		0.1984127	0.05	FALSE		8	2	E
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.489584	1.89458	0.3196984	0.05	FALSE	0.0135442	7		C
PCB 118	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.740327	1.85955	0.0599923	0.05	FALSE	0.8099266	8		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.673627	1.89458	0.0690593	0.05	FALSE	0.4165833	7		C
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.732648	1.85955	0.0606964	0.05	FALSE	1.416678	8		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.76638	1.89458	0.0603364	0.05	FALSE	0.6703608	7		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.376726	1.85955	0.1029467	0.05	FALSE	0.7347827	8		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.8905411	1.89458	0.2013721	0.05	FALSE	0.4361266	7		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.657441	1.85955	0.0680094	0.05	FALSE	1.498911	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.424039	1.89458	0.0987243	0.05	FALSE	0.8394986	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	1.574341	1.85955	0.0770279	0.05	FALSE	1.070131	8		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 3	22.5		0.1984127	0.05	FALSE		8	2	E
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0.489584	1.89458	0.3196984	0.05	FALSE	0.0135442	7		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 3	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
PCB 008	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	31		0.8095238	0.05	FALSE		8	2	E
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	-1.73205	1.89458	0.9365647	0.05	FALSE	0.00984452	7		C
PCB 018	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.288244	2.13185	0.0420097	0.05	TRUE	0.8161271	4		C
PCB 028	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 044	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 052	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	6.20408	2.13185	0.0017167	0.05	TRUE	0.2584023	4		C
PCB 066	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 101	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	3.098309	2.13185	0.0181403	0.05	TRUE	0.3784373	4		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 118	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 128	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 138	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.292357	2.13185	0.0418198	0.05	TRUE	1.374511	4		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	3.665931	1.89458	0.0040036	0.05	TRUE	0.4485884	7		C
PCB 153	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	15		0.0039683	0.05	TRUE		8	0	E
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	3.114832	1.89458	0.008483	0.05	TRUE	0.6690687	7		C
PCB 170	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	27.5		0.547619	0.05	FALSE		8	1	E
PCB 170	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	22.5		0.7777778	0.05	FALSE		7	1	E
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	1.635161	1.85955	0.0703272	0.05	FALSE	2.087947	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	1.590106	1.89458	0.0779181	0.05	FALSE	0.9603327	7		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.088679	1.85955	0.035081	0.05	TRUE	1.237515	8		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 4	2.35209	1.89458	0.0254653	0.05	TRUE	0.6403624	7		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 206	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 209	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 4	35.5		0.9761904	0.05	FALSE		8	2	E
PCB 008	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 018	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 044	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 052	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 101	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 5	23		0.2420635	0.05	FALSE		8	2	E
PCB 101	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.6945642	1.89458	0.2548586	0.05	FALSE	0.00954703	7		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 118	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.216457	1.85955	0.1292403	0.05	FALSE	0.642037	8		C
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.466569	1.85955	0.090334	0.05	FALSE	0.9382889	8		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	2.033882	1.85955	0.0381979	0.05	TRUE	0.4790854	8		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	1.156731	1.85955	0.1403766	0.05	FALSE	1.16068	8		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8036639	1.85955	0.2224061	0.05	FALSE	0.9162799	8		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	vs	Comp 5	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
PCB 008	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 018	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	25		0.3611111	0.05	FALSE		8	2	E
PCB 018	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.1924506	1.89458	0.4264268	0.05	FALSE	0.00984452	7		C
PCB 028	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 044	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 052	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 066	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 101	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 105	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 118	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 128	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 138	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.2395095	1.85955	0.4083664	0.05	FALSE	0.3726712	8		C
PCB 153	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	0.5121476	1.85955	0.3111916	0.05	FALSE	0.5809414	8		C
PCB 170	Unequal Variance t Two-Sample Test	CLDS	vs	Comp 6	-1.538224	2.13185	0.9005907	0.05	FALSE	0.2300617	4		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	-0.5622197	1.85955	0.7053161	0.05	FALSE	0.6879624	8		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	vs	Comp 6	-0.5230398	1.85955	0.6924401	0.05	FALSE	0.604396	8		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 206	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E
PCB 209	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	Comp 6	28.5		0.6587301	0.05	FALSE		8	2	E

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-6293-6609	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 008	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-5370-7000	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 008	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-6882-3060	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 008	234.46%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	31	n/a	2	8	Exact	0.8095	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.20449	0.20449	1	0.94	0.3607	Non-Significant Effect
Error	1.74092	0.217615	8			
Total	1.94541		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5440	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.633	0.741	1.4E-04	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.52	-0.299	1.34	0.23	0.22	1.7	0.295	126.86%	-122.22%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	1.7	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-0958-2585	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 008	4.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-1.73	1.89	0.01	7	CDF	0.9366	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00018	0.00018	1	3	0.1269	Non-Significant Effect
Error	0.00042	0.00006	7			
Total	0.0006		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	46.2	0.4979	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.804	0.701	0.0227	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		4	0.225	0.216	0.234	0.225	0.22	0.23	0.00289	2.57%	3.85%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	Outlier	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-8737-0229	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 008	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-4865-7985	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 008	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-9884-6839	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 018	122.11%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	25.5	n/a	2	8	Exact	0.3452	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.7E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05776	0.05776	1	0.978	0.3515	Non-Significant Effect
Error	0.47224	0.05903	8			
Total	0.53		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1470	23.2	2.8E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.651	0.741	2.3E-04	Non-Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.386	-0.0405	0.812	0.24	0.22	1	0.154	88.99%	-64.96%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	1	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-1476-9782	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 018	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-6364-2943 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 018	348.77%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.29	2.13	0.816	4	CDF	0.0420	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.73	2.29	0.6137	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.91844	1.91844	1	5.24	0.0514	Non-Significant Effect
Error	2.93112	0.36639	8			
Total	4.84956		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9160	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.741	0.1346	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	1.11	0.0472	2.17	1.3	0.22	2.1	0.383	77.12%	-374.36%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		1.7	1.3	2.1	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-7948-8948 **Endpoint:** PCB 018 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 018	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-7235-1533	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 018	518.94%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	25	n/a	2	8	Exact	0.3611	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.06929	1.06929	1	1	0.3459	Non-Significant Effect
Error	8.5286	1.06607	8			
Total	9.59789		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	26700	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.629	0.741	1.2E-04	Non-Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.888	-0.925	2.7	0.24	0.23	3.5	0.653	164.43%	-279.49%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	3.5	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-2811-4275	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 028	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-0214-6474	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 028	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-9104-5152	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 028	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4675-9807	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 028	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-0286-9394 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 028	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8780-5410	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 044	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-3624-3681	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 044	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-0793-0409	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 044	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-0033-2893 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 044	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-9645-9929	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 044	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-2637-8904	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 052	52.67%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	6.95	2.13	0.123	4	CDF	0.0011	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.29	0.1244	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.40401	0.40401	1	48.4	1.2E-04	Significant Effect
Error	0.06684	0.008355	8			
Total	0.47085		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	208	23.2	1.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.741	0.1139	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.636	0.476	0.796	0.64	0.5	0.82	0.0577	20.28%	-171.79%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.5	0.69	0.82	0.53	0.64

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0746-4815	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 052	56.25%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	22.5	n/a	2	8	Exact	0.1984	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	5.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01369	0.01369	1	1.09	0.3264	Non-Significant Effect
Error	0.1002	0.012525	8			
Total	0.11389		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	312	23.2	6.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.678	0.741	4.8E-04	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.308	0.112	0.504	0.24	0.22	0.59	0.0707	51.30%	-31.62%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.59	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-0589-9465 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 052	110.43%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	6.2	2.13	0.258	4	CDF	0.0017	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.29	0.1628	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.41376	1.41376	1	38.5	2.6E-04	Significant Effect
Error	0.29384	0.03673	8			
Total	1.7076		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	917	23.2	7.1E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.908	0.741	0.2700	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.986	0.65	1.32	1.1	0.61	1.3	0.121	27.47%	-321.37%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.82	1.1	1.1	0.61	1.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-8133-5322 **Endpoint:** PCB 052 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 052	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-5911-0054	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 052	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-8030-3763	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 066	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-1029-0270	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 066	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3592-3211	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 066	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-3896-4606 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 066	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-2800-6482 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 066	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-8378-1432 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 101	73.94%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	1.55	2.13	0.173	4	CDF	0.0977	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.29	0.2507	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03969	0.03969	1	2.41	0.1591	Non-Significant Effect
Error	0.13172	0.016465	8			
Total	0.17141		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	411	23.2	3.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1430	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.36	0.135	0.585	0.25	0.22	0.6	0.0811	50.35%	-53.85%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.51	0.25	0.22	0.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8072-0948	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 failed pcb 101	79.79%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102*	2.56	2.13	0.187	4	CDF	0.0314	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.67	2.29	0.7460	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.12544	0.12544	1	6.54	0.0338	Significant Effect
Error	0.1534	0.019175	8			
Total	0.27884		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	478	23.2	2.6E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1258	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.458	0.215	0.701	0.57	0.24	0.63	0.0875	42.71%	-95.73%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.63	0.57	0.6	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-4659-8210	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 101	161.73%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	3.1	2.13	0.378	4	CDF	0.0181	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.09	2.29	0.1532	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.75625	0.75625	1	9.6	0.0147	Significant Effect
Error	0.63024	0.07878	8			
Total	1.38649		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1970	23.2	1.5E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.852	0.741	0.0606	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.784	0.291	1.28	0.71	0.23	1.3	0.177	50.62%	-235.04%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.71	0.69	0.99	0.23	1.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1684-6051	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 101	4.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.695	1.89	0.01	7	CDF	0.2549	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.722E-05	2.722E-05	1	0.482	0.5097	Non-Significant Effect
Error	0.000395	5.643E-05	7			
Total	0.0004222		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.2	46.2	0.3666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.832	0.701	0.0475	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		4	0.237	0.23	0.245	0.24	0.23	0.24	0.0025	2.11%	-1.50%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		Outlier	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-6924-6284	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 101	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-0181-7950	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 105	39.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	25.5	n/a	2	8	Exact	0.3452	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.9E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.922	0.3652	Non-Significant Effect
Error	0.05	0.00625	8			
Total	0.05576		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	155	23.2	2.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.699	0.741	8.5E-04	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.282	0.144	0.42	0.24	0.22	0.48	0.0498	39.52%	-20.51%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.48	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8554-5999	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 105	6.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.188	1.89	0.015	7	CDF	0.5717	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000005	0.000005	1	0.0352	0.8565	Non-Significant Effect
Error	0.000995	0.0001421	7			
Total	0.001		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.81	24.3	0.3434	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.701	0.1700	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	0.64%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	Outlier	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-9401-1134 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 105	56.25%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	22.5	n/a	2	8	Exact	0.1984	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.67	2.29	5.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01369	0.01369	1	1.09	0.3264	Non-Significant Effect
Error	0.1002	0.012525	8			
Total	0.11389		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	312	23.2	6.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.678	0.741	4.8E-04	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.308	0.112	0.504	0.24	0.22	0.59	0.0707	51.30%	-31.62%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.59	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7369-1441	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 105	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-3929-1236	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 105	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-6494-7432	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 105	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-8392-1723	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 118	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4876-6864	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 118	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-0700-1259	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 118	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-9603-4432 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 118	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-8519-2812 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 118	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-0160-3503	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 128	36.59%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	25.5	n/a	2	8	Exact	0.3452	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.65	2.29	8.8E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00484	0.00484	1	0.913	0.3672	Non-Significant Effect
Error	0.0424	0.0053	8			
Total	0.04724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	132	23.2	3.4E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.704	0.741	9.8E-04	Non-Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.278	0.151	0.405	0.24	0.22	0.46	0.0459	36.89%	-18.80%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.46	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-5158-7822	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 128	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-1775-8631	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 128	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-2981-3996 **Endpoint:** PCB 128 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 128	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-4360-1100	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 128	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-3923-4895 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 138	66.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	2.2	1.86	0.724	8	CDF	0.0294	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.34	2.29	0.0345	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.84041	1.84041	1	4.85	0.0587	Non-Significant Effect
Error	3.03408	0.37926	8			
Total	4.87449		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.87	23.2	0.0705	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.884	0.741	0.1436	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-101		5	1.94	0.921	2.96	1.9	1.2	3.3	0.367	42.29%	-79.30%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-101		1.2	3.3	1.4	1.9	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1604-8179	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 138	37.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	2.4	1.89	0.408	7	CDF	0.0236	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.596276	0.596276	1	5.78	0.0472	Significant Effect
Error	0.72208	0.103154	7			
Total	1.31836		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.48	24.3	0.6939	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.701	0.0201	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-101		4	1.6	1.03	2.17	1.65	1.2	1.9	0.178	22.24%	-47.87%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-101		1.2	Outlier	1.4	1.9	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1276-9526	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 138	38.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.67	1.89	0.417	7	CDF	0.0691	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.300942	0.300942	1	2.8	0.1381	Non-Significant Effect
Error	0.75208	0.10744	7			
Total	1.05302		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	24.3	0.6457	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.864	0.701	0.1054	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-102		4	1.45	0.862	2.04	1.4	1.1	1.9	0.185	25.50%	-34.01%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-102		Outlier	1.9	1.1	1.6	1.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-6096-8619	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 138	127.03%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.29	2.13	1.37	4	CDF	0.0418	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.54	2.29	0.0052	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.46121	5.46121	1	5.25	0.0511	Non-Significant Effect
Error	8.31408	1.03926	8			
Total	13.7753		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	23.3	23.2	0.0099	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.793	0.741	0.0121	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-103		5	2.56	0.807	4.31	2.1	1.4	5	0.631	55.15%	-136.60%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-103		2.4	2.1	1.9	1.4	5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-3519-7354	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 138	41.46%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	3.67	1.89	0.449	7	CDF	0.0040	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.67428	1.67428	1	13.4	0.0080	Significant Effect
Error	0.87208	0.124583	7			
Total	2.54636		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.07	24.3	0.4949	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.701	0.7185	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-103		4	1.95	1.28	2.62	2	1.4	2.4	0.21	21.55%	-80.22%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-103		2.4	2.1	1.9	1.4	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-7568-6026 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 138	59.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.22	1.86	0.642	8	CDF	0.1292	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.29	0.3006	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.441	0.441	1	1.48	0.2585	Non-Significant Effect
Error	2.38416	0.29802	8			
Total	2.82516		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.97	23.2	0.1117	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.962	0.741	0.8097	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-104		5	1.5	0.615	2.39	1.5	0.61	2.5	0.32	47.57%	-38.82%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-104		2.5	1.5	0.61	1.1	1.8

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-4637-3684 **Endpoint:** PCB 138 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 138	34.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.24	1.86	0.373	8	CDF	0.4084	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.47	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00576	0.00576	1	0.0574	0.8167	Non-Significant Effect
Error	0.80328	0.10041	8			
Total	0.80904		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.35	23.2	0.7792	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.884	0.741	0.1451	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	0.00%
31243-105		5	1.13	0.708	1.55	1.3	0.69	1.5	0.152	30.05%	-4.44%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-105		0.69	0.86	1.3	1.3	1.5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7555-1871	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 153	81.09%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	1.83	1.86	1.38	8	CDF	0.0520	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.29	0.0835	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.624	4.624	1	3.37	0.1039	Non-Significant Effect
Error	10.992	1.374	8			
Total	15.616		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	18	23.2	0.0161	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2336	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	0.00%
31243-101		5	3.06	1.06	5.06	3.3	1.4	5.5	0.722	52.72%	-80.00%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-101		1.4	5.5	1.8	3.3	3.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-3243-2511	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 153	83.33%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.73	1.86	1.42	8	CDF	0.0607	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.45	2.29	0.0141	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.356	4.356	1	3	0.1214	Non-Significant Effect
Error	11.608	1.451	8			
Total	15.964		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19	23.2	0.0145	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.843	0.741	0.0483	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	0.00%
31243-102		5	3.02	0.958	5.08	2.5	1.7	5.8	0.743	54.98%	-77.65%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-102		5.8	3.2	1.7	2.5	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-9546-8026	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 153	39.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	3.11	1.89	0.669	7	CDF	0.0085	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.68889	2.68889	1	9.7	0.0170	Significant Effect
Error	1.94	0.277143	7			
Total	4.62889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.13	24.3	0.2996	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.82	0.701	0.0343	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	0.00%
31243-103		4	2.8	1.73	3.87	2.5	2.4	3.8	0.337	24.05%	-64.71%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-103		3.8	2.6	2.4	2.4	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-4585-5256 **Endpoint:** PCB 153 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 153	55.19%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.47	1.86	0.938	8	CDF	0.0903	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5287	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.369	1.369	1	2.15	0.1807	Non-Significant Effect
Error	5.092	0.6365	8			
Total	6.461		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.78	23.2	0.0719	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.993	0.741	0.9993	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	0.00%
31243-104		5	2.44	1.12	3.76	2.5	1.1	3.7	0.475	43.53%	-43.53%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-104		3.7	2.5	1.1	1.7	3.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-4375-4832	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 153	34.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.512	1.86	0.581	8	CDF	0.3112	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4913	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.064	0.064	1	0.262	0.6224	Non-Significant Effect
Error	1.952	0.244	8			
Total	2.016		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.37	23.2	0.4248	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.939	0.741	0.5463	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	0.00%
31243-105		5	1.86	1.13	2.59	2	1.3	2.7	0.262	31.49%	-9.41%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-105		1.3	1.3	2	2	2.7

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-6184-0001	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 170	211.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	1.45	1.86	0.845	8	CDF	0.0923	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.27	2.29	0.0563	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.089	1.089	1	2.11	0.1847	Non-Significant Effect
Error	4.1346	0.516825	8			
Total	5.2236		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.8	23.2	0.0183	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.884	0.741	0.1450	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	0.00%
31243-101		5	1.06	-0.166	2.29	0.83	0.22	2.6	0.442	93.17%	-165.00%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-101		0.22	2.6	0.25	0.83	1.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-2200-8170	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 170	109.03%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.891	1.89	0.436	7	CDF	0.2014	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0933889	0.0933889	1	0.793	0.4027	Non-Significant Effect
Error	0.8243	0.117757	7			
Total	0.917689		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.39	24.3	0.2693	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.701	0.3429	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	0.00%
31243-102		4	0.605	-0.102	1.31	0.55	0.22	1.1	0.222	73.39%	-51.25%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-102		Outlier	1.1	0.22	0.86	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-1611-4290	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 170	299.86%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	27.5	n/a	1	8	Exact	0.5476	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.5	2.29	0.0082	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.21104	1.21104	1	1.16	0.3120	Non-Significant Effect
Error	8.32092	1.04011	8			
Total	9.53196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	34.7	23.2	0.0046	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.784	0.741	0.0092	Non-Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	0.00%
31243-103		5	1.1	-0.67	2.86	0.23	0.22	3.5	0.636	129.74%	-174.00%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-103		1.3	0.23	0.22	0.23	3.5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-8791-1887	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed pcb 170	119.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	2.03	1.86	0.479	8	CDF	0.0382	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.29	0.5296	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.68644	0.68644	1	4.14	0.0764	Non-Significant Effect
Error	1.32752	0.16594	8			
Total	2.01396		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.7	23.2	0.1629	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.911	0.741	0.2873	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	0.00%
31243-104		5	0.924	0.274	1.57	0.76	0.24	1.5	0.234	56.62%	-131.00%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-104		1.5	0.72	0.24	0.76	1.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-4336-0101	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 170	57.52%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-1.54	2.13	0.23	4	CDF	0.9006	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.24	2.29	0.0699	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06889	0.06889	1	2.37	0.1626	Non-Significant Effect
Error	0.23292	0.029115	8			
Total	0.30181		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1940	23.2	1.6E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.851	0.741	0.0603	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	41.50%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-8751-1837	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 180	112.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101*	1.87	1.86	1.63	8	CDF	0.0491	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.29	0.1073	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.69124	6.69124	1	3.5	0.0983	Non-Significant Effect
Error	15.2947	1.91184	8			
Total	21.986		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.72	23.2	0.0490	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.939	0.741	0.5396	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	0.00%
31243-101		5	3.08	0.768	5.39	3.2	1.2	5.9	0.833	60.45%	-113.30%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-101		1.2	5.9	1.6	3.5	3.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-8247-7583 **Endpoint:** PCB 180 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 180	103.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.66	1.86	1.5	8	CDF	0.0680	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.35	2.29	0.0333	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.46224	4.46224	1	2.75	0.1360	Non-Significant Effect
Error	12.9947	1.62434	8			
Total	17.457		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.11	23.2	0.0670	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.886	0.741	0.1548	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	0.00%
31243-102		5	2.78	0.668	4.89	2.6	1.3	5.6	0.761	61.17%	-92.52%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-102		5.6	2.8	1.3	2.6	1.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-4390-3167	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 180	144.59%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	1.64	1.86	2.09	8	CDF	0.0703	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.46	2.29	0.0124	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.42724	8.42724	1	2.67	0.1407	Non-Significant Effect
Error	25.2147	3.15184	8			
Total	33.642		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	16.7	23.2	0.0185	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.831	0.741	0.0346	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	0.00%
31243-103		5	3.28	0.252	6.31	2.1	1.6	7.4	1.09	74.35%	-127.15%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-103		3.6	2.1	1.6	1.7	7.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-8631-2364	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 180	80.38%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.16	1.86	1.16	8	CDF	0.1404	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.65	2.29	0.7928	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.30321	1.30321	1	1.34	0.2808	Non-Significant Effect
Error	7.79184	0.97398	8			
Total	9.09505		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.46	23.2	0.1766	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.968	0.741	0.8750	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	0.00%
31243-104		5	2.17	0.6	3.73	2.2	0.85	3.7	0.564	58.24%	-50.00%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-104		3.7	2.2	0.98	0.85	3.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-3650-8296	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 180	47.64%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-0.562	1.86	0.688	8	CDF	0.7053	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.55	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.10816	0.10816	1	0.316	0.5894	Non-Significant Effect
Error	2.73744	0.34218	8			
Total	2.8456		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.09	23.2	0.9365	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.902	0.741	0.2326	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	0.00%
31243-105		5	1.24	0.525	1.95	1.4	0.64	1.9	0.256	46.31%	14.40%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-105		0.64	0.64	1.4	1.6	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-5261-0709 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 187	109.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	1.39	1.86	1.13	8	CDF	0.1013	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.29	0.2141	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.77241	1.77241	1	1.93	0.2027	Non-Significant Effect
Error	7.36468	0.920585	8			
Total	9.13709		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.54	23.2	0.1720	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.741	0.4479	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	0.00%
31243-101		5	1.87	0.347	3.4	1.7	0.77	3.7	0.549	65.62%	-81.75%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-101		0.77	3.7	0.79	2.4	1.7

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-2776-6571	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 187	103.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	1.57	1.86	1.07	8	CDF	0.0770	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.29	0.1018	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.05209	2.05209	1	2.48	0.1541	Non-Significant Effect
Error	6.62352	0.82794	8			
Total	8.67561		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.98	23.2	0.2094	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.924	0.741	0.3896	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	0.00%
31243-102		5	1.94	0.508	3.36	1.9	0.88	3.8	0.514	59.42%	-87.96%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-102		3.8	2	0.88	1.9	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-5635-1341	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 187	120.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.09	1.86	1.24	8	CDF	0.0351	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.4	2.29	0.0219	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.83025	4.83025	1	4.36	0.0702	Non-Significant Effect
Error	8.8576	1.1072	8			
Total	13.6879		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.66	23.2	0.1217	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.804	0.741	0.0163	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	0.00%
31243-103		5	2.42	0.717	4.12	1.7	1.6	4.8	0.614	56.69%	-134.95%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-103		2.4	1.7	1.6	1.6	4.8

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-7675-9424 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 187	88.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.804	1.86	0.916	8	CDF	0.2224	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.29	0.8719	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.39204	0.39204	1	0.646	0.4448	Non-Significant Effect
Error	4.85592	0.60699	8			
Total	5.24796		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.65	23.2	0.3677	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.933	0.741	0.4785	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	0.00%
31243-104		5	1.43	0.26	2.59	1.6	0.24	2.4	0.42	65.84%	-38.45%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-104		2.4	1.6	0.24	0.69	2.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-4504-9367 **Endpoint:** PCB 187 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 187	58.68%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	-0.523	1.86	0.604	8	CDF	0.6924	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.29	0.9341	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07225	0.07225	1	0.274	0.6151	Non-Significant Effect
Error	2.1128	0.2641	8			
Total	2.18505		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.7	23.2	0.6207	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.903	0.741	0.2344	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	0.00%
31243-105		5	0.86	0.311	1.41	1.1	0.24	1.3	0.198	51.45%	16.50%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-105		0.24	0.56	1.3	1.1	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1876-5519	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 195	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-5792-3653	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 195	5.79%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.49	1.89	0.014	7	CDF	0.3197	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.722E-05	2.722E-05	1	0.24	0.6394	Non-Significant Effect
Error	0.000795	0.0001136	7			
Total	0.0008222		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.98	24.3	0.5186	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.701	0.1596	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		4	0.237	0.217	0.258	0.24	0.22	0.25	0.00629	5.30%	-1.50%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		Outlier	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-8811-2549	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 195	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-5378-2959 **Endpoint:** PCB 195 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 195	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-5933-6910	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 195	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 08-9335-9036 **Endpoint:** PCB 206 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 206	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-1341-6090	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 206	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6517-0670	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 206	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-3419-5473 **Endpoint:** PCB 206 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 206	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-9254-8177	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 206	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7537-8356	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:52	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 209	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-4203-2272 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:52 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 209	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-1203-7495 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 209	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-5588-2269 **Endpoint:** PCB 209 **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 8:53 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 209	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-6086-0310	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 8:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 209	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Nereis virens
28 day Bioaccumulation Evaluation

Body Burden Data and Statistical Analysis

Pesticides

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

					Pre-Tissue	
CONTAMINANT	REP1	*	REP2	*	REP3	*
Pesticides (ng/g wet weight)						
Aldrin	0.24	U	0.24	U	0.23	U
cis-Chlordane	0.24	U	0.24	U	0.23	U
trans-Chlordane	0.24	U	0.24	U	0.23	U
cis-Nonachlor	0.24	U	0.24	U	0.23	U
trans-Nonachlor	0.24	U	0.24	U	0.23	U
Oxychlordane	0.47	U	0.47	U	0.46	U
Total Chlordanes	1.4		1.4		1.4	
4,4'-DDT	0.24	U	0.24	U	0.23	U
4,4'-DDD	0.24	U	0.24	U	0.23	U
4,4'-DDE	0.24	U	0.24	U	0.23	U
Total DDT	0.71		0.71		0.70	
Dieldrin	0.24	U	0.24	U	0.23	U
alpha-Endosulfan	0.24	U	0.24	U	0.23	U
beta-Endosulfan	0.24	U	0.24	U	0.23	U
Endosulfans	0.47		0.47		0.46	
Endrin	0.24	U	0.24	U	0.23	U
Heptachlor	0.24	U	0.24	U	0.23	U
Heptachlor epoxide	0.47	U	0.47	U	0.46	U
Hexachlorobenzene	0.47	U	0.47	U	0.46	U
Lindane	0.24	U	0.24	U	0.23	U
Methoxychlor	0.95	U	0.94	U	0.93	U
Toxaphene	12	U	12	U	12	U

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	CLDS Reference									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
cis-Chlordane	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
trans-Chlordane	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
cis-Nonachlor	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
trans-Nonachlor	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Oxychlordane	0.46	U	0.43	U	0.47	U	0.47	U	0.47	U
Total Chlordanes	1.4		1.3		1.4		1.4		1.4	
4,4'-DDT	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
4,4'-DDD	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
4,4'-DDE	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Total DDT	0.68		0.65		0.71		0.71		0.71	
Dieldrin	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
alpha-Endosulfan	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
beta-Endosulfan	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Endosulfans	0.46		0.43		0.47		0.47		0.47	
Endrin	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Heptachlor	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Heptachlor epoxide	0.46	U	0.43	U	0.47	U	0.47	U	0.47	U
Hexachlorobenzene	0.46	U	0.43	U	0.47	U	0.47	U	0.47	U
Lindane	0.23	U	0.22	U	0.24	U	0.24	U	0.24	U
Methoxychlor	0.91	U	0.86	U	0.95	U	0.95	U	0.95	U
Toxaphene	11	U	11	U	12	U	12	U	12	U

* = Qualifiers
U Analyte not detected; below Method Detection Limit; value is one-half the Method Detection Limit
J Analyte estimated; detection below Reporting Limit but above Method Detection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 2 (R',S')									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
cis-Chlordane	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
trans-Chlordane	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
cis-Nonachlor	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
trans-Nonachlor	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Oxychlordane	0.43	U	0.44	U	0.49	U	0.43	U	0.49	U
Total Chlordanes	1.3		1.3		1.5		1.3		1.5	
4,4'-DDT	0.22	U	1.2		0.25	U	0.22	U	0.24	U
4,4'-DDD	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
4,4'-DDE	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Total DDT	0.65		1.7		0.74		0.65		0.73	
Dieldrin	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
alpha-Endosulfan	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
beta-Endosulfan	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Endosulfans	0.43		0.44		0.49		0.43		0.49	
Endrin	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Heptachlor	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Heptachlor epoxide	0.43	U	0.44	U	0.49	U	0.43	U	0.49	U
Hexachlorobenzene	0.43	U	0.44	U	0.49	U	0.43	U	0.49	U
Lindane	0.22	U	0.22	U	0.25	U	0.22	U	0.24	U
Methoxychlor	0.87	U	0.88	U	0.99	U	0.87	U	0.98	U
Toxaphene	11	U	11	U	12	U	11	U	12	U

* = Qualifiers
U Analyte not detected; below Mthe Method Detection Limit
J Analyte estimated; detection beDetection Limit
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 3 (US-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
cis-Chlordane	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
trans-Chlordane	0.49		0.24	U	0.22	U	0.25	U	0.24	U
cis-Nonachlor	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
trans-Nonachlor	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
Oxychlordane	0.45	U	0.48	U	0.43	U	0.50	U	0.48	U
Total Chlordanes	1.6		1.5		1.3		1.5		1.4	
4,4'-DDT	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
4,4'-DDD	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
4,4'-DDE	0.22	U	0.48		0.22	U	0.25	U	0.24	U
Total DDT	0.67		0.97		0.65		0.75		0.72	
Dieldrin	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
alpha-Endosulfan	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
beta-Endosulfan	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
Endosulfans	0.45		0.48		0.43		0.50		0.48	
Endrin	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
Heptachlor	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
Heptachlor epoxide	0.45	U	0.48	U	0.43	U	0.50	U	0.48	U
Hexachlorobenzene	0.45	U	0.48	U	0.43	U	0.50	U	0.48	U
Lindane	0.22	U	0.24	U	0.22	U	0.25	U	0.24	U
Methoxychlor	0.90	U	0.97	U	0.87	U	1.0	U	0.96	U
Toxaphene	11	U	12	U	11	U	13	U	12	U

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 4 (DS-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.22	U	0.53		0.22	U	0.23	U	0.22	U
cis-Chlordane	0.22	U	1.6		0.22	U	0.23	U	0.22	U
trans-Chlordane	0.49		0.23	U	0.47		0.23	U	0.57	
cis-Nonachlor	0.22	U	1.5		0.22	U	0.23	U	0.22	U
trans-Nonachlor	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
Oxychlordane	0.45	U	0.45	U	0.44	U	0.46	U	0.44	U
Total Chlordanes	1.6		3.9		1.6		1.4		1.7	
4,4'-DDT	0.22	U	2.3		0.22	U	0.23	U	0.22	U
4,4'-DDD	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
4,4'-DDE	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
Total DDT	0.67		2.7		0.66		0.69		0.66	
Dieldrin	0.22	U	0.94		0.22	U	0.23	U	1.7	
alpha-Endosulfan	0.22	U	1.6		0.22	U	0.23	U	0.22	U
beta-Endosulfan	0.22	U	1.3		0.22	U	0.23	U	0.22	U
Endosulfans	0.45		2.9		0.44		0.46		0.44	
Endrin	0.22	U	0.23	U	0.22	U	0.23	U	0.22	U
Heptachlor	0.22	U	0.65		0.22	U	0.23	U	0.22	U
Heptachlor epoxide	0.45	U	0.45	U	0.44	U	0.46	U	0.44	U
Hexachlorobenzene	0.45	U	4.5		0.44	U	0.46	U	0.44	U
Lindane	0.22	U	2.5		0.22	U	0.23	U	0.22	U
Methoxychlor	0.90	U	0.91	U	0.89	U	0.92	U	0.89	U
Toxaphene	11	U	11	U	11	U	12	U	11	U

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 5 (TB-1,-2)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
cis-Chlordane	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
trans-Chlordane	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
cis-Nonachlor	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
trans-Nonachlor	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Oxychlordane	0.48	U	0.47	U	0.48	U	0.48	U	0.47	U
Total Chlordanes	1.4		1.4		1.4		1.5		1.4	
4,4'-DDT	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
4,4'-DDD	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
4,4'-DDE	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Total DDT	0.72		0.70		0.72		0.73		0.71	
Dieldrin	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
alpha-Endosulfan	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
beta-Endosulfan	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Endosulfans	0.48		0.47		0.48		0.48		0.47	
Endrin	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Heptachlor	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Heptachlor epoxide	0.48	U	0.47	U	0.48	U	0.48	U	0.47	U
Hexachlorobenzene	0.48	U	0.47	U	0.48	U	0.48	U	0.47	U
Lindane	0.24	U	0.23	U	0.24	U	0.24	U	0.24	U
Methoxychlor	0.97	U	0.93	U	0.96	U	0.97	U	0.95	U
Toxaphene	12	U	12	U	12	U	12	U	12	U

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

APPENDIX A. CONCENTRATIONS OF COCs IN THE WORM (*N. virens*)
New Haven Harbor FNP 2018

	Composite 6 (CAD-1,-2,-3)									
CONTAMINANT	REP1	*	REP2	*	REP3	*	REP4	*	REP5	*
Pesticides (ng/g wet weight)										
Aldrin	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
cis-Chlordane	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
trans-Chlordane	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
cis-Nonachlor	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
trans-Nonachlor	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Oxychlordane	0.48	U	0.47	U	0.45	U	0.46	U	0.47	U
Total Chlordanes	1.4		1.4		1.4		1.4		1.4	
4,4'-DDT	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
4,4'-DDD	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
4,4'-DDE	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Total DDT	0.72		0.71		0.68		0.69		0.70	
Dieldrin	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
alpha-Endosulfan	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
beta-Endosulfan	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Endosulfans	0.48		0.47		0.45		0.46		0.47	
Endrin	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Heptachlor	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Heptachlor epoxide	0.48	U	0.47	U	0.45	U	0.46	U	0.47	U
Hexachlorobenzene	0.48	U	0.47	U	0.45	U	0.46	U	0.47	U
Lindane	0.24	U	0.24	U	0.23	U	0.23	U	0.23	U
Methoxychlor	0.96	U	0.95	U	0.90	U	0.92	U	0.93	U
Toxaphene	12	U	12	U	11	U	12	U	12	U

* = Qualifiers
U Analyte not detected; below Me
J Analyte estimated; detection be
NA Not Analyzed

Bioaccumulation Evaluation - Pesticides - Nereis | **EnviroSystems, Inc.**

Start Date: 20 Nov-18 12:04 | **Species:** Nereis virens | **Sample Code:** 31250-000
End Date: 18 Dec-18 12:04 | **Protocol:** US ACE NED RIM (2004) | **Sample Source:** New Haven Harbor 2018
Sample Date: 20 Nov-18 | **Material:** Laboratory Control Sediment | **Sample Station:** Laboratory Control (Nv)

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor	2-4'-DDD	2-4'-DDE	2-4'-DDT	endosulfan sulfate	Total DDTs
31242-008	1	6	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.46	0.46	0.91	0.46	11	0.23					
31242-008	2	8	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.43	0.43	0.86	0.43	11	0.22					
31242-008	3	13	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.47	0.47	0.95	0.47	12	0.24					
31242-008	4	24	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.47	0.47	0.95	0.47	12	0.24					
31242-008	5	29	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.47	0.47	0.95	0.47	12	0.24					
31243-101	1	1	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.43	0.43	0.87	0.43	11	0.22					
31243-101	2	7	0.22	0.22	1.2	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.44	0.44	0.88	0.44	11	0.22					
31243-101	3	18	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.49	0.49	0.99	0.49	12	0.25					
31243-101	4	23	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.43	0.43	0.87	0.43	11	0.22					
31243-101	5	25	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.49	0.49	0.98	0.49	12	0.24					
31243-102	1	2	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.49	0.22	0.45	0.45	0.9	0.45	11	0.22					
31243-102	2	12	0.24	0.48	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.97	0.48	12	0.24					
31243-102	3	17	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.43	0.43	0.87	0.43	11	0.22					
31243-102	4	20	0.25	0.25	0.25	0.25	0.25			0.25		0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.5	0.5	1	0.5	13	0.25					
31243-102	5	27	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.96	0.48	12	0.24					
31243-103	1	5	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.49	0.22	0.45	0.45	0.9	0.45	11	0.22					
31243-103	2	11	0.23	0.23	2.3	0.53	1.6			1.5		0.94	1.6	1.3	0.23	2.45	0.23	0.65	0.45	4.5	0.91	0.45	11	0.23					
31243-103	3	16	0.22	0.22	0.22	0.22	0.22			0.22		0.22	0.22	0.22	0.22	0.22	0.47	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-103	4	21	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.46	0.46	0.92	0.46	12	0.23					
31243-103	5	28	0.22	0.22	0.22	0.22	0.22			0.22		1.7	0.22	0.22	0.22	0.22	0.57	0.22	0.44	0.44	0.89	0.44	11	0.22					
31243-104	1	3	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.97	0.48	12	0.24					
31243-104	2	9	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.47	0.47	0.93	0.47	12	0.23					
31243-104	3	14	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.96	0.48	12	0.24					
31243-104	4	19	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.97	0.48	12	0.24					
31243-104	5	26	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.47	0.47	0.95	0.47	12	0.24					
31243-105	1	4	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.48	0.48	0.96	0.48	12	0.24					
31243-105	2	10	0.24	0.24	0.24	0.24	0.24			0.24		0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.47	0.47	0.95	0.47	12	0.24					
31243-105	3	15	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.45	0.45	0.9	0.45	11	0.23					
31243-105	4	22	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.46	0.46	0.92	0.46	12	0.23					

Sample	Rep	Pos	4-4'-DDD	4-4'-DDE	4-4'-DDT	aldrin	alpha chlordane	alpha-BHC	beta-BHC	cis-Nonachlor	delta-BHC	Dieldrin	endosulfan I	endosulfan II	endrin	gamma-BHC (Lindane)	gamma-chlordane	heptachlor	heptachlor epoxide	hexachlorobenzene	Methoxychlor	oxychlordane	toxaphene	trans-nonachlor	2-4'-DDD	2-4'-DDE	2-4'-DDT	endosulfan sulfate	Total DDTs
31243-105	5	30	0.23	0.23	0.23	0.23	0.23			0.23		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.47	0.47	0.93	0.47	12	0.23					

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Batch ID:	11-0180-7361	**Test Type:**	Bioaccumulation - Pesticides	**Analyst:**	Nancy Roka
Start Date:	20 Nov-18 12:04	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	18 Dec-18 12:04	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
13-2259-0600	4-4'-DDD	Equal Variance t Two-Sample Test	0.6962	31243-101 passed 4-4'-ddd
20-7450-0162	4-4'-DDD	Equal Variance t Two-Sample Test	0.5000	31243-102 passed 4-4'-ddd
20-3350-7522	4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed 4-4'-ddd
09-3401-9078	4-4'-DDD	Equal Variance t Two-Sample Test	0.1986	31243-104 passed 4-4'-ddd
17-4563-7129	4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed 4-4'-ddd
09-1272-1973	4-4'-DDE	Equal Variance t Two-Sample Test	0.6962	31243-101 passed 4-4'-dde
14-4250-0064	4-4'-DDE	Equal Variance t Two-Sample Test	0.5717	31243-102 passed 4-4'-dde
06-5140-7363	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.3452	31243-102 passed 4-4'-dde
19-4387-9394	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed 4-4'-dde
06-7844-8161	4-4'-DDE	Equal Variance t Two-Sample Test	0.1986	31243-104 passed 4-4'-dde
18-3686-3317	4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed 4-4'-dde
06-8125-3382	4-4'-DDT	Equal Variance t Two-Sample Test	0.5717	31243-101 passed 4-4'-ddt
10-0684-3690	4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	0.3452	31243-101 passed 4-4'-ddt
17-7612-2460	4-4'-DDT	Equal Variance t Two-Sample Test	0.5000	31243-102 passed 4-4'-ddt
01-5677-8978	4-4'-DDT	Equal Variance t Two-Sample Test	0.9718	31243-103 passed 4-4'-ddt
10-4151-3154	4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed 4-4'-ddt
02-5145-1433	4-4'-DDT	Equal Variance t Two-Sample Test	0.1986	31243-104 passed 4-4'-ddt
14-7456-8786	4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed 4-4'-ddt
00-0743-7141	aldrin	Equal Variance t Two-Sample Test	0.6962	31243-101 passed aldrin
15-8547-5674	aldrin	Equal Variance t Two-Sample Test	0.5000	31243-102 passed aldrin
12-8767-6472	aldrin	Equal Variance t Two-Sample Test	0.9718	31243-103 passed aldrin
06-2875-6493	aldrin	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed aldrin
17-3027-4126	aldrin	Equal Variance t Two-Sample Test	0.1986	31243-104 passed aldrin
20-9034-6982	aldrin	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed aldrin
21-0361-1579	alpha chlordane	Equal Variance t Two-Sample Test	0.6962	31243-101 passed alpha chlordane
19-8162-4708	alpha chlordane	Equal Variance t Two-Sample Test	0.5000	31243-102 passed alpha chlordane
00-4268-1296	alpha chlordane	Equal Variance t Two-Sample Test	0.9718	31243-103 passed alpha chlordane
13-8426-8534	alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed alpha chlordane
02-7408-3382	alpha chlordane	Equal Variance t Two-Sample Test	0.1986	31243-104 passed alpha chlordane
19-2454-8380	alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed alpha chlordane
16-7078-8408	cis-Nonachlor	Equal Variance t Two-Sample Test	0.6962	31243-101 passed cis-nonachlor
18-3793-2195	cis-Nonachlor	Equal Variance t Two-Sample Test	0.5000	31243-102 passed cis-nonachlor
19-0509-0003	cis-Nonachlor	Equal Variance t Two-Sample Test	0.9718	31243-103 passed cis-nonachlor

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
12-9308-5278	cis-Nonachlor	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed cis-nonachlor
02-3639-5533	cis-Nonachlor	Equal Variance t Two-Sample Test	0.1986	31243-104 passed cis-nonachlor
15-0025-6030	cis-Nonachlor	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed cis-nonachlor
03-5240-2642	Dieldrin	Equal Variance t Two-Sample Test	0.6962	31243-101 passed dieldrin
06-8589-0863	Dieldrin	Equal Variance t Two-Sample Test	0.5000	31243-102 passed dieldrin
10-5616-4871	Dieldrin	Unequal Variance t Two-Sample Test	0.1098	31243-103 passed dieldrin
01-3657-9720	Dieldrin	Wilcoxon Rank Sum Two-Sample Test	0.7857	31243-103 passed dieldrin
10-6732-6334	Dieldrin	Equal Variance t Two-Sample Test	0.1986	31243-104 passed dieldrin
02-9691-9187	Dieldrin	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed dieldrin
03-6112-7330	endosulfan I	Equal Variance t Two-Sample Test	0.6962	31243-101 passed endosulfan i
18-9547-0886	endosulfan I	Equal Variance t Two-Sample Test	0.5000	31243-102 passed endosulfan i
03-6223-1867	endosulfan I	Equal Variance t Two-Sample Test	0.9718	31243-103 passed endosulfan i
17-6932-5855	endosulfan I	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed endosulfan i
12-6094-9099	endosulfan I	Equal Variance t Two-Sample Test	0.1986	31243-104 passed endosulfan i
12-2739-2656	endosulfan I	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed endosulfan i
15-3984-7736	endosulfan II	Equal Variance t Two-Sample Test	0.6962	31243-101 passed endosulfan ii
11-4783-1993	endosulfan II	Equal Variance t Two-Sample Test	0.5000	31243-102 passed endosulfan ii
04-5407-8903	endosulfan II	Equal Variance t Two-Sample Test	0.9718	31243-103 passed endosulfan ii
05-2092-1050	endosulfan II	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed endosulfan ii
04-5069-1753	endosulfan II	Equal Variance t Two-Sample Test	0.1986	31243-104 passed endosulfan ii
20-1227-0488	endosulfan II	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed endosulfan ii
12-1405-6338	endrin	Equal Variance t Two-Sample Test	0.6962	31243-101 passed endrin
02-2380-1284	endrin	Equal Variance t Two-Sample Test	0.5000	31243-102 passed endrin
00-0855-7669	endrin	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed endrin
12-7057-1957	endrin	Equal Variance t Two-Sample Test	0.1986	31243-104 passed endrin
09-9554-6834	endrin	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed endrin
17-3775-4041	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.6962	31243-101 passed gamma-bhc (lindane)
04-2713-7398	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.5000	31243-102 passed gamma-bhc (lindane)
11-8993-3305	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.9718	31243-103 passed gamma-bhc (lindane)
04-6997-9178	gamma-BHC (Lindane)	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed gamma-bhc (lindane)
16-1051-0947	gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	0.1986	31243-104 passed gamma-bhc (lindane)
04-0165-6874	gamma-BHC (Lindane)	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed gamma-bhc (lindane)
18-3808-0205	gamma-chlordane	Equal Variance t Two-Sample Test	0.6962	31243-101 passed gamma-chlordane
01-6355-1119	gamma-chlordane	Equal Variance t Two-Sample Test	0.3197	31243-102 passed gamma-chlordane
09-1235-2843	gamma-chlordane	Wilcoxon Rank Sum Two-Sample Test	0.1984	31243-102 passed gamma-chlordane
05-5493-9530	gamma-chlordane	Unequal Variance t Two-Sample Test	0.0406	31243-103 failed gamma-chlordane
04-9538-6964	gamma-chlordane	Equal Variance t Two-Sample Test	0.1986	31243-104 passed gamma-chlordane
03-8492-3918	gamma-chlordane	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed gamma-chlordane
09-0582-7478	heptachlor	Equal Variance t Two-Sample Test	0.6962	31243-101 passed heptachlor
06-2877-3240	heptachlor	Equal Variance t Two-Sample Test	0.5000	31243-102 passed heptachlor
05-6670-9601	heptachlor	Equal Variance t Two-Sample Test	0.9718	31243-103 passed heptachlor
15-3278-2036	heptachlor	Wilcoxon Rank Sum Two-Sample Test	0.8651	31243-103 passed heptachlor
11-9215-2155	heptachlor	Equal Variance t Two-Sample Test	0.1986	31243-104 passed heptachlor
18-5016-7173	heptachlor	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed heptachlor
08-3365-0892	heptachlor epoxide	Equal Variance t Two-Sample Test	0.5956	31243-101 passed heptachlor epoxide
09-4184-3626	heptachlor epoxide	Equal Variance t Two-Sample Test	0.2997	31243-102 passed heptachlor epoxide
07-0624-3782	heptachlor epoxide	Equal Variance t Two-Sample Test	0.9977	31243-103 passed heptachlor epoxide
18-9030-0064	heptachlor epoxide	Equal Variance t Two-Sample Test	0.8997	31243-103 passed heptachlor epoxide
05-4480-2154	heptachlor epoxide	Wilcoxon Rank Sum Two-Sample Test	0.0397	31243-104 failed heptachlor epoxide
06-4566-6242	heptachlor epoxide	Wilcoxon Rank Sum Two-Sample Test	0.0794	31243-104 passed heptachlor epoxide
12-7596-5081	heptachlor epoxide	Equal Variance t Two-Sample Test	0.2679	31243-105 passed heptachlor epoxide
07-6005-3732	hexachlorobenzene	Equal Variance t Two-Sample Test	0.5956	31243-101 passed hexachlorobenzene
11-7834-3319	hexachlorobenzene	Equal Variance t Two-Sample Test	0.2997	31243-102 passed hexachlorobenzene

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
20-4836-5019	hexachlorobenzene	Equal Variance t Two-Sample Test	0.8799	31243-103 passed hexachlorobenzene
15-4499-0488	hexachlorobenzene	Wilcoxon Rank Sum Two-Sample Test	0.7460	31243-103 passed hexachlorobenzene
10-4908-2700	hexachlorobenzene	Wilcoxon Rank Sum Two-Sample Test	0.0397	31243-104 failed hexachlorobenzene
12-5936-1132	hexachlorobenzene	Wilcoxon Rank Sum Two-Sample Test	0.0794	31243-104 passed hexachlorobenzene
12-2147-5395	hexachlorobenzene	Equal Variance t Two-Sample Test	0.2679	31243-105 passed hexachlorobenzene
14-3745-4053	Methoxychlor	Equal Variance t Two-Sample Test	0.5705	31243-101 passed methoxychlor
05-7951-1571	Methoxychlor	Equal Variance t Two-Sample Test	0.3028	31243-102 passed methoxychlor
01-4989-4515	Methoxychlor	Equal Variance t Two-Sample Test	0.8633	31243-103 passed methoxychlor
05-1701-5240	Methoxychlor	Equal Variance t Two-Sample Test	0.9947	31243-103 passed methoxychlor
11-7113-0067	Methoxychlor	Equal Variance t Two-Sample Test	0.0678	31243-104 passed methoxychlor
14-9216-5923	Methoxychlor	Equal Variance t Two-Sample Test	0.3549	31243-105 passed methoxychlor
12-1297-3125	oxychlordane	Equal Variance t Two-Sample Test	0.5956	31243-101 passed oxychlordane
10-2008-4006	oxychlordane	Equal Variance t Two-Sample Test	0.2997	31243-102 passed oxychlordane
13-8440-9001	oxychlordane	Equal Variance t Two-Sample Test	0.8997	31243-103 passed oxychlordane
16-7773-6799	oxychlordane	Equal Variance t Two-Sample Test	0.9977	31243-103 passed oxychlordane
03-5450-3727	oxychlordane	Wilcoxon Rank Sum Two-Sample Test	0.0397	31243-104 failed oxychlordane
20-8290-7070	oxychlordane	Wilcoxon Rank Sum Two-Sample Test	0.0794	31243-104 passed oxychlordane
19-2482-4737	oxychlordane	Equal Variance t Two-Sample Test	0.2679	31243-105 passed oxychlordane
20-2730-5291	toxaphene	Equal Variance t Two-Sample Test	0.7102	31243-101 passed toxaphene
06-1356-0577	toxaphene	Equal Variance t Two-Sample Test	0.3333	31243-102 passed toxaphene
21-0102-4542	toxaphene	Equal Variance t Two-Sample Test	0.8792	31243-103 passed toxaphene
10-4893-4972	toxaphene	Equal Variance t Two-Sample Test	0.0706	31243-104 passed toxaphene
17-2804-1698	toxaphene	Wilcoxon Rank Sum Two-Sample Test	0.5000	31243-105 passed toxaphene
02-0519-3611	trans-nonachlor	Equal Variance t Two-Sample Test	0.6962	31243-101 passed trans-nonachlor
20-9178-4221	trans-nonachlor	Equal Variance t Two-Sample Test	0.5000	31243-102 passed trans-nonachlor
10-7621-4680	trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	0.9762	31243-103 passed trans-nonachlor
05-3537-4887	trans-nonachlor	Equal Variance t Two-Sample Test	0.1986	31243-104 passed trans-nonachlor
05-2691-1466	trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	0.6587	31243-105 passed trans-nonachlor

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.282	0.144	0.42	0.22	0.48	0.0498	0.111	39.52%	-20.51%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.426	-0.111	0.963	0.22	1.2	0.194	0.433	101.61%	-82.05%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.638	-0.516	1.79	0.22	2.3	0.416	0.929	145.63%	-172.65%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.284	0.113	0.455	0.22	0.53	0.0615	0.138	48.45%	-21.37%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.498	-0.267	1.26	0.22	1.6	0.276	0.616	123.71%	-112.82%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.478	-0.231	1.19	0.22	1.5	0.256	0.571	119.53%	-104.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.662	-0.155	1.48	0.22	1.7	0.294	0.658	99.40%	-182.91%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.498	-0.267	1.26	0.22	1.6	0.276	0.616	123.71%	-112.82%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.438	-0.16	1.04	0.22	1.3	0.216	0.482	110.02%	-87.18%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.668	-0.569	1.9	0.22	2.45	0.446	0.996	149.13%	-185.47%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.288	0.147	0.429	0.22	0.49	0.0507	0.113	39.39%	-23.08%
31243-103		5	0.398	0.202	0.594	0.23	0.57	0.0706	0.158	39.66%	-70.09%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

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heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.308	0.0706	0.545	0.22	0.65	0.0855	0.191	62.09%	-31.62%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.43	0.47	0.00775	0.0173	3.77%	0.00%
31243-101		5	0.456	0.417	0.495	0.43	0.49	0.014	0.0313	6.87%	0.87%
31243-102		5	0.468	0.434	0.502	0.43	0.5	0.0124	0.0277	5.93%	-1.74%
31243-103		5	0.448	0.438	0.458	0.44	0.46	0.00374	0.00837	1.87%	2.61%
31243-104		5	0.476	0.469	0.483	0.47	0.48	0.00245	0.00548	1.15%	-3.48%
31243-105		5	0.466	0.452	0.48	0.45	0.48	0.0051	0.0114	2.45%	-1.30%

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.43	0.47	0.00775	0.0173	3.77%	0.00%
31243-101		5	0.456	0.417	0.495	0.43	0.49	0.014	0.0313	6.87%	0.87%
31243-102		5	0.468	0.434	0.502	0.43	0.5	0.0124	0.0277	5.93%	-1.74%
31243-103		5	1.26	-0.992	3.51	0.44	4.5	0.811	1.81	144.07%	-173.48%
31243-104		5	0.476	0.469	0.483	0.47	0.48	0.00245	0.00548	1.15%	-3.48%
31243-105		5	0.466	0.452	0.48	0.45	0.48	0.0051	0.0114	2.45%	-1.30%

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.924	0.875	0.973	0.86	0.95	0.0178	0.0397	4.30%	0.00%
31243-101		5	0.918	0.842	0.994	0.87	0.99	0.0275	0.0614	6.69%	0.65%
31243-102		5	0.94	0.874	1.01	0.87	1	0.0239	0.0534	5.68%	-1.73%
31243-103		5	0.902	0.886	0.918	0.89	0.92	0.00583	0.013	1.45%	2.38%
31243-104		5	0.956	0.935	0.977	0.93	0.97	0.00748	0.0167	1.75%	-3.46%
31243-105		5	0.932	0.902	0.962	0.9	0.96	0.0107	0.0239	2.56%	-0.87%

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.43	0.47	0.00775	0.0173	3.77%	0.00%
31243-101		5	0.456	0.417	0.495	0.43	0.49	0.014	0.0313	6.87%	0.87%
31243-102		5	0.468	0.434	0.502	0.43	0.5	0.0124	0.0277	5.93%	-1.74%
31243-103		5	0.448	0.438	0.458	0.44	0.46	0.00374	0.00837	1.87%	2.61%
31243-104		5	0.476	0.469	0.483	0.47	0.48	0.00245	0.00548	1.15%	-3.48%
31243-105		5	0.466	0.452	0.48	0.45	0.48	0.0051	0.0114	2.45%	-1.30%

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	11	12	0.245	0.548	4.72%	0.00%
31243-101		5	11.4	10.7	12.1	11	12	0.245	0.548	4.80%	1.72%
31243-102		5	11.8	10.8	12.8	11	13	0.374	0.837	7.09%	-1.72%
31243-103		5	11.2	10.6	11.8	11	12	0.2	0.447	3.99%	3.45%
31243-104		5	12	12	12	12	12	0	0	0.00%	-3.45%
31243-105		5	11.8	11.2	12.4	11	12	0.2	0.447	3.79%	-1.72%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	1.71%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	4.27%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-1.71%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	0.00%

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.48	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	1.2	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	2.3	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.53	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	1.6	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	1.5	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis **EnviroSystems, Inc.**

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.94	0.22	0.23	1.7
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	1.6	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	1.3	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	2.45	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.49	0.24	0.22	0.25	0.24
31243-103		0.49	0.23	0.47	0.23	0.57
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

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heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.65	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-101		0.43	0.44	0.49	0.43	0.49
31243-102		0.45	0.48	0.43	0.5	0.48
31243-103		0.45	0.45	0.44	0.46	0.44
31243-104		0.48	0.47	0.48	0.48	0.47
31243-105		0.48	0.47	0.45	0.46	0.47

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-101		0.43	0.44	0.49	0.43	0.49
31243-102		0.45	0.48	0.43	0.5	0.48
31243-103		0.45	4.5	0.44	0.46	0.44
31243-104		0.48	0.47	0.48	0.48	0.47
31243-105		0.48	0.47	0.45	0.46	0.47

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.91	0.86	0.95	0.95	0.95
31243-101		0.87	0.88	0.99	0.87	0.98
31243-102		0.9	0.97	0.87	1	0.96
31243-103		0.9	0.91	0.89	0.92	0.89
31243-104		0.97	0.93	0.96	0.97	0.95
31243-105		0.96	0.95	0.9	0.92	0.93

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-101		0.43	0.44	0.49	0.43	0.49
31243-102		0.45	0.48	0.43	0.5	0.48
31243-103		0.45	0.45	0.44	0.46	0.44
31243-104		0.48	0.47	0.48	0.48	0.47
31243-105		0.48	0.47	0.45	0.46	0.47

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	11	12	12	12
31243-101		11	11	12	11	12
31243-102		11	12	11	13	12
31243-103		11	11	11	12	11
31243-104		12	12	12	12	12
31243-105		12	12	11	12	12

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trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
4-4'-DDE	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	3	25.5		0.3452381	0.05	FALSE		8	2	E
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.1875523	1.89458	0.5717258	0.05	FALSE	0.0151524	7		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
gamma-chlordane	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.02975277	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.02975277	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.1834252	1.85955	0.5704859	0.05	FALSE	0.0608274	8		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.2499998	1.85955	0.5955562	0.05	FALSE	0.02975277	8		C
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5773503	1.85955	0.710208	0.05	FALSE	0.6441664	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	3	-0.5345224	1.85955	0.6962444	0.05	FALSE	0.01391558	8		C
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	4	25.5		0.3452381	0.05	FALSE		8	2	E
4-4'-DDE	Equal Variance t Two-Sample Test	CLDS	vs	4	-0.1875523	1.89458	0.5717258	0.05	FALSE	0.0151524	7		C
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
gamma-chlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	4	22.5		0.1984127	0.05	FALSE		8	2	E
gamma-chlordane	Equal Variance t Two-Sample Test	CLDS	vs	4	0.489584	1.89458	0.3196984	0.05	FALSE	0.0135442	7		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	4	0.5468683	1.85955	0.2996936	0.05	FALSE	0.02720284	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	4	0.5468683	1.85955	0.2996936	0.05	FALSE	0.02720284	8		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	4	0.5375304	1.85955	0.3027632	0.05	FALSE	0.05535084	8		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	4	0.5468683	1.85955	0.2996936	0.05	FALSE	0.02720284	8		C
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	4	0.4472136	1.85955	0.3332905	0.05	FALSE	0.8316151	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	4	0	1.85955	0.5	0.05	FALSE	0.01340939	8		C
4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	35.5		0.9761904	0.05	FALSE		8	2	E
4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	35.5		0.9761904	0.05	FALSE		8	2	E
4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
aldrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
cis-Nonachlor	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
Dieldrin	Unequal Variance t Two-Sample Test	CLDS	vs	5	1.454235	2.13185	0.1097804	0.05	FALSE	0.6274297	4		C
Dieldrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	22.5		0.7857143	0.05	FALSE		7	2	E
endosulfan I	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
endosulfan II	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
endrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	35.5		0.9761904	0.05	FALSE		8	2	E
gamma-BHC (Lindane)	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
gamma-chlordane	Unequal Variance t Two-Sample Test	CLDS	vs	5	2.31931	2.13185	0.0405991	0.05	TRUE	0.1507443	4		C
heptachlor	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	32		0.8650793	0.05	FALSE		8	2	E
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	5	-2.282139	1.89458	0.971771	0.05	FALSE	0.00954703	7		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	5	-1.394973	1.85955	0.8997328	0.05	FALSE	0.01599644	8		C
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	5	-4.081909	1.89458	0.9976608	0.05	FALSE	0.00905074	7		C
hexachlorobenzene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	30.5		0.7460318	0.05	FALSE		8	1	E
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	5	-1.283681	1.89458	0.8799449	0.05	FALSE	0.0184487	7		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	5	-1.17595	1.85955	0.8632895	0.05	FALSE	0.03478895	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	5	-3.456587	1.89458	0.9947018	0.05	FALSE	0.02082806	7		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	5	-1.394973	1.85955	0.8997328	0.05	FALSE	0.01599644	8		C
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	5	-4.081909	1.89458	0.9976608	0.05	FALSE	0.00905074	7		C
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	5	-1.264911	1.85955	0.879248	0.05	FALSE	0.5880407	8		C
trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	5	35.5		0.9761904	0.05	FALSE		8	2	E
4-4'-DDD	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
4-4'-DDE	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
4-4'-DDT	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
aldrin	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
alpha chlordane	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
cis-Nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
Dieldrin	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
endosulfan I	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
endosulfan II	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
endrin	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
gamma-BHC (Lindane)	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
gamma-chlordane	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
heptachlor	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
heptachlor epoxide	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	6	18		0.0396825	0.05	TRUE		8	1	E
heptachlor epoxide	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	6	18		0.0793651	0.05	FALSE		7	1	E
hexachlorobenzene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	6	18		0.0396825	0.05	TRUE		8	1	E
hexachlorobenzene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	6	18		0.0793651	0.05	FALSE		7	1	E
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	6	1.659123	1.85955	0.0678372	0.05	FALSE	0.03586566	8		C
oxychlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	6	18		0.0396825	0.05	TRUE		8	1	E
oxychlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	6	18		0.0793651	0.05	FALSE		7	1	E
toxaphene	Equal Variance t Two-Sample Test	CLDS	vs	6	1.632993	1.85955	0.0705566	0.05	FALSE	0.4554944	8		C
trans-nonachlor	Equal Variance t Two-Sample Test	CLDS	vs	6	0.8944274	1.85955	0.1986019	0.05	FALSE	0.00831615	8		C
4-4'-DDD	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
4-4'-DDE	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
4-4'-DDT	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
aldrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
alpha chlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
cis-Nonachlor	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
Dieldrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
endosulfan I	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
endosulfan II	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
endrin	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
gamma-BHC (Lindane)	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
gamma-chlordane	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
heptachlor	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E
heptachlor epoxide	Equal Variance t Two-Sample Test	CLDS	vs	7	0.6469961	1.85955	0.2678765	0.05	FALSE	0.01724474	8		C
hexachlorobenzene	Equal Variance t Two-Sample Test	CLDS	vs	7	0.6469961	1.85955	0.2678765	0.05	FALSE	0.01724474	8		C
Methoxychlor	Equal Variance t Two-Sample Test	CLDS	vs	7	0.385794	1.85955	0.3548529	0.05	FALSE	0.0385604	8		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden Pesticides

Endpoint	Method	Group 1		Group 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
oxychlordane	Equal Variance t Two-Sample Test	CLDS	vs	7	0.6469961	1.85955	0.2678765	0.05	FALSE	0.01724474	8		C
toxaphene	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	25		0.5	0.05	FALSE		8	2	E
trans-nonachlor	Wilcoxon Rank Sum Two-Sample Test	CLDS	vs	7	28.5		0.6587301	0.05	FALSE		8	2	E

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-2259-0600	**Endpoint:**	4-4'-DDD	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed 4-4'-ddd	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-7450-0162 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed 4-4'-ddd	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-3350-7522 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed 4-4'-ddd	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-3401-9078 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-ddd	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-4563-7129 **Endpoint:** 4-4'-DDD **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed 4-4'-ddd	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

4-4'-DDD Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

4-4'-DDD Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-1272-1973 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed 4-4'-dde	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-4250-0064 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed 4-4'-dde	6.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	-0.188	1.89	0.015	7	CDF	0.5717	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000005	0.000005	1	0.0352	0.8565	Non-Significant Effect
Error	0.000995	0.0001421	7			
Total	0.001		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.81	24.3	0.3434	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.701	0.1700	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	0.64%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	Outlier	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 19-4387-9394 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed 4-4'-dde	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-7844-8161 **Endpoint:** 4-4'-DDE **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-dde	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-3686-3317	**Endpoint:**	4-4'-DDE	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed 4-4'-dde	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

4-4'-DDE Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

4-4'-DDE Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-0684-3690	**Endpoint:**	4-4'-DDT	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed 4-4'-ddt	153.87%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	25.5	n/a	2	8	Exact	0.3452	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.6E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09216	0.09216	1	0.983	0.3504	Non-Significant Effect
Error	0.74984	0.09373	8			
Total	0.842		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2340	23.2	1.1E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.646	0.741	2.0E-04	Non-Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.426	-0.111	0.963	0.24	0.22	1.2	0.194	101.61%	-82.05%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	1.2	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-8125-3382 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed 4-4'-ddt	6.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.188	1.89	0.015	7	CDF	0.5717	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000005	0.000005	1	0.0352	0.8565	Non-Significant Effect
Error	0.000995	0.0001421	7			
Total	0.001		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.81	24.3	0.3434	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.701	0.1700	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	0.64%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	Outlier	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-7612-2460 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed 4-4'-ddt	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-4151-3154 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed 4-4'-ddt	330.21%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	32	n/a	2	8	Exact	0.8651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.40804	0.40804	1	0.945	0.3594	Non-Significant Effect
Error	3.4532	0.43165	8			
Total	3.86124		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10800	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.63	0.741	1.3E-04	Non-Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.638	-0.516	1.79	0.22	0.22	2.3	0.416	145.63%	-172.65%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	2.3	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-5145-1433 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed 4-4'-ddt	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 14-7456-8786 **Endpoint:** 4-4'-DDT **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed 4-4'-ddt	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

4-4'-DDT Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

4-4'-DDT Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-0743-7141 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed aldrin	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 15-8547-5674 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed aldrin	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-2875-6493 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed aldrin	49.00%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	32	n/a	2	8	Exact	0.8651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	5.1E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00625	0.00625	1	0.658	0.4409	Non-Significant Effect
Error	0.07604	0.009505	8			
Total	0.08229		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	237	23.2	1.1E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.658	0.741	2.7E-04	Non-Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.284	0.113	0.455	0.22	0.22	0.53	0.0615	48.45%	-21.37%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.53	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-8767-6472 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed aldrin	4.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-2.28	1.89	0.01	7	CDF	0.9718	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002939	0.0002939	1	5.21	0.0565	Non-Significant Effect
Error	0.000395	5.643E-05	7			
Total	0.0006889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.2	46.2	0.3666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.701	0.0875	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		4	0.223	0.215	0.23	0.22	0.22	0.23	0.0025	2.25%	4.91%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	Outlier	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-3027-4126 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed aldrin	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-9034-6982 **Endpoint:** aldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed aldrin	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

aldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

aldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-0361-1579 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed alpha chlordane	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-8162-4708	**Endpoint:**	alpha chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed alpha chlordane	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-4268-1296 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed alpha chlordane	4.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-2.28	1.89	0.01	7	CDF	0.9718	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002939	0.0002939	1	5.21	0.0565	Non-Significant Effect
Error	0.000395	5.643E-05	7			
Total	0.0006889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.2	46.2	0.3666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.701	0.0875	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		4	0.223	0.215	0.23	0.22	0.22	0.23	0.0025	2.25%	4.91%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	Outlier	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-7408-3382 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed alpha chlordane	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 19-2454-8380 **Endpoint:** alpha chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed alpha chlordane	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

alpha chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

alpha chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7078-8408	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed cis-nonachlor	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 18-3793-2195 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed cis-nonachlor	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-9308-5278	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed cis-nonachlor	203.07%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	32	n/a	2	8	Exact	0.8651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.14884	0.14884	1	0.912	0.3676	Non-Significant Effect
Error	1.306	0.16325	8			
Total	1.45484		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4080	23.2	3.6E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.633	0.741	1.4E-04	Non-Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.478	-0.231	1.19	0.22	0.22	1.5	0.256	119.53%	-104.27%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	1.5	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-3639-5533 **Endpoint:** cis-Nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed cis-nonachlor	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-0025-6030	**Endpoint:**	cis-Nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed cis-nonachlor	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

cis-Nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

cis-Nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-5240-2642 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed dieldrin	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-8589-0863 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed dieldrin	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-5616-4871 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed dieldrin	268.13%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	1.45	2.13	0.627	4	CDF	0.1098	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.37	2.29	0.0288	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.45796	0.45796	1	2.11	0.1840	Non-Significant Effect
Error	1.7324	0.21655	8			
Total	2.19036		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5410	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.807	0.741	0.0178	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.662	-0.155	1.48	0.23	0.22	1.7	0.294	99.40%	-182.91%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.94	0.22	0.23	1.7

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-6732-6334 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed dieldrin	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-9691-9187 **Endpoint:** Dieldrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed dieldrin	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

Dieldrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

Dieldrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-6112-7330 **Endpoint:** endosulfan I **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed endosulfan i	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-9547-0886	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed endosulfan i	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6932-5855	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed endosulfan i	218.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	32	n/a	2	8	Exact	0.8651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.17424	0.17424	1	0.918	0.3661	Non-Significant Effect
Error	1.5184	0.1898	8			
Total	1.69264		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4740	23.2	2.7E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.633	0.741	1.4E-04	Non-Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.498	-0.267	1.26	0.22	0.22	1.6	0.276	123.71%	-112.82%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	1.6	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-6094-9099	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed endosulfan i	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-2739-2656	**Endpoint:**	endosulfan I	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed endosulfan i	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

endosulfan I Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

endosulfan I Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 15-3984-7736 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed endosulfan ii	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 11-4783-1993 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed endosulfan ii	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-2092-1050 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed endosulfan ii	171.29%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	32	n/a	2	8	Exact	0.8651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.10404	0.10404	1	0.896	0.3716	Non-Significant Effect
Error	0.9292	0.11615	8			
Total	1.03324		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2900	23.2	7.1E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.635	0.741	1.4E-04	Non-Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.438	-0.16	1.04	0.22	0.22	1.3	0.216	110.02%	-87.18%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	1.3	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-5069-1753 **Endpoint:** endosulfan II **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed endosulfan ii	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-1227-0488	**Endpoint:**	endosulfan II	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed endosulfan ii	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

endosulfan II Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

endosulfan II Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-1405-6338 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed endrin	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-2380-1284 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed endrin	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 00-0855-7669 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed endrin	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-7057-1957 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed endrin	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-9554-6834 **Endpoint:** endrin **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed endrin	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

endrin Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

endrin Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 17-3775-4041 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed gamma-bhc (lindane)	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-2713-7398 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed gamma-bhc (lindane)	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-8993-3305	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed gamma-bhc (lindane)	4.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-2.28	1.89	0.01	7	CDF	0.9718	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002939	0.0002939	1	5.21	0.0565	Non-Significant Effect
Error	0.000395	5.643E-05	7			
Total	0.0006889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.2	46.2	0.3666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.701	0.0875	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		4	0.223	0.215	0.23	0.22	0.22	0.23	0.0025	2.25%	4.91%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	Outlier	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-1051-0947	**Endpoint:**	gamma-BHC (Lindane)	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed gamma-bhc (lindane)	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-0165-6874 **Endpoint:** gamma-BHC (Lindane) **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed gamma-bhc (lindane)	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

gamma-BHC (Lindane) Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

gamma-BHC (Lindane) Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-3808-0205	**Endpoint:**	gamma-chlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed gamma-chlordane	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-1235-2843 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed gamma-chlordane	40.44%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	22.5	n/a	2	8	Exact	0.1984	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.66	2.29	7.0E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00729	0.00729	1	1.13	0.3196	Non-Significant Effect
Error	0.0518	0.006475	8			
Total	0.05909		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	161	23.2	2.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.697	0.741	8.2E-04	Non-Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.288	0.147	0.429	0.24	0.22	0.49	0.0507	39.39%	-23.08%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.49	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-5493-9530 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed gamma-chlordane	64.42%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103*	2.32	2.13	0.151	4	CDF	0.0406	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.29	0.8315	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06724	0.06724	1	5.38	0.0490	Significant Effect
Error	0.1	0.0125	8			
Total	0.16724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	312	23.2	6.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.902	0.741	0.2278	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.398	0.202	0.594	0.47	0.23	0.57	0.0706	39.66%	-70.09%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.49	0.23	0.47	0.23	0.57

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-9538-6964 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed gamma-chlordane	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-8492-3918 **Endpoint:** gamma-chlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed gamma-chlordane	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

gamma-chlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

gamma-chlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3365-0892	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed heptachlor epoxide	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.25	1.86	0.03	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.43	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00512	0.00064	8			
Total	0.00516		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.27	23.2	0.2781	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.741	0.2026	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-101		5	0.456	0.417	0.495	0.44	0.43	0.49	0.014	6.87%	0.87%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-101		0.43	0.44	0.49	0.43	0.49

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-4184-3626	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed heptachlor epoxide	5.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.547	1.86	0.027	8	CDF	0.2997	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.5989	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.299	0.5994	Non-Significant Effect
Error	0.00428	0.000535	8			
Total	0.00444		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.57	23.2	0.3835	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1593	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-102		5	0.468	0.434	0.502	0.48	0.43	0.5	0.0124	5.93%	-1.74%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-102		0.45	0.48	0.43	0.5	0.48

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-0624-3782 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed heptachlor epoxide	1.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-4.08	1.89	0.009	7	CDF	0.9977	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000845	0.000845	1	16.7	0.0047	Significant Effect
Error	0.000355	5.071E-05	7			
Total	0.0012		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.8	46.2	0.4240	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.701	0.0496	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.468	0.46	0.475	0.47	0.46	0.47	0.0025	1.07%	0.00%
31243-103		5	0.448	0.438	0.458	0.45	0.44	0.46	0.00374	1.87%	4.17%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	Outlier	0.47	0.47	0.47
31243-103		0.45	0.45	0.44	0.46	0.44

CETIS Analytical Report

Report Date: 07 Feb-19 12:52 (p 1 of 1)
Test Code: 31250Nv-Pest | 11-0894-3381

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-4480-2154 **Endpoint:** heptachlor epoxide **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed heptachlor epoxide	3.28%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	18	n/a	1	8	Exact	0.0397	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.48	2.29	0.0105	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00064	0.00064	1	3.88	0.0844	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10	23.2	0.0466	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.782	0.741	0.0088	Non-Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-104		5	0.476	0.469	0.483	0.48	0.47	0.48	0.00245	1.15%	-3.48%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-104		0.48	0.47	0.48	0.48	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4566-6242	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed heptachlor epoxide	1.43%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	18	n/a	1	7	Exact	0.0794	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001606	0.0001606	1	5.76	0.0474	Significant Effect
Error	0.000195	2.786E-05	7			
Total	0.0003556		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.2	46.2	0.9174	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.738	0.701	0.0039	Non-Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.468	0.46	0.475	0.47	0.46	0.47	0.0025	1.07%	0.00%
31243-104		5	0.476	0.469	0.483	0.48	0.47	0.48	0.00245	1.15%	-1.82%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	Outlier	0.47	0.47	0.47
31243-104		0.48	0.47	0.48	0.48	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-7596-5081	**Endpoint:**	heptachlor epoxide	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed heptachlor epoxide	3.75%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.647	1.86	0.017	8	CDF	0.2679	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.29	0.1033	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9E-05	9E-05	1	0.419	0.5358	Non-Significant Effect
Error	0.00172	0.000215	8			
Total	0.00181		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.31	23.2	0.4379	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0757	Normal Distribution

heptachlor epoxide Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-105		5	0.466	0.452	0.48	0.47	0.45	0.48	0.0051	2.45%	-1.30%

heptachlor epoxide Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-105		0.48	0.47	0.45	0.46	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 09-0582-7478 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed heptachlor	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-2877-3240 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed heptachlor	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-3278-2036	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed heptachlor	68.04%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	32	n/a	2	8	Exact	0.8651	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.8E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01369	0.01369	1	0.747	0.4126	Non-Significant Effect
Error	0.1466	0.018325	8			
Total	0.16029		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	457	23.2	2.9E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.649	0.741	2.1E-04	Non-Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.308	0.0706	0.545	0.22	0.22	0.65	0.0855	62.09%	-31.62%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.65	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-6670-9601 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed heptachlor	4.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-2.28	1.89	0.01	7	CDF	0.9718	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002939	0.0002939	1	5.21	0.0565	Non-Significant Effect
Error	0.000395	5.643E-05	7			
Total	0.0006889		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.2	46.2	0.3666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.701	0.0875	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		4	0.223	0.215	0.23	0.22	0.22	0.23	0.0025	2.25%	4.91%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	Outlier	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 11-9215-2155 **Endpoint:** heptachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed heptachlor	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-5016-7173	**Endpoint:**	heptachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed heptachlor	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

heptachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

heptachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-6005-3732	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed hexachlorobenzene	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.25	1.86	0.03	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.43	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00512	0.00064	8			
Total	0.00516		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.27	23.2	0.2781	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.741	0.2026	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-101		5	0.456	0.417	0.495	0.44	0.43	0.49	0.014	6.87%	0.87%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-101		0.43	0.44	0.49	0.43	0.49

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-7834-3319	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed hexachlorobenzene	5.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.547	1.86	0.027	8	CDF	0.2997	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.5989	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.299	0.5994	Non-Significant Effect
Error	0.00428	0.000535	8			
Total	0.00444		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.57	23.2	0.3835	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1593	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-102		5	0.468	0.434	0.502	0.48	0.43	0.5	0.0124	5.93%	-1.74%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-102		0.45	0.48	0.43	0.5	0.48

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4499-0488	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed hexachlorobenzene	327.66%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	30.5	n/a	1	8	Exact	0.7460	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.68	2.29	4.4E-04	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.59201	1.59201	1	0.969	0.3537	Non-Significant Effect
Error	13.1397	1.64246	8			
Total	14.7317		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10900	23.2	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.63	0.741	1.3E-04	Non-Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-103		5	1.26	-0.992	3.51	0.45	0.44	4.5	0.811	144.07%	-173.48%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-103		0.45	4.5	0.44	0.46	0.44

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-4908-2700	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed hexachlorobenzene	3.28%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	18	n/a	1	8	Exact	0.0397	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.48	2.29	0.0105	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00064	0.00064	1	3.88	0.0844	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10	23.2	0.0466	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.782	0.741	0.0088	Non-Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-104		5	0.476	0.469	0.483	0.48	0.47	0.48	0.00245	1.15%	-3.48%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-104		0.48	0.47	0.48	0.48	0.47

CETIS Analytical Report

Report Date: 07 Feb-19 12:53 (p 1 of 1)
Test Code: 31250Nv-Pest | 11-0894-3381

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-5936-1132	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed hexachlorobenzene	1.43%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	18	n/a	1	7	Exact	0.0794	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001606	0.0001606	1	5.76	0.0474	Significant Effect
Error	0.000195	2.786E-05	7			
Total	0.0003556		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.2	46.2	0.9174	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.738	0.701	0.0039	Non-Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.468	0.46	0.475		0.46	0.47	0.0025	1.07%	0.00%
31243-104		5	0.476	0.469	0.483		0.47	0.48	0.00245	1.15%	-1.82%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	Outlier	0.47	0.47	0.47
31243-104		0.48	0.47	0.48	0.48	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-2147-5395	**Endpoint:**	hexachlorobenzene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed hexachlorobenzene	3.75%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.647	1.86	0.017	8	CDF	0.2679	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.29	0.1033	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9E-05	9E-05	1	0.419	0.5358	Non-Significant Effect
Error	0.00172	0.000215	8			
Total	0.00181		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.31	23.2	0.4379	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0757	Normal Distribution

hexachlorobenzene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-105		5	0.466	0.452	0.48	0.47	0.45	0.48	0.0051	2.45%	-1.30%

hexachlorobenzene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-105		0.48	0.47	0.45	0.46	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3745-4053	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed methoxychlor	6.58%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.183	1.86	0.061	8	CDF	0.5705	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.48	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9E-05	9E-05	1	0.0336	0.8590	Non-Significant Effect
Error	0.0214	0.002675	8			
Total	0.02149		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.39	23.2	0.4203	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.741	0.2798	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.924	0.875	0.973	0.95	0.86	0.95	0.0178	4.30%	0.00%
31243-101		5	0.918	0.842	0.994	0.88	0.87	0.99	0.0275	6.69%	0.65%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.91	0.86	0.95	0.95	0.95
31243-101		0.87	0.88	0.99	0.87	0.98

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-7951-1571 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed methoxychlor	5.99%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.538	1.86	0.055	8	CDF	0.3028	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.29	0.9636	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00064	0.00064	1	0.289	0.6055	Non-Significant Effect
Error	0.01772	0.002215	8			
Total	0.01836		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.8	23.2	0.5818	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.741	0.1272	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.924	0.875	0.973	0.95	0.86	0.95	0.0178	4.30%	0.00%
31243-102		5	0.94	0.874	1.01	0.96	0.87	1	0.0239	5.68%	-1.73%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.91	0.86	0.95	0.95	0.95
31243-102		0.9	0.97	0.87	1	0.96

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-4989-4515 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed methoxychlor	3.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-1.18	1.86	0.035	8	CDF	0.8633	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.29	0.0484	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00121	0.00121	1	1.38	0.2734	Non-Significant Effect
Error	0.007	0.000875	8			
Total	0.00821		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	9.29	23.2	0.0530	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.848	0.741	0.0542	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.924	0.875	0.973	0.95	0.86	0.95	0.0178	4.30%	0.00%
31243-103		5	0.902	0.886	0.918	0.9	0.89	0.92	0.00583	1.45%	2.38%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.91	0.86	0.95	0.95	0.95
31243-103		0.9	0.91	0.89	0.92	0.89

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 11-7113-0067 **Endpoint:** Methoxychlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed methoxychlor	3.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.66	1.86	0.036	8	CDF	0.0678	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.23	2.29	0.0751	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00256	0.00256	1	2.75	0.1357	Non-Significant Effect
Error	0.00744	0.00093	8			
Total	0.01		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.64	23.2	0.1223	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.864	0.741	0.0848	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.924	0.875	0.973	0.95	0.86	0.95	0.0178	4.30%	0.00%
31243-104		5	0.956	0.935	0.977	0.96	0.93	0.97	0.00748	1.75%	-3.46%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.91	0.86	0.95	0.95	0.95
31243-104		0.97	0.93	0.96	0.97	0.95

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-9216-5923	**Endpoint:**	Methoxychlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed methoxychlor	4.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.386	1.86	0.039	8	CDF	0.3549	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.07	2.29	0.1711	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.149	0.7097	Non-Significant Effect
Error	0.0086	0.001075	8			
Total	0.00876		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.77	23.2	0.3472	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.858	0.741	0.0724	Normal Distribution

Methoxychlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.924	0.875	0.973	0.95	0.86	0.95	0.0178	4.30%	0.00%
31243-105		5	0.932	0.902	0.962	0.93	0.9	0.96	0.0107	2.56%	-0.87%

Methoxychlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.91	0.86	0.95	0.95	0.95
31243-105		0.96	0.95	0.9	0.92	0.93

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-1297-3125	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed oxychlordane	6.47%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.25	1.86	0.03	8	CDF	0.5956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.43	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4E-05	4E-05	1	0.0625	0.8089	Non-Significant Effect
Error	0.00512	0.00064	8			
Total	0.00516		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.27	23.2	0.2781	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.897	0.741	0.2026	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-101		5	0.456	0.417	0.495	0.44	0.43	0.49	0.014	6.87%	0.87%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-101		0.43	0.44	0.49	0.43	0.49

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-2008-4006	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed oxychlordane	5.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.547	1.86	0.027	8	CDF	0.2997	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.74	2.29	0.5989	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00016	0.00016	1	0.299	0.5994	Non-Significant Effect
Error	0.00428	0.000535	8			
Total	0.00444		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.57	23.2	0.3835	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.888	0.741	0.1593	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-102		5	0.468	0.434	0.502	0.48	0.43	0.5	0.0124	5.93%	-1.74%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-102		0.45	0.48	0.43	0.5	0.48

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7773-6799	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed oxychlordane	1.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-4.08	1.89	0.009	7	CDF	0.9977	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000845	0.000845	1	16.7	0.0047	Significant Effect
Error	0.000355	5.071E-05	7			
Total	0.0012		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.8	46.2	0.4240	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.701	0.0496	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.468	0.46	0.475	0.47	0.46	0.47	0.0025	1.07%	0.00%
31243-103		5	0.448	0.438	0.458	0.45	0.44	0.46	0.00374	1.87%	4.17%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	Outlier	0.47	0.47	0.47
31243-103		0.45	0.45	0.44	0.46	0.44

CETIS Analytical Report

Report Date: 07 Feb-19 12:53 (p 1 of 1)
Test Code: 31250Nv-Pest | 11-0894-3381

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-5450-3727 **Endpoint:** oxychlordane **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 failed oxychlordane	3.28%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104*	18	n/a	1	8	Exact	0.0397	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.48	2.29	0.0105	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00064	0.00064	1	3.88	0.0844	Non-Significant Effect
Error	0.00132	0.000165	8			
Total	0.00196		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	10	23.2	0.0466	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.782	0.741	0.0088	Non-Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482		0.43	0.47	0.00775	3.77%	0.00%
31243-104		5	0.476	0.469	0.483		0.47	0.48	0.00245	1.15%	-3.48%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-104		0.48	0.47	0.48	0.48	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-8290-7070	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed oxychlordane	1.43%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	18	n/a	1	7	Exact	0.0794	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001606	0.0001606	1	5.76	0.0474	Significant Effect
Error	0.000195	2.786E-05	7			
Total	0.0003556		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.2	46.2	0.9174	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.738	0.701	0.0039	Non-Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	4	0.468	0.46	0.475	0.47	0.46	0.47	0.0025	1.07%	0.00%
31243-104		5	0.476	0.469	0.483	0.48	0.47	0.48	0.00245	1.15%	-1.82%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	Outlier	0.47	0.47	0.47
31243-104		0.48	0.47	0.48	0.48	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-2482-4737	**Endpoint:**	oxychlordane	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed oxychlordane	3.75%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	0.647	1.86	0.017	8	CDF	0.2679	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.17	2.29	0.1033	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9E-05	9E-05	1	0.419	0.5358	Non-Significant Effect
Error	0.00172	0.000215	8			
Total	0.00181		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.31	23.2	0.4379	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.86	0.741	0.0757	Normal Distribution

oxychlordane Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.46	0.438	0.482	0.47	0.43	0.47	0.00775	3.77%	0.00%
31243-105		5	0.466	0.452	0.48	0.47	0.45	0.48	0.0051	2.45%	-1.30%

oxychlordane Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.46	0.43	0.47	0.47	0.47
31243-105		0.48	0.47	0.45	0.46	0.47

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-2730-5291	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed toxaphene	5.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.577	1.86	0.644	8	CDF	0.7102	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.16	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1	0.1	1	0.333	0.5796	Non-Significant Effect
Error	2.4	0.3	8			
Total	2.5		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	23.2	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.799	0.741	0.0142	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-101		5	11.4	10.7	12.1	11	11	12	0.245	4.80%	1.72%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	11	12	12	12
31243-101		11	11	12	11	12

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 06-1356-0577 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed toxaphene	7.17%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0.447	1.86	0.832	8	CDF	0.3333	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.29	0.4974	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1	0.1	1	0.2	0.6666	Non-Significant Effect
Error	4	0.5	8			
Total	4.1		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.33	23.2	0.4320	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.883	0.741	0.1411	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-102		5	11.8	10.8	12.8	12	11	13	0.374	7.09%	-1.72%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	11	12	12	12
31243-102		11	12	11	13	12

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 21-0102-4542 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed toxaphene	5.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	-1.26	1.86	0.588	8	CDF	0.8792	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4	0.4	1	1.6	0.2415	Non-Significant Effect
Error	2	0.25	8			
Total	2.4		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.89	0.741	0.1713	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-103		5	11.2	10.6	11.8	11	11	12	0.2	3.99%	3.45%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	11	12	12	12
31243-103		11	11	11	12	11

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 10-4893-4972 **Endpoint:** toxaphene **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed toxaphene	3.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	1.63	1.86	0.455	8	CDF	0.0706	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.29	0.8052	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4	0.4	1	2.67	0.1411	Non-Significant Effect
Error	1.2	0.15	8			
Total	1.6		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	96	11.3	9.9E-06	Unequal Variances
Variances	Mod Levene Equality of Variance Test	3	13.7	0.1340	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.814	0.741	0.0215	Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-104		5	12	12	12	12	12	12	0	0.00%	-3.45%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	11	12	12	12
31243-104		12	12	12	12	12

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2804-1698	**Endpoint:**	toxaphene	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed toxaphene	5.07%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	25	n/a	2	8	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.29	0.6884	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1	0.1	1	0.4	0.5447	Non-Significant Effect
Error	2	0.25	8			
Total	2.1		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	23.2	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.759	0.741	0.0045	Non-Normal Distribution

toxaphene Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	11.6	10.9	12.3	12	11	12	0.245	4.72%	0.00%
31243-105		5	11.8	11.2	12.4	12	11	12	0.2	3.79%	-1.72%

toxaphene Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	11	11	12	12	12
31243-105		12	12	11	12	12

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 02-0519-3611 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed trans-nonachlor	5.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-101	-0.535	1.86	0.014	8	CDF	0.6962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.79	2.29	0.5093	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.286	0.6075	Non-Significant Effect
Error	0.00112	0.00014	8			
Total	0.00116		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.5	23.2	0.3965	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.741	0.2642	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	1.71%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-9178-4221 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:02 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed trans-nonachlor	5.73%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-102	0	1.86	0.013	8	CDF	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.29	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00104	0.00013	8			
Total	0.00104		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.25	23.2	0.4515	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.826	0.741	0.0298	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	0.00%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7621-4680	**Endpoint:**	trans-nonachlor	**CETIS Version:**	CETISv1.9.3
Analyzed:	07 Feb-19 9:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed trans-nonachlor	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-103	35.5	n/a	2	8	Exact	0.9762	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00025	0.00025	1	4.55	0.0656	Non-Significant Effect
Error	0.00044	0.000055	8			
Total	0.00069		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	4.27%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-3537-4887 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed trans-nonachlor	3.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-104	0.894	1.86	0.008	8	CDF	0.1986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.1	2.29	0.1484	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00004	0.00004	1	0.8	0.3972	Non-Significant Effect
Error	0.0004	0.00005	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	23.2	0.2080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.83	0.741	0.0337	Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-1.71%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - Pesticides - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-2691-1466 **Endpoint:** trans-nonachlor **CETIS Version:** CETISv1.9.3
Analyzed: 07 Feb-19 9:03 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed trans-nonachlor	3.73%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		31243-105	28.5	n/a	2	8	Exact	0.6587	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.29	0.2320	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.00044	5.5E-05	8			
Total	0.00044		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.67	23.2	0.3651	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.781	0.741	0.0085	Non-Normal Distribution

trans-nonachlor Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	0.00%

trans-nonachlor Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Nereis virens
28 day Bioaccumulation Evaluation

Statistical Analysis

Evaluation of PCB Congeners in Pre-Tissue
Summary Report

CETIS Test Data Worksheet

Report Date: 22 Mar-19 13:00 (p 1 of 2)
Test Code/ID: 09-6971-0849/31250Nv-PCB PRE

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

Start Date: 20 Nov-18 12:05 **Species:** Nereis virens **Sample Code:** 31250-000
End Date: 18 Dec-18 12:05 **Protocol:** US ACE NED RIM (2004) **Sample Source:** New Haven Harbor 2018
Sample Date: 20 Nov-18 **Material:** Laboratory Control Sediment **Sample Station:** Laboratory Control (Nv)

Sample	Rep	Pos	PCB 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087	PCB 049	PCB 183	PCB 184	Total PCBs
31250-PRE	1	7	0.24	0.24	0.24	0.24	0.24	0.24	0.5	0.24	0.24	0.24	1.8	2.6	0.88	2.5	2.1	0.24	0.24	0.24	0.24	0.24	0.83	0.24	
31250-PRE	2	12	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	2.3	2.6	1	2.7	1.8	0.24	0.24	0.24	0.24	0.24	0.88	0.24	
31250-PRE	3	20	1.7	5.3	0.23	0.23	0.58	0.23	0.53	0.23	0.23	0.23	2.8	4.2	1.7	3.8	2.9	0.23	0.23	0.23	0.23	0.61	1	0.23	
31242-008	1	1	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.4	2.1	0.76	2.3	1.8	0.23	0.23	0.23	0.23	0.23	0.63	0.23	
31242-008	2	8	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.92	1.4	0.22	0.82	0.58	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31242-008	3	21	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.82	1.3	0.24	1.2	0.61	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31242-008	4	27	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.4	2.1	0.54	1.8	1.5	0.24	0.24	0.24	0.24	0.24	0.52	0.24	
31242-008	5	33	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.87	1.6	0.24	1.1	0.66	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-101	1	3	0.22	0.22	0.22	0.22	0.5	0.22	0.22	0.22	0.22	0.22	1.2	1.4	0.22	1.2	0.77	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
31243-101	2	13	0.22	1	0.22	0.22	0.69	0.22	0.51	0.48	0.22	0.46	3.3	5.5	2.6	5.9	3.7	0.22	0.22	0.22	0.22	0.22	1.4	0.22	
31243-101	3	15	0.25	0.25	0.25	0.25	0.82	0.25	0.25	0.25	0.25	0.25	1.4	1.8	0.25	1.6	0.79	0.25	0.25	0.25	0.25	0.25	0.25	0.25	
31243-101	4	25	0.22	0.22	0.22	0.22	0.53	0.22	0.22	0.22	0.22	0.22	1.9	3.3	0.83	3.5	2.4	0.22	0.22	0.22	0.22	0.22	1	0.22	
31243-101	5	30	0.24	0.24	0.24	0.24	0.64	0.24	0.6	0.24	0.24	0.24	1.9	3.3	1.4	3.2	1.7	0.24	0.24	0.24	0.24	0.24	0.99	0.24	
31243-102	1	5	0.22	0.22	0.22	0.22	0.59	0.22	0.63	0.59	0.22	0.22	3.4	5.8	2.3	5.6	3.8	0.69	0.22	0.22	0.22	0.22	1.7	0.22	
31243-102	2	9	0.24	0.24	0.24	0.24	0.24	0.24	0.57	0.24	0.24	0.24	1.9	3.2	1.1	2.8	2	0.24	0.24	0.24	0.24	0.24	0.76	0.24	
31243-102	3	17	0.22	0.22	0.22	0.22	0.22	0.22	0.6	0.22	0.22	0.22	1.1	1.7	0.22	1.3	0.88	0.22	0.22	0.22	0.22	0.22	0.44	0.22	
31243-102	4	22	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1.6	2.5	0.86	2.6	1.9	0.25	0.25	0.25	0.25	0.25	0.87	0.25	
31243-102	5	28	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.2	1.9	0.24	1.6	1.1	0.24	0.24	0.24	0.24	0.24	0.56	0.24	
31243-103	1	2	0.22	1.7	0.22	0.22	0.82	0.22	0.71	0.22	0.22	0.22	2.4	3.8	1.3	3.6	2.4	0.22	0.22	0.22	0.22	0.22	0.96	0.22	
31243-103	2	11	0.23	1.3	0.23	0.23	1.1	0.23	0.69	0.23	0.23	0.23	2.1	2.6	0.23	2.1	1.7	0.23	0.23	0.23	0.23	0.23	0.76	0.23	
31243-103	3	16	1.7	2.1	0.22	0.22	1.1	0.22	0.99	0.22	0.22	0.22	1.9	2.4	0.22	1.6	1.6	0.22	0.22	0.22	0.22	1.3	0.6	0.22	
31243-103	4	26	0.23	0.23	0.23	0.23	0.61	0.23	0.23	0.23	0.23	0.23	1.4	2.4	0.23	1.7	1.6	0.23	0.23	0.23	0.23	0.23	0.58	0.23	
31243-103	5	32	0.22	0.22	0.22	0.22	1.3	0.22	1.3	0.22	0.22	0.22	5	7.5	3.5	7.4	4.8	0.22	0.22	0.22	0.22	0.22	2.1	0.22	
31243-104	1	4	0.24	0.24	0.24	0.24	0.24	0.24	0.64	0.24	0.24	0.24	2.5	3.7	1.5	3.7	2.4	0.24	0.24	0.24	0.24	0.24	1.1	0.24	
31243-104	2	14	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.5	2.5	0.72	2.2	1.6	0.23	0.23	0.23	0.23	0.23	0.67	0.23	
31243-104	3	18	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.61	1.1	0.24	0.98	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-104	4	24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.1	1.7	0.76	0.85	0.69	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-104	5	31	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1.8	3.2	1.4	3.1	2.2	0.24	0.24	0.24	0.24	0.24	0.86	0.24	
31243-105	1	6	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.69	1.3	0.24	0.64	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	2	10	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.86	1.3	0.24	0.64	0.56	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
31243-105	3	19	0.23	3.5	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.3	2	0.23	1.4	1.3	0.23	0.23	0.23	0.23	0.23	0.55	0.23	

Sample	Rep	Pos	PCB 008	PCB 018	PCB 028	PCB 044	PCB 052	PCB 066	PCB 101	PCB 105	PCB 118	PCB 128	PCB 138	PCB 153	PCB 170	PCB 180	PCB 187	PCB 195	PCB 206	PCB 209	PCB 087	PCB 049	PCB 183	PCB 184	Total PCBs
31243-105	4	23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.3	2	0.23	1.6	1.1	0.23	0.23	0.23	0.23	0.23	0.51	0.23	
31243-105	5	29	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	1.5	2.7	0.23	1.9	1.1	0.23	0.23	0.23	0.23	0.23	0.53	0.23	

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Batch ID:	06-9346-2173	**Test Type:**	Bioaccumlation - PCBs - Nv	**Analyst:**	
Start Date:	20 Nov-18 12:05	**Protocol:**	US ACE NED RIM (2004)	**Diluent:**	Not Applicable
Ending Date:	18 Dec-18 12:05	**Species:**	Nereis virens	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-1731-4129	PCB 008	Equal Variance t Two-Sample Test	0.2056	31250-PRE passed pcb 008
16-6463-1400	PCB 008	Equal Variance t Two-Sample Test	0.7944	31250-PRE passed pcb 008
04-1392-4581	PCB 008	Unequal Variance t Two-Sample Test	0.2090	31250-PRE passed pcb 008
12-2272-2322	PCB 008	Unequal Variance t Two-Sample Test	0.7910	31250-PRE passed pcb 008
01-9626-3663	PCB 008	Equal Variance t Two-Sample Test	0.1940	31243-101 passed pcb 008
02-6122-1401	PCB 008	Equal Variance t Two-Sample Test	0.8060	31243-101 passed pcb 008
12-6502-5890	PCB 008	Unequal Variance t Two-Sample Test	0.7926	31243-101 passed pcb 008
16-3032-1435	PCB 008	Unequal Variance t Two-Sample Test	0.2074	31243-101 passed pcb 008
02-9399-3902	PCB 008	Equal Variance t Two-Sample Test	0.2881	31243-102 passed pcb 008
09-8597-1190	PCB 008	Equal Variance t Two-Sample Test	0.7119	31243-102 passed pcb 008
10-3328-6464	PCB 008	Unequal Variance t Two-Sample Test	0.7910	31243-102 passed pcb 008
20-8866-5544	PCB 008	Unequal Variance t Two-Sample Test	0.2090	31243-102 passed pcb 008
08-3621-9758	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.9643	31243-103 passed pcb 008
12-4022-3320	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.1071	31243-103 passed pcb 008
01-2736-0287	PCB 008	Unequal Variance t Two-Sample Test	0.2105	31243-104 passed pcb 008
11-8383-5061	PCB 008	Unequal Variance t Two-Sample Test	0.7895	31243-104 passed pcb 008
00-1819-6195	PCB 008	Wilcoxon Rank Sum Two-Sample Test	1.0000	31243-104 passed pcb 008
03-1910-8620	PCB 008	Wilcoxon Rank Sum Two-Sample Test	0.2857	31243-104 passed pcb 008
11-6574-6891	PCB 008	Equal Variance t Two-Sample Test	0.8984	31243-105 passed pcb 008
12-3379-2665	PCB 008	Equal Variance t Two-Sample Test	0.1016	31243-105 passed pcb 008
15-1650-0720	PCB 008	Unequal Variance t Two-Sample Test	0.7910	31243-105 passed pcb 008
16-1254-9447	PCB 008	Unequal Variance t Two-Sample Test	0.2090	31243-105 passed pcb 008
02-6127-5834	PCB 018	Equal Variance t Two-Sample Test	0.2056	31250-PRE passed pcb 018
10-8290-0868	PCB 018	Equal Variance t Two-Sample Test	0.7944	31250-PRE passed pcb 018
09-5994-7382	PCB 018	Unequal Variance t Two-Sample Test	0.2106	31250-PRE passed pcb 018
13-6294-5151	PCB 018	Unequal Variance t Two-Sample Test	0.7894	31250-PRE passed pcb 018
15-7298-9691	PCB 018	Unequal Variance t Two-Sample Test	0.7705	31243-101 passed pcb 018
19-8581-6908	PCB 018	Unequal Variance t Two-Sample Test	0.2295	31243-101 passed pcb 018
06-3945-9699	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.5714	31243-101 passed pcb 018
20-1930-8030	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.5714	31243-101 passed pcb 018
12-0505-3529	PCB 018	Equal Variance t Two-Sample Test	0.7119	31243-102 passed pcb 018

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
21-0581-7559	PCB 018	Equal Variance t Two-Sample Test	0.2881	31243-102 passed pcb 018
00-1289-7371	PCB 018	Unequal Variance t Two-Sample Test	0.7894	31243-102 passed pcb 018
07-9627-8980	PCB 018	Unequal Variance t Two-Sample Test	0.2106	31243-102 passed pcb 018
02-9230-6681	PCB 018	Equal Variance t Two-Sample Test	0.7187	31243-103 passed pcb 018
14-3237-9494	PCB 018	Equal Variance t Two-Sample Test	0.2813	31243-103 passed pcb 018
02-2865-3392	PCB 018	Unequal Variance t Two-Sample Test	0.2111	31243-104 passed pcb 018
17-7100-4239	PCB 018	Unequal Variance t Two-Sample Test	0.7889	31243-104 passed pcb 018
06-4088-3503	PCB 018	Wilcoxon Rank Sum Two-Sample Test	1.0000	31243-104 passed pcb 018
15-8891-1039	PCB 018	Wilcoxon Rank Sum Two-Sample Test	0.2857	31243-104 passed pcb 018
12-9481-2471	PCB 018	Equal Variance t Two-Sample Test	0.7416	31243-105 passed pcb 018
15-6611-4994	PCB 018	Equal Variance t Two-Sample Test	0.2584	31243-105 passed pcb 018
11-0851-9689	PCB 028	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 028
18-6877-6721	PCB 028	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 028
12-4603-9902	PCB 028	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 028
13-6535-1711	PCB 028	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 028
03-3618-4710	PCB 028	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 028
13-5662-3983	PCB 028	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 028
02-7695-8583	PCB 028	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 028
08-2465-2932	PCB 028	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 028
03-9515-5571	PCB 028	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 028
18-6476-5983	PCB 028	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 028
05-1953-9604	PCB 028	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 028
12-8947-7173	PCB 028	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 028
04-4011-7580	PCB 044	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 044
15-7582-8798	PCB 044	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 044
11-7695-8104	PCB 044	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 044
15-6191-9723	PCB 044	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 044
01-9205-0687	PCB 044	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 044
15-3196-7285	PCB 044	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 044
01-1873-2135	PCB 044	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 044
05-3704-9490	PCB 044	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 044
00-1667-7877	PCB 044	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 044
01-7002-6104	PCB 044	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 044
02-4903-3854	PCB 044	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 044
16-6410-3315	PCB 044	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 044
02-4833-7926	PCB 049	Equal Variance t Two-Sample Test	0.7944	31250-PRE passed pcb 049
14-8211-5390	PCB 049	Equal Variance t Two-Sample Test	0.2056	31250-PRE passed pcb 049
05-6307-8864	PCB 049	Unequal Variance t Two-Sample Test	0.2023	31250-PRE passed pcb 049
16-2506-6576	PCB 049	Unequal Variance t Two-Sample Test	0.7977	31250-PRE passed pcb 049
00-6667-4502	PCB 049	Equal Variance t Two-Sample Test	0.1940	31243-101 passed pcb 049
15-7402-6428	PCB 049	Equal Variance t Two-Sample Test	0.8060	31243-101 passed pcb 049
00-0331-6155	PCB 049	Unequal Variance t Two-Sample Test	0.8034	31243-101 passed pcb 049
20-5809-1109	PCB 049	Unequal Variance t Two-Sample Test	0.1966	31243-101 passed pcb 049
16-7640-7424	PCB 049	Equal Variance t Two-Sample Test	0.7119	31243-102 passed pcb 049
18-8045-3716	PCB 049	Equal Variance t Two-Sample Test	0.2881	31243-102 passed pcb 049
07-1425-1637	PCB 049	Unequal Variance t Two-Sample Test	0.2024	31243-102 passed pcb 049
19-7671-6749	PCB 049	Unequal Variance t Two-Sample Test	0.7976	31243-102 passed pcb 049
08-8456-6088	PCB 049	Unequal Variance t Two-Sample Test	0.1894	31243-103 passed pcb 049
21-1712-6071	PCB 049	Unequal Variance t Two-Sample Test	0.8106	31243-103 passed pcb 049
11-4097-3921	PCB 049	Wilcoxon Rank Sum Two-Sample Test	0.1071	31243-103 passed pcb 049
18-0401-9607	PCB 049	Wilcoxon Rank Sum Two-Sample Test	0.9107	31243-103 passed pcb 049
16-0455-4103	PCB 049	Unequal Variance t Two-Sample Test	0.7917	31243-104 passed pcb 049
16-6505-8892	PCB 049	Unequal Variance t Two-Sample Test	0.2083	31243-104 passed pcb 049

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-2889-7160	PCB 049	Wilcoxon Rank Sum Two-Sample Test	0.2857	31243-104 passed pcb 049
21-2185-8339	PCB 049	Wilcoxon Rank Sum Two-Sample Test	1.0000	31243-104 passed pcb 049
06-1578-4729	PCB 049	Equal Variance t Two-Sample Test	0.8984	31243-105 passed pcb 049
12-2437-0143	PCB 049	Equal Variance t Two-Sample Test	0.1016	31243-105 passed pcb 049
03-3985-1591	PCB 049	Unequal Variance t Two-Sample Test	0.2022	31243-105 passed pcb 049
08-8096-4662	PCB 049	Unequal Variance t Two-Sample Test	0.7978	31243-105 passed pcb 049
08-4043-1727	PCB 052	Equal Variance t Two-Sample Test	0.7944	31250-PRE passed pcb 052
12-6675-8257	PCB 052	Equal Variance t Two-Sample Test	0.2056	31250-PRE passed pcb 052
08-5476-6910	PCB 052	Unequal Variance t Two-Sample Test	0.7985	31250-PRE passed pcb 052
21-0760-4360	PCB 052	Unequal Variance t Two-Sample Test	0.2015	31250-PRE passed pcb 052
18-2037-4713	PCB 052	Equal Variance t Two-Sample Test	0.0232	31243-101 failed pcb 052
20-5236-9159	PCB 052	Equal Variance t Two-Sample Test	0.9768	31243-101 passed pcb 052
19-3675-2760	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.5000	31243-102 passed pcb 052
20-0527-1558	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.6250	31243-102 passed pcb 052
15-4078-9690	PCB 052	Equal Variance t Two-Sample Test	0.9935	31243-103 passed pcb 052
15-9297-7348	PCB 052	Equal Variance t Two-Sample Test	0.0065	31243-103 failed pcb 052
03-6606-4674	PCB 052	Unequal Variance t Two-Sample Test	0.2080	31243-104 passed pcb 052
12-6951-2205	PCB 052	Unequal Variance t Two-Sample Test	0.7920	31243-104 passed pcb 052
06-1160-7720	PCB 052	Wilcoxon Rank Sum Two-Sample Test	1.0000	31243-104 passed pcb 052
18-1697-9429	PCB 052	Wilcoxon Rank Sum Two-Sample Test	0.2857	31243-104 passed pcb 052
08-6652-3427	PCB 052	Equal Variance t Two-Sample Test	0.1016	31243-105 passed pcb 052
13-6470-2914	PCB 052	Equal Variance t Two-Sample Test	0.8984	31243-105 passed pcb 052
08-1214-0960	PCB 052	Unequal Variance t Two-Sample Test	0.7986	31243-105 passed pcb 052
12-9098-3043	PCB 052	Unequal Variance t Two-Sample Test	0.2014	31243-105 passed pcb 052
04-6770-1202	PCB 066	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 066
19-3533-1568	PCB 066	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 066
15-2392-8953	PCB 066	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 066
16-7170-0415	PCB 066	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 066
02-1312-6889	PCB 066	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 066
04-4044-0214	PCB 066	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 066
09-0830-2414	PCB 066	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 066
13-9176-3271	PCB 066	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 066
08-3308-5023	PCB 066	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 066
11-8120-8955	PCB 066	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 066
06-3170-0822	PCB 066	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 066
09-9084-9490	PCB 066	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 066
11-9586-4993	PCB 087	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 087
19-1559-8824	PCB 087	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 087
14-7103-7565	PCB 087	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 087
14-9175-4320	PCB 087	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 087
12-9363-8593	PCB 087	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 087
16-3794-1071	PCB 087	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 087
07-6949-1907	PCB 087	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 087
15-4703-1074	PCB 087	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 087
15-4893-9961	PCB 087	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 087
18-8935-4439	PCB 087	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 087
12-7727-3257	PCB 087	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 087
12-8956-7835	PCB 087	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 087
14-6608-9820	PCB 101	Equal Variance t Two-Sample Test	6.5E-07	31250-PRE failed pcb 101
18-9346-3996	PCB 101	Equal Variance t Two-Sample Test	1.0000	31250-PRE passed pcb 101
07-6773-3876	PCB 101	Unequal Variance t Two-Sample Test	0.0882	31250-PRE passed pcb 101
14-0285-2610	PCB 101	Unequal Variance t Two-Sample Test	0.9118	31250-PRE passed pcb 101
00-0607-6238	PCB 101	Equal Variance t Two-Sample Test	0.3182	31243-101 passed pcb 101

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-3648-6600	PCB 101	Equal Variance t Two-Sample Test	0.6818	31243-101 passed pcb 101
00-2295-8550	PCB 101	Equal Variance t Two-Sample Test	0.4027	31243-102 passed pcb 101
12-0591-5961	PCB 101	Equal Variance t Two-Sample Test	0.5973	31243-102 passed pcb 101
01-0092-2394	PCB 101	Equal Variance t Two-Sample Test	0.0965	31243-103 passed pcb 101
20-2063-5820	PCB 101	Equal Variance t Two-Sample Test	0.9035	31243-103 passed pcb 101
09-1543-2493	PCB 101	Equal Variance t Two-Sample Test	0.7812	31243-104 passed pcb 101
17-2710-9473	PCB 101	Equal Variance t Two-Sample Test	0.2188	31243-104 passed pcb 101
16-2460-0283	PCB 101	Equal Variance t Two-Sample Test	3.1E-07	31243-105 failed pcb 101
17-4870-6640	PCB 101	Equal Variance t Two-Sample Test	1.0000	31243-105 passed pcb 101
03-5009-8305	PCB 101	Unequal Variance t Two-Sample Test	0.0881	31243-105 passed pcb 101
03-5490-5118	PCB 101	Unequal Variance t Two-Sample Test	0.9119	31243-105 passed pcb 101
10-3031-7633	PCB 105	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 105
10-3767-0684	PCB 105	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 105
14-6302-6090	PCB 105	Equal Variance t Two-Sample Test	0.3365	31243-101 passed pcb 105
20-0712-0798	PCB 105	Equal Variance t Two-Sample Test	0.6635	31243-101 passed pcb 105
14-4553-1894	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.5536	31243-101 passed pcb 105
15-0947-0538	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.4464	31243-101 passed pcb 105
03-5061-3277	PCB 105	Equal Variance t Two-Sample Test	0.5397	31243-102 passed pcb 105
05-8181-1156	PCB 105	Equal Variance t Two-Sample Test	0.4603	31243-102 passed pcb 105
00-3321-5252	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-102 passed pcb 105
11-8288-1687	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.8036	31243-102 passed pcb 105
10-5339-5549	PCB 105	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 105
20-3776-3551	PCB 105	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 105
09-6550-0772	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 105
21-4601-8788	PCB 105	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 105
01-7903-2805	PCB 105	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 105
10-3069-6391	PCB 105	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 105
06-4883-1646	PCB 118	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 118
17-2733-3052	PCB 118	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 118
10-7109-1936	PCB 118	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 118
21-1302-4000	PCB 118	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 118
14-9313-1393	PCB 118	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 118
18-4672-3626	PCB 118	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 118
04-9015-6574	PCB 118	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 118
05-0217-3648	PCB 118	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 118
01-9050-5807	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 118
14-3729-9492	PCB 118	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 118
01-0246-5856	PCB 118	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 118
17-2215-1397	PCB 118	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 118
09-2357-8811	PCB 128	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 128
20-3313-7922	PCB 128	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 128
08-3338-8905	PCB 128	Equal Variance t Two-Sample Test	0.3365	31243-101 passed pcb 128
13-4415-7155	PCB 128	Equal Variance t Two-Sample Test	0.6635	31243-101 passed pcb 128
00-3605-7721	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.5536	31243-101 passed pcb 128
16-4252-2609	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.4464	31243-101 passed pcb 128
12-6295-4681	PCB 128	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 128
16-5336-3698	PCB 128	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 128
10-9748-5825	PCB 128	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 128
15-6953-1812	PCB 128	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 128
06-5580-8036	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 128
16-2957-8151	PCB 128	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 128
09-9700-4941	PCB 128	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 128
18-7460-0483	PCB 128	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 128

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
00-7594-5544	PCB 138	Equal Variance t Two-Sample Test	0.9978	31250-PRE passed pcb 138
21-0616-4546	PCB 138	Equal Variance t Two-Sample Test	0.0022	31250-PRE failed pcb 138
09-2830-2611	PCB 138	Equal Variance t Two-Sample Test	0.7378	31243-101 passed pcb 138
11-1832-3678	PCB 138	Equal Variance t Two-Sample Test	0.2622	31243-101 passed pcb 138
04-1901-5139	PCB 138	Equal Variance t Two-Sample Test	0.2336	31243-102 passed pcb 138
20-0750-3037	PCB 138	Equal Variance t Two-Sample Test	0.7664	31243-102 passed pcb 138
04-3743-5270	PCB 138	Equal Variance t Two-Sample Test	0.6127	31243-103 passed pcb 138
07-2535-7460	PCB 138	Equal Variance t Two-Sample Test	0.3873	31243-103 passed pcb 138
10-4840-5897	PCB 138	Equal Variance t Two-Sample Test	0.8205	31243-103 passed pcb 138
20-8323-0757	PCB 138	Equal Variance t Two-Sample Test	0.1795	31243-103 passed pcb 138
03-2838-0565	PCB 138	Equal Variance t Two-Sample Test	0.9279	31243-104 passed pcb 138
14-3341-4701	PCB 138	Equal Variance t Two-Sample Test	0.0721	31243-104 passed pcb 138
06-2006-5530	PCB 138	Equal Variance t Two-Sample Test	0.0035	31243-105 failed pcb 138
19-2921-8550	PCB 138	Equal Variance t Two-Sample Test	0.9965	31243-105 passed pcb 138
10-2651-2170	PCB 153	Equal Variance t Two-Sample Test	0.9905	31250-PRE passed pcb 153
12-7576-6898	PCB 153	Equal Variance t Two-Sample Test	0.0095	31250-PRE failed pcb 153
05-9570-4308	PCB 153	Equal Variance t Two-Sample Test	0.5270	31243-101 passed pcb 153
13-5393-6278	PCB 153	Equal Variance t Two-Sample Test	0.4730	31243-101 passed pcb 153
08-7667-9269	PCB 153	Equal Variance t Two-Sample Test	0.4593	31243-102 passed pcb 153
10-0518-2513	PCB 153	Equal Variance t Two-Sample Test	0.5407	31243-102 passed pcb 153
09-1571-0929	PCB 153	Equal Variance t Two-Sample Test	0.3353	31243-103 passed pcb 153
09-5160-5836	PCB 153	Equal Variance t Two-Sample Test	0.6647	31243-103 passed pcb 153
09-8567-7399	PCB 153	Wilcoxon Rank Sum Two-Sample Test	0.9143	31243-103 passed pcb 153
21-0253-9215	PCB 153	Wilcoxon Rank Sum Two-Sample Test	0.1143	31243-103 passed pcb 153
12-1436-9938	PCB 153	Equal Variance t Two-Sample Test	0.1935	31243-104 passed pcb 153
13-2647-1869	PCB 153	Equal Variance t Two-Sample Test	0.8065	31243-104 passed pcb 153
04-0099-7436	PCB 153	Equal Variance t Two-Sample Test	0.9746	31243-105 passed pcb 153
18-3012-2560	PCB 153	Equal Variance t Two-Sample Test	0.0254	31243-105 failed pcb 153
03-3009-6749	PCB 170	Equal Variance t Two-Sample Test	0.9924	31250-PRE passed pcb 170
05-1890-1653	PCB 170	Equal Variance t Two-Sample Test	0.0076	31250-PRE failed pcb 170
04-3123-7262	PCB 170	Equal Variance t Two-Sample Test	0.5819	31243-101 passed pcb 170
12-0551-9882	PCB 170	Equal Variance t Two-Sample Test	0.4181	31243-101 passed pcb 170
05-4080-3907	PCB 170	Equal Variance t Two-Sample Test	0.3303	31243-102 passed pcb 170
06-6479-7362	PCB 170	Equal Variance t Two-Sample Test	0.6697	31243-102 passed pcb 170
05-2046-5564	PCB 170	Equal Variance t Two-Sample Test	0.4572	31243-103 passed pcb 170
17-9143-2609	PCB 170	Equal Variance t Two-Sample Test	0.5428	31243-103 passed pcb 170
03-4525-4266	PCB 170	Wilcoxon Rank Sum Two-Sample Test	0.9429	31243-103 passed pcb 170
13-5624-9896	PCB 170	Wilcoxon Rank Sum Two-Sample Test	0.1143	31243-103 passed pcb 170
02-2948-5235	PCB 170	Equal Variance t Two-Sample Test	0.7566	31243-104 passed pcb 170
19-3515-1922	PCB 170	Equal Variance t Two-Sample Test	0.2434	31243-104 passed pcb 170
03-8648-4225	PCB 170	Unequal Variance t Two-Sample Test	0.9730	31243-105 passed pcb 170
10-3374-0487	PCB 170	Unequal Variance t Two-Sample Test	0.9679	31243-105 passed pcb 170
12-9166-5711	PCB 170	Unequal Variance t Two-Sample Test	0.0321	31243-105 failed pcb 170
18-2306-9694	PCB 170	Unequal Variance t Two-Sample Test	0.0270	31243-105 failed pcb 170
00-8924-2370	PCB 180	Equal Variance t Two-Sample Test	0.0076	31250-PRE failed pcb 180
05-6061-6757	PCB 180	Equal Variance t Two-Sample Test	0.9924	31250-PRE passed pcb 180
10-4295-7295	PCB 180	Equal Variance t Two-Sample Test	0.4734	31243-101 passed pcb 180
12-2721-0564	PCB 180	Equal Variance t Two-Sample Test	0.5266	31243-101 passed pcb 180
06-7894-8349	PCB 180	Equal Variance t Two-Sample Test	0.5791	31243-102 passed pcb 180
14-6166-5807	PCB 180	Equal Variance t Two-Sample Test	0.4209	31243-102 passed pcb 180
04-7663-0908	PCB 180	Equal Variance t Two-Sample Test	0.8518	31243-103 passed pcb 180
06-5821-0785	PCB 180	Equal Variance t Two-Sample Test	0.1482	31243-103 passed pcb 180
09-3430-4088	PCB 180	Equal Variance t Two-Sample Test	0.4283	31243-103 passed pcb 180

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
18-6914-7352	PCB 180	Equal Variance t Two-Sample Test	0.5717	31243-103 passed pcb 180
08-2098-3420	PCB 180	Equal Variance t Two-Sample Test	0.8291	31243-104 passed pcb 180
10-9969-9122	PCB 180	Equal Variance t Two-Sample Test	0.1709	31243-104 passed pcb 180
07-1812-0907	PCB 180	Equal Variance t Two-Sample Test	0.0039	31243-105 failed pcb 180
17-7383-6251	PCB 180	Equal Variance t Two-Sample Test	0.9961	31243-105 passed pcb 180
04-7538-5209	PCB 183	Equal Variance t Two-Sample Test	0.0022	31250-PRE failed pcb 183
13-7792-2768	PCB 183	Equal Variance t Two-Sample Test	0.9978	31250-PRE passed pcb 183
11-7573-1430	PCB 183	Equal Variance t Two-Sample Test	0.6564	31243-101 passed pcb 183
15-1197-2026	PCB 183	Equal Variance t Two-Sample Test	0.3436	31243-101 passed pcb 183
03-2921-9989	PCB 183	Equal Variance t Two-Sample Test	0.9499	31243-102 passed pcb 183
05-3744-1812	PCB 183	Equal Variance t Two-Sample Test	0.0501	31243-102 passed pcb 183
09-7021-6501	PCB 183	Equal Variance t Two-Sample Test	0.4522	31243-102 passed pcb 183
11-0718-8224	PCB 183	Equal Variance t Two-Sample Test	0.5478	31243-102 passed pcb 183
04-5453-7674	PCB 183	Equal Variance t Two-Sample Test	0.4037	31243-103 passed pcb 183
11-2654-0239	PCB 183	Equal Variance t Two-Sample Test	0.5963	31243-103 passed pcb 183
16-8137-2925	PCB 183	Equal Variance t Two-Sample Test	0.9132	31243-103 passed pcb 183
17-2890-6957	PCB 183	Equal Variance t Two-Sample Test	0.0868	31243-103 passed pcb 183
06-5927-8654	PCB 183	Equal Variance t Two-Sample Test	0.8665	31243-104 passed pcb 183
18-2675-3602	PCB 183	Equal Variance t Two-Sample Test	0.1335	31243-104 passed pcb 183
08-5933-2442	PCB 183	Equal Variance t Two-Sample Test	0.0015	31243-105 failed pcb 183
14-5350-5683	PCB 183	Equal Variance t Two-Sample Test	0.9985	31243-105 passed pcb 183
11-9273-4658	PCB 184	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 184
20-7316-3279	PCB 184	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 184
08-5981-0283	PCB 184	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 184
16-8062-8481	PCB 184	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 184
07-4383-4381	PCB 184	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 184
20-0938-3976	PCB 184	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 184
05-6745-6763	PCB 184	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 184
12-7215-3017	PCB 184	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 184
16-9734-7726	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 184
18-7557-8631	PCB 184	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 184
16-1375-7949	PCB 184	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 184
16-7214-7736	PCB 184	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 184
12-8246-2816	PCB 187	Equal Variance t Two-Sample Test	0.9872	31250-PRE passed pcb 187
18-0403-2376	PCB 187	Equal Variance t Two-Sample Test	0.0128	31250-PRE failed pcb 187
11-3346-2507	PCB 187	Equal Variance t Two-Sample Test	0.3134	31243-101 passed pcb 187
17-5957-0471	PCB 187	Equal Variance t Two-Sample Test	0.6866	31243-101 passed pcb 187
05-1509-2227	PCB 187	Equal Variance t Two-Sample Test	0.3325	31243-102 passed pcb 187
14-3800-4211	PCB 187	Equal Variance t Two-Sample Test	0.6675	31243-102 passed pcb 187
00-4593-6450	PCB 187	Equal Variance t Two-Sample Test	0.5684	31243-103 passed pcb 187
05-2254-3262	PCB 187	Equal Variance t Two-Sample Test	0.8644	31243-103 passed pcb 187
13-7742-2054	PCB 187	Equal Variance t Two-Sample Test	0.1356	31243-103 passed pcb 187
17-3753-3198	PCB 187	Equal Variance t Two-Sample Test	0.4316	31243-103 passed pcb 187
05-8235-7475	PCB 187	Equal Variance t Two-Sample Test	0.1084	31243-104 passed pcb 187
18-1257-3872	PCB 187	Equal Variance t Two-Sample Test	0.8916	31243-104 passed pcb 187
11-7418-0783	PCB 187	Equal Variance t Two-Sample Test	0.0038	31243-105 failed pcb 187
21-2981-2114	PCB 187	Equal Variance t Two-Sample Test	0.9962	31243-105 passed pcb 187
15-3081-6491	PCB 195	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 195
15-7513-9225	PCB 195	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 195
02-4488-6918	PCB 195	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 195
02-7546-3061	PCB 195	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 195
01-3457-4129	PCB 195	Equal Variance t Two-Sample Test	0.5397	31243-102 passed pcb 195
19-1370-2237	PCB 195	Equal Variance t Two-Sample Test	0.4603	31243-102 passed pcb 195

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
14-8057-4355	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.8036	31243-102 passed pcb 195
20-2903-6545	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.3214	31243-102 passed pcb 195
13-6436-6607	PCB 195	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 195
16-7805-3667	PCB 195	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 195
05-7084-7074	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 195
20-2639-9419	PCB 195	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 195
11-6825-5763	PCB 195	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 195
16-4211-0443	PCB 195	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 195
16-8623-1722	PCB 206	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 206
18-3184-1824	PCB 206	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 206
00-1218-6888	PCB 206	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 206
16-0890-0996	PCB 206	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 206
07-6035-2536	PCB 206	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 206
19-7236-7314	PCB 206	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 206
05-8052-7394	PCB 206	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 206
08-8919-6924	PCB 206	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 206
03-5842-3134	PCB 206	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 206
11-1891-8588	PCB 206	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 206
01-0662-5839	PCB 206	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 206
16-9484-6159	PCB 206	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 206
12-3902-9504	PCB 209	Equal Variance t Two-Sample Test	0.6674	31250-PRE passed pcb 209
14-4647-9393	PCB 209	Equal Variance t Two-Sample Test	0.3326	31250-PRE passed pcb 209
10-1873-0411	PCB 209	Equal Variance t Two-Sample Test	0.2381	31243-101 passed pcb 209
17-6605-9929	PCB 209	Equal Variance t Two-Sample Test	0.7619	31243-101 passed pcb 209
01-6195-0269	PCB 209	Equal Variance t Two-Sample Test	0.6197	31243-102 passed pcb 209
13-1565-6816	PCB 209	Equal Variance t Two-Sample Test	0.3803	31243-102 passed pcb 209
00-2761-8212	PCB 209	Equal Variance t Two-Sample Test	0.0104	31243-103 failed pcb 209
08-2763-4262	PCB 209	Equal Variance t Two-Sample Test	0.9896	31243-103 passed pcb 209
07-5955-6352	PCB 209	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 209
17-7582-9539	PCB 209	Wilcoxon Rank Sum Two-Sample Test	0.6429	31243-104 passed pcb 209
07-5406-5358	PCB 209	Equal Variance t Two-Sample Test	0.2685	31243-105 passed pcb 209
14-2868-6187	PCB 209	Equal Variance t Two-Sample Test	0.7315	31243-105 passed pcb 209

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PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	1.7	0.487	0.843	116.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	67.80%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	68.35%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	67.80%
31243-103		5	0.52	-0.299	1.34	0.22	1.7	0.295	0.66	126.86%	28.44%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	67.25%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	67.80%

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	5.3	1.69	2.92	151.63%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	87.85%
31243-101		5	0.386	-0.0405	0.812	0.22	1	0.154	0.343	88.99%	79.97%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	87.85%
31243-103		5	1.11	0.0472	2.17	0.22	2.1	0.383	0.856	77.12%	42.39%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	87.65%
31243-105		5	0.888	-0.925	2.7	0.23	3.5	0.653	1.46	164.43%	53.91%

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.61	0.123	0.214	58.79%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	35.60%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	36.70%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	35.60%
31243-103		5	0.44	-0.157	1.04	0.22	1.3	0.215	0.481	109.27%	-21.10%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	34.50%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	35.60%

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PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.58	0.113	0.196	55.56%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	33.77%
31243-101		5	0.636	0.476	0.796	0.5	0.82	0.0577	0.129	20.28%	-80.00%
31243-102		5	0.308	0.112	0.504	0.22	0.59	0.0707	0.158	51.30%	12.83%
31243-103		5	0.986	0.65	1.32	0.61	1.3	0.121	0.271	27.47%	-179.06%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	32.64%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	33.77%

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.24	0.53	0.0921	0.159	37.67%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	44.72%
31243-101		5	0.36	0.135	0.585	0.22	0.6	0.0811	0.181	50.35%	14.96%
31243-102		5	0.458	0.215	0.701	0.24	0.63	0.0875	0.196	42.71%	-8.19%
31243-103		5	0.784	0.291	1.28	0.23	1.3	0.177	0.397	50.62%	-85.20%
31243-104		5	0.318	0.0944	0.542	0.23	0.64	0.0805	0.18	56.62%	24.88%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	44.72%

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.282	0.144	0.42	0.22	0.48	0.0498	0.111	39.52%	-19.15%
31243-102		5	0.308	0.112	0.504	0.22	0.59	0.0707	0.158	51.30%	-30.14%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

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PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.278	0.151	0.405	0.22	0.46	0.0459	0.103	36.89%	-17.46%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	1.8	2.8	0.289	0.5	21.74%	0.00%
31242-008	RS	5	1.08	0.719	1.45	0.82	1.4	0.131	0.292	27.03%	52.96%
31243-101		5	1.94	0.921	2.96	1.2	3.3	0.367	0.82	42.29%	15.65%
31243-102		5	1.84	0.687	2.99	1.1	3.4	0.415	0.929	50.49%	20.00%
31243-103		5	2.56	0.807	4.31	1.4	5	0.631	1.41	55.15%	-11.30%
31243-104		5	1.5	0.615	2.39	0.61	2.5	0.32	0.715	47.57%	34.70%
31243-105		5	1.13	0.708	1.55	0.69	1.5	0.152	0.34	30.05%	50.87%

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	4.2	0.533	0.924	29.48%	0.00%
31242-008	RS	5	1.7	1.23	2.17	1.3	2.1	0.17	0.381	22.40%	45.74%
31243-101		5	3.06	1.06	5.06	1.4	5.5	0.722	1.61	52.72%	2.34%
31243-102		5	3.02	0.958	5.08	1.7	5.8	0.743	1.66	54.98%	3.62%
31243-103		5	3.74	1.03	6.45	2.4	7.5	0.975	2.18	58.32%	-19.36%
31243-104		5	2.44	1.12	3.76	1.1	3.7	0.475	1.06	43.53%	22.13%
31243-105		5	1.86	1.13	2.59	1.3	2.7	0.262	0.586	31.49%	40.64%

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	0.88	1.7	0.256	0.443	37.11%	0.00%
31242-008	RS	5	0.4	0.1	0.7	0.22	0.76	0.108	0.241	60.31%	66.48%
31243-101		5	1.06	-0.166	2.29	0.22	2.6	0.442	0.988	93.17%	11.17%
31243-102		5	0.944	-0.111	2	0.22	2.3	0.38	0.85	90.04%	20.89%
31243-103		5	1.1	-0.67	2.86	0.22	3.5	0.636	1.42	129.74%	8.16%
31243-104		5	0.924	0.274	1.57	0.24	1.5	0.234	0.523	56.62%	22.57%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	80.39%

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.5	3.8	0.404	0.7	23.33%	0.00%
31242-008	RS	5	1.44	0.702	2.19	0.82	2.3	0.267	0.597	41.36%	51.87%
31243-101		5	3.08	0.768	5.39	1.2	5.9	0.833	1.86	60.45%	-2.67%
31243-102		5	2.78	0.668	4.89	1.3	5.6	0.761	1.7	61.17%	7.33%
31243-103		5	3.28	0.252	6.31	1.6	7.4	1.09	2.44	74.35%	-9.33%
31243-104		5	2.17	0.6	3.73	0.85	3.7	0.564	1.26	58.24%	27.80%
31243-105		5	1.24	0.525	1.95	0.64	1.9	0.256	0.572	46.31%	58.80%

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.83	1	0.0504	0.0874	9.67%	0.00%
31242-008	RS	5	0.37	0.132	0.608	0.22	0.63	0.0856	0.191	51.71%	59.04%
31243-101		5	0.772	0.129	1.41	0.22	1.4	0.231	0.517	67.03%	14.54%
31243-102		5	0.866	0.251	1.48	0.44	1.7	0.222	0.495	57.21%	4.13%
31243-103		5	1	0.213	1.79	0.58	2.1	0.283	0.634	63.36%	-10.70%
31243-104		5	0.622	0.149	1.09	0.24	1.1	0.17	0.381	61.18%	31.14%
31243-105		5	0.414	0.216	0.612	0.24	0.55	0.0713	0.159	38.52%	54.17%

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	1.8	2.9	0.328	0.569	25.09%	0.00%
31242-008	RS	5	1.03	0.314	1.75	0.58	1.8	0.258	0.577	55.97%	54.56%
31243-101		5	1.87	0.347	3.4	0.77	3.7	0.549	1.23	65.62%	17.41%
31243-102		5	1.94	0.508	3.36	0.88	3.8	0.514	1.15	59.42%	14.59%
31243-103		5	2.42	0.717	4.12	1.6	4.8	0.614	1.37	56.69%	-6.76%
31243-104		5	1.43	0.26	2.59	0.24	2.4	0.42	0.939	65.84%	37.09%
31243-105		5	0.86	0.311	1.41	0.24	1.3	0.198	0.442	51.45%	62.06%

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.328	0.0764	0.58	0.22	0.69	0.0906	0.203	61.79%	-38.59%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

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PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.23	0.24	0.00333	0.00577	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.22	0.24	0.004	0.00894	3.82%	1.13%
31243-101		5	0.23	0.212	0.248	0.22	0.25	0.00632	0.0141	6.15%	2.82%
31243-102		5	0.234	0.217	0.251	0.22	0.25	0.006	0.0134	5.73%	1.13%
31243-103		5	0.224	0.217	0.231	0.22	0.23	0.00245	0.00548	2.45%	5.35%
31243-104		5	0.238	0.232	0.244	0.23	0.24	0.002	0.00447	1.88%	-0.56%
31243-105		5	0.234	0.227	0.241	0.23	0.24	0.00245	0.00548	2.34%	1.13%

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PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	1.7	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	1	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		1.7	1.3	2.1	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	3.5	0.23	0.23

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	1.3	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

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PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.5	0.69	0.82	0.53	0.64
31243-102		0.59	0.24	0.22	0.25	0.24
31243-103		0.82	1.1	1.1	0.61	1.3
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.51	0.25	0.22	0.6
31243-102		0.63	0.57	0.6	0.25	0.24
31243-103		0.71	0.69	0.99	0.23	1.3
31243-104		0.64	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.48	0.25	0.22	0.24
31243-102		0.59	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

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PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.46	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31242-008	RS	1.4	0.92	0.82	1.4	0.87
31243-101		1.2	3.3	1.4	1.9	1.9
31243-102		3.4	1.9	1.1	1.6	1.2
31243-103		2.4	2.1	1.9	1.4	5
31243-104		2.5	1.5	0.61	1.1	1.8
31243-105		0.69	0.86	1.3	1.3	1.5

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31242-008	RS	2.1	1.4	1.3	2.1	1.6
31243-101		1.4	5.5	1.8	3.3	3.3
31243-102		5.8	3.2	1.7	2.5	1.9
31243-103		3.8	2.6	2.4	2.4	7.5
31243-104		3.7	2.5	1.1	1.7	3.2
31243-105		1.3	1.3	2	2	2.7

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31242-008	RS	0.76	0.22	0.24	0.54	0.24
31243-101		0.22	2.6	0.25	0.83	1.4
31243-102		2.3	1.1	0.22	0.86	0.24
31243-103		1.3	0.23	0.22	0.23	3.5
31243-104		1.5	0.72	0.24	0.76	1.4
31243-105		0.24	0.24	0.23	0.23	0.23

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PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31242-008	RS	2.3	0.82	1.2	1.8	1.1
31243-101		1.2	5.9	1.6	3.5	3.2
31243-102		5.6	2.8	1.3	2.6	1.6
31243-103		3.6	2.1	1.6	1.7	7.4
31243-104		3.7	2.2	0.98	0.85	3.1
31243-105		0.64	0.64	1.4	1.6	1.9

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31242-008	RS	0.63	0.22	0.24	0.52	0.24
31243-101		0.22	1.4	0.25	1	0.99
31243-102		1.7	0.76	0.44	0.87	0.56
31243-103		0.96	0.76	0.6	0.58	2.1
31243-104		1.1	0.67	0.24	0.24	0.86
31243-105		0.24	0.24	0.55	0.51	0.53

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31242-008	RS	1.8	0.58	0.61	1.5	0.66
31243-101		0.77	3.7	0.79	2.4	1.7
31243-102		3.8	2	0.88	1.9	1.1
31243-103		2.4	1.7	1.6	1.6	4.8
31243-104		2.4	1.6	0.24	0.69	2.2
31243-105		0.24	0.56	1.3	1.1	1.1

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.69	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis **EnviroSystems, Inc.**

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24
31243-101		0.22	0.22	0.25	0.22	0.24
31243-102		0.22	0.24	0.22	0.25	0.24
31243-103		0.22	0.23	0.22	0.23	0.22
31243-104		0.24	0.23	0.24	0.24	0.24
31243-105		0.24	0.24	0.23	0.23	0.23

Nereis virens
28 day Bioaccumulation Evaluation

Statistical Analysis

Evaluation of PCB Congeners in Pre-Tissue
Reference < Pre-Tissue

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Reference Tissue Significantly < Pre-Tissue?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Unequal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	1.012295	2.91999	0.2089733	0.05	FALSE	1.421108	2		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.8964213	2.01505	0.2055529	0.05	FALSE	0.01348728	5		C
PCB 018	Unequal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	1.003554	2.91999	0.210642	0.05	FALSE	4.925056	2		C
PCB 018	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.8964213	2.01505	0.2055529	0.05	FALSE	0.01348728	5		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 044	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 049	Unequal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	1.048097	2.91999	0.2022887	0.05	FALSE	0.3603209	2		C
PCB 049	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.8964213	2.01505	0.2055529	0.05	FALSE	0.01348728	5		C
PCB 052	Unequal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	1.052286	2.91999	0.2015224	0.05	FALSE	0.3311377	2		C
PCB 052	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.8964213	2.01505	0.2055529	0.05	FALSE	0.01348728	5		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	2.05436	2.91999	0.0881514	0.05	FALSE	0.2691108	2		C
PCB 101	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	27.06433	2.01505	6.4596E-07	0.05	TRUE	0.02092158	5		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 118	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	4.451915	1.94318	0.00216013	0.05	TRUE	0.5316349	6		C
PCB 153	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	3.179231	1.94318	0.00954722	0.05	TRUE	0.8760688	6		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	3.365649	1.94318	0.00756179	0.05	TRUE	0.4580364	6		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	3.364132	1.94318	0.00757599	0.05	TRUE	0.8987721	6		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	4.449024	1.94318	0.00216684	0.05	TRUE	0.2329416	6		C
PCB 184	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	2.950571	1.94318	0.01279699	0.05	TRUE	0.814441	6		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	RS	<	Pre-Tissue	PR	0.4548591	1.94318	0.3326022	0.05	FALSE	0.01139213	6		C

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-1392-4581	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 008	607.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	1.01	2.92	1.42	2	CDF	0.2090	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0374	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.455101	0.455101	1	1.92	0.2151	Non-Significant Effect
Error	1.42139	0.236898	6			
Total	1.87649		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8880	26.3	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.766	0.645	0.0122	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	67.80%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-1731-4129	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 008	5.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.896	2.02	0.014	5	CDF	0.2056	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.804	0.4111	Non-Significant Effect
Error	0.00032	0.000064	5			
Total	0.0003714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.09	16.3	0.0567	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.09	21.2	0.3552	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.563	0.0878	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	2.50%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-0851-9689	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 028	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-7582-8798	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 044	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-6307-8864	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 049	153.98%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	1.05	2.92	0.36	2	CDF	0.2023	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0386	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0313633	0.0313633	1	2.05	0.2017	Non-Significant Effect
Error	0.0915867	0.0152644	6			
Total	0.12295		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	570	26.3	2.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.789	0.645	0.0219	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	35.60%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-0760-4360	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 052	141.51%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	1.05	2.92	0.331	2	CDF	0.2015	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0388	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0267008	0.0267008	1	2.07	0.2003	Non-Significant Effect
Error	0.0773867	0.0128978	6			
Total	0.104087		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	482	26.3	3.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.792	0.645	0.0234	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	33.77%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-6770-1202	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 066	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9586-4993	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 087	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-6773-3876	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 101	115.00%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	2.05	2.92	0.269	2	CDF	0.0882	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.13	0.0432	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0672133	0.0672133	1	7.88	0.0309	Significant Effect
Error	0.0511867	0.0085311	6			
Total	0.1184		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	318	26.3	7.8E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.828	0.645	0.0569	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	44.72%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-6608-9820	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 101	8.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	27.1	2.02	0.021	5	CDF	6.5E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.112801	0.112801	1	732	1.3E-06	Significant Effect
Error	0.00077	0.000154	5			
Total	0.113571		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.62	31.3	0.1534	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.563	0.2700	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.515	0.324	0.706	0.515	0.5	0.53	0.015	4.12%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	54.56%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	Outlier	0.53		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3031-7633	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 105	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4883-1646	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 118	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-3313-7922	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 128	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-0616-4546	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 138	49.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	4.45	1.94	0.532	6	CDF	0.0022	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.44	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.78161	2.78161	1	19.8	0.0043	Significant Effect
Error	0.84208	0.140347	6			
Total	3.62369		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.92	26.3	0.3300	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.645	0.6274	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	52.96%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31242-008	RS	1.4	0.92	0.82	1.4	0.87

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-7576-6898	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 153	51.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	3.18	1.94	0.876	6	CDF	0.0095	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.13	0.2453	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.85208	3.85208	1	10.1	0.0191	Significant Effect
Error	2.28667	0.381111	6			
Total	6.13875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.89	26.3	0.1287	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.645	0.1695	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	45.74%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31242-008	RS	2.1	1.4	1.3	2.1	1.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-1890-1653	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 170	114.51%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	3.37	1.94	0.458	6	CDF	0.0076	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.13	0.4863	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.18008	1.18008	1	11.3	0.0151	Significant Effect
Error	0.625067	0.104178	6			
Total	1.80515		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.37	26.3	0.2774	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.846	0.645	0.0868	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	66.48%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31242-008	RS	0.76	0.22	0.24	0.54	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-8924-2370	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 180	62.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	3.36	1.94	0.899	6	CDF	0.0076	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.46	2.13	0.9901	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.53963	4.53963	1	11.3	0.0152	Significant Effect
Error	2.40672	0.40112	6			
Total	6.94635		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	26.3	0.7028	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.853	0.645	0.1011	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	51.87%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31242-008	RS	2.3	0.82	1.2	1.8	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-7538-5209	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 183	62.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	4.45	1.94	0.233	6	CDF	0.0022	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.13	0.4606	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.533333	0.533333	1	19.8	0.0043	Significant Effect
Error	0.161667	0.0269444	6			
Total	0.695		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.79	199	0.3599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.645	0.2302	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31242-008	RS	5	0.37	0.132	0.608	0.24	0.22	0.63	0.0856	51.71%	59.04%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31242-008	RS	0.63	0.22	0.24	0.52	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-9273-4658	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 184	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-0403-2376	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE failed pcb 187	79.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue*	2.95	1.94	0.814	6	CDF	0.0128	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.86752	2.86752	1	8.71	0.0256	Significant Effect
Error	1.97627	0.329378	6			
Total	4.84379		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.03	199	1.0947	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.801	0.645	0.0294	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	54.56%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31242-008	RS	1.8	0.58	0.61	1.5	0.66

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-7513-9225	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 195	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8623-1722	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 206	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4647-9393	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31250-PRE passed pcb 209	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	0.455	1.94	0.011	6	CDF	0.3326	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Nereis virens
28 day Bioaccumulation Evaluation

Statistical Analysis

Evaluation of PCB Congeners in Pre-Tissue Reference > Pre-Tissue

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Reference Tissue Significantly > Pre-Tissue?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Unequal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-1.012295	2.91999	0.7910267	0.05	FALSE	1.421108	2		C
PCB 008	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.8964213	2.01505	0.7944471	0.05	FALSE	0.01348728	5		C
PCB 018	Unequal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-1.003554	2.91999	0.789358	0.05	FALSE	4.925056	2		C
PCB 018	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.8964213	2.01505	0.7944471	0.05	FALSE	0.01348728	5		C
PCB 028	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 044	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 049	Unequal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-1.048097	2.91999	0.7977113	0.05	FALSE	0.3603209	2		C
PCB 049	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.8964213	2.01505	0.7944471	0.05	FALSE	0.01348728	5		C
PCB 052	Unequal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-1.052286	2.91999	0.7984776	0.05	FALSE	0.3311377	2		C
PCB 052	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.8964213	2.01505	0.7944471	0.05	FALSE	0.01348728	5		C
PCB 066	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 087	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 101	Unequal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-2.05436	2.91999	0.9118486	0.05	FALSE	0.2691108	2		C
PCB 101	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-27.06433	2.01505	0.9999993	0.05	FALSE	0.02092158	5		C
PCB 105	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 118	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 128	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 138	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-4.451915	1.94318	0.9978399	0.05	FALSE	0.5316349	6		C
PCB 153	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-3.179231	1.94318	0.9904528	0.05	FALSE	0.8760688	6		C
PCB 170	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-3.365649	1.94318	0.9924382	0.05	FALSE	0.4580364	6		C
PCB 180	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-3.364132	1.94318	0.992424	0.05	FALSE	0.8987721	6		C
PCB 183	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-4.449024	1.94318	0.9978331	0.05	FALSE	0.2329416	6		C
PCB 184	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 187	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-2.950571	1.94318	0.987203	0.05	FALSE	0.814441	6		C
PCB 195	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 206	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C
PCB 209	Equal Variance t Two-Sample Test	CLDS	RS	>	Pre-tissue	PR	-0.4548591	1.94318	0.6673978	0.05	FALSE	0.01139213	6		C

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-2272-2322	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 008	607.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-1.01	2.92	1.42	2	CDF	0.7910	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0374	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.455101	0.455101	1	1.92	0.2151	Non-Significant Effect
Error	1.42139	0.236898	6			
Total	1.87649		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8880	26.3	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.766	0.645	0.0122	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	67.80%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-6463-1400	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 008	5.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.896	2.02	0.014	5	CDF	0.7944	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.804	0.4111	Non-Significant Effect
Error	0.00032	0.000064	5			
Total	0.0003714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.09	16.3	0.0567	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.09	21.2	0.3552	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.563	0.0878	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	2.50%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6294-5151	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 018	2104.72%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-1	2.92	4.93	2	CDF	0.7894	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0373	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.3721	5.3721	1	1.89	0.2185	Non-Significant Effect
Error	17.0694	2.8449	6			
Total	22.4415		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	107000	26.3	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.76	0.645	0.0105	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	87.85%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-6877-6721	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 028	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-4011-7580	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 044	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2506-6576	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 049	153.98%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-1.05	2.92	0.36	2	CDF	0.7977	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0386	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0313633	0.0313633	1	2.05	0.2017	Non-Significant Effect
Error	0.0915867	0.0152644	6			
Total	0.12295		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	570	26.3	2.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.789	0.645	0.0219	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	35.60%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-4833-7926	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 049	5.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.896	2.02	0.014	5	CDF	0.7944	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.804	0.4111	Non-Significant Effect
Error	0.00032	0.000064	5			
Total	0.0003714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.09	16.3	0.0567	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.09	21.2	0.3552	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.563	0.0878	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	2.50%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-5476-6910	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 052	141.51%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-1.05	2.92	0.331	2	CDF	0.7985	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0388	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0267008	0.0267008	1	2.07	0.2003	Non-Significant Effect
Error	0.0773867	0.0128978	6			
Total	0.104087		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	482	26.3	3.4E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.792	0.645	0.0234	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	33.77%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-4043-1727	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 052	5.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.896	2.02	0.014	5	CDF	0.7944	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.804	0.4111	Non-Significant Effect
Error	0.00032	0.000064	5			
Total	0.0003714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.09	16.3	0.0567	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.09	21.2	0.3552	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.563	0.0878	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	2.50%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-3533-1568	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 066	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-1559-8824	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 087	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-9346-3996	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 101	8.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-27.1	2.02	0.021	5	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.112801	0.112801	1	732	1.3E-06	Significant Effect
Error	0.00077	0.000154	5			
Total	0.113571		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.62	31.3	0.1534	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.563	0.2700	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.515	0.324	0.706	0.515	0.5	0.53	0.015	4.12%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	54.56%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	Outlier	0.53		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3767-0684	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 105	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2733-3052	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 118	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-2357-8811	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 128	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-7594-5544	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 138	49.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-4.45	1.94	0.532	6	CDF	0.9978	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.44	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.78161	2.78161	1	19.8	0.0043	Significant Effect
Error	0.84208	0.140347	6			
Total	3.62369		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.92	26.3	0.3300	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.942	0.645	0.6274	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31242-008	RS	5	1.08	0.719	1.45	0.92	0.82	1.4	0.131	27.03%	52.96%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31242-008	RS	1.4	0.92	0.82	1.4	0.87

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-2651-2170	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 153	51.53%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-3.18	1.94	0.876	6	CDF	0.9905	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.13	0.2453	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.85208	3.85208	1	10.1	0.0191	Significant Effect
Error	2.28667	0.381111	6			
Total	6.13875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.89	26.3	0.1287	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.875	0.645	0.1695	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31242-008	RS	5	1.7	1.23	2.17	1.6	1.3	2.1	0.17	22.40%	45.74%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31242-008	RS	2.1	1.4	1.3	2.1	1.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-3009-6749	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 170	114.51%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-3.37	1.94	0.458	6	CDF	0.9924	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.7	2.13	0.4863	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.18008	1.18008	1	11.3	0.0151	Significant Effect
Error	0.625067	0.104178	6			
Total	1.80515		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.37	26.3	0.2774	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.846	0.645	0.0868	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31242-008	RS	5	0.4	0.1	0.7	0.24	0.22	0.76	0.108	60.31%	66.48%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31242-008	RS	0.76	0.22	0.24	0.54	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-6061-6757	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 180	62.24%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-3.36	1.94	0.899	6	CDF	0.9924	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.46	2.13	0.9901	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.53963	4.53963	1	11.3	0.0152	Significant Effect
Error	2.40672	0.40112	6			
Total	6.94635		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.37	26.3	0.7028	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.853	0.645	0.1011	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31242-008	RS	5	1.44	0.702	2.19	1.2	0.82	2.3	0.267	41.36%	51.87%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31242-008	RS	2.3	0.82	1.2	1.8	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-7792-2768	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 183	62.96%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-4.45	1.94	0.233	6	CDF	0.9978	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.71	2.13	0.4606	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.533333	0.533333	1	19.8	0.0043	Significant Effect
Error	0.161667	0.0269444	6			
Total	0.695		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.79	199	0.3599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.889	0.645	0.2302	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31242-008	RS	5	0.37	0.132	0.608	0.24	0.22	0.63	0.0856	51.71%	59.04%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31242-008	RS	0.63	0.22	0.24	0.52	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-7316-3279	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 184	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-8246-2816	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 187	79.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-2.95	1.94	0.814	6	CDF	0.9872	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.45	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.86752	2.86752	1	8.71	0.0256	Significant Effect
Error	1.97627	0.329378	6			
Total	4.84379		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.03	199	1.0947	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.801	0.645	0.0294	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31242-008	RS	5	1.03	0.314	1.75	0.66	0.58	1.8	0.258	55.97%	54.56%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31242-008	RS	1.8	0.58	0.61	1.5	0.66

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-3081-6491	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 195	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-3184-1824	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 206	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-3902-9504	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	04 Apr-19 11:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31242-008	14-2067-5029	23 Oct-18 10:28	24 Oct-18 10:15	28d 2h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31242-008	Reference sediment	New Haven Harbor 2018	CLDS Reference (NHH-CL	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31250-PRE passed pcb 209	4.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		Pre-Test Tissue	-0.455	1.94	0.011	6	CDF	0.6674	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.88	2.13	0.2261	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.207	0.6652	Non-Significant Effect
Error	0.0003867	6.444E-05	6			
Total	0.0004		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.4	199	0.6302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.825	0.645	0.0524	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31242-008	RS	5	0.234	0.223	0.245	0.24	0.22	0.24	0.004	3.82%	1.13%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31242-008	RS	0.23	0.22	0.24	0.24	0.24

Nereis virens
28 day Bioaccumulation Evaluation

Statistical Analysis

Evaluation of PCB Congeners in Pre-Tissue
Pre-Tissue < Treatment

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly < Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-1.020462	2.91999	0.7925729	0.05	FALSE	1.42118	2		C
PCB 008	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.9449109	2.01505	0.805954	0.05	FALSE	0.02132527	5		C
PCB 018	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.909674	2.91999	0.7704917	0.05	FALSE	4.945425	2		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 2		20		0.5714286	0.05	FALSE		5	2	E
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-1.079662	2.91999	0.8034067	0.05	FALSE	0.3606048	2		C
PCB 049	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.9449109	2.01505	0.805954	0.05	FALSE	0.02132527	5		C
PCB 052	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		2.502038	1.94318	0.02320008	0.05	TRUE	0.21953	6		C
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.4975708	1.94318	0.6817535	0.05	FALSE	0.2473378	6		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 2		22		0.4464286	0.05	FALSE		6	2	E
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.4479309	2.01505	0.6635278	0.05	FALSE	0.01874404	5		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 128	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 2		22		0.4464286	0.05	FALSE		6	2	E
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.4479309	2.01505	0.6635278	0.05	FALSE	0.01874404	5		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.6758453	1.94318	0.7378407	0.05	FALSE	1.035066	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.0706561	1.94318	0.5270162	0.05	FALSE	2.016807	6		C
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.2158146	1.94318	0.581859	0.05	FALSE	1.200525	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		0.06963579	1.94318	0.4733732	0.05	FALSE	2.232394	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.4226365	1.94318	0.656356	0.05	FALSE	0.6038389	6		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.5121081	1.94318	0.6865635	0.05	FALSE	1.497552	6		C
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 2		-0.7595546	1.94318	0.7618532	0.05	FALSE	0.01705544	6		C
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-1.012252	2.91999	0.7910186	0.05	FALSE	1.421168	2		C
PCB 008	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.597614	2.01505	0.7119341	0.05	FALSE	0.02023092	5		C
PCB 018	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-1.003551	2.91999	0.7893573	0.05	FALSE	4.925074	2		C
PCB 018	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.597614	2.01505	0.7119341	0.05	FALSE	0.02023092	5		C
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly < Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-1.04741	2.91999	0.7975852	0.05	FALSE	0.3605575	2		C
PCB 049	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.597614	2.01505	0.7119341	0.05	FALSE	0.02023092	5		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 3		23		0.625	0.05	FALSE		6	1	E
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		0.2574721	1.94318	0.4027085	0.05	FALSE	0.2616346	6		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 3		20		0.3214286	0.05	FALSE		6	2	E
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		0.1048284	2.01505	0.4602937	0.05	FALSE	0.01601861	5		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.776114	1.94318	0.7664185	0.05	FALSE	1.151716	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.106522	1.94318	0.5406798	0.05	FALSE	2.067429	6		C
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.4616098	1.94318	0.6696885	0.05	FALSE	1.049587	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.2083108	1.94318	0.5790612	0.05	FALSE	2.052221	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.1253963	1.94318	0.547847	0.05	FALSE	0.5785289	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-2.013729	2.01505	0.9499158	0.05	FALSE	0.2459944	5		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.4550425	1.94318	0.6674601	0.05	FALSE	1.412055	6		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 3		20		0.3214286	0.05	FALSE		6	2	E
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		0.1048284	2.01505	0.4602937	0.05	FALSE	0.01601861	5		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 3		-0.3188965	1.94318	0.6196927	0.05	FALSE	0.01624921	6		C
PCB 008	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 4		27.5		0.9642857	0.05	FALSE		6	1	E
PCB 018	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-0.6125021	1.94318	0.7186579	0.05	FALSE	2.590899	6		C
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 049	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 4		27		0.9107143	0.05	FALSE		6	0	E
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-1.121314	2.91999	0.8106458	0.05	FALSE	0.3602302	2		C
PCB 052	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		3.485831	1.94318	0.00652472	0.05	TRUE	0.3526807	6		C
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly < Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		1.466144	1.94318	0.09648371	0.05	FALSE	0.4780159	6		C
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		0.2996103	1.94318	0.3872912	0.05	FALSE	1.68628	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-1.009662	2.01505	0.8205035	0.05	FALSE	0.6985179	5		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		0.4468236	1.94318	0.3353392	0.05	FALSE	2.638319	6		C
PCB 153	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 4		19		0.9142857	0.05	FALSE		5	1	E
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-0.1121063	1.94318	0.5428022	0.05	FALSE	1.687115	6		C
PCB 170	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 4		20		0.9428571	0.05	FALSE		5	0	E
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		0.1887074	1.94318	0.4282717	0.05	FALSE	2.88325	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-1.165397	2.01505	0.8517871	0.05	FALSE	1.2968	5		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		0.2546709	1.94318	0.4037406	0.05	FALSE	0.7375823	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-1.58603	2.01505	0.9132045	0.05	FALSE	0.2265723	5		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		0.179878	1.94318	0.4315848	0.05	FALSE	1.656425	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-1.236173	2.01505	0.864352	0.05	FALSE	0.7199473	5		C
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 4		-3.109604	1.94318	0.9895703	0.05	FALSE	0.00791535	6		C
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.004101	2.91999	0.7894628	0.05	FALSE	1.421072	2		C
PCB 008	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21		1	0.05	FALSE		5	2	E
PCB 018	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.001185	2.91999	0.7889031	0.05	FALSE	4.925046	2		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21		1	0.05	FALSE		5	2	E
PCB 028	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 044	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.016083	2.91999	0.7917454	0.05	FALSE	0.3601789	2		C
PCB 049	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21		1	0.05	FALSE		5	2	E
PCB 052	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.017489	2.91999	0.7920115	0.05	FALSE	0.3309832	2		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21		1	0.05	FALSE		5	2	E
PCB 066	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 087	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly < Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-0.8314714	1.94318	0.7812305	0.05	FALSE	0.246168	6		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 118	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 128	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.678744	1.94318	0.927896	0.05	FALSE	0.923701	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-0.9325446	1.94318	0.8064784	0.05	FALSE	1.444726	6		C
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-0.7408203	1.94318	0.7566141	0.05	FALSE	0.7064645	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.03215	1.94318	0.8291003	0.05	FALSE	1.570132	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.223783	1.94318	0.8665465	0.05	FALSE	0.4467143	6		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 5		-1.38031	1.94318	0.891643	0.05	FALSE	1.183478	6		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 206	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 209	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	<	Comp 5		21.5		0.6428571	0.05	FALSE		6	3	E
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-1.012316	2.91999	0.7910308	0.05	FALSE	1.421078	2		C
PCB 008	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-1.46385	2.01505	0.8984447	0.05	FALSE	0.00825923	5		C
PCB 018	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6885809	1.94318	0.7415935	0.05	FALSE	2.931125	6		C
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-1.048442	2.91999	0.7977744	0.05	FALSE	0.3602026	2		C
PCB 049	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-1.46385	2.01505	0.8984447	0.05	FALSE	0.00825923	5		C
PCB 052	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-1.052695	2.91999	0.7985523	0.05	FALSE	0.331009	2		C
PCB 052	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-1.46385	2.01505	0.8984447	0.05	FALSE	0.00825923	5		C
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 101	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-2.055571	2.91999	0.9119266	0.05	FALSE	0.2689523	2		C
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-31.45613	2.01505	0.9999997	0.05	FALSE	0.01800058	5		C
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-4.00272	1.94318	0.9964515	0.05	FALSE	0.5679939	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-2.434092	1.94318	0.9745607	0.05	FALSE	1.016525	6		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly < Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 170	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-3.751755	2.91999	0.9678644	0.05	FALSE	0.7466477	2		C
PCB 170	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-11.75687	6.31375	0.9729906	0.05	FALSE	0.3791407	1		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-3.909209	1.94318	0.9960502	0.05	FALSE	0.876845	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-4.798582	1.94318	0.9984974	0.05	FALSE	0.198155	6		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-3.94566	1.94318	0.9962124	0.05	FALSE	0.6927629	6		C
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	<	Comp 6		-0.6546537	1.94318	0.7315183	0.05	FALSE	0.00791534	6		C

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-6502-5890	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 008	195.58%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-1.02	2.92	1.42	2	CDF	0.7926	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0375	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.462521	0.462521	1	1.95	0.2119	Non-Significant Effect
Error	1.42187	0.236978	6			
Total	1.88439		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3550	26.3	6.3E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.771	0.645	0.0140	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	68.35%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-8597-1190	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 008	8.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.598	2.02	0.020	5	CDF	0.7119	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.357	0.5761	Non-Significant Effect
Error	0.00072	0.000144	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.66	16.3	0.0266	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.03	21.2	0.1567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.563	0.3976	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	2.50%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3621-9758	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 008	141.76%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	27.5	n/a	1	6	Exact	0.9643	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.13	0.3899	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0800833	0.0800833	1	0.152	0.7101	Non-Significant Effect
Error	3.16167	0.526944	6			
Total	3.24175		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.63	26.3	0.6062	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.686	0.645	0.0016	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31243-103		5	0.52	-0.299	1.34	0.23	0.22	1.7	0.295	126.86%	28.44%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31243-103		0.22	0.23	1.7	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-1819-6195	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 008	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21	n/a	2	5	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-6574-6891	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 008	3.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-1.46	2.02	0.008	5	CDF	0.8984	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	2.14	0.2031	Non-Significant Effect
Error	0.00012	0.000024	5			
Total	0.0001714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	34.3	16.3	0.0021	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.33	21.2	0.3125	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.805	0.563	0.0454	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	2.50%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-7298-9691	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 018	256.68%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.91	2.92	4.95	2	CDF	0.7705	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.13	0.0482	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.4506	4.4506	1	1.52	0.2634	Non-Significant Effect
Error	17.541	2.9235	6			
Total	21.9916		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	72.3	26.3	0.0014	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.821	0.645	0.0482	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-101		5	0.386	-0.0405	0.812	0.24	0.22	1	0.154	88.99%	79.97%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-101		0.22	1	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-3945-9699	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 018	215.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	20	n/a	2	5	Exact	0.5714	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0304514	0.0304514	1	0.323	0.5946	Non-Significant Effect
Error	0.47192	0.094384	5			
Total	0.502371		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.53	16.3	0.1726	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.528	21.2	0.5078	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.657	0.563	0.0012	Non-Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-101		5	0.386	-0.0405	0.812	0.24	0.22	1	0.154	88.99%	-60.83%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-101		0.22	1	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-0505-3529	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 018	8.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.598	2.02	0.020	5	CDF	0.7119	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.357	0.5761	Non-Significant Effect
Error	0.00072	0.000144	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.66	16.3	0.0266	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.03	21.2	0.1567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.563	0.3976	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	2.50%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-9230-6681	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 018	134.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-0.613	1.94	2.59	6	CDF	0.7187	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.13	0.1249	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.25052	1.25052	1	0.375	0.5627	Non-Significant Effect
Error	19.9999	3.33331	6			
Total	21.2504		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.6	26.3	0.0429	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.894	0.645	0.2534	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-103		5	1.11	0.0472	2.17	1.3	0.22	2.1	0.383	77.12%	42.39%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-103		1.7	1.3	2.1	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7100-4239	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 018	255.63%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-1	2.92	4.93	2	CDF	0.7889	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0373	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.34674	5.34674	1	1.88	0.2195	Non-Significant Effect
Error	17.0691	2.84486	6			
Total	22.4159		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	427000	26.3	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.758	0.645	0.0101	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	87.65%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-4088-3503	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 018	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21	n/a	2	5	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-9481-2471	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 018	152.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.689	1.94	2.93	6	CDF	0.7416	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.13	0.3777	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.0228	2.0228	1	0.474	0.5168	Non-Significant Effect
Error	25.5973	4.26622	6			
Total	27.6202		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	26.3	0.2220	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.764	0.645	0.0118	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-105		5	0.888	-0.925	2.7	0.24	0.23	3.5	0.653	164.43%	53.91%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-105		0.24	0.24	3.5	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6535-1711	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 028	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-3618-4710	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 028	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-2465-2932	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 028	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-9515-5571	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 028	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-1953-9604	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 028	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-7695-8104	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 044	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-9205-0687 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:14 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 044	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-1873-2135 **Endpoint:** PCB 044 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:14 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 044	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-7002-6104	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 044	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-4903-3854	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 044	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-0331-6155	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 049	99.25%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-1.08	2.92	0.361	2	CDF	0.8034	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.13	0.0406	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0333333	0.0333333	1	2.17	0.1909	Non-Significant Effect
Error	0.0920667	0.0153444	6			
Total	0.1254		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	228	26.3	1.5E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.808	0.645	0.0347	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	36.70%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-7671-6749	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 049	99.24%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-1.05	2.92	0.361	2	CDF	0.7976	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.13	0.0403	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0313633	0.0313633	1	2.05	0.2026	Non-Significant Effect
Error	0.0919867	0.0153311	6			
Total	0.12335		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	254	26.3	1.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.808	0.645	0.0346	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	35.60%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7640-7424	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 049	8.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.598	2.02	0.020	5	CDF	0.7119	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.357	0.5761	Non-Significant Effect
Error	0.00072	0.000144	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.66	16.3	0.0266	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.03	21.2	0.1567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.563	0.3976	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	2.50%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1712-6071	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 049	99.15%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-1.12	2.92	0.36	2	CDF	0.8106	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0328048	0.0328048	1	1.8	0.2380	Non-Significant Effect
Error	0.0913667	0.0182733	5			
Total	0.124171		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1370	49.8	7.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.803	0.563	0.0438	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-103		4	0.225	0.216	0.234	0.225	0.22	0.23	0.00289	2.57%	38.07%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-103		0.22	0.23	Outlier	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-2185-8339	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 049	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21	n/a	2	5	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-1578-4729	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 049	3.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-1.46	2.02	0.008	5	CDF	0.8984	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	2.14	0.2031	Non-Significant Effect
Error	0.00012	0.000024	5			
Total	0.0001714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	34.3	16.3	0.0021	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.33	21.2	0.3125	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.805	0.563	0.0454	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	2.50%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-2037-4713	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 failed pcb 052	62.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101*	2.5	1.94	0.22	6	CDF	0.0232	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.13	0.7020	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.149813	0.149813	1	6.26	0.0464	Significant Effect
Error	0.143587	0.0239311	6			
Total	0.2934		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.32	26.3	0.4292	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.848	0.645	0.0915	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-101		5	0.636	0.476	0.796	0.64	0.5	0.82	0.0577	20.28%	-80.00%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-101		0.5	0.69	0.82	0.53	0.64

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0527-1558	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 052	68.97%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	23	n/a	1	6	Exact	0.6250	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.13	0.3637	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0038533	0.0038533	1	0.131	0.7301	Non-Significant Effect
Error	0.176947	0.0294911	6			
Total	0.1808		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	26.3	0.6372	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7	0.645	0.0023	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-102		5	0.308	0.112	0.504	0.24	0.22	0.59	0.0707	51.30%	12.83%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-102		0.59	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-9297-7348	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 failed pcb 052	99.82%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.49	1.94	0.353	6	CDF	0.0065	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.13	0.5978	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.750501	0.750501	1	12.2	0.0130	Significant Effect
Error	0.370587	0.0617644	6			
Total	1.12109		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.9	199	0.7453	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.645	0.7434	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-103		5	0.986	0.65	1.32	1.1	0.61	1.3	0.121	27.47%	-179.06%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-103		0.82	1.1	1.1	0.61	1.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-1160-7720	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 052	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21	n/a	2	5	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-1214-0960	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 052	93.68%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-1.05	2.92	0.331	2	CDF	0.7986	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0379	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0267008	0.0267008	1	2.08	0.1998	Non-Significant Effect
Error	0.0771867	0.0128644	6			
Total	0.103887		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1280	26.3	4.8E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.779	0.645	0.0170	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	33.77%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6470-2914	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 052	3.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-1.46	2.02	0.008	5	CDF	0.8984	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	2.14	0.2031	Non-Significant Effect
Error	0.00012	0.000024	5			
Total	0.0001714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	34.3	16.3	0.0021	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.33	21.2	0.3125	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.805	0.563	0.0454	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	2.50%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7170-0415	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 066	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-1312-6889	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 066	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-9176-3271	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 066	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3308-5023	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 066	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-3170-0822	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 066	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-9175-4320	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 087	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-3794-1071	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 087	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 07-6949-1907 **Endpoint:** PCB 087 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:14 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 087	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-8935-4439	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 087	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-7727-3257	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 087	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-3648-6600	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 101	58.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.498	1.94	0.247	6	CDF	0.6818	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.13	0.9208	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0075208	0.0075208	1	0.248	0.6365	Non-Significant Effect
Error	0.182267	0.0303778	6			
Total	0.189787		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	199	0.9605	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.885	0.645	0.2097	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-101		5	0.36	0.135	0.585	0.25	0.22	0.6	0.0811	50.35%	14.96%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-101		0.22	0.51	0.25	0.22	0.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2295-8550	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 101	61.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.257	1.94	0.262	6	CDF	0.4027	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.28	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0022533	0.0022533	1	0.0663	0.8054	Non-Significant Effect
Error	0.203947	0.0339911	6			
Total	0.2062		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	199	0.8732	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.785	0.645	0.0197	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-102		5	0.458	0.215	0.701	0.57	0.24	0.63	0.0875	42.71%	-8.19%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-102		0.63	0.57	0.6	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-0092-2394	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 101	112.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	1.47	1.94	0.478	6	CDF	0.0965	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.13	0.3597	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.243901	0.243901	1	2.15	0.1930	Non-Significant Effect
Error	0.680787	0.113464	6			
Total	0.924687		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.19	199	0.2877	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.645	0.9259	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-103		5	0.784	0.291	1.28	0.71	0.23	1.3	0.177	50.62%	-85.20%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-103		0.71	0.69	0.99	0.23	1.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-1543-2493	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 101	58.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-0.831	1.94	0.246	6	CDF	0.7812	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.13	0.1181	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0208033	0.0208033	1	0.691	0.4375	Non-Significant Effect
Error	0.180547	0.0300911	6			
Total	0.20135		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	199	0.9682	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.645	0.1246	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-104		5	0.318	0.0944	0.542	0.24	0.23	0.64	0.0805	56.62%	24.88%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-104		0.64	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 03-5490-5118 **Endpoint:** PCB 101 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:15 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 101	63.53%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-2.06	2.92	0.269	2	CDF	0.9119	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.13	0.0416	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0672133	0.0672133	1	7.91	0.0307	Significant Effect
Error	0.0509867	0.0084978	6			
Total	0.1182		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	848	26.3	1.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.811	0.645	0.0371	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	44.72%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-0947-0538	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 105	54.60%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	22	n/a	2	6	Exact	0.4464	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.35	2.13	0.0025	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0038533	0.0038533	1	0.465	0.5208	Non-Significant Effect
Error	0.0497467	0.0082911	6			
Total	0.0536		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	373	199	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.706	0.645	0.0026	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.282	0.144	0.42	0.24	0.22	0.48	0.0498	39.52%	-19.15%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.48	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0712-0798	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 105	7.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.448	2.02	0.019	5	CDF	0.6635	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.976E-05	2.976E-05	1	0.201	0.6729	Non-Significant Effect
Error	0.0007417	0.0001483	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.75	199	0.2635	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.563	0.4935	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	1.76%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	Outlier	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-3321-5252	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 105	77.39%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	20	n/a	2	6	Exact	0.3214	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.36	2.13	0.0019	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0095408	0.0095408	1	0.573	0.4778	Non-Significant Effect
Error	0.0999467	0.0166578	6			
Total	0.109487		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	749	199	0.0027	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.686	0.645	0.0016	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.308	0.112	0.504	0.24	0.22	0.59	0.0707	51.30%	-30.14%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.59	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-8181-1156	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 105	6.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.105	2.02	0.016	5	CDF	0.4603	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.190E-06	1.190E-06	1	0.011	0.9206	Non-Significant Effect
Error	0.0005417	0.0001083	5			
Total	0.0005429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.75	199	0.3576	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.563	0.2294	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		4	0.237	0.217	0.258	0.24	0.22	0.25	0.00629	5.30%	-0.35%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		Outlier	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 20-3776-3551 **Endpoint:** PCB 105 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:14 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 105	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-4601-8788	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 105	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3069-6391	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 105	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-7109-1936	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 118	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-9313-1393	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 118	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-0217-3648	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 118	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3729-9492	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 118	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 01-0246-5856 **Endpoint:** PCB 118 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:15 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 118	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-4252-2609	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 128	50.26%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	22	n/a	2	6	Exact	0.4464	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.35	2.13	0.0027	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0032033	0.0032033	1	0.456	0.5246	Non-Significant Effect
Error	0.0421467	0.0070245	6			
Total	0.04535		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	316	199	0.0063	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.711	0.645	0.0030	Non-Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.278	0.151	0.405	0.24	0.22	0.46	0.0459	36.89%	-17.46%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.46	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-4415-7155	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 128	7.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.448	2.02	0.019	5	CDF	0.6635	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.976E-05	2.976E-05	1	0.201	0.6729	Non-Significant Effect
Error	0.0007417	0.0001483	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.75	199	0.2635	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.563	0.4935	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	1.76%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	Outlier	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-5336-3698	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 128	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6953-1812	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 128	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-5580-8036	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 128	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-9700-4941	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 128	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-2830-2611	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 138	45.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.676	1.94	1.04	6	CDF	0.7378	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.13	0.1118	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.243	0.243	1	0.457	0.5243	Non-Significant Effect
Error	3.192	0.532	6			
Total	3.435		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.69	199	0.5775	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.645	0.2429	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-101		5	1.94	0.921	2.96	1.9	1.2	3.3	0.367	42.29%	15.65%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-101		1.2	3.3	1.4	1.9	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0750-3037	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 138	50.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.776	1.94	1.15	6	CDF	0.7664	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.13	0.0738	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.39675	0.39675	1	0.602	0.4672	Non-Significant Effect
Error	3.952	0.658667	6			
Total	4.34875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.45	199	0.4741	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.645	0.1843	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-102		5	1.84	0.687	2.99	1.6	1.1	3.4	0.415	50.49%	20.00%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-102		3.4	1.9	1.1	1.6	1.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-2535-7460	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 138	73.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	0.3	1.94	1.69	6	CDF	0.3873	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.13	0.0207	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.12675	0.12675	1	0.0898	0.7746	Non-Significant Effect
Error	8.472	1.412	6			
Total	8.59875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.97	199	0.2291	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.829	0.645	0.0575	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-103		5	2.56	0.807	4.31	2.1	1.4	5	0.631	55.15%	-11.30%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-103		2.4	2.1	1.9	1.4	5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-4840-5897	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 138	30.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-1.01	2.02	0.699	5	CDF	0.8205	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.21	0.21	1	1.02	0.3590	Non-Significant Effect
Error	1.03	0.206	5			
Total	1.24		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.42	49.8	0.7382	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.914	0.563	0.4255	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-103		4	1.95	1.28	2.62	2	1.4	2.4	0.21	21.55%	15.22%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-103		2.4	2.1	1.9	1.4	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-2838-0565	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 138	40.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-1.68	1.94	0.924	6	CDF	0.9279	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.13	0.5564	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.19401	1.19401	1	2.82	0.1442	Non-Significant Effect
Error	2.54208	0.42368	6			
Total	3.73609		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.04	199	0.7094	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.985	0.645	0.9840	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-104		5	1.5	0.615	2.39	1.5	0.61	2.5	0.32	47.57%	34.70%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-104		2.5	1.5	0.61	1.1	1.8

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-2921-8550	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 138	24.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-4	1.94	0.568	6	CDF	0.9965	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.35	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.56669	2.56669	1	16	0.0071	Significant Effect
Error	0.9612	0.1602	6			
Total	3.52789		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.17	26.3	0.4604	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.645	0.5609	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-105		5	1.13	0.708	1.55	1.3	0.69	1.5	0.152	30.05%	50.87%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-105		0.69	0.86	1.3	1.3	1.5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-9570-4308	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 153	64.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.0707	1.94	2.02	6	CDF	0.5270	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.85	2.13	0.2588	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0100833	0.0100833	1	0.00499	0.9460	Non-Significant Effect
Error	12.1187	2.01978	6			
Total	12.1287		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.05	199	0.5237	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.645	0.7267	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-101		5	3.06	1.06	5.06	3.3	1.4	5.5	0.722	52.72%	2.34%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-101		1.4	5.5	1.8	3.3	3.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-0518-2513	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 153	65.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.107	1.94	2.07	6	CDF	0.5407	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.13	0.0821	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0240833	0.0240833	1	0.0113	0.9186	Non-Significant Effect
Error	12.7347	2.12244	6			
Total	12.7588		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.23	199	0.5001	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.854	0.645	0.1049	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-102		5	3.02	0.958	5.08	2.5	1.7	5.8	0.743	54.98%	3.62%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-102		5.8	3.2	1.7	2.5	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-8567-7399	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 153	38.47%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	19	n/a	1	5	Exact	0.9143	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.190476	0.190476	1	0.311	0.6014	Non-Significant Effect
Error	3.06667	0.613333	5			
Total	3.25714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.88	49.8	0.5907	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.724	0.563	0.0067	Non-Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-103		4	2.8	1.73	3.87	2.5	2.4	3.8	0.337	24.05%	10.64%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-103		3.8	2.6	2.4	2.4	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-2647-1869	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 153	46.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-0.933	1.94	1.44	6	CDF	0.8065	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.42	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.901333	0.901333	1	0.87	0.3870	Non-Significant Effect
Error	6.21867	1.03644	6			
Total	7.12		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	199	0.9471	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.645	0.5142	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-104		5	2.44	1.12	3.76	2.5	1.1	3.7	0.475	43.53%	22.13%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-104		3.7	2.5	1.1	1.7	3.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-0099-7436	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 153	32.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-2.43	1.94	1.02	6	CDF	0.9746	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.13	0.6487	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.04008	3.04008	1	5.92	0.0509	Non-Significant Effect
Error	3.07867	0.513111	6			
Total	6.11875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.49	26.3	0.3972	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.814	0.645	0.0403	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-105		5	1.86	1.13	2.59	2	1.3	2.7	0.262	31.49%	40.64%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-105		1.3	1.3	2	2	2.7

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-3123-7262 **Endpoint:** PCB 170 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 13:13 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 170	100.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.216	1.94	1.2	6	CDF	0.5819	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.13	0.1480	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0333334	0.0333334	1	0.0466	0.8363	Non-Significant Effect
Error	4.29407	0.715678	6			
Total	4.3274		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.97	199	0.3487	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.645	0.3302	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-101		5	1.06	-0.166	2.29	0.83	0.22	2.6	0.442	93.17%	11.17%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-101		0.22	2.6	0.25	0.83	1.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-6479-7362	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 170	87.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.462	1.94	1.05	6	CDF	0.6697	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.13	0.1367	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.116563	0.116563	1	0.213	0.6606	Non-Significant Effect
Error	3.28219	0.547031	6			
Total	3.39875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.68	199	0.4495	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.645	0.3660	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-102		5	0.944	-0.111	2	0.86	0.22	2.3	0.38	90.04%	20.89%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-102		2.3	1.1	0.22	0.86	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-4525-4266	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 170	64.65%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	20	n/a	0	5	Exact	0.9429	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.836005	0.836005	1	3.33	0.1277	Non-Significant Effect
Error	1.25637	0.251273	5			
Total	2.09237		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.47	199	0.8592	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.709	0.563	0.0046	Non-Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-103		4	0.495	-0.359	1.35	0.23	0.22	1.3	0.268	108.42%	58.52%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-103		1.3	0.23	0.22	0.23	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-2948-5235	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 170	59.20%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-0.741	1.94	0.706	6	CDF	0.7566	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.48	2.13	0.9289	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.136013	0.136013	1	0.549	0.4868	Non-Significant Effect
Error	1.48699	0.247831	6			
Total	1.623		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.4	199	0.9160	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.645	0.1793	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-104		5	0.924	0.274	1.57	0.76	0.24	1.5	0.234	56.62%	22.57%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-104		1.5	0.72	0.24	0.76	1.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-3374-0487	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 170	62.57%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-3.75	2.92	0.747	2	CDF	0.9679	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.14	2.13	0.0447	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.7256	1.7256	1	26.4	0.0021	Significant Effect
Error	0.392387	0.0653978	6			
Total	2.11799		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6540	26.3	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.802	0.645	0.0300	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	80.39%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-4295-7295	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 180	74.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.0696	1.94	2.23	6	CDF	0.4734	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.13	0.1740	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.012	0.012	1	0.00485	0.9467	Non-Significant Effect
Error	14.848	2.47467	6			
Total	14.86		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.08	199	0.2553	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.645	0.6808	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-101		5	3.08	0.768	5.39	3.2	1.2	5.9	0.833	60.45%	-2.67%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-101		1.2	5.9	1.6	3.5	3.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-7894-8349	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 180	68.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.208	1.94	2.05	6	CDF	0.5791	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.11	2.13	0.0589	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09075	0.09075	1	0.0434	0.8419	Non-Significant Effect
Error	12.548	2.09133	6			
Total	12.6387		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.9	199	0.3002	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.882	0.645	0.1948	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-102		5	2.78	0.668	4.89	2.6	1.3	5.6	0.761	61.17%	7.33%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-102		5.6	2.8	1.3	2.6	1.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-3430-4088	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 180	96.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	0.189	1.94	2.88	6	CDF	0.4283	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.19	2.13	0.0278	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.147	0.147	1	0.0356	0.8565	Non-Significant Effect
Error	24.768	4.128	6			
Total	24.915		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	12.1	199	0.1551	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.831	0.645	0.0605	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-103		5	3.28	0.252	6.31	2.1	1.6	7.4	1.09	74.35%	-9.33%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-103		3.6	2.1	1.6	1.7	7.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-7663-0908	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 180	43.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-1.17	2.02	1.3	5	CDF	0.8518	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.964286	0.964286	1	1.36	0.2964	Non-Significant Effect
Error	3.55	0.71	5			
Total	4.51429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.75	199	0.7681	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.563	0.0622	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-103		4	2.25	0.777	3.72	1.9	1.6	3.6	0.463	41.14%	25.00%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-103		3.6	2.1	1.6	1.7	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-2098-3420	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 180	52.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-1.03	1.94	1.57	6	CDF	0.8291	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.13	0.8957	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.30417	1.30417	1	1.07	0.3418	Non-Significant Effect
Error	7.34512	1.22419	6			
Total	8.64929		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.25	199	0.4981	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.95	0.645	0.7107	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-104		5	2.17	0.6	3.73	2.2	0.85	3.7	0.564	58.24%	27.80%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-104		3.7	2.2	0.98	0.85	3.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7383-6251	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 180	29.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-3.91	1.94	0.877	6	CDF	0.9961	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.4	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.83443	5.83443	1	15.3	0.0079	Significant Effect
Error	2.29072	0.381787	6			
Total	8.12515		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	26.3	0.6548	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.645	0.1931	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-105		5	1.24	0.525	1.95	1.4	0.64	1.9	0.256	46.31%	58.80%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-105		0.64	0.64	1.4	1.6	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-7573-1430	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 183	66.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.423	1.94	0.604	6	CDF	0.6564	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.13	0.6779	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0323408	0.0323408	1	0.179	0.6873	Non-Significant Effect
Error	1.08635	0.181058	6			
Total	1.11869		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	35.1	199	0.0558	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.645	0.5832	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-101		5	0.772	0.129	1.41	0.99	0.22	1.4	0.231	67.03%	14.54%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-101		0.22	1.4	0.25	1	0.99

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-0718-8224	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 183	64.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.125	1.94	0.579	6	CDF	0.5478	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.13	0.0227	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026133	0.0026133	1	0.0157	0.9043	Non-Significant Effect
Error	0.997187	0.166198	6			
Total	0.9998		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	32.2	199	0.0608	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.645	0.0650	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-102		5	0.866	0.251	1.48	0.76	0.44	1.7	0.222	57.21%	4.13%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-102		1.7	0.76	0.44	0.87	0.56

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-5453-7674	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 183	81.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	0.255	1.94	0.738	6	CDF	0.4037	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.13	0.0084	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0175208	0.0175208	1	0.0649	0.8075	Non-Significant Effect
Error	1.62087	0.270144	6			
Total	1.63839		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	52.6	199	0.0375	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.769	0.645	0.0133	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-103		5	1	0.213	1.79	0.76	0.58	2.1	0.283	63.36%	-10.70%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-103		0.96	0.76	0.6	0.58	2.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8137-2925	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 183	25.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-1.59	2.02	0.227	5	CDF	0.9132	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.054519	0.054519	1	2.52	0.1736	Non-Significant Effect
Error	0.108367	0.0216733	5			
Total	0.162886		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.07	199	0.4074	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.94	0.563	0.6428	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-103		4	0.725	0.445	1.01	0.68	0.58	0.96	0.0881	24.30%	19.74%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-103		0.96	0.76	0.6	0.58	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-5927-8654	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 183	49.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-1.22	1.94	0.447	6	CDF	0.8665	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.13	0.5863	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.148403	0.148403	1	1.5	0.2669	Non-Significant Effect
Error	0.594547	0.0990911	6			
Total	0.74295		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19	199	0.1014	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.645	0.6784	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-104		5	0.622	0.149	1.09	0.67	0.24	1.1	0.17	61.18%	31.14%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-104		1.1	0.67	0.24	0.24	0.86

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-5350-5683	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 183	21.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-4.8	1.94	0.198	6	CDF	0.9985	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.35	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.448963	0.448963	1	23	0.0030	Significant Effect
Error	0.116987	0.0194978	6			
Total	0.56595		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.33	199	0.4879	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.853	0.645	0.1010	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-105		5	0.414	0.216	0.612	0.51	0.24	0.55	0.0713	38.52%	54.17%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-105		0.24	0.24	0.55	0.51	0.53

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-5981-0283	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 184	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-0938-3976	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 184	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-7215-3017	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 184	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-7557-8631	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 184	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-1375-7949	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 184	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-5957-0471	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 187	66.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.512	1.94	1.5	6	CDF	0.6866	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.13	0.2399	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.292053	0.292053	1	0.262	0.6269	Non-Significant Effect
Error	6.68175	1.11362	6			
Total	6.9738		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.67	199	0.3684	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.645	0.4964	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-101		5	1.87	0.347	3.4	1.7	0.77	3.7	0.549	65.62%	17.41%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-101		0.77	3.7	0.79	2.4	1.7

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3800-4211	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 187	62.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.455	1.94	1.41	6	CDF	0.6675	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.13	0.1054	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.205013	0.205013	1	0.207	0.6651	Non-Significant Effect
Error	5.94059	0.990098	6			
Total	6.1456		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.09	199	0.4117	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.645	0.3930	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-102		5	1.94	0.508	3.36	1.9	0.88	3.8	0.514	59.42%	14.59%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-102		3.8	2	0.88	1.9	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-3753-3198	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 187	73.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	0.18	1.94	1.66	6	CDF	0.4316	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.13	0.0245	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0440834	0.0440834	1	0.0324	0.8632	Non-Significant Effect
Error	8.17467	1.36244	6			
Total	8.21875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.82	199	0.3039	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.786	0.645	0.0204	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-103		5	2.42	0.717	4.12	1.7	1.6	4.8	0.614	56.69%	-6.76%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-103		2.4	1.7	1.6	1.6	4.8

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-2254-3262	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 187	31.76%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-1.24	2.02	0.72	5	CDF	0.8644	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.334405	0.334405	1	1.53	0.2713	Non-Significant Effect
Error	1.09417	0.218833	5			
Total	1.42857		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.17	49.8	0.5231	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.811	0.563	0.0524	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-103		4	1.83	1.21	2.44	1.65	1.6	2.4	0.193	21.16%	19.49%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-103		2.4	1.7	1.6	1.6	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-1257-3872	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 187	52.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	-1.38	1.94	1.18	6	CDF	0.8916	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.13	0.8047	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.3251	1.3251	1	1.91	0.2167	Non-Significant Effect
Error	4.17299	0.695498	6			
Total	5.49809		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.73	199	0.5718	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.645	0.7624	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-104		5	1.43	0.26	2.59	1.6	0.24	2.4	0.42	65.84%	37.09%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-104		2.4	1.6	0.24	0.69	2.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-2981-2114	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 187	30.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-3.95	1.94	0.693	6	CDF	0.9962	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.4	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.71008	3.71008	1	15.6	0.0076	Significant Effect
Error	1.42987	0.238311	6			
Total	5.13995		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.65	26.3	0.6000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.945	0.645	0.6646	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-105		5	0.86	0.311	1.41	1.1	0.24	1.3	0.198	51.45%	62.06%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-105		0.24	0.56	1.3	1.1	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-7546-3061	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 195	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-1370-2237	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 195	6.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.105	2.02	0.016	5	CDF	0.4603	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.190E-06	1.190E-06	1	0.011	0.9206	Non-Significant Effect
Error	0.0005417	0.0001083	5			
Total	0.0005429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.75	199	0.3576	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.563	0.2294	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		4	0.237	0.217	0.258	0.24	0.22	0.25	0.00629	5.30%	-0.35%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		Outlier	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7805-3667	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 195	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-7084-7074	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 195	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-4211-0443	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 195	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-0890-0996	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 206	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-6035-2536	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 206	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-8052-7394	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 206	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-1891-8588	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 206	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-0662-5839	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 206	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-6605-9929	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-101 passed pcb 209	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.76	1.94	0.017	6	CDF	0.7619	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-6195-0269	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-102 passed pcb 209	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.319	1.94	0.016	6	CDF	0.6197	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-2763-4262	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-103 passed pcb 209	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.11	1.94	0.008	6	CDF	0.9896	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-5955-6352	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-104 passed pcb 209	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	21.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-2868-6187	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 13:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	31243-105 passed pcb 209	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	-0.655	1.94	0.008	6	CDF	0.7315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Nereis virens
28 day Bioaccumulation Evaluation

Statistical Analysis

Evaluation of PCB Congeners in Pre-Tissue
Pre-Tissue > Treatment

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly > Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		1.020462	2.91999	0.2074271	0.05	FALSE	1.42118	2		C
PCB 008	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.9449109	2.01505	0.1940459	0.05	FALSE	0.02132527	5		C
PCB 018	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.909674	2.91999	0.2295083	0.05	FALSE	4.945425	2		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 2		20		0.5714286	0.05	FALSE		5	2	E
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		1.079662	2.91999	0.1965933	0.05	FALSE	0.3606048	2		C
PCB 049	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.9449109	2.01505	0.1940459	0.05	FALSE	0.02132527	5		C
PCB 052	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		-2.502038	1.94318	0.9767999	0.05	FALSE	0.21953	6		C
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.4975708	1.94318	0.3182465	0.05	FALSE	0.2473378	6		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 2		23		0.5535714	0.05	FALSE		6	2	E
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.4479309	2.01505	0.3364722	0.05	FALSE	0.01874404	5		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 128	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 2		23		0.5535714	0.05	FALSE		6	2	E
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.4479309	2.01505	0.3364722	0.05	FALSE	0.01874404	5		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.6758453	1.94318	0.2621593	0.05	FALSE	1.035066	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.07065611	1.94318	0.4729838	0.05	FALSE	2.016807	6		C
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.2158146	1.94318	0.418141	0.05	FALSE	1.200525	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		-0.0696358	1.94318	0.5266268	0.05	FALSE	2.232394	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.4226365	1.94318	0.343644	0.05	FALSE	0.6038389	6		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.5121081	1.94318	0.3134365	0.05	FALSE	1.497552	6		C
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 2		0.7595546	1.94318	0.2381468	0.05	FALSE	0.01705544	6		C
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		1.012252	2.91999	0.2089814	0.05	FALSE	1.421168	2		C
PCB 008	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.597614	2.01505	0.2880659	0.05	FALSE	0.02023092	5		C
PCB 018	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		1.003551	2.91999	0.2106427	0.05	FALSE	4.925074	2		C
PCB 018	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.597614	2.01505	0.2880659	0.05	FALSE	0.02023092	5		C
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly > Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		1.04741	2.91999	0.2024148	0.05	FALSE	0.3605575	2		C
PCB 049	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.597614	2.01505	0.2880659	0.05	FALSE	0.02023092	5		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 3		22		0.5	0.05	FALSE		6	1	E
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		-0.2574721	1.94318	0.5972915	0.05	FALSE	0.2616346	6		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 3		25		0.8035714	0.05	FALSE		6	2	E
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		-0.1048284	2.01505	0.5397063	0.05	FALSE	0.01601861	5		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.776114	1.94318	0.2335815	0.05	FALSE	1.151716	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.106522	1.94318	0.4593202	0.05	FALSE	2.067429	6		C
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.4616098	1.94318	0.3303116	0.05	FALSE	1.049587	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.2083108	1.94318	0.4209388	0.05	FALSE	2.052221	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.1253963	1.94318	0.452153	0.05	FALSE	0.5785289	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		2.013729	2.01505	0.05008423	0.05	FALSE	0.2459944	5		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.4550425	1.94318	0.3325399	0.05	FALSE	1.412055	6		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 3		25		0.8035714	0.05	FALSE		6	2	E
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		-0.1048284	2.01505	0.5397063	0.05	FALSE	0.01601861	5		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 3		0.3188965	1.94318	0.3803073	0.05	FALSE	0.01624921	6		C
PCB 008	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 4		17.5		0.1071429	0.05	FALSE		6	1	E
PCB 018	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		0.6125021	1.94318	0.2813421	0.05	FALSE	2.590899	6		C
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 049	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 4		18		0.1071429	0.05	FALSE		6	0	E
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		1.121314	2.91999	0.1893542	0.05	FALSE	0.3602302	2		C
PCB 052	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-3.485831	1.94318	0.9934753	0.05	FALSE	0.3526807	6		C
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly > Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-1.466144	1.94318	0.9035163	0.05	FALSE	0.4780159	6		C
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-0.2996103	1.94318	0.6127088	0.05	FALSE	1.68628	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		1.009662	2.01505	0.1794965	0.05	FALSE	0.6985179	5		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-0.4468236	1.94318	0.6646608	0.05	FALSE	2.638319	6		C
PCB 153	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 4		13		0.1142857	0.05	FALSE		5	1	E
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		0.1121063	1.94318	0.4571978	0.05	FALSE	1.687115	6		C
PCB 170	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 4		12		0.1142857	0.05	FALSE		5	0	E
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-0.1887074	1.94318	0.5717283	0.05	FALSE	2.88325	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		1.165397	2.01505	0.1482129	0.05	FALSE	1.2968	5		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-0.2546709	1.94318	0.5962594	0.05	FALSE	0.7375823	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		1.58603	2.01505	0.08679551	0.05	FALSE	0.2265723	5		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		-0.179878	1.94318	0.5684152	0.05	FALSE	1.656425	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		1.236173	2.01505	0.1356479	0.05	FALSE	0.7199473	5		C
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 4		3.109604	1.94318	0.01042969	0.05	TRUE	0.00791535	6		C
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.004101	2.91999	0.2105372	0.05	FALSE	1.421072	2		C
PCB 008	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		19		0.2857143	0.05	FALSE		5	2	E
PCB 018	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.001185	2.91999	0.2110969	0.05	FALSE	4.925046	2		C
PCB 018	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		19		0.2857143	0.05	FALSE		5	2	E
PCB 028	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 044	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.016083	2.91999	0.2082546	0.05	FALSE	0.3601789	2		C
PCB 049	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		19		0.2857143	0.05	FALSE		5	2	E
PCB 052	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.017489	2.91999	0.2079885	0.05	FALSE	0.3309832	2		C
PCB 052	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		19		0.2857143	0.05	FALSE		5	2	E
PCB 066	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 087	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly > Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		0.8314714	1.94318	0.2187695	0.05	FALSE	0.246168	6		C
PCB 105	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 118	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 128	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.678744	1.94318	0.07210398	0.05	FALSE	0.923701	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		0.9325446	1.94318	0.1935216	0.05	FALSE	1.444726	6		C
PCB 170	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		0.7408203	1.94318	0.2433858	0.05	FALSE	0.7064645	6		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.03215	1.94318	0.1708997	0.05	FALSE	1.570132	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.223783	1.94318	0.1334535	0.05	FALSE	0.4467143	6		C
PCB 184	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 5		1.38031	1.94318	0.1083569	0.05	FALSE	1.183478	6		C
PCB 195	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 206	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 209	Wilcoxon Rank Sum Two-Sample Test	Pre-Tissue	PR	>	Comp 5		23.5		0.6428571	0.05	FALSE		6	3	E
PCB 008	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		1.012316	2.91999	0.2089692	0.05	FALSE	1.421078	2		C
PCB 008	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		1.46385	2.01505	0.1015553	0.05	FALSE	0.00825923	5		C
PCB 018	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6885809	1.94318	0.2584064	0.05	FALSE	2.931125	6		C
PCB 028	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 044	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 049	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		1.048442	2.91999	0.2022256	0.05	FALSE	0.3602026	2		C
PCB 049	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		1.46385	2.01505	0.1015553	0.05	FALSE	0.00825923	5		C
PCB 052	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		1.052695	2.91999	0.2014477	0.05	FALSE	0.331009	2		C
PCB 052	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		1.46385	2.01505	0.1015553	0.05	FALSE	0.00825923	5		C
PCB 066	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 087	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 101	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		2.055571	2.91999	0.08807342	0.05	FALSE	0.2689523	2		C
PCB 101	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		31.45613	2.01505	3.0669E-07	0.05	TRUE	0.01800058	5		C
PCB 105	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 118	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 128	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 138	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		4.00272	1.94318	0.00354848	0.05	TRUE	0.5679939	6		C
PCB 153	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		2.434092	1.94318	0.02543929	0.05	TRUE	1.016525	6		C

STUDY: 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP
ASSAY: *N. virens* 28-day Bioaccumulation Evaluation
TASK: Statistical Analysis of Body Burden PCBs
QUESTION: Is Pre-Test Tissue Significantly > Treatment?

Endpoint	Method	Group 1	Code 1		Group 2	Code 2	Statistic	Critical	P Level	Alpha	Reject Null	MSD	DF	Ties	P-Type
PCB 170	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		3.751755	2.91999	0.0321356	0.05	TRUE	0.7466477	2		C
PCB 170	Unequal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		11.75687	6.31375	0.02700936	0.05	TRUE	0.3791407	1		C
PCB 180	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		3.909209	1.94318	0.0039498	0.05	TRUE	0.876845	6		C
PCB 183	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		4.798582	1.94318	0.00150255	0.05	TRUE	0.198155	6		C
PCB 184	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 187	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		3.94566	1.94318	0.00378763	0.05	TRUE	0.6927629	6		C
PCB 195	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 206	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C
PCB 209	Equal Variance t Two-Sample Test	Pre-Tissue	PR	>	Comp 6		0.6546537	1.94318	0.2684817	0.05	FALSE	0.00791534	6		C

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-9626-3663	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 008	8.89%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.945	2.02	0.021	5	CDF	0.1940	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001429	0.0001429	1	0.893	0.3881	Non-Significant Effect
Error	0.0008	0.00016	5			
Total	0.0009429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	12.9	16.3	0.0158	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.23	21.2	0.3288	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.856	0.563	0.1386	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	4.17%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-8866-5544	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 008	195.57%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	1.01	2.92	1.42	2	CDF	0.2090	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0375	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.455101	0.455101	1	1.92	0.2151	Non-Significant Effect
Error	1.42179	0.236964	6			
Total	1.87689		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3950	26.3	5.1E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.771	0.645	0.0139	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	67.80%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-9399-3902	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 008	8.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.598	2.02	0.020	5	CDF	0.2881	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.357	0.5761	Non-Significant Effect
Error	0.00072	0.000144	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.66	16.3	0.0266	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.03	21.2	0.1567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.563	0.3976	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	2.50%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-4022-3320	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 008	141.76%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	17.5	n/a	1	6	Exact	0.1071	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.13	0.3899	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0800833	0.0800833	1	0.152	0.7101	Non-Significant Effect
Error	3.16167	0.526944	6			
Total	3.24175		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.63	26.3	0.6062	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.686	0.645	0.0016	Non-Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31243-103		5	0.52	-0.299	1.34	0.23	0.22	1.7	0.295	126.86%	28.44%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31243-103		0.22	0.23	1.7	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-2736-0287	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 008	195.56%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	1	2.92	1.42	2	CDF	0.2105	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0373	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.447741	0.447741	1	1.89	0.2183	Non-Significant Effect
Error	1.42115	0.236858	6			
Total	1.86889		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	35500	26.3	<1.0E-37	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.761	0.645	0.0107	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.727	-1.37	2.82	0.24	0.24	1.7	0.487	116.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	67.25%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	1.7		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-3379-2665	**Endpoint:**	PCB 008	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 008	3.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	1.46	2.02	0.008	5	CDF	0.1016	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	2.14	0.2031	Non-Significant Effect
Error	0.00012	0.000024	5			
Total	0.0001714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	34.3	16.3	0.0021	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.33	21.2	0.3125	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.805	0.563	0.0454	Normal Distribution

PCB 008 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	2.50%

PCB 008 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-8581-6908	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 018	256.68%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.91	2.92	4.95	2	CDF	0.2295	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.13	2.13	0.0482	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.4506	4.4506	1	1.52	0.2634	Non-Significant Effect
Error	17.541	2.9235	6			
Total	21.9916		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	72.3	26.3	0.0014	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.821	0.645	0.0482	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-101		5	0.386	-0.0405	0.812	0.24	0.22	1	0.154	88.99%	79.97%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-101		0.22	1	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-0581-7559	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 018	8.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.598	2.02	0.020	5	CDF	0.2881	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.357	0.5761	Non-Significant Effect
Error	0.00072	0.000144	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.66	16.3	0.0266	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.03	21.2	0.1567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.563	0.3976	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	2.50%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3237-9494	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 018	134.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	0.613	1.94	2.59	6	CDF	0.2813	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.13	0.1249	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.25052	1.25052	1	0.375	0.5627	Non-Significant Effect
Error	19.9999	3.33331	6			
Total	21.2504		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	11.6	26.3	0.0429	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.894	0.645	0.2534	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-103		5	1.11	0.0472	2.17	1.3	0.22	2.1	0.383	77.12%	42.39%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-103		1.7	1.3	2.1	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-8891-1039	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 018	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	19	n/a	2	5	Exact	0.2857	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6611-4994	**Endpoint:**	PCB 018	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 018	152.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.689	1.94	2.93	6	CDF	0.2584	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.76	2.13	0.3777	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.0228	2.0228	1	0.474	0.5168	Non-Significant Effect
Error	25.5973	4.26622	6			
Total	27.6202		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4	26.3	0.2220	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.764	0.645	0.0118	Normal Distribution

PCB 018 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.93	-5.33	9.18	0.24	0.24	5.3	1.69	151.63%	0.00%
31243-105		5	0.888	-0.925	2.7	0.24	0.23	3.5	0.653	164.43%	53.91%

PCB 018 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	5.3		
31243-105		0.24	0.24	3.5	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-4603-9902	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 028	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-5662-3983	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 028	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-7695-8583	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 028	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-6476-5983	**Endpoint:**	PCB 028	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 028	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 12-8947-7173 **Endpoint:** PCB 028 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 14:10 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 028	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 028 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 028 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-6191-9723	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 044	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-3196-7285	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 044	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-3704-9490	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 044	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-1667-7877	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 044	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-6410-3315	**Endpoint:**	PCB 044	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 044	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 044 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 044 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-5809-1109	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 049	99.25%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	1.08	2.92	0.361	2	CDF	0.1966	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.13	0.0406	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0333333	0.0333333	1	2.17	0.1909	Non-Significant Effect
Error	0.0920667	0.0153444	6			
Total	0.1254		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	228	26.3	1.5E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.808	0.645	0.0347	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	36.70%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-1425-1637	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 049	99.24%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	1.05	2.92	0.361	2	CDF	0.2024	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.13	0.0403	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0313633	0.0313633	1	2.05	0.2026	Non-Significant Effect
Error	0.0919867	0.0153311	6			
Total	0.12335		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	254	26.3	1.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.808	0.645	0.0346	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	35.60%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-8045-3716	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 049	8.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.598	2.02	0.020	5	CDF	0.2881	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	0.357	0.5761	Non-Significant Effect
Error	0.00072	0.000144	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	9.66	16.3	0.0266	Equal Variances
Variances	Mod Levene Equality of Variance Test	3.03	21.2	0.1567	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.91	0.563	0.3976	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	2.50%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-8456-6088	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 049	99.15%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	1.12	2.92	0.36	2	CDF	0.1894	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0328048	0.0328048	1	1.8	0.2380	Non-Significant Effect
Error	0.0913667	0.0182733	5			
Total	0.124171		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1370	49.8	7.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.803	0.563	0.0438	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-103		4	0.225	0.216	0.234	0.225	0.22	0.23	0.00289	2.57%	38.07%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-103		0.22	0.23	Outlier	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-6505-8892	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 049	99.13%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	1.02	2.92	0.36	2	CDF	0.2083	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0376	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0294533	0.0294533	1	1.93	0.2136	Non-Significant Effect
Error	0.0913467	0.0152244	6			
Total	0.1208		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2280	26.3	1.5E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.77	0.645	0.0137	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	34.50%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-2889-7160	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 049	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	19	n/a	2	5	Exact	0.2857	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-3985-1591	**Endpoint:**	PCB 049	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 049	99.14%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	1.05	2.92	0.36	2	CDF	0.2022	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.16	2.13	0.0378	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0313633	0.0313633	1	2.06	0.2013	Non-Significant Effect
Error	0.0913867	0.0152311	6			
Total	0.12275		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1520	26.3	3.4E-06	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.777	0.645	0.0163	Normal Distribution

PCB 049 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.363	-0.167	0.894	0.24	0.24	0.61	0.123	58.79%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	35.60%

PCB 049 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.61		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-5236-9159	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 052	62.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-2.5	1.94	0.22	6	CDF	0.9768	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.58	2.13	0.7020	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.149813	0.149813	1	6.26	0.0464	Significant Effect
Error	0.143587	0.0239311	6			
Total	0.2934		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.32	26.3	0.4292	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.848	0.645	0.0915	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-101		5	0.636	0.476	0.796	0.64	0.5	0.82	0.0577	20.28%	-80.00%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-101		0.5	0.69	0.82	0.53	0.64

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-3675-2760	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 052	68.97%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	22	n/a	1	6	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.77	2.13	0.3637	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0038533	0.0038533	1	0.131	0.7301	Non-Significant Effect
Error	0.176947	0.0294911	6			
Total	0.1808		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.54	26.3	0.6372	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7	0.645	0.0023	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-102		5	0.308	0.112	0.504	0.24	0.22	0.59	0.0707	51.30%	12.83%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-102		0.59	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4078-9690	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 052	99.82%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-3.49	1.94	0.353	6	CDF	0.9935	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.63	2.13	0.5978	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.750501	0.750501	1	12.2	0.0130	Significant Effect
Error	0.370587	0.0617644	6			
Total	1.12109		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.9	199	0.7453	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.645	0.7434	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.353	-0.134	0.841	0.24	0.24	0.58	0.113	55.56%	0.00%
31243-103		5	0.986	0.65	1.32	1.1	0.61	1.3	0.121	27.47%	-179.06%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.58		
31243-103		0.82	1.1	1.1	0.61	1.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-1697-9429	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 052	2.81%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	19	n/a	2	5	Exact	0.2857	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.714E-06	5.714E-06	1	0.357	0.5761	Non-Significant Effect
Error	8E-05	0.000016	5			
Total	8.571E-05		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	2.54	16.3	0.1719	Equal Variances
Variances	Mod Levene Equality of Variance Test	0.444	21.2	0.5415	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.634	0.563	6.7E-04	Non-Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	0.83%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-6652-3427	**Endpoint:**	PCB 052	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 052	3.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	1.46	2.02	0.008	5	CDF	0.1016	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.143E-05	5.143E-05	1	2.14	0.2031	Non-Significant Effect
Error	0.00012	0.000024	5			
Total	0.0001714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	34.3	16.3	0.0021	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.33	21.2	0.3125	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.805	0.563	0.0454	Normal Distribution

PCB 052 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.24	0.239	0.241	0.24	0.24	0.24	0	0.00%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	2.50%

PCB 052 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	Outlier		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-2392-8953	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 066	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 04-4044-0214 **Endpoint:** PCB 066 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 14:08 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 066	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-0830-2414	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 066	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-8120-8955	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 066	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-9084-9490	**Endpoint:**	PCB 066	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 066	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 066 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 066 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-7103-7565	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 087	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-9363-8593	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 087	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4703-1074	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 087	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-4893-9961	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 087	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-8956-7835	**Endpoint:**	PCB 087	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 087	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 087 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 087 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-0607-6238	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 101	58.43%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.498	1.94	0.247	6	CDF	0.3182	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.49	2.13	0.9208	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0075208	0.0075208	1	0.248	0.6365	Non-Significant Effect
Error	0.182267	0.0303778	6			
Total	0.189787		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.29	199	0.9605	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.885	0.645	0.2097	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-101		5	0.36	0.135	0.585	0.25	0.22	0.6	0.0811	50.35%	14.96%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-101		0.22	0.51	0.25	0.22	0.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-0591-5961	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 101	61.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.257	1.94	0.262	6	CDF	0.5973	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.28	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0022533	0.0022533	1	0.0663	0.8054	Non-Significant Effect
Error	0.203947	0.0339911	6			
Total	0.2062		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	199	0.8732	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.785	0.645	0.0197	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-102		5	0.458	0.215	0.701	0.57	0.24	0.63	0.0875	42.71%	-8.19%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-102		0.63	0.57	0.6	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-2063-5820	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 101	112.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-1.47	1.94	0.478	6	CDF	0.9035	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.78	2.13	0.3597	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.243901	0.243901	1	2.15	0.1930	Non-Significant Effect
Error	0.680787	0.113464	6			
Total	0.924687		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.19	199	0.2877	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.974	0.645	0.9259	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-103		5	0.784	0.291	1.28	0.71	0.23	1.3	0.177	50.62%	-85.20%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-103		0.71	0.69	0.99	0.23	1.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2710-9473	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 101	58.15%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	0.831	1.94	0.246	6	CDF	0.2188	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2	2.13	0.1181	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0208033	0.0208033	1	0.691	0.4375	Non-Significant Effect
Error	0.180547	0.0300911	6			
Total	0.20135		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.27	199	0.9682	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.862	0.645	0.1246	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819	0.5	0.24	0.53	0.0921	37.67%	0.00%
31243-104		5	0.318	0.0944	0.542	0.24	0.23	0.64	0.0805	56.62%	24.88%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-104		0.64	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-5009-8305	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 101	63.53%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	2.06	2.92	0.269	2	CDF	0.0881	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.15	2.13	0.0416	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0672133	0.0672133	1	7.91	0.0307	Significant Effect
Error	0.0509867	0.0084978	6			
Total	0.1182		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	848	26.3	1.1E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.811	0.645	0.0371	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.423	0.0272	0.819		0.24	0.53	0.0921	37.67%	0.00%
31243-105		5	0.234	0.227	0.241		0.23	0.24	0.00245	2.34%	44.72%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	0.24	0.53		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2460-0283	**Endpoint:**	PCB 101	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 101	3.50%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	31.5	2.02	0.018	5	CDF	3.1E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.112801	0.112801	1	989	6.1E-07	Significant Effect
Error	0.00057	0.000114	5			
Total	0.113371		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	15	31.3	0.0359	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.939	0.563	0.6295	Normal Distribution

PCB 101 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.515	0.324	0.706	0.515	0.5	0.53	0.015	4.12%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	54.56%

PCB 101 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.5	Outlier	0.53		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-4553-1894	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 105	54.60%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	23	n/a	2	6	Exact	0.5536	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.35	2.13	0.0025	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0038533	0.0038533	1	0.465	0.5208	Non-Significant Effect
Error	0.0497467	0.0082911	6			
Total	0.0536		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	373	199	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.706	0.645	0.0026	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.282	0.144	0.42	0.24	0.22	0.48	0.0498	39.52%	-19.15%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.48	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-8288-1687	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 105	77.39%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	25	n/a	2	6	Exact	0.8036	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.36	2.13	0.0019	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0095408	0.0095408	1	0.573	0.4778	Non-Significant Effect
Error	0.0999467	0.0166578	6			
Total	0.109487		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	749	199	0.0027	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.686	0.645	0.0016	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.308	0.112	0.504	0.24	0.22	0.59	0.0707	51.30%	-30.14%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.59	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-5061-3277	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 105	6.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.105	2.02	0.016	5	CDF	0.5397	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.190E-06	1.190E-06	1	0.011	0.9206	Non-Significant Effect
Error	0.0005417	0.0001083	5			
Total	0.0005429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.75	199	0.3576	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.563	0.2294	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		4	0.237	0.217	0.258	0.24	0.22	0.25	0.00629	5.30%	-0.35%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		Outlier	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-5339-5549	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 105	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-6550-0772	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 105	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-7903-2805	**Endpoint:**	PCB 105	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 105	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 105 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 105 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-1302-4000	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 118	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-4672-3626	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 118	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-9015-6574	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 118	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-9050-5807	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 118	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-2215-1397	**Endpoint:**	PCB 118	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 118	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 118 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 118 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-3338-8905	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 128	7.92%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.448	2.02	0.019	5	CDF	0.3365	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.976E-05	2.976E-05	1	0.201	0.6729	Non-Significant Effect
Error	0.0007417	0.0001483	5			
Total	0.0007714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6.75	199	0.2635	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.923	0.563	0.4935	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		4	0.232	0.209	0.256	0.23	0.22	0.25	0.0075	6.45%	1.76%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	Outlier	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-6295-4681	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 128	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-9748-5825	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 128	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-2957-8151	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 128	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-7460-0483	**Endpoint:**	PCB 128	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 128	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 128 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 128 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-1832-3678	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 138	45.00%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.676	1.94	1.04	6	CDF	0.2622	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.01	2.13	0.1118	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.243	0.243	1	0.457	0.5243	Non-Significant Effect
Error	3.192	0.532	6			
Total	3.435		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.69	199	0.5775	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.892	0.645	0.2429	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-101		5	1.94	0.921	2.96	1.9	1.2	3.3	0.367	42.29%	15.65%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-101		1.2	3.3	1.4	1.9	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-1901-5139	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 138	50.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.776	1.94	1.15	6	CDF	0.2336	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.08	2.13	0.0738	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.39675	0.39675	1	0.602	0.4672	Non-Significant Effect
Error	3.952	0.658667	6			
Total	4.34875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.45	199	0.4741	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.879	0.645	0.1843	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-102		5	1.84	0.687	2.99	1.6	1.1	3.4	0.415	50.49%	20.00%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-102		3.4	1.9	1.1	1.6	1.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	04-3743-5270	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 138	73.32%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-0.3	1.94	1.69	6	CDF	0.6127	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.22	2.13	0.0207	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.12675	0.12675	1	0.0898	0.7746	Non-Significant Effect
Error	8.472	1.412	6			
Total	8.59875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.97	199	0.2291	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.829	0.645	0.0575	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-103		5	2.56	0.807	4.31	2.1	1.4	5	0.631	55.15%	-11.30%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-103		2.4	2.1	1.9	1.4	5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-3341-4701	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 138	40.16%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	1.68	1.94	0.924	6	CDF	0.0721	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.66	2.13	0.5564	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.19401	1.19401	1	2.82	0.1442	Non-Significant Effect
Error	2.54208	0.42368	6			
Total	3.73609		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.04	199	0.7094	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.985	0.645	0.9840	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-104		5	1.5	0.615	2.39	1.5	0.61	2.5	0.32	47.57%	34.70%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-104		2.5	1.5	0.61	1.1	1.8

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-2006-5530	**Endpoint:**	PCB 138	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 138	24.70%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	4	1.94	0.568	6	CDF	0.0035	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.35	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.56669	2.56669	1	16	0.0071	Significant Effect
Error	0.9612	0.1602	6			
Total	3.52789		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.17	26.3	0.4604	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.935	0.645	0.5609	Normal Distribution

PCB 138 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.3	1.06	3.54	2.3	1.8	2.8	0.289	21.74%	0.00%
31243-105		5	1.13	0.708	1.55	1.3	0.69	1.5	0.152	30.05%	50.87%

PCB 138 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	1.8	2.3	2.8		
31243-105		0.69	0.86	1.3	1.3	1.5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-5393-6278	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 153	64.37%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.0707	1.94	2.02	6	CDF	0.4730	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.85	2.13	0.2588	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0100833	0.0100833	1	0.00499	0.9460	Non-Significant Effect
Error	12.1187	2.01978	6			
Total	12.1287		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.05	199	0.5237	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.952	0.645	0.7267	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-101		5	3.06	1.06	5.06	3.3	1.4	5.5	0.722	52.72%	2.34%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-101		1.4	5.5	1.8	3.3	3.3

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-7667-9269	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 153	65.98%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.107	1.94	2.07	6	CDF	0.4593	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.06	2.13	0.0821	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0240833	0.0240833	1	0.0113	0.9186	Non-Significant Effect
Error	12.7347	2.12244	6			
Total	12.7588		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.23	199	0.5001	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.854	0.645	0.1049	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-102		5	3.02	0.958	5.08	2.5	1.7	5.8	0.743	54.98%	3.62%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-102		5.8	3.2	1.7	2.5	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-5160-5836	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 153	84.20%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-0.447	1.94	2.64	6	CDF	0.6647	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.18	2.13	0.0295	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.690084	0.690084	1	0.2	0.6707	Non-Significant Effect
Error	20.7387	3.45644	6			
Total	21.4288		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.58	199	0.3156	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.794	0.645	0.0245	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-103		5	3.74	1.03	6.45	2.6	2.4	7.5	0.975	58.32%	-19.36%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-103		3.8	2.6	2.4	2.4	7.5

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	21-0253-9215	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 153	38.47%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	13	n/a	1	5	Exact	0.1143	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.190476	0.190476	1	0.311	0.6014	Non-Significant Effect
Error	3.06667	0.613333	5			
Total	3.25714		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.88	49.8	0.5907	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.724	0.563	0.0067	Non-Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-103		4	2.8	1.73	3.87	2.5	2.4	3.8	0.337	24.05%	10.64%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-103		3.8	2.6	2.4	2.4	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-1436-9938	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 153	46.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	0.933	1.94	1.44	6	CDF	0.1935	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.42	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.901333	0.901333	1	0.87	0.3870	Non-Significant Effect
Error	6.21867	1.03644	6			
Total	7.12		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.32	199	0.9471	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.93	0.645	0.5142	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-104		5	2.44	1.12	3.76	2.5	1.1	3.7	0.475	43.53%	22.13%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-104		3.7	2.5	1.1	1.7	3.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-3012-2560	**Endpoint:**	PCB 153	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 153	32.44%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	2.43	1.94	1.02	6	CDF	0.0254	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.61	2.13	0.6487	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.04008	3.04008	1	5.92	0.0509	Non-Significant Effect
Error	3.07867	0.513111	6			
Total	6.11875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.49	26.3	0.3972	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.814	0.645	0.0403	Normal Distribution

PCB 153 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3.13	0.839	5.43	2.6	2.6	4.2	0.533	29.48%	0.00%
31243-105		5	1.86	1.13	2.59	2	1.3	2.7	0.262	31.49%	40.64%

PCB 153 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.6	2.6	4.2		
31243-105		1.3	1.3	2	2	2.7

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-0551-9882	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 170	100.60%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.216	1.94	1.2	6	CDF	0.4181	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.97	2.13	0.1480	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0333334	0.0333334	1	0.0466	0.8363	Non-Significant Effect
Error	4.29407	0.715678	6			
Total	4.3274		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.97	199	0.3487	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.907	0.645	0.3302	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-101		5	1.06	-0.166	2.29	0.83	0.22	2.6	0.442	93.17%	11.17%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-101		0.22	2.6	0.25	0.83	1.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-4080-3907	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 170	87.95%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.462	1.94	1.05	6	CDF	0.3303	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.98	2.13	0.1367	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.116563	0.116563	1	0.213	0.6606	Non-Significant Effect
Error	3.28219	0.547031	6			
Total	3.39875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.68	199	0.4495	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.912	0.645	0.3660	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-102		5	0.944	-0.111	2	0.86	0.22	2.3	0.38	90.04%	20.89%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-102		2.3	1.1	0.22	0.86	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-5624-9896	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 170	64.65%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	12	n/a	0	5	Exact	0.1143	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.836005	0.836005	1	3.33	0.1277	Non-Significant Effect
Error	1.25637	0.251273	5			
Total	2.09237		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.47	199	0.8592	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.709	0.563	0.0046	Non-Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-103		4	0.495	-0.359	1.35	0.23	0.22	1.3	0.268	108.42%	58.52%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-103		1.3	0.23	0.22	0.23	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-3515-1922	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 170	59.20%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	0.741	1.94	0.706	6	CDF	0.2434	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.48	2.13	0.9289	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.136013	0.136013	1	0.549	0.4868	Non-Significant Effect
Error	1.48699	0.247831	6			
Total	1.623		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.4	199	0.9160	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.878	0.645	0.1793	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	1.19	0.0932	2.29	1	0.88	1.7	0.256	37.11%	0.00%
31243-104		5	0.924	0.274	1.57	0.76	0.24	1.5	0.234	56.62%	22.57%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	1.7		
31243-104		1.5	0.72	0.24	0.76	1.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-2306-9694	**Endpoint:**	PCB 170	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 170	40.33%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	11.8	6.31	0.379	1	CDF	0.0270	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.712051	0.712051	1	486	3.6E-06	Significant Effect
Error	0.00732	0.001464	5			
Total	0.719371		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	240	31.3	2.0E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.857	0.563	0.1429	Normal Distribution

PCB 170 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	2	0.94	0.178	1.7	0.94	0.88	1	0.06	9.03%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	75.11%

PCB 170 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.88	1	Outlier		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	12-2721-0564	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 180	74.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	-0.0696	1.94	2.23	6	CDF	0.5266	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.94	2.13	0.1740	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.012	0.012	1	0.00485	0.9467	Non-Significant Effect
Error	14.848	2.47467	6			
Total	14.86		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	7.08	199	0.2553	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.645	0.6808	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-101		5	3.08	0.768	5.39	3.2	1.2	5.9	0.833	60.45%	-2.67%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-101		1.2	5.9	1.6	3.5	3.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	14-6166-5807	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 180	68.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.208	1.94	2.05	6	CDF	0.4209	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.11	2.13	0.0589	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09075	0.09075	1	0.0434	0.8419	Non-Significant Effect
Error	12.548	2.09133	6			
Total	12.6387		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.9	199	0.3002	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.882	0.645	0.1948	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-102		5	2.78	0.668	4.89	2.6	1.3	5.6	0.761	61.17%	7.33%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-102		5.6	2.8	1.3	2.6	1.6

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-6914-7352	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 180	96.11%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-0.189	1.94	2.88	6	CDF	0.5717	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.19	2.13	0.0278	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.147	0.147	1	0.0356	0.8565	Non-Significant Effect
Error	24.768	4.128	6			
Total	24.915		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	12.1	199	0.1551	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.831	0.645	0.0605	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-103		5	3.28	0.252	6.31	2.1	1.6	7.4	1.09	74.35%	-9.33%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-103		3.6	2.1	1.6	1.7	7.4

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	06-5821-0785	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 180	43.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	1.17	2.02	1.3	5	CDF	0.1482	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.964286	0.964286	1	1.36	0.2964	Non-Significant Effect
Error	3.55	0.71	5			
Total	4.51429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.75	199	0.7681	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.819	0.563	0.0622	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-103		4	2.25	0.777	3.72	1.9	1.6	3.6	0.463	41.14%	25.00%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-103		3.6	2.1	1.6	1.7	Outlier

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-9969-9122	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 180	52.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	1.03	1.94	1.57	6	CDF	0.1709	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.13	0.8957	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.30417	1.30417	1	1.07	0.3418	Non-Significant Effect
Error	7.34512	1.22419	6			
Total	8.64929		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.25	199	0.4981	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.95	0.645	0.7107	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-104		5	2.17	0.6	3.73	2.2	0.85	3.7	0.564	58.24%	27.80%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-104		3.7	2.2	0.98	0.85	3.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-1812-0907	**Endpoint:**	PCB 180	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 180	29.23%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	3.91	1.94	0.877	6	CDF	0.0039	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.4	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.83443	5.83443	1	15.3	0.0079	Significant Effect
Error	2.29072	0.381787	6			
Total	8.12515		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.5	26.3	0.6548	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.645	0.1931	Normal Distribution

PCB 180 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	3	1.26	4.74	2.7	2.5	3.8	0.404	23.33%	0.00%
31243-105		5	1.24	0.525	1.95	1.4	0.64	1.9	0.256	46.31%	58.80%

PCB 180 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.5	2.7	3.8		
31243-105		0.64	0.64	1.4	1.6	1.9

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	15-1197-2026	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 183	66.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.423	1.94	0.604	6	CDF	0.3436	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.59	2.13	0.6779	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0323408	0.0323408	1	0.179	0.6873	Non-Significant Effect
Error	1.08635	0.181058	6			
Total	1.11869		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	35.1	199	0.0558	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.937	0.645	0.5832	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-101		5	0.772	0.129	1.41	0.99	0.22	1.4	0.231	67.03%	14.54%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-101		0.22	1.4	0.25	1	0.99

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	09-7021-6501	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 183	64.04%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.125	1.94	0.579	6	CDF	0.4522	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.21	2.13	0.0227	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026133	0.0026133	1	0.0157	0.9043	Non-Significant Effect
Error	0.997187	0.166198	6			
Total	0.9998		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	32.2	199	0.0608	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.834	0.645	0.0650	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-102		5	0.866	0.251	1.48	0.76	0.44	1.7	0.222	57.21%	4.13%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-102		1.7	0.76	0.44	0.87	0.56

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-2654-0239	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 183	81.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-0.255	1.94	0.738	6	CDF	0.5963	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.29	2.13	0.0084	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0175208	0.0175208	1	0.0649	0.8075	Non-Significant Effect
Error	1.62087	0.270144	6			
Total	1.63839		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	52.6	199	0.0375	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.769	0.645	0.0133	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-103		5	1	0.213	1.79	0.76	0.58	2.1	0.283	63.36%	-10.70%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-103		0.96	0.76	0.6	0.58	2.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	18-2675-3602	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 183	49.45%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	1.22	1.94	0.447	6	CDF	0.1335	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.64	2.13	0.5863	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.148403	0.148403	1	1.5	0.2669	Non-Significant Effect
Error	0.594547	0.0990911	6			
Total	0.74295		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	19	199	0.1014	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.645	0.6784	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-104		5	0.622	0.149	1.09	0.67	0.24	1.1	0.17	61.18%	31.14%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-104		1.1	0.67	0.24	0.24	0.86

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-5933-2442	**Endpoint:**	PCB 183	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 183	21.94%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	4.8	1.94	0.198	6	CDF	0.0015	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.35	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.448963	0.448963	1	23	0.0030	Significant Effect
Error	0.116987	0.0194978	6			
Total	0.56595		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.33	199	0.4879	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.853	0.645	0.1010	Normal Distribution

PCB 183 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.903	0.686	1.12	0.88	0.83	1	0.0504	9.67%	0.00%
31243-105		5	0.414	0.216	0.612	0.51	0.24	0.55	0.0713	38.52%	54.17%

PCB 183 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.83	0.88	1		
31243-105		0.24	0.24	0.55	0.51	0.53

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-8062-8481	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 184	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-4383-4381	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 184	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID: 05-6745-6763 **Endpoint:** PCB 184 **CETIS Version:** CETISv1.9.3
Analyzed: 22 Mar-19 14:10 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 184	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-9734-7726	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 184	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-7214-7736	**Endpoint:**	PCB 184	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 184	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 184 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 184 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-3346-2507	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 187	66.07%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.512	1.94	1.5	6	CDF	0.3134	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.87	2.13	0.2399	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.292053	0.292053	1	0.262	0.6269	Non-Significant Effect
Error	6.68175	1.11362	6			
Total	6.9738		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.67	199	0.3684	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.928	0.645	0.4964	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-101		5	1.87	0.347	3.4	1.7	0.77	3.7	0.549	65.62%	17.41%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-101		0.77	3.7	0.79	2.4	1.7

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-1509-2227	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 187	62.30%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.455	1.94	1.41	6	CDF	0.3325	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.02	2.13	0.1054	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.205013	0.205013	1	0.207	0.6651	Non-Significant Effect
Error	5.94059	0.990098	6			
Total	6.1456		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.09	199	0.4117	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.915	0.645	0.3930	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-102		5	1.94	0.508	3.36	1.9	0.88	3.8	0.514	59.42%	14.59%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-102		3.8	2	0.88	1.9	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-4593-6450	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 passed pcb 187	73.08%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103	-0.18	1.94	1.66	6	CDF	0.5684	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.2	2.13	0.0245	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0440834	0.0440834	1	0.0324	0.8632	Non-Significant Effect
Error	8.17467	1.36244	6			
Total	8.21875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.82	199	0.3039	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.786	0.645	0.0204	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-103		5	2.42	0.717	4.12	1.7	1.6	4.8	0.614	56.69%	-6.76%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-103		2.4	1.7	1.6	1.6	4.8

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	05-8235-7475	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 187	52.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	1.38	1.94	1.18	6	CDF	0.1084	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.54	2.13	0.8047	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.3251	1.3251	1	1.91	0.2167	Non-Significant Effect
Error	4.17299	0.695498	6			
Total	5.49809		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.73	199	0.5718	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.955	0.645	0.7624	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-104		5	1.43	0.26	2.59	1.6	0.24	2.4	0.42	65.84%	37.09%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-104		2.4	1.6	0.24	0.69	2.2

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-7418-0783	**Endpoint:**	PCB 187	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 failed pcb 187	30.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105*	3.95	1.94	0.693	6	CDF	0.0038	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.4	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.71008	3.71008	1	15.6	0.0076	Significant Effect
Error	1.42987	0.238311	6			
Total	5.13995		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.65	26.3	0.6000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.945	0.645	0.6646	Normal Distribution

PCB 187 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	2.27	0.854	3.68	2.1	1.8	2.9	0.328	25.09%	0.00%
31243-105		5	0.86	0.311	1.41	1.1	0.24	1.3	0.198	51.45%	62.06%

PCB 187 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	2.1	1.8	2.9		
31243-105		0.24	0.56	1.3	1.1	1.1

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	02-4488-6918	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 195	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	01-3457-4129	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 195	6.77%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	-0.105	2.02	0.016	5	CDF	0.5397	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.190E-06	1.190E-06	1	0.011	0.9206	Non-Significant Effect
Error	0.0005417	0.0001083	5			
Total	0.0005429		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.75	199	0.3576	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.881	0.563	0.2294	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		4	0.237	0.217	0.258	0.24	0.22	0.25	0.00629	5.30%	-0.35%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		Outlier	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-6436-6607	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 195	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	20-2639-9419	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 195	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	11-6825-5763	**Endpoint:**	PCB 195	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 195	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 195 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 195 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-1218-6888	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 206	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	19-7236-7314	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 206	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	08-8919-6924	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 206	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	03-5842-3134	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 206	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	16-9484-6159	**Endpoint:**	PCB 206	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 206	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 206 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 206 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	10-1873-0411	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-101	15-5297-8957	24 Oct-18 15:45	24 Oct-18 15:45	26d 20h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-101	Marine Sediment	New Haven Harbor 2018	Composite 2 (R',S')	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-101 passed pcb 209	7.21%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-101	0.76	1.94	0.017	6	CDF	0.2381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.8	2.13	0.3306	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.333E-05	8.333E-05	1	0.577	0.4763	Non-Significant Effect
Error	0.0008667	0.0001444	6			
Total	0.00095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	6	199	0.2959	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.865	0.645	0.1341	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-101		5	0.23	0.212	0.248	0.22	0.22	0.25	0.00632	6.15%	2.82%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-101		0.22	0.22	0.25	0.22	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	13-1565-6816	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-102	14-6497-5144	25 Oct-18 20:30	25 Oct-18 20:30	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-102	Marine Sediment	New Haven Harbor 2018	Composite 3 (US-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-102 passed pcb 209	6.87%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-102	0.319	1.94	0.016	6	CDF	0.3803	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.51	2.13	0.8673	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.102	0.7606	Non-Significant Effect
Error	0.0007867	0.0001311	6			
Total	0.0008		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.4	199	0.3246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.906	0.645	0.3264	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-102		5	0.234	0.217	0.251	0.24	0.22	0.25	0.006	5.73%	1.13%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-102		0.22	0.24	0.22	0.25	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	00-2761-8212	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-103	11-7829-0787	25 Oct-18 20:00	25 Oct-18 20:00	25d 16h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-103	Marine Sediment	New Haven Harbor 2018	Composite 4 (DS-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-103 failed pcb 209	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-103*	3.11	1.94	0.008	6	CDF	0.0104	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003008	0.0003008	1	9.67	0.0209	Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0004875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-103		5	0.224	0.217	0.231	0.22	0.22	0.23	0.00245	2.45%	5.35%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-103		0.22	0.23	0.22	0.23	0.22

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	17-7582-9539	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-104	19-8587-2932	25 Oct-18 11:10	25 Oct-18 11:10	26d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-104	Marine Sediment	New Haven Harbor 2018	Composite 5 (TB-1,-2)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-104 passed pcb 209	2.96%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-104	23.5	n/a	3	6	Exact	0.6429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.75	2.13	0.4021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.333E-06	3.333E-06	1	0.136	0.7246	Non-Significant Effect
Error	0.0001467	2.444E-05	6			
Total	0.00015		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.67	26.3	0.5950	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.685	0.645	0.0015	Non-Normal Distribution

PCB 209 Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-104		5	0.238	0.232	0.244	0.24	0.23	0.24	0.002	1.88%	-0.56%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-104		0.24	0.23	0.24	0.24	0.24

Bioaccumulation Evaluation - PCB Congeners - Nereis — **EnviroSystems, Inc.**

Analysis ID:	07-5406-5358	**Endpoint:**	PCB 209	**CETIS Version:**	CETISv1.9.3
Analyzed:	22 Mar-19 14:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
31250-PRE	01-0823-8063	20 Nov-18	20 Nov-18	12h	AECOM	Dredged Sediment Evalu
31243-105	20-6030-4038	24 Oct-18 11:15	24 Oct-18 11:15	27d 1h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
31250-PRE	Pre-test Tissue	New Haven Harbor 2018	99NvARO112018	
31243-105	Marine Sediment	New Haven Harbor 2018	Composite 6 (CAD-1,-2,-3)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	31243-105 passed pcb 209	3.34%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Pre-Test Tissue		31243-105	0.655	1.94	0.008	6	CDF	0.2685	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.29	2.13	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.333E-05	1.333E-05	1	0.429	0.5370	Non-Significant Effect
Error	0.0001867	3.111E-05	6			
Total	0.0002		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.11	26.3	0.8265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.84	0.645	0.0762	Normal Distribution

PCB 209 Summary

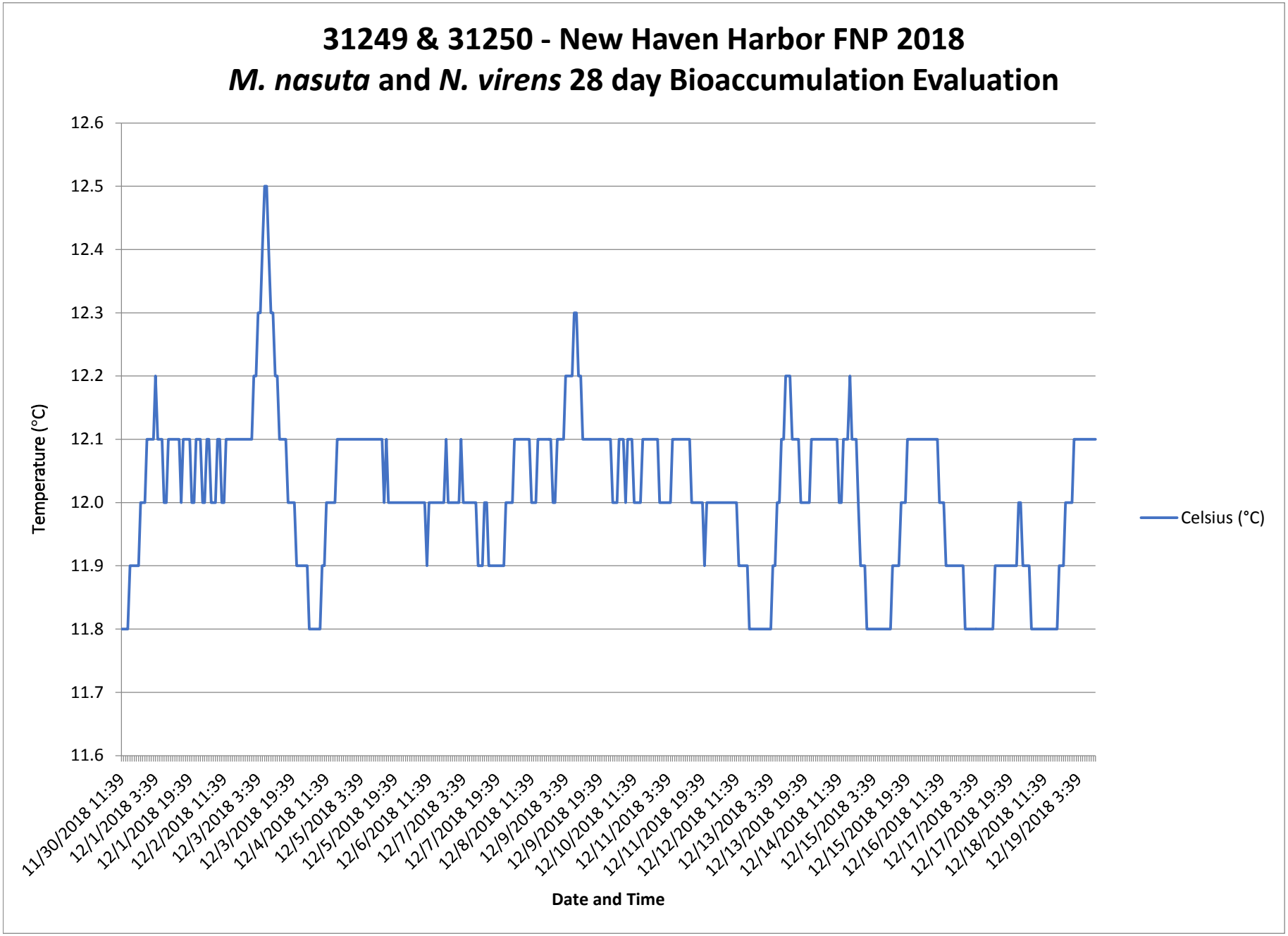
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
31250-PRE	PR	3	0.237	0.222	0.251	0.24	0.23	0.24	0.00333	2.44%	0.00%
31243-105		5	0.234	0.227	0.241	0.23	0.23	0.24	0.00245	2.34%	1.13%

PCB 209 Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
31250-PRE	PR	0.24	0.24	0.23		
31243-105		0.24	0.24	0.23	0.23	0.23

M. nasuta and *N. virens*
28 day Bioaccumulation Evaluation

Hourly Temperature Data


31249 & 31250 - New Haven Harbor FNP 2018
M. nasuta and N. virens 28 day Bioaccumulation Evaluation
Temperature (°C)
12.6
12.5
12.4
12.3
12.2
12.1
12.0
11.9
11.8
11.7
11.6
11/30/2018 11:39
12/1/2018 3:39
12/1/2018 19:39
12/2/2018 11:39
12/3/2018 3:39
12/3/2018 19:39
12/4/2018 11:39
12/5/2018 3:39
12/5/2018 19:39
12/6/2018 11:39
12/7/2018 3:39
12/7/2018 19:39
12/8/2018 11:39
12/9/2018 3:39
12/9/2018 19:39
12/10/2018 11:39
12/11/2018 3:39
12/11/2018 19:39
12/12/2018 11:39
12/13/2018 3:39
12/13/2018 19:39
12/14/2018 11:39
12/15/2018 3:39
12/15/2018 19:39
12/16/2018 11:39
12/17/2018 3:39
12/17/2018 19:39
12/18/2018 11:39
12/19/2018 3:39
Date and Time
Celsius (°C)

STUDY: 31249 & 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean: 12.0 °C
Minimum: 11.8 °C
Maximum: 12.5 °C

Reading	Date and Time	Celsius (°C)
1	11/30/2018 11:39	11.8
2	11/30/2018 12:39	11.8
3	11/30/2018 13:39	11.8
4	11/30/2018 14:39	11.8
5	11/30/2018 15:39	11.9
6	11/30/2018 16:39	11.9
7	11/30/2018 17:39	11.9
8	11/30/2018 18:39	11.9
9	11/30/2018 19:39	11.9
10	11/30/2018 20:39	12.0
11	11/30/2018 21:39	12.0
12	11/30/2018 22:39	12.0
13	11/30/2018 23:39	12.1
14	12/1/2018 0:39	12.1
15	12/1/2018 1:39	12.1
16	12/1/2018 2:39	12.1
17	12/1/2018 3:39	12.2
18	12/1/2018 4:39	12.1
19	12/1/2018 5:39	12.1
20	12/1/2018 6:39	12.1
21	12/1/2018 7:39	12.0
22	12/1/2018 8:39	12.0
23	12/1/2018 9:39	12.1
24	12/1/2018 10:39	12.1
25	12/1/2018 11:39	12.1
26	12/1/2018 12:39	12.1
27	12/1/2018 13:39	12.1
28	12/1/2018 14:39	12.1
29	12/1/2018 15:39	12.0
30	12/1/2018 16:39	12.1
31	12/1/2018 17:39	12.1
32	12/1/2018 18:39	12.1
33	12/1/2018 19:39	12.1
34	12/1/2018 20:39	12.0
35	12/1/2018 21:39	12.0

STUDY: 31249 & 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
36	12/1/2018 22:39	12.1
37	12/1/2018 23:39	12.1
38	12/2/2018 0:39	12.1
39	12/2/2018 1:39	12.0
40	12/2/2018 2:39	12.0
41	12/2/2018 3:39	12.1
42	12/2/2018 4:39	12.1
43	12/2/2018 5:39	12.0
44	12/2/2018 6:39	12.0
45	12/2/2018 7:39	12.0
46	12/2/2018 8:39	12.1
47	12/2/2018 9:39	12.1
48	12/2/2018 10:39	12.0
49	12/2/2018 11:39	12.0
50	12/2/2018 12:39	12.1
51	12/2/2018 13:39	12.1
52	12/2/2018 14:39	12.1
53	12/2/2018 15:39	12.1
54	12/2/2018 16:39	12.1
55	12/2/2018 17:39	12.1
56	12/2/2018 18:39	12.1
57	12/2/2018 19:39	12.1
58	12/2/2018 20:39	12.1
59	12/2/2018 21:39	12.1
60	12/2/2018 22:39	12.1
61	12/2/2018 23:39	12.1
62	12/3/2018 0:39	12.1
63	12/3/2018 1:39	12.2
64	12/3/2018 2:39	12.2
65	12/3/2018 3:39	12.3
66	12/3/2018 4:39	12.3
67	12/3/2018 5:39	12.4
68	12/3/2018 6:39	12.5
69	12/3/2018 7:39	12.5
70	12/3/2018 8:39	12.4

STUDY: 31249 & 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
71	12/3/2018 9:39	12.3
72	12/3/2018 10:39	12.3
73	12/3/2018 11:39	12.2
74	12/3/2018 12:39	12.2
75	12/3/2018 13:39	12.1
76	12/3/2018 14:39	12.1
77	12/3/2018 15:39	12.1
78	12/3/2018 16:39	12.1
79	12/3/2018 17:39	12.0
80	12/3/2018 18:39	12.0
81	12/3/2018 19:39	12.0
82	12/3/2018 20:39	12.0
83	12/3/2018 21:39	11.9
84	12/3/2018 22:39	11.9
85	12/3/2018 23:39	11.9
86	12/4/2018 0:39	11.9
87	12/4/2018 1:39	11.9
88	12/4/2018 2:39	11.9
89	12/4/2018 3:39	11.8
90	12/4/2018 4:39	11.8
91	12/4/2018 5:39	11.8
92	12/4/2018 6:39	11.8
93	12/4/2018 7:39	11.8
94	12/4/2018 8:39	11.8
95	12/4/2018 9:39	11.9
96	12/4/2018 10:39	11.9
97	12/4/2018 11:39	12.0
98	12/4/2018 12:39	12.0
99	12/4/2018 13:39	12.0
100	12/4/2018 14:39	12.0
101	12/4/2018 15:39	12.0
102	12/4/2018 16:39	12.1
103	12/4/2018 17:39	12.1
104	12/4/2018 18:39	12.1
105	12/4/2018 19:39	12.1

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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
106	12/4/2018 20:39	12.1
107	12/4/2018 21:39	12.1
108	12/4/2018 22:39	12.1
109	12/4/2018 23:39	12.1
110	12/5/2018 0:39	12.1
111	12/5/2018 1:39	12.1
112	12/5/2018 2:39	12.1
113	12/5/2018 3:39	12.1
114	12/5/2018 4:39	12.1
115	12/5/2018 5:39	12.1
116	12/5/2018 6:39	12.1
117	12/5/2018 7:39	12.1
118	12/5/2018 8:39	12.1
119	12/5/2018 9:39	12.1
120	12/5/2018 10:39	12.1
121	12/5/2018 11:39	12.1
122	12/5/2018 12:39	12.1
123	12/5/2018 13:39	12.1
124	12/5/2018 14:39	12.0
125	12/5/2018 15:39	12.1
126	12/5/2018 16:39	12.0
127	12/5/2018 17:39	12.0
128	12/5/2018 18:39	12.0
129	12/5/2018 19:39	12.0
130	12/5/2018 20:39	12.0
131	12/5/2018 21:39	12.0
132	12/5/2018 22:39	12.0
133	12/5/2018 23:39	12.0
134	12/6/2018 0:39	12.0
135	12/6/2018 1:39	12.0
136	12/6/2018 2:39	12.0
137	12/6/2018 3:39	12.0
138	12/6/2018 4:39	12.0
139	12/6/2018 5:39	12.0
140	12/6/2018 6:39	12.0

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Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
141	12/6/2018 7:39	12.0
142	12/6/2018 8:39	12.0
143	12/6/2018 9:39	12.0
144	12/6/2018 10:39	11.9
145	12/6/2018 11:39	12.0
146	12/6/2018 12:39	12.0
147	12/6/2018 13:39	12.0
148	12/6/2018 14:39	12.0
149	12/6/2018 15:39	12.0
150	12/6/2018 16:39	12.0
151	12/6/2018 17:39	12.0
152	12/6/2018 18:39	12.0
153	12/6/2018 19:39	12.1
154	12/6/2018 20:39	12.0
155	12/6/2018 21:39	12.0
156	12/6/2018 22:39	12.0
157	12/6/2018 23:39	12.0
158	12/7/2018 0:39	12.0
159	12/7/2018 1:39	12.0
160	12/7/2018 2:39	12.1
161	12/7/2018 3:39	12.0
162	12/7/2018 4:39	12.0
163	12/7/2018 5:39	12.0
164	12/7/2018 6:39	12.0
165	12/7/2018 7:39	12.0
166	12/7/2018 8:39	12.0
167	12/7/2018 9:39	12.0
168	12/7/2018 10:39	11.9
169	12/7/2018 11:39	11.9
170	12/7/2018 12:39	11.9
171	12/7/2018 13:39	12.0
172	12/7/2018 14:39	12.0
173	12/7/2018 15:39	11.9
174	12/7/2018 16:39	11.9
175	12/7/2018 17:39	11.9

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CLIENT: AECOM
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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean: 12.0 °C
Minimum: 11.8 °C
Maximum: 12.5 °C

Reading	Date and Time	Celsius (°C)
176	12/7/2018 18:39	11.9
177	12/7/2018 19:39	11.9
178	12/7/2018 20:39	11.9
179	12/7/2018 21:39	11.9
180	12/7/2018 22:39	11.9
181	12/7/2018 23:39	12.0
182	12/8/2018 0:39	12.0
183	12/8/2018 1:39	12.0
184	12/8/2018 2:39	12.0
185	12/8/2018 3:39	12.1
186	12/8/2018 4:39	12.1
187	12/8/2018 5:39	12.1
188	12/8/2018 6:39	12.1
189	12/8/2018 7:39	12.1
190	12/8/2018 8:39	12.1
191	12/8/2018 9:39	12.1
192	12/8/2018 10:39	12.1
193	12/8/2018 11:39	12.0
194	12/8/2018 12:39	12.0
195	12/8/2018 13:39	12.0
196	12/8/2018 14:39	12.1
197	12/8/2018 15:39	12.1
198	12/8/2018 16:39	12.1
199	12/8/2018 17:39	12.1
200	12/8/2018 18:39	12.1
201	12/8/2018 19:39	12.1
202	12/8/2018 20:39	12.1
203	12/8/2018 21:39	12.0
204	12/8/2018 22:39	12.0
205	12/8/2018 23:39	12.1
206	12/9/2018 0:39	12.1
207	12/9/2018 1:39	12.1
208	12/9/2018 2:39	12.1
209	12/9/2018 3:39	12.2
210	12/9/2018 4:39	12.2

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Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
211	12/9/2018 5:39	12.2
212	12/9/2018 6:39	12.2
213	12/9/2018 7:39	12.3
214	12/9/2018 8:39	12.3
215	12/9/2018 9:39	12.2
216	12/9/2018 10:39	12.2
217	12/9/2018 11:39	12.1
218	12/9/2018 12:39	12.1
219	12/9/2018 13:39	12.1
220	12/9/2018 14:39	12.1
221	12/9/2018 15:39	12.1
222	12/9/2018 16:39	12.1
223	12/9/2018 17:39	12.1
224	12/9/2018 18:39	12.1
225	12/9/2018 19:39	12.1
226	12/9/2018 20:39	12.1
227	12/9/2018 21:39	12.1
228	12/9/2018 22:39	12.1
229	12/9/2018 23:39	12.1
230	12/10/2018 0:39	12.1
231	12/10/2018 1:39	12.0
232	12/10/2018 2:39	12.0
233	12/10/2018 3:39	12.0
234	12/10/2018 4:39	12.1
235	12/10/2018 5:39	12.1
236	12/10/2018 6:39	12.1
237	12/10/2018 7:39	12.0
238	12/10/2018 8:39	12.1
239	12/10/2018 9:39	12.1
240	12/10/2018 10:39	12.1
241	12/10/2018 11:39	12.0
242	12/10/2018 12:39	12.0
243	12/10/2018 13:39	12.0
244	12/10/2018 14:39	12.0
245	12/10/2018 15:39	12.1

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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
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Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
246	12/10/2018 16:39	12.1
247	12/10/2018 17:39	12.1
248	12/10/2018 18:39	12.1
249	12/10/2018 19:39	12.1
250	12/10/2018 20:39	12.1
251	12/10/2018 21:39	12.1
252	12/10/2018 22:39	12.1
253	12/10/2018 23:39	12.0
254	12/11/2018 0:39	12.0
255	12/11/2018 1:39	12.0
256	12/11/2018 2:39	12.0
257	12/11/2018 3:39	12.0
258	12/11/2018 4:39	12.0
259	12/11/2018 5:39	12.1
260	12/11/2018 6:39	12.1
261	12/11/2018 7:39	12.1
262	12/11/2018 8:39	12.1
263	12/11/2018 9:39	12.1
264	12/11/2018 10:39	12.1
265	12/11/2018 11:39	12.1
266	12/11/2018 12:39	12.1
267	12/11/2018 13:39	12.1
268	12/11/2018 14:39	12.0
269	12/11/2018 15:39	12.0
270	12/11/2018 16:39	12.0
271	12/11/2018 17:39	12.0
272	12/11/2018 18:39	12.0
273	12/11/2018 19:39	12.0
274	12/11/2018 20:39	11.9
275	12/11/2018 21:39	12.0
276	12/11/2018 22:39	12.0
277	12/11/2018 23:39	12.0
278	12/12/2018 0:39	12.0
279	12/12/2018 1:39	12.0
280	12/12/2018 2:39	12.0

STUDY: 31249 & 31250
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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean: 12.0 °C
Minimum: 11.8 °C
Maximum: 12.5 °C

Reading	Date and Time	Celsius (°C)
281	12/12/2018 3:39	12.0
282	12/12/2018 4:39	12.0
283	12/12/2018 5:39	12.0
284	12/12/2018 6:39	12.0
285	12/12/2018 7:39	12.0
286	12/12/2018 8:39	12.0
287	12/12/2018 9:39	12.0
288	12/12/2018 10:39	12.0
289	12/12/2018 11:39	12.0
290	12/12/2018 12:39	11.9
291	12/12/2018 13:39	11.9
292	12/12/2018 14:39	11.9
293	12/12/2018 15:39	11.9
294	12/12/2018 16:39	11.9
295	12/12/2018 17:39	11.8
296	12/12/2018 18:39	11.8
297	12/12/2018 19:39	11.8
298	12/12/2018 20:39	11.8
299	12/12/2018 21:39	11.8
300	12/12/2018 22:39	11.8
301	12/12/2018 23:39	11.8
302	12/13/2018 0:39	11.8
303	12/13/2018 1:39	11.8
304	12/13/2018 2:39	11.8
305	12/13/2018 3:39	11.8
306	12/13/2018 4:39	11.9
307	12/13/2018 5:39	11.9
308	12/13/2018 6:39	12.0
309	12/13/2018 7:39	12.0
310	12/13/2018 8:39	12.1
311	12/13/2018 9:39	12.1
312	12/13/2018 10:39	12.2
313	12/13/2018 11:39	12.2
314	12/13/2018 12:39	12.2
315	12/13/2018 13:39	12.1

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CLIENT: AECOM
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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
316	12/13/2018 14:39	12.1
317	12/13/2018 15:39	12.1
318	12/13/2018 16:39	12.1
319	12/13/2018 17:39	12.0
320	12/13/2018 18:39	12.0
321	12/13/2018 19:39	12.0
322	12/13/2018 20:39	12.0
323	12/13/2018 21:39	12.0
324	12/13/2018 22:39	12.1
325	12/13/2018 23:39	12.1
326	12/14/2018 0:39	12.1
327	12/14/2018 1:39	12.1
328	12/14/2018 2:39	12.1
329	12/14/2018 3:39	12.1
330	12/14/2018 4:39	12.1
331	12/14/2018 5:39	12.1
332	12/14/2018 6:39	12.1
333	12/14/2018 7:39	12.1
334	12/14/2018 8:39	12.1
335	12/14/2018 9:39	12.1
336	12/14/2018 10:39	12.1
337	12/14/2018 11:39	12.0
338	12/14/2018 12:39	12.0
339	12/14/2018 13:39	12.1
340	12/14/2018 14:39	12.1
341	12/14/2018 15:39	12.1
342	12/14/2018 16:39	12.2
343	12/14/2018 17:39	12.1
344	12/14/2018 18:39	12.1
345	12/14/2018 19:39	12.1
346	12/14/2018 20:39	12.0
347	12/14/2018 21:39	11.9
348	12/14/2018 22:39	11.9
349	12/14/2018 23:39	11.9
350	12/15/2018 0:39	11.8

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CLIENT: AECOM
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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean: 12.0 °C
Minimum: 11.8 °C
Maximum: 12.5 °C

Reading	Date and Time	Celsius (°C)
351	12/15/2018 1:39	11.8
352	12/15/2018 2:39	11.8
353	12/15/2018 3:39	11.8
354	12/15/2018 4:39	11.8
355	12/15/2018 5:39	11.8
356	12/15/2018 6:39	11.8
357	12/15/2018 7:39	11.8
358	12/15/2018 8:39	11.8
359	12/15/2018 9:39	11.8
360	12/15/2018 10:39	11.8
361	12/15/2018 11:39	11.8
362	12/15/2018 12:39	11.9
363	12/15/2018 13:39	11.9
364	12/15/2018 14:39	11.9
365	12/15/2018 15:39	11.9
366	12/15/2018 16:39	12.0
367	12/15/2018 17:39	12.0
368	12/15/2018 18:39	12.0
369	12/15/2018 19:39	12.1
370	12/15/2018 20:39	12.1
371	12/15/2018 21:39	12.1
372	12/15/2018 22:39	12.1
373	12/15/2018 23:39	12.1
374	12/16/2018 0:39	12.1
375	12/16/2018 1:39	12.1
376	12/16/2018 2:39	12.1
377	12/16/2018 3:39	12.1
378	12/16/2018 4:39	12.1
379	12/16/2018 5:39	12.1
380	12/16/2018 6:39	12.1
381	12/16/2018 7:39	12.1
382	12/16/2018 8:39	12.1
383	12/16/2018 9:39	12.1
384	12/16/2018 10:39	12.0
385	12/16/2018 11:39	12.0

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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean: 12.0 °C
Minimum: 11.8 °C
Maximum: 12.5 °C

Reading	Date and Time	Celsius (°C)
386	12/16/2018 12:39	12.0
387	12/16/2018 13:39	11.9
388	12/16/2018 14:39	11.9
389	12/16/2018 15:39	11.9
390	12/16/2018 16:39	11.9
391	12/16/2018 17:39	11.9
392	12/16/2018 18:39	11.9
393	12/16/2018 19:39	11.9
394	12/16/2018 20:39	11.9
395	12/16/2018 21:39	11.9
396	12/16/2018 22:39	11.8
397	12/16/2018 23:39	11.8
398	12/17/2018 0:39	11.8
399	12/17/2018 1:39	11.8
400	12/17/2018 2:39	11.8
401	12/17/2018 3:39	11.8
402	12/17/2018 4:39	11.8
403	12/17/2018 5:39	11.8
404	12/17/2018 6:39	11.8
405	12/17/2018 7:39	11.8
406	12/17/2018 8:39	11.8
407	12/17/2018 9:39	11.8
408	12/17/2018 10:39	11.8
409	12/17/2018 11:39	11.8
410	12/17/2018 12:39	11.9
411	12/17/2018 13:39	11.9
412	12/17/2018 14:39	11.9
413	12/17/2018 15:39	11.9
414	12/17/2018 16:39	11.9
415	12/17/2018 17:39	11.9
416	12/17/2018 18:39	11.9
417	12/17/2018 19:39	11.9
418	12/17/2018 20:39	11.9
419	12/17/2018 21:39	11.9
420	12/17/2018 22:39	11.9

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ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean: 12.0 °C
Minimum: 11.8 °C
Maximum: 12.5 °C

Reading	Date and Time	Celsius (°C)
421	12/17/2018 23:39	12.0
422	12/18/2018 0:39	12.0
423	12/18/2018 1:39	11.9
424	12/18/2018 2:39	11.9
425	12/18/2018 3:39	11.9
426	12/18/2018 4:39	11.9
427	12/18/2018 5:39	11.8
428	12/18/2018 6:39	11.8
429	12/18/2018 7:39	11.8
430	12/18/2018 8:39	11.8
431	12/18/2018 9:39	11.8
432	12/18/2018 10:39	11.8
433	12/18/2018 11:39	11.8
434	12/18/2018 12:39	11.8
435	12/18/2018 13:39	11.8
436	12/18/2018 14:39	11.8
437	12/18/2018 15:39	11.8
438	12/18/2018 16:39	11.8
439	12/18/2018 17:39	11.8
440	12/18/2018 18:39	11.9
441	12/18/2018 19:39	11.9
442	12/18/2018 20:39	11.9
443	12/18/2018 21:39	12
444	12/18/2018 22:39	12
445	12/18/2018 23:39	12
446	12/19/2018 0:39	12
447	12/19/2018 1:39	12.1
448	12/19/2018 2:39	12.1
449	12/19/2018 3:39	12.1
450	12/19/2018 4:39	12.1
451	12/19/2018 5:39	12.1
452	12/19/2018 6:39	12.1
453	12/19/2018 7:39	12.1
454	12/19/2018 8:39	12.1
455	12/19/2018 9:39	12.1

STUDY: 31249 & 31250
CLIENT: AECOM
PROJECT: New Haven Harbor FNP 2018
ASSAY: *M. nasuta* & *N. virens* 28 Day Bioaccumulation Evaluation
TASK: Hourly Temperature Data
Serial Number: Telatemp 10015918

Mean:	12.0 °C
Minimum:	11.8 °C
Maximum:	12.5 °C

Reading	Date and Time	Celsius (°C)
456	12/19/2018 10:39	12.1
457	12/19/2018 11:39	12.1

Table II-1: Completeness Checklist

Quality Assurance/Quality Control Questions	Yes/No? Comments?
1. Was the report signed by the responsible applicant approved representative?	Yes
2. Were the methods for sampling, chemical and biological testing described in the Sampling and Analysis Plan (SAP) and the Laboratory QA Plan (LQAP) followed?	Yes
3. If not, were deviations documented?	NA
4. Was the SAP approved by the New England District?	Yes
5. Did the applicant use a laboratory with a LQAP on file at the New England District?	Yes
6. Did the samples adequately represent the physical/chemical variability in the dredging area?	Yes
7. Were the correct stations sampled (include the precision of the navigation method used)?	Yes
8. Were the preservation and storage requirements in Chapter 8 of the EPA/Corps QA/QC Manual (EPA/USACE 1995) and EPA (2001d) followed?	Yes
9. Were the samples properly labeled?	Yes
10. Were all the requested data included?	Yes
11. Were the reporting limits met?	Yes, except as noted for PCBs in Section 2.4 and 3.3, and in Table 10. The complete tissue chemistry report is provided by Alpha Analytical under separate cover.
12. Were the chain-of-custody forms properly processed?	Yes
13. Were the method blanks run and were the concentration below the acceptance criteria?	NA
14. Was the MDL study performed on each matrix (with this data submission) or within the last 12 months?	NA
15. Were the SRM/CRM analyses within acceptance criteria?	NA
16. Were the matrix spike/matrix spike duplicates run at the required frequency and was the percent recovery/RPD within the acceptance criteria?	NA
17. Were the duplicate samples analyzed and were the RPDs within the required acceptance criteria?	NA
18. For each analytical fraction of organic compounds, were recoveries for the internal standard within the acceptance criteria?	NA
19. Were surrogate recoveries within the required acceptance criteria?	NA
20. Were corrective action forms provided for all non-conforming data?	NA
21. Were all the species-specific test conditions in Appendix V met?	Yes, except as noted for temperature and salinity.
22. Were the test-specific age requirements met for each test species?	Yes
23. Was the bulk physical/chemical testing performed on the sediments/composites that were biologically tested?	Yes
24. Were the mortality acceptance criteria met for the water column and sediment toxicity tests?	Yes
25. Were the test performance requirements in Table 11.3 of EPA (1994a) met?	Yes

Table II-8: Quality Control Summary for Biological Toxicity Testing only

Method Reference Numbers:

Quality Control (QC) Element	Acceptance Criteria*	Criteria Met? Yes/No	List results outside criteria (Cross-reference results table in data report)	Location of Results (Retained at Lab or in Data Package)
Test condition requirements for each species: Temperature, Salinity, pH, D.O., Ammonia (Total, Un-ionized)	Test conditions within the requirements specified for each species	No	Temperature (Sections 3.2.2, 3.3, Table 4, and Appendix A) and salinity (Sections 3.1.2, 3.2.2, 3.3, Table 4 and Appendix A) fell below the protocol ranges.	Data Package
Test species age	Age/health within guidelines for each species (Appendix V)	Yes		Data Package
Bulk physical/chemical analyses (If required by the Sampling plan)	Required? If so, performed? Yes or No	Yes		Data Package (separate cover)
Water column toxicity test: Control mortality Control abnormality	 ≤ 10% mean ≤ 30% mussel/oyster; < 40% clam larvae, < 30% sea urchin larvae	NA		
Sediment toxicity test: Control mortality Compliance with applicable test acceptability requirements in Table 11.3 (EPA 1994a)	 ≤ 10% mean (no chamber > 20%) See EPA (1994a) Section 9; Table 11.3	Yes		Data Package

* The Quality Control Acceptance Criteria are general guidelines. If alternate criteria are used, they must be documented in this table.

ASSAY REVIEW CHECKLIST

STUDY#: 31249 & 31250

CLIENT: AECOM

PROJECT: New Haven Harbor FNP 2018

ASSAY: *M. nasuta* & *N. virens* 28 day Bioaccumulation Evaluation

Analyst Data Review	Date	Initials	Comments
Chains of Custody Complete	11/16/18	JTP	
Sample Receipt Complete	↓	↓	
Organism Culture Sheet(s)	01/17/19	BG	
Bench Sheets Complete (dates, times, initials, etc...)			
Water Quality Data Complete		↓	
Weights Reported		NA	
Assay Acceptability Review	↓	BG	

Technical Report Review	Date	Initials	Comments
Statistical Analysis Data Entry (chem)	2/1/19	NR	
Survival	12/27/18	NR	
Chemical	2/1/19	NR	
Statistical Analysis Reviewed	2/4/19	LF	
Data Acceptability Review	12/27/18	NR	
Support Documentation			
Temperature Data Logger	1/9/19	NR	
Daily WQ Data	1/10/19	NR	
Overlying and/or Pore Water Chemistry	NA		
Other Chemical Analysis Data	—		Tissue chemistry by Alpha Analytica provided by AECOM 1/30/19
Draft Report	2/14/19	NR	3/8/19 Revised per AECOM comments (NR) 4/10/19 ~~Draft Final~~ w/ supp. PCB eval
Report Reviewed	2/18/19	LF	2/14/19 KC Sec. 2.5+ 3.0 + CENAE checklist (NR) 3/8/19 KC (NR) RVW revisions per AECOM comment
QA Audit/Review Complete			
Report Printed - PDF	2/22/19	NR	3/8/19 (NR) draft final 4/10/19 ~~Draft~~ Final w/ supp. PCB eval
Bioaccumulation EDD	2/13/19	NR	QC 2/12/19 LF (E) NR 4/10/19
Report E-mailed / Faxed	2/22/19	NR	3/8/19 (NR) draft final 4/10/19 ~~Draft~~ Final w/ supp. PCB eval
Report Logged Out	↓	↓	↓

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